NORDIC ID

RF600

BASE STATION INSTALLATION INSTRUCTIONS

Contents

Nordic ID Oy reserves itself the right to change the information mentioned in this guide without prior notification and is not responsible for any damages possibly caused by the information presented in this guide.

Introduction

This guide is related to the installation of RF600 system base stations and related equipment. The work phases and methods mentioned in this guide are recommended procedures when installing RF600 systems.

The installation can be achieved using other models as well, but Nordic ID Oy cannot accept liability for the functioning of these kind of installations.

Nordic ID Oy reserves the right to charge current, updated hourly fees for the repair of erroneous installations or the time used in troubleshooting these installations.

Occupational safety

For the proper execution of the work phases specified in this guide, personnel working on the installation must:

- know and comply with current electrical safety regulations for the parts

- have undertaken training to perform similar types of installations or have participated in a special training programme organised by Nordic ID Oy

- comply with current safety regulations in the workplace for the application.

The installation may involve procedures that endanger the health of the person or persons carrying out the installation work or of others not directly involved in the work. Typically personnel work on ladders or stands, with the risk of falling or of items/tools dropping. This may cause injury and/or damage.

 Installation personnel and the supervisor in charge of the installation and/or the installation company must be covered by statutory insurance and any other insurance against risks, as deemed necessary. If the person in charge of the installation work considers that procedures requiring a hot work card need to be carried out, the supervisor should make sure that the personnel carrying out the work have valid hot work cards.

Nordic ID Oy shall not be liable for any direct or indirect damages arising from carrying out the procedures in these installation instructions.

WARNING!   Current industrial safety regulations must be complied with at all times. Only approved equipment must be used. Check the condition of the work equipment such as ladders and the like before starting installation work. Do notcarry out dangerous work alone in an isolated area. Notify the customer representative of where you are working and make sure that help is available if you need it.

WARNING!   Do not leave small objects or tools anywhere in the reach of children. Do not leave wires or tools anywhere that may be dangerous to bystanders (tripping, dropping , etc.).

N.B.!   All packaging materials, trash and waste should be disposed of as appropriate.. Recyclable materials should be delivered to a recycling point wherever possible.

Picture: The ladders in the picture on the left do not comply with safety regulations in the workplace anywhere in the world. Minimise personal injury by using only suitable ladders and stands. The ladder in the right side picture is a better choice compared to the ladder in the previous picture, but still is not necessarily the best option. With long ladders two people should be present, one to secure the ladder and hand over or take tools and supplies, the other on the ladder.

N.B.!   Whenever necessary, prevent bystanders from entering a dangerous area by segregating the area and placing notices around it alerting personnel to the dangers. Check ladders before use. Before using a passenger hoist, check who is liable for injury and damage and ask for a work instruction..

Preparatory procedures

Scheduling the necessary people

Several experts are usually needed during the installation, particularly in installations that contain a pre-installation review, e.g. a Site Survey, and/or Final System Test and/or System Background Application Training for end users. If these people cannot come to the installation site, the installation work will be unfinished, un-checked or the schedule for the end of work will not be complied with.

Typically, the following persons may need to be called to the installation site:

- representative of the final customer (access rights, keys, safety)

- representative of the background application supplier (passwords, application testing)

- IT manager of the final customer (using workstations, setting switches, access to the electric switch gear cabinet, IP address definition).

If review and installation are done at the same time, the following personnel may also be needed:

- electrician (installation of LAN and electrical plugs).

If the final customer has subcontracted the management and maintenance of the LAN network to a third party or the manager in question is elsewhere (not on site), contact information for this person is needed for any possible explanations over the phone.

Clearly, several people may be needed and getting them all to the installation site requires scheduling. The absence of even one person or manager or difficulties in getting a phone connection may, in the worst case, mean the installation remains unfinished.

The page below lists the vital people, background parties and tasks related to the installation. The list is meant for guidance only. Each installation is unique.

People involved in installations

Person	Anyone else *	Task
Installer of the RF600 system	Systems integrator Service and maintenance Line management Outsourcing service Technical manager for the final customer Nordic ID Oy	The physical installation of the base stations at specified locations and testing the radio system whenever/ wherever possible.
Shop manager Shop responsible	Final customer	Access rights Providing a work space Safety Work equipment (ladder and hoist)
IT support person	Final customer Service and maintenance Line management Outsourcing service	Use of workstation licenses, any programme installations required Setting of power switches
Background application expert	Systems integrator Line management Service and maintenance	Registering the handset onto the background program IP address definition of Viola Systems ESERV-10 equipment and registering onto the background program PING testing the ESERV-10 IP addresses Training
Electrician LAN network installer Telephone fitter	Representative of the final customer Outsourcing service Service and maintenance Local telephone company	230 VAC change work LAN network change work
Network manager	IT support from the final customer Service and maintenance Outsourcing service	Remote programming of the network switches
Trainer	Systems integrator Line management	Trains the representative of the final customer to using the background application

* one or more

Review or Site Survey

Before installation work, make sure that the site in question has undergone a review, i.e. a Site Survey. The review involves measurement of filed radio reception, and in connection with the measurement the definition of installation locations.

The review produces a map into which the RSSI value (Received Signal Strength Indicator value) indicating reception is logged at regular intervals. In addition, ask the customer representative where, on the site, reception is required. To guarantee the satisfaction of the final customer, it is generally recommended to make sure that all back rooms, cellars and bomb shelters have been taken into consideration in the review, even if this task is not strictly part of an installation review.

In some cases the review is made right before the installation by the party doing the installation. The review must always be performed according to a separate "RF600 system – Site Survey Instruction" guide. The Site Survey makes the review simpler and quicker. Additional information is contained in the guide mentioned above.

The information needed from cooperating parties

The system is typically supplied by a systems integrator who at the same time may be the re-seller of the equipment. In certain cases the delivery involves a device manufacturer or several manufacturers (Nordic ID Oy, Viola Systems Oy), re-seller, systems integrator or company providing the background application as well as the customer's Line management.

Typically, at least the following information should be requested beforehand from the parties mentioned above:

General information

- Copies of the blueprints of the installation site
- Instructions for the installation targets for base stations (measured or otherwise verified)

Information relating to RF600 handsets and chargers

- The channel to be used
- The setting value for re-send times
- The setting value for the waiting time
- The password for the settings menu
- The locations where the chargers should be placed

If Viola Systems Oy ESERV-10 converters are used

- IP addresses
- Mask
- Gateway

Other issues to clarify

- At the installation site, make sure that all rooms and storage spaces to be included in reception areas have been reviewed.

The necessary connections

If the review was performed appropriately, the intended base station installation points were fitted with the necessary connections (free electrical plug 230VAC and a free LAN plug, if Viola Systems ESERV-10 devices are used). If this was not done, the installation cannot be carried out correctly.

In this case, installation must be delayed until all the necessary procedures have been carried out.

Reserving a work area

Next you must segregate a suitable area that you can lock, preferably protected from bystanders, for preparatory procedures. Typically the representative of the final customer (shop manager) gives the fitter a so-called back room, which is separate from the shop or storage facilities.

The work area should include enough table space and a few 230VAC mains connections.

Picture: The work area is typically located in the so-called back room.

The picture on the left shows a typical situation. A laptop (equipped with Piccopla program) and the necessary voltage sources are ready. These are needed, for example, to change the base station channels and test the equipment before actual installation. Tools, assembly supplies and note-taking equipment as well as a mobile phone are also needed.

The picture on the right shows an important work phase to be done before the installation: checking the delivered supplies and equipment. The devices and supplies delivered to the installation site should be checked in connection to type, model and functioning before moving on to the actual installation work.

Possible installation options

The RF600 system can be installed in several ways. A simple method suitable in particular for small targets is to install the base stations directly in the workstations. In more complex cases (large reception area, remote control needed) the base stations are connected to the background system with special RS-232/TCP-IP converters, in turn connected to the existing LAN network. Both methods involve certain considerations. These are explained in more detail in the following sections.

Connecting the base stations directly to workstations

The RF600 base station can be connected directly to a workstation that includes a free male 9-pin D connector equipped with a RS-232 connector. The base station is connected to the workstation usually with the grey 5m long connection cable provided. In addition, the base station voltage source is connected to the base station.

If the connection distance is over 5 meters, a separate extension cable is required. It can also be connected with a special connector. When using this method, the largest connection distance allowed is about 30-50 meters. The extension cable set includes a special connector that enables connecting the voltage source to the extension cable at the workstation. In this case you don't have to wire up the 230V cables, for example, to the ceiling on the shop side.

N.B.! The back room is usually not the optimal installation location for a base station. The base station should generally be installed in a central place in the reception area. When necessary, use an RS-232 extension cable or a separate RS-232 amplifier.

Picture: Standard connection cable for RF600 base stations.

Picture: The extension cable set for the RF600 base station includes a connector for extensions as well as a separate piece equipped with a voltage source connector. This piece is installed on the workstation end of the cable.

Picture: The extension cable set for the RF600 base station includes a connector for extensions (picture on the left) as well as a separate piece equipped with a voltage source connector, which is installed on the workstation end of the cable (picture on the right).

Please note that a direct workstation connection usually requires the installation of a special PLClient application on the workstation. The program is available free of charge on the Nordic ID Oy website. The system supplier is mainly responsible for installing and testing the software. The installation of programs onto workstations or the server usually requires access rights.

Picture: Voltage source (7.5VDC) for RF600 base station.
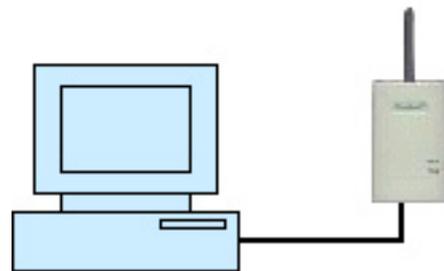
Picture: The simplest possible RF600 system is based on connecting the base station directly to the workstation containing the application.

Connecting the base stations with the ESERV-10 converters

You should use RS-232/TCP-IP converters if the system reception area is large, there are many workstations or you do not want to utilise them in the installation and particularly if you want a remote control possibility, for example, from the shop chain IT department using a Telnet connection. The prerequisite for using the converters is that the installation site has a LAN network. The customer or systems integrator is the main responsible for the LAN network installations and functioning.

The RF600 base stations can be connected to the LAN network using a suitable converter. Nordic ID Oy recommends and supports the ESERV-10 converter by Viola Systems. The converters of other manufacturers may also be used, if compatible.

The base station is connected to the ESERV-10 converter with a black 2-meter long connection cable supplied with the converter. The cable connects the base station voltage source input voltage (7.5VDC) to the converter, so the converter does not require a separate voltage source. Connect a network cable to the LAN connector of the converter. Install the other end of the cable to a free or specified network connection point. The port settings of any possible switches should be adjusted to position 10/Half for those ports to which the ESERV-10 converters are connected.
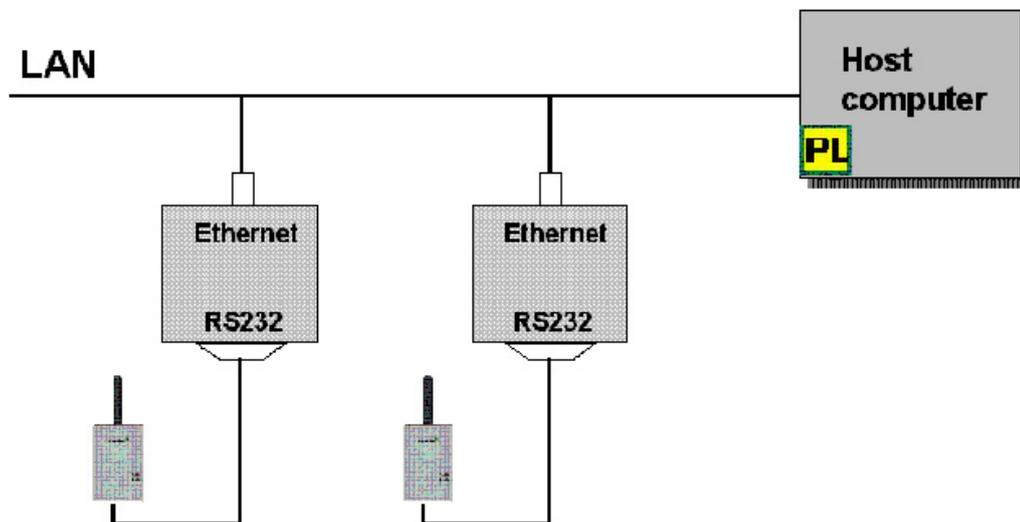
Picture: RF600 base stations can be connected to the server with RS-232/TCP-IP converters. The converters are connected to the LAN network. Typically a PLServer application is installed on the server. The functions of the PLServer application are also included sometimes inside the customer application.

Connecting the base stations with the help of workstations connected to the LAN network

RF600 base stations can be connected to a background system by utilising the workstations connected to the LAN network. In this case, the serial traffic is converted to TCP/IP traffic with the help of a separate PLClient application, and the traffic is transferred to a server, where the PLServer application relays the traffic forward to a background program. The PLServer application is responsible, for example, for routing the background system answer messages to the base station closest to the handset.
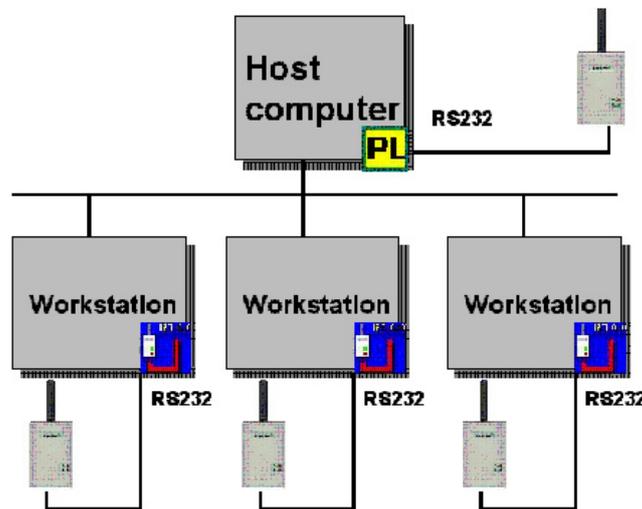
Picture: RF600 base stations can be connected to the server by utilising the workstations, the LAN network cards in the workstations and the LAN network. In this case, you typically install the PLClient application to each workstation and the PLServer application to the server.

Pre-installation testing of equipment and cables

The equipment to be installed at the installation site are either brought by the fitter or have been delivered to the installation site beforehand. You should open the delivery packages and make sure that the necessary equipment and their supplies are ready to be installed.

In addition, it is recommended to turn on the power for all the equipment and to check all connection cables individually before installation. Similarly, connect the Viola Systems ESERV-10 devices individually to a free network connection and check the settings at least for the IP address by utilising the workstation of the final customer and the PING command.

This saves time and effort by preventing the installation of malfunctioning equipment, which then has to be replaced.

If the handsets have been delivered to the installation site, unpack them and fit the batteries. The serial numbers of the handsets should be recorded in the final documentation. When necessary, the channel of

the handsets must be changed, as well as the number of send times and the waiting time per send time. Unless otherwise specified by the background application expert, use the default values until you can test the installation. At this point you can define new default values together with the background system expert, and these values can finally be programmed for each handset.

The settings are protected by activating the password protecting the menu. The password is defined by the background system expert or the representative of the final customer. The password should be recorded for final documentation. More information on changing the settings can be found in "RF600-käsipäätteen käyttöoppaassa".

Checking the base station channel

RF600 base stations supplied by Nordic ID are ready for use, but since channel no. 3 is used as the default channel, in most cases the channels of all base stations connected to the system should be changed (the available channels are 1-7, and the capacity of channel 7 is a little smaller than other channels).

Usually the channel is defined by the Line management of the final customer or the systems integrator who is responsible for delivering the entire system. The fitter should ascertain whether a corresponding RF600 system is in use next-door to the installation site. If there are other Piccolink RF600 users next door, make sure that the systems channels are not the same. Greatest reliability is obtained by setting the channels close to each other but skipping one out (1-3-5 or 2-4-6).

The channel of base stations can be changed by connecting the base station with the grey 5-meter long RS-232 cable provided to the free RS-232 connector in the PC. The Piccopla program should be installed in the computer. You can change the channel from the program menus.

N.B.! The base stations and handsets to be connected to the system should have identical channel settings.

Checking the channel of the handsets

RF600 handsets supplied by Nordic ID are ready for use, but since channel no. 3 is used as the default channel, in the majority of cases there will be a need to change the channels of all handsets connected to the system (the available channels are 1-7, and the capacity of channel 7 is a little smaller than other channels).

Usually the channel is defined by the Line management of the final customer or systems integrator who is responsible for delivering the entire system. The fitter should ascertain whether a corresponding RF600 system is in use next-door to the installation site. If there are other Piccolink RF600 users next door, make sure that the system channels are not the same. Greatest reliability is obtained by setting the channels of systems close to each other but skipping one out (1-3-5 or 2-4-6).

The channel of the handsets can be changed by connecting the handset with the grey 5-meter long RS-232 cable provided to the free RS-232 connector in the PC. The Piccopla program should be installed in the computer. You can change the channel from the program menus. The settings of the handsets can

be changed via the settings menu in the terminal. More instructions can be found in the guide "RF600-käsipäätteen käyttöopas" and "RF600-tukiasemien ja käsipäätteiden asetuksien muuttaminen Piccopla-ohjelman avulla".

N.B.! The base stations and handsets to be connected to the system should have identical channel settings.

Settings for the Viola Systems ESERV-10

Nordic ID and Viola Systems have translated a special FW program version (2.1.6 NORDIC ID) containing the correct setting values for the use of the RF600 system. The default settings of the background system may need to be changed. A typical example is the need to change the setting value defining the traffic method from a TCP to a UDP value.

In connection with the installation, it is usually necessary to define at least an IP address, mask and gateway and the application IP address and port where the ESERV-10 contacts. Customer IT support personnel should provide the necessary information together with the Line management and/or background application supplier representative.

The ESERv-10 device is programmed by connecting the so-called null modem cable device directly to the RS-232 port of the PC (HyperTerminal method), by connecting the so-called cross-connection cable device directly to the network card connector of the PC (Telnet method) or by connecting the device with a normal network cable to the LAN network plug at the installation site (Telnet method).

Additional instructions can be found in the guide "Viola Systems ESERV-10 User Handbook", "Viola Systems ESERV-10 Getting Started Handbook" and in the document "RF600 system – Viola Systems ESERV-10 – Settings of the HyperTerminal program".

Default values are listed in the Appendix to this guide "Viola Systems ESERV-10 default settings".

Pre-installation test

When base stations, handsets and Viola ESERV-10 devices have been checked and the default settings changed as necessary, a pre-installation test should be carried out. The purpose of the pre-installation test is to make sure that all equipment to be installed is operational before doing any actual installation work.

The pre-installation test can be carried out earlier by utilising the background application as soon as it is functional. In this case the base station and the connected ESERV-10 are connected to a free/suitable LAN network connector with a network cable. When the ESERV-120 has connected to the network and the background application has recognised it (the IP address of the ESERV-10 normally needs to be logged into the background system beforehand), a log-in window should appear in the handset display when any F key is pressed (the CommID of the handset generally needs to be logged into the background system beforehand). If the supplier of the background system has provided a user name and password, you can also test by using the application.

Another way to do the pre-installation test is to utilise the RF600 test program (or RF600 demo programs) installed on a PC (test laptop). Each base station is connected to the voltage source and to the PC with the RS-232 cable, after which you the functioning of all the equipment can be verified with the help of the handset and the test program. The handsets, base stations and voltage sources are gone through one by one. At the same time base stations can be labelled, if this has not yet been done.

Viola Systems ESERV-10 devices are tested in the following way. First connect a 2-meter Viola Ethernet cable between the ESERV-10 device and the base station. Then connect a voltage source (7.5VDC) to the

base station. A green LED should come on in the base station and in the ESERV-10. If possible, the ESERV-10 should be connected to the LAN network of the installation site, after which a PING test can be carried out by using a programmed IP address (which requires the use of a network host or a background system or the presence of Line management personnel).

N.B.! In normal use ESERV-10 device DIP switches should be in the "OFF" position (lowest position).

Logging serial numbers

At the same time, write down the serial numbers of the base stations and corresponding devices that have serial numbers. As the installation progresses, clearly mark the installation locations on the map as well as the serial numbers of the devices installed in the locations.

Picture: Write down the serial numbers of the handsets, install batteries in the handsets and, if necessary, change the settings according to the requirements of the installation location. The settings menu can be protected with a password. Finally place the handsets in the charger, so that you can check the charging function and charge the handsets fully for any possible training.

Equipment, tools and supplies

A typical installation requires the following supplies, tools and devices:

Background information and guides

At least the following background information and guides are needed in the installation:

- RF600 base station installation instruction (this handbook)

- RF600 handset user guide

- the map describing the reception area, drawn in connection with the review

- the devices, cables, voltage sources and supplies ordered for the installation
- contact information of the contact persons and responsible parties (see section "Scheduling the necessary people")
- passwords and access rights for testing the customer background system.

Tools

In the installation, you need at least the following tools:

- scissors

- side cutting pliers

- cleaning rags (3M VHB Surface Cleaner Sachets)

- a ladder or a hoist (a model complying with safety regulations in the workplace).

Fixing and marking supplies

At least the following fixing and marking supplies are needed in the installation:

- cable ties (different sizes, back and white)
- Velcro type sticker tape (3M Scotchmate™ SJ 352 D)
- installation stands for the base stations

- DYMO type marking device for labelling the base stations and installation locations or stickers printed beforehand.

Testing and programming equipment

At least the following testing and programming equipment are needed in the installation:

- laptop with the Piccopla program installed and with 1 RS-232 connector free or alternatively access to the final customer workstation and the right to use it; the workstation should have the Piccopla program or it should be possible to install the program.

- Piccopla program in a USB memory stick or on a CD-ROM

- charged AA size batteries (2 pcs NiMH 1600 mAh) or 2 pcs of AA size 1.5V batteries

- 1 base station connection cable (5m long gray RS-232 cable)

- 1 Viola Ethernet cable (2m black RS-232/RJ45 cable)

- 1 voltage source for programming the base stations (7.5VDC)

- 1 voltage source with Viola Systems ESERV-10 connector (7.5VDC)

- 1 RS-232 null modem cable

- 1 cross-connection cable (LAN)

- 1 network cable (LAN)

Supplies related to safety

At least the following safety-related supplies are needed in the installation:

- Notices and chains to rope off the dangerous areas

In addition you may need

- Site Survey tool (for the review)

- 1 base station (for testing and possible review)

- 1 handset (for testing and possible review)

Installation procedures

The installation can be started when the pre-installation test has been performed, the base stations and ESERV-10 devices have been marked with stickers and the setting information has been changed if necessary.

The installation locations of the base stations are examined, preferably in a specific order (from the cellar to the top floor or the other way around, one floor at a time). Identification codes (STAT 1, STAT 2, etc.) are used in sequence.

At the installation location itself, first examine how the devices should be installed and estimate the free lengths of the necessary cables. The extra cable lengths are tied up in a suitably tight bundle and then locked with cable ties, and the extra tails are cut off the ties.

Then cut suitably long pieces of the Velcro band and attach them to the base station and the ESERV-10 device in the appropriate places in such a way that the devices can be installed on the intended installation surface (rail, groove, grid, etc.). The lengths of the Velcro straps should be maximised and two Velcro pieces should be used side by side in the case of the ESERV-10.

The aim is to prepare a situation in which you can see the base station and ESERV-10 device signal lights

standing on the floor. Next clean the installation surfaces with suitable equipment and materials, so that the Velcro strap attachment is as fast as possible. A good choice is a special individually packed cleaning rag dampened with cleaning agent. The surfaces must be dried if wet (water, cleaning agents).

Next install the equipment one device at a time, and then attach the cables. The extra cable lengths are bundled up at this stage at the latest and tied together neatly with cable ties, the ends of which are cut off. The cable between the base station and the ESERV-10 device is attached in a suitable way from a few spots to the fixing surface (rail, groove). This prevents devices falling even if the Velcro tape fails.

The labels printed earlier are attached, one on the base station, one on the ESERV-10 and one in the near vicinity of the installation location. The labels should be legible from a standing position.

Finally connect the voltage source to the mains voltage (230VAC) and the weak current plug of the voltage source to the base station connector. The green light in the base station should come on, as well as the green light in the ESERV-10 device. Finally connect the LAN network cable to the ESERV-10 device network connector, at which point the green signal light should start blinking slowly in step. After this the signal light will start to blink irregularly and quite fast. This means that the ESERV-10 device has been fitted to the network.

N.B.! Make sure the appropriate switches have been turned to position 10/Half.

The installation is completed one base station at a time. Mark the base station serial number, ESERV-10 MAC address and their joint identification (STAT 1 or corresponding) on the blueprint. Collect all extra packaging materials and trash and dispose of them appropriately at the waste collection point or for recycling.

Now test the connection between the background application and the RF600 system. This is done by the final customer IT support personnel and/or Line management representative and/or the representative of the background application.

The fitter should be available until the functioning of the installation has been verified.

Finally prepare the documentation and remove the tools and supplies from customer facilities.

Cabling

The cabling of the LAN networks should be subcontracted to knowledgeable installation staff. High-class materials should be used. The use of extension cables and all kinds of "riggings" is not recommended and may cause the guarantee to become invalid before the period expires. If necessary, contact Nordic ID Oy technical support for further information about extension cables.

Network and corresponding connectors

The most common problems relate to the LAN network of the installation site. The network may contain switches with settings that do not correspond to the settings required by the Viola Systems ESERV-10

device (10/Half).

There have also been cases where the installation site contains "ghost switches" installed later that are unknown to the customer's IT maintenance staff. In these cases, troubleshooting is practically impossible, unless the installation site includes both the final customer's IT manager and the IT maintenance representative.

Picture: The functioning of the installation site switches needs to be clearly defined. The installation cannot progress unless the customer's network manager or IT representative is present.

Testability and serviceability

A few essential matters need to be taken into consideration to simplify maintenance. Base stations and Viola Systems ESERV-10 devices should be installed in such a way that their signal lights are visible from a standing position. They should be fitted so they can be removed easily and quickly. The labels attached to the devices should be legible from a standing position.

The use of a Velcro type sticker tape for mounting the device casings is recommended, but the installations should be secured. This can be done by attaching jumper cables and network and power feed cables appropriately by tying them with cable ties to the mounting rails and light rails. A proper installation enables any individual device (base station, ESERV-10, voltage source) to be replaced easily and quickly without touching the other devices.

Naming and marking the base stations

To simplify systems servicing, maintenance and help desk type services, each base station should be labelled with a clear name (STAT 1, STAT 2, etc.). The markings should be made with a large enough DYMO

type sticker. The stickers are attached to the base station, ESERV-10 device and next to the base station, for example, in a light rail or other corresponding point that is clearly visible from a standing position.

The aim is that a person standing on the floor monitoring the signal lights of the devices can read the identification without a ladder and in cases of malfunctioning can telephone service personnel or the IT support for the base station identification. The identifications should be written onto the installation map.
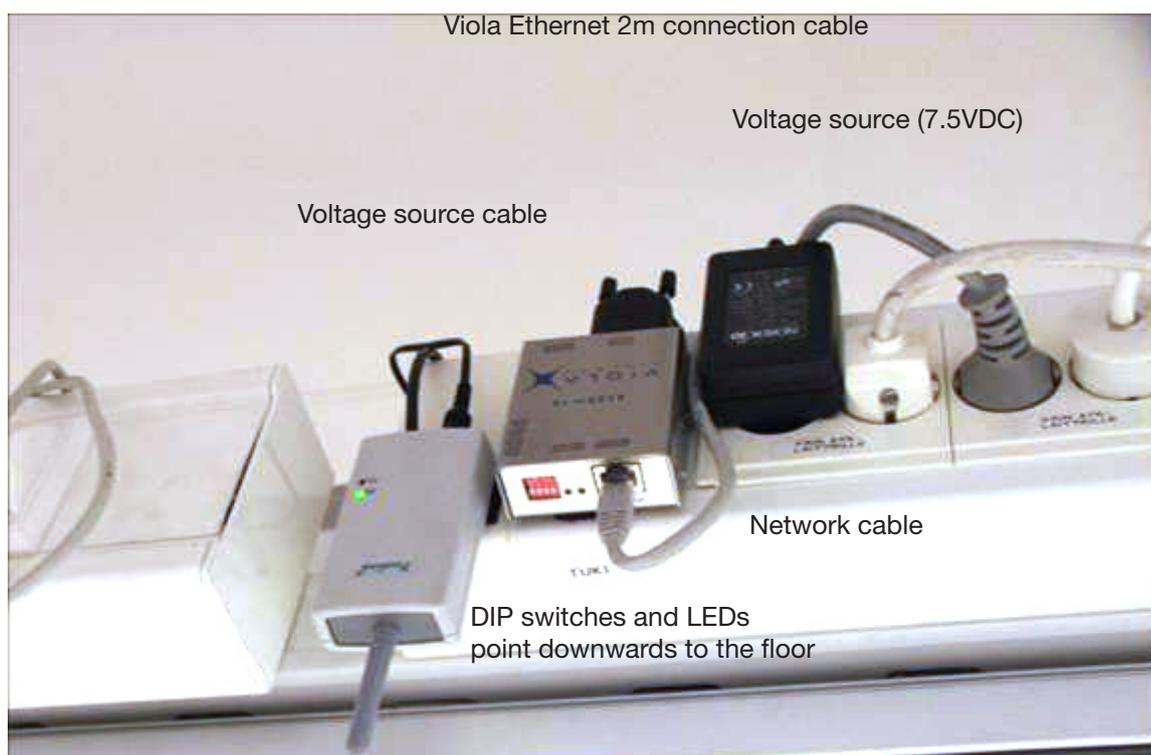
Installation examples

Picture: Installations should be carried out neatly and with care. Often the base stations are located in customer facilities, so untidy installations impact negatively on the customer image, the professional skill of the fitter, the quality of the system supplier and on the Nordic ID Oy products.

In the left-hand picture at the top, the arrow is pointing to a label attached to the base station. The sticker tape (Velcro type) is cut in such a way that the sticking surface is as large as possible. Near the ceiling, the mounting rails are very dusty and the mounting point should be cleaned with a dampened rag or by using a suitable cleaning agent (spray bottle) and rag. The mounting point should be dried before fitting the device. Devices are preventing from falling even if the sticker tapes fails by joining the cables together and securing them to the rail with cable ties. This also allows parts to be replaced quickly and easily.

The arrow at the upper right points to the label attached to the mounting rail.

On the lower left, the arrow points to a properly secured LAN network cable, originally too long and therefore bundled up and secured with a cable tie. The extra ends of the cable ties have been cut off.

On the lower right the arrow points to a base station installed in storage where roller cages are handled. The installation height of the base station must be checked and the base station should not be hit by the roller cage. The ceiling has been partly lowered in the installation site, but the base station should still be installed as low as possible due to reception.

Viola Ethernet 2m connection cable

Voltage source (7.5VDC)

Voltage source cable

Network cable

DIP switches and LEDs
point downwards to the floor

Base station antenna should be placed
below the lower level of the mounting rail

Base station LEDs
readable when standing on the floor

Picture: Details of the installation.

Picture: Installation location conditions affect the assembly method.

The picture on the left shows a typical ceiling grid. The base station should be placed hanging from the connection wire in such a way that the base station antenna tip is about 25-30cm below the grid level. Particularly in relation to metallic grids, the distance should be sufficient to avoid interference. In the picture, the Viola Systems ESERV-10 has been mounted with a cable tie. Better is sticky tape such as Velcro.

The picture on the right shows how the sticky tape has been attached to the lowest part of the base station, so the base station can hang as far as possible from the bottom edge of the rail.

Picture: The wall installation support enables installations on wall surfaces.

Final testing of the installation

The extensive final installation testing of the RF600 system includes connection tests for the radio terminal devices, network tests of any Viola Systems ESERV-10 devices (with the PING command) and testing between the background system and the RF600 system (the background is tested with handsets). On installation day, all the required personnel should be available.

Picture: The installation of the RF600 system has not been completed until connection and application tests have been carried out. In the picture on the left the serial numbers of the hhandsets are logged into the background and application testing and training is being prepared. In the picture on the right PING testing is being carried out on the Viola Systems ESERV-10 devices installed. This test enables network traffic to be verified.

Basic testing of the radio system installation

The functioning of the radio system can be tested either with the help of the background application or in such a way that the base stations are put into Site Survey mode one at a time (in this case other base stations should be shut down). The test should be carried out in such a way that the background system is utilised, because this also provides information on the response time (it may be necessary to change the waiting time and/or send time setting value of handsets). Generally, the background system cannot be used unless you have obtained a suitable user name and password. In addition, the handset serial number (CommID) should be registered in the background program. The Site Survey method involves much more work and is usually not possible within specified schedules.

If the background system does not respond, the handset and base stations may have been set to function on different channels or the connection between the base station and the workstation or the Viola Systems ESERV-10 device may be broken (cable malfunction or device malfunction). It is also possible that the Viola Systems ESERV-10 device has the wrong settings and/or its IP address and/or port to be used by the application have not been registered in the background system.

Other possible faults are switch settings, connection problems with the background system server and the absence of the handset CommID from the definition file of the background system. Troubleshooting generally requires cooperation between the personnel specified at the beginning of this guide.

If a malfunction is suspected in the Viola Systems ESERV-10 device, the devices can be tested via the customers workstation or with the help of a laptop connected to the customer LAN network. The ESERV-10 device responding to the PING command usually functions correctly, so if the connection cable between the ESERV-10 and the RF600 base station is ok and if the base station radio terminal is functioning normally, the fault is in the background system or in its settings.

Picture: The final installation test of radio system reception can be carried out easiest by utilising the background system. First log into the background system. This is generally done by inputting the user name and password with the handset. Next walk through the edges of the reception area and read the bar codes of products for example by using inventory or the product query application. The reading should be done in difficult places with your back to the base station. If the background system responds sufficiently fast and no messages are lost, the installation is ready for the radio system part.

Malfunctions related to background systems

Malfunctions related to background systems are not common, but do occur.. For the fitter, the problem is usually that there is no previous information on the background system. For background systems usually the CommIDs must be defined for the handsets so they can be used in the system. The serial numbers of the base stations do not need to be registered into the background system. If the system uses Viola Systems ESERV-10 devices or corresponding converters made by another manufacturer, you should usually register or define the IP address of each device in the background system, as well as the application port number for the ESERV-10 device. Correspondingly you should define the ESERV-10 devices in the background system IP address and the port number which the RF600 system should contact. The switches in between should be set to position 10/Half.

There are differences between background systems, so the default settings in the FW program of the ESERV-10 device should be checked and changed to correspond to the requirements of the background system. This is usually a task for the systems integrator. During installation contact information about the systems integrator should be on hand at all times.

Troubleshooting routing malfunctions

If a background application related to the RF600 system is not utilising the PLServer application or if an old version of the program is being used, the functioning of the system installed may be defective. A fast way to check the routing function is to stand near the base station or under it in such a way that you can see the base station LEDs. Now, when you use the handset, the background application should respond to the handset in question through the base station. In this case the signal light on the base station (red TX-LED) blinks a few times. If necessary, carefully unscrew the handset antenna by turning it counter-clockwise and repeat the test. If the red LED doesn't blink, there is most likely something wrong in the background application routing, or the network or other connection from the base station in question to the ESERV-10 converter or forward of the network through the switches to the server. Faults can be caused by defective or badly connected cables, damaged units, defective network cables, incorrect settings in the units or network switches or routers or inadequate initialisation information in the application on the server (handset CommID has not been registered, the IP address or port of the ESERV-10 has not been defined, etc.). Troubleshooting can take a lot of time and generally requires close cooperation between several parties.

Picture: RF600 base station LEDs.

Customer training

Customer training is an important part of systems implementation. Usually the system installer is not responsible for training the final customer, but training is often scheduled to start immediately after the installation has been completed, which adds pressure to performing the installation successfully within the specified schedule. Therefore pre-planning, sufficient backup equipment and device-specific training are all essential factors for a successful outcome.

Picture: The training of the final customer is usually scheduled to take place right after the installation. Therefore it is important to comply with the original installation schedule. A responsible fitter stays on site at least at the beginning of the training period to solve any possible problems and answer questions.

Final documentation

The aim of the final documentation is to gather together all the essential information on the installed system into one binder. The final documentation is needed in connection with future installation changes, troubleshooting of malfunctions in the system and to support help desk type functions.

The following information should be included in the final documentation:

- updated map of the installation site

- list of the base station serial numbers

- list of the handset serial numbers

- setting values of the handsets

- the password for the settings menu of the handsets

- a list of IP addresses, MAC addresses and the given base station specific names.

The base station installation locations, serial numbers, IP addresses and Viola Systems ESERV-10 device MAC address (on the sticker on the outer side of the casing) and the base station nickname (STAT 1, STAT2, etc.) should be marked on the installation site map. In addition, you should draft a separate base station serial number list to which the corresponding information is added. The serial numbers of the handsets should also be recorded. In connection with this, write down the FW version of the handsets (instructions on checking the FW version are in the guide "RF600-käsipäätteen käyttöopas"). If the setting values of the handsets are changed from the default values, the changed values should be recorded, as well as the password for the setting menu, if used.

Wherever possible, you should keep copies of the final documentation. One copy should be held by the representative of the final customer on the installation site, one copy delivered to the systems integrator and/or background system representative and one copy, if possible, delivered to Nordic ID Oy Technical Support. One copy should be held by the installer.

The final documentation should specify the installer and installing company names and contact information.

Appendices

Special environments

Even though installations are always unique, there are some similarities. Department store environments are often similar and so are gas station environments.

Department stores

Department stores are challenging installation environments mainly because of the separate back rooms, storage facilities and the cellar facilities generally used as goods-in facilities. In most cases, the installation height requires the use of ladders. Problems are caused by the LAN plug placement, switch cabinets, switch settings and the fact that usually installation can be carried out only during opening hours, in which case customer safety needs to be taken into consideration. The installation area should be segregated and notices placed around it. Customers and particularly small children should not be allowed to enter an area where tools may drop from a height. Often a special pass (RFID key or similar) is required for unescorted access to backrooms and the like.
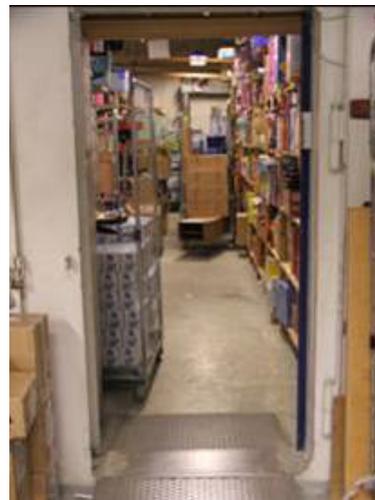
Picture: Department store environments are often confusing and something of a maze in their layouts. Department store cellars usually include large bomb shelters used as storage facilities. The Site Survey can be carried out with the door open, which is usually enough to ensure that reception also covers the inside of the bomb shelter. In this case, the Site Survey results documentation should specify that reception measurements were made "WITH THE DOOR OPEN". Usually installations have to be carried out during the opening hours of the department store. The picture on the right shows ladders, notices and segregating chains ready to ensure the safety of customers, even though the installation work has yet to begin.

In department stores the ceilings are usually of the intermediate ceiling type (grid or similar). Sometimes the opening of the grid is so small that accessing the plugs (LAN and 230VAC) located in the space above it can be difficult. The grids are usually dusty, so before attaching any sticker-surfaced materials or identification labels, clean the installation surface with suitable methods.

Gas stations

Nowadays gas stations resemble each other very much regardless of the oil company.. Normally the gas station has a shopping area, and there is a line of coolers on the back wall. The doors of the coolers are made of glass. The walls and back door of the cooler space are thick and insulated, creating massive barriers to radio signals, and this should be taken into consideration when placing the base stations. The backroom of the gas station includes a workstation to which you usually want to directly connect the base station. In addition, you usually want the handsets to function outside as well, at least in connection with inventorying the different kinds of liquid products in front of the shop. In the summertime there may be more products outside (grill products, summer furniture, etc.). You should be particularly careful with the oil room. Usually the oil room is located at the side of the building or behind it and has its own front door. Since the space is fire protected, the walls are naturally also thicker. Usually the base station has to cover the functioning of the oil room.

Large gas stations these days also contain even a sizeable restaurant space, where the cash desk sells tobacco products and magazines, so the handset should also work on the restaurant side. The kitchen of the restaurant includes several storage spaces, some of which are cold spaces. Usually it is difficult or impossible to provide coverage in freezer rooms. One solution is to ask the customer to use a bar code system in such a way that the freezer room door is open. Another option is to move the things out of the freezer room for a while.

Even in small gas stations you should not settle for a base station installed next to the workstation in the backroom. Creating sufficient coverage for the entire shop space and the gas station building almost always requires the base station to be in a central location in the shop, also providing "visual contact" from the base station to the glass doors of the coolers.

In this case you generally need an RS-232 type extension cable (direct RS-232 cable, 9-pin D connectors, female at one end, male at the other). In tests, the connection of the RS-232 may be via a cable of dozens of meters, where a desktop is used. If the base station is a laptop, the connection length is essentially smaller due to differences in the computer RS-232 connection driver circuit.

Picture: In front of the gas station, often there are products outside the customer wants to inventory without having to carry the products separately into the shop. Coverage should extend a little outside the shop, at least in the front of the building. In the shop space, the base station should be placed in such a way that there is "visual connection" from the base station to the cooler glass doors. This ensures that there is coverage for the rear parts of coolers.

Picture: Behind or at the side of gas stations there is generally a door to the oil room. The room is fire-protected, so field coverage in this space should be checked carefully. This gas station has a cellar, but the customer forgot about it at the review. Products in the cellar need to be inventoried, so coverage should include the cellar.

Picture: Typical "incorrect" installation. The base station is attached to the wall, in addition to which on the other side in the near vicinity there is a metal-surfaced one-way mirror and the shop space on the other side of the mirror. The shop space includes a metal-background shelf construction installed later. Coverage in the shop is poor with this type of installation. The base station should generally be installed in the shop space in a central location and to the ceiling.

If the shop contains a LAN network, Viola Systems ESERV-10 devices can be used.

If more than one base station is clearly needed in the shop, there must be a corresponding amount of workstations or an ESERV-10 based solution must be used.

Warehouses

Warehouses usually have a very high ceiling, and the rafters are also fairly deep (several meters below the ceiling itself). Ladders cannot be used, so a hoist is required. Hoisting with forklifts is generally not allowed by safety regulations. The equipment is almost always ordered specifically from a supplier not involved in the installation work. Be sure to book the hoist in time.

Metallic shelves and other structures restrict coverage. In addition, warehouses containing, for example, liquid substances, such as alcohol, effectively suppress the 433MHz frequency. The Site Survey should be carried out carefully when the warehouse is fully fitted and close to maximum storage capacity.

In the case of concrete rafters, when base stations are installed in the ceiling, they should be installed low enough and in such a way that the base station antenna is at least 30cm below the lower level of the rafter. If handsets are used only at floor level, installing the base stations on the walls may be a better solution than on the ceiling. If the warehouse uses forklift trucks with protective cages (and protective roof), the signal of a base station located too high can be disrupted by the metallic protective grid, causing disturbances. When a base station is installed on the wall at a height of about 2 m., there is a "visual contact" with the handset inside the forklift, but if the base station is installed on the ceiling, the metallic protective ceiling of the forklift between the handset and the base station causes a disturbance. In the worst case, radio traffic is prevented.

Notify the customer that when it comes to handsets installed in forklifts, in certain cases (when the forklift is moving with great speed) disturbances may occur. Generally drivers use the handset while the forklift is stationary, so in practice the problem hardly ever occurs.

For forklift use, recommend to the customer the use of a special handset stand to prevent the handsets from falling.

Picture: The stand for the RF600 and terminal, installed by forklift.

Example of a map drawing

The map below is an example of how base stations should be marked in the blueprints of the installation site. The markings should be clearly legible and capable of being copied. If possible, the map drawings should be requested in electrical format and the markings should be made with a suitable drawing program in addition to hard copies.
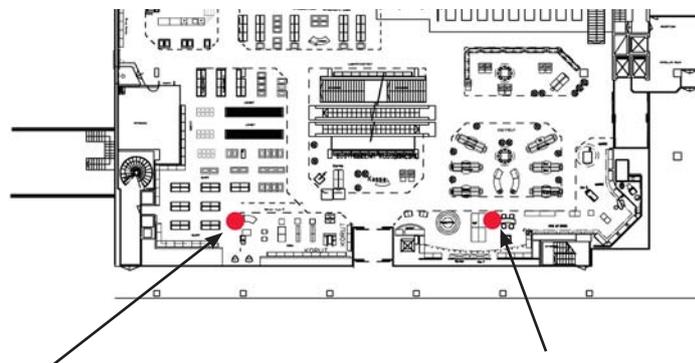
TUKI 1
IP 123.123.123.123
MAC 00:06:70:00:0E:21

TUKI 2
IP 123.123.123.124
MAC 00:06:70:00:0E:22

KOHDE: Asennuskohde X
PVM: 13.12.2004
ASENT: HS
YRITYS: Nordic ID Oy

Other related documents

RF600 system – Base station installation instruction

ESERV-10 Getting Started Handbook

ESERV-10 User's Manual

RF600 system – Site Survey instruction

Default settings for the ESERV-10 FW program

The following default settings are valid for Viola Systems ESERV-10 FW version 1.0 Nordic ID.

NORDIC ID

RF600 SYSTEM - VIOLA ESERV-10 SETTINGS (FIRMWARE)

N.B.! The settings are related to version 1.0.0 Nordic ID

Viola Systems ESERV-10 configuration mode
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1)	Serial settings
2)	Network settings
3)	Transmit algorithm
4)	Terminal communication mode
5)	E-mail settings
6)	AT commands settings
7)	Security
8)	Address book
D)	Default settings
A)	About (system)

S)	Save settings
Q)	Quit without save
E)	Save & Exit
H)	Help
C)	Back

Serial settings

1)	Speed (bps)	19200
2)	Data bits	8
3)	Stop bits	1
4)	Parity	N
5)	Flow control	N
6)	RS-485 Duplex	FULL DPLX

Network settings

1)	IP address	[depends on your network]	
2)	Network mask	255.255.255.0	[usually this one]
3)	Default gateway	[depends on your network]	
4)	Type of service (TOS)	0	
5)	Enable BOOTP	OFF	
6)	Store parameters from BOOTP permanently	OFF	
7)	Enable DHCP	OFF	
8)	Store parameters from DHCP permanently	OFF	
9)	Enable WEB server	OFF	
A)	Enable TFTP server (WEB page upload)	OFF	
B)	DNS address	0.0.0.0	
D)	MAC/Ethernet address	00:06:70:00:0E:DB	[device specific]

Transmit settings

1)	Transmit trigger algorithm	DELAY
2)	Trigger delay (msecs)	5
3)	Trigger amount (bytes)	20
4)	Delimiter character (hex)	0D

Terminal communication mode settings

1)	Monitor connection	ON	
2)	Monitor TCP port	8003	
3)	Communication method	03	[application specific]
4)	RTS used to indicate connection	OFF	
5)	Use UDP checksum for terminal data	ON	

6)	Terminal communication socket type	TCP
7)	Terminal default local TCP/UDP port (Automode)	7001
8)	Terminal default remote TCP/UDP server port (Automode)	[application specific]
9)	Terminal default remote IP address (Automode)	[application specific]
A)	Terminal default remote host name (Automode)	[empty field]
B)	Use DNS for Autosocket client	OFF
D)	TCP connection hangtime (secs)	120
E)	Empty serial buffer on connection	ON
F)	TCP Keep alive option	ON
G)	Connect automatically in client mode	ON

* [application port on the server is 501 if this is the test application]

E-mail settings

1)	Incoming (POP3) server	0.0.0.0
2)	Outgoing (MAIL) server	0.0.0.0
3)	My E-mail address	[empty field]
4)	User name	[empty field]
5)	Password	[empty field]
6)	Mail check interval (secs, 0=never)	0
7)	Subject to outgoing mail	Mail from ESERV
8)	Max. incoming E-mail len (0=no limit)	0
9)	Send E-mail sender addr & subj. to RS?	OFF
A)	Default recipient E-mail address	[empty field]
B)	Action to incoming E-mail in AT mode	INDICATION

AT command settings (applicable only when AT Terminal communication selected)

1)	Indicate ESERV start-up	ON

Security settings

1)	System password (config. & monitor)	[installation site specific information] [2]
2)	Password change by using network	ON
3)	Configuration using Telnet (TCP port 8001)	ON
4)	Viola configurator (UDP port 8001)	ON
5)	Permitted IP network for Terminal connections	0.0.0.0
6)	Netmask for permitted Terminal connections	0.0.0.0
7)	Permitted domain for incoming E-mail	-

System info

Manufacturer:	Viola Systems Ltd.	
Product name:	ESERV-10	
Serial number:	21000200126	**[device specific information]**
HW version:	depends on the version	
SW version:	depends on the version	

[2] System password by default is pass

Contact information

Add here the contact information of the cooperating parties

Nordic ID Oy
Myllyojankatu 2 A
FIN-24100 SALO
FINLAND

Telephone   +358 (0)2 727 7700
Fax   +358 (0)2 727 7720

E-mail   info@nordicid.com

Technical Support

Telephone   +358 (0)2 727 7736
Fax   +358 (0)2 727 7720

E-mail   support@nordicid.com