Installation guide

LCU9016II/LCU9017II
# Contents

## ARX ACCESS
- System overview ................................................................. 5
- About this installation guide .................................................. 6
- The typography of this document ............................................ 6

## ARX LCU9016II
- Introduction ............................................................................. 7
- Included parts .......................................................................... 7
- Hardware .................................................................................. 8
  - Box (casing) ........................................................................... 8
  - Power Supply ......................................................................... 8
  - Network cable (Ethernet) ......................................................... 8
  - CPU board 9016cII ................................................................. 9
  - Communication board 9014LC .............................................. 12
  - Mounting of further communication boards (4014LC) .............. 12
  - Mounting of communication board 9018ES and 4014LC in LCU9017II ................................................................................................................. 13
- Mounting of further communication boards in LCU9017 .............. 13
- Indications on the 9019EM board .............................................. 14
- Other indications on the 9019EM board ..................................... 14
- 9018ES addressing ..................................................................... 15
- 9018ES and ECP30 addressing .................................................. 16
- Mounting of relay board 6416RC ............................................. 17

## ARX ACCESS Server
- Introduction .............................................................................. 18
- Install ARX ACCESS Server ....................................................... 18
  - Program icons ......................................................................... 19
  - Server name ............................................................................ 19
  - ARX ACCESS Server Manager ................................................. 20
  - License handling (ARX ACCESS Server Manager, without licenses or private keys= .................................................. 21
  - Private keys ............................................................................ 21
  - Start the ARX ACCESS Server ................................................. 22
  - Demo version .......................................................................... 23
- Edit settings ............................................................................... 24
  - Database settings .................................................................... 24
  - Control unit settings ............................................................... 24
  - Image settings .......................................................................... 24
  - License settings ....................................................................... 24
  - Event log settings .................................................................... 24
  - Security settings ...................................................................... 24
  - Firmware settings .................................................................... 25
  - Settings for multiple servers ................................................... 25
  - Web settings ............................................................................ 25
  - Client settings .......................................................................... 25
- Backup ....................................................................................... 26
  - Create a backup (manually) ...................................................... 26
  - Scheduled backup (automatic) .................................................. 26
  - Backup at server start ............................................................. 27
ARX ACCESS Client

Introduction..................................................................................................................31
Install ARX ACCESS Client..........................................................................................31
Start the ARX ACCESS Client......................................................................................31

Configuration

Introduction .....................................................................................................................32
Automatic configuration..............................................................................................33
  Conditions..................................................................................................................33
  Check list....................................................................................................................33
Manual configuration......................................................................................................34
  Terminal software.......................................................................................................34
  Configuration guide ("Setup Wizard").........................................................................34
  Terminal commands...................................................................................................37
  Key handling...............................................................................................................39

Mounting/Installation

General advice ..............................................................................................................40
Environment ..................................................................................................................40
Cabling in the control unit ............................................................................................40

DAC

Introduction .....................................................................................................................41
  Hardware.....................................................................................................................41

Technique

Survey pictures ..............................................................................................................42
Connection sketches ......................................................................................................46
  LCU9016, power supply and DAC.............................................................................46
  Connection of DAC to LCU9016II ............................................................................47
  Connection of ECP30 to LCU9017II .........................................................................48
Upgrade firmware in DAC via LCU9016/LCU9017......................................................49
Different configuration examples ..................................................................................50
  Automatic configuration, small net ..........................................................................50
  Automatic configuration, larger net ...........................................................................51
  Automatic configuration, LCU at local office ............................................................52
  Manual configuration, LCU outside firewall ..............................................................53

Troubleshooting

ARX LCU9016 (control unit)..........................................................................................54
Terms and abbreviations...............................................................................................61
ARX ACCESS

System overview

ARX ACCESS is a client/server based system for administration and surveillance of different security modules.

ARX ACCESS consists of three main components:

- *ARX ACCESS Server*, the server platform
- *ARX ACCESS Client*, the client software
- *ARX LCU*, the control unit

The control units communicate upwards with the ARX ACCESS server software via an Ethernet cable and downwards with the connected door units DAC via a traditional current loop.
Outline diagram with server/client, control units and door units.

About this installation guide

This guide aims towards installers, project engineers and persons with similar work. The reader is expected to have basic knowledge about access systems and data communication in network (TCP/IP protocols and Ethernet).

The installation guide is written to either be used as a complete instruction, or as a reference document to use when needed for information about different parts.

A lot of the texts in the installation guide are written in step-by-step form to clearly describe the work process of the different moments.

In this guide the server platform and the control unit are described in detail while the information about the client software is found in the “ARX ACCESS User guide”.

The typography of this document

Text written in italic style in the text refers to objects on the screen (for example buttons or menu options) or on specific keys.

Text or commands that are to be written literally are in the text shown in the font Courier. This font is also used to symbolise text shown in terminal windows.
Introduction

This section about control unit LCU9016II describes:

- what is delivered together with LCU9016II
- the different parts of the control unit (hardware)

Included parts

The box, which the control unit LCU9016II is delivered in, should contain following:

- 1 lockable aluminium box, containing:
  - 1 CPU board 9016
  - 1 communication board 9014
  - flat cables for connection of the boards
- 2 keys to the box/control unit
- 1 register sheet ("LCU 9016 register sheet")
Hardware

The control unit consists of a lockable aluminium box which as default contains a CPU board and a communication board (also called loop board) for four door units. There is room for three more communication boards in the box. Fully equipped the control unit can serve 16 door units, meaning four doors per communication board.

Box (casing)

Box measurements: 390 x 216 x 94 mm (height x width x deep) and have six cable implementations in its upper and lower edge.

Power Supply

For a safe operation of the installation a stabile source of current with a battery backup should be used for the control unit. For example:

- Power supply 24V 2450PS (article number 512 450 000)
- Transformer PSS60 (article number 511 005 087)
- Transformer ST60S (article number 511 006 087)

Preferably power supply 24V 2450PS since it has backup power (battery backup).

Network cable (Ethernet)

The control unit LCU9016 communicates with the ARX ACCESS server via a traditional network cable of Ethernet type.

Note! Do not use a screened network cable in your ARX ACCESS installation. Use of that kind of cable can lead to an earth fault in the installation.
CPU board 9016cII

The CPU board consists of a micro processor with memory, clock and built-in internal backup. All information to control the system is stored here, including data about cards and schedules.

Outline diagram of CPU board 9016CII with important parts pointed out.

Note! The serial number of the control unit is written on the label on the CPU board by the serial connection.
**DIP switches on the CPU board**

On the CPU board is a line with eight DIP switches, in other words, small power switches that can either be ON or OFF. The different functions controlled by the switches are described in the table below.

<table>
<thead>
<tr>
<th>DIP no.</th>
<th>Function (ON/OFF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><strong>ON:</strong> If the switch is set to ON you can communicate with the control unit via the serial port using a terminal program with the settings 115,200 bps, 8 bits, no parity, one stop bit and no flow regulation. (See also the section Note! It isn’t possible to use any serial cable, the cable to use should be designed for the purpose.)&lt;br&gt;&lt;br&gt;<strong>OFF:</strong> The terminal communication turned off and the serial port can for example be used for connection of a modem. (Normal operation)</td>
</tr>
<tr>
<td>2</td>
<td>Not used, should be in position OFF.</td>
</tr>
<tr>
<td>3</td>
<td><strong>ON:</strong> Installation test of door environment. The Exit button works and the code symbol on the reader is lit. Four optional digit keys or a card of the correct type generates red man and activates the buzzer in the reader.&lt;br&gt;&lt;br&gt;<strong>OFF:</strong> Normal operation.</td>
</tr>
<tr>
<td>4, 5</td>
<td>Not used, should be in position OFF.</td>
</tr>
<tr>
<td>6</td>
<td><strong>ON:</strong> Activates Telnet in the control unit. &lt;br&gt;&lt;br&gt;Note! We recommend that all configuration of the control unit is made with a terminal software via the serial port.&lt;br&gt;&lt;br&gt;<strong>OFF:</strong> Normal operation.</td>
</tr>
<tr>
<td>7</td>
<td><strong>ON:</strong> Fixed IP address for configuration. 192.168.1.250&lt;br&gt;&lt;br&gt;<strong>OFF:</strong> Normal operation.</td>
</tr>
<tr>
<td>8</td>
<td><strong>ON:</strong> Clears the database in LCU9016 at upstart and resets LCU9016 to factory settings. &lt;br&gt;&lt;br&gt;Note! If this is done the LCU9016 will lose all settings and new information must be loaded to the LCU9016.&lt;br&gt;&lt;br&gt;<strong>OFF:</strong> Normal operation.</td>
</tr>
</tbody>
</table>
**LEDs on the CPU board**

There are a number of LEDs on the CPU board, each indicating different status modes. The different LEDs and their positions are described below.

The five LED’s at the serial port (RS-232):

- **Blue [WDOG]**: Flashes slowly (every other second or with 0.5 Hz) during the start-up or shutdown of the system. Flashes fast (approx. 5 times a second or with 5 Hz) when the control unit is operating.

- **Yellow [A]**: Unlit during start-up. Flashes slowly while the control unit tries to create a connection with the ARX server. Lit when the control unit is in contact with the ARX server.

- **Red [B]**: Unlit during start-up. Lit when the control unit have messages to send to the ARX server.

- **Green [C]**: Unlit during start-up. Lit when the control unit is receiving messages from the ARX server.

- **Red [D]**: Normally unlit.

The three LED’s at the Ethernet contact:

- **Green [LINK]**: Lit at link. Unlit when there is no link.

- **Red [100M]**: Lit at 100 Mbit communication. Unlit when there is no 100 Mbit communication.

- **Yellow [ACT]**: Flashes at activity on the Ethernet port. Unlit when there is no activity on the Ethernet port.

The two green LED’s in the upper left part of the board:

- **Green [+3.3V]**: Lit when the voltage (+3.3V) is OK.

- **Green [+13.8V]**: Lit when the voltage (+13.8V) is OK.

When the voltage is turned on for the board all LED’s are lit to show that they are working. After approx. 1 second all LED’s are unlit, except the blue WDOG.
**Communication board 9014LC**

A communication board of the type 9014LC is mounted in the control unit. This communication board (also called loop board) is mounted below the CPU board. Connections to DAC door units are made on this board. Four door units can be connected to the 9014LC board.

The current supply on the communication board goes through “AC/DC-IN” on terminal block 1 (KP1) and are then distributed (internally on the board) to each door terminal block on pin 1 and 2.

The door terminal blocks are marked **DOOR X.1 – DOOR X.4** on the board (KP2 – KP5).

![Outline diagram of communication board 9014LC III](image)

**Mounting of further communication boards (4014LC)**

The control unit can be equipped with three more communication board, of the type 4014LC. Each board makes it possible to connect four more DAC, which means four more doors. Fully equipped the control unit can serve 16 door units, meaning four doors per communication board.

Further communication boards are mounted with the four enclosed screws on the next free board location in the control unit. Fix the corners of the board in the control unit.

The connection to the connection board is made with the adherent flat cable between the right cable contact (10 pins) on the 9014LC board and the related cable contact at the top of the 4014LC board.

The current supply on the communication board goes through “AC/DC-IN” on terminal block 1 (KP1) and are then distributed (internally on the board) to each door terminal block on pin 1 and 2.

The door terminal blocks are marked **DOOR X.1 – DOOR X.4** on the board (KP2 – KP5).

![Outline diagram of communication board 4014LC II](image)
Mounting of communication board 9018ES and 4014LC in LCU9017II

A communication board of the type 9019ES is mounted in control unit LCU9017. This communication board is mounted below the CPU board. Two ECP30 can be connected to the 9019EM board.

The current supply on the communication board goes through “AC/DC-IN” on terminal block 1 (KP1) and are then distributed (internally on the board) to each door terminal block on pin 1 and 2.

The door terminal blocks are marked DOOR X.1 – DOOR X.4 on the board (KP2 – KP5).

A LCU9017 can either handle an elevator reader or a Galaxy connection, not both at the same time.

9019EM

Mounting of further communication boards in LCU9017

The control unit can be equipped with three more communication boards of the type 9018ES or 4014LC or a combination of these boards. Each 9018ES board can handle two entry phones of the type ECP30 and 4014LC makes it possible to connect four more DAC, meaning four doors. Fully equipped a LCU9017 control unit with three 9018ES boards can serve 8 entry phones, meaning two doors for each communication board. But since you can combine entry phone board 9018ES and communication board 4014LC can door and type of door vary.

Further communication boards are mounted with the four enclosed screws on the next free board location in the control unit. Fix the corners of the board in the control unit.

Connection to the 9019EM board is made with the adherent flat cable connections and the 9018ES and/or 4014LC board.

The current supply on the communication board goes through “AC/DC-IN” on terminal block 1 (KP1) and are then distributed (internally on the board) to each door terminal block on pin 1 and 2.

The door terminal blocks are marked DOOR X.1 – DOOR X.4 on the board.

9018ES
Indications on the 9019EM board

There are four operation indications in the upper right corner of the 9019EM board, marked 1, 2, 3 and 4. The LED indications 1 and 2 are used to see which entry phones that are in contact and LED indications 3 and 4 shows that the software of the board are working and is in sync with the CPU board.

LED indications 1 and 2 flashes to indicate which ECP30 you have contact with. LED1 flashes eight times and then makes a pause for 5 seconds. After the pause the first flash from LED1 represents the ECP30 with address 1, the second flash address 2, and so on. At the same time as LED 1 is lit, the green LED2 is lit on the address where there is an ECP30 connected.

Example: If you have three ECP30 connected to the control unit on positions 1 – 3, with the addresses 1, 2 and 3.

Wait until LED1 makes a pause, then count the flashes. On the flashes where LED2 also is lit a ECP30 is connected. In the example above LED2 should be lit together with LED1 on the three first flashes, after the pause.

LED1

LED2
Other indications on the 9019EM board

- **LED** indicates that the elevator reader is connected.
- **LED** indicates RS485 communication with the Galaxy unit.
- **LED** indicates that C+ and C- are connected to ECP30, the LED flicker, indicate communication with ECP.
- **LED** indicates that the elevator reader is connected.

9018ES addressing

The 9018ES boards should be addressed from 1 to 3 depending on the position and desired address to use on the ECP30 entry phones.

The base board in LCU9017, 9019EM, handles the ECP30 entry phone addresses 1 and 2. The first 9018ES additional board with address 1 handles the ECP30 addresses 3 and 4. 9018ES with address 2 handles the ECP30 with the addresses 5 and 6, and finally the 9018ES board with address 3 which handles the ECP30 with the addresses 7 and 8. This means that it is the address on 9018ES that determines which address the ECP30 should have, not the position.
9018ES and ECP30 addressing

Note!
LCU9017 with entry phone ECP30 cannot co-exist with DAC30/DAC20. Ordinary door environments at the same control unit must be equipped with later versions of DAC as DAC430, DAC530 or PCR40II.
Mounting of relay board 6416RC

The control unit can be equipped with a relay board 6416RC which has four relay outputs.

The relay board is mounted in the control unit with the bi-packed screws and spacers at the top of the control unit, outside the 9016LC board.

The connection to the 9014 board are made with the flat cable between the cable contact to the right (10 pins) down on the 9014LC board and corresponding cable contact placed to the right on the relay board (6416RC).
Introduction

The core in ARX ACCESS is the server application ARX ACCESS Server.

For current information about current system demands and capacity for ARX ACCESS, study the inlay delivered together with the installation cd.

Install ARX ACCESS Server

To install the server application, do as follows:

1. Place the installation cd for ARX ACCESS in the cd reader of the computer.
2. Click on the Start button in Windows and select the menu alternative Run. Enter D:\SETUP.EXE in the field Open and click on the OK button.
3. First the dialog box Installer Language is shown, there you select the language for the installation. Select desired language and click on OK to start the installation guide.
4. The first bigger window now showing in the installation guide is an information window. You are here recommended to close all other programs running on your computer.
5. Click on Next to continue with the next step or Cancel to cancel the installation.
6. The following window informs about the licence terms that apply. Read them thoroughly. If you accept terms of the agreement, select I accept to continue.
7. The installation software now shows the components you should install. Select the components you want to install or deselect the ones you don’t want to install. Down in the window you can see how much space the different components will need together on the hard drive.

The different components are:

- **Java JRD** – The installation software will automatically determine if the correct version of Java JRE (Java Runtime Environment) is installed. If not, this alternative will be selected and installed in the next step.

- **ARX ACCESS Documentation** – With this alternative selected the PDF versions of the documentations (installation and user guides among other) will be installed on the computer and shortcuts to the documents will be added to the program menu.

- **ARX ACCESS Server** – The server application for ARX ACCESS.

- **ARX ACCESS** – The client software for ARX ACCESS.

- **ACE** – Drivers for possible ACE encoders.
  
  Note! This alternative only applies for installations with offline doors. In systems where an ACE encoder should be connected it is enough to install these drivers on the computer the ACE encoder will be connected to.

8. Click on **Next** to continue with the next step, **Back** to go back one step or **Cancel** to cancel the installation.

9. The installation software will now suggest a folder for the installation of the server application, for example:

   C:\Program Files\SOLID\ARX SA

   If you want to install the application in another folder you click on the button **Scroll** and select another folder.

10. Click on **Next** to continue with the next step, **Back** to go back one step or **Cancel** to cancel the installation.

11. In the window now showing you can select in which folder in the start menu the program shortcuts should be saved in. You can enter a name of your own to create a new folder.

12. Click on **Install** to start the installation, **Back** to go back one step or **Cancel** to cancel the installation.

13. The installation is now performed and files and information are transferred to your computer. This can take a couple of minutes.

14. When the installation is done a window opens to say so. By clicking **Next** you finish the installation.

15. Finally a window opens to inform that ARX ACCESS now is installed on your computer. Click on **Finish** to end the installation.

### Program icons

With ARX ACCESS installed on the computer, new program icons have been added to the list of programs on your computer: **ARX ACCESS**, **ARX ACCESS Server**, **Uninstall** and **Website**.

![ARX ACCESS program icons](image)

### Server name

In order to later make an automatic configuration of connected control units the server name “arx” must exist in the register of the DNS server. (You find more information about automatic configuration in the section...
Automatic configuration

on page 33.)

If you have named your server computer to “arx”, the name will most often be added automatically to the DNS register with the aid of Windows. (To check or change the computer name in Windows: Start > Control panel > System > Computer name.)

You can also check it yourself by “pinging” the computer name “arx”. You do this in a command window by typing: ping arx.

To open a command window in Windows: Start > Program > Accessories > Command prompt. (You find a more thorough description of the command ping in the section Terminal commands on page 36.)

If you don’t know if the server name “arx” is added in the register of the DNS server or not, we recommend that you contact the network administrator and ask for help.

ARX ACCESS Server Manager

With the tool ARX ACCESS Server Manager you handle all the settings concerning the ARX ACCESS server. Among other you use the ARX ACCESS Server Manager to start and stop the server.

To be able to run ARX ACCESS it takes both licences and private keys to be installed for the ARX ACCESS server. This is made from the tool ARX ACCESS Server Manager.

To start ARX ACCESS Server Manager, do as follows:

16. Click on the Start button in Windows and select the menu option Program and thereafter the program group ARX ACCESS, there you click on the ARX ACCESS Server icon in the program menu.

17. The first time you start ARX ACCESS Server Manager, without licenses or private keys installed, an empty window is shown together with the warning message that no licenses or keys are installed.
License handling (ARX ACCESS Server Manager, without licenses or private keys=)

Each customer will get a set of license documents together with the installation cd for ARX ACCESS. These are demanded to install and run ARX ACCESS.

To install the license on an ARX ACCESS Server, do as follows:
1. In the window ARX ACCESS Server Manager under the heading License information, select the button Add to add a license.
2. In the file manager that opens, step to the folder/unit where the license is stored.
3. Select the current license file (a file ending with .alc) and click on Open in the file manager.
4. In the ARX ACCESS Server Manager window a new line is shown under the heading License information with the selected license.

If you want to add further licenses all you have to do is repeat this procedure for each license.

You can study the details about installed licenses by selecting the current license row and then click on the button Details. A new window is then opened with all accessible license information.

To remove a license you select it and then click on the button Remove.

Private keys

As with the license documents a set of private server keys are delivered together with the installation cd for ARX ACCESS. These are also demanded to install and run ARX ACCESS.

To install these private keys on an ARX ACCESS Server, do as follows:
1. In the window ARX ACCESS Server Manager, under the heading Private keys of the server, select the button Import to import a private key.
2. Click on Open in the window Import the private key of the server.
3. In the file manager that opens, step to the folder/unit where the key is stored.
4. Select the appropriate key (in other words a file with the extension .pfx) and select Open.
5. Enter the Pass phrase delivered with the current key file in the window Import the private key of the server, then click on Next.
6. Now the information about the selected key is shown under the heading Private keys of the server. If the information is correct, click on Finish to end the import.
Start the ARX ACCESS Server

When licenses and private keys are correctly installed you can proceed and start the ARX ACCESS server. This is also made from the tool ARX ACCESS Server Manager.

1. At the top of the main window for ARX ACCESS Server Manager you find the button Start which starts the server.

2. After a few seconds when the server is running the Status information is altered to: “The service ARX ACCESS is running”

ARX ACCESS Server Manager (with licenses and private keys)

With ARX ACCESS server running you can now proceed in the organization of the installation. For example by connecting control units (see the section
ARX ACCESS Server

in this guide) and build up the logical structure of the installation with access areas and authority categories (see “ARX ACCESS User guide”).

The tool ARX ACCESS Server Manager do not have to be running in order for the server to work. Once you have started the server (as described above) you can finish/close the tool ARX ACCESS Server Manager.

**Demo version**

Even if you run a limited demo version of ARX ACCESS you must install private keys and licenses. (You find the demo version on the installation cd for ARX ACCESS.)

The procedure is the same as for a fully functional version of ARX ACCESS.
Edit settings

With the menu option Edit settings under the menu File in ARX ACCESS Server Manager you can set a number of parameters and settings for how the ARX ACCEXX server should work.

The Menu option Edit Settings (File menu)

The settings concern a number of different parts of the configuration of the ARX ACCESS server. The different settings are described below.

Database settings

The settings you can edit are:

- The database driver
- Number of simultaneous connections to the database
- The URL (address) to the database
- Database users
- Database password
- Database type

The location of the database can be altered in the field URL to the database by altering the prefix after the last “:” sign.

Control unit settings

In the field Folder you find a folder for the synchronisation files of the control units. If the folder is missing it is automatically created when the server starts.

Image settings

The field Folder is used to enter the folder on the server where personal images should be saved and the field Maximum size of image files is used to limit the size of the files, entered in kB.

License settings

In the field Folder you enter a folder on the server where the license files are saved.

Event log settings

In the field Folder you enter a folder on the server where the event log is saved. The folder is automatically created when the server is started, if missing. You can also choose to state the number of days that the event log should be saved by the server. The value zero (“0”) equals infinite.

Security settings

Select a folder where the private key for the server and other security information should be saved.
Firmware settings

Here you can enter the **Folder** where the firmware for the control units should be saved on the server, and the **Firmware version file** name.

Settings for multiple servers

The checkbox **Configure multiple servers** makes it possible to run several ARX ACCESS systems on the server. If you select this option you must also enter the fields **ARX server address** and **Firmware update address** which states the IP address the configuration should use, and the server address that will allocate firmware.

Web settings

Enter the current TCP ports for the server. If more than one port, separate them with a comma sign. (Example: "80,8080").

Also select between only allowing secure, encrypted traffic (https) or both secure and unsecure traffic (both http and https).

The alternative **Enable Single Sign-On** is used so that web user that are already logged in (in another portal/application) shouldn’t have to log in again to get access to the web functions in ARX ACCESS.

This Single Sign-On solution demands that the first link (not ARX ACCESS) is configured correctly.

Client settings

In this field the time (in seconds) is set for how long a client can be inactive before the server disconnects. If the server doesn’t get an answer to a ping within the set time the server disconnects and the client must log in again.

The window **Edit ARX Server settings**
Backup

With ARX ACCESS Server Manager you can both create your own security backup, or select to schedule the security backup. The ARX ACCESS Server Manager is also used to reset the system from the backup information.

![ARX ACCESS Server Manager](image)

The backup menu in the window ARX ACCESS Server Manager

Create a backup (manually)

The following steps describe how you manually create a backup with ARX ACCESS Server Manager:

1. In the menu Backup, select the option Create a backup.
2. In the first window showing, select what or which parts you want in your backup by checking one or several of the checkboxes.
3. Click on Next to continue with the next step or Cancel to cancel.
4. Now select where the backup should be saved by clicking on Select and then step to desired folder. Select this folder by clicking on Open.
5. Click on Ready to create the backup or Cancel to cancel.
6. In the selected folder a compressed file will be saved with the name: 20050420112835backup.zip (example), where the first part of the file name consists of the date and time for the backup. (In this example it was at 11:28:35, April 20 2005)

Scheduled backup (automatic)

It is also possible to schedule a backup of the system information. The backup will then automatically be performed at regular intervals, at specific times. You can for example select that a new backup of the ARX ACCESS database should be saved every Monday at 03:00.

This is how you create a scheduled backup:

1. In the menu Backup, select the option Schedule backup.
2. In the window showing you can select to add a new backup schedule or edit an existing.

![Backup tools](image)

The window Backup tools
3. To add a new backup, select the button **New**.
4. In the window showing, enter a **Name** for this backup and also enter a **Description**.
5. Click on **Next** to continue or **Cancel** to cancel.
6. The next step is to select what or which components you want in the backup by checking one or several checkboxes.
7. Click on **Next** to continue or **Cancel** to cancel.
8. Now enter how often this should be made: **Daily**, **Weekly**, **Monthly** or just **Once**. Also select the time for the backup (for example Mondays at 03:00 o’clock).
9. Click on **Next** to continue or **Cancel** to cancel.
10. Now select where the backup should be saved by clicking on **Select** and then step to desired folder, and then click on **Open**.
11. Click on **Ready** to save the settings or **Cancel** to cancel.

**Rights and target folders**

The ARX ACCESS server run as a service which as default has local system rights. In order for the scheduled backups to succeed this user (the server) must have read and write permission to the target folder you select for the backup. This is very important to check if the folder is located on a network disc.

In Windows you change the rights for the ARX ACCESS server via the Control panel > Administration tools > Services. In the window Services you double-click on “ARX SA” to get access to the server settings. Behind the tab “Login” you can then allocate the server another account with different rights.

If you select to save the backup copies on a network disc you must enter the full network path to the current target folder. For example: `\\servername\resurs\Backupkatalog05` (Correct.)

You **cannot** enter mapped network units:

E:\resurs\Backupkatalog05 (Incorrect!)

**Backup at server start**

Scheduled backup will not be performed if the server is stopped. When the ARX ACCESS server is started again the latest scheduled backup tasks, where the start time have been passed (if any), will be performed. This is done for security reason and will be performed regardless if the latest backup have been performed or not.

A backup is for example made if the server is started on a Tuesday and there is a backup registered to be performed every Monday at 03:00 o’clock.

The extra backups that may be made at a server upstart is given a name showing the actual time for the backup, in other words the server upstart time.

**Restore from backup**

To restore from an earlier backup, do as follows:

1. Stop the ARX ACCESS server by selecting the button **Stop** in ARX ACCESS Server Manager, then wait until the text “ARX ACCESS Server is stopped” is shown.
2. In the menu Backup, select the option **Restore from backup**.
3. Select the backup to be used by clicking on **Scroll** and then step to the correct file. Select this and click on **Open**. (The files are compressed with names as for example: `20050420112835backup.zip`)
4. Click on **Next >** to continue. Select which parts of the system to restore (for example ARX configuration, ARX ACCESS database or Event log). At restore existing (older) data is removed for the components selected to be restored.
Note! There is also a possibility to remove all data in an installation before restoring. (Select this option with care.)

5. Then click on Next to restore the system with the selected backup or Cancel to cancel.

6. You will now see a short report telling if the restore was successful or not. Click on Finish to finish the restoring.

7. Start the server again by selecting the button Start in ARX ACCESS Server Manager.

8. When the text “The service ARX ACCESS Server is started” is shown the server has been restarted and the restored system information is accessible.
Folder and file structure

When installing ARX ACCESS on a computer a number of new folders are created on the hard drive of the computer. The folders and the files they contain make the foundation in ARX ACCESS.

In some cases it can facilitate at support and troubleshooting if you as administrator know parts of these folders and files.

The folders and files described below are found in the folder entered during the installation process, for example in: C:\Program Files\SOLID\ARX SA

Folders
The following folders contain information that can be good to know.

Events
Contain logs that are shown in the ARX ACCESS client, in other words the whole event log. The content of this folder is part of the backup if you select the option Backup of the event log.

Firmware
The folder contains all accessible firmware versions. The different firmware packages here are shown in the list over firmware in the client, presuming that they aren’t too old (have the wrong version number).

Firmware/DCFW
This is the location for firmware upgrades of DAC, PCR and other door units. See a separate section about updating firmware in door units.

Images
In this folder all images of persons added to the ARC ACCESS client is saved. If you want to include the content of this folder at a backup you check the options Backup of images. Note that images take a lot of space and that backups with images therefore can be very large.

Licenses
The location of licenses added with ARX ACCESS Server Manager. The content of this folder is part of the backup if you select the option Backup of license.

Logs
In this folder ARX ACCESS creates a number of additional log files. These logs can sometime facilitate at troubleshooting and support. This folder is not part of a backup.

Secrets
The folder contains the private keys for the server, which you import with ARX ACCESS Server Manager. The content of this folder is part of the backup if you check the option Make a backup of the private key of the server, with certificate.
Files

The following files contain information that can be good to know. All files described below are located in the root of the folder ..\ARX SA.

arx.properties

The file arx.properties can be read and edited in any text editor. The file contains a number of advanced settings and the different settings are well commented in the file.

README_sv.html

This HTML file contains, among other, information about different software versions, upgrades and possible remarks.

uninst.exe

This is the uninstall software for ARX ACCESS. A shortcut to the program is also found in the menu group ARX ACCESS in the program options.

wrapper.conf

A configuration file that can be read and edited in any text editor. (Here you can, for example, control the amount of memory Java can allocate for the ARX ACCESS Server service.)
Introduction

The client software in ARX ACCESS is automatically installed on the computer with the server application ARX ACCESS Server installed. It is also possible to install only the client software on another computer.

Install ARX ACCESS Client

To install the client software, do as follows:

1. Open a web browser and enter the ARX ACCESS server name by entering http://servername/ACSetup.exe/ in the address field of the browser.

2. A login page for the service is now opened. There you enter User name and Password and then you click on the button Login.

Login page for ARX ACCESS Web client

3. You are now logged in on the ARX ACCESS Web client. If you as user have the rights to download the ARX ACCESS client the link Download of ACSetup.exe should start automatically. If not click here.

4. When the download is started you get the question “Do you want to run or save this file?” Select the option Run.

Start the ARX ACCESS Client

Do like this to start the client software ARX ACCESS:

1. Click on the Start button in Windows and select the menu option Program and thereafter the program group ARX ACCESS, there you click on the ARX ACCESS icon in the program menu.

2. The first thing showing is a login window. Enter user name, password and select server.

3. After doing that, click on OK.

For further information regarding the function of the client software we refer to “ARX ACCESS User guide” or the built-in help in the software.
Configuration

Introduction

The configuration of the control unit is made in order for the unit to make contact and communicate with the ARX server of the system. This communication is made via an Ethernet cable through a computer network. In this section the configuration of a control unit is described step by step.

The configuration of the control unit can be made in different ways. This depends on the type of installation you are building up and of the current computer network. The method for configuration is divided into two main groups:

- Automatic configuration
- Manual configuration
Automatic configuration

The easiest method for configuration, which is also the one recommended, is an automatic configuration. In this section we show step by step how this is performed.

An automatic configuration means that the network settings are made with DHCP, in other words the allocation of IP number, netmask, DNS server and router are made automatically from a DHCP server in the network.

Conditions

An automatic configuration requires that there is both a DNS server and a DHCP server in the network. The server name “arx” must also be added in the register of the DNS server. This is usually automatic with the aid of Windows if the server computer is named “arx”.

(To check or change the computer name in Windows: Start > Control panel > System > Computer name.)

If you don’t know if the server name “arx” is added in the register of the DNS server or not you can contact the network administrator and ask for help.

You can also check it yourself by “pinging” the computer name “arx”. You do this in a command window by typing: ping arx. (To open a command window in Windows: Start > Program > Accessories > Command prompt.)

Check list

For an automatic configuration, follow these steps:

1. Start the server application ARX ACCESS Server, if it isn’t running already. (For further information, see the section If you don’t know if the server name “arx” is added in the register of the DNS server or not, we recommend that you contact the network administrator and ask for help.

2. on page 19 in this guide.)

3. Connect the control unit to the network by connecting a network cable to the Ethernet contact on the CPU board.

4. Connect an appropriate power source to the “AC/DC” inputs (terminal block down to the left) on the CPU board.

5. The WDOG LED flashes slowly when the control unit is starting up and flashes faster when the control unit is running.

6. The yellow LED (marked A) next to the WDOG diode flashes when the control unit is trying to get in contact with the server. This can take a couple of seconds. When the control unit has established contact with the server the yellow A diode is lit.

7. The automatic configuration of the control unit is now finished.

You can now, for example, enter the client software ARX Client and add the configured control unit to your installation. If everything worked out well at the configuration the symbol for the control unit (LCU) will turn green in the installation tree.

(For further information regarding the client software we refer to the “ARX ACCESS User guide”.)

If something goes wrong during the configuration according to above, see further information in the section Troubleshooting.
**Manual configuration**

It is not possible to use the earlier described automatic configuration in all installations. For example, if you don’t have any DNS or DHCP server in the network or if parts of the installation is outside a firewall.

At a manual configuration you do all the settings yourself and administer the addresses in the system. The manual settings regarding the control unit is made from a terminal software on a computer, connected with a serial cable to the CPU board in the control unit.

The Serial cable is part of the ASSA product line and has article number S556333000.

**Note!** It isn’t possible to use any serial cable, the cable to use should be designed for the purpose.

---

**Terminal software**

There are several different terminal software’s that can be used. Below two that are common and easy to use are listed.

- HyperTerminal (comes with Windows)
- Teraterm (free software)

Regardless of which terminal software you use, the communication should be set to 115200 bps, 8 bits, no parity, one stop bit and now flow control.

(For detailed information about how the different terminal software works, see the user guide for each software.)

---

**Configuration guide ("Setup Wizard")**

In order to facilitate the manual configuration there is a built-in configuration guide (or "Setup Wizard"). This guide helps you setting the different configuration alternatives for the control unit in a correct way.

You start the configuration guide by typing `setup` and pressing [Enter] in the command window of the terminal software.

What is then shown is a paragraph called “Configuration and status”, showing information about the connected control unit and its status.

The next paragraph, “Setup menu”, is a menu over the different options in the configuration guide.
Menu options

You select one of the menu options by entering the digit that correspond to your choice and pressing [Enter]. The different options in the configuration guide are:

1. Show current configuration and status – This option will show just that.
2. Run the setup wizard – With this option you make the actual configuration of the control unit. After selecting this option you get the possibility to select type of configuration, either “Automatic with DHCP” or “Manual”.
   Tip! At a manual configuration, have this information at hand:
   – IP address of the control unit
   – netmask of the control unit
   – the IP address to the default gateway
   – IP address of the DNS server
   – IP address or name of the ARX server
3. Test the communications with the ARX server – Tests the communication between the control unit and the ARX server.
4. Trace the network route to the ARX server – With this option you can trace the route the information from the control unit takes through the network to the ARX server.
5. Reboot – Restarts the control unit.
6. Master reset – Note! This option is not in use.
0. Quit – This last option terminates the configuration guide.
Example "setup"

After typing `setup` the following information can, for example, be shown:

```
# setup
```

**Configuration and status**

- **LCU Serial Number:** 00:06:8e:30:00:02
- **IP Address:** automatic via DHCP
- **Netmask:** automatic via DHCP
- **Gateway:** automatic via DHCP
- **DNS Server:** automatic via DHCP
- **ARX Server:** arx

**Setup Menu.**

1. Show current configuration and status
2. Run the setup wizard
3. Test the communications with the ARX server
4. Trace the network route to the ARX server
5. Reboot
6. Master reset

0. Quit

What do you want to do?

```
#_
```

In addition to the configuration guide described above there are a number of commands that can be used at configuration and troubleshooting. A complete list over terminal commands that can be used in ARX ACCESS you find on page 36.
## Terminal commands

The following command can be used in the terminal software to configure the ARX ACCESS system:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>setup</td>
<td>Starts the configuration guide “LCU Wizard”</td>
</tr>
<tr>
<td>nv set arx &lt;IP-adress&gt;</td>
<td>States the IP address to the ARX Server</td>
</tr>
<tr>
<td>nv set arx &lt;servername&gt;</td>
<td>States another name (DNS) of the ARX Server (the default name is <em>arx</em>)</td>
</tr>
<tr>
<td>nv set dns &lt;IP-adress&gt;</td>
<td>States the IP address for a possible DNS Server</td>
</tr>
<tr>
<td>nv set domain &lt;domain&gt;</td>
<td>States the domain the control unit belongs to</td>
</tr>
<tr>
<td></td>
<td>(ex: company.com)</td>
</tr>
<tr>
<td>nv set ip &lt;ip-adress&gt;</td>
<td>States an IP address for the control unit</td>
</tr>
<tr>
<td>nv set gateway &lt;gateway-address&gt;</td>
<td>States the default gateway</td>
</tr>
<tr>
<td>nv set hostname &lt;ucnamn&gt;</td>
<td>States a name for the control unit.</td>
</tr>
<tr>
<td>nv set netmask &lt;netmask&gt;</td>
<td>States the netting for the control unit</td>
</tr>
<tr>
<td>nv show</td>
<td>Shows all variables</td>
</tr>
<tr>
<td>nv del ip</td>
<td>Command to delete the IP address for the control unit (for example an erroneous address)</td>
</tr>
<tr>
<td>nv del netmask</td>
<td>Command to delete the netting for the control unit (for example an erroneous set netting)</td>
</tr>
<tr>
<td>nv init</td>
<td>Initiates the original variables in the control unit (roughly <em>reset factory settings</em>)</td>
</tr>
<tr>
<td>ping &lt;datornam</td>
<td>ip-adress&gt;</td>
</tr>
<tr>
<td>reboot</td>
<td>Restarts the control unit</td>
</tr>
<tr>
<td>ifconfig</td>
<td>Shows the present network settings</td>
</tr>
<tr>
<td>logread</td>
<td>Show logs</td>
</tr>
<tr>
<td>route [-n]</td>
<td>Shows gateway settings. -n lead to an IP view.</td>
</tr>
<tr>
<td>traceroute &lt;datornam</td>
<td>ip-adress&gt;</td>
</tr>
<tr>
<td>tcptraceroute &lt;datornam</td>
<td>ip-adress&gt; 5002</td>
</tr>
<tr>
<td>cat /etc/resolv.conf</td>
<td>Shows DNS settings</td>
</tr>
<tr>
<td>telnet &lt;servernamn&gt; 5002</td>
<td>Creates a telnet connection towards port 5002. If you don’t get “connection refused” it means that the server has responded. Type any character to get the server to disconnect.</td>
</tr>
<tr>
<td>ps</td>
<td>Shows started programs/processes</td>
</tr>
<tr>
<td>killall mux_client</td>
<td>Disconnects the mux communication and then connects again with debug printouts activated</td>
</tr>
<tr>
<td>killall -d &lt;servername&gt;</td>
<td></td>
</tr>
<tr>
<td>netstat -t [-n]</td>
<td>Shows existing connections. -n lead to an IP view.</td>
</tr>
<tr>
<td>killall acp</td>
<td>Terminates all ACP communication and restarts ACP again.</td>
</tr>
<tr>
<td>acp</td>
<td>Tip: After typing “acp” and the text line “Command&gt;” is shown, type “help” to see a list over all available options. -clean deletes the database and all settings.</td>
</tr>
<tr>
<td>killall udhcpc</td>
<td>Restarts DHCP</td>
</tr>
<tr>
<td>cat BUILD</td>
<td>Prints out the firmware version installed in the control unit</td>
</tr>
<tr>
<td>Fwupdate -r arx://firmware/ &lt;fw zip&gt;</td>
<td>Updates firmware via existing connection. Note! ARX ACCESS 1.4 and later.</td>
</tr>
</tbody>
</table>
**Upgrade RX9016II or LCU6516II to ARX LCU 9016II**

With the commands “fwupdate” you can upgrade a RX9016II control unit to become an ARX LCU9016II control unit, see below.

1. Set DIP1 in mode ON and restart the control unit.
2. Connect a terminal software to the LCU, via the serial port. 115200 n 8 1.
3. Configure the RX control unit as if it was an ARX control unit, with the ARX server name etc. Restart the control unit.
4. The MAC address of the control unit should, after restart, be visible in ARX.
5. Create and connect the control unit softly in ARX. Note! The control unit will be red in the installation tree.
6. With the aid of the terminal software connected to the LCU via the serial port. Write: `fwupdate -r arx://firmware/PR300222.17.1.1-3498.zip`

   The exact name of the PR300222 file must be checked in the firmware folder, which normally is located at C:\Program\SOLID\ARX SA\firmware\.
**Example "ping arx"**

If you after “pinging” the name “arx” from a command window get the following answer:

```
C:\>ping arx
Ping request could not find host arx. Please check the name and try again.
... it means that the name “arx” is not added.
```

But an answer looking like this:

```
C:\>ping arx
Pinging arx.foretaget.se [194.103.52.123] with 32 bytes of data:
Reply from 194.103.52.123: bytes=32 time<1ms TTL=128.
...
... mean that the server name “arx” is added in the register of the DNS server.
```

(If you would like to abort the ping check you can press Ctrl+C on the keyboard.

**Example “nv show”**

After typing `nv show` (to show the variables of the control unit) and pressing [Enter] the following information, for example, can be shown:

```
# nv show
factory.keys <2401 bytes>
ethaddr=00:06:8e:3f:01:0a
client.keys <2795 bytes>
#
```

**Explanation:**

- `factory.keys <2401 bytes>` – factory keys (for control unit)
- `ethaddr=00:06:8e:3f:01:0a` – serial number of the control unit (or ethernet address)
- `client.keys <2797 bytes>` – client keys

**Key handling**

To guarantee a high security in the communication between the control unit (LCU) and ARX Server, two different types of keys are used: factory keys and client keys.

The factory keys are already stored in the control unit at delivery. They are unique for each control unit.

When the control unit establish contact with the ARX Server and is approved the control unit is added to the ARX installation and is given new keys – client keys.

When the control unit has been given these client keys it is locked to a specific ARX server, the one allocating the keys.
Mounting/Installation

General advice

The access control system is among other installed to provide high security within the company. To decrease the risk of unauthorised attacks on the access system all cabling should be hidden, if possible.

Hidden cables are particularly important in door environment, it is for example extremely inappropriate to fix the cable from an exit button to a DAC unconcealed. If an attacker can get access to this cable there is a risk that the attacker can unlock the door.

It is also very important that all door leafs, door shutters, locks and hinges are working properly. No access system can compensate for badly functioning doors.

Environment

The LCU should preferably be placed indoors in a warm area. If the LCU, at special occasions, must be placed otherwise, heating of the LCU should be made.

The main reason for the heating is to avoid condensation in the LCU. If there is condensation the function of the equipment can be affected in the long run.

Cabling in the control unit

Be careful when you are peeling the cables and peel them in level with the end of the inlet to the box. Inside the box, mount the wires so that they turn directly after the inlet, to the right or left. Then follow the right or left side of the box and turn to desired terminal block.

If the cables are mounted straight and clearly from the beginning it is easier to maintain, change or troubleshoot later. It also gives a professional appearance to the installation.

Document and label the components and cables during the installation. If you for instance label all cables in the control unit, leading to connected DAC, you will get a better control over the installation from one place. It also facilitates at troubleshooting.
Introduction

This section about the door unit DAC will only briefly go through some of the parts and functions of the unit. For all other information about the door unit and its usage we refer to the DAC user guide.

Hardware

DAC is a communication unit for connection of all units around a door. To the DAC you connect readers for in and out passage, exit button and an electrical lock. Connecting these units to the DAC instead of directly to the control unit minimizes the cabling.

DIP switches

The DIP switches in DAC are numbered 1 – 8, were switch 1 – 5 are used for the addressing.

DIP switch value at addressing

<table>
<thead>
<tr>
<th>DIP switches</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>ON value</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>8</td>
<td>16</td>
</tr>
</tbody>
</table>

DIP switch 6: ON = Balanced IN on SW, micro switch/door leaf.

DIP switch 7: should be OFF

DIP switch 8: should be OFF

DIP switch position at addressing of DAC

<table>
<thead>
<tr>
<th>Door</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ON</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>ON</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>ON</td>
<td>ON</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td>ON</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>ON</td>
<td>ON</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
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<tr>
<td>9</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
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<tr>
<td>10</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
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<tr>
<td>11</td>
<td>ON</td>
<td>ON</td>
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<tr>
<td>12</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
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<tr>
<td>13</td>
<td>ON</td>
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<tr>
<td>14</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
</tr>
<tr>
<td>15</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
</tr>
<tr>
<td>16</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>ON</td>
</tr>
</tbody>
</table>
Technique

Survey pictures

On the following pages we show survey pictures that, among other, show the different boards in a LCU9016II control unit, and connections to other units.

ARX system overview

- LCU9016: Control unit for 1 – 16 doors.
- LCU9017: Control unit for 1 – 8 entry phones and DAC doors, see table for the number of doors/entry phones.
- LCU9101: Control unit for one door, the control unit is directly connected to Ethernet.
Control unit 9016II, with the regular communication board 9014LC and one extra communication board 4014LC.
Connection to ECP30 door 3 and door 4. Door 5 and 6 and door 7 and 8, depending on the address of the board.
Connection sketches

LCU9016, power supply and DAC

![Connection sketches diagram]
Connection of DAC to LCU9016II

Hi-O DAC in the 500 family as DAC530, DAC564 with reader, electric strike and exit button.
Connection of ECP30 to LCU9017II

Note!

LCU9017 with entry phone ECP30 cannot co-exist with DAC30/DAC20. Ordinary door environments at the same control unit must be equipped with later versions of DAC as DAC430, DAC530 or PCR40II.
Upgrade firmware in DAC via LCU9016/LCU9017

On the ARX server:
1) Create a folder under the firmware folder in the ARX SA folder with the name dcfw C:\Program\SOLID\ARX_SA\firmware\dcfw
2) Copy the *.ssf files to the folder dcfw
3) Restart the ARX server application.

Flashing via LCU
1) Enter terminal mode
2) Write: command
3) At the prompt Command> write the flash command, see table.
4) The LCU will gather each firmware via the ARX server and load it to the door unit.

Example:
To upgrade firmware in all door units, write:
Command> flash all start

Information
Doors that are not loaded with firmware at the moment, for each control unit, will work almost as normal. Some interference can occur as if the system is slow. The firmware load will take about 3 – 7 minutes per door, to make the load considerably faster, make sure that the control unit don’t have any DAC20/DAC30 or RCE16 connected at the update.

Error-handling
Door units that for some reason fail with the firmware load, for example by interruption in the communication or similar, will get the version 255.255.
When the LCU discovers one of these units the firmware load will restart automatically in the background to those units.

Flash commands: Command>

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>flash all start</td>
<td>Starts the firmware upgrade to all units on the LCU. But only to the units that have an older firmware than the one in the folder dcfw</td>
</tr>
<tr>
<td>flash all stop</td>
<td>Finishes the firmware upgrade. Running flashing will finish before the procedure is cancelled.</td>
</tr>
<tr>
<td>flash n</td>
<td>Firmware upgrades a specific address. n = Address</td>
</tr>
<tr>
<td>flash n force</td>
<td>As above but you force the version on the server regardless of the version in the door unit if you want to go back to an older version.!!! You must also use this method if you for instance upgrade a DAC500 from version 1.804 to 1.806 since the last digits, 04 and 06, are not supported by the DAC protocol. Meaning that you can’t tell the difference.</td>
</tr>
<tr>
<td>flash check</td>
<td>Shows the door unit versions</td>
</tr>
</tbody>
</table>

Note!
Make sure that the control unit don’t have any DAC20/DAC30 or RCE16 connected at the update to ensure a safer and faster update.
Different configuration examples

To further describe what happens between the control unit, server and other units in the network during the configuration we will go through a couple of examples. The first three shows automatic configuration and the last a manual configuration.

**Note!** An automatic configuration requires that there is both a DNS server and a DHCP server in the network. The server name “arx” must also be added in the register of the DNS server.

**Automatic configuration, small net**

In this case we assume that we have a small net and are going to do an automatic configuration. A block schedule for the net is shown below.

*Block schedule for a company with a small network.*

When connecting a control unit (LCU) to the network it starts a chain of events:

1. After connecting the LCU to the network via the Ethernet contact and it is powered the LCU sends a DHCP request “Which IP configuration shall this LCU have?”.
2. The answer is the IP address and netmask for the LCU.
3. Next question from the LCU is “Where is the ARX server?” (This is made through a DNS request.)
4. The answer is the IP address for the ARX server.
5. When the LCU knows this it can connect to the ARX server.

*Sequence diagram, small net*
Automatic configuration, larger net

In this case we have larger net which also contains an internal router. We are still making an automatic configuration.

Block schedule for a larger net, with router

The connection is mostly as in the previous case (with the smaller network). The difference is that as answer to the question in step 1 the LCU will get the IP address, netmask but also Default Gateway. (See step 2 below.)

1. After connecting the LCU to the network via the Ethernet contact and it is powered the LCU sends a DHCP request “Which IP configuration shall this LCU have?”.
2. The answer is the IP address and netmask for the LCU and information about the Default Gateway.
3. Next question from the LCU is “Where is the ARX server?”. (This is made through a DNS request.)
4. The answer is the IP address for the ARX server.
5. When the LCU knows this it can connect to the ARX server.

Sequence diagram, larger net
Automatic configuration, LCU at local office

In this example we describe an installation where the ARX server is located at the head office (inside the firewall) and the control unit at the local office. The communication between server and control unit is made via Internet.

Block schedule for communication between local and head office

1. Since there is a firewall between the LCU and the server, the firewall must first be configured to let through communication from the control unit to the server on port 5002.
2. After that the LCU can send a DHCP request (“Which is the IP configuration for this LCU?”).
3. The answer is the IP address and netmask for the LCU and information about the Default Gateway.
4. Next question from the LCU is “Where is the ARX server?”. (This is made through a DNS request.)
5. The answer to this request comes from the DNS server as the IP address of the ARX server.
6. When the LCU knows this it can connect to the ARX server.

Sequence diagram for local office outside firewall
Manual configuration, LCU outside firewall

In this example the ARX server is inside the company firewall but the control unit (LCU) is inside the firewall. In this case there are no DNS or DHCP servers in the network. This means that manual settings in the control unit and in the firewall are demanded.

Block schedule for control unit (LCU) outside firewall

1. Since there is a firewall between the LCU and the server, the firewall must first be configured to let through communication from the control unit to the server on port 5002.
2. In this case the LCU can’t get answer for the DHCP request since there are no DHCP server in the network. You must therefore manually enter the IP address and netmask for the control unit. (With `nv set ip och nv set netmask`.)
3. Possibly, depending on how the network is built, you must also enter the Default Gateway. (With `nv set gateway`.)
4. Since there isn’t any DNS server in the network either you must manually give the IP address of the ARX server to the LCU. (With command `nv set arx`.)
5. When the firewall is set, the IP address and netmask (and possible Default Gateway) have been entered and the control unit know the IP address of the ARX server, restart the LCU with the command `reboot`.
6. The LCU can now connect to the ARX server.

Sequence diagram, LCU – firewall – ARX server
Troubleshooting

ARX LCU9016 (control unit)

This section describes steps to take trying to solve some common problems with LCU9016 and ARX ACCESS.

Often used for troubleshooting is:

- a HyperTerminal/TeraTerm connection via serial cable alternatively a Telnet connection via the network. DIP switch 6 must be ON (up) to make Telnet work.
- a command prompt in Windows.

In the part below a HyperTerminal/Teraterm command is shown with the sign # in the beginning of each command line. In a command window in Windows the line will begin with the sign > instead.

**Problem: The control unit will not start and the LEDs WDOG, B and C flashes at cadence**

Check that the DIP switches on the CPU board are in the correct position. Especially see that switch number 8 is in OFF.

(For more information, see the section **Outline diagram of CPU board 9016CII with important parts pointed out**.  
Note! The serial number of the control unit is written on the label on the CPU board by the serial connection. on page 9.)

**Problem: Which network settings have the control unit been allocated?**

To check the network settings for the control unit you can use the command `ifconfig`. The command will show, among other, if the DHCP server has allocated an IP address for the control unit.

```
# ifconfig [Enter]
```

**Problem: Are the control unit in contact with the server?**

To examine if the control unit can reach the ARX server you can “ping” the server computer by writing:

```
>ping arx [Enter]
```

An answer similar to this means that the control unit don’t have contact with the ARX server:

```
>ping arx
Ping request could not find host arx. Please check the name and try again.
```

On the other hand, an answer similar to this means that the control unit do have contact with the ARX server:

```
>ping arx
Pinging arx.foretaget.se [194.103.52.123] with 32 bytes of data:
Reply from 194.103.52.123: bytes=32 time<1ms TTL=128.
...
Problem: The control unit will not connect to the server

1. Check that the control unit is pointing to the correct server by checking the parameter `arx` in the answer from:

   ```
   # nv show
   ethaddr=00:06:8e:30:00:01
   factory.keys <2797 bytes>
   fwkey <564 bytes>
   arx=arxserver
   client.keys <3330 bytes>
   ```

2. Check that the control unit has a network connection and correct settings.

   ```
   # cat /etc/resolv.conf
   search solid.se
   nameserver 192.168.105.2
   nameserver 192.168.105.3
   #
   # ifconfig
   eth0    Link encap:Ethernet HWaddr
           UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
           RX packets:443 errors:0 dropped:0 overruns:0 frame:0
           TX packets:195 errors:0 dropped:0 overruns:0 carrier:0
           collisions:0 txqueuelen:1000
           RX bytes:78925 (77.0 KiB) TX bytes:59061 (57.6 KiB)
           Interrupt:17 DMA channel:
   lo      Link encap:Local Loopback
           inet addr:127.0.0.1 Mask:255.0.0.0
           UP LOOPBACK RUNNING MTU:16436 Metric:1
           RX packets:396 errors:0 dropped:0 overruns:0 frame:0
           TX packets:396 errors:0 dropped:0 overruns:0 carrier:0
           collisions:0 txqueuelen:0
           RX bytes:19912 (19.4 KiB) TX bytes:19912 (19.4 KiB)
   ```

3. Check that the control unit can reach the server over the network or find out where the problem is if it can’t reach the server.
   (The keyboard combination `Ctrl+C` cancels the ping.)

   ```
   # ping <servername>
   # ping <IP-adress ARX-server>
   # ping <IP-adress gateway>
   # ping <IP-adress nameserver>
   ```

   One alternative is to follow the connection path to the server:

   ```
   # traceroute <servername>
   ```

4. Check that the server answers to calls at the correct port (write some signs and press return to make the server disconnect).

   ```
   # telnet arxserver 5002
   Connected to (192.168.105.107)
   sadfsdaf
   Connection closed by foreign host.
   ```

   In newer versions of firmware you can also do step 3 and 4 in one single step:

   ```
   # tcptraceroute <servername> 5002
   ```
5. Check that a number of `acp` and one `mux_client` appear to be running.

```
# ps
```

```
PID  Uid  VmSize Stat Command
1    root  600 S init
2    root SW [keventd]
3    root RWN [ksoftirqd_CPU0]
4    root SW [kswapd]
5    root SW [bdflush]
6    root SW [kupdated]
7    root SW [mtdblockd]
35   root SWN [jffs2_gcd_mtd3]
79   root  424 S /usr/sbin/telnetd
92   root  1576 S acp
111  root  1576 S acp
112  root  1576 S acp
113  root  1576 S acp
115  root  1576 S acp
116  root  1576 S acp
117  root  1576 S acp
118  root  1576 S acp
124  root  632 S /bin/ash -
129  root  1504 R mux_client arxserver
134  root  1304 S stunnel /tmp/stunnel.conf
135  root  616 S udhcpc
143  root  712 R ps
```

6. Open the file on the server in a text editor and analyze the end of the file to see if the control unit has connected but for some reason has been denied a connection. If for example the certificate of the control unit is wrong it will show here.

7. Do a manual connection towards the server to see why it cancels. (In the example below everything is OK)

```
# killall mux_client
# mux_client -d arxserver
```

```
mux_client: Loading crypto keys from "/tmp/certs/client.ks"
mux_client: Connection to 192.168.105.107:5002 established
mux_client: Using cipher: DES-CBC3-SHA
mux_client: listening on 127.0.0.1:8100
mux_client: starting mux
mux_client: mux_client: channel[0] received open request, reason=shell
mux_client: creating socketpair
mux_client: forking
mux_client: mux_client: channel[0] open succeeded
mux_client: child shell
mux_client: mux_client: channel[0] read EOF
```

**Problem: A control unit connects and disconnects all the time**

1. Compare the MAC addresses on the malfunctioning control unit in the log of the ARX client with the MAC address of the control unit in the installation tree. If a control unit isn’t added to the installation tree it will repeatedly be disconnected by the server but be connected again once the control unit discovers that it no longer has contact.

2. Since the control unit repeatedly connects it is probable that it lacks contact. At the same time as the server disconnects the control unit when trying to connect. Open the file `C:\Program\SolidARX SA\Logs\arx.log` on the server in a text editor and examine the end of the file to find out why the control unit is disconnected.
**Problem: A control unit do not have the correct certificate**

1. Erase the erroneous certificate on the control unit so that the control unit can generate a new at the next connection towards the server.
   
   # nv del client.keys
   # reboot

**Problem: The control unit has an unknown IP address**

1. Ping the broadcast address and thereby all computers on the same net and by that let the computer know about them. (The broadcast address is often the highest address in a subnet, but if you are unsure, check this with a network technician.)
   
   > ping 192.168.105.255

2. List the units the computer recognize. The MAC addresses (physical addresses) of the control units begins with 00-06-8e-30-

   > arp -a
   
<p>| Interface: 192.168.105.107 --- 0x2 |</p>
<table>
<thead>
<tr>
<th>Internet address</th>
<th>Physical address</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>192.168.105.2</td>
<td>00-04-23-b3-f7-6e</td>
<td>dynamic</td>
</tr>
<tr>
<td>192.168.105.3</td>
<td>00-04-23-b3-f5-b5</td>
<td>dynamic</td>
</tr>
<tr>
<td>192.168.105.11</td>
<td>00-0f-20-16-d4-40</td>
<td>dynamic</td>
</tr>
<tr>
<td>192.168.105.12</td>
<td>00-13-21-50-af-00</td>
<td>dynamic</td>
</tr>
<tr>
<td>192.168.105.18</td>
<td>00-30-6e-f9-c7-88</td>
<td>dynamic</td>
</tr>
<tr>
<td>192.168.105.20</td>
<td>00-60-b0-7c-a0-b7</td>
<td>dynamic</td>
</tr>
<tr>
<td>192.168.105.28</td>
<td>00-10-dc-60-bb-19</td>
<td>dynamic</td>
</tr>
<tr>
<td>192.168.105.65</td>
<td>00-06-8e-30-01-0a</td>
<td>dynamic</td>
</tr>
<tr>
<td>192.168.105.186</td>
<td>00-06-8e-30-00-05</td>
<td>dynamic</td>
</tr>
</tbody>
</table>

3. The only alternative remaining if the computer can’t see the control unit in step 2 is to make a connection with a serial cable to the control unit and write ifconfig.

**Problem: The Terminal software HyperTerminal hangs**

Some versions of the terminal software HyperTerminal can sometimes hang during use.

If this happens you can try to Disconnect the connection and the Call again.

For further information we refer to the user guide for HyperTerminal.
Specifications

Capacity of ARX ACCESS

Max number of control units: Unlimited
Max number of doors: 16 door units per control units
Max number of schedules: >1,000 schedules per control unit
Max number of cards: >100,000 cards (with PIN code and authority) per control unit
Number of log events: > 30,000 log events per control unit

ARX ACCESS Server

System requirements: See inlay in the CD cover
Operating system: See inlay in the CD cover

ARX ACCESS Client

Operating system: See inlay in the CD cover

ARX LCU9016II

Flash-memory: 16 Mbyte
RAM-memory: 32 Mbyte SDRAM
Operativsystem: Linux
Ethernet: 10BASE-T, 100BASE-TX
Serial port: RS232
Power supply, external: 17 – 28V AC or 17 – 40V DC
Power supply, internal: 3.3V DC and 13.8V DC
Current: max 15 VA
Temperature range: +5°C to +70°C
License information

This product contains software licensed under the GNOW General Public License and the GNOW Library General Public License. The sources to this software can be found on the accompanying CD.

This product includes software developed by the Apache Software Foundation (http://www.apache.org/).

This product includes software developed by the OpenSSL Project for use in the OpenSSL Toolkit (http://www.openssl.org/)

This product includes cryptographic software written by Eric Young (eay@cryptsoft.com)

This product includes cryptographic software from PuTTY (http://www.chiark.greenend.org.uk/~sgtatham/putty/).

This product includes software written by Graham Mainwaring (graham@mhn.org).

This product includes Sun's Java 2 Runtime Environment (J2RE), Standard Edition which is subject to the following licenses:

This product includes code licensed from RSA Security, Inc.

Some portions licensed from IBM are available at http://oss.software.ibm.com/icu4j/.

(For further information about licenses, see ARX ACCESS installation cd.)
Terms and abbreviations

**CPU**
Central Processing Unit

**DAC**
Door Access Control

**DHCP**
Dynamic Host Configuration Protocol, used for configuration of a units connection to TCP/IP network.

**DNS**
Domain Name System is the system that among other translates from system and domain name to IP addresses.

**LCU**
Local Control Unit

**TFTP**
Trivial File Transfer Protocol, a file transfer protocol.