



Z10k

Stand-Alone Access Control System





1. Features

- Stand alone operation, needs only a industry-standard low-voltage power supply to operate.
- Supports up to 9999 users, with configurable access rights for each.
- Comes with easy to use PC software to configure the access control device.
(PC is used only for setup, device can operate completely stand-alone.)
- Can control access to:
 - Drive through lanes
 - Building doors
 - Restricted areas
 - etc...
- Provides relay contact to control:
 - Turnstile
 - Speed flap
 - Automatic barrier
 - Door buzzer
 - Motor driven door lock
 - etc...
- Available for use with different access tokens:
 - Magnetic stripe cards
 - HiTag 125kHz RFID Tags in various shapes
 - High security Mifare RFID Tags, also in various shapes

2. PC Software features

- Built in database which can hold address and other information for all 9999 users.
- Powerful search feature.
- Built in support for a desktop reader/writer to encode user cards.
- Up-/Download feature to transfer access control rights between PC and the actual Z10k device.
- Database can be exported to and imported from a spreadsheet application.
- Multi-language ready.



3. Principle of operation

The Z10k system provides access control for up to 9999 users. Each user is provided with an access control token. The type of token depends on the system in use, it may be:

- A credit card sized magnetic stripe card.
- A credit card sized card with embedded Hitag or Mifare transponder.
- A coin sized token with embedded Hitag or Mifare transponder.

Especially for the contactless Hitag or Mifare systems, the token manufacturers offer a large number of shapes, sizes and colors.

This document will always talk about a "card" when it means one of the mentioned tokens, regardless of the type or shape actually in use.

Card versioning

Each card has, in addition to its user number (0001 - 9999) a separate version digit (0 - 7).

Should a card get lost, a new card can be issued with the same user number, but the version digit increased by one. This will automatically render the lost card as invalid and avoids the necessity to issue a new user number to the card holder.

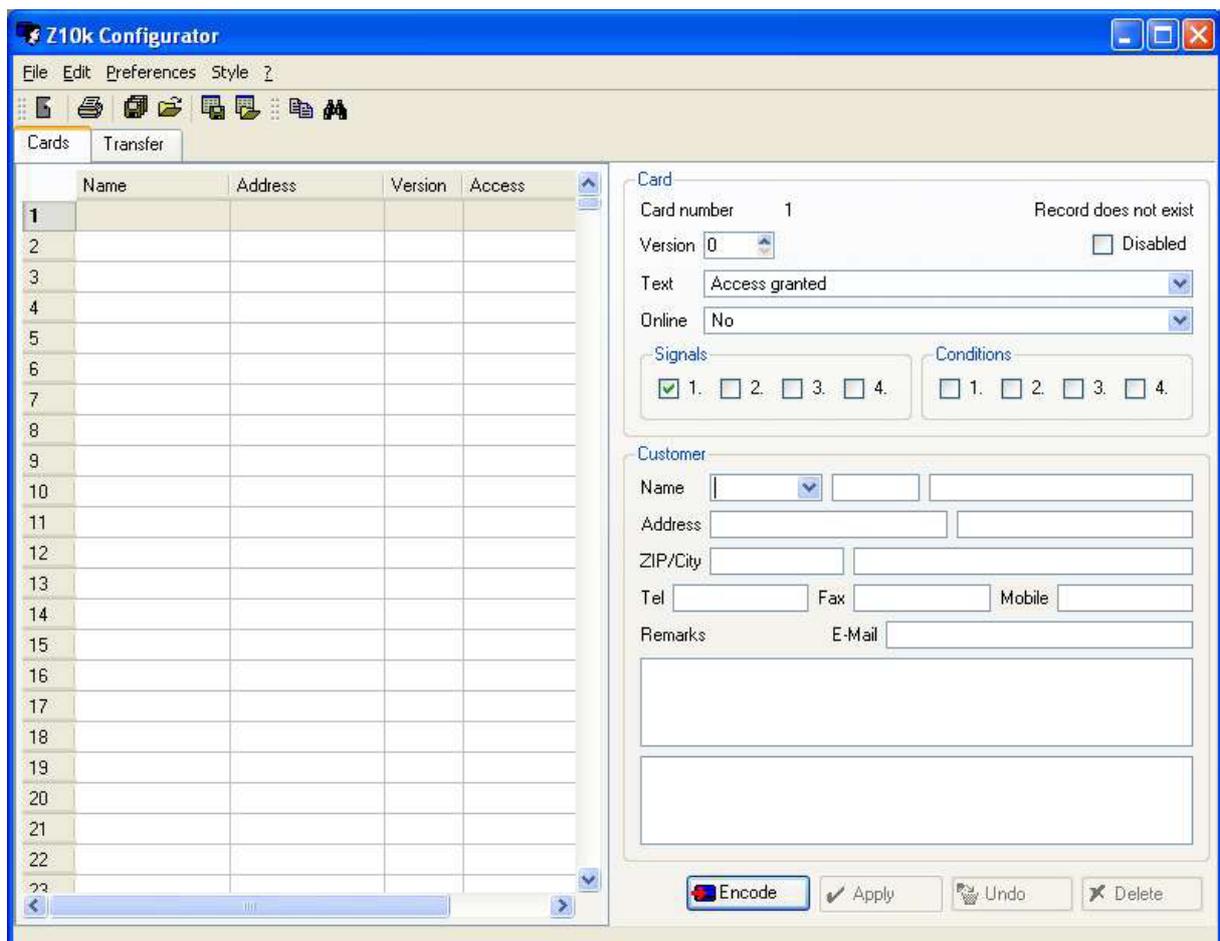




4. Setting up system preferences

To install the software, run the provided installer and follow the instructions. After installation, you will find the Z10k application in your start menu.

When the application first starts up, it presents an empty database view.





System type

Prior to using the application, it will need to know the type of access control system you are running. Please open Preferences -> System configuration to display the setup dialog.

System preferences - Z10k Configurator

System type

Magstripe Track: Track 2

Hitag

Hitag (Motor driven)

Mifare Sector: 1 Key...

Encoding

Format:

0-9=Digits X=Anything goes V=Version digit ZZZZ=Card number

Desktop reader

The desktop reader is used to encode cards for use.

Interface:

Z10k reader

The Z10k reader can be connected to your computer in order to set it up.

Interface:





First, you need to choose the system type:

- Magstripe

Select this if you have a magstripe reader, e.g. an insertion reader, swipe reader or motordriven magstripe reader.

- Hitag

This option is for use with a contactless Hitag reader, if you plan to use Hitag-S or Hitag-2 transponders from Philips.

- Hitag (Motor driven)

Same as above, but used if the reader is motorized. A motorized reader works on credit-card-sized Hitag transponders and pulls them into the reader while reading. This type of device is sometimes preferred when the reader is to be operated from inside a car.

- Mifare

Use this option if you plan to use Philips Mifare-1k or Mifare-4k transponders with a contactless reader. The Mifare system offers the highest security of all listed system types in terms of copy protection.

Magstripe systems

If you are using a magstripe system, you will need to choose which track will hold the access control data. This value depends strongly on the magnetic card reader type in use and must be selected appropriately. Standard ISO cards are divided into three tracks 1 - 3.



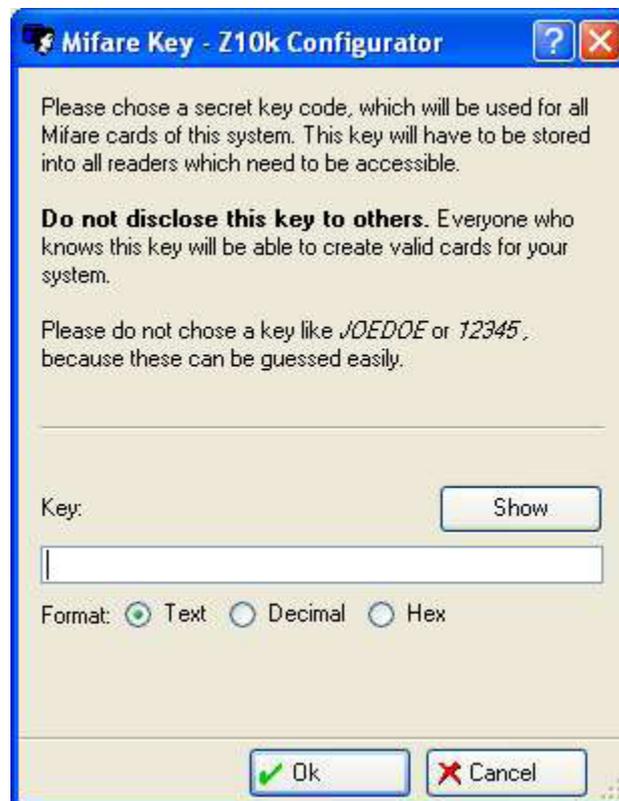
Mifare systems

Sector selection

Mifare cards are divided into several sectors. You can choose any number here if you plan to use the Mifare transponders with the Z10k system only. If the Mifare card is to be shared with non-Z10k systems, the chosen sector must not be the same as the sector(s) used by other systems.

Key selection

For a Mifare system to work properly, a secret key code must be chosen at installation time. Click on the "Key" button to open the appropriate dialog.



Once a key has been chosen and cards have been encoded with it, the key cannot be changed anymore. **If you change the key anyway, all cards encoded with the old key will stop to work.**

Do not lose this key. If you lose the key, you may have to re-encode all cards already in use. With up to 9999 cards per system, this may be much work.

Do not disclose this key to others. Everyone in possession of the key will be able to create or copy existing cards. If you want to keep a written copy of the key, you should store it in a safe. Note: The program has to keep a copy of the key on your harddisk in order to be able to encode cards. It's the responsibility of the user to employ proper file protection by using the access control mechanism of the computer's operating system.



Encoding

The data on the card has to be encoded in some way. Each card is encoded with a number that consists of a constant part and the part that contains the user number (0001 - 9999).

When the Z10k reader reads a card, it will first check that the constant part of the data that was read matches the constant part entered here. Then it will pick the user number from the place you have marked with ZZZZ and the version number from the part you marked with V. Places marked with X will be ignored by the reader. Finally, the user number is looked up in the database and checked if it is acceptable.

So, to choose a proper encoding, you should set up the number so it contains a long, random, fixed number and the proper ZZZZ and V markings at some place.

The longest possible encodings are as follows:

Magstripe: 39 digits
Hitag: 12 digits
Mifare: 38 digits

For maximum safety, the chosen encoding should use up the longest possible encoding and not contain any Xs. Only if you need to read already existing cards with a special encoding, putting in some Xs may be useful.

Desktop reader

If you have a desktop reader/writer that will be used to encode new cards, please specify the serial port it is connected to. The program will aid you in choosing the right setting by showing the names of all serial ports. A desktop reader connected via USB will show up as something like "HTTRDesk" or "Micore-Desk", depending on the type.

Note: For Hitag and Mifare systems, the Z10k reader can also be used to encode cards. Just select the same serial port as below.

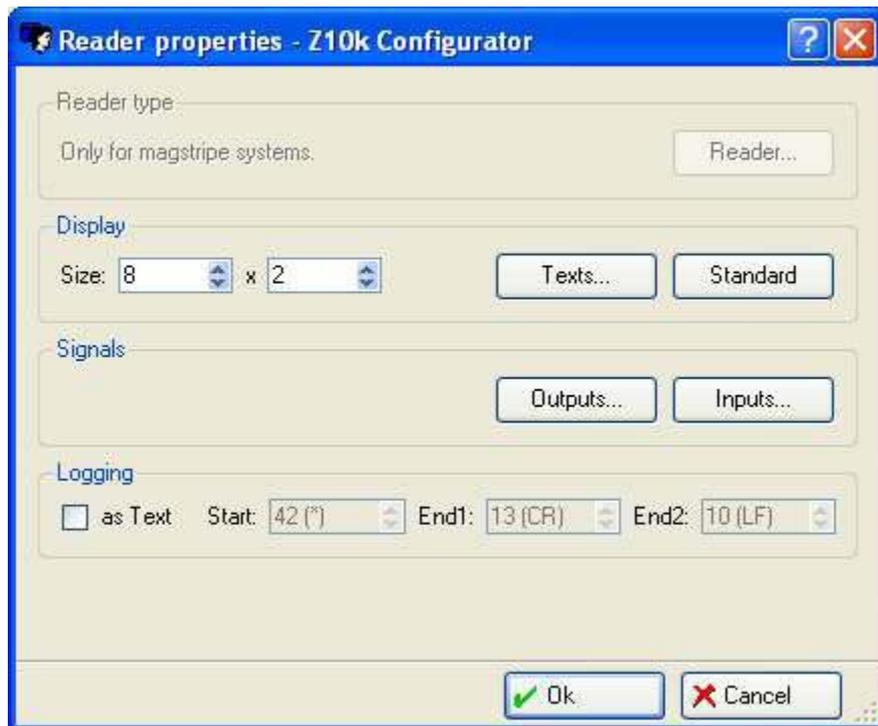
Z10k reader

In order to set-up the Z10k reader, it must be connected to the PC through a serial port. Please note that this connection is only necessary while setting it up. *For normal operation, the Z10k reader does not need the PC connection.*



5. Setting up reader properties

To configure the general settings of your Z10k reader, please open Preferences -> Reader properties to display the setup dialog.





Reader type

This option is only necessary for magstripe readers. Here you have to choose the actual type of magstripe reader connected. This setting depends heavily on the hardware



Reader type:

Choose if you have an Insertion, Swipe or Motor (MCR/MBR) reader.

Tracks:

This selects the actual tracks your reader supports, not the track you chose to use on the cards.

Eject:

Motor readers only. Chooses what to do on powerup, if there's still a card inside the reader. Eject is to be taken literally in that case, the card is actually thrown right out of the reader.





Display

Some readers come with an own display. While you are completely free to decide what is shown on the display in each situation, the program already comes with a handy set of default values.

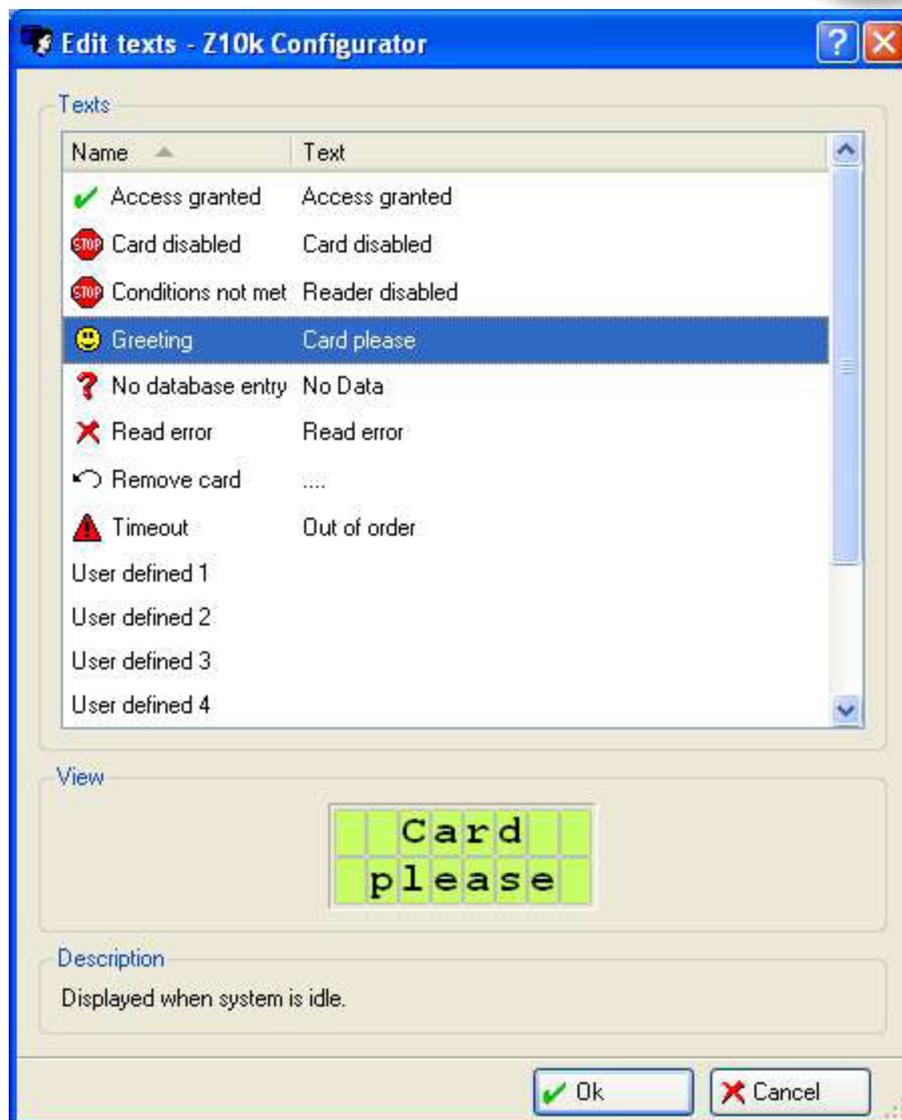
First chose the size of the display, which usually is:

8x2 for Micore-Stack, HTTR-Stack

20x2 for μ Card (Magstripe) readers

To use the default texts, push the "Standard" button. To edit the texts yourself, push the "Texts..." button.





The text editor will show an explanation what every text item means, so editing should be straightforward. There's also a set of eight user definable texts, which can be assigned to any card number in the database. So, you can even show "Hello, Mr Chairman", if the CEO of your company accesses the device...





Signals

This is for advanced users only. The readers already come pre-configured, so there's usually no need to set up the signals and conditions.

The reader supports several user defined signals and conditions.

An output signal is raised whenever a card is either rejected (Reject signal) or accepted (Signal groups 1 - 4). Each card can be assigned to one or more of the four signal groups.

When an output signal is raised, it's assigned outputs (usually relay contacts) emit a pulse of a definable length. These pulses will in turn open the door, the turnstile, the barrier, your pick..

A condition is a specific state (on or off) of up to five inputs (usually an opto-isolated input). An input condition is always checked before a card is accepted. There's the main condition, which must be always met in order to accept any card whatsoever. In addition, there are four specific conditions (1 - 4) that can be assigned to any card number. The specific conditions are only checked for the card numbers which they are assigned.

In real life, this feature is useful vor vehicle lanes, where the reader is connected to a vehicle presence detector. The reader will then only accept entry if there's really a vehicle present.

Logging

The reader's serial port can be configured to send out a log message any time a card is read. By keeping the reader connected with a PC, a data logger or a serial printer, it is possible to track all actions taken.

The character selected for "Start" is always sent in front of a message, while the characters "End1" and "End2" are sent afterwards. Entering 0 (Zero) will disable the character, respectively.



6. Database editing

The database is always visible after starting the program, or by selecting the "Cards" tab in the main window. While the left part of the window displays a summary of database entries, the right part will always show the complete data set of one user.

To edit the database, the Z10k reader is not necessary, because all data is also stored on the PC. Only after you are done editing, you need to connect the reader and synchronize it to the PC.





Card pane

The screenshot shows a 'Card' configuration window with the following fields and options:

- Card number: 1
- Version: 0 (dropdown menu)
- Disabled:
- Text: Access granted (dropdown menu)
- Online: No (dropdown menu)
- Signals: 1, 2, 3, 4
- Conditions: 1, 2, 3, 4

The card pane displays the data that is actually stored inside the Z10k reader. It defines the access conditions for any one of the 9999 card entries.

Version

Lets you assign a version digit. This feature is helpful if the card holder has lost the card. Just chose the next version number and issue a new card. The lost one is automatically disabled. The maximum version number is 7. If that's used up, you might want to have a serious talk with the card holder...

Disabled

If this checkbox is turned on, the card will not be accepted.

Text

For readers with a display, this selects either the standard text or one of the eight user definable texts.

Online

Not yet supported. Keep at "No".

Signals

Lets you specify what happens when this card is accepted. Usually, only signal 1 is used. If the checkbox is checked, the card will be accepted and provide access.

(TODO: Have software make sure that at least one signal is set, or the card is useless)

Conditions

Unused in most systems. In more advanced systems, this buttons will cause the card to be accepted only if the selected conditions are met.



Customer pane

Customer

Name	<input type="text"/>	<input type="text"/>	<input type="text"/>
Address	<input type="text"/>		
ZIP/City	<input type="text"/>	<input type="text"/>	
Tel	<input type="text"/>	Fax	<input type="text"/>
		Mobile	<input type="text"/>
Remarks	<input type="text"/>		
E-Mail	<input type="text"/>		
<input type="text"/>			
<input type="text"/>			

The customer pane's contents are only stored in the PCs database. Technically, they are not needed for proper system operation. They are very helpful to keep track of the card holders however, if more than a few cards are issued.

The system does not enforce the entry of any data in these fields, they can be kept empty if not needed.

Even though the fields are tagged with names like "Address" or "E-Mail", you are completely free to enter any information you may find useful.





Buttons



Encode

Provided a desktop reader is present (or the Z10k reader itself is selected for that purpose), this button will cause the currently selected record to be issued to a card. A dialog box will appear and give instructions on how to proceed.

Apply

This button will apply any changes made to the Card and Customer fields and store them to the database. Note: **The Z10k reader will not be updated.** This has to be done manually, on the "Transfer" tab.

Undo

Undoes any changes made to the Card and Customer field, by reading the old values back from the database.

Delete

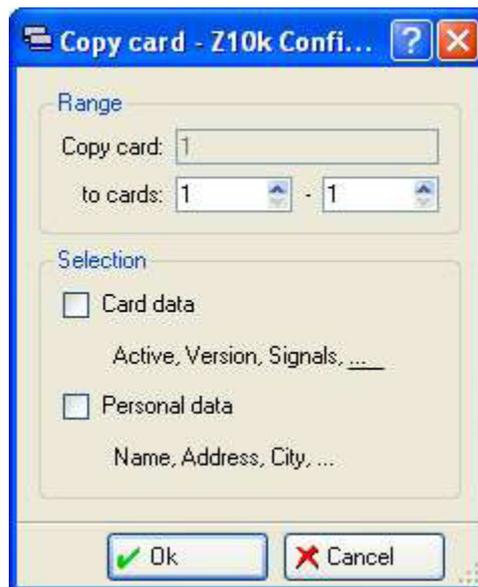
Completely clears the currently selected database record.





Copying

In order to enable a large number of cards at once, the properties of one card can be copied to a range of other cards. For that purpose, select "Copy" from the "Edit" menu.



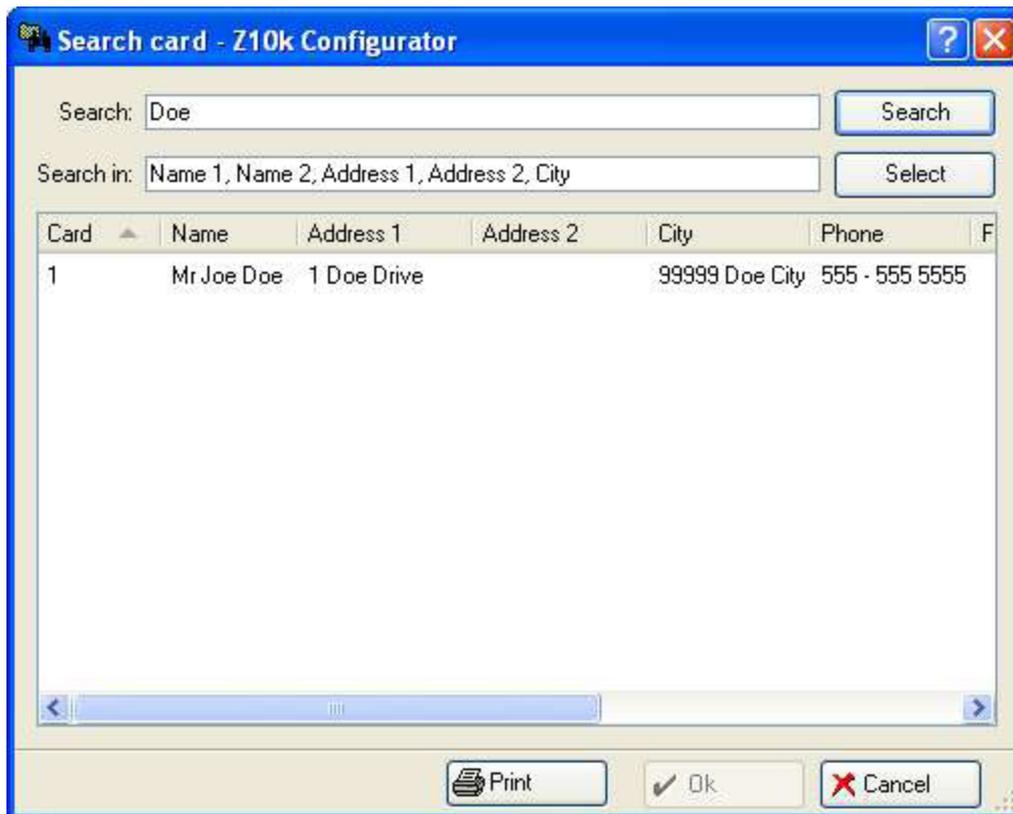
The dialog accepts a destination range. Also, it is possible to select which pane(s) to copy: Card data (Card pane) and Personal data (Customer pane).





Searching

With the database growing larger over time, it will become more difficult to find an existing entry. The search dialog, accessible from the "Edit" menu, comes to the rescue.



Enter the text you want to search for and click "Search". All fields selected are searched for the text and the results are listed in the box below.

By double clicking on a search result, the item is selected in the main window and ready to edit.

The search field supports wildcard characters: The asterisk (*) will match any number of characters while the '?' character matches one arbitrary character.

Example: Wa*er will match, e.g.: Waters, Warner, Walter, ...

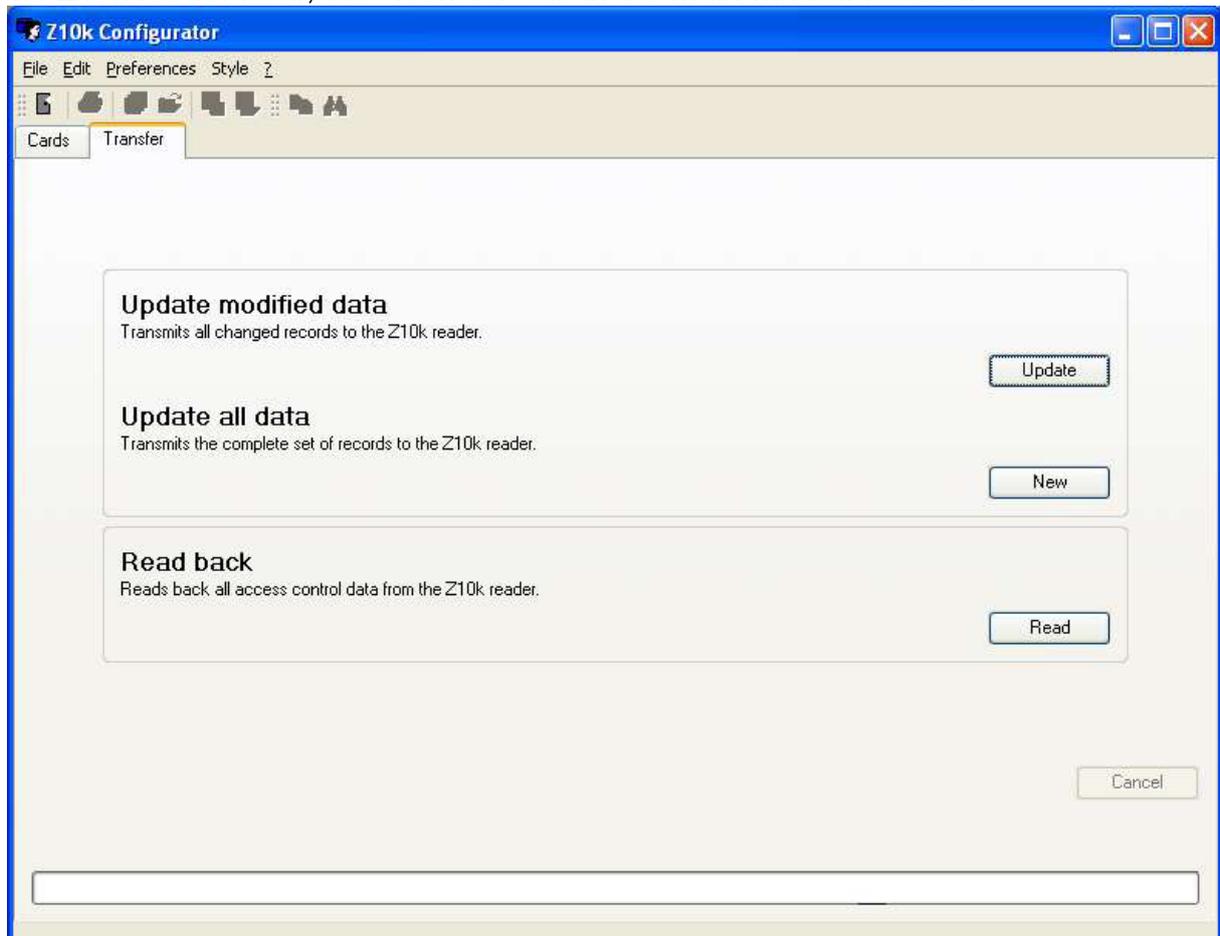
More advanced computer users may like to enter a regular expression by enclosing it in two slashes (/).





7. Data transfer

All changes made to the database are only stored on the PC yet. In order to update the Z10k reader itself, the "Transfer" tab in the main window is used.



There are only a few buttons on this page. In order to use any of these buttons, first make sure the Z10k reader is properly connected to the PC and is powered up.

Update

Probably the most used button. This will only send these records to the Z10k reader that have changed since the last update.

New

This will send the complete set of data to the Z10k reader. Depending on how many items there are in the database, this can take a few minutes. Best used only after initially installing the system for the first time.

Read

This will read back the complete set of data from the Z10k reader. Warning: the reader does not store personal data, only access control information. While the transfer is in progress, it can be stopped with the cancel button at any time.



8. Exporting

The Software supports exporting and importing the database contents to other programs. The file format chosen for this purpose is "Symbolic Link (SLK)" as supported by e.g. Microsoft Excel and OpenOffice.org.

By selecting "Export" from the file menu, the data can be written to a SLK file. After editing it with another program, it can be read back with the "Import" item from the file menu.

Please leave the first row of the table intact, as it is necessary to properly sort the data back into the database.

9. Backup

You are advised to regularly back up the database. This is as easy as selecting "Backup" from the File menu and selecting a file name. The actual backup is a matter of seconds.

(Technical note: The resulting backup is a ZIP-file containing the database data in a set of wellformed and valid XML files, complete with a DTD. The data can be processed with a number of XML tools. Think of it as a second way of exporting the data.)

Should you ever lose or accidentally destroy the program's own data, you can always restore a backup with the "Restore" function of the "File" menu.