

ACS ccTalk cashless reader for RFID

Operator's manual

Rev. 1.02

ACS

CCTALK CASHLESS RFID READER

(RFID - MIFARE®)



User Manual

CE

Alberici[®]
CASH SOLUTIONS

Progettazione e produzione di sistemi di pagamento e accessori per macchine Gaming, Vending e Car-Wash

Via Cà Bianca, 421 - 40024
Castel San Pietro Terme (BO) - Italy

Tel.: +39.051.944300
Fax.: +39.051.944594

Web: www.alberici.net
E.mail: info@alberici.net

NOTICE

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STORICO REVISIONI			
Revisione n°	Data	Modifica	Note
Rev. 1.00 (Creazione)	21.04.10	Creazione	
Rev. 1.01	26.04.13	Nuovo moduli Round e Square	
Rev. 1.02	22.07.15	Cambiato frontespizio	

Dear Sirs,

we would like to thank you and congratulate for your choice.

We trust that you will appreciate the quality and performance of the ACS Cashless Reader for RFID Keys.

Please read carefully this handbook, to obtain the most from your machine

1. Package content

The Alberici Cashless System ACS is made up by:

1. As many red/write (RW) modules as requested
2. As many empty keys as requested

This product has been packed with the utmost care. In the case that you receive it damaged or incomplete, please notify immediately your findings to the Carrier.

2. Introduction

The Alberici Cashless System (ACS) is designed to read or write data on the chip transponder (Tag) built in the key-shaped support.

The key can be read or written (R/W) only by the RW module sharing the same password (PIN) of the key. Each key and each RW module can be initialized only by means of the preset ccTalk command (see section 8. Communication protocol).

The ACS makes use of the secure and reliable MIFARE[®] technology. Exchange of data occurs through radio-frequency signals (RFID): no direct contact is made between components prevent wear-out of the system. The keys are waterproof, resistant and non-reproducible.

The system is ideal for applications like:

- Automatic distributors
- Car-wash plants
- Automatic Laundrettes
- Gyms and swimming-pools
- Access controls
- Theme parks
- Parking places
- Internet kiosks

The RW module can be connected to any Alberici cctalk coin acceptor or cctalk banknote validator through the cctalk interface board (this one must be produced by the machine manufacturer): this will allow to charge credits into the User keys. The machine Manufacturer will choose whether to offer one or more independent charging stations, dedicated to credit charge only.

Data can be stored in the form of credits or services, or staff identity codes. Memory is ready to be shaped by the programmer at his/her wish: he/she will therefore configure it according to his/her own needs.

The chip transponder contains 45 blocks, 16 bytes each. It can therefore store up to 720 bytes.

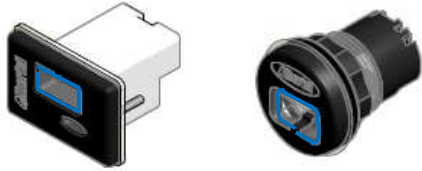
Each RW module must control only the keys that have been initialized for that particular module, and inversely each key must be compatible only with the RW modules for which they have been initialized. To this aim, the system is designed so as to make the keys accessible only through password (PIN).

Such password must be matched to the RW module when initialized, by means of the preset ccTalk commands. The designer must therefore prepare a configuration page so as to use the initialization commands of the system. As an alternative, the Alberici programmers and software can be used.

If lost, the password cannot be retrieved, not even by Alberici S.p.A.: once the password has been produced for the RW module, it must properly be recorded and kept secret. The password is essential to clone various modules so that they take the same keys (Tags).

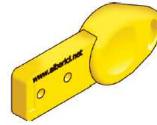
3. Parts denomination

RW (Read-Write) Module



The RW module contains the RFID aerial and the ccTalk board.

Key with built-in transponder chip



The key bears the transponder chip, it is waterproof and easily portable. Memory 720 bytes.

Accessories (to be ordered separately)

Programmer for ACS aerial (reader)



It connects to the PC through USB port or RS232 port

ACR Programmer for RFID Keys



It connects to the PC through USB port

NOTICE: it is possible to build up one's own system without making use of the Alberici programmers. Just develop the system by the commands described under Section 8.

4. Product description

4.1 General data

- RW Module

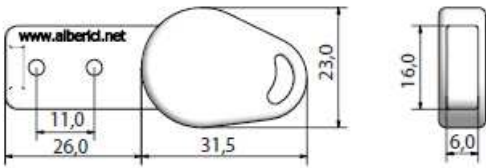
Dimensions W x H x D (mm)	SQUARE: 54 x 36 x (40+8) - ROUND: diam. 43 x (39+8)
Power supply	8 – 30 Vdc
Current draw	Max 60 mA (normal operation) - Max 130 mA (when writing)
Operating temperature	0 / + 50°C
Humidity	0-85% internal / 99% external

- Key

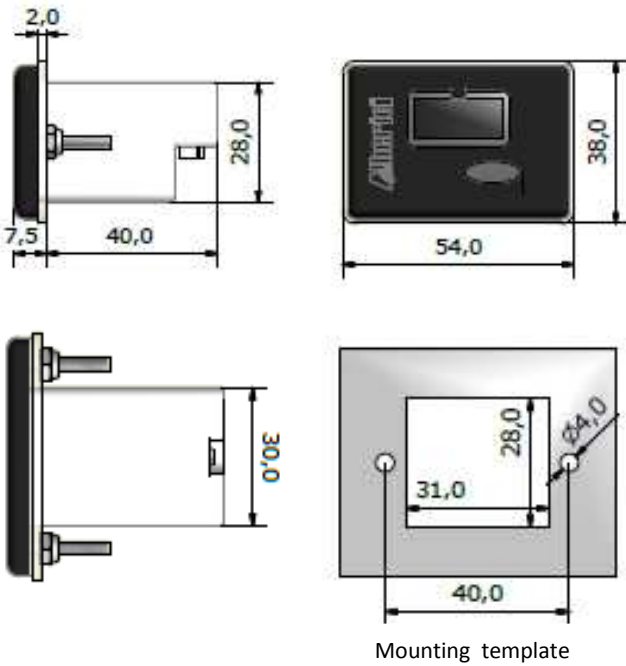
Dimensions W x H x D (mm)	54 x 23 x 9
Memory storage capacity	720 bytes

4.2 Size

RFID Keys



ACS SQUARE AERIAL (CH-BS00)

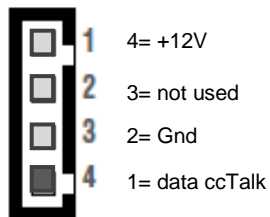


ACS ROUND AERIAL (CH-BS01)

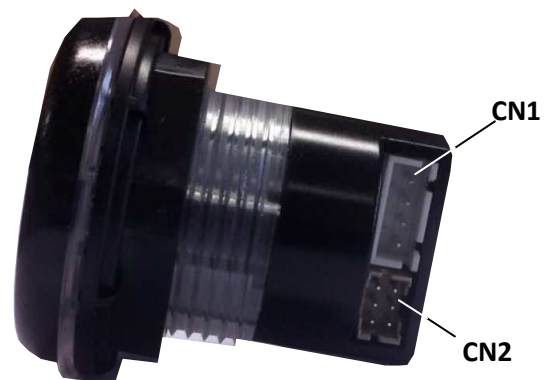


5. Connections

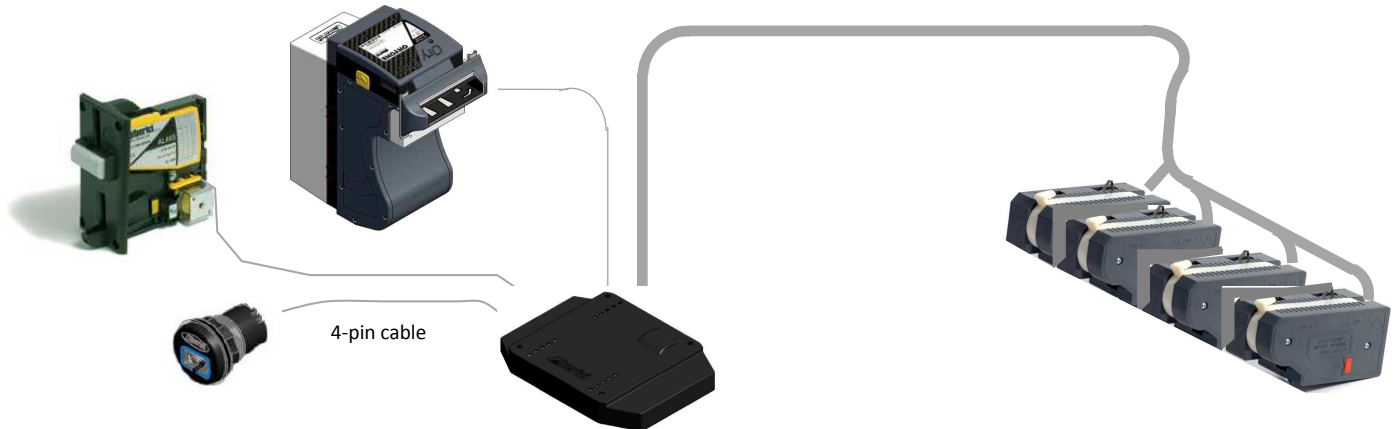
CN1 - power and data socket:



CN2 - socket for optional RGB pushbutton



Neither the machine control board nor its operation software can be supplied by Alberici S.p.A.. They must be implemented by the manufacturer of the machine, according to the commands explained in Section 8. The RW module, as well as the other cctalk peripheral units (i.e. coin acceptor, note validator, ...), must be connected to the machine control board, to build up a system similar to the one pictured below:



The machine must of course be equipped with a display and a keypad, so as to allow choice between getting the service or charging credits into the key.

Pls. pay attention: if the single machine includes two or more modules, or two or more machines are installed near to each other, the modules must be at least 50 cm far from each other.

Another possibility is to make use of the Alberici Start STS control board (code nr. SH-1H21-000T), that in conjunction with the interface relay board (code nr. S-020901-110) can drive 6 dry-contact service lines.

6. Initializing the system

If the PC does not contain the USB drivers, please install them before connecting the reader (antenna) programming kit to the PC.

The drivers can be found in the software-CD which is part of the package. The programming software "cctalk-mifare.exe" can be found on the same CD.

Such drivers can also be downloaded from the Download Area available in www.alberici-net: Programming Kits / Driver USB / Silicon Labs 2K3 XP Vista 7.rar.

Then from the Start menu of the PC, go to Device Manager (in XP, through System): in the Controller USB or Gate (COM and LPT) list, find the programming interface (USB Serial Converter, or USB Serial Port), and double-click on it. In the window that opens up, choose Driver, click on Driver Update and follow the instructions appearing by and by.

Connecting the reader programming kit (cod. K-P10-000005)



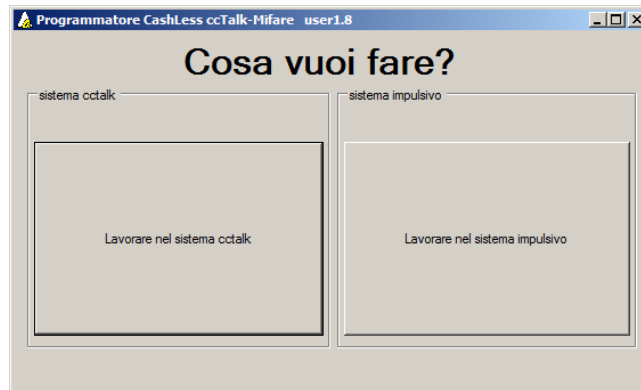
- Connect the power supply box to the 12 Vdc input.
- Connect the USB cable to the PC and to the USB-A socket of the interface ; or else, use the RS232 cable.
- Connect the 4p (3 wires) cable between the cctalk 4p socket of the programming interface and the 4p socket behind the key reader.

6.1 Initializing the RW aerial module:

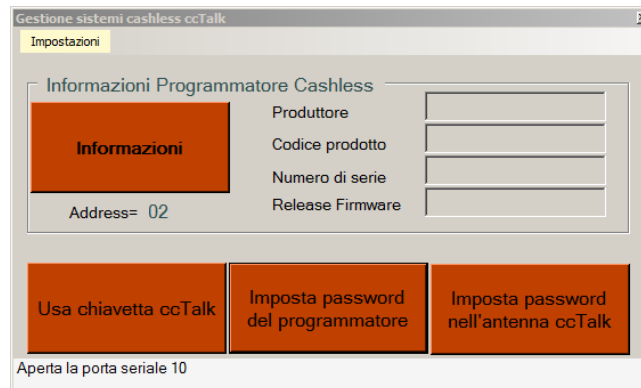
Copy the application “cctalk-mifare.exe” from the software-CD, and paste it on your PC Desktop.

Connect the ACS (aerial) module to be initialized to your RS232 or USB Port through the K-P10-000005 Programmer kit interface (see Section 5).

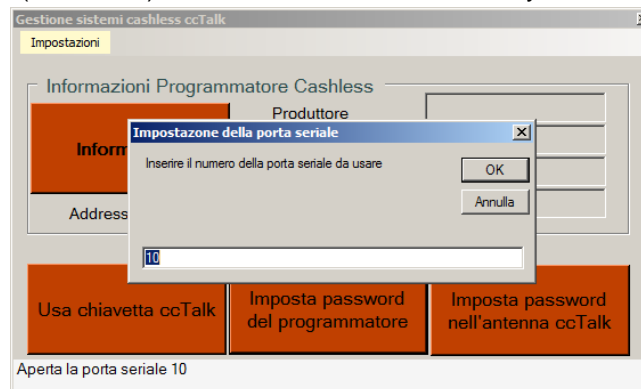
Open up the program “cctalk-mifare.exe”. The following prompt will be displaying:



Choose ‘Lavorare nel sistema cctalk’ (‘operate in cctalk mode’). The following window will appear:



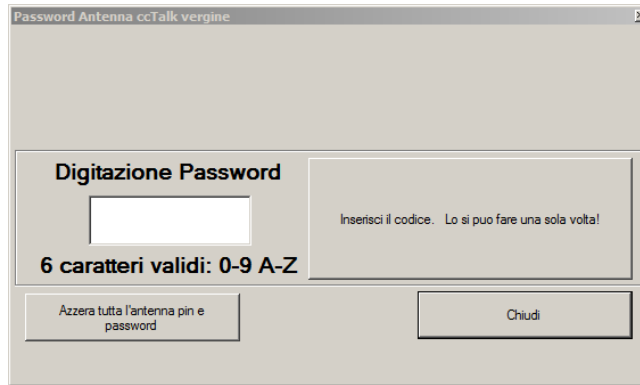
Check that the application reads from the right USB Port: click ‘Impostazioni > Porta seriale’ (‘Setup > Serial Port’), write the right Port nr. (ex. nr. 10) in the white box, and confirm by the OK button.



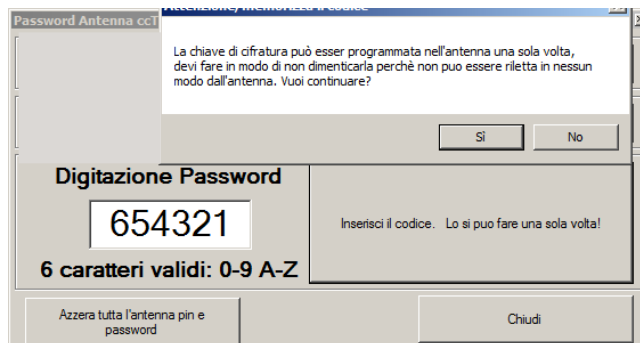
NOTICE: to establish communication, it might be necessary to switch the programmer green button off/on.

Click the button “Imposta password dell’antenna ccTalk” (“Set Password of the aerial module”), and enter the 6-digit code that will be used to match RFID keys to this key reader. Then press ‘Inserisci il codice. Lo si può fare una sola volta!’ (‘Save the code. It can be saved only once’).

IMPORTANT INFORMATION: THE PASSWORD CAN BE PROGRAMMED ONLY ONCE!!!
do not lose/forget the initialization password attributed to the antenna. It cannot be recovered!
This password allows operation only to those keys marked by the same password.



A message will warn that it will never be possible to change the reader password if “Sì” (“Yes”) is chosen.



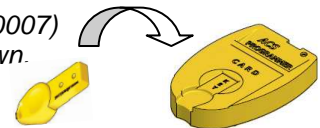
Choose “Sì”: then press the button “Chiudi” (“End”) to end the initialization of the Antenna module, switch the green button off, and disconnect the antenna.

It is now possible to program the User RFID keys.

6.2 Initializing the User Keys and loading credit:

6.2.1 Initialization: this is done by using the ACR key programmer (K-P4N-000007)
 NOTICE: the 6-digit code used to initialize the relevant key reader must be known.

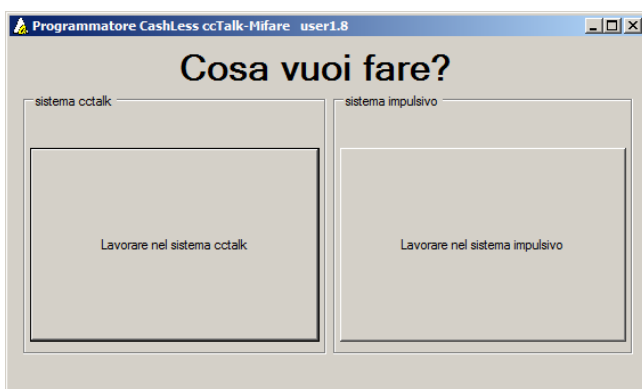
Connect the ACR programmer box to a USB Port of your PC: it will take about 1 minute to install the drivers and get the programming box ready for use.



In case the programming unit should not find the USB drivers in your PC, they are in the software-CD included, or from the Download Area of www.alberici.net (Download Area / Programmer Kits / Driver Silicon Lab 2K3 XP Vista 7.rar).

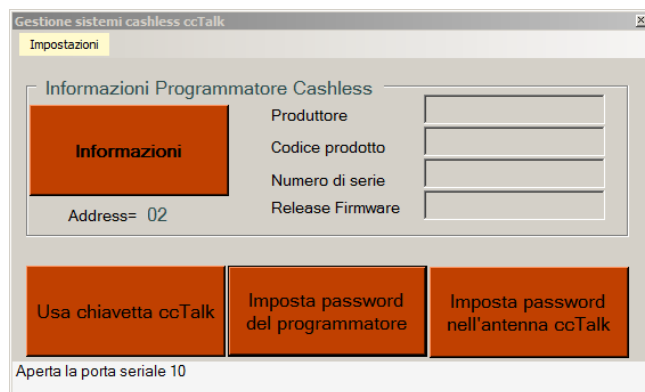
From the Start button at the bottom-left of your PC, select Control Panel, then Device Management: among the “Ports (COM and LPT) list, find out the programmer box “Silicon Labs”, and double click it. In the setting window that opens up, choose the tag “Driver”, and click “Update driver”: follow the instructions displaying. When the programmer box is ready, its pilot light will turn from red to green.

Start the program “cctalk-mifare.exe” . The following prompt will be displaying:

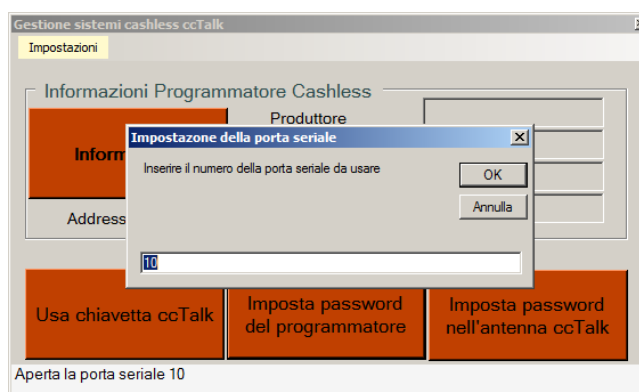


Choose ‘Lavorare nel sistema cctalk’ (‘operate in cctalk mode’).

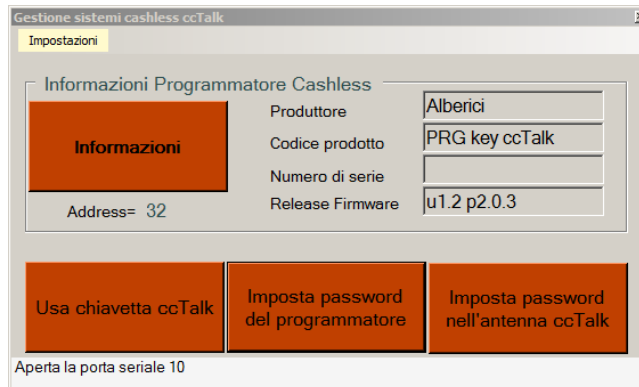
The window shown in the next page will appear:



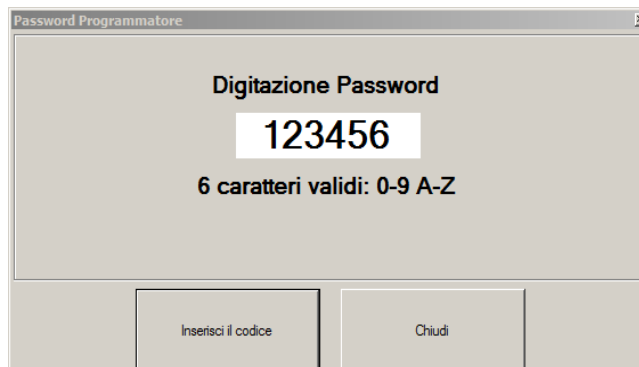
Check that the application reads from the right USB Port: click 'Impostazioni > Porta seriale' ('Setup > Serial Port'), type down the right Port nr. (ex. nr. 10), and confirm by the OK button.



Lay one User Key on the programmer shaped seat. Click on 'Informazioni' ('Information on the key'): the data of the tag will be acknowledged (any non compatible key will be not get acknowledged)

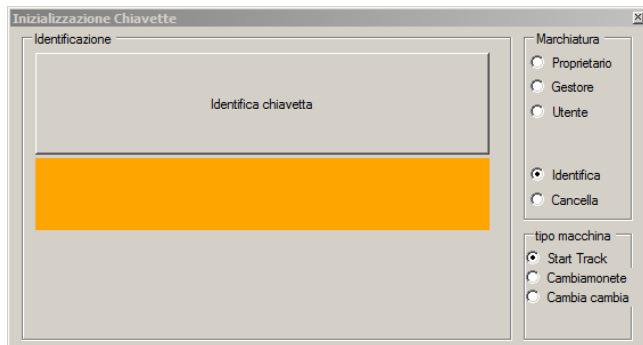


Click "Imposta password del programmatore" ('Temporarily set the key reader code in the programmer box'), and write in the white box the 6-digit code used to initialize the relevant key reader (ex. 123456):

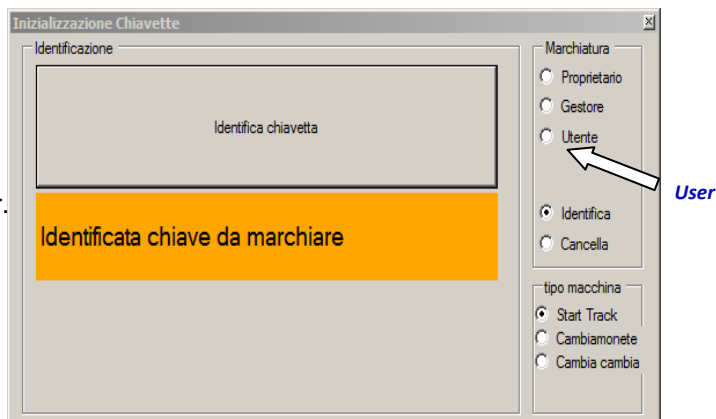


To end this step, click 'Inserisci il codice' ('enter the code') and 'Chiudi' ('End').

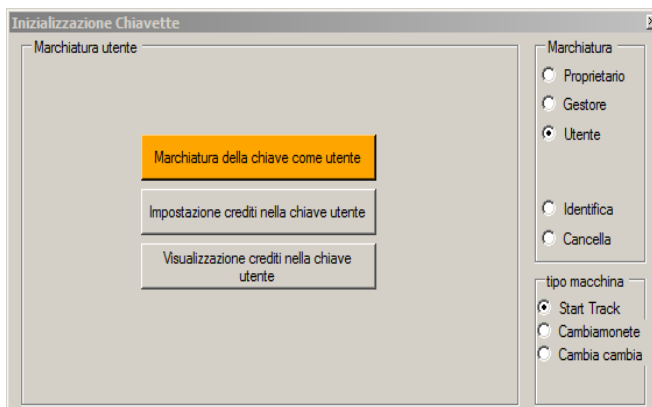
Now click the button 'Usa chiavetta ccTalk' ('Manage cctalk key'), the management window will appear:



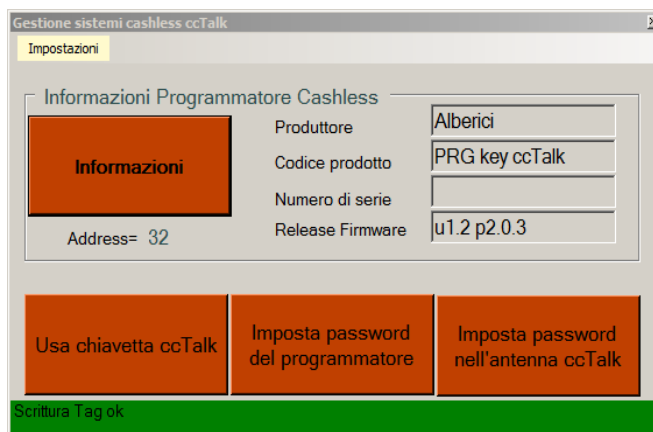
Click 'Identifica chiavetta' ('Identify this key'). If the key is not compatible, the message 'Chiavetta non associata Alberici' ('This key is not compatible with Alberici reader') will appear. If the key has not yet been initialized, the side window shall appear, the orange bar showing 'Identificata chiave da marchiare' ('Key can be branded'):



When ticking the 'Utente' ('User') option, the system will show the following buttons:



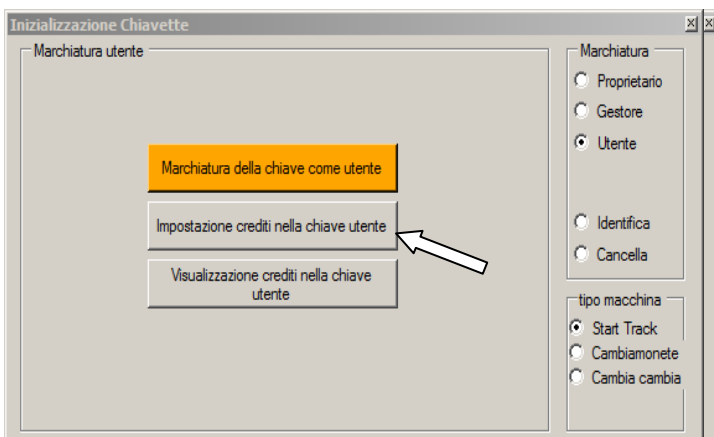
Click on the orange bar: a message against green background will confirm that the Tag has been correctly branded 'Scrittura Tag OK'. It is now possible to load it with credits by the button 'Impostazione crediti nella chiave utente' ('Set credits in the User key'), or to remove it and go on with another one.



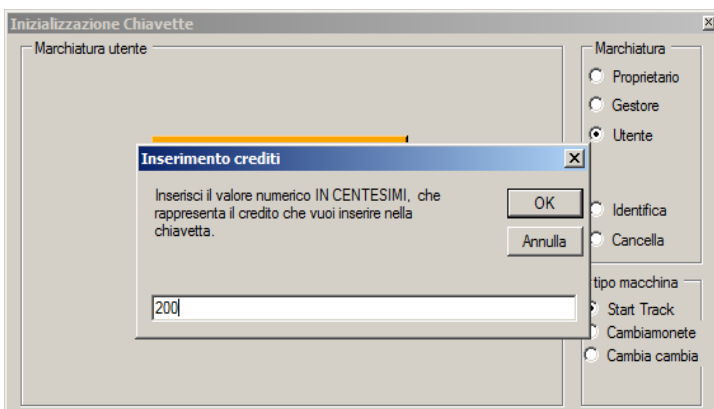
If the User Key has already been initialized to work with the same reader (i.e. with code 123456), the message 'Identificata chiave Utente' ('User key identified') will be displayed, and it will be possible only to check credits by the button 'Visualizzazione crediti nella chiave Utente' ('Display credits existing in the User key'), or to load credits by the button 'Impostazione crediti nella chiave utente' ('Set credits in the User key').



6.2.2 Filling the key with credits:



Choose 'Impostazione crediti nella chiave utente' ('Set up credits'), then type the credit amount in the white box opening up.



Credit must be written in hundredth parts, i.e. 2 € = 200.

Confirm by the OK button, and close down the windows by clicking on the crossed boxes at top-right corners of each window. Or, repeat the steps to fill other initialized User keys with credit.

If one new key or several new keys must match a different key reader, take care to set the 6-digit code of this key reader before initializing this/these User Key(s).

6.2.3 Self-service credit refill: the initialized User Key(s) can be charged with credit also through self-service re-load, if the circuit hosting the ACS reader is connected to a ccTalk coin acceptor, and if its control board is properly programmed. In such a case, it will be enough to insert the User Key in the reader slot without activating any service; then insert the coins in the coin acceptor > the board display would ask if the amount should be used to load the key or to start a service > choose and press the relevant pushbutton: the amount entered will be loaded to the key.

7. Operation

7.1 Loading credits

First of all each key must be initialized using the same password relevant to the RW module(s) where it will be used. To this purpose, the system Operator must allow one programming station (PC + ACS module, or self-service kiosk). The credits can be charged or added to the key chip in any of the following three ways:

- 7.1.1 Charging at the Manager desk: the ACR programming station (K-P4N-000007) can be used to charge credits into the keys (see Section 6.2.2).
- 7.1.2 Self-Service charging kiosk: the kiosk must contain the ACS module, the coin acceptor and/or the note validator. The Customer will insert his/her key into the module, then he/she will introduce coins/note(s); eventually, he/she will press the button for charging, and the control board will transfer the introduced amount to the key chip through the ACS module. It is also possible to use the Alberici SH-1A21-000T control board. This has been already explained in Section 6.2.3.
- 7.1.3 Self-Service charging station built in the activation machine - when the key is inserted, the module will read the data contained and will transmit them to the machine control board; it will then stand waiting for instructions from the board itself. The Customer will introduce coins/note(s), and the control board will prompt him/her to choose whether to obtain a product/service or to add credits into the key: he/she will press the corresponding button, and if such button stands for charging credits, the board will transfer the introduced amount to the key chip through the ACS module.

7.2 How it works

When the device is connected and powered, the blue pilot light is lit up.

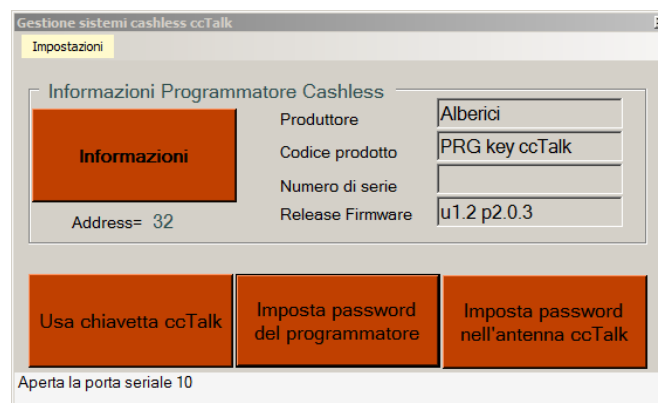
When the key is inside the module slot, this one gets lit up in green, and reads the data contained. If the content is void, the module light will be flashing green. It will flash red if the password of the key does not match the password of the ACS reader module.

When the transmission of the data from the key reader to the control board is in progress, the reader light flashes yellow. It turns again to green after the transmission has ended.

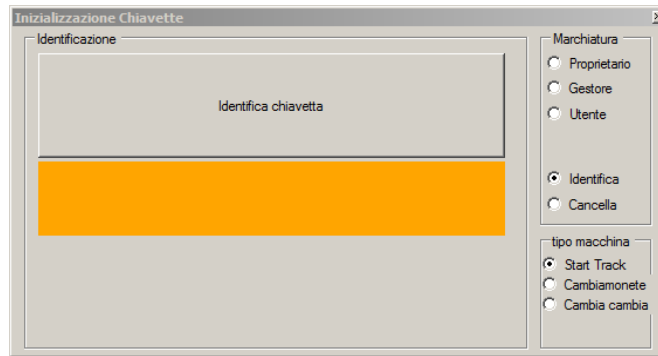
The ccTalk RW module can be charged with an amount of "units of credit". The ccTalk control board can make of these "units of credit" anything needed. For instance, if the key contains 200 units of credit, the machine can consider that each 100 is 1 €, or that each units means one free access, and so on. The great advantage of the ccTalk system is, that the designer can structure the system according to his needs. It will as well be left to the designer to decide about whether the starting activation should be automatic, or else controlled by one or more pushbuttons (ex. in automatic multiple distributors).

7.3 Check accounts

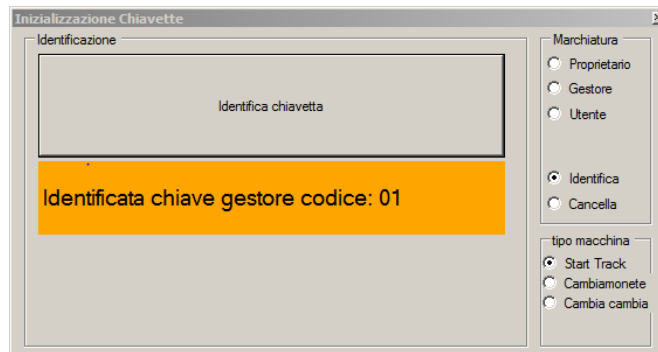
When the Service key is placed in the module slot, the reader flashes green. Remove the Service key to download the Accounts records. To read the data, lay the key on the USB ACR Programmer Box, and start the "cctalk-mifare.exe" program. The following window will get displayed; do not forget to set the proper Port in the Menu "Impostazioni" / "Porta seriale".



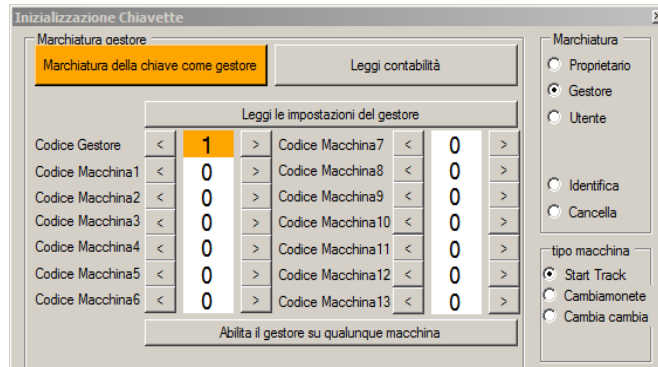
Click 'Usa chiavetta ccTalk' ('Manage cctalk key'), the management window will appear:



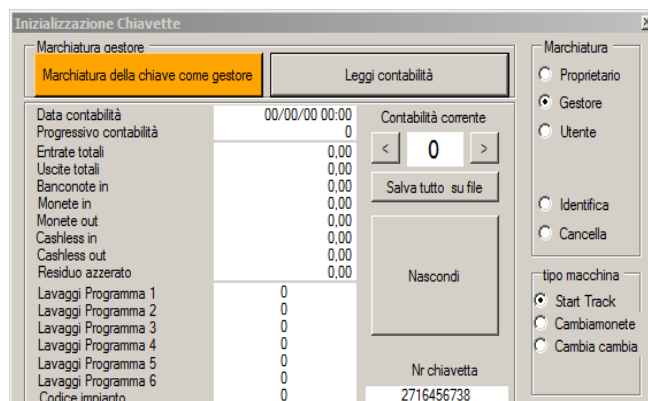
Click 'Identifica chiavetta' ('Identify this key'): the following confirmation "Identificata chiavetta Gestore codice: 0n" ('Service Key with code nr. 0n has been acknowledged') will be displayed:



Tick "Gestore" ('Service'): access will be given to the following portfolio. Click "Leggi le impostazioni del gestore" ('Show Service Key settings'), to check the settings of the Service Key.



and/or click "Leggi contabilità" ('Read Accounts data') to display the Accounts data previously downloaded:



8. Communication protocol

It is possible to build up one's own system without making use of the Alberici programmers. Just develop the system by the commands described in this section.

The default address of the ccTalk pcb of the RW module is H32 (50 in decimals). Cctalk command 251 allows to change its address if necessary.

The implemented commands are typical of the RW module (in description below, always referred to as "antenna") or of the key (in description below, always referred to as "Tag").

The RW module answers to its typical commands even when the key is not inserted into its slot.

The commands typical of the key will receive NACK answer when the key is not inserted, or when the key is not compatible with the RW module (they have not the same initializing password).

> Typical Commands of RW Module (antenna):

- header 255-165 – Test status antenna
- header 255-163 – Initialized antenna
- header 254 – Simple poll
- header 253 – Address poll
- header 252 – Address clash
- header 251 – Address change
- header 250 – Address random
- header 246 – Request manufacturer ID (Alberici)
- header 245 – Request equipment category ID (Card Reader)
- header 244 – Request product code (Minkey ccTalk)
- header 242 – Request serial number (return unique serial number of MIFARE chip)
- header 241 – Request software revision (MCC1.01 at present).
- header 219 – Enter new PIN number
- header 218 – Enter PIN number
- header 151 – Test lamps
- header 192 – Request build code (MCB1.00 at present).
- header 170 – Request base year (2009).

FFA5 test status antenna

The returned byte describes the status of the antenna: pwd pin, a.s.o.

Tx = 32 01 01 FF A5 28

Rx = 01 01 32 00 xx cksum

Where byte "xx" means:

Bit7= not used

Bit6= not used

Bit5= not used

Bit4= not used

Bit3= not used

Bit2= not used

Bit1= code compatible with antenna if bit value = 1

Bit0= pin correct if bit value = 1

FFA3 Initialized antenna

The RW Module/antenna can be initialized only once. Nack (Not acknowledged = 01 00 32 05 C8) is the answer to a second attempt to initialize it.

To initialize the Module, send it the 6 bytes (included in the command string) relevant to the key access password: it will reply Ack (Acknowledged = 01 00 32 00 CD).



IMPORTANT INFORMATION:

do not lose/forget the initialization password attributed to the antenna. It cannot be read twice or recovered! This password protects the access to the data in the keys, and allows operation only to those keys marked by the same password. THE PASSWORD CAN BE PROGRAMMED IN THE MODULE ONLY ONCE!!!

To use this command, the pin password must already have been loaded by the command 218 (see below), or NACK reply will be received:
Tx = 32 07 01 FF A3 01 02 03 04 05 06 0F (in this example, the password transmitted is 01 02 03 04 05 06)
Rx = 01 00 32 00 CD

Simple poll 254

The antenna answers by Ack :
tx = 32 00 01 FE CF
rx = 01 00 32 00 CD

253 Address poll

The antenna returns one single byte equal to its address value. This command is used in broadcast mode, where the master addresses to all slaves, prompting them by address 0:
tx = 00 00 01 FD 02
rx = 32

252 Address clash

The antenna returns one single byte equal to its address value. This command is used in broadcast mode, where the master addresses to all slaves, prompting them by address 0: the reply timespan is pseudo-random from 1ms to 255 ms.
Tx = 00 00 01 FC 03
Rx = 32

251 Address change

The antenna answers Ack and, from this moment on, it will take the new address received. The new address will be equal to the byte sent as datum in the command, as follows:
tx = 32 01 01 FB 33 9E (take 33 as new address)
rx = 01 00 33 00 CC (the antenna has taken new address 33)

246 Request manufacturer id

The antenna provides the name of the manufacturer:
tx = 32 00 01 F6 D7
rx = 01 08 32 00 41 6C 62 65 72 69 63 69 AA (Alberici)

245 Request equipment category id

The antenna provides its equipment category:
tx = 32 00 01 F5 D8
rx = 01 0B 32 00 43 61 72 64 20 52 65 61 64 65 72 D5 (Card Reader)

244 Request product code

The antenna provides its particular product code:
tx = 244 Request product code
rx = 01 0E 32 00 4D 69 6E 69 6B 65 79 20 63 63 54 61 6C 6B 77 (Minikey ccTalk)

242 Request serial number

The antenna provides the unique S/N of the built-in MIFARE® chip:
tx = 32 00 01 F2 DB
rx = 01 04 32 00 1D 81 D7 40 14 (data are: 1D 81 D7 40)

241 Request software revision

The antenna provides the release nr. of its internal software:
tx = 32 00 01 F1 DC
rx = 01 07 32 00 4D 43 43 31 2E 31 30 33 (MCC1.10)

219 Enter new PIN number

Use it when you want to change the antenna PIN (but first use command 218 to enter the existing PIN):
tx = 32 04 01 DB 31 31 31 2A
rx = 01 00 32 05 C8 (Nack: this means that the existing PIN had not been entered first)
rx = 01 00 32 00 CD (Ack: new PIN has been accepted)

218 Enter user pin

The antenna must receive and check the PIN nr. every time that they are powered up. The PIN nr. of a new, virgin antenna is: 30303030. The antenna replies by Ack; this reply has 220ms delay in case of wrong PIN.

tx = 32 04 01 DA 30 30 30 30 2F

rx = 01 00 32 00 CD

192 Request build code

The antenna replies according to its build code:

tx = 32 00 01 C0 0D

rx = 01 07 32 00 4D 43 42 31 2E 30 30 35 (MCB1.00)

170 Request base year

The antenna replies by the year when it has been manufactured:

tx = 32 00 01 AA 23

rx = 01 84 B2 80 32 30 30 39 FE (2009)

151 Test lamps

The antenna can activate the green LED or the red LED, to show the state of operation to the User.

First byte identifies the Led to be activated. Select operation mode by the second byte.

NOTICE: only one Led at the time can be activated.

- Byte 1: Bit7= not used
 Bit6= not used
 Bit5= not used
 Bit4= not used
 Bit3= not used
 Bit2= not used
 Bit1= Green Led
 Bit0= Red Led

- Byte 2: Byte2=0: the antenna will drive the Leds
 Byte2=1: Led as identified by first byte is on.
 Byte2=2: Led as identified by first byte is off.
 When $10 \leq \text{Byte2} \leq 255$: Led as identified by first byte flashes at duty 50% and at period equal to $\text{Byte2} \times 20 \text{msec}$

The antenna replies:

Tx = 32 02 01 97 01 13 20 to start flashing red led (period 380msec)

Tx = 32 02 01 97 02 25 0D to start flashing green led (period 740msec)

Rx = 01 00 32 00 CD in any case, the antenna replies ACK.

> *Typical Commands for chip Keys:*

- header 255 + 160 – Poll Tag
- header 255 + 161 – Read data block
- header 255 + 162 – Write data block
- header 255 + 164 – Initialized Tag

FFA0 Poll Tag

Answer is Nack if the Tag (key) is not inserted; if the tag is inserted, the answer contains the 4 bytes showing the Tag serial number:

Tx = 32 01 01 FF A0 2D

Rx = 01 00 32 05 C8 (Nack: Tag is not inserted)

Rx = 01 04 32 00 42 FD E9 A1 00 (in this example, 42 FD E9 A1 is the Tag serial number)

FFA1 Read data block

Add up one data byte to the ccTalk string, to point out which memory block (1...45) must be read.

If the command is correct, the key chip returns the 14 bytes contained in the block requested:

Tx = 32 02 01 FF A1 01 2A

Rx = 01 10 32 04 00 00 00 00 00 00 00 00 00 00 00 00 B9

Pay attention, the following steps must be taken before using the FFA1 Read data block command, or Nack message will be returned:

- the pin must be recorded into the RW Module (Antenna),
- the key (Tag) must be preset by Alberici for this type of ccTalk system.
- the key (Tag) must have been initialized with the code set by the operator.

FFA2 Write data block

Add one byte to the command string pointing out which block to write in, and add as well the 14 content bytes. Total is 15 bytes to be added.

To modify any single byte in the location, follow this procedure:

read the 14 bytes,
modify the value, and
re-program all bytes.

In fact, the system cannot modify one byte per time only.

Tx = 32 10 01 FF A2 01 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F 10 AE

Rx = 01 00 32 00 CD

As an example, this is the Tx/Rx for loading 20 € on a key:

Tx = 32 10 01 FF A2 01 07 D0 00 00 00 00 00 00 00 00 00 00 00 44

Rx = 01 00 32 00 CD

Pay attention, the following steps must be taken before using the FFA2 Write data block command, or Nack message will be returned:

- the pin must be recorded into the RW Module (Antenna),
- the key (Tag) must be preset by Alberici for this type of ccTalk system.
- the key (Tag) must have been initialized with the code set by the operator.

FFA4 Initialized tag

The antenna must already have been initialized; the Tag must be produced by Alberici, it must be properly inserted, and it must be virgin and empty. If any of the previous conditions are not complied with, the answer would be Nack.

If everything is fine, it will take 5-6 seconds to get the Ack reply, that confirms that the Tag has been initialized.

Tx = 32 01 01 FF A4 29

Rx = 01 00 32 00 CD



VERY IMPORTANT NOTICE:

KEYS CANNOT BE INITIALIZED TWICE, AND THEY WILL BE ABLE TO EXCHANGE DATA ONLY WITH THOSE RW-MODULES (ANTENNAS) THAT SHARE THE SAME INITIALIZATION PASSWORD.

9. Guarantee

The manufacturer will fix malfunctions arising from production faults in this machine or parts of it within 12 months from the date of sale.

All communications referring to guarantee repairs or replacements must be accompanied by the product serial number and the copy of the sale invoice.

To obtain your guarantee repair, please send the part to the Dealer where you purchased the machine, together with the following documents:

- copy of the sale invoice
- delivery note stating "returned for guarantee repair"
- detailed report of the problem found and the circumstances in which it occurs.

Before sending the product, please get in touch with your Dealer or with Alberici S.p.a. (+39 051 944300); very often malfunctions can be fixed via a simple phone call, saving you costs and time.

Alberici S.p.a. will verify that warranty is applicable, i.e. that problem is not caused by:

- transport damages
- damages from incorrect installation or wrong configuration
- installation in premises or areas not complying with the prescribed safety requirements
- intentional or unwilled tampering
- wrong or careless use or maintenance
- non-compliance with precautions prescribed (see Chapter 4. Caution)
- natural disasters, vandalisms, intentional or unintentional damage

Guarantee is considered automatically expired if outer and inner labels are missing.
Transport costs of repaired products are at the Customer's charge.

10. Customer service

Alberici S.p.a. will be pleased to offer all the necessary information on use, ordinary maintenance and technical service. Please call (+39) 051 944300 and specify if your request concerns information on use or technical support.

NOTE

Alberici S.p.A. reserves the right to modify the product at any time and without prior notice, to the purpose of continuously improve it.



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Design and manufacture of payment systems, accessories for videogames and vending machines

Via Ca' Bianca 421
40024 Castel San Pietro
Terme (BO) – ITALY

Tel. + 39 051 944 300
Fax. + 39 051 944 594

<http://www.alberici.net>

info@alberici.net