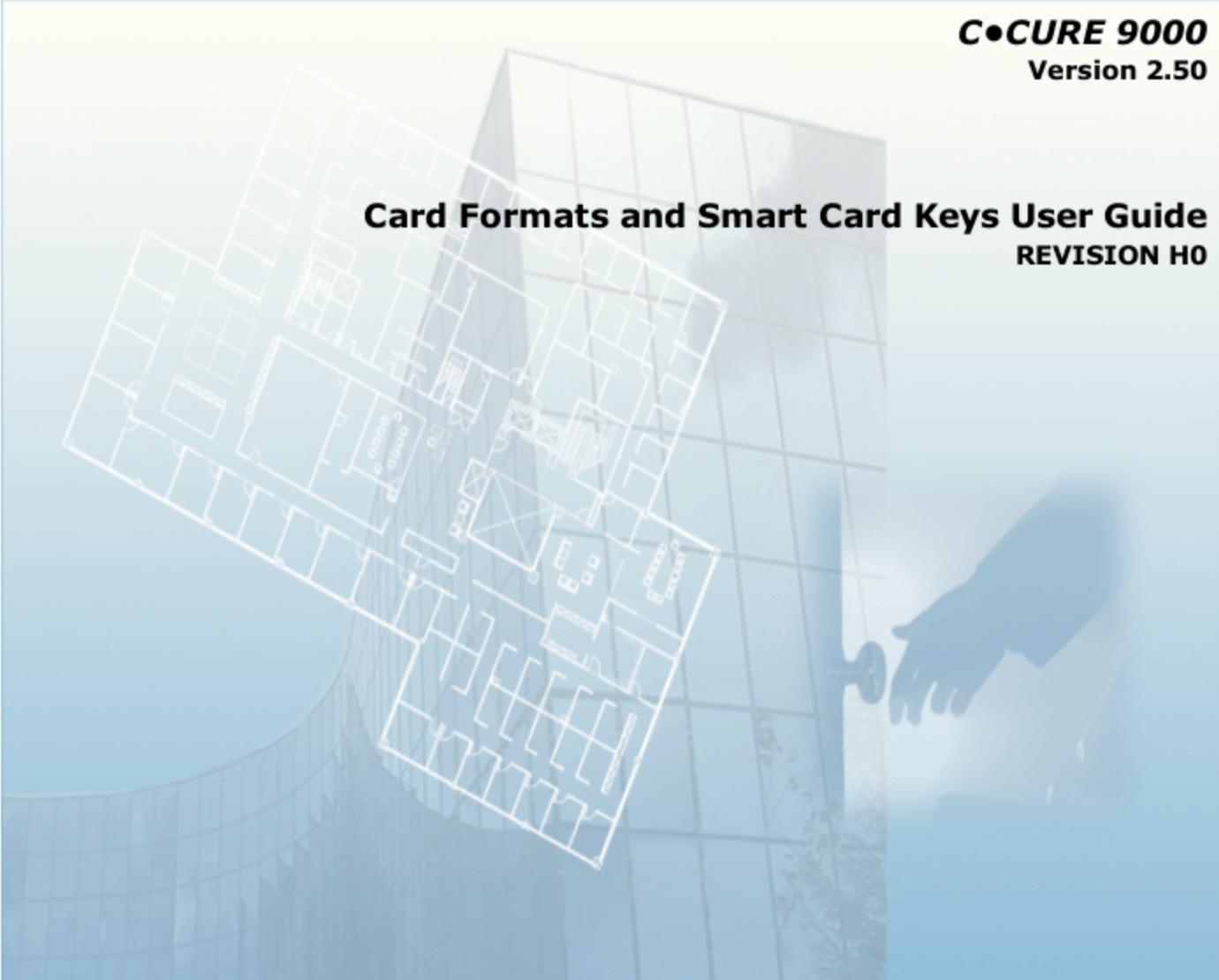# SOFTWARE HOUSE

*From Tyco Security Products*

**C•CURE 9000**
**Version 2.50**

**Card Formats and Smart Card Keys User Guide**
**REVISION H0**

# SOFTWARE HOUSE

UM-253 H0

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# Table of Contents

EFTA01225246

EFTA01225247

# Preface

The *C•CURE 9000 Card Formats and Keys User Guide* is for new and experienced security system users who want to learn to use this product for the Security Management System.

In this preface

EFTA01225248

# How to Use this Manual

This manual contains chapters that provide the following information about the C•CURE Card Formats and Smart Card Keys.

## Chapter 1: Card Formats

This chapter explains how to create and use Card Formats in C•CURE 9000.

## Chapter 2: Smart Card Keys

This chapter explains how to create and use Smart Card Keys.

## Appendix A: Card Format Primer

This appendix explains the way Card Formats are used in C•CURE 9000.

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# Finding More Information

You can access C•CURE 9000 manuals and online Help for more information about C•CURE 9000.

## Manuals

C•CURE 9000 software manuals are available in Adobe PDF format on the C•CURE 9000 DVD.

You can access the manuals if you copy the appropriate PDF files from the C•CURE 9000 Installation DVD English\Manuals folder.

The available C•CURE 9000 and Software House manuals are listed in the *C•CURE 9000 Installation and Upgrade Guide*, and appear as hyperlinks in the online.pdf file on the C•CURE 9000 DVD English\Manuals folder.

These manuals are also available from the Software House Member Center website
( ).

## Online Help

You can access C•CURE 9000 Help by pressing F1 or clicking Help from the menu bar in the Administration/Monitoring Station applications.

EFTA01225250

# Conventions

This manual uses the following text formats and symbols.

| Convention | Meaning |
|---|---|
| **Bold** | This font indicates screen elements, and also indicates when you should take a direct action in a procedure.<br>Bold font describes one of the following items:<br>• A command or character to type, or<br>• A button or option on the screen to press, or<br>• A key on the keyboard to press<br>• A screen element or name |
| blue color text | Indicates a hyperlink to a URL, or a cross-reference to a figure, table, or section in this guide. |
| *Regular italic font* | Indicates a new term. |
| <text> | Indicates a variable. |

The following items are used to indicate important information.

| | |
|---|---|
| **NOTE** | Indicates a note. Notes call attention to any item of information that may be of special importance. |
| **TIP** | Indicates an alternate method of performing a task. |
| ⚠ | Indicates a caution. A caution contains information essential to avoid damage to the system. A caution can pertain to hardware or software. |
| 🚫 | Indicates a warning. A warning contains information that advises users that failure to avoid a specific action could result in physical harm to the user or to the hardware. |
| 🛑 | Indicates a danger. A danger contains information that users must know to avoid death or serious injury. |

# Software House Customer Support Center

## Telephone Technical Support

During the period of the Agreement, the following guidelines apply:

- Software House accepts service calls **only** from employees of the Systems Integrator of Record for the installation associated with the support inquiry.

## Before Calling

Ensure that you:

- Are the Dealer of record for this account.
- Are certified by Software House for this product.
- Have a valid license and current Software Support Agreement (SSA) for the system.
- Have your system serial number available.
- Have your certification number available.

| Hours | Normal Support Hours | Monday through Friday, 8:00 ▮▮. to 8:00 ▮▮., EST. Except holidays. |
|---|---|---|
| | Emergency Support Hours | 24 hours/day, seven days a week, 365 days/year. Requires Enhanced SSA "7 x 24" Standby Telephone Support (emergency) provided to Certified Technicians. For all other customers, billable on time and materials basis. Minimum charges apply – See MSRP. |
| Phone | For telephone support contact numbers for all regions, see ▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮ | |

# 1

# Card Formats

This chapter explains how to create and use Card Formats in C•CURE 9000.

In this chapter:

# Card Format Overview

Card Formats specify the arrangement of data that a reader connected to a controller expects to read from presented access cards. When a person presents an access card at a reader, the reader passes the information encoded in it to the controller. This information is generally a string of numbers. Various portions of this string may have specific purposes, which the controller can check while determining if the cardholder should be granted or denied access. For the controller to interpret the numerical string, you must define a card format for C•CURE 9000 to download to the controller for use with that reader. Card Formats are assigned to a Controller's Readers in the Reader Editor for that Controller. See the *C•CURE 9000 Hardware Configuration Guide* for more information.

C•CURE 9000 supports up to 128 Card Formats. For each controller, only the card formats configured for its readers are downloaded.

C•CURE 9000 supports two types of Card Formats:

- Magnetic – Used with magnetic stripe encoding. Magnetic Card Format Fields are configured in digits and Data Length specifies the number of digits. Data Length is limited to 40 digits with Magnetic Card Formats, unless an HMAC field is included (in which case the Data Length must be 50 digits).

- WiegandProximity – the Card Format Fields are binary - they are configured in bits and Data Length specifies the number of bits. Data Length is limited to 200 bits for an ISC Controller, or 256 bits for an iSTAR Controller. Card formats longer than 200 bits will not be available for assignment to a card reader on an ISC controller.

Each Card Format is associated with a CHUID Format. Selecting a CHUID to associate with the Card Format determines which fields are valid in the Card Format definition, and automatically determines the Position Value for each Card Format Field.

Card Format configuration includes a range of reverse swipe options. Some of these options are controller-specific, as explained in the section on Reverse Swipe in Card Format Definitions on Page 22.

You can use the **Card Format Format Fields** tab to specify the fields included in the Card Format, their order and position in the Card Format, and the parity fields that are part of the Card Format.

To edit a card format, you use the **Card Format Editor** (see Card Format Editor on Page 13).

# Card Format Editor

You use the **Card Format Editor** to define the format and characteristics of the card formats used in your system. You can specify the fields used in the card format, the card type, and the way that C•CURE 9000 should handle a reverse swipe of a card that uses this format.

See Card Format Definitions on Page 22 for more information about **Card Format Editor** fields and buttons.

See Card Format Tasks on Page 13 for more information about the tasks you can perform with the **Card Format Editor**.

**Figure 1:** Card Format Editor
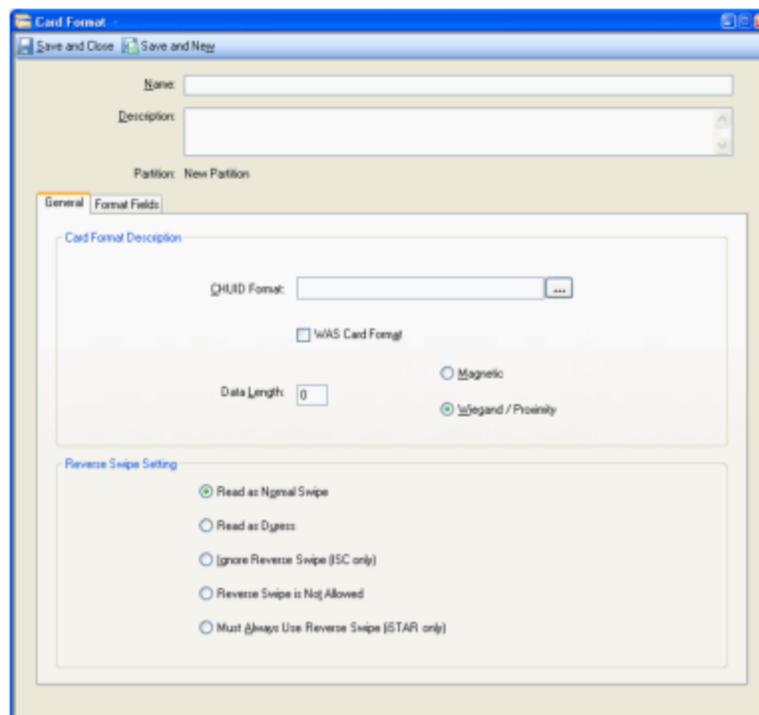


## Card Format Editor Tabs

The Card Format Editor stores information on several tabbed views. The following sections give more information about each Card Format tab and how to use it.

- Card Format General Tab on Page 16
- Card Format Format Fields Tab on Page 21

## Card Format Tasks

You can perform the following tasks with the Card Format Editor.

- Accessing the Card Format Editor on Page 14
- Creating a Card Format on Page 14
- Creating a Card Format Template on Page 15

- Viewing a List of Card Formats on Page 15
- Deleting a Card Format on Page 15

## Accessing the Card Format Editor

You can access the Card Format Editor from the C•CURE 9000 Navigation pane.

### To Access the Card Format Editor

1. In the Navigation Pane of the Administration Workstation, click **Card Formats and Keys** to open the Card Formats and Keys pane.

2. Select **Card Format** from the Card Formats and Keys pane drop-down list.

3. You can either:

   - Create a new Card Format by clicking **New**. The **Card Format Editor** opens, and you can configure the Card Format. See Creating a Card Format on Page 14 for more information.

   - Open a Dynamic View listing all Card Format objects by clicking . You can then double-click any Card Format object in the Dynamic View to open the Card Format Editor and configure the Card Format. See Viewing a List of Card Formats on Page 15 for more information.

## Creating a Card Format

You can create a new Card Format for use with your readers. You can base your Card Format on one of the Card Format templates provided with C•CURE 9000, or on a blank Card Format.

You can also create a new Card format template to use if you need to create multiple Card Formats based on a common set of parameters. See Creating a Card Format Template on Page 15.

### To Create a Card Format

1. In the Navigation Pane of the Administration Workstation, click **Card Formats and Keys** to open the Card Formats and Keys pane.

2. Select **Card Format** from the Card Formats and Keys pane drop-down list.

3. Click **New** to create a new Card Format. The **Card Format Editor** opens, and you can configure the Card Format.

4. Type a name for the Card format in the **Name** field.

5. Select a **CHUID Format** for the Card Format.

6. Configure the fields on the Card Format General tab and Format Fields tab. See Card Format Definitions on Page 22 for more information about these fields.

7. To save your new Card Format, click **Save and Close**.

   Alternatively, if you want to save the Card Format and then create a new one, click **Save and New**. The current Card Format is saved and closed, but the **Card Format Editor** remains open to allow you to create a new Card Format.

## Creating a Card Format Template

You can create a Card Format template, which you can then use as the basis of new Card Formats.

In a template, you can fill in field values that will have the same values for all records, and then use the template when you are creating new records.

**Example:**

> You could create a template for all card formats used in your company, all based on the same card type, but each format could include different data fields. Then you could save time by creating each new format from the template instead of the default blank form.

### To Create a Card Format Template

1. In the Navigation Pane of the Administration Workstation, click **Card Formats and Keys** to open the Card Formats and Keys pane.

2. Select **Card Format** from the Card Formats and Keys pane drop-down list.

3. Click the down-arrow on the **New** button and click on **Template** to create a new Card Format template. The **Badge Layout Editor** opens, and you can configure the Card Format.

4. Any fields for which you configure values become part of the template, and when you subsequently create a new Card Format from that template, these field values are already filled in.

5. Fill in the **Name** field with the name you wish to use for the template (for example "Card Format Template").

6. To save your new Card Format template, click **Save and Close**.

## Viewing a List of Card Formats

You can view a list of all Card Formats by opening the default Dynamic View for Card Formats.

### To View a List of Card Formats

1. In the Navigation Pane of the Administration Workstation, click **Card Formats and Keys** to open the Card Formats and Keys pane.

2. Select **Card Formats** from the Card Formats and Keys drop-down list.

3. Click  to open a Dynamic View listing all Card Format objects.

4. You can sort, filter, and group items in the list.

5. You can right-click a Card Format in the list to open the context menu and perform any of the functions on that menu. See "Using the Object List Context Menu" in the *C•CURE 9000 Getting Started Guide* for more information.

## Deleting a Card Format

You can delete a Card Format that you created in C•CURE 9000 if it is no longer needed. When a card format is deleted, if it has been assigned to any Readers, the assignment is removed.

1. In the Navigation Pane of the Administration Workstation, click **Card Formats and Keys** to open the Card Formats and Keys pane.

2. Select **Card Format** from the Card Foments and Keys pane drop-down list.

3. Click [icon] to view a list of existing Card Formats.

4. Right-click the Card Format you wish to delete and then choose **Delete** from the context menu.

5. Click **OK** to confirm that you want to delete the Card Format.

6. The Card Format is deleted.

## Card Format General Tab

The **Card Format General** tab allows you to define the type and data length for your Card Format, and define the way you want reverse swipes to be treated with this Card Format.

See Card Format Definitions on Page 22 for definitions of all fields and buttons on the **Card Format General** Tab.

### Configuring a Card Format

To configure a Card Format, you need to specify the following:

- CHUID it is based on
- Data Length of the format
- Method of encoding used
- Reverse Swipe options
- Card Data fields
- Parity fields

### Specifying a CHUID

When you define a Card Format, you must specify the Card Holder Unique ID (CHUID). A card format for use on an ISC controller must use the Card Only 32 bit CHUID format.

1. Click [icon] in the CHUID Format field. A CHUID Format dialog box appears.

2. Click the name of the CHUID you want to use; the **CHUID Format** dialog box closes and your selection is entered in the **CHUID Format** field.

### Specifying the Data Length for a Card Format

To set the data length for the Card Format, type the appropriate number in the **Data Length** field.

If you are using the Government-HMAC CHUID, the Data Length must be set to 50.

## Specifying the Encoding Method for a Card Format

To set the encoding method for the Card Format, choose either:

- Magnetic (if you are using magnetic stripe encoding)

- Wiegand/Proximity (if you are using a swipe or proximity card)

All card formats for ISC controllers should have the Wiegand/Proximity option selected because these formats are described using a binary field. This includes magnetic cards. In order to create a card format for a magnetic stripe card for ISC, each field in the Card Data Fields grid must have the encoding column set to BCD.

## Specifying the Reverse Swipe Options for a Card Format

To set the Reverse Swipe options for the Card Format, choose one of the following:

- Read as Normal Swipe – Treat a reverse swipe attempt as a normal swipe.

- Read as Duress – Treat a reverse swipe as a duress indication.

- Ignore Reverse Swipe – Select this option to have the reader ignore reverse swipe attempts. Supported only on ISC controllers.

- Reverse Swipe is Not Allowed – Select this option if you want the reader to treat reverse swipe attempts as invalid.

- Must Always Use Reverse Swipe - Select this option if you want only reverse card swipes to be read. Supported only on iSTAR controllers.

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# Creating an apC Card Format with Position Offsets

The apC controller supports the use of Position Offsets to define a Card Format that can accommodate a card set that includes some cards with identical Card Numbers but different Facility codes or Site codes.

You need to use Position Offsets in this case because the apC controller does not support multiple CHUID formats. (For iSTAR controllers, you can use multiple CHUID formats to deal with a card set that includes some cards with identical Card Numbers but different Facility codes or Site codes.)

**Example:**

A company using apCs has multiple cards with the same card number, but differing Facility codes.

**Table 1:** Position Offset Card Number Example

| Card Number | Facility Code |
|-------------|---------------|
| 0000000245  | 33            |
| 0000000245  | 45            |

With Position Offsets, you can define a Card Number that is composed of two fields in the card format. This card number is calculated by the apC and is compared to the Card Number specified in the Personnel record to determine if the card is accepted or rejected at the reader. You can specify an offset value for Facility code fields or Site code fields.

You can only use Position Offsets with Card Formats that use the **Card Only** CHUID, and are intended for use with apC Readers.

Position Offset values must be a minimum of five positions, with a maximum of nine positions.

When you select the **Card Only** CHUID Format in the Card Format editor, an additional field, **Show Position Offsets - apC only**, appears and is selectable. On the Format Fields tab, an additional column - **Position Offset** - is added to the Card Data Fields table.



If you select any features that enable the Card Format for use with an ISC or iSTAR reader, the Position Offsets option becomes unavailable.

**Example:**

If you select either **Ignore Reverse Swipe (ISC only)** or **Must always Use Reverse Swipe (iSTAR only)**, the **Show Position Offsets - apC only** option is unavailable.
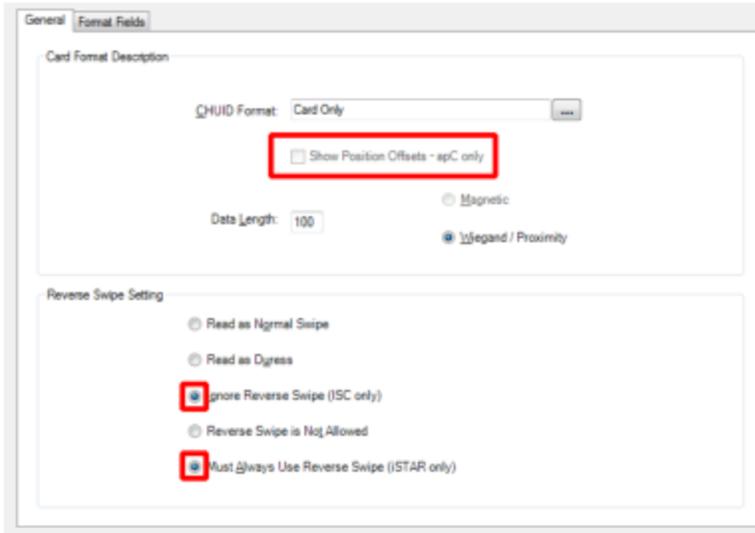
## Using Card formats with Position Offsets for apC

You need to perform the following steps to define a Card Format that uses a Position Offset for apC:

1. Define a new Card Format. See Defining a Card Format with a Position Offset on Page 19.

2. Assign the Card Format to the apC Readers where the cards will be used (only apC Readers are allowed to use this type of Card Format).

3. For every access card that will use the new Card Format:

   a. Calculate the card number that the apC will use. You can either calculate the number manually or swipe the card at an apC reader to see the card number (the System Variable Display Card in Journal must be set to True). See To Calculate a Card Number When Using an Offset Facility Code on Page 20.

   b. Add a Credential to the owner's Personnel record (on the Personnel Credentials tab).

   c. Enter the calculated card number for the card into the Credential.

## Defining a Card Format with a Position Offset

To use Position Offsets for a Facility code or Site code in a Card Format, you must configure the offsets on the Card Format editor Format Fields tab.

You add a row to the Card Data Fields table to define the Position Offset and the possible Values for the Facility code or Site code.

### To Define a Card Format with Offset Facility Code

1. Open the Card Format Editor (see Accessing the Card Format Editor on Page 14).

2. Click [...] in the CHUID Format field and select the **Card Only** CHUID Format. The **Show Position Offsets - apC Only** field appears.

3. Select **Show Position Offsets - apC Only** to enable the Position Offset column on the Format Fields tab.

4. Enter the **Data Length** for your Card Format. For Wiegand/Proximity formats, the data length is measured in bits. If you select Magnetic, the data length is in digits.

5. Click the Format Fields tab.

6. Click **Add** to add a row to the Card Data Fields table for the Facility code.

7. Click the drop-down arrow in the **Field Type** column and choose **Card Facility Code**. (This row defines the Position Offset.)

8. Configure the Start Position, Length, End Position for this field.

9. In the Position Offset column, enter the offset value (minimum of 5, maximum of 9).

10. Click in the **Value** column, then click   ...  .
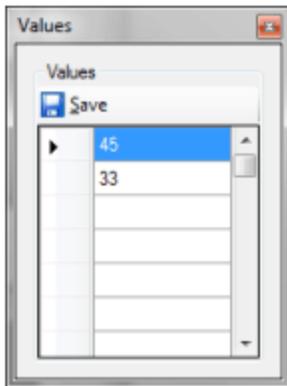


11. In the **Values** popup that appears, enter the values for your Facility Codes (each in a separate row of the table), then click **Save**.

12. Click **Add** to add a row to the Card Data Fields table for the Card Number.

13. Click the drop-down arrow in the **Field Type** column and choose **Card Number**. (This row defines the Card Number for the card).
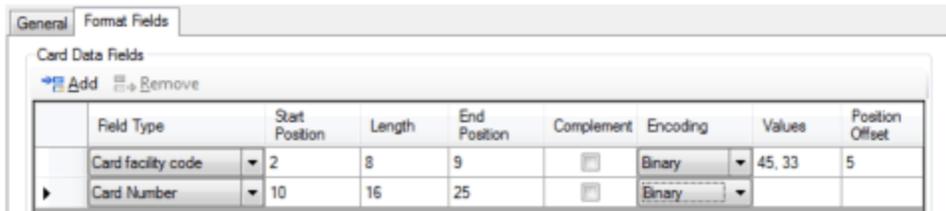
14. Configure the **Start Position**, **Length**, **End Position** for this field.



15. Click **Save and Close** to save the Card Format you have configured.

## Calculating a Card Number for a Card Format that Uses an Offset Facility Code

### To Calculate a Card Number When Using an Offset Facility Code

Once you define a Card Format with offsets, you will need to calculate the card number to enter in each Personnel Credential for cards that use this format.

Use the following formula to calculate the card number when offset values are being used.

Calculated Card_Number = Offset_field x $10^{Position\_Offset\_for\_Field}$ + Card_Number_field

**Example:**

You have a card set with cards that have the same card number but different Facility Codes.

In this case, two cards with card number 245, one having Facility Code 45, the other having Facility Code 33.

For each card, you need to use the following formula to determine the calculated Card Number that includes the Facility code:

Calculated Card_Number = Facility_code_field x $10^{Position\_Offset\_for\_Facility\_code}$ + Card_Number_field

Card Number Calculation

| Card Data | Facility code field x 10 Position Offset for Facility code | Card Number | Calculated Card Number |
|---|---|---|---|
| Card number 245, Facility Code 45 | $45 \times 10^5 = 4,500,000$ | 245 | 4,500,245 |
| Card number 245, Facility Code 33 | $33 \times 10^5 = 3,300,000$ | 245 | 3,300,245 |

## Card Format Format Fields Tab

The **Format Fields** tab lets you specify the fields included in the Card Format, their order and position in the Card Format, and the parity fields that are part of the Card Format.

See Card Format Format Fields Tab Definitions on for definitions of all fields and buttons on the **Card Format Format Fields** tab.

### Format Fields Tab Tasks

- Specifying Card Data Fields on
- Defining Parity Fields on

### Specifying Card Data Fields

You can choose the Data Fields that are contained in your Card Format by adding them to the **Card Data Fields** table on the **Format Fields** tab.

**To Specify Card Data Fields**

1. Create a Card Format or edit an existing Card Format.

2. Select a CHUID format for the Card Format.

3. Click the **Format Fields** tab.

4. In the **Card Data Fields** table, click **Add** to add a row to the table.

5. In the **Field Type** column, select a field from the drop-down list.

6. Configure the columns in the **Card Data Fields** table.

   - For Magnetic card formats, enter the Start Position, Length, and Values for the field (the End Position is calculated by the system). See Card Format Format Fields Tab Definitions on Page 23.

   - For Wiegand/Proximity card formats, enter the Start Position, Length, Complement, Encoding, and Values for the field (the End Position is calculated by the system). See Card Format Format Fields Tab Definitions on Page 23.

7. You can add additional fields to the Card Format by repeating the previous steps.

8. You can remove one or more fields from the **Card Data Fields** table by clicking the row selector ▸ for each row you wish to remove (hold down **SHIFT** or **Ctrl** to select multiple rows), then clicking the **Remove** button.

9. To save your new Card Format, click **Save and Close**.

## Defining Parity Fields

For Card Formats, such as Standard Wiegand, that support Parity Fields, you can choose the Parity Fields that are contained in your Card Format by adding them to the **Parity Fields** table on the **Format Fields** tab.

### To Define Parity Fields

1. Create a Card Format or edit an existing Card Format.

2. Select a CHUID format for the Card Format.

3. Click the **Format Fields** tab.

4. In the **Parity Fields** table, click **Add** to add a row to the table.

5. Set the Type Column to either **EvenParity** or **OddParity**.

   - In an Even Parity row, you can click in a column to add an **E** (set an even parity bit mask), or click again to clear a column. Type a **P** in the column to indicate the parity bit.

   - In an Odd Parity row, you can click in a column to add on **O** (set an odd parity bitmask), or click again to clear a column. Type a **P** in the column to indicate the parity bit.

6. You can add additional Parity fields to the Card Format by repeating the previous steps.

7. You can remove one or more fields from the **Parity Fields** table by clicking the row selector ▸ for each row you wish to remove (hold down **SHIFT** or **Ctrl** to select multiple rows), then clicking the **Remove** button.

8. To save your Card Format, click **Save and Close**.

## Card Format Definitions

This section defines the fields and buttons on the **Card Format Editor General** and **Format Fields** tabs.

### Card Format General Tab Definitions

See Table 2 on Page 23 for definitions of the fields and buttons on the **Card Format General** tab.

**Table 2:** Card Format General Tab Definitions

| Field/Button | Description |
|---|---|
| Name | Type a name for the Card Format you are editing. |
| Description | Type a textual description of the Card Format you are creating. |
| Partition | A read-only field displaying the partition to which this Card Format belongs. This field is visible only if the C•CURE 9000 system is partitioned. |
| CHUID Format | Choose a CHUID format from the list of CHUID formats. |
| Show Position Offsets - apC only | If you choose the **Card Only** CHUID for the CHUID format, this field appears to allow you to designate this Card Format as an apC-only Card Format that uses Position Offsets. You can use this to define a Card Format that allows access cards with duplicate card numbers but differing Facility Codes or Site Codes to be used at apC Readers. <br><br> See Creating an apC Card Format with Position Offsets on Page 18. |
| Data Length | Type the data length. For Wiegand/Proximity, the data length is measured in bits. If you select Magnetic, the data length is in digits. If you specify a CHUID that includes an HMAC, the data length must be 50. |
| Magnetic | Select this option to define this format as intended for Magnetic stripe access cards. |
| Wiegand/Proximity | Select this option to define this format as intended for Wiegand or proximity access cards. |
| Read as Normal Swipe | Treats a reverse swipe attempt as a normal swipe. |
| Read as Duress | Treats a reverse swipe as a duress indication. |
| Ignore Reverse Swipe (ISC only) | The reader ignores reverse swipe attempts. (Supported only on ISC controllers.) |
| Reverse Swipe is Not Allowed | The reader treats reverse swipe attempts as invalid. |
| Must Always Use Reverse Swipe (iSTAR only) | Only reverse card swipes are read. (Supported only on iSTAR controllers.) |
| Save and Close | Click **Save and Close** when you have completed any changes to a Card Format and wish to save those changes. |
| Save and New | Click **Save and New** when you have completed any changes to the Card Format and wish to save those changes, and you want to create a new Card Format. The Card Format you were editing is saved, and a new Card Format opens (either blank or including template information if you were using a template to create new Card Formats). |
| Close <br> ❎ | Click **Close** when you want to close the Card Format Editor without saving your changes. <br><br> A prompt appears so that you can choose to continue editing or close the editor. Click **OK** to close the editor without saving changes, or click **Cancel** to continue editing the Card Format. |

## Card Format Format Fields Tab Definitions

See Table 3 on Page 24 for definitions of the fields and buttons on the **Card Format Format Fields** tab **Card Data Fields**.

See Table 4 on Page 25 for definitions of the fields and buttons on the **Card Format Format Fields** tab **Parity Fields**. The **Parity Fields** table is used only for binary data formats and is not available for Magnetic card formats.

**Table 3:** Card Format Fields Tab Card Data Fields

| Field/Button | Description |
|---|---|
| Add | Click this button to add a new card data field. A new row is added to the table, and you can select the field for the row from the drop-down list in the Fields column. |
| Remove | Click the row selector ▸ to select one or more parity field rows (hold down **SHIFT** or **Ctrl** to select multiple rows), then click this button to remove the row for this field. This button is unavailable when no rows exist, or no rows are selected. |
| Field Type | The available field types are the same as those available for CHUID Formats.<br>See Card Format Fields on Page 36 for a list of field types. |
| Start Position | Indicates the starting position of the field in units of either digits or bits depending on the Data Format. The first position is 1.<br>For a Magnetic Format, position 1 is reserved and cannot be assigned to any field type. |
| Length | Indicates the field length in digits or bits. |
| End Position | This read-only value is calculated based on the Start Position and Length. |
| Complement | If you select **Complement**, the bits in the field will be complemented (that is, all 1 bits are changed to 0 and all 0 bits are changed to 1).<br>If you do not select **Complement**, the bits in the field will not be complemented.<br>NOTE: Complement is disabled for the following field types because it does not apply:<br>  - Card Status<br>  - Expiration Date<br>  - Fixed Data |
| Encoding | Encoding applies only to the Binary Data Format; it does not appear for a magnetic card. It provides three possible valid values:<br>• Binary data<br>• BCD data<br>• BCD reversed data<br>NOTE: The Encoding column is disabled for the following because it does not apply:<br>  - Card Status<br>  - Expiration Date<br>  - Fixed Data |
| Values | A data value can be specified for the field type.<br>NOTE: The Values cell for a Card Data Field is only enabled if it requires a value. Values are required for the following field types:<br>  - Card Facility Code<br>  - Fixed Data<br>  - Fixed Binary<br>  - Site Code |
| Position Offset | Enter the number of positions to offset the Card Data field defined by this row in the Card Data Fields table. This column appears only when **Show Position Offsets - apC only** is selected on the General tab. See Creating an apC Card Format with Position Offsets on Page 18 for more information about using Position Offsets for card numbers with apC Readers. |

**Table 4:** Card Format Fields Tab Parity Fields

| Field/Button | Description |
|---|---|
| Add | Click this button to add a new parity field. A new row is added to the table, and you can select the parity for the row from the drop-down list in the **Type** column. |
| Remove | Click the row selector ▸ to select one or more parity field rows (hold down **SHIFT** or **Ctrl** to select multiple rows), then click **Remove** to delete the row(s) for this field. This button is unavailable when no rows exist, or no rows are selected. |
| Type | Choose Even Parity or Odd Parity for this row. |
| Positions | If you have set Even Parity for this row, you can type in a P to indicate the parity bit, or click in a position block to place a E for an Even parity mask bit. Click again to clear a position block.<br><br>If you have set Odd Parity, you can type in a P to indicate the parity bit, or click in a position block to place an O for an Odd parity mask bit. Click again to clear a position block.<br><br>You can use this mechanism to create parity masks containing non-contiguous bits. |

# 2

# Smart Card Keys

This chapter explains how to create and use Smart Card Keys.

In this chapter

# Smart Card Keys

C•CURE ID provides the ability to define Smart Cart Keys for MIFARE Smart Cards.

MIFARE Smart Card Keys are six byte (48-Bit) values used to secure sectors on the card. There is one key for reading and one key for writing per sector. The keys can be the same value if desired, but for security reasons, they are typically assigned different values.

The Smart Card Keys are used when you are reading data from MIFARE Smart Cards and programming MIFARE Smart Cards.

- To read data from a MIFARE Smart Card, a device must know the Read Key that is on the Smart Card, or the read attempt is rejected.

- To program (write data to) the Smart Card, the device must know the Write Key.

Each sector on the Smart Card can have a different Read Key and Write Key.

In addition,you must program your Smart Card readers with the Read key that you used on the cards, so that your Smart Card readers can read the data that you program onto the Smart Cards.

You define Smart Card Keys using the Smart Card Key editor.

You can access the Smart Card Key editor from the **Card Formats and Keys** pane in the Administration Client application.

See **Smart Card Keys** help for more information about Smart Card Keys.

## Smart Card Key Configuration

Use **Configure>Smart Card Key** from the C•CURE 800/8000 Administration application to create, edit, and specify Smart Card keys. A Smart Card key is used to securely read and write data to a Smart Card, and also to program Smart Card readers to read cards that are encoded with this Smart Card key.

## Smart Card Key Tasks

You can perform the following tasks from the Smart Card Key dialog box.

- Accessing the Smart Card Key Dialog Box on Page 29.
- Creating a Smart Card Key on Page 29.
- Editing a Smart Card Key on Page 30.

For more information on Smart Card Keys, see:

- Smart Card Keys on Page 28.
- Smart Card Key Definitions on Page 32.

## Accessing the Smart Card Key Dialog Box

### To Access the Smart Card Key Dialog Box

You access the Smart Card Key dialog box from the **Configure** menu in the Administration application.

1. Choose **Configure>Smart Card Key** from the Administration application menu. The Smart Card Selection dialog box opens.

2. Select a Smart Card Key from the selection list and click **Edit** to edit an existing Smart Card Key, or click **New** to create a new Smart Card Key. The Smart Card Key dialog box opens.

## Creating a Smart Card Key

You can create custom Smart Card Keys that can be used to read and write Smart Card data to MIFARE Smart Cards. Custom keys provided additional security over default keys because you can make them unique to your site. However, they add complexity because you have to program your Smart Card readers to read your custom keys, and if you decide to change custom keys, you will need to re-program your readers and re-issue cards with the new custom keys.

After you create a Smart Card Key file with a custom key, you can add the Smart Card Key file to a template for enrolling and programming MIFARE Smart Cards in **Options>Badge Setup**.

### To Create a Smart Card Key

1. Choose **Configure>Smart Card Key** from the Administration Application menu.

2. On the Smart Card Key Selection dialog box, click Click **New**. The Smart Card Key dialog box opens.

3. On the Smart Card Key dialog box, type a name for the Smart Card Key in the **Name** field.

4. Type a description that describes the Smart Card Key in the **Description** field.

5. If you want to use an existing Smart Card Key file (the file that defines the read and write key values) for this Smart Card Key, select the file name from the **Smart card key file name** field and click **Edit File**. The Smart Card Key dialog box opens and you can edit the Smart Card Key.

6. Alternatively, if you want to create a new Smart Card Key, type a name for the Smart Card Key into the **Smart card key file name** field and click **New File**. The Smart Card Key file dialog box opens and you can create a new Smart Card Key.

7. On the Smart Card Key dialog box, you can type in a new key value in the **Key Value** field, then retype it in the **Confirm Key Value** field.

8. Alternatively, if you want to create a random key, you can click **Generate Random Key**, and a 12 hex character random key is inserted into the **Key Value** and **Confirm Key Value** fields.

9. Whether you type in or generate a random key, you should write this key down and save it in a secure location. When you save the key, the key will be encrypted, and you will not be able to read it.

10. If you want to export the encrypted key to a file for later use (for example, to buy programmed cards from Software House), click **Export Key**. A **Save as** dialog appears to let you save the encrypted key as a file with a

.doc extension. Note that this is not a Word document, and it should not be opened with a word processing editor.

11. Click **OK** to save the Smart Card Key file. If you have changed the Smart Card Key value, a confirmation dialog box appears to confirm the change.

> If you have modified an existing Key, the system displays the following message
>
> "Are you sure you want to overwrite this key? Loss of a key could result in reissuing all of the cards in the system along with programming all of the readers."
>
> This means that if you change the Key value and use it to program one or more Smart Cards, your Smart Card readers will need to be re-programmed to accept a card with the new key. If you re-program the readers, any cards you have issued using the previous key will need to be re-issued as well.

12. Select **Confirm file over write operation** and click **Continue** to save the changes. The key file is encrypted and saved, and the Smart Card Key dialog box re-opens.

13. Click **OK** to save your Smart Card Key, or **Cancel** to discard <u>ALL</u> changes (even if you have saved changes to a Smart Card Key, clicking **Cancel** signifies that you want to discard them).

## Editing a Smart Card Key

You can create custom Smart Card Keys that can be used to read and write Smart Card data to MIFARE Smart Cards. Custom keys provided additional security over default keys because you can make them unique to your site. However, they add complexity because you have to program your Smart Card readers to read your custom keys, and if you decide to change custom keys, you will need to re-program your readers and re-issue cards with the new custom keys.

After you create a Smart Card Key file with a custom key, you can add the Smart Card Key file to a template for enrolling and programming MIFARE Smart Cards in **Options>Badge Setup**.

### To Edit a Smart Card Key

1. Choose **Configure>Smart Card Key** from the Administration Application menu.

2. On the Smart Card Key Selection dialog box, click Click **New**. The Smart Card Key dialog box opens.

3. On the Smart Card Key dialog box, edit the name for the Smart Card Key in the **Name** field.

4. Make any changes needed to the description that describes the Smart Card Key in the **Description** field.

5. If you want to use a different Smart Card Key file for this Smart Card Key, select the file name from the **Smart card key file name** field and click **Edit File**. The Smart Card Key file dialog box opens and you can edit the Smart Card Key.

6. Alternatively, if you want to create a new Smart Card Key file, type a name for the Smart Card Key file into the **Smart card key file name** field and click **New File**. The Smart Card Key dialog box opens and you can create a new Smart Card Key.

7. On the Smart Card Key dialog box, you can type a new key value into the **Key Value** field, then retype it in the **Confirm Key Value** field.

> **NOTE** You will not be able to see the existing Key Value. The Key Value is represented by asterisks (************).

8. Alternatively, if you want to create a random key, you can click **Generate Random Key**, and a 12 hex character random key is inserted into the **Key Value** and **Confirm Key Value** fields.

9. Whether you type in or generate a random key, you should write this key and save it in a secure location. When you save the key, the key will be encrypted, and you will not be able to read it.

10. If you want to export the encrypted key to a file for later use (for example, to buy programmed cards from Software House), click **Export Key**. A **Save as** dialog appears to let you save the encrypted key as a file with a .doc extension. Note that this is not a Word document, and it should not be opened with a word processing editor.

11. Click **OK** to save the Smart Card Key file. If you have changed the Smart Card Key value, a confirmation dialog box appears to confirm the change.

> 🚫 If you have modified an existing Key, the system displays the following message
>
> "Are you sure you want to overwrite this key? Loss of a key could result in reissuing all of the cards in the system along with programming all of the readers."
>
> This means that if you change the Key value and use it to program one or more Smart Cards, your Smart Card readers will need to be re-programmed to accept a card with the new key. If you re-program the readers, any cards you have issued using the previous key will need to be re-issued as well.

12. Select **Confirm file over write operation** and click **Continue** to save the changes. The key file is encrypted and saved, and the Smart Card Key dialog box re-opens.

13. Click **OK** to save your Smart Card Key, or **Cancel** to discard ALL changes (even if you have saved changes to a Smart Card Key, clicking **Cancel** signifies that you want to discard them).

# Smart Card Key Definitions

The following fields and buttons appear on the Smart Card Key dialog boxes.

## Smart Card Key Dialog Box

Table 5 on Page 32 provides definitions for the fields and buttons on the Smart Card Key dialog box.

**Table 5:** Smart Card Key Definitions

| Field/Button | Description |
|---|---|
| Name | Enter a name for the Smart Card Key. The name can be from 1-50 characters, and is validated as a unique name by C•CURE 800/8000. |
| Description | Enter a textual description of the Smart Card Key. The description can be from 1 to 3000 characters. |
| Smart card key file name | This drop-down list will be populated with all ".SWK" files in the "KEY" directory in the badging server data path. Key files are unique per C•CURE 800/8000 System. In case of C•CURE Central, key files will not work across multiple C•CURE 800/8000 Servers. Users with this setup need to set up a different Badging Server Path for each server. |
| Edit File | Click this button to open the Key Configuration dialog box to edit the key file. |
| New File | Click this button to open the New Key file dialog box, so that you can create a new key file. |
| OK | Click **OK** to save your edits to the Smart Card Key. |
| Cancel | Click **Cancel** to discard any edits you have made to the Smart Card Key. |

## New Key File Dialog Box

Table 6 on Page 32 provides definitions for the fields and buttons on the New Key File dialog box.

**Table 6:** Smart Card Key Definitions

| Field/Button | Description |
|---|---|
| New File Name | You can enter a name for the Smart Card Key file. The name must be from 1-50 characters. The name is is validated as a unique name by C•CURE 800/8000. |
| OK | Click **OK** to save your edits to the Smart Card Key file. |
| Cancel | Click **Cancel** to discard any edits you have made to the Smart Card Key file. |

## Smart Card Key Configuration Dialog Box

**NOTE**

> This dialog box displays the following recommendation:
>
> It is recommended that you save this HEX key value in an external source. This data is not stored in the database, and the loss of this key could result in reissuing all of the cards in the system along with reprogramming all of the readers.
>
> You should save an unencrypted copy of the HEX key value in a secure location so that you can reproduce it if needed, and so that you can use it to program Smart Card readers to read the cards you program.
>
> You can use the **Export Key** button to save the Key value in a file with the extension .doc – this is not a Microsoft Word document file, it is a text file with encrypted data. Do not open it with a word processor like Word. This .doc file is used if you order pre-programmed cards from Software House, or if you order program cards from Software House to program your Smart Card readers.

Table 7 on Page 33 provides definitions for the fields and buttons on the Smart Card Key dialog box.

**Table 7:** Smart Card Key Definitions

| Field/Button | Description |
|---|---|
| Key Value (12 Hex characters) | This is a 6 Byte Value (12 Hex Digits: '0'-'9', 'A'-'F') that you can type in to create a new Smart Card Key. When you edit an existing Smart Card Key, this field will only show "asterisks" like a password field. |
| Confirm Key Value | This is a 6 Byte Value (12 Hex Digits: '0'-'9', 'A'-'F'), that must match the key in **Key Value**, otherwise any changes in the key value will not be saved when you click **OK**. When you click **Generate Random Key**, matching keys are generated and inserted into both the **Key Value** and **Confirm Key Value** fields. |
| Generate Random Key | Click this button to have the system generate a random number key value. The Random key value is displayed in the **Key Value** and **Confirm Key Value** fields. Click **OK** to save this random key value. |
| Export Key | This button will export a key to a ".DOC" format that can be used to order a program card to program smart card readers, or to order pre-programmed smart cards from Software House. When you click **Export Key**, a prompt appears asking for the path where you want to save the key file. type in the path and click **OK**. |
| Destination File | This read-only field displays the location that the export key .doc file will be written to. The file is named by the Smart Card key name that you typed in to create the key. |
| OK | Click **OK** to accept the Key value. If you have modified an existing Key, the system displays the following message<br><br>"Are you sure you want to overwrite this key? Loss of a key could result in reissuing all of the cards in the system along with programming all of the readers."<br><br>This means that if you change the Key value and use it to program one or more Smart Cards, your Smart Card readers will need to be re-programmed to accept a card with the new key. If you re-program the readers, any cards you have issued using the previous key will need to be re-issued as well.<br><br>When the Smart Card Key dialog box reappears, you must click **OK** to save the Smart Card Key File. If you click **Cancel** from the Smart Card Key dialog box, the changes you made to the Smart Card key file will not be saved. |
| Cancel | Click **Cancel** to discard any changes that you have made, or to cancel creating a Key file. |

*C•CURE 9000 Card Formats and Smart Card Keys User Guide*

# A

# Card Format Primer

This appendix explains the way Card Formats are used in C•CURE 9000.

In this Appendix

# Card Formats

When a person presents an access card at a reader, the reader passes the information encoded in it to the panel. This information is generally a string of numbers. Various portions of this string may have specific purposes, which the panel can check while determining if the cardholder should be granted or denied access. For the panel to interpret the numerical string, you must define a card format.

The following topics provide more information about Card Formats:

## Card Format Fields

The possible fields within the card format are described in Figure 2 on Page 37.

**Table 8:** Card Format fields

| Field | Description |
|---|---|
| Facility/company code | Data field that should contain identification unique to the company. C•CURE 9000 card formats support up to 50 Facility codes in a card format for apC and iSTAR controllers. |
| Site code | Field that identifies the issuing site—for companies that issue cards from several locations. |
| Card number | Field that contains the identification number, unique to each person using the system, for cards with the same facility and/or site code.<br>This number is associated with a particular personnel record in the system. |
| Issue code | Number indicating how many times a card with this card number has been issued. When the card is replaced (original is lost or damaged), you must increment this number. The panel supports issue codes from 0 to 7.<br>The number on the card must match the issue code in the person's record. |
| Fixed data | Field within the encoded information that remains the same for all cards used with the particular card format. Similar to facility and site codes. |
| Parity | Field providing a way to check whether the card read operation was correct.<br>Parity bits are included in Wiegand and proximity access cards.<br>Parity can be even or odd. It can be calculated for the entire length of the card, or for a part of it. |
| LRC | Longitudinal Redundancy Check. This field is for informational purposes only. |
| Expiration date | Field providing a way for a card reader to check whether or not a card is still valid through an expiration date encoded in the card. Once this card format is applied to a given reader, a cardholder whose card has an unexpired date is allowed access at the door. If, on the other hand, the cardholder presents a card with an expired date to the reader, the door stays locked, denying the cardholder access.<br>If the expiration date encoded on the card is the present date, the panel expires the card at the beginning of the following day.<br>If the expiration date/time configured in the cardholder's personnel record precedes the encoded expiration date, the panel expires the card at that date/time. |

When you define a card format, you must include these fields:

- Card number
- Card length
- Card type

The other field types provide additional information for the system to check before granting access, but they are not required.

## Sample Card Format for Mag14

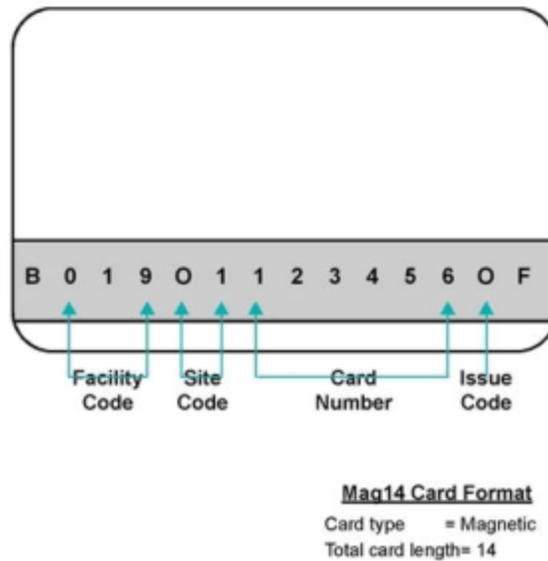**Figure 2:** Sample Card Format for Mag14



Mag14 Card Format
Card type      = Magnetic
Total card length= 14

**Table 9:** Card Format for Mag14

| Field | Starting Position | Length | Data in Field |
|---|---|---|---|
| Facility Code | 2 | 3 | 019 |
| Site Code | 5 | 2 | 01 |
| Card Number | 7 | 6 | |
| Issue Code | 13 | 1 | |

## Magnetic Cards

Magnetic cards have tracks inside a magnetic strip. These tracks contain encoded information, such as an internal card number, that the panel interprets. A user swipes this kind of card through a card reader. Refer to the *C•CURE 9000 Getting Started Guide* for a list of UL approved readers and card formats.

The encoded information on a magnetic card may include:

- Facility or company code

- Issue code

- Site code

- Card number

- Expiration date

Fourteen and 25-digit (one half byte) magnetic cards are common.

**NOTE** Be sure to follow ISO Standards: Track 1 can be alphanumeric but Tracks 2 and 3 must be numeric only. See Table 10 on Page 38.

**Table 10:** ISO Standards

| Track | Data Type | Credit Card | AAMVA License | Non-AAMVA Version of California License |
|-------|-----------|-------------|---------------|------------------------------------------|
| 1 | Alpha-Numeric (210 BPI, 7 Bits/Char) | Account Number<br>Name<br>Expiration Date | Last Name<br>First Name<br>Address<br>City<br>State | Last Name<br>First Name<br>Address<br>City |
| 2 | Numeric-Only<br>(75 BPI, 5 Bits/Char) | Account Number<br>Expiration Date | Drivers License Number<br>Expirtation Date<br>Birthdate | Drivers License Number<br>Expirtation Date<br>Birthdate |
| 3 | Numeric-Only<br>(210 BPI, 5 Bits/Char)<br>(No longer in use) | ISO 4909 Specification<br>(No longer in use) | (N/A) | (N/A) |

## Encrypted Magnetic Cards

These cards are generated using the ELCOM encoder with the Software House algorithm.

## Wiegand Cards

Wiegand cards contain encoded information in an internal format that resembles a bar code. A sensing coil inside a Wiegand reader creates a magnetic field so that when the wires inside the card interact with the reader's magnetic field, they create low voltage impulses in the sensing coil.

Depending on the arrangement of wires in the card, the voltage is either positive or negative. The read head and small circuit board inside the card reader (called a *personality board*) translate the card's voltages and transmit the information to the panel.

Some Wiegand cards have an external or *emboss* number that maps to an internal number. The security manifest you receive with your cards matches a card's emboss number with its internal number and also provides information about card format. The encoded information on a Wiegand card can include:

- Parity information
- Facility or company code
- Card number

**NOTE**  Wiegand cards can use a variety of different formats. If you are uncertain about what data is encoded in your cards, contact your dealer representative.

Twenty-six, 36-bit, and 37-bit Wiegand cards are common.


## Proximity Cards

Proximity cards contain an antenna and an IC chip containing stored information. Usually the cards contain the same type of cardholder information as Wiegand cards. Readers and cards are available in a number of frequencies and technologies. Some readers are able to read several different types of cards, while others are limited to a single format.

The most common proximity cards are "passive"; the radio frequency field generated by the card reader energizes the card and allows the IC chip to transmit its data. Most readers require the card to be placed within a few inches of the read head. A few types of "long range" readers have effective ranges out to several feet.

The obvious advantage of the proximity card is that it may remain in a pocket or handbag, hang from a belt, or even be attached to a vehicle and still be effective.

Most modern proximity readers use a Wiegand-style output, with Wiegand 36 and 37 being the most popular. C•CURE 9000 users, however, should select the Proximity technology when configuring proximity card formats.

# Index

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Index