CRC
Technical Reference Manual

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DOCUMENT HISTORY

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01NOV01	1.0	Initial publication.

Content

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This equipment can generate and radiate radio frequency energy. If this equipment is not installed in accordance with this manual, it may cause interference to radio communications. This equipment has been tested and found to comply within the limits for Class A computing devices pursuant to Subpart B of Part 15 of the FCC Rules. These rules are designed to provide reasonable protection against such interference when this equipment is operated in a commercial environment. Operation of this equipment is likely to cause interference, in which case the user at his own expense, is required to take whatever measures may be required to correct the interference.

Approvals

The Card Reader Controller (CRC) has been submitted to the following approval agencies for listing:

- Federal Communications Commission (FCC)
- Underwriters Laboratories Inc. (UL)
- Underwriters Laboratories of Canada (ULC)

The CRC is compatible with the EST3 System.

Chapter 1

Introduction

Summary

This chapter introduces you to the Card Reader Controller (CRC). We describe the CRC and present an overview of its operation.

Content

About this manual

Purpose of the manual

This manual shows you how to design and develop an access control system based on the capabilities of the Card Reader Controller (CRC). It also provides information on how to install, wire, configure, and maintain the CRC and related components.

Intended audience

This manual and the information it contains are intended for people who have experience with fire alarm systems, and a basic knowledge of security and access control applications.

Organization

This manual is organized into chapters. Here are brief descriptions of the chapters.

Chapter 1: Introduction. Provides information on how this manual is structured and gives a basic overview of the CRC.

Chapter 2: Features and functions. Provides a detailed look at the CRC's primary features and functions.

Chapter 3: Hardware and equipment. Provides a detailed list of compatible equipment that can be used with a CRC and an access control system.

Chapter 4: Access control applications. Provides information on designing an access control system using the CRC and related components.

Chapter 5: Installation. Provides details on how to install a CRC and associated devices.

Chapter 6: Programming. Breaks configuration down into SDU and ACDB options. This chapter gives a definition and explanation of each configuration option or setting.

Chapter 7: Operation. This chapter explains the operations of the CRC and some of its related components.

Chapter 8: Maintenance and troubleshooting. Explains different problems that may arise while using the CRC, card readers, or access control system and gives suggested solutions.

The manual includes a glossary and an index.

Related documents

ACDB User Manual (P/N 270961)

CRC CRCXM Card Reader Controller (P/N 387625)

Introduction to the CRC

The Card Reader Controller (CRC) is shown in Figure 1-1. The CRC interfaces card readers and door locks to an integrated system (fire, security, and access control) allowing access to a protected area only when a cardholder presents a valid access card, and has access privileges for that area. The intelligence for controlling access is programmed into the CRC.

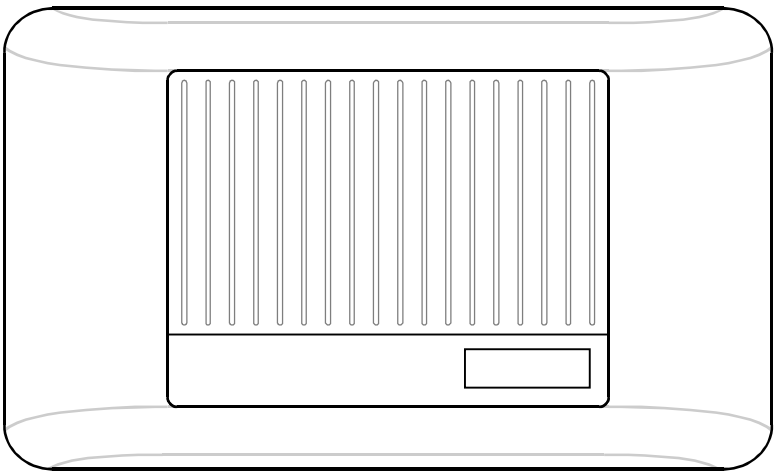


Figure 1-1: Card Reader Controller

CRCs are connected by a dedicated RS-485 circuit, called a SAC bus. The SAC bus allows the CRC to communicate with a control panel. The control panel can support an integrated security, access control, and fire alarm system.

Model CRCXM is a version of the CRC with expanded memory capacity. It has the same physical and functional attributes as the CRC, but can store a larger database of cardholder and history records.

For specifications please refer to the installation sheet *CRC CRCXM Card Reader Controller,* P/N 387625.

Physical description

The CRC has a streamlined white housing, designed to blend in with most surroundings. This lets you install the CRC in plain sight, which typically requires much less time and effort.

The CRC has terminals for connection to the SAC bus, power, card reading devices, and door locking mechanism. Space is provided for a standby battery. The CRC battery continues to operate the CRC in case of a power failure. Jumpers are provided for configuring the CRC to use ac or dc power, and to operate continuous or intermittent operation door locks.

Overview of operation

Each door being used for access control requires a CRC, a card reading device, and an electric door lock. Both the card reader and door lock are wired to the CRC.

An access card is assigned to each person that requires access. The access card is equipped with a unique code that must be entered into the database of the CRC. The unique code allows the CRC to recognize a valid cardholder.

Each cardholder is assigned a set of access privileges that determine the times and conditions under which access is granted. The set of privileges is called an *access level*

When a card is read at the card reader, the following sequence of events occurs before the person is granted access:

1. The reader interprets the code on the card and forwards this data to the CRC.
2. The CRC determines whether to grant access. Some of the questions that must be satisfied to make this decision are:
   - Does the card code exist in the CRC database?
   - Does the cardholder have disarm privileges for the security partition assigned to the CRC?
   - Is the security partition armed in the area being accessed?
   - Is the time of day within the access level schedule?
   - Does the person have an irregular access privilege?
3. If the CRC determines that the person has the correct access privileges, it releases the door lock, thereby allowing the person to open the door.
4. The CRC automatically shares entry and exit event information when there are multiple CRCs within a partition.
5. Entry and exit event information required by external integrated gateway connections (such as FireWorks) is automatically sent to the control panel.

Chapter 2

Features and functions

Summary

This chapter provides detailed definitions of the CRC's features and functions.

Content

CRC features

System integration

The CRC integrates seamlessly with the EST3 fire alarm system. If a fire alarm occurs, a simple program rule can unlock exit doors. With fire and security devices installed on the same network, no degradation in system performance occurs.

Because each CRC makes its own access decisions, very little network traffic is generated by the access control function. This, along with the integrated design of the network operating system, ensures that fire signals always receive the highest priority. To reduce traffic even further, the SDU optimizes which event messages the system receives.

Enhanced survivability

In performing its task, the CRC maintains a database of up to 8,000 users with all options and schedules. It also stores the 5,000 most recent access denied (and optionally, access granted) events.

The CRCXM stores up to 36,000 users and 20,000 events.

If the control panel 3-CPU1 or 3-SAC fails, or if the CRC loses communication with the 3-SAC, the CRC continues to function without any degradation.

If power is lost to the CRC, it can continue to operate on its own internal battery power. The CRC will continue to grant and deny access for a limited amount of time (refer to battery calculations in Appendix A), thereby eliminating the need for granting free access during a degraded period.

When battery power is exhausted the control panel generates a communication fault event message for the CRC.

System CRC capacity

In an integrated system, security and access control devices are connected by a dedicated RS-485 circuit, called a SAC bus. The SAC bus originates at the Security Access Control module (3-SAC).

Each 3-SAC can support up to 62 CRC or KPDISP (Keypad Display) devices for Class B wiring (30 CRCs or KPDISPs for Class A). This is a multiple-drop circuit and does not require a dedicated run for each device.

Should network communication be lost, the CRC will continue to grant access based on the database stored in its memory, without loss of any security feature.

(Applications that rely on communication between CRCs are the exception. For example, anti-passback and two-person rule applications, requiring more than one door, may not work in degraded mode.)

Controls for readers and locks

Each CRC provides the power and electronics required to control and monitor a single door. The CRC can accommodate two card readers (entry and exit) plus an associated electric door lock. The CRC can use an external 24 Vdc power supply or a CRCXF CRC Transformer (a 16.5 Vac transformer) to power continuous-duty locks.

If desired, all entry and exit events can be reported to the FireWorks Guard Workstation. It is also possible to determine the current location of an individual and obtain a list of all people who are in the premises.

The CRC can monitor the door contact and activate an optional sounder if the door is opened without first badging out. This can act as a reminder to badge out, and ensure that management knows who is in the building. It can also act as a simple form of exit control in the event of an unauthorized exit.

LED and CRC sounder drivers

The CRC provides LED driver terminals for the card readers. Thus, the readers can visually indicate whether access is granted or denied.

The CRC provides different LED flash rates for applications that require a PIN number or a second card. Examples: two-person rule or escorted visitor.

A driver for an audible sounder is also provided by the CRC. Refer to the installation sheet for the *CRCSND CRC Sounder,* P/N 3100033 for additional information.

CRC dry contact relay connections

The CRC includes common, N.O., and N.C. outputs from a Form C relay. These can be used to control auxiliary fire alarm devices such as fans and dampers, as well as devices that support handicap functions

CRC input circuits

Each CRC has two input circuits for use with access control and security devices. These are typically used for a door position sensor and a request to exit device. The input circuits can be configured for use with a switch, controlled by a receptionist, that manually unlocks the door. Finally, the input circuits can be used as security input points.

Access cards

The CRC is compatible with a large variety of access cards. These cards do not require a specially-ordered facility code. EST offers access cards that are prenumbered and ready for use. The EST cards have nonrepeating, unique numbers. This makes it easy for administrators to add new cards to the access control system.

When a site has an existing access control system, the CRC is flexible enough to integrate with most cards and card readers already in use. To determine which cards and card readers are compatible with the CRC see Chapter 3, *Hardware and Equipment.*

Card readers

The CRC is compatible with a variety of card readers that communicate using the Security Industry Association (SIA) Wiegand output format. These include:

- Proximity
- Wiegand pin
- Magnetic stripe
- Smart card
- Keypad

To determine which cards and card readers are compatible with the CRC, see the CRC installation sheet.

Database storage

Each CRC stores a complete database within its memory. It retains all the data necessary for complete operation of the devices it controls. This distribution of intelligence maximizes the speed at which access decisions are made and provides survivability in the event that the CRC is disconnected from the network.

Cardholder data is created and maintained by the Access Control Database (ACDB) program, which runs on the end user's PC.

This information is encrypted and sent to the CRCs, via either direct connection or modem (dial-up) connection.

With modem connection, the ACDB program can dial up the system and send the encrypted database information to individual CRCs. This allows a single access control database to serve multiple sites.

Modem connection also permits multiple tenants to share a common access control system without sharing a common database.

Access levels and schedules

An *access level* is a predefined collection of access and security privileges. One or more cardholders can be assigned the same access level, and thus would have the same set of privileges.

Access levels consist of a list of doors, each with a specified schedule. Any combination of doors and schedules can be assigned to an access level. The access level determines whether or not a cardholder can access a given door at a given time.

Each cardholder can be assigned two access levels. This helps the administrator quickly assign multiple access rights to a single person. For example, a female manger could be assigned two access levels, one access level for mangers and one access level for females. This grants the employee access privileges for the manger-level doors and for all women's restrooms.

Each access level can have an active date and an expiration date. This means the two access levels can be used to control rotating shifts, parking lots, or temporary schedules.

When used for rotating time shifts, the first access level is the current schedule and the second access level the future schedule. The first expire date and the second active date reflect the date of the change of shift.

In parking lots, dual access levels allows for canceling parking privileges without canceling building access.

In temporary schedule use, the second schedule overrides the first schedule when active and returns control to the first schedule when it expires.

Schedules and holidays

The CRC stores the schedules and holidays created in the ACDB program. Each schedule identifies specific times (in 15-minute increments) and days when access is granted.

Holidays are exceptions to normal Monday through Sunday schedules, when different access requirements are desired. Many holidays can be programmed using rules rather than fixed dates. This minimizes year-to-year programming required to update holidays.

For example, schedules for fixed holidays such as January 1, which can fall on a Saturday or Sunday, are assigned to take place on the previous Friday or next Monday respectively.

Database capacities

All access decisions are made locally in the CRC. The CRC's non-volatile memory holds the cardholder, schedule, and holiday information required.

A total of 8,000 cardholders can be stored in each CRC. The CRCXM has additional memory, and supports 36,000 cardholders.

The CRC or CRCXM can store 1,200 access levels (255 per company). Each cardholder can be assigned two access levels.

The CRC or CRCXM can store 1,200 schedules (255 per company) and 1,200 holidays (255 per company).

The CRC stores up to 5,000 events per door, ensuring no loss of history. The CRCXM has additional memory and stores up to 20,000 events. This history information can be uploaded to the ACDB program on demand, for use in a variety of reports.

User-defined logged attempts

By using a suppression schedule in the ACDB, you can determine when normal access events are to be logged. Logged events always include irregular events and unsuccessful attempts. Determining what you want to be logged helps eliminate unnecessary events from entering the history buffer.

User-defined PIN schedule

A schedule can be used to define when a PIN must be entered to verify each card swipe. To use this option, a combination card reader and keypad must be installed. The use of a PIN decreases the possibility that a recently lost or stolen card can be used to gain entry. A schedule defines when a PIN must be used. This can be during business hours, outside business hours, or at all times.

The card is always presented first. If the schedule determines that a PIN is required, the red LED on the card reader will flash

at 1 Hz. This is an indication that the user must enter a PIN. The user then enters the PIN to gain access.

This option is selectable per door. If no schedule is defined for a door, that door will not require a PIN. For this application the keypad used must provide output in standard Dorado 8-bit Wiegand data format.

User-defined unlock and open times

Using the ACDB program, the administrator can control how much time a person has to enter or exit through a door. The CRC controls both the unlock time and door open time, and these can be set in the ACDB program.

Unlock timers control the number of seconds that the door stays unlocked when a user badges in. When the unlock timer expires the door lock locks. The ACDB has three unlock timers:

- Standard unlock
- Handicap unlock
- Manual unlock

The CRC relay can be used to control a door opener. Door open timers control the number of seconds that the relay stays active. The ACDB has two door open timers:

- Manual open time
- Relay open time

Refer to Chapter 6: *Programming* for more information on these fields.

CRC functions

Construction mode

The CRC can operate in a construction mode. In this mode, the building contractors use specially coded cards for gaining access before the system is fully operational.

This mode is in effect before the CRC is programmed by the ACDB. As soon as a card record is downloaded into the CRC, the construction card stops working.

Remember that temporary cards can be included in the access control database and downloaded into the CRC. This allows workmen to continue installation and testing, even after the ACDB database has been downloaded. The ACDB user can define an automatic deactivation date for such cards.

The ACDB cannot be used to restore a CRC to its original condition. This can only be done with the SDU, using the Remove from 3-SAC download action (found in the Communication Functions dialog box).

Security partition disarming

A *partition* is an area of an alarm system that can operate and be controlled independently. A CRC can be used to disarm one of 255 security partitions.

Alarm point bypass

CRCs can be programmed to automatically bypass alarm points when a cardholder is granted access. For example, an employee entrance door may need to be armed at all times. Bypassing this door contact allows free entry and exit as authorized employees come and go. If an unauthorized entry is made an annunciation alarm sounds.

Cardholder disability

A special disability option allows an individual additional access time. A disability option can be selected for any cardholder. When such a cardholder presents his card to the reader, the CRC recognizes the option and provides additional, user-defined access time and operates a relay that can activate an automatic door opener.

Multiple tenants

Multiple tenants are supported by the CRC. During system installation, the available schedules and holidays are allocated to the tenants, up to 255 per tenant.

Tenants can then control their own access control database, using a dial-up modem connection or direct RS-232 connection.

Elevator floor access control

Elevator floor access control is possible if you use CRCs in an integrated system. Because the fire portion of the system is already interconnected with the elevator controller for elevator capture functions, floor access control is a simple extension of an existing function.

Visitor and escort function

The CRC can be used to allow a visitor to gain access only when with an escort. Both the escort and visitor must badge in at a card reader to gain access. First the visitor badges in, followed by the escort. The CRC will only allow access after the escort has badged in.

Anti-passback options

Anti-passback is a feature of the access control system that prevents successive use of one card to pass through a controlled door (in the same direction). The CRC supports three different versions of anti–passback: strict, timed, and logged.

Muster function

In the event of an evacuation of a building, the *muster* application can be used to verify that everyone has exited the building.

During an evacuation, everyone exits the building immediately and goes to one of the predetermined muster stations. At the muster station, personnel use their access cards to badge out at a card reader that is attached to a CRC designated as a muster station.

After everyone has badged out at the muster station, security staff use the ACDB program to run a muster report. The ACDB report will indicate personnel that have badged into the building but have not badged out.

Two-person rule

A *two-person rule* ensures that no staff member can be in the controlled area alone. When two people are present in the area, one cannot exit without the other.

This feature is typically used in high security areas, where policy requires a minimum of two persons in a secured area. (Examples: top-secret areas, vaults, high value stockrooms.)

Mounting

Physical design

The unit is housed in an off-white case. The attractive design allows for surface mounting in exposed areas.

Distance from panel

In an integrated access control system the CRC is connected to the 3-SAC via the SAC bus. The CRC can be up to 4,000 feet (1,220 m) from the 3-SAC. Power requirements must be determined for extended distances. (Refer to the CRC installation sheet for further details).

Supervision

CRC ac power

The power for operating the CRC can come from any one of three sources:

- The control panel power supply
- An external 24 Vdc power supply
- A CRCXF CRC Transformer

If the CRC loses any primary power source, a primary power trouble signal is sent to the panel for annunciation.

CRC cover

If the cover of the CRC is removed, the built-in tamper switch is activated and a tamper signal is sent to the panel for annunciation.

CRC low battery

The power for operating the door releasing mechanism can be furnished by a 1.2 AH, 12 V battery in the CRC. The battery is charged from either an ac or a dc power source.

The battery is monitored for a low voltage condition. If a low voltage condition exists, a CRC trouble condition is sent to the panel for annunciation.

CRC to card reader connection

If the wiring from the CRC to the card reader breaks, a card reader trouble signal is sent to the panel for annunciation.

CRC to lock connection

If the wiring from the CRC to the electric door lock breaks, a lock trouble signal is sent to the panel for annunciation.

Chapter 3

Hardware and equipment

Summary

This chapter provides information about hardware and equipment that can be used with the CRC.

Content

Basic equipment

The equipment required for a basic, networked, access control system is shown in Figure 3-1. In this chapter, we discuss the items shown in the figure.

The equipment needed for specific applications is detailed in Chapter 4: *Access control applications.*

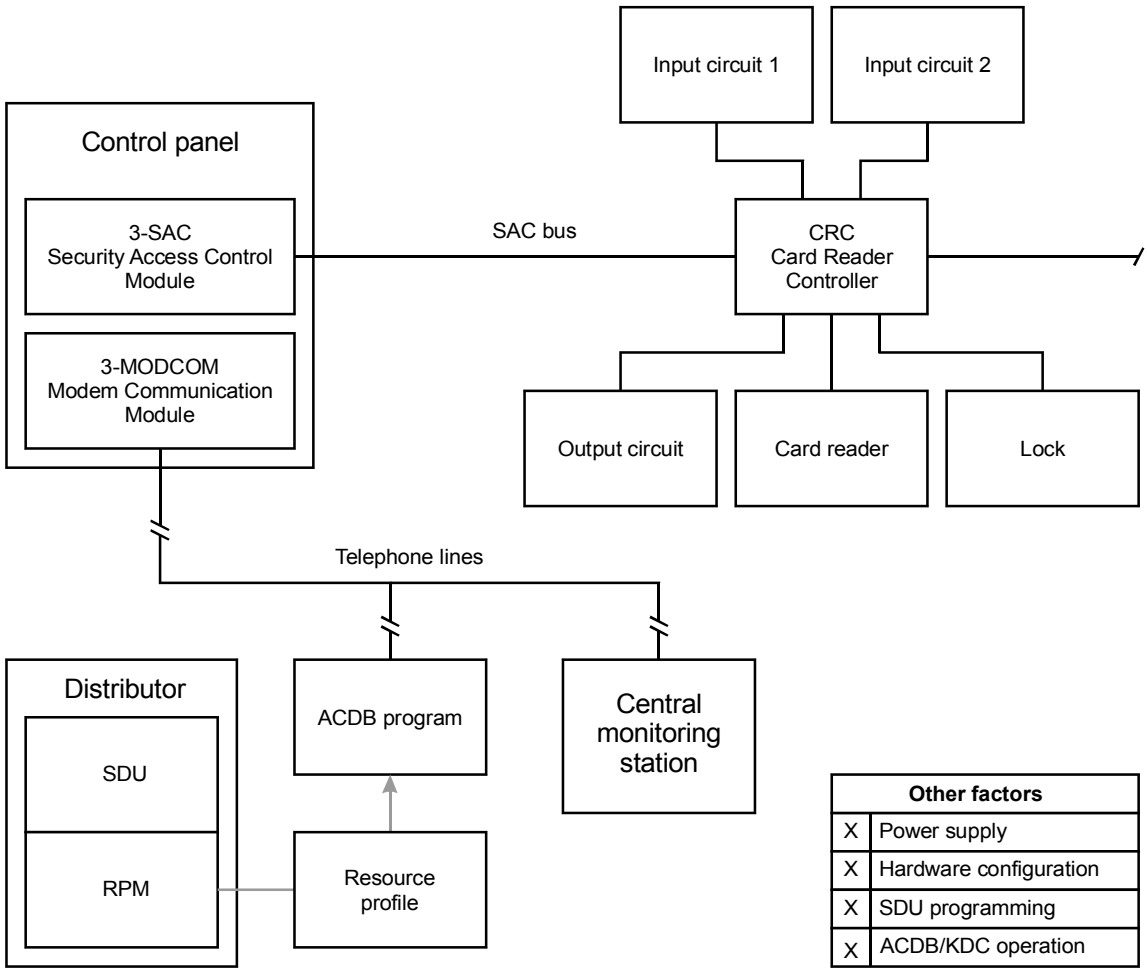


Figure 3-1: Equipment required for a basic access control system

Control panel modules

3-SAC Security Access Control module

The 3-SAC Security Access Control rail module controls a high-speed RS-485 circuit called the Security Access Control (SAC) bus. The SAC bus supports fire, security, and access control devices.

The 3-SAC handles message traffic for these devices. Events are passed from the devices to the 3-SAC module, then to the 3-CPU1 for processing.

The 3-SAC has two sets of bus circuit terminals, and is capable of Class A or Class B configuration. Each Class B circuit can include 31 devices, for a total of 62 devices per module. Class A circuits can include 30 devices total. In Figure 3-1, we show a Class B bus with a CRC Card Reader Controller module.

3-MODCOM Modem Communicator module

The 3-MODCOM Modem Communicator module has both modem and dialer functions. It can transmit and receive information.

The 3-MODCOM can transmit alarm, supervisory, or trouble messages to a remote central monitoring station using one or two telephone lines. A variation of the module (3-MODCOMP) can transmit pager messages to a paging company using the TAP protocol.

The module can also receive information sent over telephone lines by the Access Control Database (ACDB) program.

SAC bus and wiring

SAC bus

Since our security and access control devices require 24 Vdc, we suggest that you always use a four-wire cable for the SAC bus and a 24 Vdc power supply.

For the data wires, use unshielded, twisted pair, with greater than 6 twists per foot, in 14 to 22 AWG (1.50 to 0.25 sq mm). For the power wires, use 14 or 16 AWG.

You can use a four-conductor cable with an overall jacket containing solid 2-19 AWG and 2-16 AWG for the SAC bus.

The maximum run from a CRC to the 3-SAC is 4,000 ft (1,220 m) at 25 pF/ft. The maximum total capacitance of the run is 0.1 μF, and the maximum total resistance is 52 Ω.

Card reader wire

Eight-conductor stranded 22 AWG cable with overall shield is recommended for the cable from the CRC to the card reader.

CRC connections and options

CRC Card Reader Controller

The Card Reader Controller (CRC) is used for interfacing a card reader into an integrated security and fire alarm system. One CRC is required for each door you want to control. The CRC has a terminal strip for connections to the following:

- 24 Vdc power
- Strike (or other lock type)
- Relay contacts
- Card reader power
- Card reader data
- Card reader LEDs (two)
- Optional sounder
- SAC bus
- Input loops 1 and 2

Each CRC supports:

- 8,000 cardholders
- 5,000 events
- 1,200 access levels (255 per company)
- 1,200 schedules (255 per company)
- 1,200 holidays (255 per company)

Each CRCXM supports:

- 36,000 cardholders
- 20,000 events
- 1,200 access levels (255 per company)
- 1,200 schedules (255 per company)
- 1,200 holidays (255 per company)

The CRC module performs all access decision processing. Each CRC stores an access database and is capable of granting or denying entry without external communication.

When entry is granted, the CRC applies or removes power to the strike or maglock to unlock the door. The CRC is also capable of unlocking a door on activation of a manual push button.

Each CRC stores access control information and records of the events for the door it controls. The CRCXM model features enhanced storage capacity.

Using its internal battery, the CRC can continue processing access events even if there is a loss of communication or primary power.

Input circuits 1 and 2

Each CRC supports two input circuits for such devices as:

- Door contacts
- Motion detectors
- Request to exit buttons
- Security devices

A door contact device monitors the door position (open or closed) for various applications.

A motion detector detects a person's approach and can be used to unlock the door.

A request to exit (REX) push button (or bar) can be used to manually unlock the door.

Security devices, such as glass-break detectors can be associated with the door to enhance its security, or to monitor a nearby window.

Output circuit

Each CRC supports one output circuit in the form of N.O. and N.C. dry contact connections. The output circuit can be used for such devices as:

- Automatic door openers
- Fan and damper control
- Door holder control

Lock

The CRC supports any type of door locking device. Common lock devices are strikes and maglocks. A strike *opens* the door when power is supplied, while a maglock *secures* the door while power is supplied.

CRC options

CRCSND CRC Sounder

The CRC Sounder is a small horn that mounts inside the card reader controller module. The sounder operates if an emergency exit door is opened without an exit request and can also indicate that a door has been left open. The sounder clips to the inside of the CRC cover.

The CRC Sounder can be programmed, using rules written in the SDU. Further, the ACDB program can control several operating parameters of the sounder.

CRCRL CRC Accessory Relay

The CRCRL is an accessory relay for the CRC(XM) Card Reader Controller. Use the CRCRL in conjunction with an external power supply to control a lock which requires voltage or current outside the CRC's operating range.

CRC battery

Each CRC has space for an internal, 1.2 Ah, sealed lead-acid battery. The battery supplies power to the CRC and its peripherals, and provides local standby power.

The CRC battery provides 30 minutes of standby power for access control functions and up to 4 hours for security functions. The battery cannot be used for fire applications.

The following is a list of compatible batteries:

Manufacturer	Model number	AH
Edward Systems Technology	12V1A2	1.2
PowerSonic	PS-1212	1.2
Technacell	PS1212	1.2
Yuasa	NP1.2-12	1.2
Panasonic	LCR12V1.3P	1.3
Empire	NP 1.2-12	1.3
NewMax	FNC 1212	1.2
Interstate	PC1212	1.2
B&B Battery	BP1.2-12	1.2
Rocket G&Y	ES 1.2-12	1.2
DiaMec	DM 12-1.3	1.3
Long	WP 1.2-12	1.3
Union	MX12012	1.2
GS Portalac	PE12V1.2	1.2

CRCXF - CRC Transformer

The CRCXF - CRC Transformer is a 16.5 Vac transformer that can power the CRC or CRCXM. It provides local power for applications requiring additional power at door lock. The CRC has ac load terminals for easy connection to transformer.

Be sure to check the CRC installation sheet for a list of applications that prohibit the use of the CRCXF.

Cypress CVT-2110

The Cypress CVT-2110 converts Wiegand data to RS-232 ASCII hexadecimal.

You can use the CVT2110 to connect a card reader to a serial port on the ACDB computer. This means you can read a card number directly into the ACDB program by swiping the card, rather than by typing.

The CVT-2110 requires an external source of voltage between 8 and 24 Vdc at 150 mA. It is available from Cypress Computer Systems, Inc. (www.cypresscom.com).

Card readers and access cards

Card readers

By *card reader*, we mean any of the different types of credential reader supported by the CRC. A card reader scans a card to determine the card number and passes the card number to the CRC.

All the required electronics are assembled in the card reader housing. The card reader connects directly to the CRC, which processes the card number and grants or denies access.

Each CRC can support several card readers. Typically, a CRC will control an entry and exit card reader for the doorway. It can also support multiple readers for such applications as two-person rule or anti-passback.

Note that the CRC supports any type of reader that uses the industry standard Wiegand output format. These include:

- Proximity
- Wiegand pin
- Magnetic stripe
- Keypad
- Smart card

Some applications work best with card readers that support dual LED control. The CRC uses two LEDs, or two LED states, to indicate that further actions are required after the initial badging operation, before access is granted. These applications are:

- Two-person rule
- Visitor and escort
- PIN schedule

If you plan one of these applications, contact the card reader manufacturer to confirm that the reader supports dual LED control.

Card readers are additionally categorized by the way the card must be presented to the card reader for reading:

- Card swipe: The card swipe reader does its reading as a card is swiped through a slot in the reader.
- Insert: The insert reader requires that the card be inserted fully into a narrow slot, with the reading typically being done as the card is withdrawn.
- Proximity: The proximity reader requires the user to pass the coded card in close proximity to the reader, with the reader using RF energy to determine the code on the card.

Some card readers are also equipped with a keypad. The keypad allows for entry of a PIN number in addition to the card code. The CRC can accommodate any PIN number of 1-4 digits along with the associated card code. The need to enter a PIN is controlled by two factors: whether or not the access schedule calls for use of a PIN, and whether or not the partition to which the CRC belongs is armed.

Card readers may come with an LED arrangement to visually inform the user of the card reading and access control status. Typically, an LED arrangement uses red and green LED lighting. Some readers use a bicolor LED and others use two separate LEDs. On most card readers the red LED is normally lit; this serves as an indication that the reader is receiving power. When a card is read, the LED temporarily turns from red to green.

The CRC can provide 12 Vdc at 0.5A for operating its card readers.

Note: For a list of compatible card readers, see the CRC installation sheet.

Access cards

With the correct card reader, the CRC can process the following types of access cards:

- Wiegand
- Magnetic stripe
- Proximity

Note: For a list of compatible access cards, see the CRC installation sheet.

Software packages

Resource Profile Manager (RPM) tool

The Resource Profile Manager (RPM) tool is part of the SDU. It uses the project database to create a separate resource profile for each company that will be using the access control system.

The resource profile defines the access control system for the ACDB program. It includes detailed information about each CRC used by a given company. For example:

- Communication method
- Primary or secondary control
- Number of cardholders
- Number of schedules
- Number of holidays
- Number of access levels
- Command lists used

Access Control Database (ACDB) program

The Access Control Database (ACDB) program lets the user define and maintain a database of information about CRCs, cardholders, schedules, and access levels.

The ACDB program runs on the user's PC. Additions or updates to the access control database can be transmitted to the CRC units in two ways.

The first method is via modem and dial-up telephone line to the 3-MODCOM. The information is then routed to the 3-CPU1, through the correct 3-SACs, and finally to the CRC units.

The second method is by connecting the user's PC directly to the 3-CPU1 using an RS-232 cable. The connection is made between the PC's COM1 port and any of the RS-232 terminals on the 3-CPU1. As in the first method, after reaching the 3-CPU1 additions and changes are routed through the correct 3-SACs to the CRCs.

Note: Changes to the access control database have no impact on the parameters or operations of listed fire system equipment.

Different versions of the ACDB software are available according to your system configuration and the number of doors you need to control. These are described below.

ACDB8

ACDB8 is a software package that lets you enroll 50,000 cardholders in an EST3 network system with eight or less doors.

ACDB8+

ACDB8+ is a software package that lets you enroll 50,000 cardholders in a networked EST3 system with over 4,000 doors.

ACDB-SVR

ACDB-SVR is the Access Control Database Server Application Software. This is installed on the server PC for connection of additional Access Control Database client machines. This version provides the same graphical user interface for cardholder enrollment and database configuration.

ACDB-CLNT

ACDB-CLNT is the Access Control Database Client Application Software. This allows client machines to communicate with the ACDB-SVR database for use with additional workstations.

Chapter 4

Access control applications

Summary

The CRC is a powerful and flexible component of access control systems. While it is a central component of such systems, it cannot work in isolation. This chapter shows how the CRC interacts with other components and modules.

This chapter also illustrates and describes several access control applications. Each application is presented as a separate topic that includes a block diagram and description. These give you an overview of the application, and show the components required and their interconnection.

Refer to the *EST3 Installation Sheets* for specific component settings and terminal connections.

Content

Other factors

Each of the application drawings in this chapter includes a callout box for *other factors* that should be considered. These are:

- Power supply
- Hardware configuration
- SDU programming
- ACDB/KDC operation

Power supply

The CRC is designed to operate on 24 Vdc. For this reason, we recommend that you include power from the panel with the SAC bus cable. You can use the panel 3-PPS/M or 3-BPS/M power supplies.

When using a transformer power supply you must provide a circuit common path between all devices, using the –24 Vdc terminals.

If you use an additional power supply other than the CRCXF, that power supply must be listed for fire alarm applications, must have ground fault detection disabled, and must have a circuit ground (circuit common) that is isolated from earth ground.

Hardware configuration

The CRC has two jumpers that configure the power source and usage for the module. See the CRC installation sheet for details on the jumper settings.

No other configuration settings are made at the device itself. All other configuration is done via SDU or ACDB programming.

The SDU determines site-level configuration and parameters. The ACDB program controls end-user settings.

SDU programming

While the ACDB program defines the access control database, all other definition, configuration, and programming for the access control system happens in the SDU.

The SDU controls the general configuration of the 3-SAC modules, plus the configuration of all CRC devices on the SAC busses.

CRC modules can be configured to execute a specific, predefined command list when a specific access control event occurs. You write the command lists in the SDU, and assign them to CRC events when you configure the CRC module.

Partitions are fundamental groups used with access control systems. To use such access control features as two-person rule, muster, or anti-passback, CRCs must belong to the same partition. All partitions are created and defined in the SDU, and each CRC can be assigned to a partition.

For the 3-MODCOM module, the SDU determines the dialer and modem parameters, defines the receivers and accounts, and assigns each account to the correct receiver. These settings control CMS reporting and ACDB download operation.

Finally, the SDU includes the RPM tool, described in Chapter 3.

ACDB operation

The ACDB program lets the end user create and revise his access control database. Parameters stored in the database identify cardholders, schedules, and holidays, and assign access privileges.

The SDU includes a tool called the Resource Profile Manager (RPM). The RPM lets you create a resource profile for each company using the system for access control purposes. During setup of the ACDB program, the user imports the resource profile created by the RPM. This defines the system devices for the ACDB program.

The ACDB runs on the end user's computer. You can connect the computer to the access control system in two ways:

- From an RS-232 port on the computer to an RS-232 port on the 3-CPU1
- From the computer modem to a 3-MODCOM via telephone lines

The end result is that the ACDB database can be downloaded from the user's computer to the system. Each CRC stores that portion of the database pertinent to its operation.

Access control applications

The remaining topics in this chapter discuss specific access control applications. Each topic gives you an overview of the application, showing the components required and their interconnection.

Each topic includes a block diagram and general description of the application. Other factors (as called out on the drawings) are discussed under separate headings in the topic.

Anti-passback

Description of the application

Anti-passback is a feature of the access control system that prevents successive use of one card to pass through any door in the same direction. Anti-passback prevents a card from being passed back to another person for the purpose of gaining unauthorized access.

The CRC supports three forms of anti-passback:

- Strict
- Logged
- Timed

Strict anti-passback is the most restrictive form of anti-passback. It requires all personnel to badge in and out, denying them access to an area when they fail to do so.

Logged anti-passback is less restrictive than strict anti-passback. It still requires personnel to badge in and out but does not deny access when anti-passback rules are violated. Rather, such access is logged as an access granted anti-passback event. With logged anti-passback, security staff can work to correct violations, but personnel are not locked out.

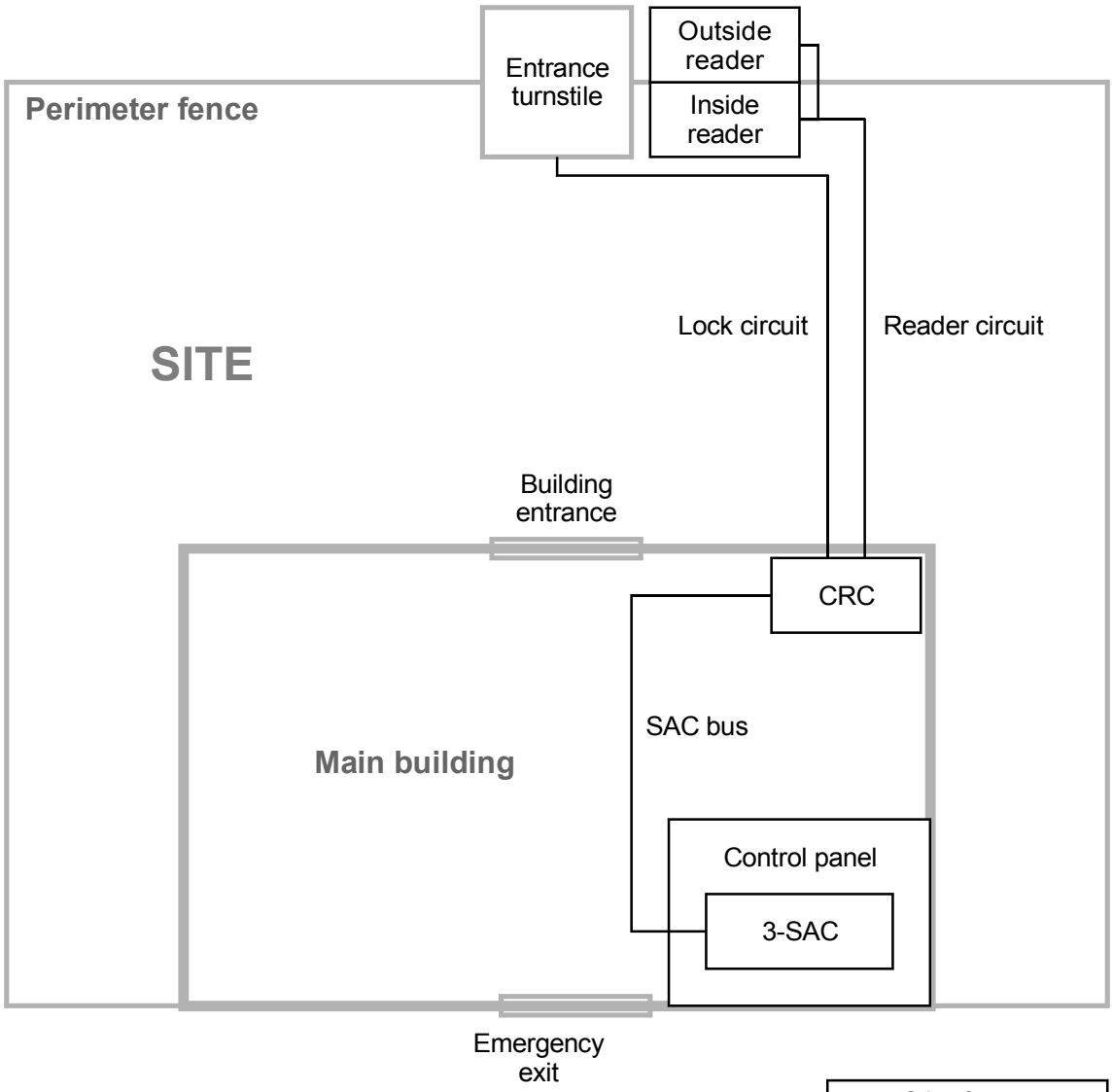
Timed anti-passback prevents reuse of a card for a specific period, but does not require personnel to badge out. A timed anti-passback system automatically badges a cardholder out of the controlled partition after a specified time period, allowing the card to be used again.

Note: Timed anti-passback cannot be used with a muster application, since the system automatically logs cardholders out of the partition, defeating muster accounting.

To implement anti-passback, a separate CRC is required at each doorway in the controlled partition. Each doorway requires an outside card reader. Strict and logged anti-passback applications also require an inside reader at every doorway. Timed anti-passback does not require the use of an inside card reader.

A typical anti-passback application is shown in Figure 4-1, below.

The figure shows a building with a perimeter fence. It would be easy for an employee to pass his access card to an unauthorized individual through the fence, thereby allowing access. Configuring the access control system for anti-passback operation can help prevent this from happening.



Other factors	
	Power supply
X	Hardware configuration
X	SDU programming
X	ACDB/KDC operation

Figure 4-1: Anti-passback

Hardware configuration

The control panel must contain a 3-SAC Security Access Control module. The 3-SAC module supports the SAC bus. Power for the CRC can be taken from the 3-PPS/M and routed with the data lines in a cable composed of two twisted-pair wires (the SAC bus).

SDU programming

If the CRC is to be used for anti-passback this must be configured using the SDU. The CRC configuration dialogs let you select the type of anti-passback you want to use:

- None
- Logged
- Timed
- Strict

You can also assign a predefined command list to various access granted or access denied events, including the anti-passback events:

- Access granted anti-passback
- Access denied anti-passback

The 3-CPU1 runs the command list you specify when either of these events occurs.

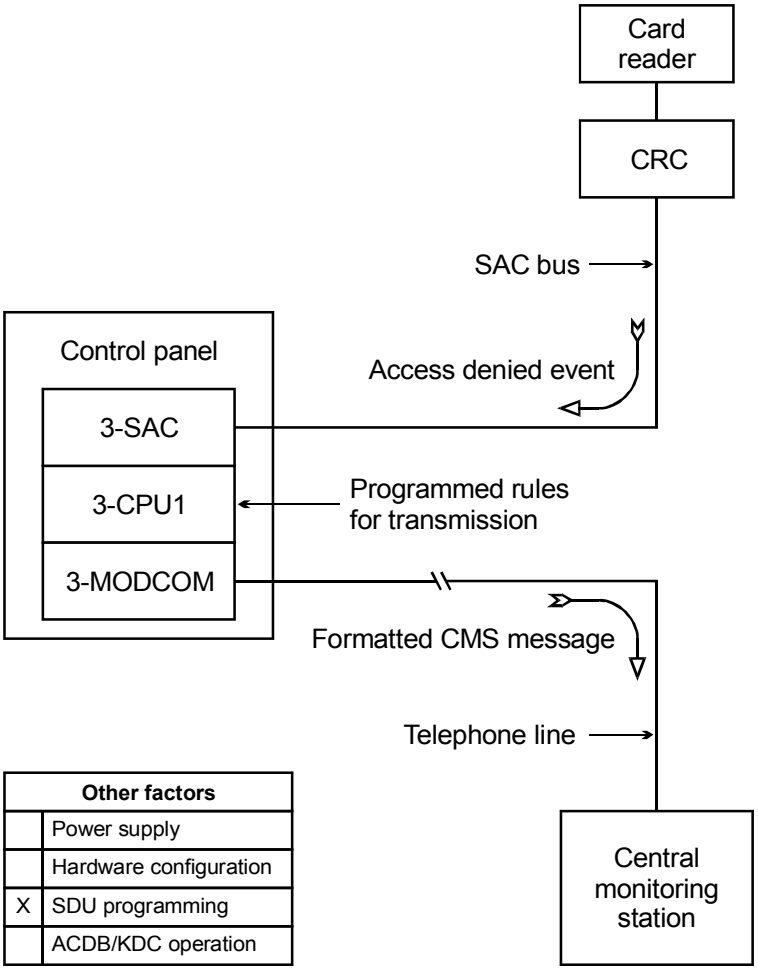
ACDB programming

With timed anti-passback, the cardholder is automatically marked out after a specified period of time. This period is defined by the ACDB. The period can be set from 0 through 255 minutes (4 hours and 15 minutes).

Central monitoring station

Description of the application

An access control system can transmit different kinds of event information to a central monitoring station (CMS). The basics for such a system are shown in Figure 4-2.



Other factors	
	Power supply
	Hardware configuration
X	SDU programming
	ACDB/KDC operation

Figure 4-2: Access control reporting to a central monitoring station

When a reportable access event occurs, the event message travels from the CRC to the 3-SAC. The 3-SAC passes the message to the 3-CPU1 which executes a predefined command list. The command list specifies the details of the message that is sent to the 3-MODCOM for transmission to the CMS.

SDU programming

Reporting access control events to a CMS depends entirely on programming and the creation of command lists. In essence, you must assign a command list to each CRC event you want to report. The command list contains the details of the message to be transmitted.

The following CRC events can be assigned command lists:

- Access granted
- Access granted irregular
- Access granted anti-passback
- Access granted muster
- Access denied unknown
- Access denied reader disabled
- Access denied access level not active
- Access denied outside schedule 1
- Access denied outside schedule 2
- Access denied partition armed
- Access denied PIN not entered
- Access denied PIN not valid
- Access denied two-person timeout
- Access denied anti-passback
- Access denied escort

Common door access

Description of the application

A site that makes use of a common door is shown in Figure 4-3. Here, the door is the main entrance of an office building, and leads into a common lobby area. Within the building, two companies rent offices, each with controlled access doors.

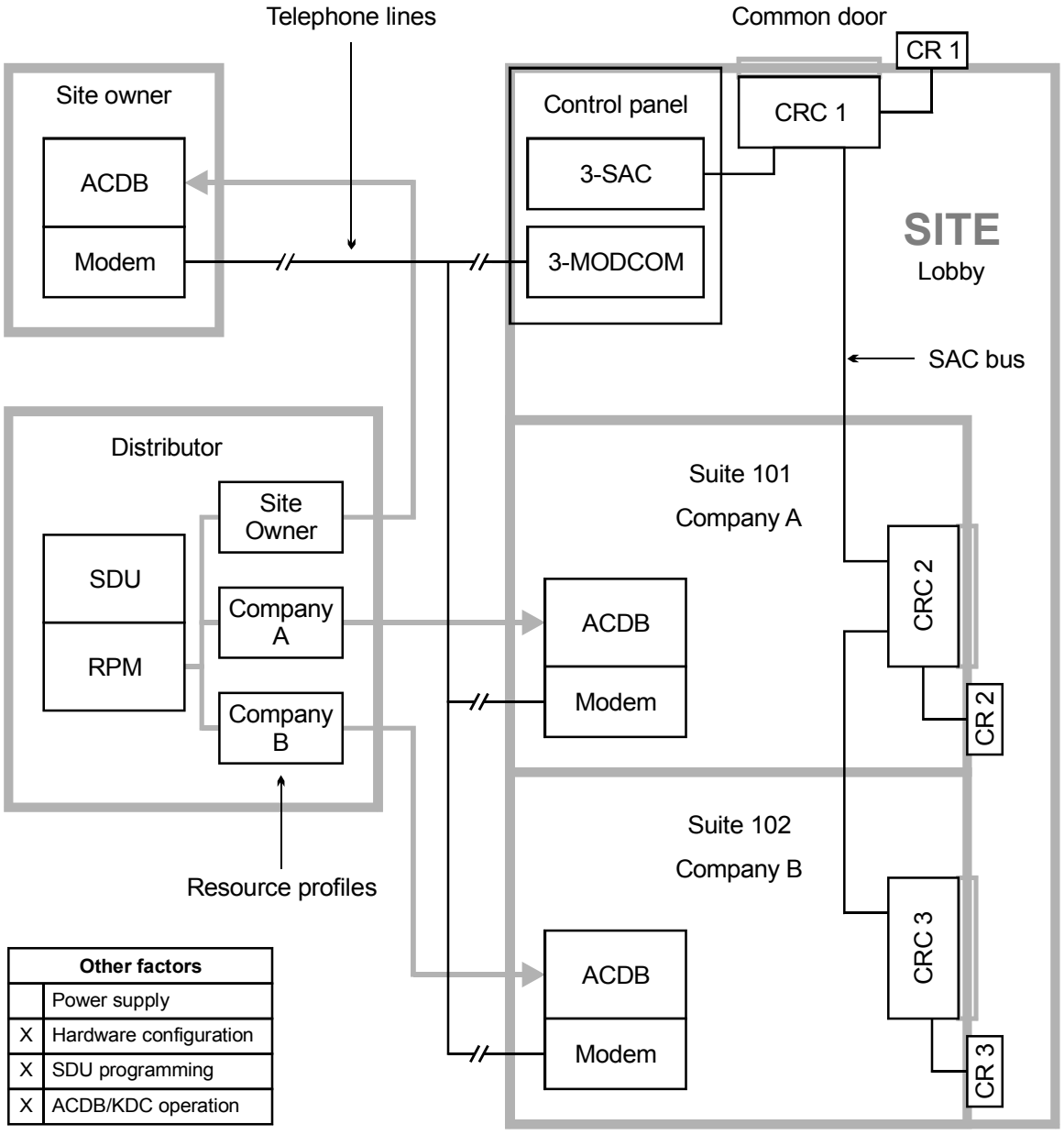


Figure 4-3: Common door in a lobby area

Hardware configuration

The site has an EST3 control panel that includes a 3-SAC and a 3-MODCOM module. The 3-SAC supports the SAC bus. The 3-MODCOM module supports modem communication with the control panel over telephone lines.

SDU programming

As the distributor, you use the SDU to program the EST panel for this application. Part of the programming job is to use the Resource Profile Manager (RPM) to create resource profiles for the site owner and for each tenant company.

Resource profiles are imported into the Access Control Database (ACDB) program. They determine which devices the user can see and program. Resource profiles also establish transmission routes that permit modem communication with the EST3 panel.

When a device is shared, the RPM lets you specify how much of the device is allocated to each company. You can allocate resources either by percentages or by actual numbers.

It's a good idea to hold some allocation in reserve, giving each company only what it needs. It is much easier to allocate additional resources as needed than to reclaim resources that are already allocated.

In our example, the resource profile for company A would contain CRC 1 (the lobby door) and CRC 2 (the suite 101 door). For Company A, you might choose to allocate 80% of CRC 2, and 20% of CRC 1.

Similarly, the resource profile for company B would allocate 80% of CRC 3 and another 20% of CRC 1.

The site owner will need access to the CRC2 and CRC3 doors for cleaning or inspection purposes. The site owner resource profile could allocate 20% of CRC 1, 10 % of CRC 2, and 10% of CRC 3.

This leaves 40% of CRC1 unallocated, and 10% of CRC2 and CRC3 unallocated. The unallocated resources are reserved for future expansion or changes.

ACDB operation

The site owner, the owner of company A, and the owner of company B, can all use telephone lines to communicate with the EST3 control panel via the 3-MODCOM module. They can download additions and changes to the CRCs, and upload usage data for various ACDB reports.

Delayed egress

Description of the application

Delayed egress doors help to control shoplifting at retail sites. A delayed egress door has card readers and a request to exit (REX) switch. Employees can badge in and out as they would at any other door. In an emergency, customers must press the REX switch to unlock the door.

When the REX switch is activated, the CRC sounds the CRCSND horn and sends a security alarm event to the panel. It does not unlock the door immediately, thus allowing site staff time to investigate.

The CRC waits for a specific interval of time before unlocking the door. The typical delay time is 15 seconds; however, you may be able to use a delay of up to 30 seconds with the approval of the AHJ. The horn continues to sound for a specific period of time, or until the CRC is reset.

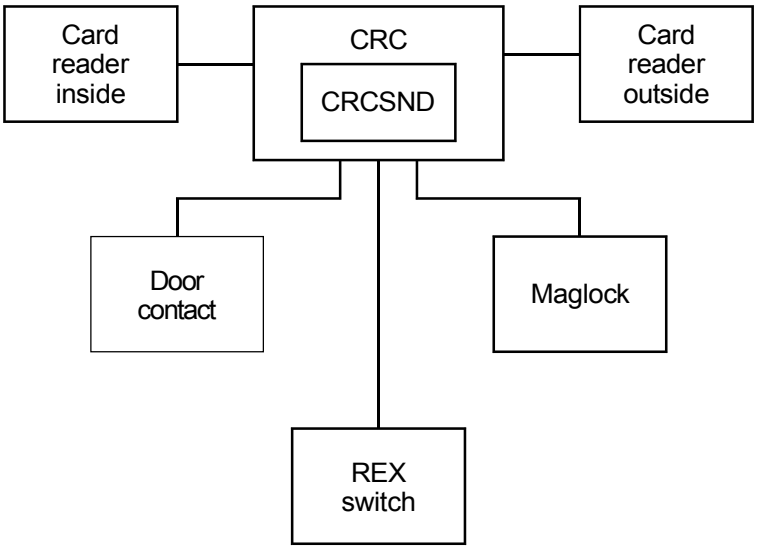
After the delay time passes, the CRC unlocks the door, and latches it in the unlocked state. The CRC must be reset in order to relock the door and silence the horn. To reset the CRC, site staff must use a valid badge at the card reader.

The CRC also activates the CRCSND horn if the door is opened without badging. For example, if the door is forced open from the outside, the CRCSND activates, even though the REX has not been pressed.

Many codes require that delayed egress doors unlock during a fire alarm, or when the panel is in trouble. This requirement allows occupants to evacuate the site immediately when a fire is detected, or when the panel loses its ability to detect a fire or sound the alarm.

Figure 4-4 shows a delayed egress door with inside and outside card readers and a request to exit switch. The CRC uses a door contact switch to determine the position of the door, and a maglock to lock the door. The door contact switch and REX switch are connected to the input loops of the CRC.

Note: Refer to NFPA 101 and the local AHJ to determine the requirements for delayed egress applications.



Other factors	
	Power supply
X	Hardware configuration
X	SDU programming
X	ACDB/KDC operation

Figure 4-4: Delayed egress doorway

Hardware configuration

A maglock is most commonly used for delayed egress applications, but you can use any locking device that has no manual override. For example, a strike with no knob could be used.

The door contact is used to detect unauthorized opening of the door. The CRC activates the CRCSND and reports a security alarm event when the door is opened without badging or use of the REX.

The door contact signal is also required to relock the door when the CRC is reset. The lock cannot be reset until the door is closed.

SDU programming

Most codes require you to program rules that unlock the door when the panel goes into alarm or when the panel goes into trouble.

When configuring the CRC, set the Delayed Egress Time field to the value (in seconds) you want to use. Define the input circuits as follows.

For the door contact input loop:

- Device Type = Security P Monitor
- Input Circuit Partition = as determined by project
- Max Delta Count = as determined by project
- Delays = None
- Application = Emergency Exit Door Contact
- Personality = Basic

For the request to exit switch:

- Device Type = Monitor
- Input Circuit Partition = None
- Max Delta Count = not applicable
- Delays = None
- Application = Request to Exit with Delayed Egress
- Personality = N.O. with Trouble

ACDB operation

When an employee badges in or out at the door, the CRC bypasses the door contact for a specified period of time. This is called the Bypass Time, and is specified in the ACDB.

The duration of the CRCSND horn is also specified in the ACDB, as the Emergency Exit Sounder Time. This can be set to any value between 0 and 255 seconds.

Setting the value to 0 seconds effectively inhibits the CRCSND. Setting the value to 255 seconds programs the CRC to operate the CRCSND until the CRC is manually reset by badging at the CRC card reader.

Elevator control

Description of the application

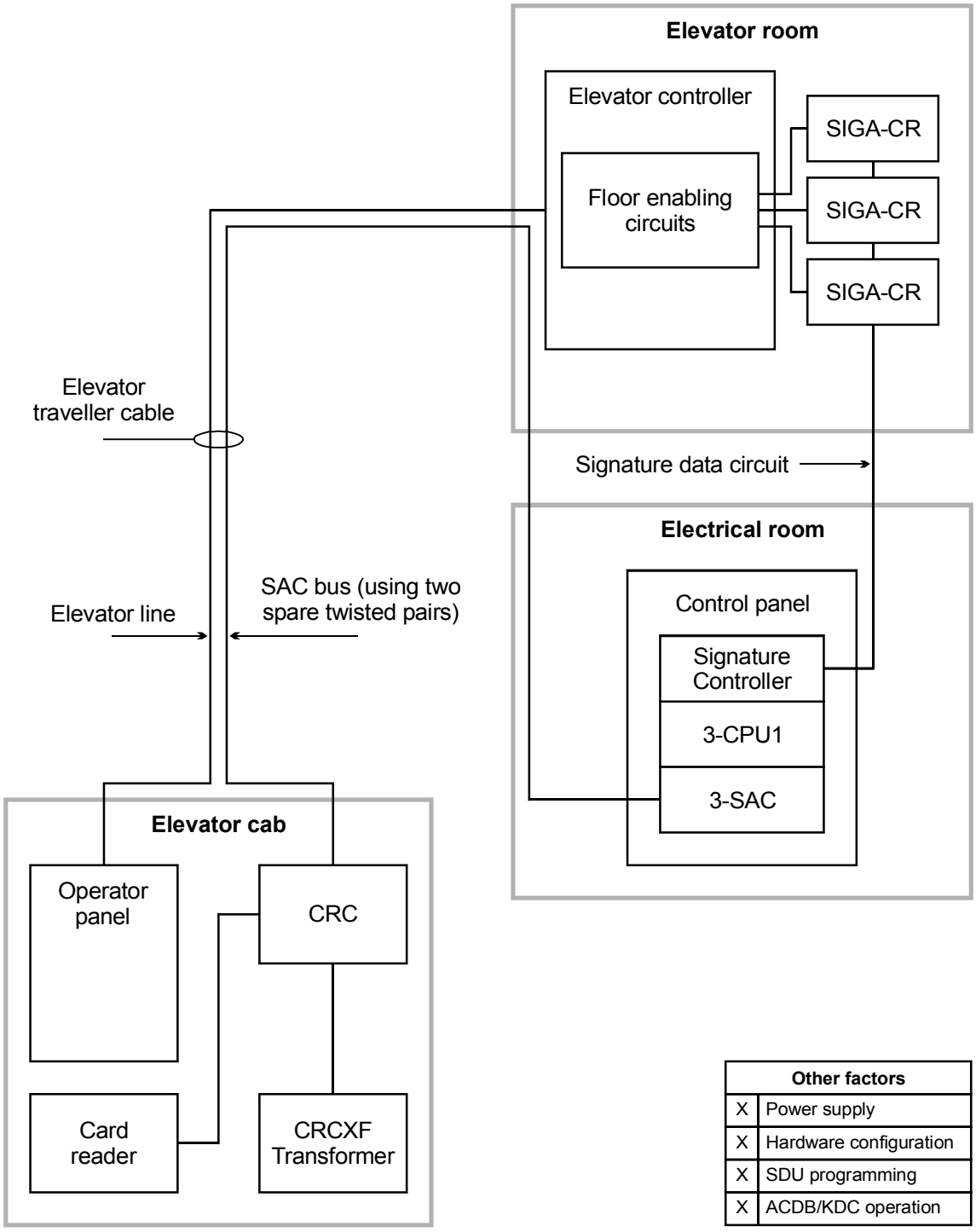
An access control system can determine which floors are available to a given cardholder. This application is shown in Figure 4-5.

A CRC and independent power source are installed in the elevator cab. When a cardholder presents his card, it is processed by the CRC. If valid, the CRC sends an access granted event and a command list request to the 3-CPU1 via the 3-SAC.

The command list operates the Signature relay modules attached to the Signature Controller module. The relays are connected to the elevator controller, and turn on or off access to the correct floors, according to the cardholder's access level privileges.

The command list includes timing, so the cardholder has a limited window of opportunity during which he can press the desired floor button. After the time has lapsed, he must present his card again.

Note: This application must be used only for floor access, and NOT for elevator control.



Other factors	
X	Power supply
X	Hardware configuration
X	SDU programming
X	ACDB/KDC operation

Figure 4-5: Access control and elevators

Power supply

The figure shows an independent power source for the CRC. This is suggested due to the length of cable from the cab to the electrical room.

Two pairs of wires are used to connect the CRC to the control panel. The SAC bus requires one pair for data communication. One wire of the second pair is required to maintain a common ground between the control panel and the CRC. For details, refer to the topic *Power from an ac source,* later in this chapter.

If you use an additional power supply other than the CRCXF, that power supply must be listed for fire alarm applications, must have ground fault detection disabled, and must have a circuit ground (circuit common) that is isolated from earth ground.

Hardware configuration

In this application, none of the CRC input circuits or relay contacts are used. The CRC simply reads the card and passes the command list request to the 3-SAC and 3-CPU1 for processing.

Since the CRC lock and input circuits are not used, you must provide dummy loads to maintain correct supervision currents. See the installation sheet for the correct load values.

SDU programming

The SDU programmer must create a command list for each combination of floors desired.

ACDB operation

The site security officer determines which floors should be accessible for an access level, and assigns the correct command list to the access granted event for that level. The site security officer also determines which cardholders belong to each access level.

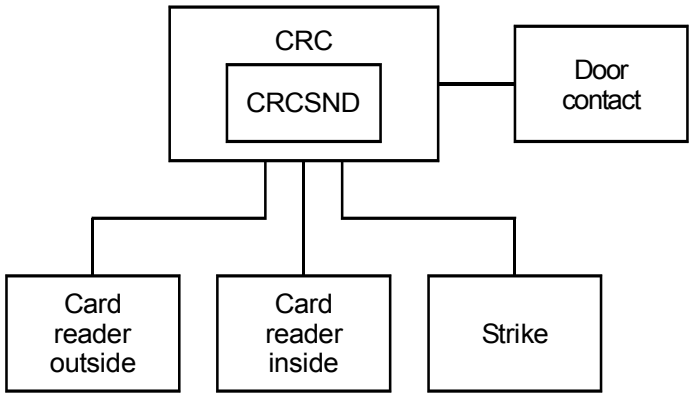
Emergency exit door

Description of the application

An *emergency exit door* is a door that is unlocked from the inside either by badging out or by opening the door.

If the door is opened without badging out, it causes an immediate alarm. Badging out bypasses the door for a specific period of time, so no alarm event occurs.

A typical CRC application for emergency exit door is shown in Figure 4-6, below.



Other factors	
	Power supply
X	Hardware configuration
X	SDU programming
X	ACDB/KDC operation

Figure 4-6: Emergency exit door

Note: Refer to NFPA 101 and the local AHJ to determine the requirements for emergency exit applications.

Hardware configuration

A CRC used for an emergency exit door requires the following additional hardware:

- CRCSND CRC Sounder
- Door contact

The CRCSND is installed inside the CRC. The sounder provides a local sound alarm. Opening the door without badging out activates the CRCSND.

The door contact is connected to the CRC via the input circuit.

SDU programming

In the SDU, you'll need to define the input circuit for the door contact as follows:

- Device type: Security P Monitor
- Delays: None
- Application: Door Contact
- Personality: Basic

ACDB operation

Two time periods are defined in the ACDB: Emergency Exit Sounder Time, and Bypass Time.

Emergency Exit Sounder Time is the number of seconds (0 through 255) the CRC Sounder sounds when an emergency exit door is opened without badging out.

When set to zero, the sounder is disabled. When set to 255, the sounder sounds until manually reset. The sounder is reset when a cardholder badges in at the door.

In all cases badging in on the affected CRC can silence the sounder.

Bypass Time is the number of seconds (0 through 255) that the door is bypassed after a cardholder badges out.

Handicap access door

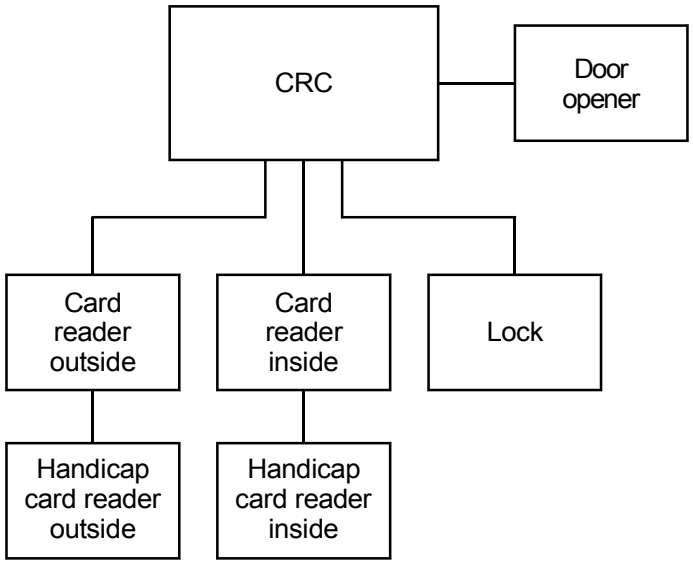
Description of application

A *handicap access door* is a door that allows a handicapped person the ability to enter and exit a door by allowing extra access time and providing an automatic door opener.

The door can function for both normal access and handicap access. A person without handicap privileges would operate the door just as any other door.

When a person with handicap privileges badges in, the CRC recognizes that the person has handicap privileges and provides two extra benefits. The first is giving the handicap person extra time to enter or exit the doorway before relocking the door. The second is an automatic door opener.

A second card reader can be installed in parallel to the entry or exit card reader to make it easier for a handicapped person to reach. The second card reader should be placed at a lower level and farther away from the door. The distance from the door should allow the automatic door to open fully without a person needing to move backwards.



Other factors	
	Power supply
X	Hardware configuration
X	SDU programming
X	ACDB/KDC operation

Figure 4-7: Handicap access door

Note: Refer to the appropriate ADA codes and the local AHJ to determine the requirements for handicap access door applications.

Hardware configuration

A CRC used for a handicap access door may require the following additional hardware:

- Automatic door opener
- Additional card readers

The automatic door opener is installed directly to the access door. The CRC controls the opening of the door with its internal relay.

Caution: The CRC relay is for low-voltage only. Do not exceed the relay limits stated on the installation sheet.

The additional card readers are wired to the standard card readers in parallel.

SDU programming

In the SDU, you'll need to define the CRC relay device type as Access Door Motor Control. This will activate the door opener for the time specified by the ACDB.

ACDB operation

The Relay Open Time is defined in the ACDB. This is the number of seconds (0 through 255) that the CRC activates the relay that automatically opens the door. The default is 30 seconds.

The Handicap Unlock time is also defined in the ACDB. This is the number of seconds (0 through 255) that the lock stays unlocked. The default is 20 seconds The door relocks when the unlock time has expired and the door has closed.

Both of these times can be set to allow a longer access time for a handicapped person.

Maglock peripherals

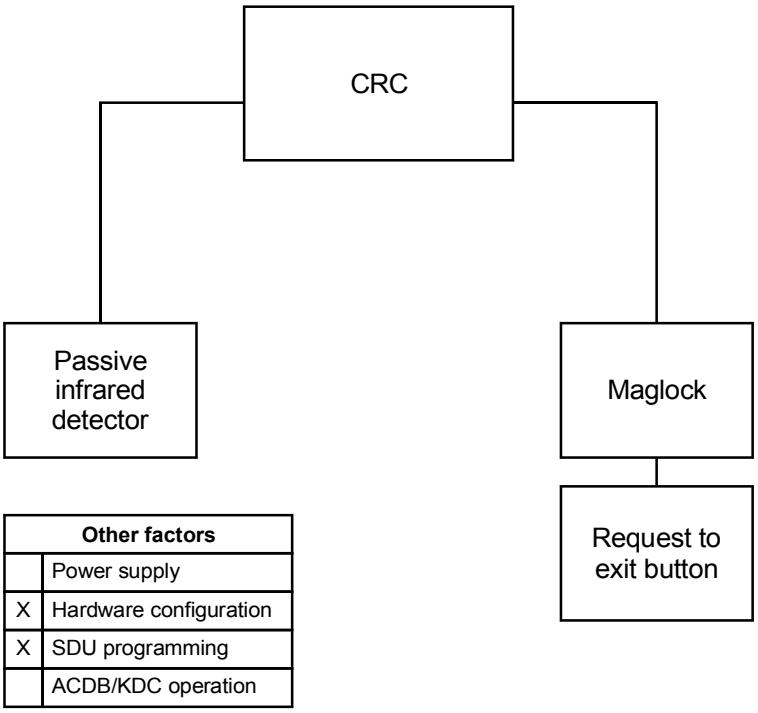
Description of the application

Maglocks require *maglock peripherals* due to NFPA codes. In general, these devices are intended to ensure that an egress door secured with a maglock can always be opened in an emergency.

Figure 4-8 shows the CRC using a maglock and required peripherals.

Maglock application requires a passive infrared motion detector (PIR) to be mounted above the door. Also required is a request to exit button (REX) to be mounted within five feet of the door and 40 to 48 inches above the ground. The PIR is connected on the input circuit of the CRC. The REX is connected directly to the maglock so that when activated it unlocks the door independently of the CRC.

The CRC is designed so that on detection of a fault on the input circuit of the PIR, the door will unlock. The PIR detects an approaching body and unlocks the door. Similarly, the REX button unlocks the door when it is pressed. The REX button must unlock the door for a minimum of 30 seconds.



Other factors	
	Power supply
X	Hardware configuration
X	SDU programming
	ACDB/KDC operation

Figure 4-8: Maglock and peripherals

Hardware configuration

The maglock peripherals consist of the following:

- Passive infrared motion detector (PIR)
- Request to exit button (REX)

The PIR is connected via the CRC input circuit. The REX is connected directly to the maglock instead of the CRC input circuit to meet NFPA requirements.

SDU programming

When programming the system for this application you'll need to configure the CRC, defining the device types. You'll also need to define the input circuits. For this application define the input circuit for the PIR as follows:

- Device type = Security interior
- Application = Request to exit motion detector.

Multiple card readers

Description of the application

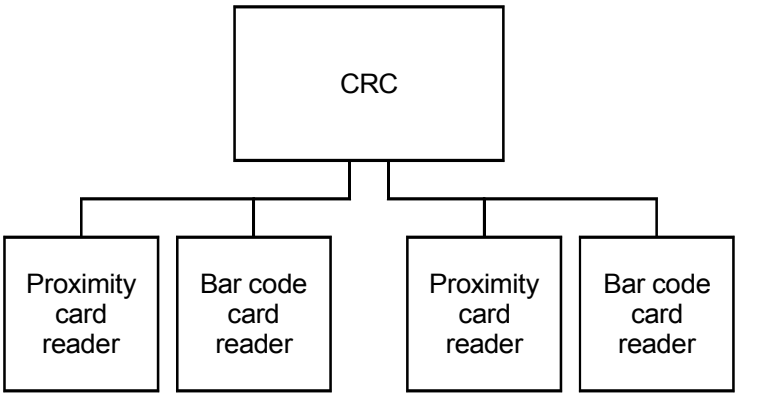
Several access control applications require the use of multiple card readers. For example:

- Visitor and escort readers
- High and low position readers

The CRC lets you use multiple card readers of the same technology or of mixed technologies. It can support up to four card readers, provided that the total current draw of the readers does not exceed the limits specified on the CRC installation sheet.

A visitor and escort application using multiple card readers is shown in Figure 4-9, below. In this application, both the escort and visitor must badge in to gain access.

The escort has a permanent, plastic card, and uses the proximity card reader. The visitor is issued an inexpensive paper bar code card, and uses the bar code reader.



Other factors	
	Power supply
X	Hardware configuration
X	SDU programming
X	ACDB/KDC operation

Figure 4-9: Multiple card readers

Card reader

This application works best with card readers that support dual LED control. The CRC uses the second LED (or LED state) to signal the visitor that the escort must badge in before access is granted.

Hardware configuration

The proximity card reader and barcode card reader are connected to the same terminals of the CRC.

SDU programming

When an escorted visitor tries to enter a controlled area without an employee, the CRC generates an access denied escort event. You can select a predefined command list that the 3-CPU1 executes in response to this event.

ACDB operation

Like employees, visitors must be assigned an access level using the ACDB. The site security officer can elect to assign the same access level to all visitor cards, or assign different access levels to ranges of visitor cards.

Muster

Description of the application

The *muster* application can be used to determine who has exited the building in the event of an evacuation.

During normal operations, staff badge in and out using the inside and outside readers. Note that muster reporting will only work if all employees badge in and out.

During an evacuation, everyone exits the building immediately and goes to one of the predetermined muster stations. At the muster station personnel badge in using a reader that is attached to a CRC designated as a muster station.

After everyone has badged in at the muster station security staff use the ACDB program to create a muster report. The report lists staff who badged into the building but did not badge out at a muster station.

Figure 4-10 shows a typical muster application. CRCs 2, 3, 5, and 6 are normal access control CRCs. CRCs 1 and 4 are muster station CRCs.

The ACDB computer must be located in a safe area so security staff can create the muster report after the evacuation. This computer can connect to the access control system either via telephone lines and a 3-MODCOM, or by direct connection to the EST3 control panel.

Note: Links between the ACDB computer and the control panel should be tested regularly to ensure correct operation.

Staff must be made aware of the importance of badging in and out at all times. Failure to do so can result in a false muster report, indicating that someone is still in the building. This in turn can result in rescue personnel risking danger to search for someone who is not actually in the building.

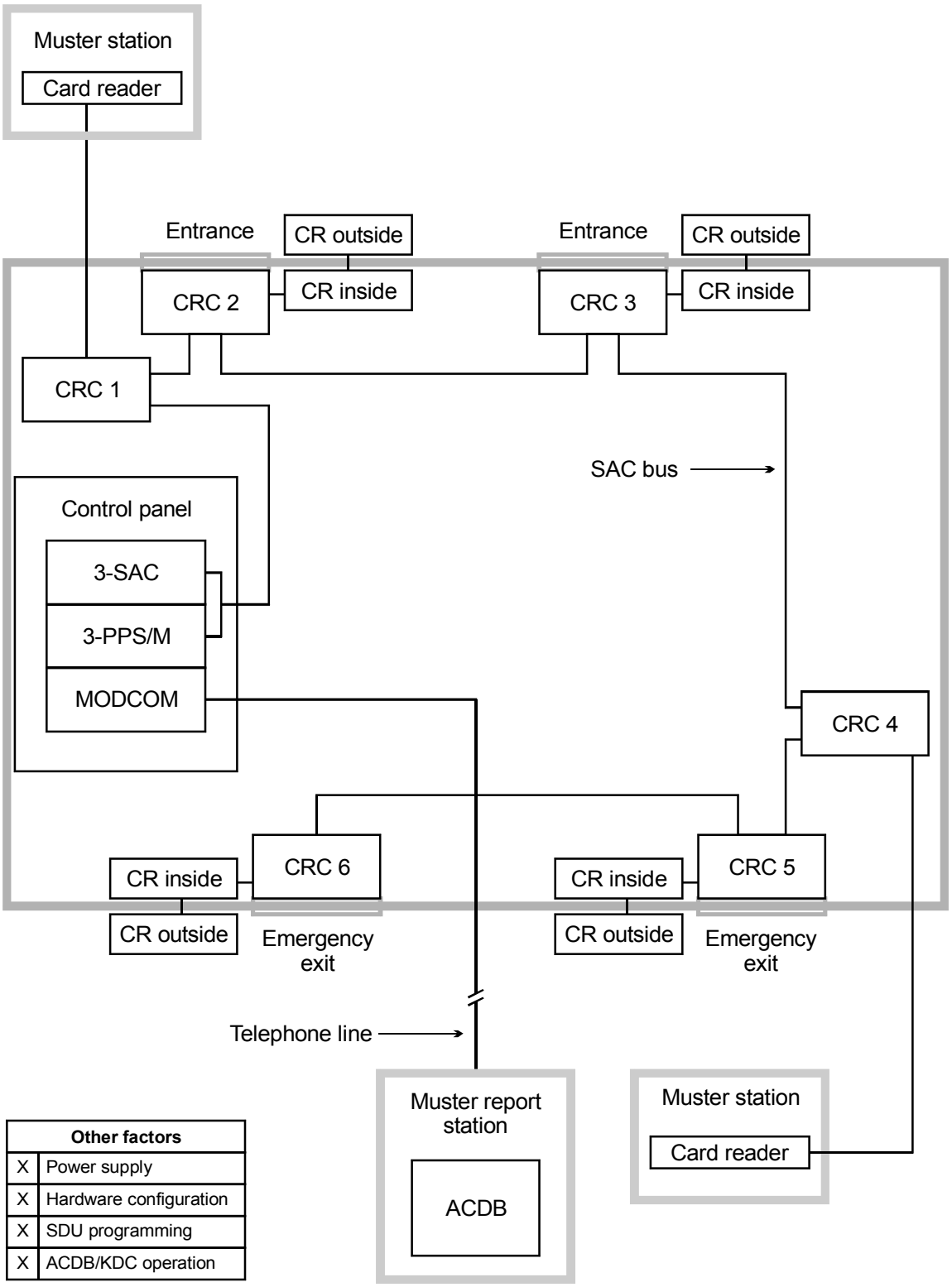


Figure 4-10: Muster application

Hardware configuration

The control panel must contain the following rail modules:

- 3-SAC Security Access Control module
- 3-PPS/M Primary Power Supply module
- 3-MODCOM Modem Communication module
  — or —
  3-RS232 Card option installed in the 3-CPU1

The 3-SAC module supports the SAC bus. Power for the CRC is normally taken from the 3-PPS/M and is routed with the data lines in a cable composed of two twisted-pair wires.

The 3-MODCOM module supports modem communication between the control panel and the ACDB program via telephone lines. Alternately, the 3-RS232 Card supports RS-232 communications on a cable connected directly to the 3-CPU1.

All CRCs controlled by a muster station must be on the same 3-SAC card as the muster station. Badging out at a muster station badges the person out of all partitions for that 3-SAC card. Therefore, a single muster station can serve multiple partitions, provided that they are on the same 3-SAC card.

The system must have at least one muster CRC per 3-SAC module. The system cannot exchange muster information between 3-SAC modules, so each must be handled separately for muster purposes.

A CRC used for a muster station requires the specified dummy load on the lock terminals to maintain supervision. (Refer to the CRC installation sheet for correct resistor values.)

The card reader used for the muster station must be wired as an outside reader.

SDU programming

Each CRC used in a muster application requires specific configuration settings. These are made in the SDU program, on the CRC Configuration tab.

If the CRC is used in a partition that has muster control, check the Muster Support box.

For the CRC designated as the muster station, check the Muster Station box, but leave the Muster Support box clear.

In the SDU, you can also assign a predefined command list to the Access Granted Muster event.

Power for continuous locks

Description of the application

By *continuous locks,* we mean locks that operate, on average, more than 30 seconds in every minute. Normally, power for the lock is taken from the CRC battery. However, for continuous locks there is not enough recharge time for the CRC battery to keep up with the drain. Consequently, the CRC must be configured so that an external power supply operates the lock.

The CRC can be powered by the 3-PPS/M, by a CRCXF (CRC Transformer), or by a remote 24 Vdc power supply. Any of these supplies is suitable for powering continuous locks. (See the topics *Power from an ac source, Power from a remote source,* and the *CRC - Card Reader Controller Installation Sheet* for more information about these options.)

A typical application using continuous locks is shown in Figure 4-11, below.

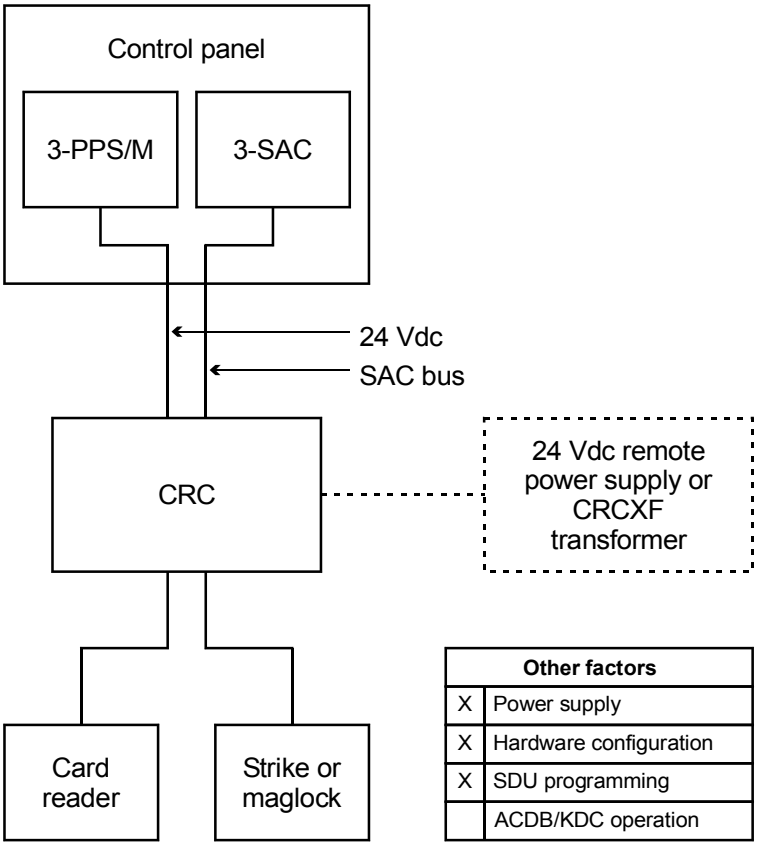


Figure 4-11: CRC controlling a continuous lock

The figure shows the power coming from the 3-PPS/M in the control panel. This power supply could be used to operate the lock, but use of a CRCXF or remote 24 Vdc supply is recommended to minimize the load on the panel power supply.

During open schedules, or when an authorized card is read at a card reader, the CRC provides power from the 3-PPS/M to the door strike to unlock the door. For maglocks, the CRC provides power from the 3-PPS/M (or CRCXF or 24 Vdc power supply) to activate the lock during closed schedules, or between authorized card accesses.

Power supply

Use power and load calculations to determine the need for remote power supplies or transformers. Refer to Appendix A: *Calculations* for calculation guidelines.

Jumper settings determine the power source and usage for the CRC. Refer to the installation sheet for correct jumper settings. Configure the input power as dc when using power from the control panel or a remote supply. Configure input power as ac when using a transformer.

For this application, configure the output power as continuous.

Hardware configuration

The control panel must contain the following rail modules:

- 3-SAC Security Access Control module
- 3-PPS/M Primary Power Supply module

The 3-SAC module supports the SAC bus. Power for the CRC is taken from the 3-PPS/M and is routed with the data lines in a cable composed of two twisted-pair wires.

SDU programming

When configuring the system for this application, you'll need to configure the CRC and define the appropriate lock type in the SDU. For this application the Lock Type can be either Strike or Maglock as required to match the lock actually used.

Power for intermittent locks

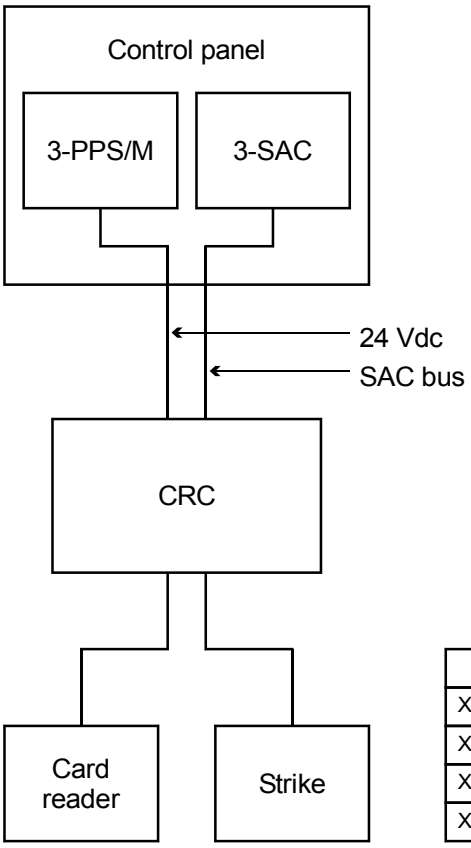
Description of the application

By *intermittent locks,* we mean locks that operate, on average, less than 30 seconds in every minute. In these applications, the CRC battery can provide the power needed to operate the lock.

The CRC is powered by the 3-PPS/M. It uses this power source to charge an internal 1.2 Ah sealed lead acid battery. The battery then provides the power needed to operate the door lock..

Because the battery powers the door strike, this configuration cannot be used for maglocks or strikes that are active more than 30 seconds in a minute. In these conditions the battery would not have enough time to charge and keep up with the drain. For heavy or continuous duty applications, refer to the topic *Power for continuous locks* presented in this chapter.

A typical application using CRC battery power is shown in Figure 4-12, below.



Other factors	
X	Power supply
X	Hardware configuration
X	SDU programming
X	ACDB/KDC operation

Figure 4-12: CRC controlling an intermittent strike

The figure shows the charging power coming from the 3-PPS/M in the control panel. The access control system requires a 24 Vdc power supply to power the CRC and to charge its battery. The 3-SAC connects to the CRC through the SAC bus.

When an authorized card is read at a card reader, the CRC provides power from its internal battery to the door strike and unlocks the door.

Power supply

Jumper settings determine the power source and usage for the CRC. Refer to the installation sheet for correct jumper settings. Configure the input power as dc. Configure the output power as intermittent.

Hardware configuration

The control panel must contain the following rail modules:

- 3-SAC Security Access Control module
- 3-PPS/M Primary Power Supply module

The 3-SAC module supports the SAC bus. Power for the CRC is taken from the 3-PPS/M and is routed with the data lines in a cable composed of two twisted-pair wires.

SDU programming

When configuring the system for this application, you'll need to configure the CRC and define the appropriate lock type in the SDU. For this application set the Lock Type to Strike.

ACDB operation

Note that a CRC configured and programmed for intermittent lock use cannot support an open schedule (a period when the lock is kept open). Such a schedule would quickly drain the CRC battery and the lock would close.

You should document the CRC configuration and include this in your project plans. Make a copy of this documentation available to the site security staff who will use the ACDB to create and assign schedules.

Power from an ac source

Description of the application

By *ac power*, we mean that the CRC provides the power to operate the electric door strike or maglock by using a 16.5 Vac transformer (model CRCXF). This supply can provide continuous power to the door strike or maglock, and also power the CRC.

Using an ac source:

- Limits power drawn from the control panel
- Supports continuous duty locks
- Supports schedules with unlock periods

Note: Be sure to check the installation sheet for the *CRC and CRCXM Card Reader Controller* (P/N: 387625) for a list of applications that prohibit the use of the CRCXF.

A typical CRC using ac power is shown in Figure 4-13.

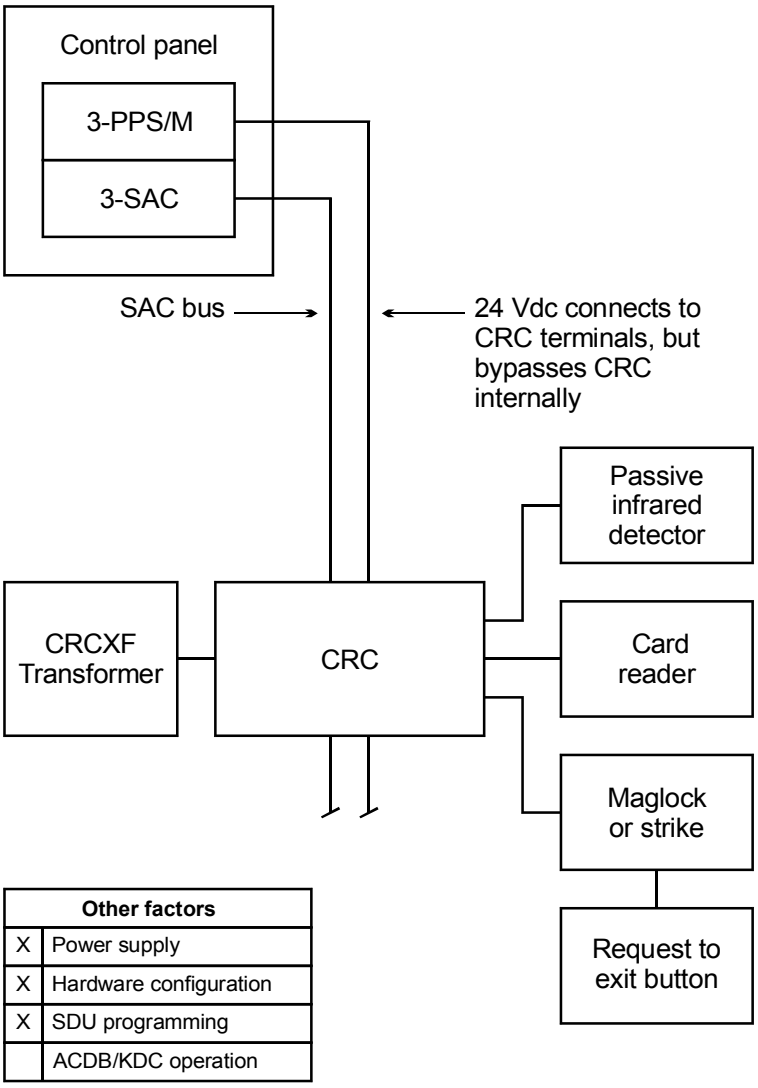


Figure 4-13: CRC using ac power

The figure above shows the CRC power coming from the 16.5 Vac transformer. The 3-PPS/M power supply coming from the control panel simply passes through the CRC. The 3-SAC connects to the CRC through the SAC bus.

This wiring is shown in Figure 4-14.

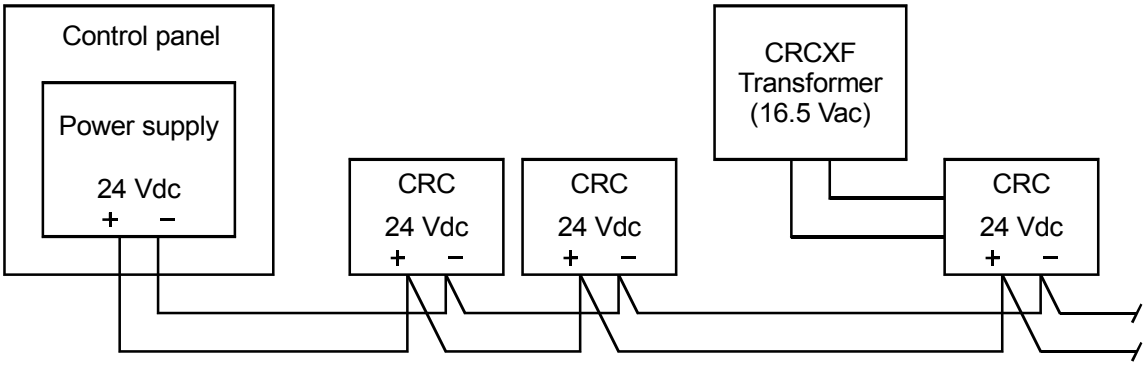


Figure 4-14: Wiring details for transformer supply

Power supply

Jumper settings determine the power source and usage for the CRC. Configure the input power as ac. Configure the output power as continuous.

If you use an additional power supply other than the CRCXF, that power supply must be listed for fire alarm applications, must have ground fault detection disabled, and must have a circuit ground (circuit common) that is isolated from earth ground.

Hardware configuration

The control panel must contain the following rail modules:

- 3-SAC Security Access Control module
- 3-PPS/M Primary Power Supply module

The 3-SAC module supports the SAC bus. Power for the CRC is normally taken from the 3-PPS/M and is routed with the data lines in a cable composed of two twisted-pair wires. In this case the power from the 3-PPS/M is connected to the CRC terminals, but internally bypassed.

When using a transformer power supply you must provide a circuit common path between all devices, using the -24 Vdc terminals. As shown in the wiring diagram, the 24 Vdc lines can be connected to all devices to accomplish this.

The 16.5 Vac transformer *must* be plugged into a continuously energized ac socket, not one controlled by a switch.

SDU programming

When programming the system for this application, you'll need to configure the CRC and define the appropriate lock type in the SDU. This can be either a strike or maglock.

Power from a remote source

Description of the application

By *remote power*, we mean that the CRC provides the power to operate the electronic door strike or maglock by using a remote dc power supply. This additional power can provide continuous power to the door strike or maglock.

A typical CRC using remote power is shown in Figure 4-15. The additional power is needed because the CRC battery can not keep up with the power needs of maglocks or strikes with an active duty cycle greater than 30 seconds in a minute. In these conditions the battery does not have enough time to charge and keep up with the drain.

The figure shows power coming from the additional remote power supply to power the CRC and maglock. The supply is supervised by the Signature data circuit derived from the 3-SSDC module. The 3-SAC connects to the CRC through the SAC bus.

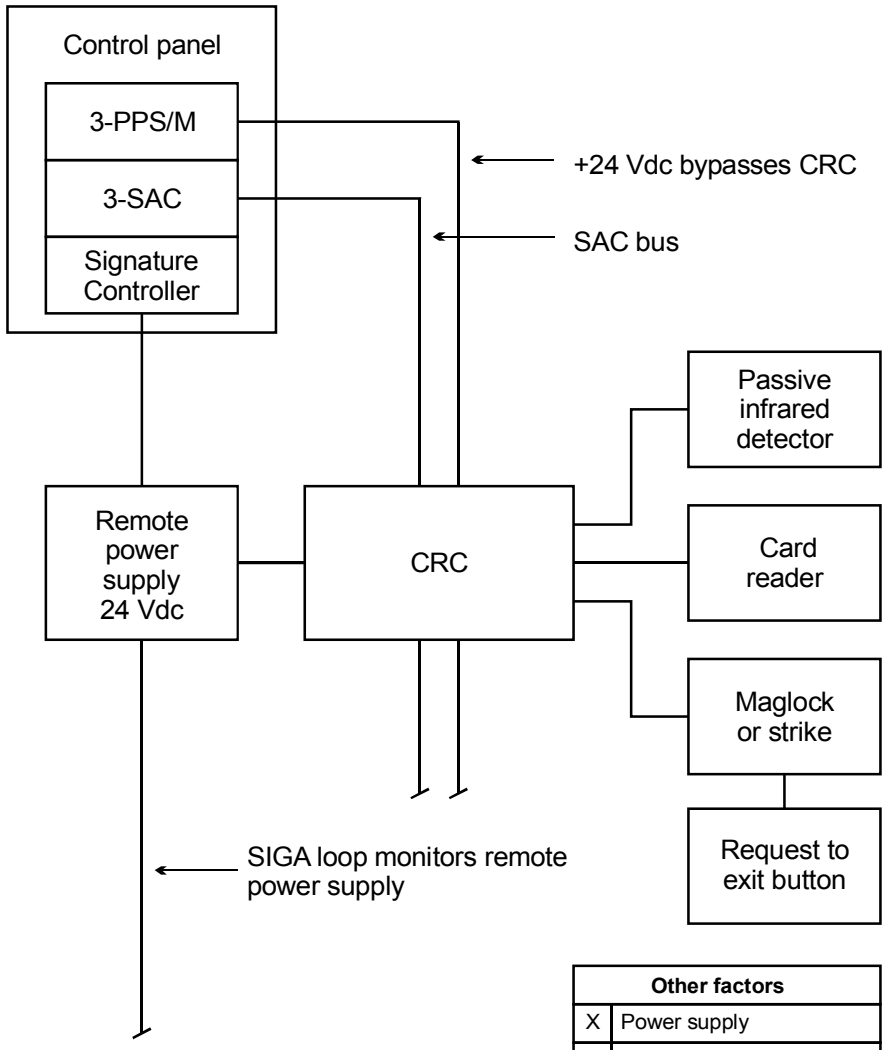


Figure 4-15: CRC using remote power

The negative side of the 3-PPS/M power supply coming from the control panel connects to the CRC (and to all other CRCs). The positive side is broken and the remote power supply picks up the load. This wiring is shown in Figure 4-16.

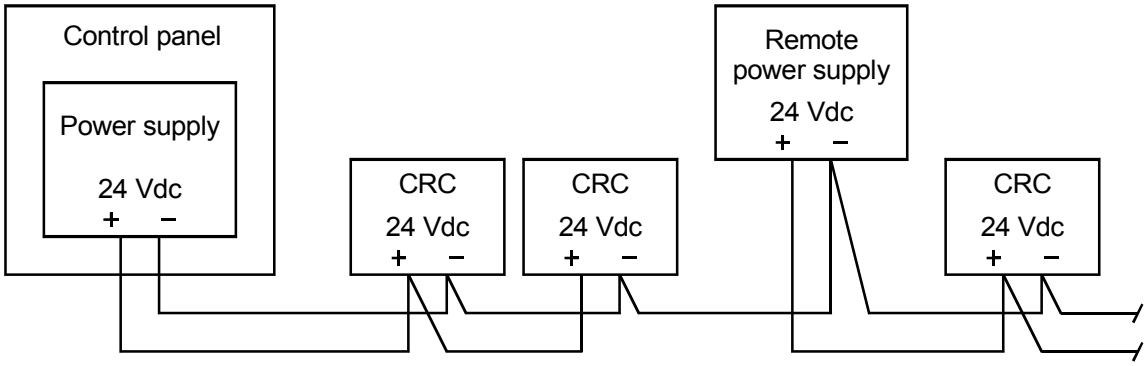


Figure 4-16: Wiring for remote power supply

Power supply

Jumper settings determine the power source and usage for the CRC. Configure the input power as dc. Configure the output power as continuous.

Note that additional power supplies must be listed for fire alarm applications, must have ground fault detection disabled, and must have a circuit ground (circuit common) that is isolated from earth ground.

Hardware configuration

The control panel must contain the following rail modules:

- 3-SSDC Single Signature Controller module
- 3-SAC Security Access Control module
- 3-PPS/M Primary Power Supply module

The 3-SSDC module supports the SIGA loop, which supervises the remote power supply

The 3-SAC module supports the SAC bus. Power for the CRC is normally taken from the 3-PPS/M and is routed with the data lines in a cable composed of two twisted-pair wires. In this case the power from the 3-PPS/M is simply passed through the CRC.

The remote power supply is supervised by the 3-SSDC module via the Signature loop. When using a remote power supply you must provide a circuit common path between all devices, using the -24 Vdc terminals. The remote power supply must share a common ground with the 3-PPS/M via the -24 Vdc line.

SDU programming

When programming the system for this application, you'll need to configure the CRC and define the appropriate lock type in the SDU. This can be either a strike or maglock.

Remote controls

Description of the application

In any access control system, a card reader and CRC can be used to operate devices that are completely remote from the CRC. In such cases the CRC simply creates an access event and passes it to the 3-SAC for processing by the 3-CPU1. Any device that can be controlled by an EST3 panel can be operated in response to an access event.

As a typical example, Figure 4-17 shows how the entrance devices to a secured parking area could be operated from a remote card reader. Note that any type of CRC input device could be used in place of a card reader.

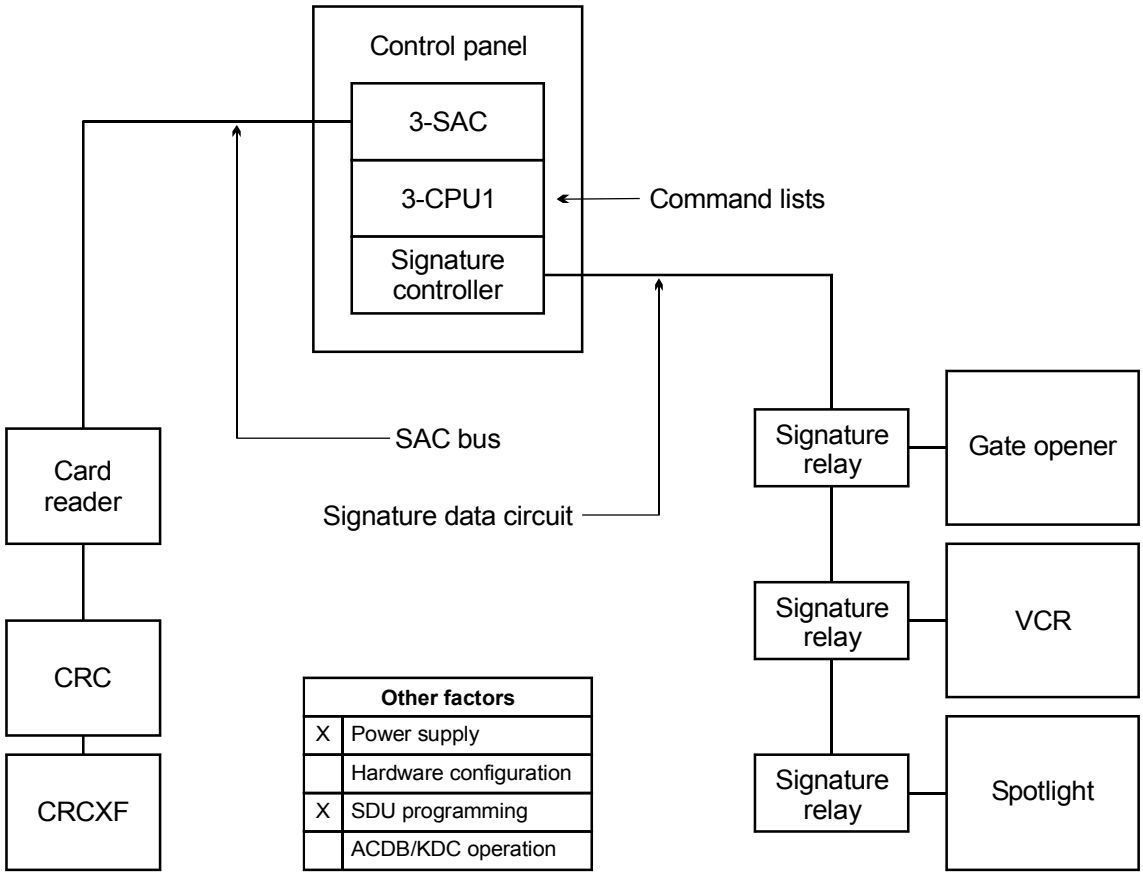


Figure 4-17: Remote control of a parking garage entrance

When the cardholder swipes his card, the access event is sent from the CRC to the 3-SAC and then to the 3-CPU1. At the 3-CPU1, the access event activates a predefined command list.

The command list operates the Signature relays on the Signature data circuit supported by the Signature controller module. These relays activate the gate opener, a spotlight, and a VCR image recording system.

An inside card reader and could be used to control exits from the area, but it would be more appropriate to use a motion detector, since egress from the area is not controlled.

Power supply

A CRCXF - CRC Transformer power supply is shown, assuming that the CRC is be located at some distance from the electrical room and control panel.

If you use an additional power supply other than the CRCXF, that power supply must be listed for fire alarm applications, must have ground fault detection disabled, and must have a circuit ground (circuit common) that is isolated from earth ground.

SDU programming

The SDU programmer must create a command list that specifies activation of the correct relays and devices, the delays required, and the deactivation of the devices.

Since there is no restoration phase of access events, the command list should include commands that turn off the devices.

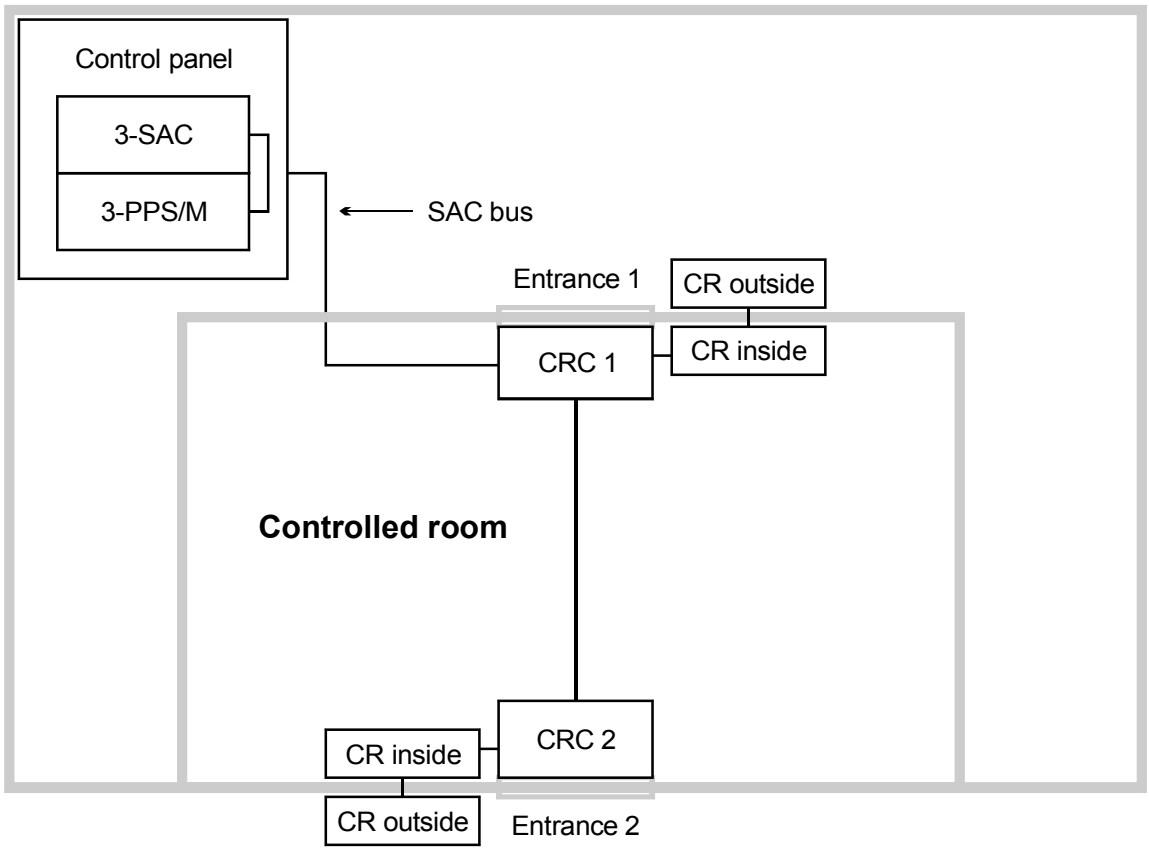
Two-person rule

Description of the application

A *two-person rule* ensures that no staff member can be in a controlled area alone. A CRC operating under two-person rule prevents the entrance of a single person into the controlled area. When two people are present in the area, one cannot exit without the other.

The controlled area can have a single entrance or multiple entrances. The network coordinates user information between the CRCs that serve a common area.

A typical two-person rule application is shown in Figure 4-18, below.



Other factors	
X	Power supply
X	Hardware configuration
X	SDU programming
X	ACDB/KDC programming

Figure 4-18: Two-person rule

Card reader

This application works best with card readers that support dual LED control. The CRC uses the second LED (or LED state) to signal the cardholder that a second person must badge in or out of the controlled area.

Hardware configuration

The control panel must contain the following rail modules:

- 3-SAC Security Access Control module
- 3-PPS/M Primary Power Supply module

The 3-SAC module supports the SAC bus. Power for the CRC is normally taken from the 3-PPS/M and is routed with the data lines in a cable composed of two twisted-pair wires.

SDU programming

If the CRC is to be used for two-person rule it must be configured in the SDU. On the CRC Configuration tab, the 2 Person Rule box must be checked.

You can also assign a predefined command list to the Access Denied 2 Person Timeout event. This setting is found on the CRC Command Lists tab.

Chapter 5

Installation

Summary

This chapter covers mechanical and wiring installation instructions for the CRC.

Content

Installation guidelines

Planning an installation

Here are some general guidelines to remember when planning your installation:

- All access control applications require a separate CRC for each door
- An inside card reader and outside card reader can be used on opposite sides of a door and share the same CRC
- When using the CRC for access control, make sure that there is always a mechanical mechanism for gaining access

If there is a problem with the door release mechanism or the CRC, the mechanical door lock will be the only method for gaining access.

Lobbies

Where general access to an unprotected lobby is required, and there is no concern for scheduling, a card reader can be used with a CRC that does not have any associated security partition.

This arrangement will allow access to the lobby for all persons with valid cards, while requiring all others (visitors, etc.) to be buzzed in.

If access to the lobby is to be limited to certain working hours the CRC can be programmed with an open schedule. While the open schedule is active, the lobby door will be unlocked.

CRC installation guidelines

For specific CRC installation instructions refer to the installation sheet, P/N 387625, *CRC / CRCXM Card Reader Controller.* The CRC installation sheet provides pertinent wiring information concerning the various card readers, including instructions for the CRC jumper settings.

Here are some additional points to remember:

- Do not use a magnetic stripe card with a Wiegand reader. Doing so may corrupt the code on the magnetic stripe card.
- Each CRC must receive a minimum of 18.5 V from the control panel power supply, otherwise the CRC battery will not charge. If 18.5 V can not be supplied to the CRC from the panel, add an additional power supply.
- Maximum current for the electric door lock is 500 mA

- Maximum current for card readers is 500 mA
- Make certain that the length of wire between the CRC and its associated card reader(s) does not exceed card reader manufacturer's recommendations
- The CRC must be installed indoors, inside the protected area, and must not be subjected to temperatures below 32° F (0° C) or above 120° F (49° C)
- Include each CRC in your project layout diagram, indicating the partition that will be accessed using the CRC and the CRC serial number
- Each CRC and each card reader presents a current drain. These current drains affect the overall system power requirements and they must be incorporated into the power calculations. (See Appendix A, *Calculations*.)

System requirements

When designing an integrated system based on an EST3 control panel, the following upgrade levels and components are required for proper operation:

- 3-CPU1 with version 3.1 firmware or higher
- SDU version 3.1 or higher
- 3-SAC Security Access Control module
- 3-MODCOM Modem Communicator module with version 3.1 firmware or higher (or 3-RS232 communication card in 3-CPU1)
- CRC Card Reader Controller modules
- Access Control Database (ACDB) program

Installing the CRC

Figure 5-1 shows a typical installation for a card reader controller.

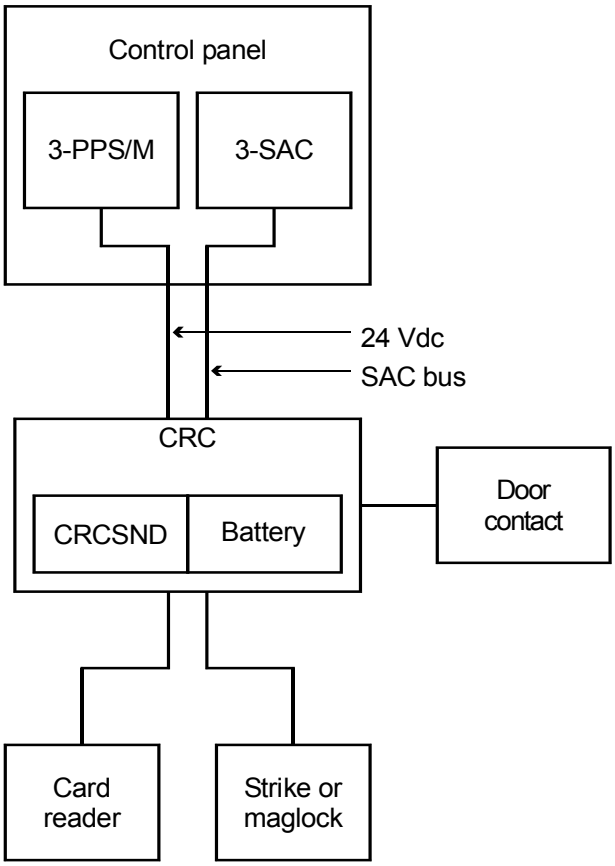


Figure 5-1: Basic CRC installation

Locate the CRC close to the door that it will control. Choose a spot inside the protected area preferably just below the ceiling, where it will not be susceptible to tampering or to damage due to the moving of office furniture, machinery, etc. A nearby closet can also be used if it is within allowable distance of the reader and lock.

The location that is chosen should allow for ease of servicing.

Wiring the CRC

SAC bus wiring

If the CRC is going to be used in an integrated system with a control panel, the CRC must be wired to the 3-SAC Security Access Control module. The 3-SAC supports the SAC bus, an RS-485 communication line.

The 3-SAC module can support Class A or Class B wiring. If Class A, the 3-SAC can support 30 CRCs or KPDISPs. If Class B, the 3-SAC can support 62 CRCs or KPDISPs (31 per loop).

Recommended cabling

Since our security and access control devices require 24 Vdc, we suggest that you always use a four-wire cable for the SAC bus and a 24 Vdc power supply.

For the data wires, use unshielded, twisted pair, with greater than 6 twists per foot, in 14 to 22 AWG (1.50 to 0.25 sq mm). For the power wires, use 14 or 16 AWG.

You can use a four-conductor cable with an overall jacket containing solid 2-19 AWG and 2-16 AWG for the SAC bus.

The maximum run from a CRC to the 3-SAC is 4,000 ft (1,220 m) at 25 pF/ft. The maximum total capacitance of the run is 0.1 μF, and the maximum total resistance is 52 Ω.

Powering the CRC

The CRC can be powered in several ways, as described in Chapter 4, *Access Control Applications.* Each method requires specific jumper settings and wiring to allow the CRC to operate and communicate properly.

Note: Be sure to make the correct jumper settings for the CRC, as described on the *CRC - Card Reader Controller Installation Sheet* (P/N 387625).

24 Vdc wiring

The CRC can receive 24 Vdc power from the control panel power supply. Simply use the 24 Vdc terminals on the CRC and control panel power supply.

Transformer wiring

The CRC can be powered from an external transformer, the CRCXF. Connect the transformer to the 16.5 Vac terminals in the CRC. Note that all connected CRCs or KPDISPs must have a

circuit common point. To establish a circuit common, connect the –24 Vdc wire to the –24 Vdc terminal of the panel power supply and the –24 Vdc terminals of all CRCs or KPDISPs.

We recommend that you connect both the +24 and –24 Vdc wires to the CRC, even when using a transformer for power. Doing so allows the –24 Vdc wire to act as the circuit common point and if, at a later time, a transformer is no longer desired no additional wiring is required to power the CRC.

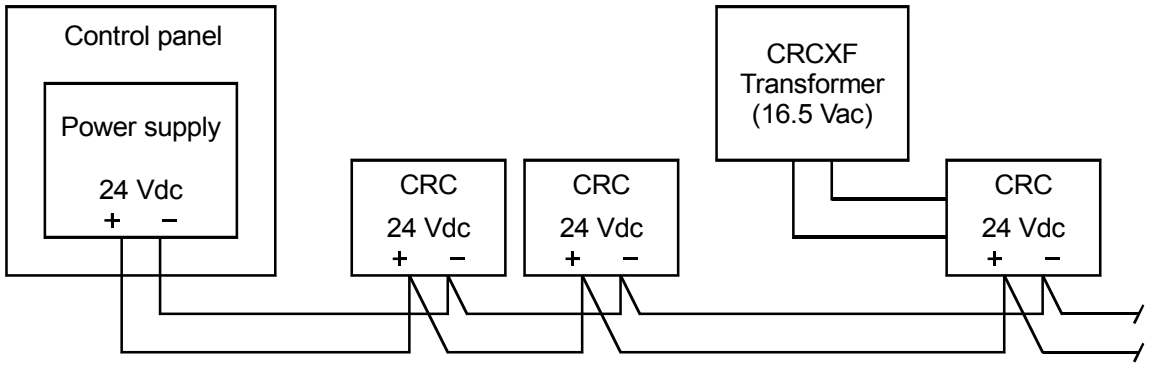


Figure 5-2: Transformer power supply wiring diagram

Additional power supply wiring

When an additional power supply is required, you require a circuit common point for correct operation of the SAC bus. To establish a circuit common, connect the –24 Vdc terminal on the additional power supply to the –24 Vdc terminal on the last device.

This circuit common must be connected to every device, and to the circuit common point of any additional power supplies.

The additional power supply must be listed for fire alarm applications, must have ground fault detection disabled, and must have a circuit ground (circuit common) that is isolated from earth ground.

Caution: Take special care when using any power supply in addition to the panel power supplies (3-PPS/M or 3-BPS/M). If you use an additional power supply, it must *not* have ground fault detection circuits.

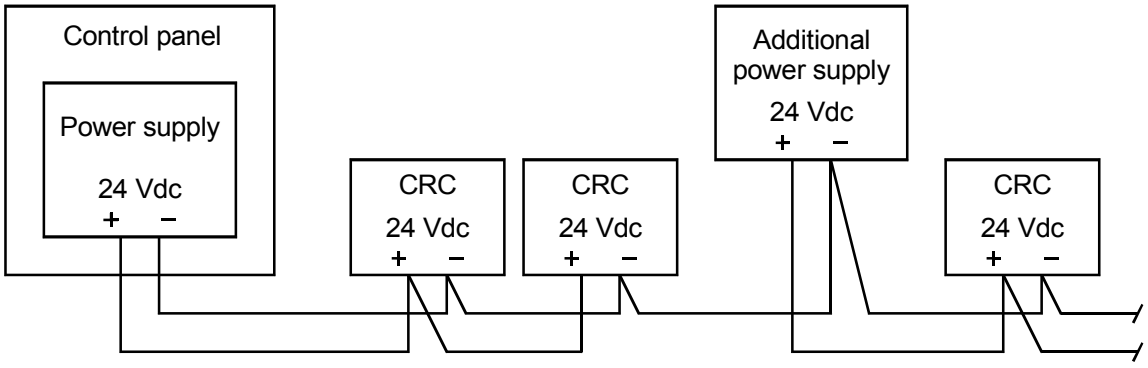


Figure 5-3: Additional power supply wiring diagram

Installing and wiring the card reader

Install card readers in accordance with the manufacturer's instructions, making connections as shown on the CRC installation sheet. Make sure that extension cables from the reader do not exceed the manufacturer's recommendations. Typically 8-conductor shielded wire is recommended.

Note that both inside and outside card readers use the same CRC terminals. However, for the inside reader, the connection is reversed. This is how the CRC distinguishes between the inside and outside readers.

When installing the inside readers make sure that the card reader Data 0 wire (typically green) is connected to terminal 13 and the Data 1 wire (typically white) is connected to terminal 12.

Some proximity readers interfere with each other, even on opposite sides of a wall, and should be kept some distance away from each other. Check with the manufacturer for recommended distances between units. Mount the inside unit temporarily until you can verify proper operation.

Where required, make DIP switch settings for the card reader as shown in the installation sheets supplied by the reader manufacturer. Make settings that will select the following options:

- Dual-LED control
- Pull up resistors
- Standard Wiegand output

The CRC installation sheet contains information for connecting the readers to the CRC. Where vendor extension cables are not available for these connections, use 22/8 shielded wire for the extension.

Installing the door locks

The CRC supports the three basic types of door lock: strikes, maglocks, and electrified locksets. Each lock type has a distinct method of operation and installation. Always follow the manufacturer's instructions while installing locks.

Installing and wiring electric door strikes

Install the electric door strike in accordance with the manufacturer's instructions, and make connections as shown on the CRC installation sheet.

Many installation companies subcontract the actual lock installation. The process of cutting metal or chiseling wood is learned over time and errors may permanently damage a doorframe.

Check with the door and lock manufacturers to ensure that adding the strike does not effect any fire rating of the door.

Check that the strike is compatible with the lockset installed in the door. The lockset should be a commercial grade lock with a dead latch to prevent someone from shimming the door open.

Make sure that strike cable does not exceed the maximum allowable voltage drop.

Make sure the door is properly aligned, has a good fit to the frame, and has an operating closer. The door should work smoothly and close fully after being opened. Insist that defective doors be fixed or replaced before proceeding with the lock installation.

Note: If you are not using the CRC to control a lock, a standard 4.7 KΩ EOL resistor must be connected across TB1-5 and TB1-6 to simulate the lock load for the CRC supervisory circuit.

Installing and wiring an electrified lockset

Install the electrified lockset in accordance with the manufacturer's instructions, making connections as shown on the CRC installation sheet for a strike.

Remove the latch and drill straight through the hole into the core of the door. Unscrew the center hinge from the door and drill another hole (in the area where the hinge was) into the core of the door. Snake the wire through the door to the knob.

Connect the wires to the lockset and run the wires to the frame using an electrified hinge or a door cord. Many installation companies subcontract the actual lock installation. The process

of drilling holes in metal or wood is learned over time and errors may permanently damage a door.

Check with the door and lock manufacturers to ensure that adding the new lockset does not effect any fire ratings. Also, check that the door can be opened from the inside without a key or card.

Check that the lockset is compatible with the striker plate installed in the frame.

Flexible armored door cord

When installing an electrified lockset, a flexible armored door cord must be used to interconnect wiring to CRC. This is used on the hinged side of door to pass the wires from the door to the frame. It comes with two plastic end caps to secure the ends to the door and frame.

Installing maglocks

Maglock and electrified bolt installations raise safety concerns. These types of lock do not have a built-in mechanical override, as do strikes and electrified locksets. This creates the potential for trapping occupants in a fire if such locks are not properly installed.

For this reason the NFPA and local building codes include regulations for the proper installation of maglock and electrified bolts. Maglocks and electrified bolts must meet ALL of the following requirements:

- Include a request to exit motion detector. The detector must be an approved exit device and fail safe upon loss of power.
- Unlock on loss of primary power to the access control system that locks the door.
- Include an independent, manual, request to exit device (a button or bar) mounted 40 to 48 inches above the floor, within 5 feet of the door with sign that reads "Push to Exit". On activation, the door must remain unlocked for a minimum of 30 seconds.
- Unlock on ANY of the following: activation of a building fire alarm, loss of primary power, activation of a fire alarm trouble, or disabling of a fire alarm device. The doors must remain unlocked until the fire alarm is manually reset or the trouble or disable condition is cleared.
- Unlock on activation of building automatic sprinkler s. The doors must remain unlocked until the sprinkler alarm is manually reset.

Note: Please refer to the latest editions of NFPA to determine the most current code requirements.

Please read the topic *NFPA 72,* later in this chapter. It discusses additional material that applies to maglocks and electrified bolts.

Checking operation with a construction card

CRCs come from the factory preprogrammed to recognize a construction card with a special card code. The CRC will only accept the construction code when no user data has been downloaded to it.

Once the CRC battery has been charged, the construction card can be used to check the operation of the electric door lock, or other releasing mechanism, in order to make adjustments where necessary. Remember, to use the construction card the CRC must be factory fresh, with no card information downloaded.

After making all required adjustments and powering up the system, temporary cards can be created for the construction staff to use as required. When the installation of the system is complete these temporary cards can be deleted or allowed to expire.

NFPA 72

Section 3-9.5

NFPA 72 3-9.5 pertains to door unlocking devices. It states that all emergency exits shall unlock upon loss of primary power to the fire alarm system.

This is expanded to include the requirement that any disablement of the fire alarm system must cause the emergency exits to unlock. This requirement includes wiring faults between the lock controller and the request to exit devices. When a request cannot be detected, the door must unlock.

Remember that these requirements only apply to a door that is locked by a device that cannot be manually overridden. Though a strike holds a latch, a knob can be turned or a paddle depressed to retract the latch and allow the door to open. Maglocks or bolts, on the other hand, hold the door shut and no amount of knob turning or pushing will open the door.

Chapter 6

Programming

Summary

This chapter covers the programming options available for the CRC. Program settings can be made in the Access Control Database (ACDB) program and in the System Definition Utility (SDU) program.

We discuss which options are configured in each program, and define the fields used to program the CRC.

Content

SDU

Configuring the CRC

In an integrated system the CRCs are connected via the SAC bus. The SAC bus is supported by the 3-SAC module. CRC configuration is part of the process of configuring the 3-SAC module.

The fields used to configure a CRC are presented on three tabs:

- CRC Configuration (CRC Config)
- CRC Command Lists (CRC Cmd Lists)
- CRC Input Circuits

In addition, the SDU randomly assigns a working encryption key and a master encryption key to the CRC. The working key is used to decrypt card access database information received from the ACDB program. The master key is the encryption key used to decrypt new working encryption keys.

CRC configuration

For each CRC or CRCXM you must enter data for or make selections for the fields described in the following table.

Field name	Description
Address	Read-only. The device address that is being configured.
Label Text	The name used to identify the CRC in the project database (typically the name of the door or location).
Serial Number	The serial number of the CRC. The serial number can be typed in or scanned in using a bar code wand. If the complete serial number is not available, enter the six-digit serial number from the CRC circuit board and the SDU will fill in the remaining four digits.
Card Reader Partition	The partition to which the CRC belongs. One or more CRCs can be used to control a partition. Select none if the CRC is not being used with security, two-person rule, muster, or anti-passback.
Lock Type	The type of door locking mechanism connected to the CRC. Either strike or maglock. Strike: Designates that the CRC connects to a fail-secure strike or electrified lock set that requires voltage only to unlock. Maglock: Designates that the CRC connects to a magnetic lock or fail-safe strike that requires constant voltage to stay locked.
Muster Support	Indicates whether the CRC is part of a muster reporting partition. If checked, the CRC passes all access events to the 3-SAC to distribute to other CRCs in the same partition.

Field name	Description
Muster Station	Designates the CRC as a muster sign-in station. Any badging in at this station lets all CRCs, on all partitions, know that the cardholder's status is out.
Anti-Passback	Prevents successive use of one card to pass through a door in the same direction. None: Anti-passback functionality is disabled. Log Only: Is less restrictive than strict anti-passback. It requires personnel to badge in and out but does not deny access when anti-passback rules are violated. Rather, such access is logged as an access granted anti-passback event. Timed: When a card is badged in a timer is started. The card can not be used again to gain access until the time period has expired. After the time period has expired the card can be used again to gain access. Strict: Is the most restrictive form of anti-passback, requiring all personnel to badge in and out and denying them access to an area when they fail to do so. Note that the time used for the Timed option is set in the ACDB program, not in the SDU.
2 Person Rule	Ensures that no staff member can be in a controlled area alone. A CRC operating under two-person rule prevents the entrance of a single person into the controlled area. When two people are present in the area, one cannot exit without the other.
Relay Device Type	Selects the function of the internal relay on the CRC. Access Door Motor Control: When access is granted, the CRC unlocks the door and activates the relay. Use this option when the relay controls a door opener for handicap coded cards. Fan Control: Use to shut down or start up a fan in the event of a fire. Damper Control: Use to open or shut a damper in the event of a fire. Door Control: Typically used to release a door holder in the event of a fire. Non Supervised Output: Use for all other functions not defined above.

CRC command lists

The CRC can instruct the 3-CPU1 to run a set of rules by triggering a predefined event, called a command list. Command lists and related rules are created using the SDU. They are typically used to transmit access event messages to a CMS, or to activate remote gates, CCTV, or relay modules.

The following table describes the fields on the CRC Cmd Lists tab.

Field name	Description
Access Granted	Occurs when the CRC grants access to a cardholder.
Access Granted Irregular	Occurs when the CRC grants access to a cardholder with irregular access privileges during nonscheduled hours.
Access Granted Anti-passback	Occurs when the CRC grants access to a cardholder a second time and the anti-passback property on the CRC is configured for logged.
Access Granted Muster	Occurs when a user badges in at a CRC and the Muster Station property on the CRC is selected.
Access Denied Unknown	Occurs when the CRC denies access to a cardholder who is not defined in the CRC database.
Access Denied Reader Disabled	Occurs when the CRC denies access to a cardholder who is attempting to enter through a reader that has been disabled.
Access Denied Access Level Not Active	Occurs when the CRC denies access to a cardholder whose access levels has not yet become active or has expired.
Access Denied Outside Schedule 2	Occurs when the CRC denies access to a cardholder who is attempting to enter an area at a time outside of the cardholder's assigned Access Level 2 schedule.
Access Denied Outside Schedule 1	Occurs when the CRC denies access to a cardholder who is attempting to enter an area at a time outside of the cardholder's assigned Access Level 1 schedule.
Access Denied Partition Armed	Occurs when the CRC denies access to a cardholder who is attempting to enter a armed partitioned area and the cardholder does not have disarm access privileges.
Access Denied PIN Not Entered	Occurs when the CRC denies access to a cardholder who fails to enter the correct PIN number in the allotted time (30 seconds).
Access Denied PIN Not Valid	Occurs when the CRC denies access to a cardholder who enters an incorrect PIN number.
Access Denied 2 Person Rule Timeout	Occurs when the CRC denies access to a cardholder who is attempting to enter an area that requires a second cardholder and the second cardholder did not present their card in the allotted time (30 seconds).
Access Denied Antipassback	Occurs when the CRC denies access to a cardholder who is attempting to enter an area configured for strict or timed anti-passback and the CRC already has the cardholder status as in.
Access Denied Escort	Occurs when the CRC denies access to a visitor cardholder who is attempting to enter an area that an escort cardholder did not authorize.

CRC input circuits

Each CRC has two input circuits that can be used for security or fire alarm devices. They are typically used to monitor a door position contact and a request to exit device. An input circuit can also be configured for use with a buzz-in switch, to manually unlock a door. The fields are the same for Circuit 1 and Circuit 2, and are described in the following table.

Field name	Description
Label Text	The name used to identify the input circuit in the project database (typically includes the name of the door or location, plus indicator of which circuit).
Device Type	The input circuit type. If the input circuit is a security type, you must also assign a partition. **Note:** The option selected here determines which options appear in the Application field. Security Perimeter: A device on a perimeter that activates a security alarm if opened. Typically used for perimeter doors and windows. Activation of the input while the partition is in armed stay or armed away will activate a security alarm. Security Interior: An interior detection device. Typically used with motion detectors, interior doors, and photo beams. This type of device provides interior detection of intrusion through ceilings, walls, or otherwise unprotected openings. Activation of the input while the partition is in armed stay state will allow free passage, causing no alarms. Activation of the input while the partition is in armed away state will activate a security alarm. Security I Monitor: A device that monitors interior areas. Typically used on stockroom doors or cages, where a violation is handled by employees on site and not reported to a CMS. Activation of the input while the partition is in armed stay will activate local annunciation. Activation of the input while the partition is in armed away will activate a security alarm. Security P Monitor: A device that monitors exterior doors that should be secured continuously. Opening while the system is disarmed, without first disarming the device, will cause a local audible and visual indication. Typically used on emergency exit doors, where a violation during the disarmed condition is handled by employees on site and not reported to a CMS. Activation of the input while the partition is in armed stay or armed away will activate a security alarm. Security Day: Any device that is always active. Typically used

Field name	Description
	with glass break detectors, foil screens and fixed traps. Activation of the input while the partition is in armed stay or armed away will activate a security alarm. Security 24 Hour: Any type of device that is armed and active continuously. Typically used with high security type devices where a violation of the device during any armed or disarmed condition is reported as a security alarm to the CMS. Activation of the input while the partition is in armed stay or armed away will activate a security alarm. Monitor: Devices not related to the security partitions. Typically used for request to exit buttons, unlock or open buttons, and panic bars.
Input Circuit Partition	If the CRC is used in a security application select the partition that the input circuit should be associated with. Otherwise, set the partition to none.
Max Delta Count	The maximum number of times the input circuit will report an activation condition before locking in the off-normal condition. This is typically called swinger shutdown. The confirmation counter is cleared when the input circuit partition is armed, disarmed, or a request for status is made. This feature is intended to reduce the reporting of unnecessary events to the CMS. The value of zero will allow unlimited restores. The default value is three. The maximum is nine.
Delays	An entry or exit delay for a given condition. None: Provides no delay. Default for all device types except security perimeter and security interior. Delayed: Provides an entry and exit delay during arm and disarm cycles. Typically used on all doors on the entry path to the keypad. Default for device type security perimeter. Follower: Provides an entry delay if a delayed device has activated. If no delayed device has been activated prior to entry then no entry delay is given (instant response). Typically used on motion detectors along the entry path to the keypad.
Application	Defines the function of the device on the input circuit for the CRC. Access Door Contact: The door is locked and unlocked by the connected CRC. The contact informs the CRC about the position of the door for door relocking and door-ajar processing. Door Contact: Used to monitor whether a door is open or closed. Security Device: A security device that is near to or next to the door, but is not itself controlled. This type is provided as a convenience and eliminates the need for a SIGA-SEC2 module for doors, windows, and motion detectors in the general vicinity of the CRC.

Field name	Description
	Emergency Exit Door Contact: The door is locked and unlocked by the connected CRC but is monitored continuously for an open state. The contact informs the CRC about the position of the door for door relocking. If the door is opened without badging in or out, it causes a local annunciation (if disarmed) or a security alarm (if armed stay or armed away). Badging in or out temporarily bypasses (for the time specified in Delayed Egress Time) the door, allowing access without creating an alarm or causing a local annunciation. Refer to NFPA 101 and AHJ. Request To Exit Motion Detector: Causes the CRC to automatically unlock an access door by detecting motion as someone approaches. The request to exit motion detector and this circuit type are required by NFPA for use with a maglock. Exiting the door without badging out will cause an alarm. Select this input circuit type if badging out is required or the other input circuit is not an emergency exit access door. Request To Exit Motion Detector with Bypass: Causes the CRC to automatically unlock an access door and activate a bypass timer by detecting motion as someone approaches. The request to exit motion detector and this circuit type are required by NFPA for use with a maglock. The bypass feature of this application allows egress without badging out. Select this input circuit type if badging out is not required and the other input circuit is an emergency exit access door. Request To Exit Button (REX): A REX button or panic bar allows a person to manually activate the CRC to unlock the access door. The REX is required by NFPA for use with a maglock. Exiting the door without badging out will cause an alarm. Select this input circuit type if badging out is required or the other input circuit is not an emergency exit access door. Request To Exit Button with Bypass: Allows a person to manually activate the CRC to unlock the access door. The REX is required by NFPA for use with a maglock. The bypass feature of this application allows egress without badging out. Select this input circuit type if badging out is not required and the other input circuit is an emergency exit access door. Request to Unlock: A pushbutton used to manually buzz a person in. Often called a visitor button and used by a receptionist, this input circuit type can be used with strikes and maglocks. The activation is not logged. Request to Unlock with Log: A pushbutton used to manually buzz a person in. Often called a visitor button and used by a receptionist, this input circuit type can be used with strikes and maglocks.

Field name	Description
	The activation is logged. Request to Open: Connects to an ADA-approved request to exit pushbutton. As a person approaches an access door, they manually activate the pushbutton. This causes the CRC to unlock the door and activate the door open relay. The ADA button and this input circuit type may be required by ADA for use with doors to public areas. Exiting the door without badging out will cause an alarm. Select this type if badging out is required or if the other input is not an emergency exit access door. Request to Open with Bypass: Connects to an ADA-approved request to exit pushbutton. As a person approaches an access door, they manually activate the pushbutton. This causes the CRC to unlock the door and activate the door open relay. The ADA button and this input circuit type may be required by ADA for use with doors to public areas. The bypass feature of this application allows egress without badging out. Select this input circuit type if badging out is not required and the door is an emergency exit access door. Request to Exit with Delayed Egress: Connects to a request to exit pushbutton or panic bar. The request to exit push button activates the CRC sounder and a timer. After a maximum of 30 seconds, the CRC will unlock the door. The delayed REX button and this input circuit type are allowed by NFPA for use with a maglock. This type of exit device is typically used in retail stores to discourage shoplifting. Refer to NFPA 101 and AHJ.
Personality	Basic: The device contact can be an N.C, N.O. or SPDT (transfer) type. Any off-normal state of the device causes a security alarm. N.C. with Trouble: Connected to an N.C. switch. A short on this switch causes a trouble and an open causes a activation. Typically, this personality is used to annunciate a short in the wiring to the device during the disarmed state. N.O. with Trouble: Connected to an N.O. or SPDT (transfer) switch. An open on this switch causes a trouble and a short causes a activation. Typically, this personality is used to annunciate an open in the wiring to the device during the disarmed state.
Delayed Egress Time	The number of seconds to delay egress when a delayed request to exit push button or bar is pressed. The field is only available when the Application field is set to Request to Exit with Delayed Egress. When set to zero (default) the delayed egress feature is disabled. Normally set to 15 seconds (16 to 30 seconds requires approval from AHJ). Refer to NFPA 101 and AHJ.

Resource Profile Manager (RPM)

The SDU includes a tool called the Resource Profile Manager (RPM). The RPM is used to divide each CRCs resources among the companies that will be using the CRC.

The RPM creates a separate resource profile for each company. The resource profile is imported into the company's ACDB program and defines the devices and devices resources available to the company.

The RPM lets you create a tree view of all the companies, buildings, floors, and devices in the project. Refer to the SDU online help system for more information on using the RPM. The table below gives definitions of the fields that apply to CRCs in this tool.

Field name	Description
Company	The name of a company as previously defined in the SDU. Read-only.
Building	A name created in the RPM to identify the building in which the device is located. Example: Manufacturing Building. Buildings are created in the RPM.
Partition	The name of a partition previously defined and assigned to the CRC in the SDU. Read-only.
Device Type	The RPM handles all types of security and access control devices. The Device type is as assigned in the SDU, and for CRCs can be either CRC or CRCXM. Read-only.
Device	The Device Label as defined in the SDU. Read-only.
Primary	Designates a company as the primary company for the CRC. The primary company sets and controls some key parameters for the CRC. Some examples: Unlock Schedule, Bypass Time, Unlock Time, PIN Required For Disarm.
User Set	Locks the values you manually enter for Cardholders, Schedules, Holidays and Access Levels, so that these values are not changed by the automatic Mass Assign function of the RPM.
Cardholders	The number of cardholders allocated to the company for this CRC.
Schedules	The number of schedules allocated to the company for this CRC.
Holidays	The number of holidays allocated to the company for this CRC.
Access Level	The number of access levels allocated to the company for this CRC.

ACDB

ACDB user-defined options

The following options are programmable by the company designated as the primary company for the CRC. The ACDB is used to program these CRC options and to download the data to the CRCs.

These options appear on various tabs of the Door dialog box.

Summary

Fields displayed on the Summary tab are read-only with the exception of the Comm Route.

Field name	Description
Comm Route	The configuration used by the ACDB to communicate with the system control panel. All CRCs start with the initial value of <3-CPU Default> for the comm route. Additional comm routes can be defined in the ACDB and assigned here.

Inputs

All fields on the Inputs tab are read-only, and display the values set in the SDU.

Options

Fields on the options tab can be set only by the primary owner of the CRC. The tab does not appear for other users of the CRC. The fields are as described in the following table.

Field name	Description
Schedules	
Unlock	This schedule defines the times when the door connected to this CRC is automatically unlocked. This is typically used to automatically unlock lobby doors when a receptionist is on duty. A selection of No Schedule disables this feature. Before the door is unlocked, the associated partition may be automatically disarmed. (Refer to Use Unlock Schedule.) The default is always locked. Doors used with an unlock schedule must be configured for continuous operation.

Field name	Description
Use Unlock Schedule	If checked, the door unlocks on time following the Unlock Schedule and automatically disarms the CRC partition. If cleared, the Unlock Schedule will not take effect until the partition associated with the CRC has been manually disarmed. This feature is useful in case of severe weather, where it is not desirable to open a building if people are unable to get to work.
PIN	This schedule defines the times during which a PIN must be entered to verify each card swipe. To use this option, a combination reader and keypad must be installed. The use of a PIN decreases the possibility that a recently lost or stolen card can be used to gain entry. The schedule may define PIN use at all times or at times outside normal business hours. The card is always presented first. If a PIN is required, the red LED flashes at 1 Hz. This indicates that the user must enter a PIN. The user then enters the PIN to gain access. This option is selectable on a door-by-door basis. The default is No Schedule; that is, a PIN is never needed.
Suppression	This schedule defines the times during which the CRC does not log normal events. This option is provided to reduce the number of normal access events stored as history during business hours. It is normally used on perimeter and bathroom doors where an audit trail is not needed for normal business hours. All abnormal events are always logged to history. The default is No Schedule, which means the CRC will always log events.

Door timers

The ACDB allows various lock, relay, and sounder timers to be defined for each CRC.

Field name	Description
Unlock timers	
Standard Unlock	The number of seconds that the door stays unlocked when a user badges in. The time can range from 0 to 255 seconds. The default value is 10 seconds. If an access door contact is connected to the CRC, then opening of the door relocks the door and allows the door to immediately lock when the door closes.
Handicap Unlock	The number of seconds the door lock stays unlocked when a user designated as handicapped badges in. The time can range from 0 to 255 seconds. Default value is 20 seconds. If an access door contact is connected to the CRC, the opening of the door relocks the door and allows the door to immediately lock when the door closes.

Manual Unlock	The number of seconds the door lock stays unlocked when an unlock command is received from the 3-CPU1, FireWorks, or a request to exit device. The time can range from 0 to 255 seconds. If an access door contact is connected to the CRC, the opening of the door relocks the door and allow the door to immediately lock when the door closes. Default value is 30 seconds.
Open timers	
Manual Open Time	The number of seconds that the auxiliary relay stays active when an open command is received from the 3-CPU1, FireWorks, or from an ADA request to open device. The time can range from 0 to 255 seconds. Default value is 20 seconds.
Relay Open Time	The number of seconds the auxiliary relay stays active when a handicapped user badges in. The time can range from 0 to 255 seconds. Default value is 30 seconds. The relay output is typically connected to a door opener.
Door Ajar Time	The number of seconds the access door may be left open. If the time is exceeded a signal is sent to the 3-CPU1 and the CRC sounder (if installed) sounds for one second every minute. This helps to maintain security for the building by not allowing doors to be propped open. The default is 0 seconds, which disables the feature. This option requires a door contact sensor.
Exit timers	
Emergency Exit Sounder	The number of seconds (0 to 255) that the CRC sounder will sound when an emergency exit door is opened without badging out or using a request to exit device. When set to zero, this feature is disabled. When set to 255, the sounder will sound until manually reset. In all cases, the sounder can be silenced by badging in on the affected CRC.
Delayed Egress	Read-only. This value is set in the SDU.
Control timers	
Bypass	The number of seconds (0 to 255) that a door contact, connected to a CRC, is bypassed. The access door must have an exit device with bypass option. If the door is opened when the bypass timer is zero a security alarm event will be created. If the door is open when the timer expires, a security maintenance event will be created. A value of 0 (default) disables this feature.

Miscellaneous

All fields on the Miscellaneous tab are read-only. See the *ACDB User Manual* for definitions of these fields.

Assignment of cardholder data

Up to 8,000 CRC or 36,000 CRCXM cardholders can be assigned to each door. Each cardholder is represented by a

unique User ID number that identifies that person to the system and to FireWorks. For information on how to program user data, please refer to the *ACDB User Manual.*

Chapter 7

Operation

Summary

This chapter explains the operation of the CRC and some of its features.

Content

CRC processing

1. Badging in

A cardholder badges in at a card reader. The card reader reads the card number, which consists of 26 to 38 bits of data. The card reader transmits the data to the CRC via the Data 0 and Data 1 lines. The CRC receives the data. When data stops, the CRC begins processing the number.

2. Multiple access attempts

If the CRC detects ten access denied events in a two-minute interval it ignores any further badging attempts. The cardholder must wait two minutes for the CRC to reset its attempt counter. This feature slows any brute force attempt to gain access by trying various cards and PINs.

3. Construction card

If the CRC database is empty, the CRC determines whether the card number is a (factory set) construction card number. If the construction card is verified, the CRC activates the lock for the default unlock time.

4. Data base search

If the CRC database is not empty, the CRC searches for the card number. The card number is checked in both normal and inverted form, in case the data is from an inside card reader. If no match is found the CRC logs an access denied unknown event, increments the attempt counter, and denies access.

5. Card reader disabled

If the CRC finds the card number, it next determines whether either card reader (inside or outside) has been disabled. If the card data is coming from a disabled reader, the CRC logs an access denied reader disabled event, increments the attempt counter, and denies access.

6. Time and date

If the card reader is enabled, the CRC checks that it has the correct time and date. If the CRC has not received a time and date update since powering up, it assumes an irregular access event and continues processing without checking schedules. In a networked system, the CRC's time and date is updated every few minutes.

7. Access level two

If the CRC has the correct time and date, it checks whether access level two is active for the cardholder. If access level two

is active, the CRC checks to see if the present time is within the cardholder's second access level schedule.

A schedule is a collection of 15-minute segments in a week. These segments tell the system whether a cardholder is permitted access at a door at a particular day and time.

An access level has a start and end date, and a start and end time. These define when the schedule is in effect, or active. An access level is considered active when the current date falls between the start and end dates, and start and end times.

8. Access level one

If the current time is outside access level two for the cardholder, the CRC checks the access level two schedule override option. If this option is not set, the CRC checks the access level one schedule. If the override option is set, then access level one is not checked.

If the first access level is inactive or the current time is outside the cardholder's access schedule one and the cardholder does not have irregular privilege, the CRC denies access.

The CRC logs an access denied outside schedule two event, increments the attempt counter, and denies access.

9. Irregular access privilege

If the current time is outside an active schedule and the cardholder has irregular privilege, the CRC sets an irregular access flag and continues processing. If access is subsequently granted, the CRC logs an access granted irregular event.

10. Disarm partition

Assuming that the cardholder has passed the schedule tests described above, the CRC next tests whether or not its partition is armed. If the CRC partition is armed, a check is made of the cardholder's disarm privilege. If the cardholder does not have disarm privilege for the partition, the CRC logs an access denied partition armed event, increments the attempt counter, and denies access. If the CRC partition is disarmed, processing continues.

11. PIN entry schedule

Next, the CRC checks the PIN schedule to determine if the cardholder is required to enter a PIN. A PIN schedule is usually active outside of normal business hours in the event an access card is lost or stolen.

If the schedule is not active, processing continues. If the schedule is active (a PIN is required), the red LED on the reader flashes slowly to inform the cardholder to enter the PIN. If the PIN is successfully entered, processing continues. If the PIN is

not entered correctly within 30 seconds, the CRC log an access denied PIN not entered event, increments the attempt counter, and denies access.

12. PIN required for disarm

If the CRC partition is armed, the CRC checks the PIN required for disarm option. If this option is set, the red LED on the reader will flash slowly to inform the cardholder to enter the PIN. If the PIN is successfully entered, processing continues. If the PIN is not entered correctly within 30 seconds, the CRC logs an access denied PIN not entered event, increments the attempt counter, and denies access.

13. Two-person rule

The CRC now checks for the two-person rule option. This feature is typically used in a high security application, where policy requires a minimum of two persons to be in a secured area. (Examples: top secret areas, vaults, high value stockrooms).

If the option is not selected or if the partition is already occupied by two or more people, processing continues. If the option is selected, the CRC flashes the red LED twice per second. If a second different cardholder badges in, processing continues. If a second cardholder does not badge in within 30 seconds the CRC logs an access denied two person rule timeout event, increments the attempt counter, and denies access.

To gain access, both cards must have access privileges for the partition and must comply with any schedule restrictions.

14. Anti-passback

CRC processing continues with a check for the anti-passback option. If the anti-passback option is not selected, processing continues. If it is selected, the location of the cardholder is determined.

If the cardholder is entering a partition and is currently marked as outside that partition, processing continues. If the cardholder is entering a partition and is currently marked as already inside that partition, the CRC looks to see which type of anti-passback is currently set.

If the log only option is selected, an anti-passback violation flag is set and processing continues. If the log option is not selected, the CRC logs an access denied anti-passback event, increments the attempt counter, and denies access.

If the timed anti-passback option is selected and the card read was from an outside card reader, the cardholder is marked as being in and the anti-passback timer is set. If the card read was

from an inside reader, the cardholder is marked as being out and the anti-passback timer is cleared.

If the anti-passback violation flag is set, the CRC logs an access granted anti-passback event and continues processing.

15. Visitor and escort

The CRC checks whether the cardholder is an employee or visitor. If the cardholder is an escorted visitor, the CRC flashes the red LED twice per second. If an employee cardholder badges in within 30 seconds, processing continues. If no employee badges in, the CRC logs an access denied escort event, increments the attempt counter, and denies access.

16. Partition disarm

At this point the card has passed all validation tests. Next the CRC determines whether or not its partition is armed. If it is already disarmed, processing continues. If it is armed, the CRC checks the card disarm option.

If this option is not in effect, processing continues. If it the card disarm option is set, the CRC sends a request to the 3-CPU1 to disarm the CRC partition.

When the 3-CPU1 confirms the request by disarming the partition, the CRC logs either an access granted event or an access granted irregular event, depending on the irregular access flag.

If the 3-CPU1 does not disarm the partition within 30 seconds, for whatever reason, the CRC logs an access denied partition armed event, increments the attempt counter, and denies access.

If the timed anti-passback option is in effect, if the card read was from an outside reader then the cardholder is marked as being in and the anti-passback timer is set. If the card read was from an inside reader, the cardholder is marked as being out and the anti-passback timer is cleared.

If the anti-passback violation flag is set, the CRC logs an access granted anti-passback event, and continues processing.

If the irregular access flag is set, the CRC logs an access granted irregular event and continues processing.

17. Muster station

If a cardholder badges in to a muster station card reader, the CRC logs an access granted muster event, and the cardholder is logged out of all partitions.

18. Suppression schedule

If a cardholder badges in and the current time is not within the suppression schedule, the CRC logs an access granted event and continues processing. If the within the suppression schedule processing continues without logging the access event.

19. Handicap

If the cardholder has not been designated as handicapped the door is unlocked for the number of seconds specified by the standard unlock time and processing continues. If the cardholder has been designated as handicapped, the door is unlocked for the number of seconds specified by the handicap unlock time. In addition, the relay to open the door will active for the number of seconds specified by the relay open time and processing continues.

20. Bypass time

If a door is opened and there is a value in bypass time, the CRC bypasses the door contact for the specified time. (The door must be configured with an open or exit device with a bypass option.) If the door is opened when this timer is zero a security event is created. If the door is open when the timer expires, a security maintenance event is created. A value of zero (default) disables this feature.

21. Emergency exit sounder

The CRC sounder activates when an emergency exit door is opened without badging out or using a request to exit device. The sounder remains active for the time specified the emergency exit sounder time field. When set to zero, this feature is disabled. When set to 255, the sounder remains active until manually reset. In all cases, the sounder can be silenced by badging in at the affected CRC.

Sounder output

The CRC has a built-in sounder output that can drive the buzzer in the card reader (if present). Alternately, this output can be used to drive a CRC Sounder (CRCSND) module mounted in the CRC enclosure.

Normally, the sounder in the card reader is off. In most card readers, when a card is presented the sounder beeps to indicate that the card presented has been badged in. This is a function of the reader itself and not a function of the CRC.

If a 3-CPU sounder on command is sent to the CRC from a rule or command, the sounder output is turned on.

If the emergency exit sounder timer is running, caused by an emergency exit door opening, the sounder output is turned on.

If the delayed egress timer is running, caused by the activation of a delayed egress request to exit button, the sounder output is turned on.

If a cardholder has incorrectly entered a PIN the sounder beeps four times. Each beep is 1/4 second in duration. This indicates to the cardholder that the PIN was not accepted and that he needs to badge in again and re-enter the PIN.

Lastly if the access door connected to the CRC has been left open for greater than the door ajar time, the sounder output is turned on for one second every minute.

If none of the timers or conditions exist, the sounder output will be off.

Card reader LED outputs

Dual-line LED control

It is important to put the card reader in the dual-line LED control mode. This is can be done by ordering the correct model reader, setting the correct option switch, or using a mode control card. Refer to the manufacturer's installation sheet for details. If the card reader is left in the single-line LED control mode, the green and red LED functions may appear reversed.

Red LED

The CRC drives two LED outputs, one designated for the red LED wire to the reader and the other for the green LED wire to the reader.

Normally, the red LED on the reader is on as an indication that the reader is receiving power and ready to read cards. In most readers, when a card is presented to the card reader the red LED flashes indicating that the card presented has been read. This is a function of the reader itself and not a function of the CRC.

If a 3-CPU unlock command is sent to the CRC from a rule or command the red LED output turns off.

If a card was read in and the unlock timer has the door unlocked, the red LED output turns off.

If a REX device, unlock button, or 3-CPU command for a timed unlock is received and the manual unlock timer has the door unlocked, the red LED output turns off.

If a card was read and a PIN is required, the red LED output flashes slowly off and on at a rate of one cycle per second. This mode lasts for 30 seconds.

The two-person rule and escort and visitor applications require that two cards be read to badge in. After the initial card has badged in, the red LED output flashes quickly off and on at a rate of two cycles per second, for 30 seconds.

Green LED

Normally, the green LED on the reader is off. In some readers, when a card is presented, the green LED flashes on as indication that the card has been read. This is a function of the reader itself and not a function of the CRC.

If a 3-CPU unlock command is sent to the CRC from a rule or command, the green LED output turns on.

If a cardholder has badged in and the unlock timer has the door unlocked, the green LED output turns on.

If a REX device, unlock button, or 3-CPU command for a timed unlock is received and the manual unlock timer has the door unlocked, the green LED output turns on.

Note: The green LED output does not turn on or flash for PIN entry, two-person rule, or escorted visitor. Only the red LED output goes off, resulting in the reader LEDs going from red to off, *not* red to green.

Card reader power

CRC card reader power control

Card reader power is controlled by the CRC. It is turned off automatically when the CRC detects a low battery condition on its internal 1.2 Ah battery.

3-CPU card reader power control

Power for the card readers are also controlled by the 3-CPU. The 3-CPU1 can disable both the inside and outside card readers. Doing so helps conserve the panel battery power if the panel powering the CRC loses ac power.

This technique is called load shedding. Load shedding is implemented via rules you create in the SDU.

Lock power

CRC lock power control

Lock power output is controlled by the CRC. It is turned off automatically when the CRC detects a low battery condition on its internal 1.2 Ah battery.

3-CPU lock power control

Lock power is also controlled by the 3-CPU1. Doing so helps conserve the panel battery power if the panel powering the CRC loses ac power.

This technique is called load shedding. Load shedding is implemented via SDU rules that unlock the door. Load shedding should be programmed for any continuous duty locks, but is not necessary for intermittent duty locks.

Chapter 8

Maintenance and troubleshooting

Summary

This chapter explains different problems that may arise while using the access control system and gives recommendations for their solutions.

Content

Maintenance

Magnetic stripe readers and cards

Magnetic stripe readers and cards may experience wear over time. This wear necessitates periodic reader maintenance and eventual card replacement. Consult the manufacturer's or vendor's literature for recommended service and replacement intervals.

Supervision of the CRC

The following CRC items are supervised by the CRC unit itself to ensure functional integrity:

- Battery voltage
- Wiring between CRC and lock
- RAM stack
- Program space
- Database space
- Continue task operation
- Task watchdog

When primary power to the CRC is lost, the battery is monitored for low voltage. If the voltage measurement falls below 11.2 volts, a low voltage condition exists. This condition produces a trouble event and a message is displayed at the control panel.

When using a strike lock, the wiring between the lock and the CRC is supervised for an open circuit. If an open circuit occurs, the control panel displays a trouble message.

CRC troubleshooting

The following table lists the most common problems that may arise with the CRC. Please review the table for symptoms, probable causes, and corrective actions before calling technical support.

CRC troubleshooting

Symptom	Cause	Corrective action
CRC strike trouble	Incorrect wiring from CRC to strike	Check the wiring from TB1-5 (+) and TB1-6 (–) to the strike and correct as necessary
	No strike installed	The CRC supervises the strike. If you are using a door-releasing device other than a strike, connect a standard 4.7 KΩ EOL resistor across TB1-5 and TB1-6.
	Battery in CRC is weak	Check to see if the battery is connected and check the voltage. If the voltage is low, check that the input voltage is greater than 18.5 V. If the input voltage is low, add a power supply. If the input voltage is okay, let the battery charge for several minutes. If battery voltage does not increase, check for 12 Vdc minimum at the battery terminals on the CRC with the battery disconnected. If the CRC voltage is okay, replace the battery. If the CRC voltage is not okay, replace the CRC.
	Strike coil open	Replace the strike
Communication failure at panel	CRC addressed incorrectly in SDU	Make sure that correct CRC serial number has been entered into the SDU project.
	CRC terminating resistor is not being used properly	Remove the EOL resistor from all devices on the SAC bus except for the end device.
	Incorrect wiring from control panel to CRC	Check wiring from SAC module to TB1-17 and TB1-19
	Defective CRC	Connect the CRC directly to the 3-SAC module. If the comm fail persists, replace the CRC.

Card reader troubleshooting

The following table lists the most common problems that arise with card readers. Please review the table for symptoms, probable causes, and corrective actions before calling technical support.

Card reader troubleshooting

Symptom	Cause	Corrective action
Red LED does not light	Insufficient power to card reader	Check for 12 Vdc between TB1-10 (+) and TB1-11 (–). If the voltage reading is too low, either the input voltage to the CRC is too low or the CRC is defective. If voltage readings are okay, the problem is in the card reader or the wiring to card reader. Check the wiring at TB1-14 for the correct card reader wire (color codes are shown on the installation sheet).
	Insufficient voltage to CRC	Check for at least 18.5 Vdc across TB1-1 (+) and TB1-2 (–). If the voltage is low, add a local power supply. If the reading is zero or if polarity is reversed, check the wiring to TB1.
	Defective CRC	Disconnect all wires from TB1. If the voltage between TB1-10 (+) and TB1-11 (–) is not 12 Vdc, replace the CRC.
	Wrong reader	The reader must be rated to operate between 10.2 Vdc and 13.2 Vdc
	Defective reader	Disconnect all reader wires on TB1, except for wires on TB1-10 (+) and TB1-11 (–). If the red LED does not light, replace the reader.
LED stays green	Card reader is set for single LED control	Use the DIP switch settings or special mode control cards specified by the reader manufacturer to switch to dual-line LED control.
Construction card does not work - green LED does not light	CRC has card data	Use ACDB to create temporary cards for workmen as required, and download the CRC database again. Alternately, use the SDU to reset the CRC to its initial factory state.
	Incorrect wiring between CRC and reader	Refer to installation sheet and check wiring to TB1 for opens, shorts, and grounds. Insulate all unused wires.
	Improper card orientation or card swiping	When swiping, the card must be properly seated in the reader slot, and swiped straight through in the direction of the arrows, without lifting or twisting. The logo should face you, with the correct edge (as per the card) up.

Card reader troubleshooting

Symptom	Cause	Corrective action
	Defective construction card	Card should not be cracked. A mag stripe card can be damaged internally if subjected to a strong magnetic field. Try a known good card.
	Defective CRC	Replace the CRC
Construction card causes green LED to light, but strike does not activate	CRC battery is missing or battery voltage is low	Install a fully charged battery in the CRC
	Incorrect wiring from CRC to strike	Check strike wiring to TB1-5 (+) and TB1-6 (–). Check wiring for open circuits, grounds, or shorts
	Wrong jumper selections	Refer to the CRC installation sheet for proper setting of jumpers JP1 and JP2
	Wrong strike	The strike must be rated for 12 Vdc and draw less than 500 mA
	Excessive voltage drop on strike wires	Strike wire should be 18 AWG minimum and the length should not exceed the maximum voltage drop allowed for the strike
	Defective strike	Connect the strike directly to the 12 Vdc battery. If the strike does not operate, replace the strike.
	Defective CRC	Replace the CRC
Cannot get system to work with Dorado reader	DIP switch in reader is not set for operation with EST	Correct DIP switch settings are: A=ON B=ON C=ON D=OFF
	Incorrect cards being used (other than ANSI 12)	Use correct cards, or if the construction card is not being used, set the DIP switch as follows: A=ON B=OFF C=ON D=OFF
Red LED does not flash for two-person rule or when PIN is required Red and green LED appear to be reversed	Reader has not been set for dual-line LED control	Use the DIP switch settings or special mode control cards specified by the reader manufacturer to switch to dual-line LED control.

Access control cards troubleshooting

The following table lists the most common problems that arise with access control cards. Please review the table symptoms, probable causes, and corrective actions before calling technical support.

Access control card troubleshooting

Symptom	Probable Cause	Corrective Action
Construction card does not work (green LED on reader does not light)	CRC has card data	Use ACDB to create temporary cards for workmen as required, and download the CRC database again. Alternately, use the SDU to reset the CRC to its initial factory state.
	Incorrect wiring between CRC and reader	Refer to the Installation chapter and check wiring to TB1 for open circuits, shorts, and grounds. Insulate all unused wires.
	Improper card orientation or card swiping	The card must be properly seated in the slot of the card reader and swiped straight through in the direction of the arrows, without lifting or twisting. The logo should face the user and the edge marked up should be up.
	Defective construction card	The card should not be cracked. A magnetic stripe card can be damaged internally if it was subjected to a strong magnetic field. Try using a known good construction card.
	Defective or damaged card reader	Replace the card reader
Successfully enrolled card does not activate green LED and unlock door	ACDB additions and changes have not been downloaded to CRC	Activate the download process from the ACDB
	Person does not have access to this door	Verify that the access level assigned to this cardholder permits access to this door
	Time is outside of schedule and person does not have irregular privilege	Wait until time is inside of schedule or reprogram cardholder with irregular privilege
	Time of day is incorrectly set in control panel	Correct system time and date at panel
	CRC partition is armed and the user does not have disarm privilege	CRC partition must be disarmed by a cardholder with disarm privilege or via keypad display

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Glossary

3-CPU1	*See* Central Processor module.
3-LCD	*See* Main LCD Display module.
3-MODCOM	*See* Modem Communication module.
3-MODCOMP	*See* Modem Communication module. This model of the 3-MODCOM can communicate to telephone pagers using TAP protocol.
3-RS232	*See* Ancillary Communications Card.
3-SAC	*See* Security Access Control module.
access card	Any of the different types of credential that can be used in an access control system. We use *card* as a general term to refer to proximity, Wiegand pin, magnetic stripe, and smart cards.
Access Control Database program	ACDB. Lets the user create and maintain a database of information about CRCs, cardholders, schedules, and access levels. The ACDB runs on the user's PC and transmits database changes by dial-up or direct connection.
access control system	Part of an integrated system intended to control access through the site doors, and thereby control access to the site.
access level	A predefined collection of access and security privileges. An access level is a list of doors, each with a specified schedule. Several cardholders can be assigned the same access level, and thus have the same privileges. Each cardholder can be assigned two access levels to enhance system flexibility.
ACDB	*See* Access Control Database program.
activate	To turn on or energize. Outputs can be activated.
ADA	Americans with Disabilities Act. A federal act requiring those with disabilities to be reasonably accommodated.
AHJ	Authority having jurisdiction.
alarm	The state of a fire alarm or security alarm device that has detected a fire or burglary condition.
Ancillary Communications Card	3-RS232. A card option for the 3-CPU1. The 3-RS232 adds two RS-232 serial ports to the 3-CPU1. These ports are used to connect serial devices such as printers, modems, and external command and control equipment. The 3-RS232 is required for direct connection of a PC to the EST3 control panel for some access control applications.
anti-passback	An access control application that prevents successive use of the same card to pass through a door in the same direction. Anti-passback prevents a card from being passed back to

	another person for the purpose of gaining unauthorized access.
arm	Arming a partition means advising the system to monitor the devices for burglar alarm events. Conversely, when you disarm a partition, you are advising the system to stop monitoring for burglar alarm events. Note that all other types of event are monitored continuously, so as to maintain the integrity of the security system. Security systems distinguish two types of arming: arm stay and arm away.
armed away	Security systems distinguish two types of arming: arm stay and arm away. Arming *away* causes the system to monitor all devices in the partition, both perimeter and interior.
armed stay	Security systems distinguish two types of arming: arm stay and arm away. Arming *stay* causes the system to monitor the perimeter devices (door and window opening detectors) but to ignore the interior detectors (motion detectors).
away	*See* armed away.
badging (in or out)	A general term for the process whereby a cardholder presents credentials to a reader in order to request access into or out of a controlled area.
bypass	Devices can be bypassed or disabled. When a device is bypassed, the system ignores its alarm events, but continues to monitor other events. When a device is disabled, the system ignores all event messages from the device.
card reader	Any of the different types of credential reader supported by the CRC. We use *card reader* as a general term to refer to proximity, Wiegand pin, magnetic stripe, and smart card readers, as well as readers equipped with a keypad.
Card Reader Controller module	CRC. A module that performs card access processing decisions for a door, and grants or denies access to a cardholder. Each CRC stores a complete database and is capable of granting or denying access without external communication.
cardholder	A general term used to refer to any user of the access control system issued with a valid access card (or other access credentials).
central monitoring station	CMS. A station to which alarm and supervisory signaling devices at the site transmit event messages. The central monitoring station is staffed continuously to monitor, record, and investigate alarm or trouble signals.
Central Processor module	3-CPU1. The primary processing module for an EST3 control panel.
CMS	*See* central monitoring station.
command list	A predefined event that can be used to trigger execution of SDU rules The CRC can be programmed to transmit these to the control panel in response to certain access events. Command lists are typically used to trigger transmission of

	access event messages to a CMS, or to trigger activation of remote gates, CCTV, or relay modules.
common door	An access control application where a given door is used by several different companies, as in the main entrance of an office building.
company	General term for a group of end-users who use the access control system at the project site. Projects can include one or more companies. Generally, the resources of dedicated security and access control devices are controlled by a single company. Several companies may share the resources of common devices.
construction card	Special access cards that will work with any CRC prior to a database being downloaded.
construction mode	Before a database is downloaded to a CRC it is in construction mode. Building contractors can use specially coded construction cards for access and for testing.
continuous lock	Locks that operate, on average, more than 30 seconds in every minute. In these applications, the CRC battery alone can not provide the power needed to operate the lock.
control panel	An electronics cabinet housing the 3-CPU1, 3-LCD, and related modules, acting as the central controlling point for an integrated system, or as one control node of a networked, integrated system.
Control Relay module	SIGA-CR. A component of the Signature Series. A device that provides one Form C dry relay contact to control external appliances (door closers, fans, dampers, etc.) or equipment shutdown.
CR	Card reader.
CRC	*See* Card Reader Controller module.
CRC Accessory Relay	CRCRL. An accessory relay for the CRC, used in conjunction with an external power supply, to control a lock with voltage or current requirements that exceed the CRC operating range.
CRC Sounder	CRCSND. A small horn that mounts inside the CRC module. The sounder is controlled by the internal firmware of the CRC, by settings in the ACDB program, and by SDU programming rules.
CRCRL	*See* CRC Accessory Relay.
CRCSND	*See* CRC Sounder.
CRCXM	*See* Card Reader Controller module. This option of the CRC has extended memory and holds a larger database.
database	A file composed of records, each containing fields, together with a set of operations for searching, sorting, recombining, and other functions. In this manual, *database* most often refers to the access control database that is created by the ACDB and downloaded through the control panel to individual CRCs.
degraded mode	A mode of operation used when a module has lost

	communication with its supporting system. The CRC can operate when communication with the control panel is disrupted, providing enhanced survivability.
delayed egress	An access control application intended to control shoplifting at retail sites. A delayed egress door is fitted with card readers and a request to exit (REX) button. Employees can badge in and out as at any other door. In an emergency, customers can press the REX to unlock the door. Pressing the REX generates a security alarm but does not unlock the door immediately.
device	Any detector or module. Devices are electronic sensing units that monitor an area for unwanted conditions and report those conditions to the system control panel. Devices are also referred to as points. Typical fire alarm devices are heat detectors, smoke detectors, and pull stations. Security devices include door status sensors, motion detectors, and broken glass detectors.
device address	A number which uniquely identifies a detector or module in an integrated system.
disable	Devices can be bypassed or disabled. When a device is bypassed, the system ignores its alarm events, but continues to monitor other events. When a device is disabled, the system ignores all event messages from the device.
disarm	Arming a partition means advising the system to monitor the devices for burglar alarm events. Conversely, when you disarm a partition, you are advising the system to stop monitoring for burglar alarm events. Note that all other types of event are monitored continuously, so as to maintain the integrity of the security system.
door contact	A switch that monitors the position (open or closed) of the door.
download	Sending a compiled project database from a PC to the fire alarm control panel. Also, sending an access control database from a PC to the CRC devices via the control panel.
dry contacts	Electrical connection points on a device provided for switching external circuits or devices, but electrically isolated from the controlling circuit. The external circuit must have its own power source, which is routed through the dry contacts.
elevator control	An access control application that determines which floors are available to a given cardholder.
emergency exit door	An access control application where an exit door can be unlocked from the inside by badging out or by mechanical means. If the door is opened without badging out, it causes an immediate security alarm.
enable	Permit an input, output, or system feature to function. Also, to instruct the system to monitor event messages from a device. *See also* disable.
FireWorks	A computerized display and control system used with EST2, EST3, FCC, and IRC-3 fire networks. FireWorks uses one or

	more display computers to monitor and control several networks of multiplex signaling systems, card access systems, and CCTV systems.
handicap access door	An access control application for a door that provides mechanical assistance and extended access time for a handicapped cardholder.
holiday schedule	Exceptions to normal schedules, when different access times are desired.
input circuit	Each CRC has two input circuits for use with access control and security devices. These are typically used for a door position sensor and a request to exit device. The input circuits can also be used as security input points.
integrated system	A panel-based system that can integrate fire alarm, security, and access control functions.
intermittent lock	Locks that operate, on average, less than 30 seconds in every minute. In these applications, the CRC battery provides the power needed to operate the lock.
keypad	Some card readers are equipped with a keypad to allow entry of a PIN number in addition to the access card. We do not use the term *keypad* to refer to the KPDISP Keypad Display module.
Keypad Display module	KPDISP. A control and display module used in security and life safety applications. The KPDISP includes an LCD display, a telephone-style keypad, a variable-tone sounder, and an internal processor. It is most typically used to arm and disarm security partitions.
KPDISP	*See* Keypad Display module.
LED	Light emitting diode.
load shedding	When ac power fails, the CRC can disable its peripheral devices in a controlled fashion so as to preserve access control and audit functions for as long as possible. This process is referred to as load shedding.
lock	Any type of door securing device. We use *lock* as a general term to refer to both strikes and maglocks.
maglock	Magnetic lock. A type of lock that secures the door (holds it shut) when power is applied.
magnetic stripe card	A type of access card having a data encoded magnetic tape or stripe on one side.
Main LCD Display module	3-LCD. An EST3 control and display module. The 3-LCD is attached to the 3-CPU1 and displays event messages and system status. It can be used to control the operation of the system from the control panel.
Modem Communication module	3-MODCOM. An EST3 communication module with modem and dialer capabilities. The 3-MODCOM can be used to download information from remote sites or to report events to a central monitoring station. The 3-MODCOMP can communicate to telephone pagers using TAP protocol.

muster	An access control application that lets users determine who has exited a controlled area in the event of an emergency evacuation.
muster report station	A PC located in a secure area, outside the controlled area, equipped with the ACDB program. Security staff use this PC to create a muster report after an emergency evacuation.
muster station	A CRC located outside the controlled area at which cardholders badge out after an emergency evacuation.
NFPA 72	National Fire Alarm Code.
normal	Devices can be in different states. States are classified as normal or off-normal. When a smoke detector is operating perfectly and there is no smoke in the area, the device is said to be in a normal state. If smoke is detected the device goes into an alarm state. If the device is damaged, it goes into a trouble state. Both alarm and trouble are off-normal states.
off-normal	*See* normal.
open schedule	A type of access control schedule, defined with the ACDB, that specifies times when a door is unlocked. For example, access to a building lobby may be determined with an open schedule. When the open schedule is active, the lobby door is unlocked.
output circuit	The CRC includes common, NO, and NC outputs from a Form C relay. These can be used to control auxiliary devices such as fans and dampers, as well as devices that support handicap functions.
partition	A physical area that a security system protects with a group of related devices. A site may consist of a single partition or of multiple partitions. Partitions can be armed and disarmed independently.
PIN schedule	A type of access control schedule that defines when a PIN must be entered to verify the badging-in operation and grant access
proximity card	A type of access card containing a microcircuit. When placed in close proximity to a card reader, the card activates the reader's circuitry and registers a unique code.
remote controls	An access control application that allows the CRC to operate devices located remotely from the CRC. The CRC passes events to the control panel, which in turn operates the remote devices.
remote power source	A dc power source located remotely from the control panel, but close to a CRC. The CRC operates an electronic door lock using power from this power supply.
resource profile	A file that defines the system security and access control devices for the ACDB program.
Resource Profile Manager tool	RPM. Part of the SDU that uses the project database to create a separate resource profile for each company that uses the access control system.

REX	Request to exit button.
RPM	*See* Resource Profile Manager tool.
RS-232	An asynchronous communication format used to communicate between a PC and a control panel.
RS-485	A serial differential communications format used to communicate between panels, and between the 3-SAC module and security or access control devices.
rule	Defines the system response to given input events. Rule format: [rule label] (input state) (input device type) 'input label' : output command (output device type) (priority) 'output label' {comments}; Rules are written with the SDU and downloaded to the control panel and its modules. Rules program the behavior of the system.
SAC bus	An RS-485 communication line supported by a 3-SAC module that connects access control and security devices. We suggest running the RS-485 data lines and a 24 Vdc power supply in the same cable, and sometimes refer to the combined data and power lines as the SAC bus.
schedule	Identifies specific times (in 15 minute increments) and days when access is granted.
SDU	*See* System Definition Utility.
Security Access Control module	3-SAC. An EST3 module that supports an RS-485 line for security and access control devices.
security alarm	When a security device goes into alarm it generates a security alarm event. This triggers programmed responses from the system control panel, and may result in a message being sent to a central monitoring station or a telephone pager. The end result will be the dispatch of a police or security officer to investigate the problem.
security partition	*See* partition.
security system	Part of an integrated system intended to monitor and report unauthorized access to specific areas of the site, thereby preventing vandalism and burglary.
security trouble	When a security device goes into trouble it generates a security trouble event. This triggers programmed responses from the system control panel, and may result in a message being sent to a central monitoring station or a telephone pager. The end result will be the dispatch of maintenance personnel to investigate and resolve the problem.
SIGA	An abbreviation for Signature Series.
SIGA-CR	*See* Control Relay module.
Signature Controller	An EST3 module used to support a Signature Data Circuit and the devices on the circuit. Several different models are available.

Signature Data Circuit	The wiring which connects Signature Series devices to the fire alarm panel.
smart card	A type of access card with an embedded integrated circuit chip. The card has both a coded memory and microprocessor intelligence. It can record card transactions and store data.
sounder	*See* CRC Sounder.
stay	*See* armed stay.
strike	A type of lock. A strike unlocks the door when power is applied.
suppression schedule	A type of access control schedule that defines times when the CRC does not log normal events. This reduces the number of events that would otherwise be stored in the CRC during normal business hours.
survivability	Property of a system, module, or device that lets it continue to perform its intended functions despite system or component failures.
System Definition Utility	A Windows based program used to enter and modify information contained in the EST3 system.
TAP protocol	Telocator Alphanumeric Protocol. A communication protocol that lets the EST3 system transmit text messages to suitably equipped and supported alphanumeric pagers, via the 3-MODCOMP.
two-person rule	An access control application that ensures that no staff member can be in the controlled area alone. A CRC operating under two-person rule prevents the entrance of a single person into the controlled area. When two people are present in the area, one cannot exit without the other.
visitor and escort	An access control application where a visitor is issued a temporary access card. Access to specific doors is granted only when an employee (escort) with a permanent access card badges in with the visitor. This application may make use of multiple card readers to handle different types of visitor and employee access card.
Wiegand pin card	A type of access card embedded with encoded ferromagnetic wires.
zone	A physical area that a fire alarm system protects with a group of related devices. A site usually consists of two or more zones.

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