HARDwired Installation/ Owner's Manual

Tracker Expansion Board
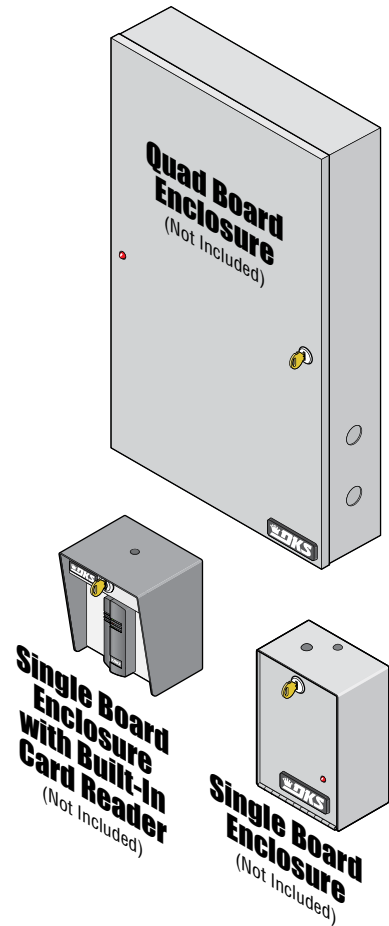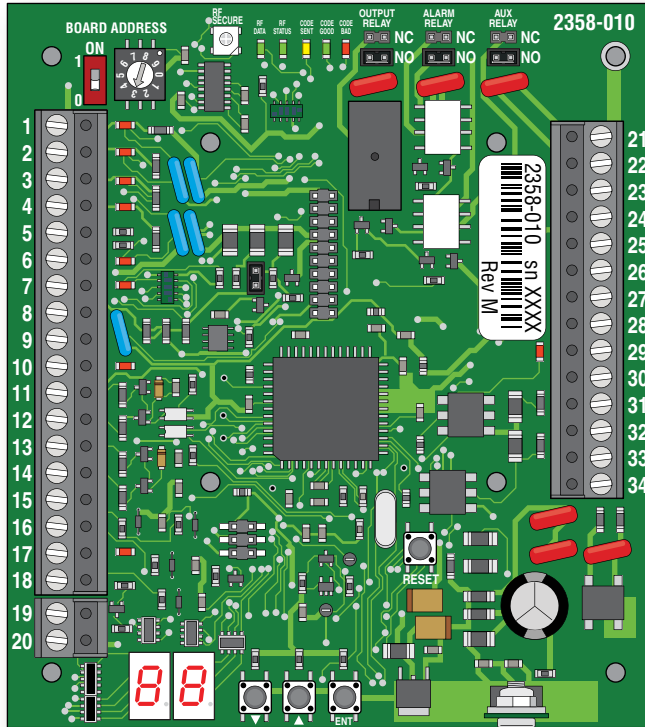## Wiegand Compatable

Use this manual for circuit board 2358-010 Revision M or higher.

2358-065-V-4-19

For Models:
1833, 1835, 1837 and 1838 Multi-Door Access Controller

Provides Access Control System expansion to manage Up to 48 additional Access Points.

This access control equipment must be installed inside of a controlled, protected or restricted area to comply with UL 294 certification.

BOARD ADDRESS

RF SECURE   RF DATA   RF STATUS   CODE SENT   CODE GOOD   CODE BAD   OUTPUT RELAY   ALARM RELAY   AUX RELAY   2358-010

NC NO   NC NO   NC NO

2358-010 sn XXXX Rev M

RESET

ENT

Quad Board Enclosure (Not Included)

Single Board Enclosure with Built-In Card Reader (Not Included)

Single Board Enclosure (Not Included)

Date Installed: _____

Circuit Board Serial Number(s) and Revision Letter: _____

Installer/Company Name: _____

Phone Number: _____

Leave Manual with Owner

Conforms To UL STD 294

ETL LISTED US
Intertek
9900288

DKS DOORKING®

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Glossary

ACCESS CONTROL SYSTEM: A collection of means, measures and specific practices that when combined, form or compose a systematic approach, which enables an authority to control access to areas and resources in a given physical facility. An access control system, within the field of physical security, is generally seen as the second layer in the security of a physical structure.

ALARM: A condition indicating a state of alert or tamper detection.

ALARM SIGNAL: A transmission of an alarm condition or alarm report.

CONTROLLED AREA: A room, office, building, facility, premises, or grounds to which access is monitored, limited, or controlled.

EQUIPMENT: Any part of an electronic access control system, such as access control units, reader interface modules, access point actuators, access point sensors, keypads, and the like.

PROTECTED AREA: A room, office, building, facility, premise or grounds to which access is monitored, and limited and/or controlled, whereby the authorized person of the Access Control System may grant access to non-authorized persons.

RESTRICTED AREA: A room, office, building, facility, premise or grounds to which access is monitored, and limited and strictly controlled, whereby only the administrator of the Access Control System shall issue credentials that will lead to access.

SECTION 1 - TRACKER EXPANSION BOARD INTRODUCTION

Use this manual for Tracker Expansion Board 2358-010 Rev M or higher.

Destructive Attack:	**Level I**
Line Security:	**Level I**
Endurance:	**Level IV**
Standby Power:	**Level I**

This access control equipment must be installed inside of a controlled, protected or restricted area to comply with UL 294 certification. See page 1 for more information.

The Model 2358 Tracker Expansion Board allows you to expand the number of access points that the models 1833, 1835, 1837 and 1838 multi-door access controller PC Programmable Entry Systems can control, up to a maximum of 48. **One tracker expansion board is required for each access point.** Tracker expansion boards will interface with a variety of wiegand devices including card readers, RF transmitters, digital keypads, etc. The tracker expansion board will also report gate operator data from DoorKing intelligent gate operators that have Gate Tracker outputs. In addition to these features, the tracker expansion boards can also monitor the status of a door, report door ajar and forced entry conditions, sound local alarms, activate a building alarm system, and has request to exit inputs.

Prior to beginning the installation, we suggest that you become familiar with the instructions, illustrations, and wiring guidelines in this manual. This will help insure that your installation is performed in an efficient and professional manner.

The proper installation is an extremely important and integral part of the overall access control system. Check all local building ordinances and building codes prior to installion. Be sure your installation is in compliance with local codes.

IMPORTANT **Wireless installation of the access control system and tracker expansion boards will vary from the HARDwire installation illustrated in this manual, see the instructions in the wireless kits for wireless installation.**

1.1 General Information

Download **REMOTE ACCOUNT MANAGER** Software **FREE** at: **http://www.doorking.com/telephone/software**

To utilize the tracker expansion board(s), **DoorKing Remote Account Manager for Windows software, V 6.4 or newer** is required to be installed on the user supplied PC. The chart below is to assist you in determining if you have the proper access control system and gate operators to utilize the tracker expansion board.

Access Control Systems	
Model	**Control Board**
1833, 1835, 1837, *1838	183x-010 Series

* 1838 Multi-Door Access Controller ONLY. NOT for use with 1838 Access Plus.

Gate Operators	
Model	**Control Board**
1601, 1602, 1603 Barrier	1601-010
6524 Swing, 9024 Slide (AC Powered ONLY)	4100-018
1150 Overhead	4402-018
9200, 9500 Slide	4404-018
6500 Swing, 9000 Slide	4405-018
6050, 6100, 6300 Swing	4502-018
9100, 9150 Slide	4602-018

- Expands the control capability of selected DoorKing access control systems to manage up to 48 additional access points.

- Provides power and wiegand inputs for almost any wiegand access control device (Card reader, RF receiver, digital keypad etc.). Board may power two card readers in parallel if required. For example: an entry and exit card reader on a single door.

- Can be used to provide a variety of door monitoring functions, such as sounding an alarm, or activating a building alarm system when the door is forced or held open.

- Provides a request to exit input (free exit).

- Provides three programmable relay outputs.

- Hold Open Feature unlocks individual doors (or holds open individual gates) when commanded from the system software.

- Monitors transactions from DoorKing intelligent gate operators. Can monitor slide, swing or overhead gate operators and the parking gate operator (barrier) in PAMS type applications.

- Optional Wireless kit available to connect tracker expansion board(s) to an access control system wirelessly. Maximum distances between the access control system and tracker expansion boards will vary from the HARD wire run distances illustrated in this manual, see the instruction manuals with the wireless kits for the correct distances between the hardware.

1.2 General System Layout

The diagram below shows the **maximum** number of tracker expansion boards that can be connected to the 1833, 1835,1837 and 1838.

Note: Wiegand 1 will activate Relay 1 and Wiegand 2 will activate Relay 2 at the access control system.

Each board can be individually setup for each access point depending on what functions are desired. See section 1.3 below for board options. Zone addresses will need to be used when using more than 8 boards per Relay/Wiegand input (See section 1.6). 13+ jumper must be used when using more than 12 boards per Relay/Wiegand input, (See section 1.8).

24 Boards maximum for Relay 1/Wiegand 1 ONLY (using board addresses 11-18)

Zone Address   Zone Address   Zone Address   Zone Address

Access Control Device / Power (repeated across top of boards)

| Tracker Expansion Board 1 | Tracker Expansion Board 2 | Tracker Expansion Board 3 | Tracker Expansion Board 4 | Tracker Expansion Board 5 | Tracker Expansion Board 6 | Tracker Expansion Board 7 | Tracker Expansion Board 8 | Tracker Expansion Board 21 | Tracker Expansion Board 22 | Tracker Expansion Board 23 | Tracker Expansion Board 24 |

Wiegand 1

Wiegand 2

Power

Power

Relay 1

Relay 2

Relay 0 → Main Door/Gate

| Tracker Expansion Board 1 | Tracker Expansion Board 2 | Tracker Expansion Board 3 | Tracker Expansion Board 4 | Tracker Expansion Board 5 | Tracker Expansion Board 6 | Tracker Expansion Board 7 | Tracker Expansion Board 8 | Tracker Expansion Board 21 | Tracker Expansion Board 22 | Tracker Expansion Board 23 | Tracker Expansion Board 24 |

Access Control Device / Power (repeated across bottom of boards)

Zone Address   Zone Address   Zone Address

24 Boards maximum for Relay 2/Wiegand 2 ONLY (using board addresses 3-10)

1.3 Tracker Expansion Board Layout Options

The diagram below shows the connections needed when all options (gate operator data, alarm outputs, door and reset switches, request to exit, etc.) available with the 2358 tracker expansion board are utilized at an access point.

Access Control System
Relay 1/Wiegand 1 or Relay 2/Wiegand 2

Communication Line

Next Tracker Expansion Board (Optional) → Next Tracker Expansion Board (Optional)

Gate operator 1 data input: DoorKing **slide, swing or overhead** operators only. → Gate Operator 1 Data Input

Gate operator 2 data input: DoorKing **barrier gate operator** only. → Gate Operator 2 Data Input

Note: If card reader has additional lighting for outdoor use, separate power must be provided.

Optional Reader LED / Beeper Control

Tracker Expansion Board 2358-010

Auxiliary Relay

Alarm Relay

Output Relay

Local Alarm

Separate Alarm Power

Alarm system outputs are dry relay contacts.

Existing Alarm System

Card Reader
Access Control Device
Tracker expansion board input will accept most wiegand 26, 30, 31-bit access control devices.

Door Contact Switch

External Alarm Reset — PRESS to RESET

Request to Exit — PUSH TO EXIT

Wireless Kit (Optional) See Wireless Instruction Sheets

Ground (Required) 12 GA. Wire

Board Power 16.5 VAC, 20 VA

Battery Back-Up (Optional)

Door Lock   **OR**   Gate Operator

WARNING If the access control system is used to control a vehicular gate with an automatic gate operator, the access control device must be mounted a minimum of six (6) feet away from the gate and gate operator, ten (10) feet recommended, or in such a way that a person cannot operate the access control device and touch the gate or gate operator at the same time.

1.4 Tracker Expansion Board Overview

Board Address (System Relays) See sections 1.6 and 1.7.

Board Relay Jumpers See section 1.7.

Board Inputs See below and next page.

1 Gate Operator 1 – Data IN
2 Gate Operator 1 – Busy
3 Gate Operator 2 – Data IN
4 Gate Operator 2 – Busy
5 Gate Operator 1 & 2 – Common
6 Wiegand Input – Data 0
7 Wiegand Input – Data 1
8 Wiegand Common
9 12 VDC Wiegand Device Power
10 *Tracker Expansion Board Busy*
11 Gate Operator 1 Power Monitor
12 Gate Operator 1 Power Monitor
13 Gate Operator 2 Power Monitor
14 Gate Operator 2 Power Monitor
15 Door Ajar Input
16 Reset Alarm Input
17 *Communication Relay Input*
18 Request To Exit input
19 *Common*
20 Card Reader LED/Beeper Control

Board Outputs & Power See below and next page.

21 Auxiliary Relay ⎤ Set relay jumper.
22 Auxiliary Relay ⎦
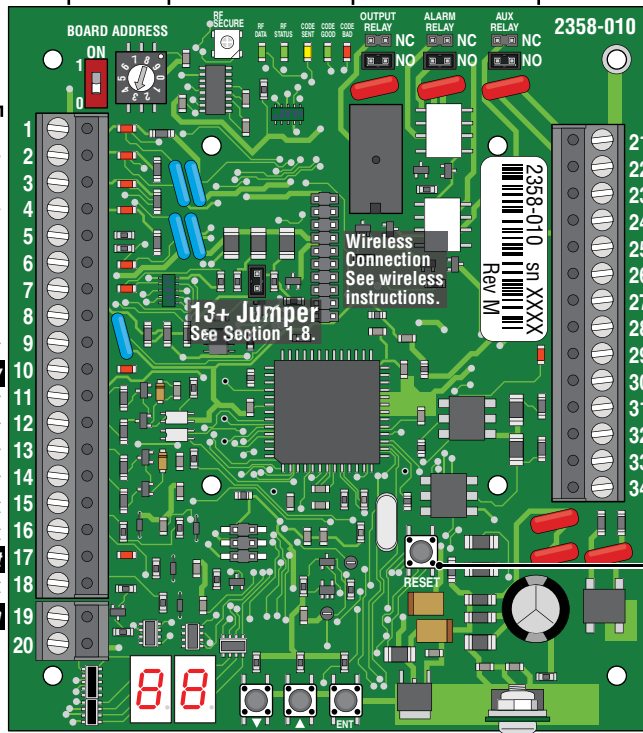23 Alarm Relay ⎤ Set relay jumper.
24 Alarm Relay ⎦
25 Output Relay ⎤ Set relay jumper.
26 Output Relay ⎦
27 *Communication Data Output – Common*
28 *Communication Data Output – Data 1*
29 *Communication Data Output – Data 0*
30 Battery Negative (-12VDC) ⎤ Battery
31 Battery Positive (+12VDC) ⎦ Back-Up
32 Earth Ground
33 16.5 VAC Input Power ⎤ Power
34 16.5 VAC Input Power ⎦ Transformer

Do Not Connect To A Receptacle Controlled By A Switch. Wire polarity does not matter.

Reset Button Press to reset the board.

Important Wireless Note: Wireless kits **DO NOT** use the #10, #17, #19, #27, #28 and #29 communication line. Refer to wireless instructions with the wireless kits when using wireless communication.

Italic Text Note: 6-wire Communication line **REQUIRED** connections. See sections 3.2 thru 3.10.

Programming See section 4.

BOARD ADDRESS 2358-010

Wireless Connection See wireless instructions.

13+ Jumper See Section 1.8.

OUTPUT RELAY / ALARM RELAY / AUX RELAY — NC NO

Board Inputs		Function / Connection
1	Gate Operator 1 – Data IN	Gate operator 1 data input from **DoorKing slide, swing or overhead gate operators.**
2	Gate Operator 1 – Busy	
3	Gate Operator 2 – Data IN	Gate operator 2 data input from **DoorKing barrier gate operator.**
4	Gate Operator 2 – Busy	
5	Gate Operator 1 & 2 – Common	
6	Wiegand Input – Data 0	26, 30, 31-bit wiegand access device input **ONLY.** 500 ft max.
7	Wiegand Input – Data 1	
8	Wiegand Common	
9	12 VDC Wiegand Device Power	
10	*Tracker Expansion Board Busy*	Communication **ONLY** to other tracker expansion boards. **DO NOT** connect to access control system.
11	Gate Operator 1 Power Monitor	Monitors 24V AC/DC power from **DoorKing slide, swing or overhead gate operators.** Wire polarity does NOT matter.
12	Gate Operator 1 Power Monitor	
13	Gate Operator 2 Power Monitor	Monitors 24V AC/DC power from **DoorKing barrier gate operator.** Wire polarity does NOT matter.
14	Gate Operator 2 Power Monitor	
15	Door Ajar Input	Magnetic Door Contact Switch: **Normally Closed:** Switch contacts are held **OPEN** when the door is **closed**; switch contacts are **CLOSED** when the door is **open**.
16	Reset Alarm Input	Connects to a alarm reset button.
17	*Communication Relay Input*	Communication to the access control system Relay 1 or 2 (Main Terminal) or other tracker expansion boards.
18	Request To Exit input	Connects to a request to exit button.
19	*Common*	Connects to a card reader with LED and beeper indicators. (Available on certain card readers)
20	Card Reader LED/Beeper Control	
21	Auxiliary Relay	Connects to a local alarm. Set relay to normally OPEN (NO) or normally CLOSED (NC) using relay jumpers on board.
22	Auxiliary Relay	
23	Alarm Relay	Connects to an existing building alarm system. Set relay to normally OPEN (NO) or normally CLOSED (NC) using relay jumpers on board.
24	Alarm Relay	
25	Output Relay	Connects to door control (electric strike, maglock) or gate control (gate operator). Set relay to normally OPEN (NO) or normally CLOSED (NC) using relay jumpers on board.
26	Output Relay	
27	*Communication Data Output – Common*	Communication data output to Wiegand 1 or 2 input (Auxiliary Terminal) on the access control system.
28	*Communication Data Output – Data 1*	
29	*Communication Data Output – Data 0*	
30	Battery Negative (-12VDC)	Optional battery back-up allows the tracker expansion board to maintain operation during power out conditions. Use .8 amp gel cell for single board P/N 1801-008, 3 amp gel cell for 4 boards max. P/N 1801-009.
31	Battery Positive (+12VDC)	
32	Earth Ground	To an approved grounding source (Required).
33	16.5 VAC Input Power	Use a **16.5 VAC, 20 VA transformer** (or UL listed equivalent) to power the tracker expansion board. Max power wire run with 18 AWG wire is 100 feet; with 16 AWG wire is 200 feet. Wire polarity does NOT matter.
34	16.5 VAC Input Power	

Note: Relay contacts are rated at 1A 30V maximum.

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2358-065-V-4-192358-065-V-4-19

1.5 Board Input Descriptions

Access Control Device Input (26, 30, 31-Bit Wiegand)

Tracker expansion boards can accept wiegand input data from most devices that output their data in a **wiegand format**. When using 30 or 31-bit wiegand devices, the system will only recognize facility code 255 and lower. An access control device (a card reader for example) is connected to the tracker expansion board **(Terminals 6-7-8-9).** When the tracker expansion board receives the wiegand data from the access device, it sends the data to the access control system where the decision to grant or deny access is made. At the same time, a report is made of this activity and is stored in the transaction buffer. Two access control devices may be connected to a single tracker expansion board, however each device will report the same location in the transaction report when connected in this method and each device will activate the same door (or gate). This may be preferable in some instances. For example, if a vehicular gate uses both a card reader and an RF receiver for resident access, each of these devices can be connected in parallel. Each device will activate the gate (door) that the output relay of the tracker expansion board is connected to, and each device will appear in the transaction report with the name assigned to the tracker expansion board in the software ("Main Gate", for example, Refer to the Dual Door Mode).

Gate Operator Data Input

Gate operator data inputs can only be used with DoorKing vehicular gate operators (see section 1.1). The tracker expansion board receives data **(Terminals 1-5 and 11-14)** from the gate operator control board, converts it to wiegand format, and then sends this wiegand data to the access control system where it is stored in the transaction buffer. The data that is sent from the gate operator control board includes information such as gate operator cycle count (x100), if an obstruction was hit, if an attempt was made to force the gate, etc. See the back of manual for a complete listing of all gate operator transactions. In PAMS applications, only one tracker expansion board is required per traffic lane to monitor the gate operator activity of the slide, swing or overhead gate operator, and the parking gate operator. The tracker expansion board will also monitor the 24 VAC power from the gate operator control board(s). When this power is removed, a "power out" transaction is sent to the access control system.

Request to Exit Input

An alarm condition will exist anytime a controlled door is opened without access being granted by the access control system. The request to exit input **(Terminals 18 & 19)** allows the door to be opened without activating the tracker expansion board alarm relays, and will not cause the access system to report a forced condition. The request to exit is typically used at a controlled access point to allow free exit to personnel. A "Push To Open" button, or a push bar, etc., is connected to the request to exit input on the tracker expansion board. When this input is activated, the tracker expansion board output relay will activate causing the door strike or magnetic lock to release allowing the door to be opened.

Door Ajar Input

The door ajar input **(Terminals 8 & 15)** monitors the status of a controlled access door through a magnetic (typical) door contact switch. This input tells the tracker expansion board if the door is not fully closed, and will cause the alarm and auxiliary relays on the tracker expansion board to activate under certain conditions (see section 3 and section 4). Typically, when the door is closed, the switch contacts are closed; when the door is open, the switch contacts are open.

Reset Alarm Input

The reset alarm input **(Terminals 16 & 19)** overrides the door ajar input allowing a door to be held open when necessary. When this input is activated, the tracker expansion board will not activate its alarm or auxiliary relays even if the door ajar input is activated (see section 4).

Communication Relay Input *(Communication Line to Access Control System's Main Terminal Relay 1 or Relay 2)*

The relay input **(Terminals 17 & 19)** is connected to the Relay 1 or Relay 2 in the access control system that activates when a valid device code is received by the access control system. For example, when a card reader connected to the wiegand input on the tracker expansion board reads the card code, it inputs this information to the tracker expansion board, which in turn sends the information to the access control system. The access control system then makes the decision to grant or deny access. If access is denied, a transaction of the denial is made and nothing else happens. If access is granted, a transaction of the access grant is made, and the access control system activates the communication relay. This relay output is connected to the tracker expansion board system communication relay input, which then causes the tracker expansion board output relay to activate. The output relay activation will then open the controlled door (or gate). If two or more tracker expansion boards are connected to the access system, only the output relay on the tracker expansion board that sent the data will activate. The tracker expansion board relay strike time is set via the programming on the tracker expansion board (see section 4).

Auxiliary and Alarm Relays

Activation and operation of the **AUXILIARY (Terminals 21-22)** and **ALARM (Terminals 23-24)** relays is dependent on the programming on the tracker expansion board (see section 4). Typically, the auxiliary relay is connected to a local alarm (bell, buzzer, light, etc.) and the alarm relay is connected to the buildings existing alarm system. These relays provide a dry contact only.

Output Relay

The Output Relay **(Terminals 25-26)** activates on command from the **access control system**, or from a **request to exit input**. The output relay releases the door strike (or magnetic lock) to allow entry or exit, or activates a gate operator if the tracker expansion board is used to control a vehicular gate. This relay provides a dry contact only.

Communication Data Output *(Communication Line to Access Control System's Auxiliary Terminal Wiegand 1 or Wiegand 2)*

All data received at the wiegand input terminals and the gate tracker terminals is sent to the access control system in 26, 30, 31-bit wiegand format from the wiegand output **(Terminals 27-28-29)**.

13+ Jumper

ONLY used when **MORE** that 12 boards are used per wiegand/relay wire run (see section 1.8).

1.6 Setting Board Address (Software - System Relay)

When using tracker expansion boards connected to a single access control system, the board addresses on **EACH** tracker expansion board **should be set so that the Remote Account Manager for Windows (V 6.4 or newer only) software can identify each tracker expansion board.** The software reserves board address 0, 1 and 2 for the access control system. Tracker expansion board address starts with relay address 3 (see below). IMPORTANT: **The software uses the board address number for the System Relay number.**

"Zone" Addresses: Board addresses can be set the same (functions as "zones"), but the system's "tracking" capability will **NOT** be able to distinguish **SPECIFIC access point** activity. Two or more boards with the same board address will be tracked and logged as "zone number" but not a specific location for that activity. For example, if you have 4 card readers in different locations in a building, and all have the same board addresses, the software would track that a card reader in the "zone number" was used, but not which specific location it was used. Zones can be used for a restricted area with multiple entrances inside the complex such as a pool area/tennis courts or community center. Zones are not recommended if detailed tracker activity reports are required.
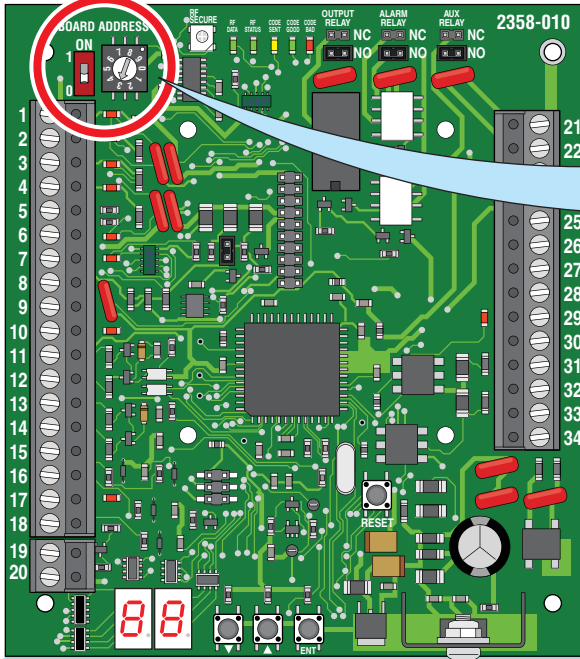
Switch MUST be **ON (1)** for board addresses 10 thru 18. (Dial number +10).

Switch MUST be **OFF (0)** for board addresses 3 thru 9. (Dial number only).
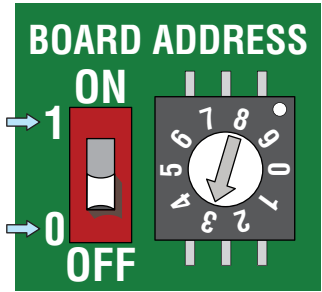
Switch   Dial Numbers
Set dial numbers accordingly with switch.

IMPORTANT: **ONLY** 8 board addresses can be used for **EACH** wiegand/relay run.

IMPORTANT: **DO NOT** set the board address to 0, 1, 2 or 19.

Example: The switch is **OFF** and the dial is set to 3, so the Board Address is **3**. The software uses the board address as the System Relay, this means the System Relay for this board is **3**. See below for all board settings.

Board addresses 3 thru 10 MUST connect to Relay 2/Wiegand 2 on the access control system

Maximum **HARD** wire run between tracker expansion boards (up to 24 boards) is **4000 feet TOTAL**, see section 2 for more information about HARDwiring limitations.

Board Address 3	Board Address 4	Board Address 5	Board Address 6	Board Address 7	Board Address 8	Board Address 9	Board Address 10
System Relay 3	System Relay 4	System Relay 5	System Relay 6	System Relay 7	System Relay 8	System Relay 9	System Relay 10
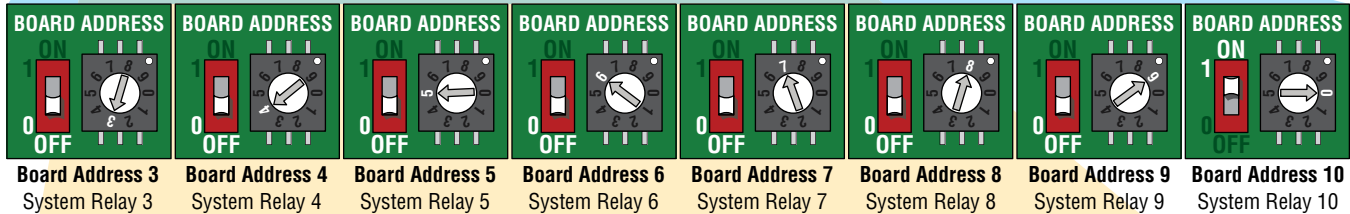
Note: Start at board address 3, the software reserves board address (system relay) 0, 1 and 2 for the **access control system ONLY.**

Board addresses 11 thru 18 MUST connect to Relay 1/Wiegand 1 on the access control system

Maximum **HARD** wire run between tracker expansion boards (up to 24 boards) is **4000 feet TOTAL**, see section 2 for more information about HARDwiring limitations.

Board Address 11	Board Address 12	Board Address 13	Board Address 14	Board Address 15	Board Address 16	Board Address 17	Board Address 18
System Relay 11	System Relay 12	System Relay 13	System Relay 14	System Relay 15	System Relay 16	System Relay 17	System Relay 18
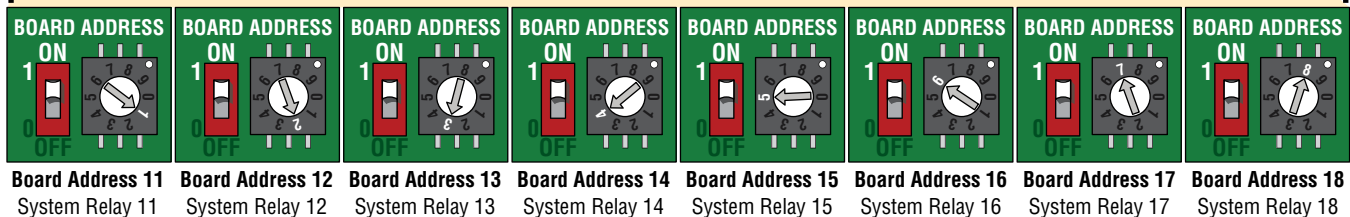
Note: Board Addresses 0, 1, 2 & 19 will not generate a wiegand signal.

1.7 Relay Identification (Software - System Relay)

The models **1833, 1835, 1837 and 1838** access control systems each have **THREE relays (Relay 0, 1, and 2)**. When the tracker expansion boards is added to this system, the **Output Relay** on the tracker expansion boards (Terminals 25-26) are identified in the software by the board address, beginning with board address 3 = System Relay 3 **(System Relays 0, 1 and 2 are reserved for the access control board relays ONLY in the software).**

Each of the 3 relays on the tracker expansion board can be set to either Normally Open (NO) or Normally Closed (NC) by setting the board relay jumper to the desired configuration. Typically, normally OPEN is used.

When tracker expansion boards are used to expand the access control system, Relays 1 and 2 on the access control system circuit board are used as tracker expansion communication relays. **Relay 2 MUST connect to tracker expansion board addresses 3-10** (system relays 3-10) and **Relay 1 MUST connect to tracker expansion board addresses 11-18** (system relays 11-18).

If both Relay 1 and Relay 2 are used to control tracker expansion boards, Relay 0 is used as the Primary Relay that will open the main door or gate when the resident pushes "9" on their telephone.

Access Control System Main Terminal

Relay 0

Relay 2 Jumper

Relay 2
Set relay 2 jumper NO or NC.
Relay 1

Board Relay Jumpers

Aux Relay
Alarm Relay
Output Relay
(System Relay)

Tracker Expansion Board
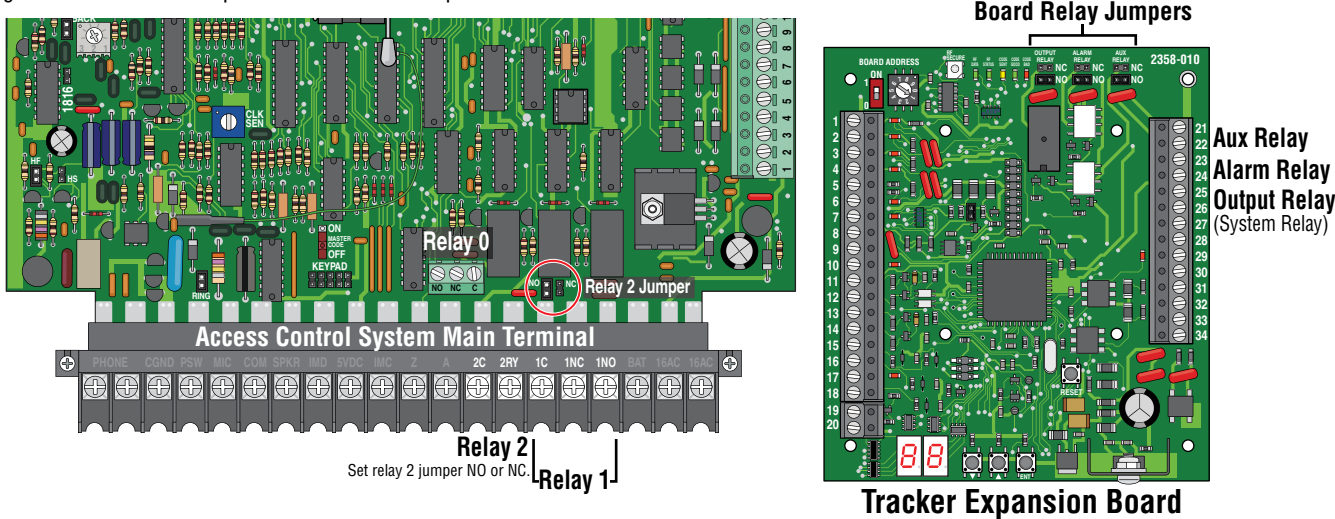
Remote Account Manager Software for Windows System Relay Identification

Important Wireless Note: Wireless kits **ARE NOT** wired like this. Refer to wireless instructions with the wireless kits when using wireless communication.

ONLY Board Addresses 11-18 connect to **Relay 1/Wiegand 1** (24 Boards max)

Zone Address / Zone Address / Zone Address / Zone Address

Tracker Expansion Board at access point Board Address 11 | 11 | 12 | 12 | 13 | 14 | 14 | 15 | 16 | 17 | 17 | 18

Wiegand 1 (Aux Terminal)

Access Control System Board

Relay 2 Jumper "NO"

Relay 0

Note: Relay 2 jumper set to normally OPEN.

RS-232

Main Terminal

Relay 1
Main Terminal

Relay 2
Main Terminal

Relay 0
Main Door/Gate

System Relays for the tracker expansion boards are identified in the DKS software sequentially by the board address, beginning with board address 3 = **System Relay 3** and ending with board address 18 = **System Relay 18**.

Relays 0, 1 and 2 are "Physically" located on the access control board. They are identified in the DKS software as system relays 0, 1 and 2.

Zone addresses CAN be used but MUST be used when more than 8 boards are required for a Relay/Wiegand input. See previous page about zone addresses.

Your PC connected to the access control system board (RS-232 terminal).

Wiegand 2 (Aux Terminal)

Tracker Expansion Board at access point Board Address 3 | 4 | 5 | 6 | 6 | 7 | 8 | 8 | 9 | 9 | 10 | 10

Zone Address / Zone Address / Zone Address / Zone Address

ONLY Board Addresses 3-10 connect to **Relay 2/Wiegand 2** (24 Boards max)

1.8 13+ Jumper

DO NOT use the 13+ jumper for the **FIRST 12 boards** in the 24 board total for each relay/wiegand connection. At least **ONE** board on the **SECOND 12 boards MUST** use the 13+ jumper for each relay/wiegand connection. **Note:** Rev M or higher 2358 board.
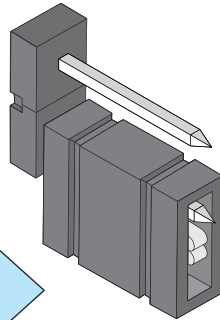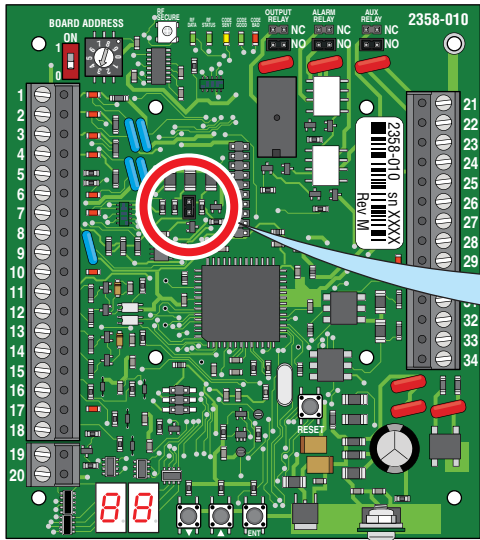
13+ jumper **NOT** used
Factory Setting - **NOT** Jumpered
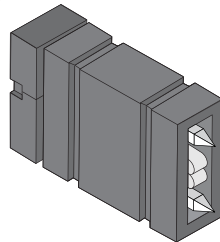
13+ jumper **USED - Jumpered**

13+ jumper **USED**

Tracker Expansion Board 24	Tracker Expansion Board 23	Tracker Expansion Board 22	Tracker Expansion Board 21	Tracker Expansion Board 20	Tracker Expansion Board 19	Tracker Expansion Board 18	Tracker Expansion Board 17	Tracker Expansion Board 16	Tracker Expansion Board 15	Tracker Expansion Board 14	Tracker Expansion Board 13

Relay 1/Wiegand 1 (24 Boards max)   13+ jumper **NOT** used

Tracker Expansion Board 1	Tracker Expansion Board 2	Tracker Expansion Board 3	Tracker Expansion Board 4	Tracker Expansion Board 5	Tracker Expansion Board 6	Tracker Expansion Board 7	Tracker Expansion Board 8	Tracker Expansion Board 9	Tracker Expansion Board 10	Tracker Expansion Board 11	Tracker Expansion Board 12

Wiegand 1 (Aux Terminal)

Access Control System Board

Note: Relay 2 jumper set to normally OPEN.

IMPORTANT: DO NOT use the 13+ jumper for **ANY** of the **FIRST 12** boards. More than one 13+ jumper can be used on the **SECOND** 12 boards or **at least ONE** 13+ jumper has to be used on **ANY** of the **SECOND** 12 boards.

IMPORTANT: ONLY 8 board addresses can be used for **EACH** wiegand/relay run. If more than 8 boards are being used, zone addresses **MUST** be used, see section 1.6.

Relay 1
Main Terminal

Relay 2
Main Terminal

Relay 0
Main Door/Gate

Wiegand 2 (Aux Terminal)

Tracker Expansion Board 1	Tracker Expansion Board 2	Tracker Expansion Board 3	Tracker Expansion Board 4	Tracker Expansion Board 5	Tracker Expansion Board 6	Tracker Expansion Board 7	Tracker Expansion Board 8	Tracker Expansion Board 9	Tracker Expansion Board 10	Tracker Expansion Board 11	Tracker Expansion Board 12

Relay 2/Wiegand 2 (24 Boards max)   13+ jumper **NOT** used

Tracker Expansion Board 24	Tracker Expansion Board 23	Tracker Expansion Board 22	Tracker Expansion Board 21	Tracker Expansion Board 20	Tracker Expansion Board 19	Tracker Expansion Board 18	Tracker Expansion Board 17	Tracker Expansion Board 16	Tracker Expansion Board 15	Tracker Expansion Board 14	Tracker Expansion Board 13

13+ jumper **USED**

SECTION 2 - INSTALLATION

The location of the tracker expansion board(s) is dependent on the application that it is being used. Tracker expansion boards can be installed in selected card reader housings, or they can be installed in their own enclosure (enclosures are optional and not included with the tracker expansion board). DoorKing has two enclosures available for this purpose. The small housing will hold a single tracker expansion board and the large housing can hold up to four tracker expansion boards. In addition, the large housing has convenience outlets to power up to four accessory transformers.

Selected models of proximity card readers are available with an enclosure that has ample room for a tracker expansion board to be mounted inside the housing. This simplifies the installation of the card reader used with the tracker expansion board.

IMPORTANT **Wireless communication maximum distances between the access control system and tracker expansion boards will vary from the HARDwire run distances illustrated below. See the instruction sheets in the wireless kits and the Layout and Start-Up Procedure for the correct distances between the hardware when using wireless communication.**

HARDwire Run: Up to 24 tracker expansion boards can be wired to **EACH** of the **TWO** communication lines available (relay 2/wiegand 2 and relay 1/wiegand 1) at the access control system.

IMPORTANT: The maximum distance for a tracker expansion board HARDwire run is 4000 feet TOTAL (1 to 24 boards can be in a HARDwire run). **The farthest boards can be NO more than 2000 feet away from the access control system.**

This access control equipment must be installed inside of a controlled, protected or restricted area to comply with UL 294 certification. See page 1 for more information.

2.1 System Layout Examples

Example 1: 4000 ft total, ONLY one HARDwired communication line shown. 2 boards are connected to relay 2/wiegand 2.

Example 2: 4000 ft total, ONLY one HARDwired communication line shown. 8 boards are connected to relay 2/wiegand 2.

All boards are less than 2000 ft away from access control system.

Communication line to boards are connected in parallel. Allows "teeing" of communication cable for optimal cable routing.

A second communication line can be added with same wiring limitations shown in examples if desired.

Relay/Wiegand Note:
Relay 2/wiegand 2 **MUST** be connected to tracker expansion board addresses 3 thru 10. Relay 1/wiegand 1 connects to tracker expansion board addresses 11 thru 18 if that many boards are desired.
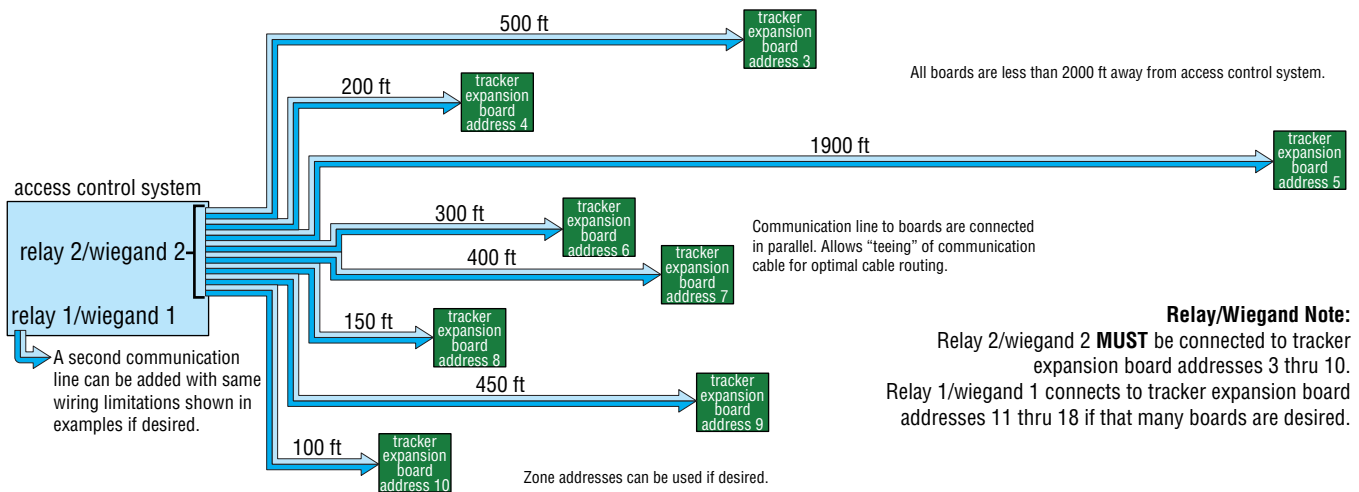
Zone addresses can be used if desired.

Example 3: 4000 ft total, ONLY one HARDwired communication line shown. 8 boards are connected to relay 2/wiegand 2.

Zone addresses can be used if desired.

access control system

relay 2/wiegand 2
relay 1/wiegand 1

A second communication line can be added with the same wiring limitations shown in examples if desired.

500 ft

Communication line to boards are connected in parallel. Allows "teeing" of communication cable for optimal cable routing.

tracker expansion board address 3

100 ft → tracker expansion board address 4

100 ft → tracker expansion board address 5

200 ft → tracker expansion board address 6 farthest board 900 ft away

500 ft → tracker expansion board address 7

500 ft → tracker expansion board address 8

100 ft → tracker expansion board address 9 farthest board 1600 ft away

2000 ft → tracker expansion board address 10 farthest board 2000 ft away

---

Example 4: 2000 ft total, ONLY one HARDwired communication line shown. 8 boards are connected to relay 2/wiegand 2.

access control system

relay 2/wiegand 2
relay 1/wiegand 1

A second communication line can be added with same wiring limitations shown in examples if desired.

1000 ft

tracker expansion board address 3 | tracker expansion board address 4
tracker expansion board address 5 | tracker expansion board address 6
Quad Box

Zone addresses can be used if desired.

1000 ft

tracker expansion board address 7 | tracker expansion board address 8
tracker expansion board address 9 | tracker expansion board address 10
Quad Box

farthest board 2000 ft away

Example 5: 4000 ft total, ONLY one HARDwired communication line shown. 12 boards with "Zones" are connected to relay 2/wiegand 2.

250 ft → tracker expansion board address 3

250 ft → tracker expansion board address 3

Zone Addresses

200 ft → tracker expansion board address 4

All boards are less than 2000 ft away from access control system.

500 ft → tracker expansion board address 5

600 ft → tracker expansion board address 5

400 ft → tracker expansion board address 5

400 ft → tracker expansion board address 5

Zone Addresses

farthest board 1900 ft away

access control system

relay 2/wiegand 2
relay 1/wiegand 1

A second communication line can be added with same wiring limitations shown in examples if desired.

300 ft → tracker expansion board address 6

400 ft → tracker expansion board address 7

Communication line to boards are connected in parallel. Allows "teeing" of communication cable for optimal cable routing.

150 ft → tracker expansion board address 8

450 ft → tracker expansion board address 9

100 ft → tracker expansion board address 10

Relay/Wiegand Note:
Relay 2/wiegand 2 **MUST** be connected to tracker expansion board addresses 3 thru 10.
Relay 1/wiegand 1 connects to tracker expansion board addresses 11 thru 18 if that many boards are desired.

Wiring More Than 8 Boards Note:
Use 6 conductor stranded with overall shield - 18 gauge.
ONLY use 18 gauge when wiring more than 8 boards.
DO NOT connect shield to 2358-010 board common.
DO NOT use twisted pair.

IMPORTANT Wireless communication maximum distances between the access control system and tracker expansion boards will vary from the HARDwire run distances illustrated above. See the instruction sheets in the wireless kits and the Layout and Start-Up Procedure for the correct distances between the hardware when using wireless communication.
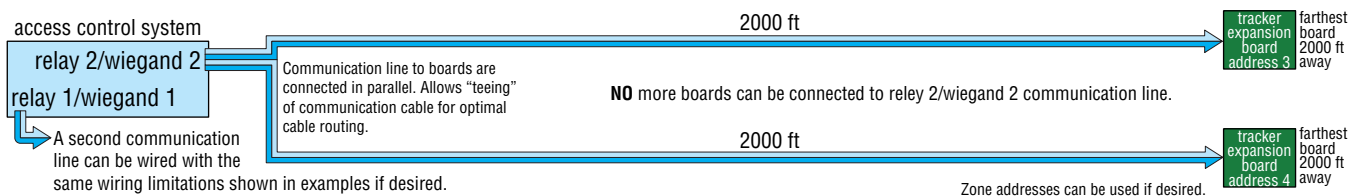
Example 6: 4000 ft total, ONLY one HARDwired communication line shown. 8 boards with "Zones" are connected to relay 2/wiegand 2.

500 ft — tracker expansion board address 3 — 600 ft — tracker expansion board address 3 — 400 ft — tracker expansion board address 3 — 500 ft — tracker expansion board address 3 — farthest board 2000 ft away

Zone Addresses
Individual addresses can be used if desired.

NO more boards can be connected to reley 2/wiegand 2 communication line.

access control system

relay 2/wiegand 2
relay 1/wiegand 1

A second communication line can be wired with the same wiring limitations shown in examples if desired.

Communication line to boards are connected in parallel. Allows "teeing" of communication cable for optimal cable routing.

500 ft — tracker expansion board address 4 — 600 ft — tracker expansion board address 4 — 400 ft — tracker expansion board address 4 — 500 ft — tracker expansion board address 4 — farthest board 2000 ft away

Zone Addresses
Individual addresses can be used if desired.

Example 7: 4000 ft total, ONLY one HARDwired communication line shown. 24 boards with "Zones" and "13+ Jumper" are connected to relay 2/wiegand 2.

250 ft — tracker expansion board address 3 — 250 ft — tracker expansion board address 3 — 1500 ft — [Quad Box: tracker expansion board address 4 (×4)] farthest board 2000 ft away

Zone Addresses

Zone Addresses

All boards are 2000 ft or less away from access control system.

100 ft — tracker expansion board address 5 — 20 ft — tracker expansion board address 5 — 20 ft — tracker expansion board address 5 — 20 ft — tracker expansion board address 5 — farthest board 160 ft away

Zone Addresses

access control system

relay 2/wiegand 2

relay 1/wiegand 1

A second communication line can be added with same wiring limitations shown in examples if desired.

50 ft — tracker expansion board address 6

55 ft — tracker expansion board address 7

55 ft — tracker expansion board address 8   Use **13+ Jumper**

Communication line to boards are connected in parallel. Allows "teeing" of communication cable for optimal cable routing.

400 ft — tracker expansion board address 9 — 100 ft — tracker expansion board address 9 — 1000 ft — [Quad Box: tracker expansion board address 10 (×4)] farthest board 1500 ft away

Zone Addresses

Zone Addresses

50 ft — tracker expansion board address 11 — 130 ft — [Quad Box: tracker expansion board address 12 (×4)] farthest board 180 ft away

Zone Addresses

Wiring More Than 8 Boards Note:
Use 6 conductor stranded with overall shield - 18 gauge. **ONLY** use 18 gauge when wiring more than 8 boards.
Use **13+ Jumper** on at least **ONE** board when using **MORE** than 12 boards.
DO NOT connect shield to 2358-010 board common.
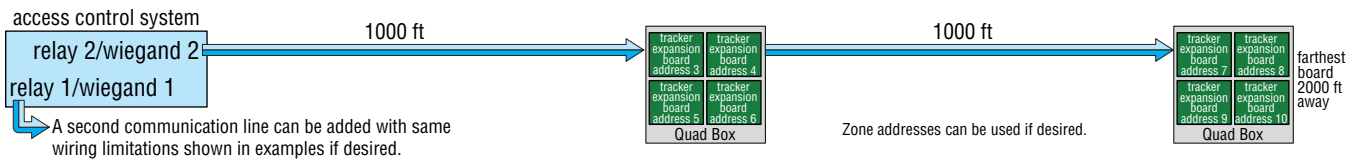**DO NOT** use twisted pair.

Relay/Wiegand Note:
Relay 2/wiegand 2 **MUST** be connected to tracker expansion board addresses 3 thru 10.
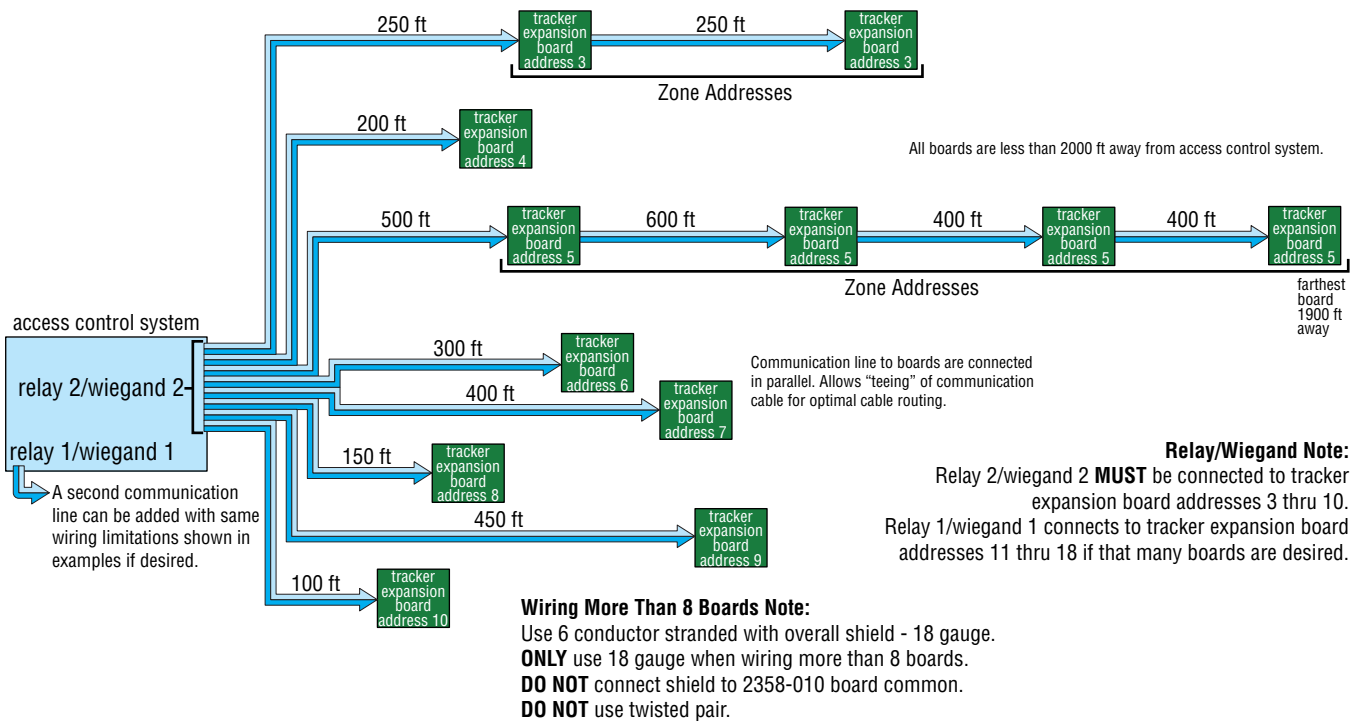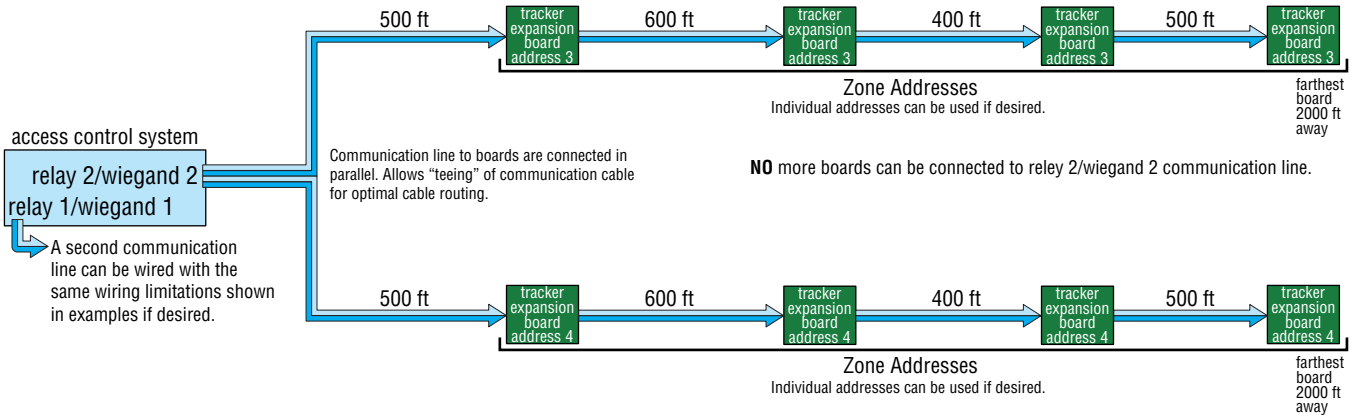Relay 1/wiegand 1 connects to tracker expansion board addresses 11 thru 18 if that many boards are desired.
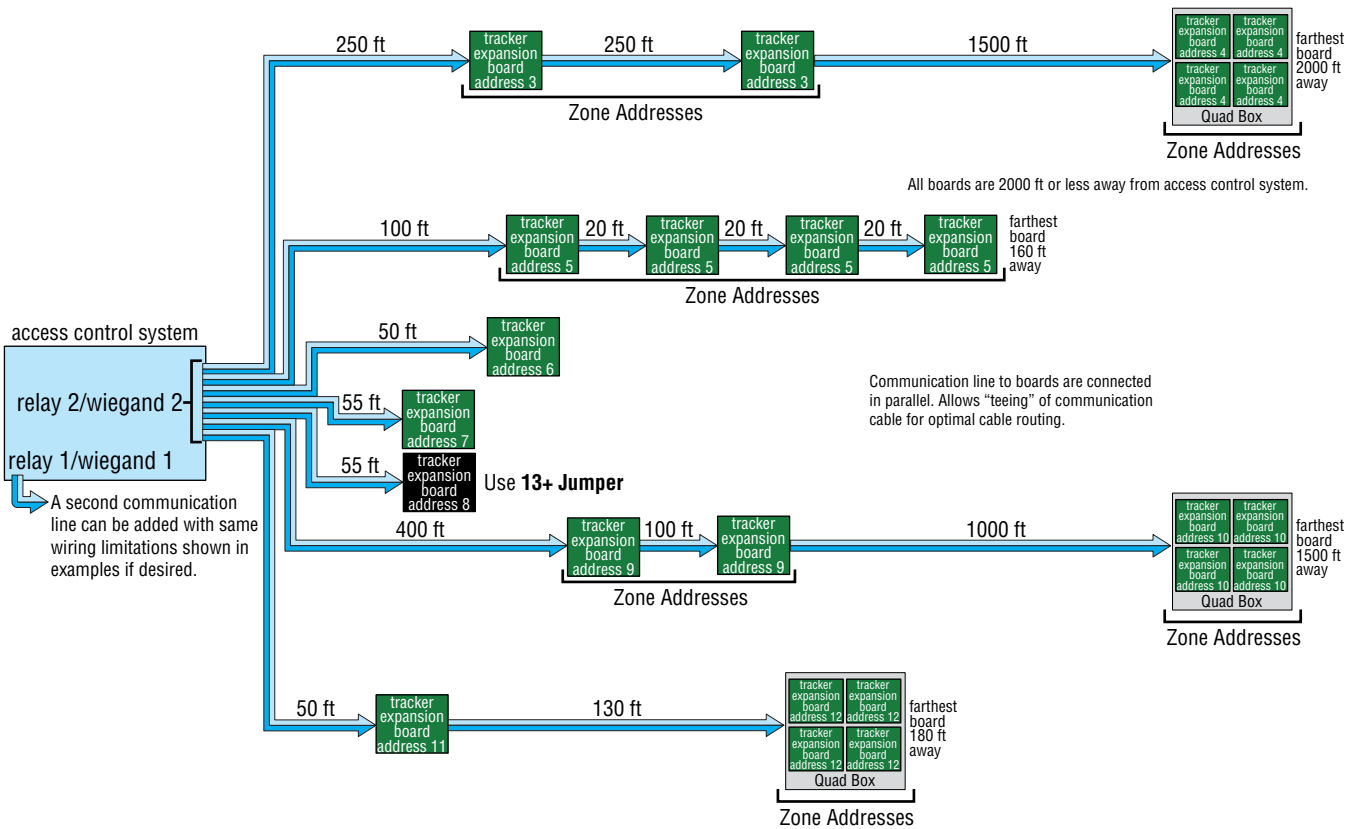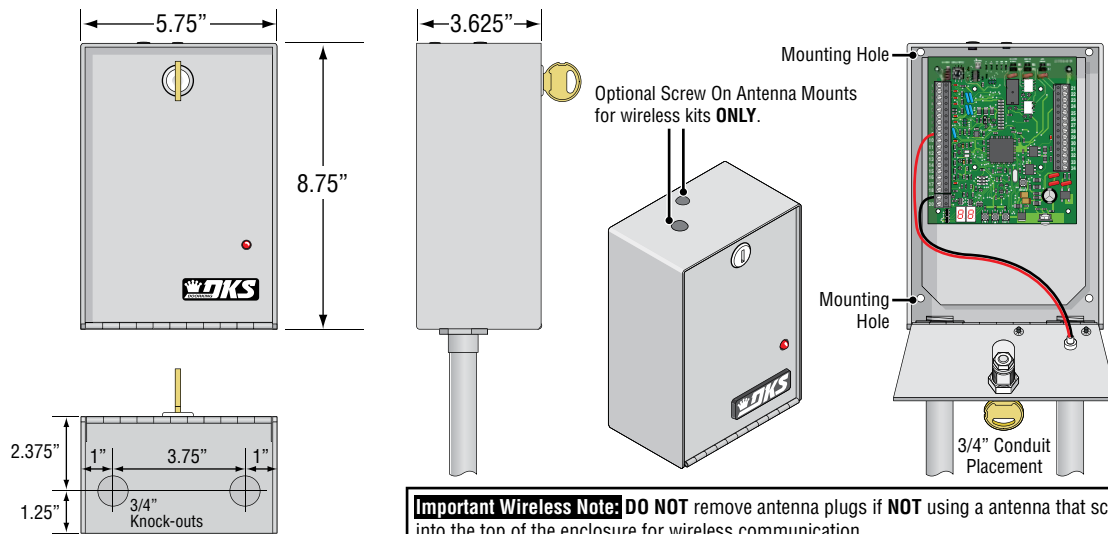
IMPORTANT Wireless communication maximum distances between the access control system and tracker expansion boards will vary from the HARDwire run distances illustrated above. See the instruction sheets in the wireless kits and the Layout and Start-Up Procedure for the correct distances between the hardware when using wireless communication.

2.2 Single Board Enclosure

Optional single enclosure with a single tracker expansion board (P/N 2351-080) provides a lockable, weather resistant housing.
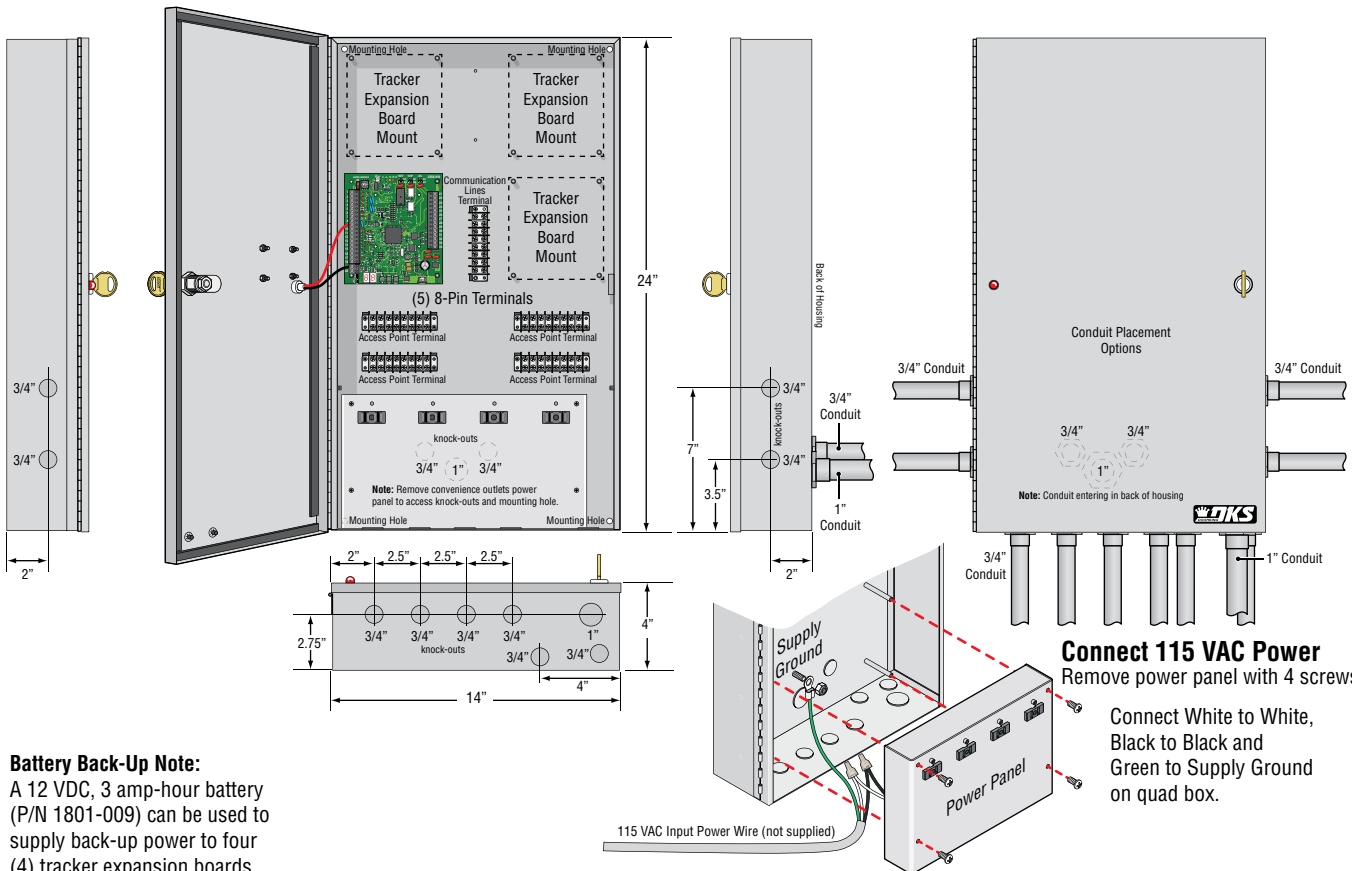
← 5.75" →

← 3.625" →

8.75"

Optional Screw On Antenna Mounts for wireless kits **ONLY**.

Mounting Hole

Mounting Hole

3/4" Conduit Placement

2.375"
1.25"
1" — 3.75" — 1"
3/4" Knock-outs

Battery Back-Up Note: A 12 VDC, .8 amp-hour battery (P/N 1801-008) can be used to supply back-up power to a single tracker expansion board.

Important Wireless Note: **DO NOT** remove antenna plugs if **NOT** using a antenna that screws into the top of the enclosure for wireless communication.
If using an external antenna for wireless communication that uses a coax cable, run it out of the **BOTTOM** of the enclosure. **DO NOT** run coax cable out of the top of the enclosure, it will leak and cause damage to the circuit board.

2.3 Quad Board Enclosure

This access control equipment must be installed inside of a controlled, protected or restricted area to comply with UL 294 certification. See page 1 for more information.
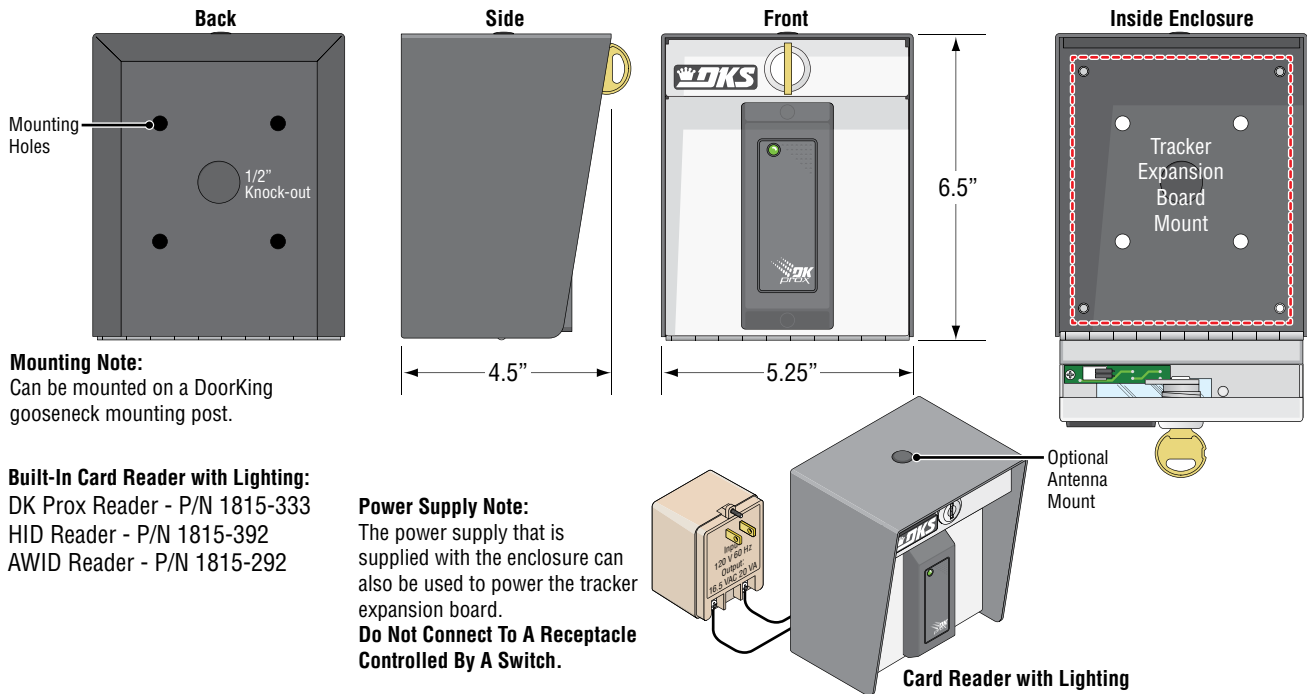
Optional quad box enclosure with a single tracker expansion board (P/N 2351-081) provides a lockable weather resistant housing for up to four (4) tracker expansion boards. Includes four (4) terminals and four (4) convenience outlets for power transformers. You may power up to four (4) tracker expansion boards from a **Single 16.5 VAC, 50 VA power transformer** (P/N 1508-060). See section 3.9 for quad box wiring information.

Mounting Hole   Mounting Hole

Tracker Expansion Board Mount

Tracker Expansion Board Mount

Communication Lines Terminal

Tracker Expansion Board Mount

24"

Back of Housing

(5) 8-Pin Terminals

Access Point Terminal   Access Point Terminal

Access Point Terminal   Access Point Terminal

knock-outs

3/4" 1" 3/4"

Note: Remove convenience outlets power panel to access knock-outs and mounting hole.

Mounting Hole   Mounting Hole

3/4"
3/4"
3/4"
knock-outs
3/4"

7"

3.5"

1" Conduit

Conduit Placement Options

3/4" Conduit   3/4" Conduit

3/4" 3/4"
1"

Note: Conduit entering in back of housing

3/4" Conduit   1" Conduit

2"

2" 2.5" 2.5" 2.5"

2.75"
3/4" 3/4" 3/4" 3/4" 1"
knock-outs
3/4" 3/4"

4"

4"

14"

Battery Back-Up Note:
A 12 VDC, 3 amp-hour battery (P/N 1801-009) can be used to supply back-up power to four (4) tracker expansion boards.

Supply Ground

115 VAC Input Power Wire (not supplied)

Power Panel

Connect 115 VAC Power
Remove power panel with 4 screws.

Connect White to White, Black to Black and Green to Supply Ground on quad box.

2.4 Single Board Enclosure with Card Reader

Optional built-in wiegand card reader single enclosure provides a lockable, weather resistant, LED lighted housing for a single tracker expansion board.

Back	Side	Front	Inside Enclosure

Mounting Note:
Can be mounted on a DoorKing gooseneck mounting post.

Built-In Card Reader with Lighting:
DK Prox Reader - P/N 1815-333
HID Reader - P/N 1815-392
AWID Reader - P/N 1815-292

Power Supply Note:
The power supply that is supplied with the enclosure can also be used to power the tracker expansion board.
Do Not Connect To A Receptacle Controlled By A Switch.

Card Reader with Lighting

SECTION 3 - HARDWIRING

Plan your HARDwire runs before starting the installation. Use proper wire for the wiegand lines, power wires, and be sure that the system is properly grounded. Check all local building ordinances and building codes prior to installing this system. Be sure your installation is in compliance with local codes.

3.1 General HARDwiring Information

- **Do Not Connect Power To A Receptacle Controlled By A Switch.**
- Use only the supplied power transformers (16.5 VAC, 20 VA) or UL listed equivalent to power the tracker expansion board. You may power up to four (4) tracker expansion boards from a single 16.5 VAC, **50 VA** power transformer.
- Use 18 AWG wire for power wire runs up to 100 feet. Use 16 AWG wire for power wire runs up to 200 feet. **It is advisable to keep power wire runs as short as possible.** Wire polarity does not matter.
- Do not power any other devices (electric strikes, magnetic locks) from the tracker expansion board power transformer. These devices must be powered from their own power supply.
- Proper grounding of the system is required. To be effective, ground connections should be made with a minimum 12 AWG wire with a ground point within 10-feet of the access control system. The ground point must be an electrical panel ground buss, a metallic cold water pipe that runs in the earth, or a grounding rod driven at least 10-feet into the soil. If there are several components in the access control system within close proximity to each other, you should consider using a single-point ground system. Check with your building department for specific grounding guidelines as soil conditions and grounding requirements differ depending on your geographical location.
- Surge suppressors can significantly reduce the chance of component failure because of static charges or surges. We recommend using both high and low voltage surge suppressors to help protect equipment from damage. High voltage suppressor P/N 1879-010; low voltage suppressor P/N 1878-010.
- A 12 VDC, 3 amp-hour battery (P/N 1801-009) can be used to supply back-up power to four (4) tracker expansion boards. Use a 12 VDC, .8 amp-hour battery (P/N 1801-007) to back-up a single tracker expansion board. Battery back-up power is optional and not required for normal tracker expansion board operation.
- Be sure to color code all wires.

24 tracker expansion boards can be connected to **Relay 2/Wiegand 2**. If more than 24 tracker expansion boards are desired, see next page.

- Maximum HARDwire run between tracker expansion boards is 4000 ft total, but no more than 2000 ft between any two boards or from the access control system. See section 2.
- **DO NOT** use twisted pair wire with wiegand output format.
- Auxiliary terminal power transformer on access control system board must be connected. Otherwise, RS-232, elevator control and wiegand inputs will not function.
- Proper grounding is required! Ground wire should be a minimum 12 AWG.

Important Wireless Note: Wireless kits **ARE NOT** wired like this. Refer to wireless instructions with the wireless kits when using wireless communication.
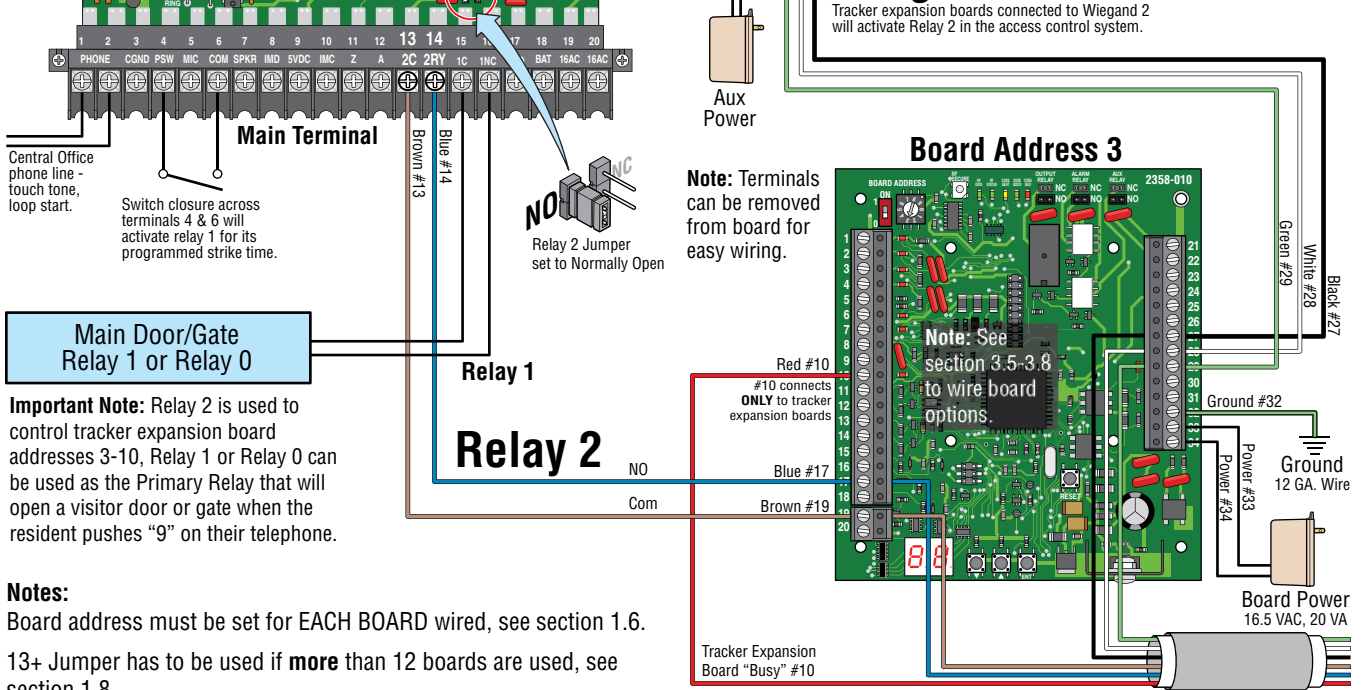
Access Control System Board

Auxiliary Terminal
Black #9-Com
White #8-Data 1
Green #7-Data 0
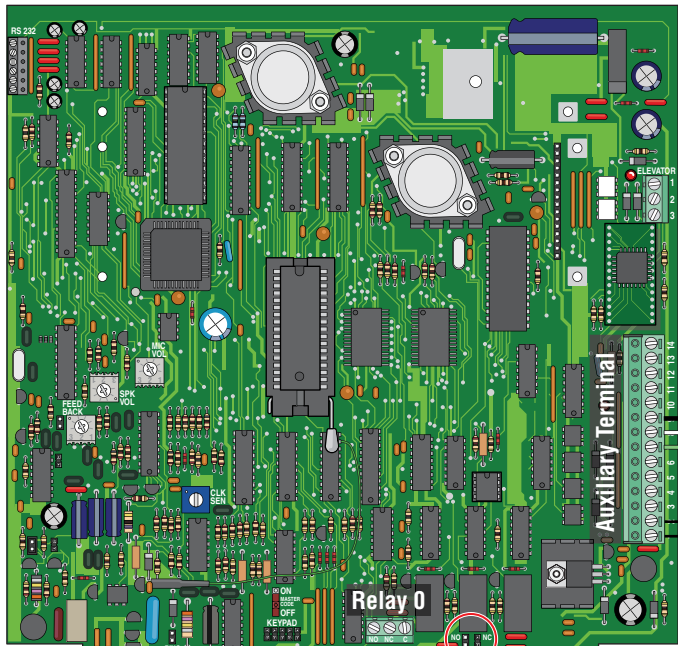
Relay 2/Wiegand 2 to Tracker Expansion Board Terminal Connection Numbers

Auxiliary Terminal	Tracker Terminal
Black #9-Com	#27
White #8-Data 1	#28
Green #7-Data 0	#29

Main Terminal	Tracker Terminal
Brown #13-Com	#19
Blue #14-N.O.	#17

When using multiple tracker boards:

Tracker Terminal	Tracker Terminal
Red #10-Busy	#10

Relay 0

Wiegand 2

Tracker expansion boards connected to Wiegand 2 will activate Relay 2 in the access control system.

Main Terminal

Aux Power

Central Office phone line - touch tone, loop start.

Switch closure across terminals 4 & 6 will activate relay 1 for its programmed strike time.

Brown #13
Blue #14

Relay 2 Jumper set to Normally Open

Relay 1

Main Door/Gate Relay 1 or Relay 0

Important Note: Relay 2 is used to control tracker expansion board addresses 3-10, Relay 1 or Relay 0 can be used as the Primary Relay that will open a visitor door or gate when the resident pushes "9" on their telephone.

Note: Terminals can be removed from board for easy wiring.

Board Address 3

2358-010

Note: See section 3.5-3.8 to wire board options.

Green #29
White #28
Black #27

Relay 2

NO
Com

Red #10
#10 connects **ONLY** to tracker expansion boards

Blue #17
Brown #19

Ground #32
Ground 12 GA. Wire

Power #33
Power #34

Board Power
16.5 VAC, 20 VA
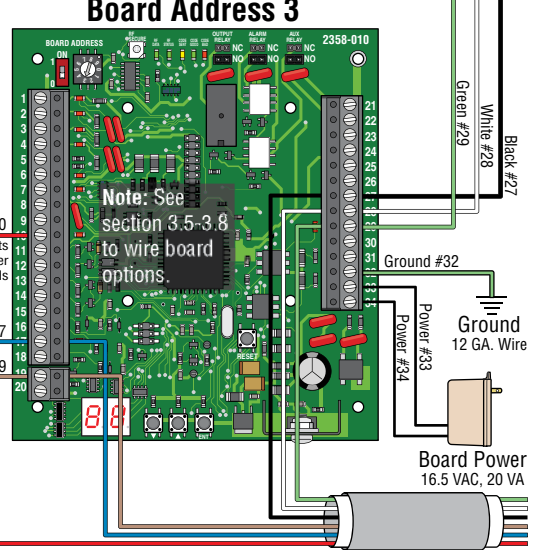
Tracker Expansion Board "Busy" #10

Notes:
Board address must be set for EACH BOARD wired, see section 1.6.

13+ Jumper has to be used if **more** than 12 boards are used, see section 1.8.

Power, access control devices, door or gate control, aux and alarm outputs, door and reset switches, request to exit, etc. wiring is not shown, see section 3.5-3.8.

Gate operator data wiring is not shown, see section 3.10.

Communication line to additional boards are connected in parallel. Allows "teeing" of communication cable for optimal cable routing.

To Board Addresses 4 thru 10 ➡

Use 6 conductor stranded with overall shield. 18 - 22 gauge. **ONLY** use 18 gauge when wiring more than 8 boards. **DO NOT** connect shield to 2358-010 board common. **DO NOT** use twisted pair.

3.3 Board Addresses 11 - 18 Communication Line HARDwiring

Up to 24 tracker expansion boards connected to Relay 2/Wiegand 2 **THEN** connect the next 24 boards to **Relay 1/Wiegand 1**.

- Maximum HARDwire run between tracker expansion boards is 4000 ft total, but no more than 2000 ft between any two boards or from the access control system. See section 2.
- **DO NOT** use twisted pair wire with wiegand output format.
- Auxiliary terminal power transformer on access conrol system board must be connected. Otherwise, RS-232, elevator control and wiegand inputs will not function.
- Proper grounding is required! Ground wire should be a minimum 12 AWG.

Note: Terminals can be removed from board for easy wiring.

Access Control System Board

Wiegand 1

Tracker expansion boards connected to Wiegand 1 will activate Relay 1 in the access control system.

Board Address 11

2358-010

Note: See section 3.5-3.8 to wire board options.

Auxiliary Terminal
Black #13-Com
White #12-Data 1
Green #11-Data 0

Red #10
#10 connects **ONLY** to tracker expansion boards
Blue #17
Brown #19

Green #29
White #28
Black #27

Ground #32
Power #33
Power #34

Ground
12 GA. Wire

Board Power
16.5 VAC, 20 VA

Relay 0

Tracker Expansion Board "Busy" #10

To Board Addresses 12 thru 18
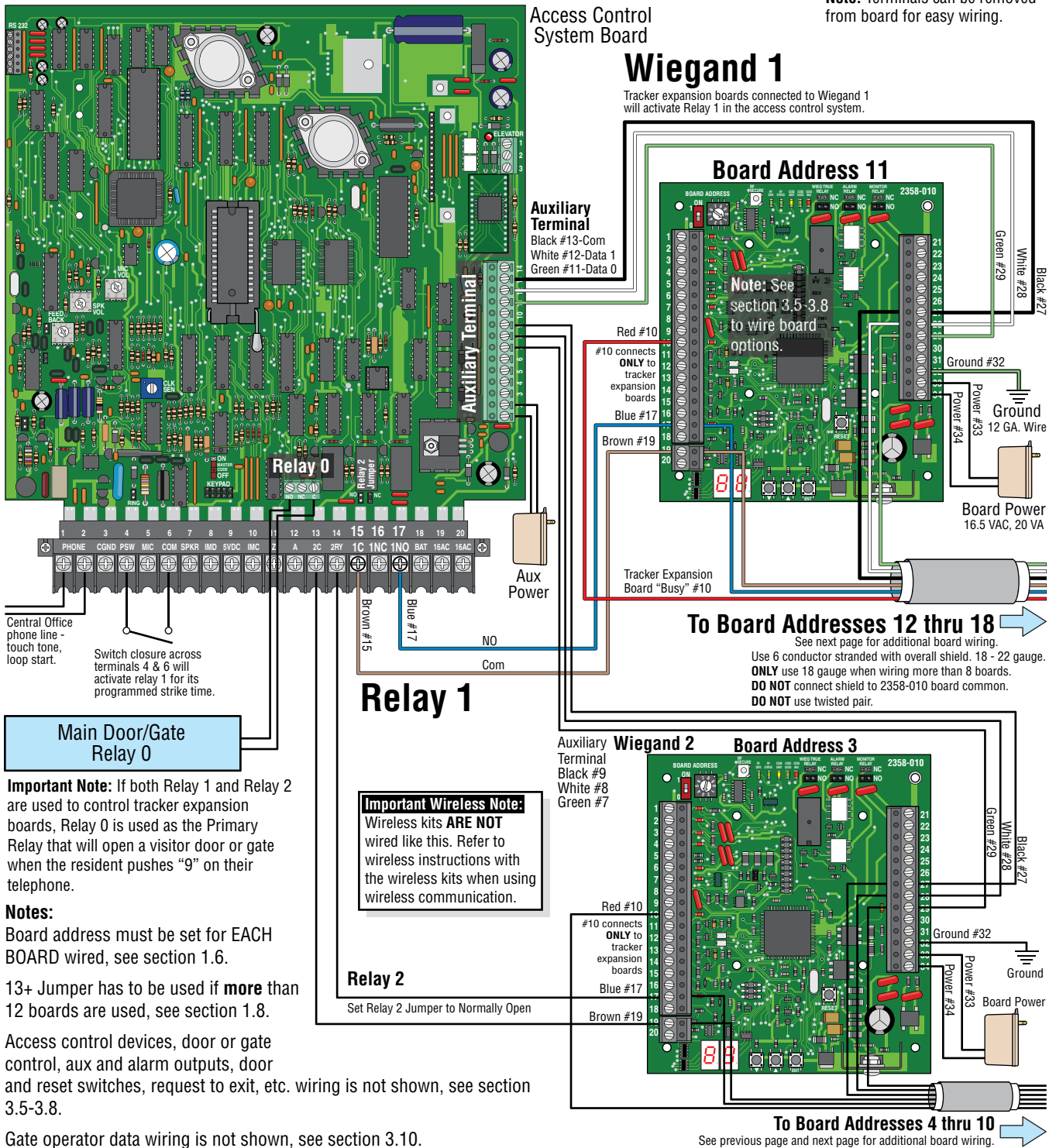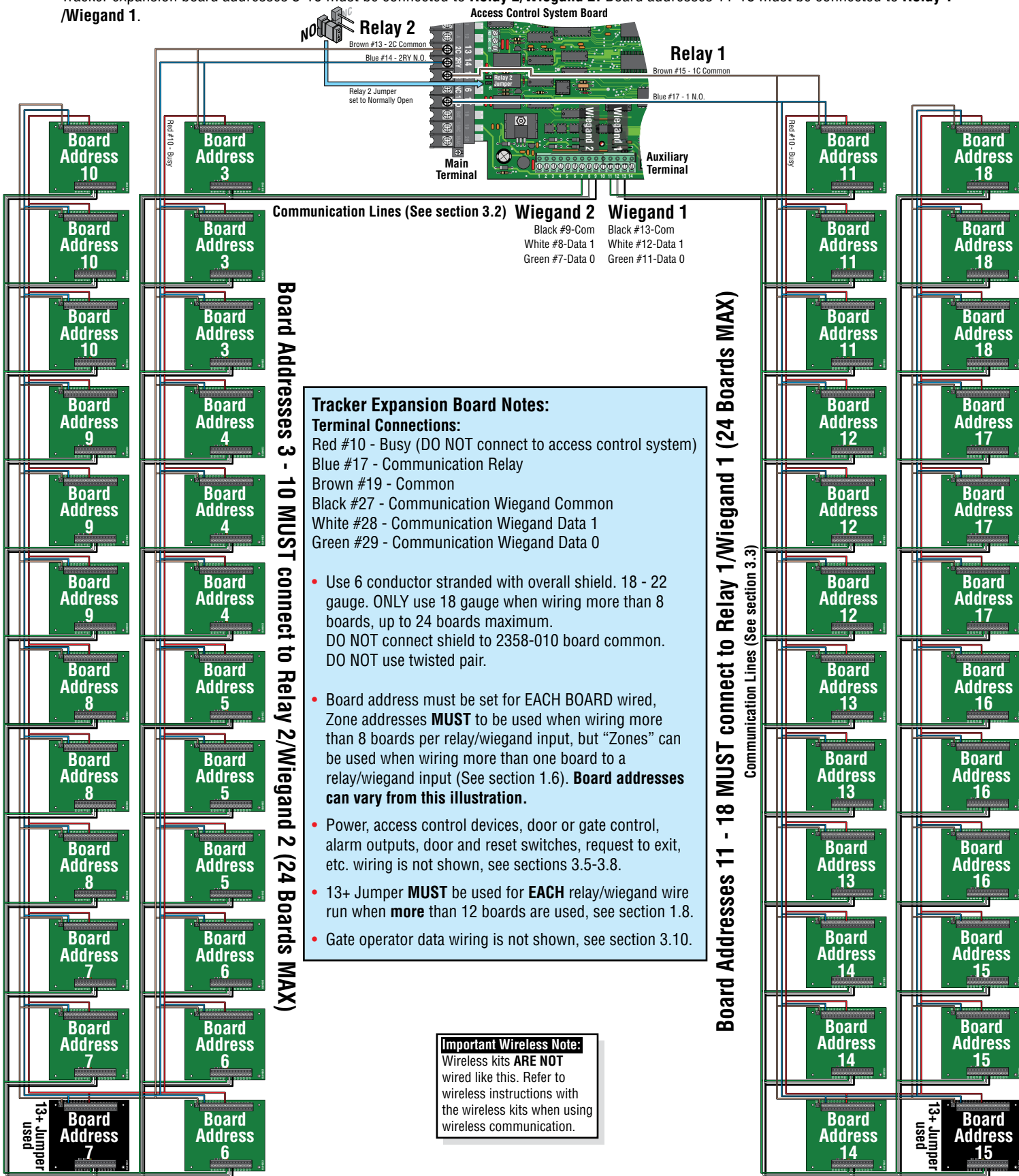See next page for additional board wiring.
Use 6 conductor stranded with overall shield. 18 - 22 gauge.
ONLY use 18 gauge when wiring more than 8 boards.
DO NOT connect shield to 2358-010 board common.
DO NOT use twisted pair.

Aux Power

Brown #15
Blue #17
NO
Com

Relay 1

Central Office phone line - touch tone, loop start.

Switch closure across terminals 4 & 6 will activate relay 1 for its programmed strike time.

Main Door/Gate Relay 0

Important Note: If both Relay 1 and Relay 2 are used to control tracker expansion boards, Relay 0 is used as the Primary Relay that will open a visitor door or gate when the resident pushes "9" on their telephone.

Important Wireless Note: Wireless kits **ARE NOT** wired like this. Refer to wireless instructions with the wireless kits when using wireless communication.

Wiegand 2

Board Address 3

2358-010

Auxiliary Terminal
Black #9
White #8
Green #7

Red #10
#10 connects **ONLY** to tracker expansion boards
Blue #17
Brown #19

Green #29
White #28
Black #27

Ground #32
Power #33
Power #34

Ground

Board Power

Relay 2

Set Relay 2 Jumper to Normally Open

Notes:
Board address must be set for EACH BOARD wired, see section 1.6.

13+ Jumper has to be used if **more** than 12 boards are used, see section 1.8.

Access control devices, door or gate control, aux and alarm outputs, door and reset switches, request to exit, etc. wiring is not shown, see section 3.5-3.8.

Gate operator data wiring is not shown, see section 3.10.

To Board Addresses 4 thru 10
See previous page and next page for additional board wiring.

3.4 MAX Boards Communication Line HARDwiring

Tracker expansion board addresses 3-10 must be connected to **Relay 2/Wiegand 2.** Board addresses 11-18 must be connected to **Relay 1 /Wiegand 1**.
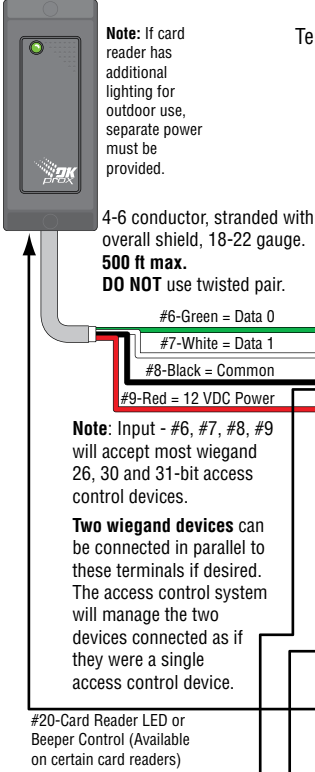
Relay 2

NO NC

Brown #13 - 2C Common

Blue #14 - 2RY N.O.

Relay 2 Jumper set to Normally Open

Access Control System Board

Relay 1

Brown #15 - 1C Common

Blue #17 - 1 N.O.

Main Terminal

Auxiliary Terminal

Wiegand 2 | Wiegand 1

Communication Lines (See section 3.2)

Wiegand 2
Black #9-Com
White #8-Data 1
Green #7-Data 0

Wiegand 1
Black #13-Com
White #12-Data 1
Green #11-Data 0

Red #10 - Busy

Board Addresses 3 - 10 MUST connect to Relay 2/Wiegand 2 (24 Boards MAX)

Board Addresses 11 - 18 MUST connect to Relay 1/Wiegand 1 (24 Boards MAX)

Communication Lines (See section 3.3)

Board Address 10 (×4)
Board Address 9 (×3)
Board Address 8 (×3)
Board Address 7 (×3)

Board Address 3 (×4)
Board Address 4 (×4)
Board Address 5 (×3)
Board Address 6 (×3)

Board Address 11 (×4)
Board Address 12 (×3)
Board Address 13 (×3)
Board Address 14 (×3)

Board Address 18 (×3)
Board Address 17 (×3)
Board Address 16 (×3)
Board Address 15 (×3)

13+ Jumper used Board Address 7

13+ Jumper used Board Address 15

Board Address 6

Board Address 14

Tracker Expansion Board Notes:
Terminal Connections:
Red #10 - Busy (DO NOT connect to access control system)
Blue #17 - Communication Relay
Brown #19 - Common
Black #27 - Communication Wiegand Common
White #28 - Communication Wiegand Data 1
Green #29 - Communication Wiegand Data 0

- Use 6 conductor stranded with overall shield. 18 - 22 gauge. ONLY use 18 gauge when wiring more than 8 boards, up to 24 boards maximum. DO NOT connect shield to 2358-010 board common. DO NOT use twisted pair.

- Board address must be set for EACH BOARD wired, Zone addresses **MUST** to be used when wiring more than 8 boards per relay/wiegand input, but "Zones" can be used when wiring more than one board to a relay/wiegand input (See section 1.6). **Board addresses can vary from this illustration.**

- Power, access control devices, door or gate control, alarm outputs, door and reset switches, request to exit, etc. wiring is not shown, see sections 3.5-3.8.

- 13+ Jumper **MUST** be used for **EACH** relay/wiegand wire run when **more** than 12 boards are used, see section 1.8.

- Gate operator data wiring is not shown, see section 3.10.

Important Wireless Note: Wireless kits **ARE NOT** wired like this. Refer to wireless instructions with the wireless kits when using wireless communication.

3.5 Basic Wiring Options at Access Point

Set **Output Relay** jumper on the tracker expansion board to N.O. (Normally Open) when using **fail-secure (electric strike)** locking device.
Set **Output Relay** jumper on the tracker expansion board to N.C. (Normally Closed) when using **fail-safe (magnetic lock)** locking device.
Set **Output Relay** jumper on the tracker expansion board to N.O. (Normally Open) when using a **gate operator**.
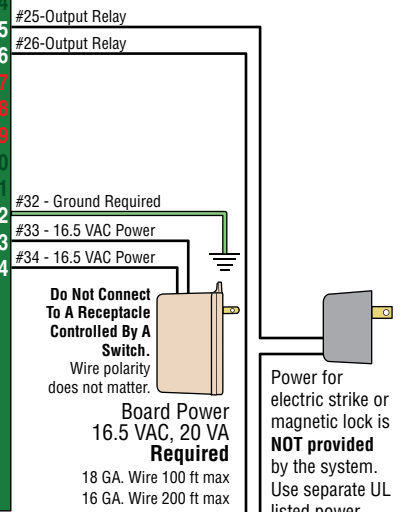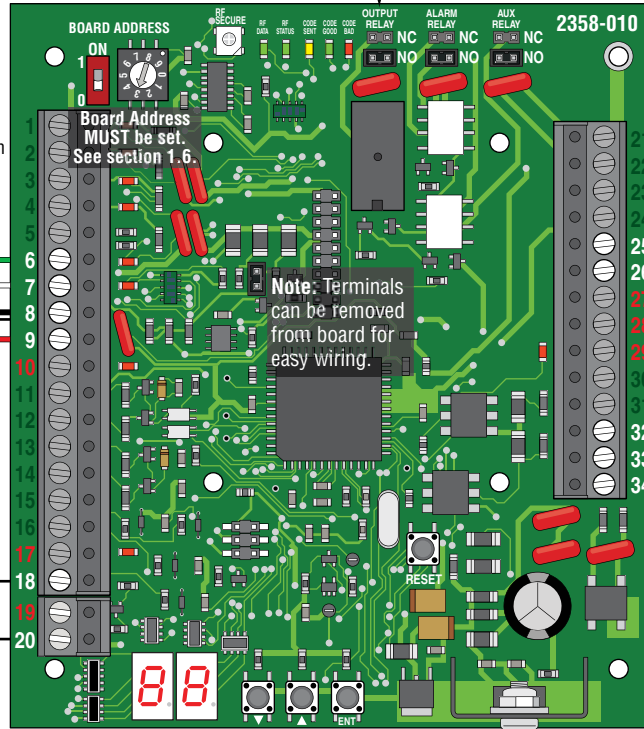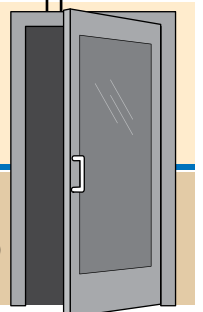
Card Reader
Wiegand Access Control Device

Note: If card reader has additional lighting for outdoor use, separate power must be provided.

4-6 conductor, stranded with overall shield, 18-22 gauge. **500 ft max. DO NOT** use twisted pair.

#6-Green = Data 0
#7-White = Data 1
#8-Black = Common
#9-Red = 12 VDC Power

Note: Input - #6, #7, #8, #9 will accept most wiegand 26, 30 and 31-bit access control devices.

Two wiegand devices can be connected in parallel to these terminals if desired. The access control system will manage the two devices connected as if they were a single access control device.

#20-Card Reader LED or Beeper Control (Available on certain card readers)

Note: Relay contact (25-26) is rated at 1A 30V maximum and can be set for Normally Open (N.O.) or Normally Closed (N.C.) operation.

Terminals-#25 & #26 Output Relay Jumper

BOARD ADDRESS

Board Address MUST be set. See section 1.6.

2358-010

Note: Terminals can be removed from board for easy wiring.

RESET

#25-Output Relay
#26-Output Relay

#32 - Ground Required
#33 - 16.5 VAC Power
#34 - 16.5 VAC Power

Do Not Connect To A Receptacle Controlled By A Switch. Wire polarity does not matter.

Board Power 16.5 VAC, 20 VA **Required** 18 GA. Wire 100 ft max 16 GA. Wire 200 ft max

Power for electric strike or magnetic lock is **NOT provided** by the system. Use separate UL listed power supply.

#8-Common
#18-Request to Exit Input

PUSH TO EXIT

Request to Exit

Door Control

Electric strike
Output Relay:
Normally Open (NO)

Magnetic lock
Output Relay:
Normally Closed (NC)

Gate Operator connects to Terminals-#25 & #26 instead of door.

Gate Operator Control

This shows wiring to **operate** the gate operator **ONLY**. To wire gate operator to **track and report data** to the access control system, see your **specific** gate operator data wiring in section 3.10.

OR

OR

OR

Important Note: Communication line (sections 3.2-3.4) and gate operator data wiring (section 3.10) is **NOT** shown.

Barrier Gate Operator
Output Relay:
Normally Open (NO)

Overhead Gate Operator
Output Relay:
Normally Open (NO)

Slide Gate Operator
Output Relay:
Normally Open (NO)

Swing Gate Operator
Output Relay:
Normally Open (NO)

3.6 Alarm Wiring Options at Access Point

Note: Relay contacts (21-22; 23-24) are rated at 1A 30V maximum and can be set for Normally Open (N.O.) or Normally Closed (N.C.) operation.
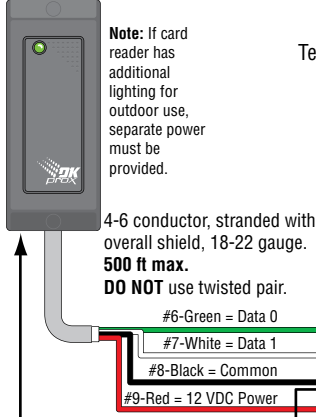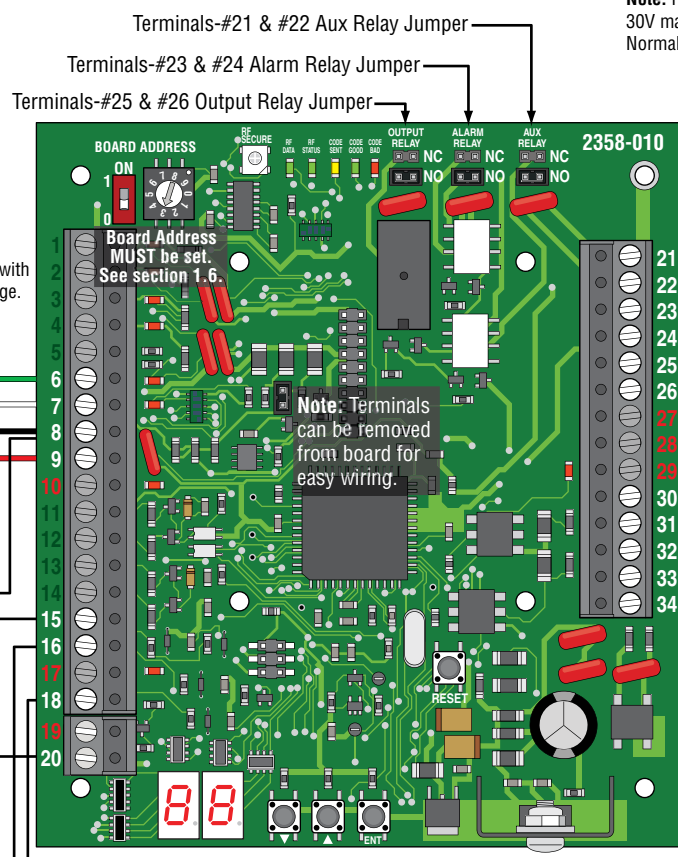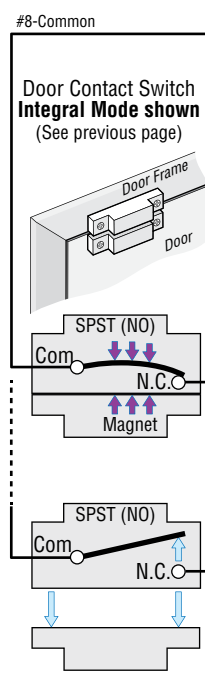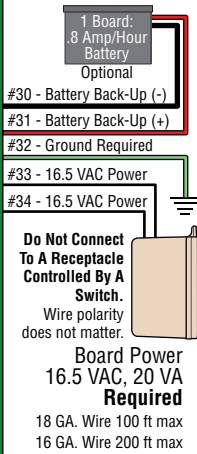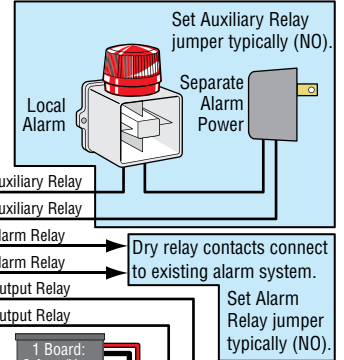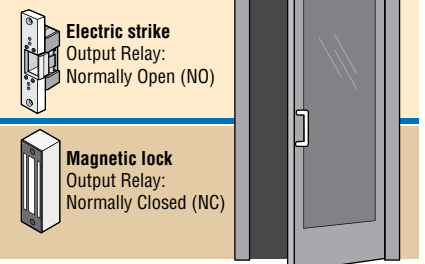
Terminals-#21 & #22 Aux Relay Jumper

Terminals-#23 & #24 Alarm Relay Jumper

Set Auxiliary Relay jumper typically (NO).

Local Alarm

Separate Alarm Power

BOARD ADDRESS
ON
1
0

RF SECURE
RF DATA
RF STATUS
CODE SENT
CODE GOOD
CODE BAD

OUTPUT RELAY — NC / NO
ALARM RELAY — NC / NO
AUX RELAY — NC / NO

2358-010

Board Address MUST be set. See section 1.6.

#21-Auxiliary Relay
#22-Auxiliary Relay
#23-Alarm Relay
#24-Alarm Relay

Dry relay contacts connect to existing alarm system.

Set Alarm Relay jumper typically (NO).

Note: Terminals can be removed from board for easy wiring.

#8-Common

#15-Door Ajar Input

#32 - Ground Required
#33 - 16.5 VAC Power
#34 - 16.5 VAC Power

Do Not Connect To A Receptacle Controlled By A Switch. Wire polarity does not matter.

RESET

Board Power
16.5 VAC, 20 VA
Required
18 GA. Wire 100 ft max
16 GA. Wire 200 ft max

#24-Alarm Relay

#23-Alarm Relay

Door Contact Switch Integral Mode
(Programming Step 16)

Door Frame
Door

#16-Reset Alarm Input

#8-Common

PRESS to RESET

External Alarm Reset

SPST (NO)
Com
N.C.
Magnet
Switch Closed:
Door Closed

SPST (NO)
Com
N.C.
Switch Open:
Door Open

Door Contact Switch Bypass Mode
(Programming Step 16)
MUST be connected to existing alarm system.

Door Frame
Door

SPST (NO)
Com
N.C.
Magnet
Switch Closed:
Door Closed

SPST (NO)
Com
N.C.
Switch Open:
Door Open

Note: Input for door contact switch is factory set at 0 for normally Open (Circuit Open - CO) but it can be set for normally Closed (Circuit Closed - CC) by programming step 8, set to 1 if required.

Important Note: Communication line (sections 3.2-3.4) is **NOT** shown.

3.7 All Available Devices at Access Point

Set **Output Relay** jumper on the tracker expansion board to N.O. (Normally Open) when using **fail-secure (electric strike)** locking device.
Set **Output Relay** jumper on the tracker expansion board to N.C. (Normally Closed) when using **fail-safe (magnetic lock)** locking device.
Set **Output Relay** jumper on the tracker expansion board to N.O. (Normally Open) when using a **gate operator**.

Card Reader
Wiegand Access Control Device

Note: If card reader has additional lighting for outdoor use, separate power must be provided.

4-6 conductor, stranded with overall shield, 18-22 gauge.
500 ft max.
DO NOT use twisted pair.

#6-Green = Data 0
#7-White = Data 1
#8-Black = Common
#9-Red = 12 VDC Power

Note: Input - #6, #7, #8, #9 will accept most wiegand 26, 30 and 31-bit access control devices.
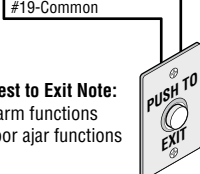
Two wiegand devices can be connected in parallel to these terminals if desired. The access control system will manage the two devices connected as if they were a single access control device.

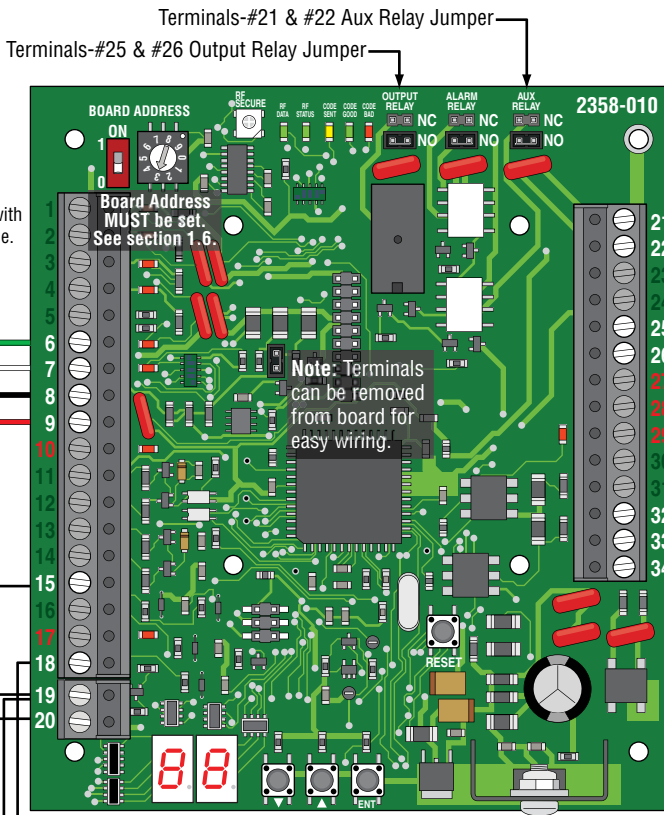#20-Card Reader LED or Beeper Control (Available on certain card readers)

#8-Common

Door Contact Switch
Integral Mode shown
(See previous page)

Door Frame
Door

SPST (NO)
Com
N.C.
Magnet

Switch Closed:
Door Closed

SPST (NO)
Com
N.C.

Switch Open:

Door Open

Important Note: Communication line (sections 3.2-3.4) and gate operator data wiring (section 3.10) is **NOT** shown.

Terminals-#21 & #22 Aux Relay Jumper
Terminals-#23 & #24 Alarm Relay Jumper
Terminals-#25 & #26 Output Relay Jumper

Note: Relay contacts (21-22; 23-24; 25-26) are rated at 1A 30V maximum and can be set for Normally Open (N.O.) or Normally Closed (N.C.) operation.

BOARD ADDRESS
ON
1
0

OUTPUT RELAY NC NO
ALARM RELAY NC NO
AUX RELAY NC NO

2358-010

Board Address MUST be set. See section 1.6.

RF SECURE / RF DATA / RF STATUS / CODE SENT / CODE GOOD / CODE BAD

Note: Terminals can be removed from board for easy wiring.

RESET

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
21 22 23 24 25 26 27 28 29 30 31 32 33 34

Set Auxiliary Relay jumper typically (NO).

Local Alarm
Separate Alarm Power

#21-Auxiliary Relay
#22-Auxiliary Relay
#23-Alarm Relay
#24-Alarm Relay
#25-Output Relay
#26-Output Relay

Dry relay contacts connect to existing alarm system.

Set Alarm Relay jumper typically (NO).

1 Board: .8 Amp/Hour Battery Optional
#30 - Battery Back-Up (-)
#31 - Battery Back-Up (+)
#32 - Ground Required
#33 - 16.5 VAC Power
#34 - 16.5 VAC Power

Do Not Connect To A Receptacle Controlled By A Switch. Wire polarity does not matter.
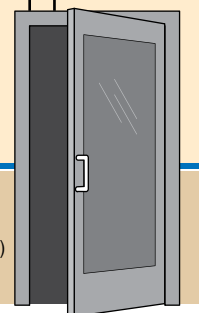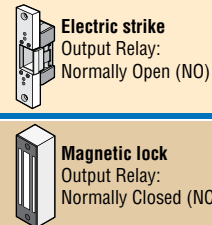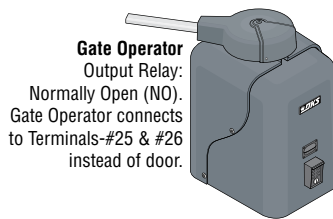Board Power 16.5 VAC, 20 VA **Required**
18 GA. Wire 100 ft max
16 GA. Wire 200 ft max

Power for electric strike or magnetic lock is **NOT provided** by the system. Use separate UL listed power supply.

#15-Door Ajar Input

#18-Request to Exit Input
#16-Reset Alarm Input

#8-Common

PRESS to RESET
External Alarm Reset

PUSH TO EXIT
Request to Exit

Door Control

Electric strike
Output Relay:
Normally Open (NO)

Magnetic lock
Output Relay:
Normally Closed (NC)

Gate Operator Control
This shows wiring to **operate** the gate operator **ONLY**. To wire gate operator to **track and report data** to the access control system, see your **specific** gate operator data wiring in section 3.10.

Gate Operator connects to Terminals-#25 & #26 instead of door.
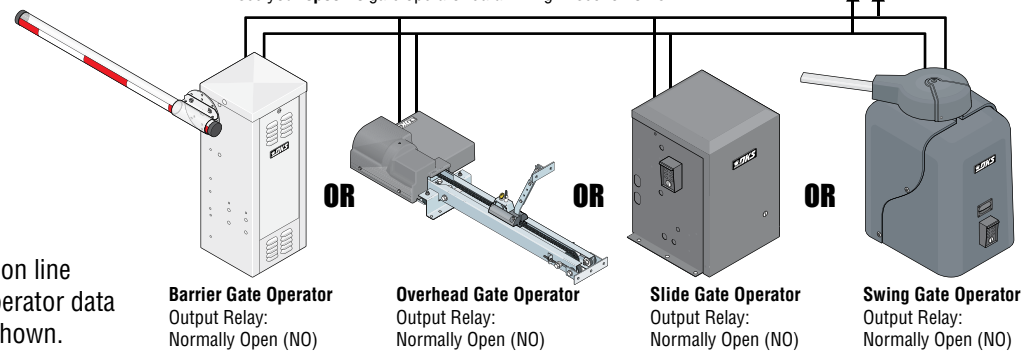
OR   OR   OR

Barrier Gate Operator
Output Relay:
Normally Open (NO)

Overhead Gate Operator
Output Relay:
Normally Open (NO)

Slide Gate Operator
Output Relay:
Normally Open (NO)

Swing Gate Operator
Output Relay:
Normally Open (NO)

One tracker expansion board can be programmed (step 12, set to 1) to control 2 access points. The board address number that has been physically set on the tracker expansion board and the **NEXT** sequential board address number will control the 2 access points. When the access device (Card Reader) gets activated from Access point 1 and access is granted or denied, the board will then automatically send out the same access device information to the next sequential board address number (Access Point 2) to grant or deny access to the second access point. The system relays will be identified in DKS Remote Account Manager software as the board address setting for Access Point 1 and board address setting plus 1 for Access point 2.

Gate Operator Control **OR** Door Control

Gate Operator
Output Relay: Normally Open (NO). Gate Operator connects to Terminals-#21 & #22 instead of door.

Electric strike
Output Relay: Normally Open (NO)

Magnetic lock
Output Relay: Normally Closed (NC)

DKS SOFTWARE INSTALLED
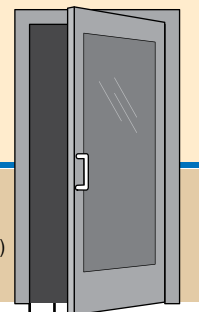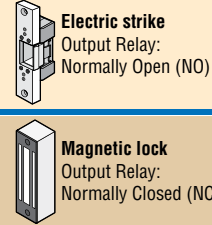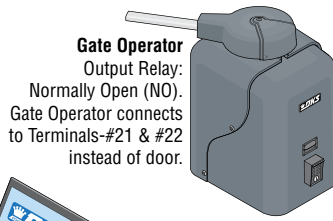
Access Point 2
Board Address Setting Plus 1
in DKS Remote Account Manager Software

Card Reader
Wiegand Access Control Device
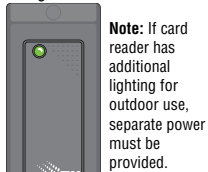
Note: If card reader has additional lighting for outdoor use, separate power must be provided.

4-6 conductor, stranded with overall shield, 18-22 gauge. **500 ft max. DO NOT** use twisted pair.

Terminals-#21 & #22 Aux Relay Jumper

Terminals-#25 & #26 Output Relay Jumper

#6-Green = Data 0
#7-White = Data 1
#8-Black = Common
#9-Red = 12 VDC Power

Note: Input - #6, #7, #8, #9 will accept most wiegand 26, 30 and 31-bit access control devices.

Two wiegand devices can be connected in parallel to these terminals if desired. The access control system will manage the two devices connected as if they were a single access control device.

BOARD ADDRESS
Board Address MUST be set. See section 1.6.

OUTPUT RELAY | ALARM RELAY | AUX RELAY 2358-010
NC NO | NC NO | NC NO

Note: Terminals can be removed from board for easy wiring.

RESET

#21-Aux Relay
#22-Aux Relay

Power for electric strike or magnetic lock is **NOT provided** by the system. Use separate UL listed power supply.

#25-Output Relay
#26-Output Relay

#32 - Ground Required
#33 - 16.5 VAC Power
#34 - 16.5 VAC Power

Do Not Connect To A Receptacle Controlled By A Switch. Wire polarity does not matter.

Board Power
16.5 VAC, 20 VA **Required**
18 GA. Wire 100 ft max
16 GA. Wire 200 ft max

Power for electric strike or magnetic lock is **NOT provided** by the system. Use separate UL listed power supply.

#20-Card Reader LED or Beeper Control (Available on certain card readers)

#15-Request to Exit Input for second Door
#19-Common

#18-Request to Exit Input
#19-Common

Request to Exit Note:
No alarm functions
No door ajar functions

PUSH TO EXIT

Request to Exit
Access Point 2

PUSH TO EXIT

Request to Exit
Access Point 1

Gate Operator Control **OR** Door Control

Gate Operator
Output Relay: Normally Open (NO). Gate Operator connects to Terminals-#25 & #26 instead of door.

Electric strike
Output Relay: Normally Open (NO)

Magnetic lock
Output Relay: Normally Closed (NC)

Important Note: Communication line (sections 3.2-3.4) and gate operator data wiring (section 3.10) is **NOT** shown.

Access Point 1
Board Address Setting in DKS Remote Account Manager Software

3.9 Quad Box Wiring

Important Note: 115 VAC convience outlets power wiring for quad box (section 2.3) is **NOT** shown.
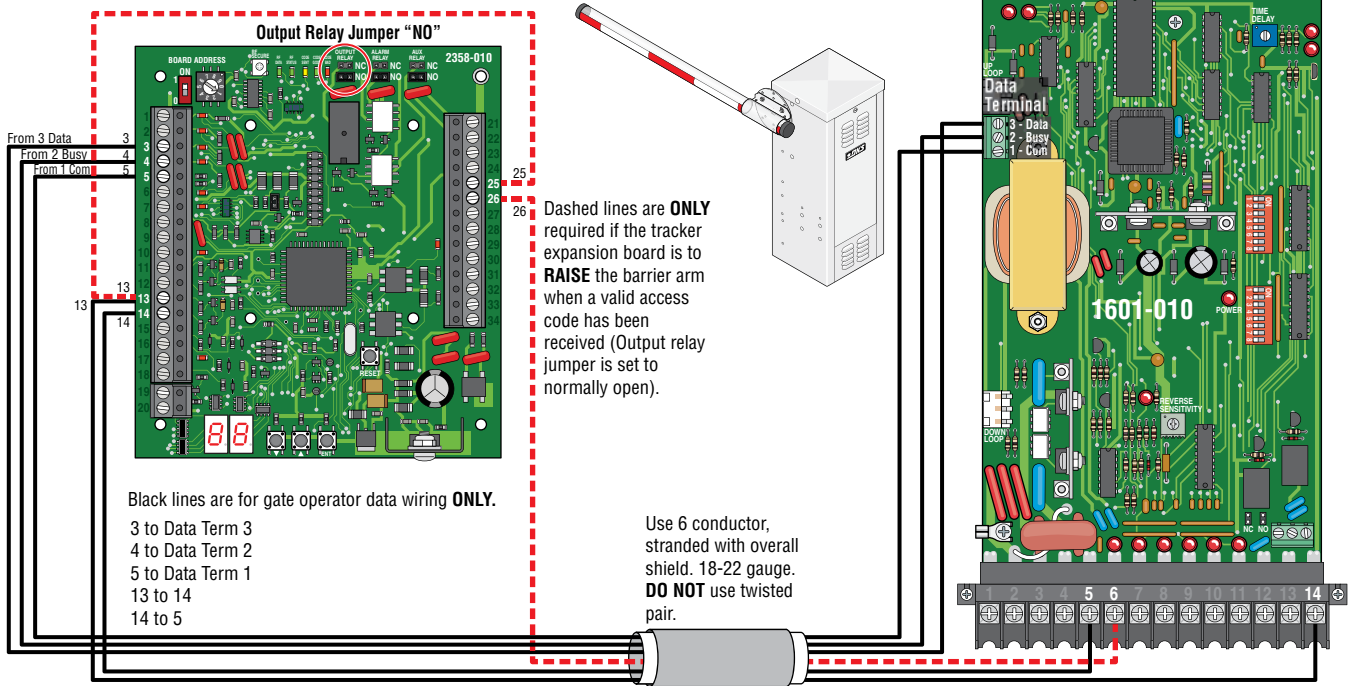
Sample Included Board Wiring
Each of the boards are wired to their own **Access Point Board Terminal** and all are wired to the **Communication Lines and Power Terminal.**
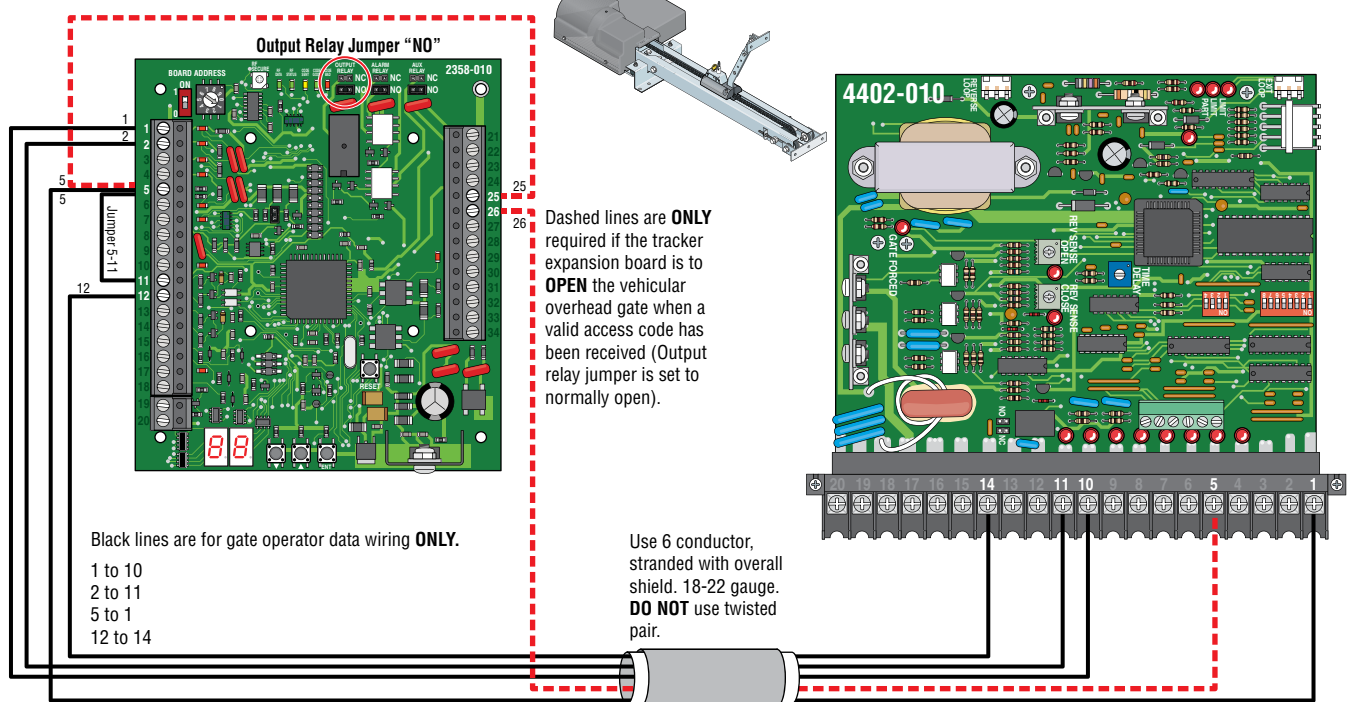Included board **MUST** be wired to LED on enclosure door to meet UL 294 compliance.

LED on Enclosure Door

Communication Lines and Power Terminal

#10-Red Busy DO NOT wire to access control system
#27-Black Communication Com
#28-White Communication Data 1
#29-Green Communication Data 0
#17-Blue Relay Input NO
#19-Brown Relay Input Com
#33-16.5 VAC
#34-16.5 VAC

Do Not Connect To A Receptacle Controlled By A Switch.
Wire polarity does not matter.

4 Boards Power
16.5 VAC, **40 VA Required**
18 GA. Wire 100 ft max
16 GA. Wire 200 ft max

To DoorKing Access Control System

Access Point Board Terminal

#6-Green Data 0
#7-White Data 1
#8-Black Common
#9-Red 12 VDC
#15-Door Ajar Input
#18-Request to Exit
#26-Output Relay
#25-Output Relay

From Card Reader
From Door Lock

Access Point Board Terminal

#6-Green Data 0
#7-White Data 1
#8-Black Common
#9-Red 12 VDC
#15-Door Ajar Input
#18-Request to Exit
#26-Output Relay
#25-Output Relay

From Card Reader
From Door Lock

Red
Black
White
Green

#6-Green
#7-White
#8-Black
#9-Red

Card Reader

#8-Common
#15-Door Ajar Input

Magnetic Contact Switch Door Ajar Input

Access Point Board Terminal

#25-Output Relay
#26-Output Relay
#18-Request to Exit
#8-Common

PUSH TO EXIT

Request to Exit Button

Important Note: Gate operator data wiring (section 3.10) is **NOT** shown.

Access Point Board Terminal

#6-Green Data 0
#7-White Data 1
#8-Black Common
#9-Red 12 VDC
#15-Door Ajar Input
#18-Request to Exit
#26-Output Relay
#25-Output Relay

From Card Reader
From Door Lock

Door Lock

Electric strike
Output Relay:
Normally Open (NO)

Magnetic lock
Output Relay:
Normally Closed (NC)

Each tracker expansion board can report data about **gate operators SPECIFIC activity** to the access control system. Two (2) DoorKing gate operators; a slide, swing or overhead gate operator and a barrier gate operator can be "Tracked". See section 5.3 for a list of the events that can be reported (Tracked). The gate operators can also be controlled (Opened and closed) if desired by wiring the red dashed wires along with the black wires in the diagrams. Choose your specific gate operator model from the 6 diagrams shown on the next 3 pages. Only DoorKing gate operators shown in the 6 diagrams will function. DO NOT wire the tracker expansion board to a third party gate operator.

1601, 1602, 1603 Barrier Gate Operators

Dashed lines are **ONLY** required if the tracker expansion board is to **RAISE** the barrier arm when a valid access code has been received (Output relay jumper is set to normally open).

Black lines are for gate operator data wiring **ONLY**.

3 to Data Term 3
4 to Data Term 2
5 to Data Term 1
13 to 14
14 to 5

Use 6 conductor, stranded with overall shield. 18-22 gauge. **DO NOT** use twisted pair.

From 3 Data
From 2 Busy
From 1 Com

1150 Overhead Gate Operator

Dashed lines are **ONLY** required if the tracker expansion board is to **OPEN** the vehicular overhead gate when a valid access code has been received (Output relay jumper is set to normally open).

Black lines are for gate operator data wiring **ONLY**.

1 to 10
2 to 11
5 to 1
12 to 14

Use 6 conductor, stranded with overall shield. 18-22 gauge. **DO NOT** use twisted pair.

6050, 6100, 6300 Swing Gate Operators

Output Relay Jumper "NO"

Dashed lines are **ONLY** required if the tracker expansion board is to **OPEN** the vehicular gate when a valid access code has been received (Output relay jumper is set to normally open).

Black lines are for gate operator data wiring **ONLY.**

1 to Aux 4
2 to Aux 5
5 to Aux 6
11 to 20
12 to 7

Use 6 conductor, stranded with overall shield. 18-22 gauge. **DO NOT** use twisted pair.

4502-010

Auxiliary Terminal

9100, 9150 Slide Gate Operators

Output Relay Jumper "NO"

Dashed lines are **ONLY** required if the tracker expansion board is to **OPEN** the vehicular gate when a valid access code has been received (Output relay jumper is set to normally open).

Black lines are for gate operator data wiring **ONLY.**

1 to 14
2 to 13
5 to 18
12 to 3

Use 6 conductor, stranded with overall shield. 18-22 gauge. **DO NOT** use twisted pair.

4602-010

9200 Series, 9500 Slide Gate Operators

Output Relay Jumper "NO"

2358-010

4404-010

Dashed lines are **ONLY** required if the tracker expansion board is to **OPEN** the vehicular gate when a valid access code has been received (Output relay jumper is set to normally open).

Black lines are for gate operator data wiring **ONLY.**

1 to 9
2 to 10
5 to 13
12 to 3

Use 6 conductor, stranded with overall shield. 18-22 gauge. **DO NOT** use twisted pair.
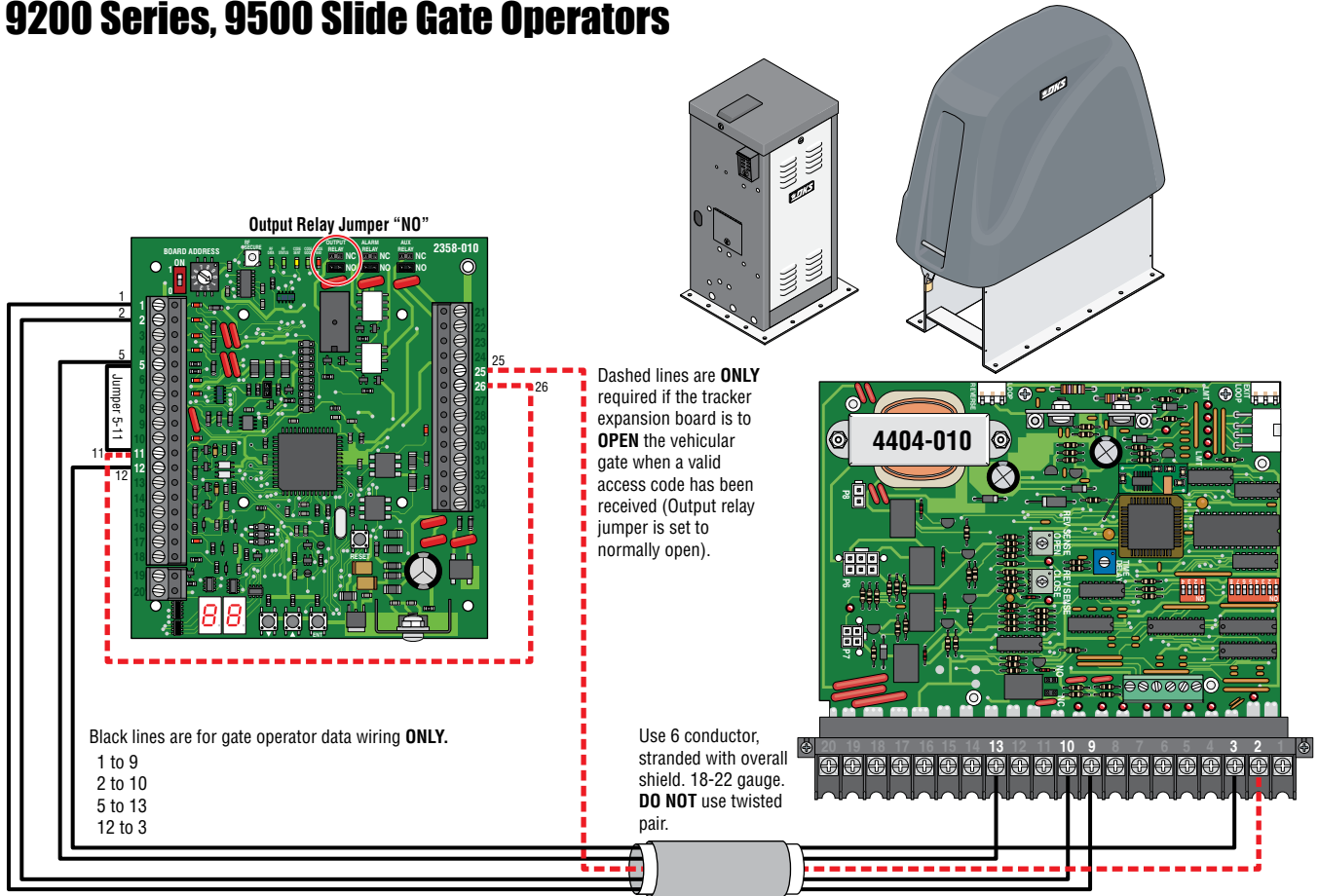
6500 Series Swing Gate Operators, 9000 Slide Gate Operators

Output Relay Jumper "NO"

2358-010

6500

9000

4405-010

Dashed lines are **ONLY** required if the tracker expansion board is to **OPEN** the vehicular gate when a valid access code has been received (Output relay jumper is set to normally open).

Black lines are for gate operator data wiring **ONLY.**

1 to 7
2 to 8
5 to 12
12 to 3

Use 6 conductor, stranded with overall shield. 18-22 gauge. **DO NOT** use twisted pair.

AC Powered 6524 Swing / 9024 Slide Gate Operators ONLY

Not for use with the SOLAR Powered 6524 or 9024.

6524   9024

AC Powered ONLY

Dashed lines are **ONLY** required if the tracker expansion board is to **OPEN** the vehicular gate when a valid access code has been received (Output relay jumper is set to normally open).

Output Relay Jumper "NO"

Black lines are for gate operator data wiring **ONLY.**

1 to 20
2 to 19
5 to 11
12 to 3

Use 6 conductor, stranded with overall shield. 18-22 gauge. **DO NOT** use twisted pair.
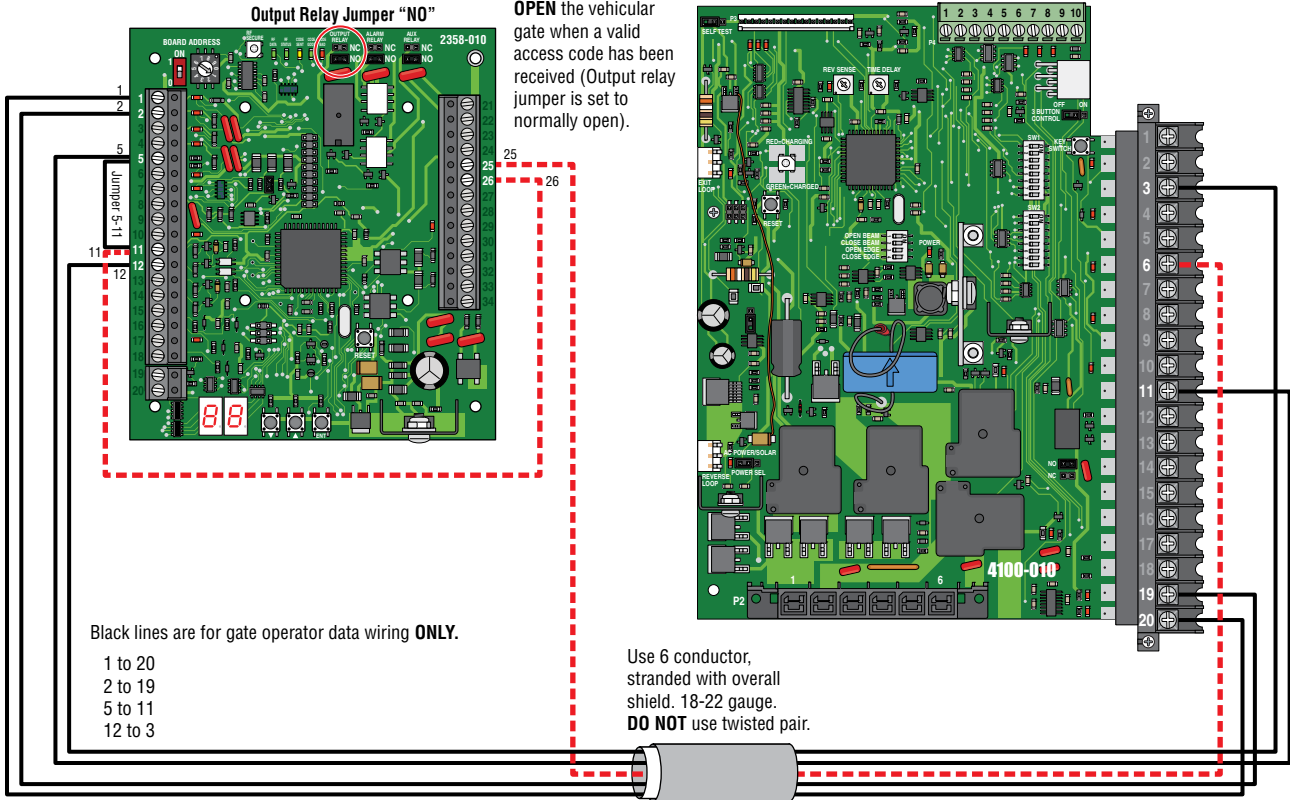
Before beginning any programming, the tracker expansion board MUST be completely wired and the board MUST have power.

4.1 LED and Button Descriptions

RF SECURE -
Not used when board is HARDwired. Used with wireles communication **ONLY** (see wireless tracker expansion board RF kit for more information).

RF DATA
RF STATUS
CODE SENT
CODE GOOD
CODE BAD

These 5 LEDs are **Not** used when board is HARDwired. Used with wireless communication **ONLY** (see wireless tracker expansion board RF kit for more information).

Gate Operator 1 Data Input -
Blinks red when operator data is sent.

Gate Operator 1 Data Output -
Blinks red when operator data is received.

Gate Operator 2 Data Input -
Blinks red when operator data is sent.

Gate Operator 2 Data Output -
Blinks red when operator data is received.

Wiegand Access Control Device
Wiegand Data 0 - Blinks red when wiegand data is sent.
Wiegand Data 1 - Blinks red when wiegand data is sent.

Communication "Busy" Line -
Turns ON when relay/wiegand data is sent/received acrossed the Communication Line. LED **DOES NOT** function when using wireless.

Communication Relay Input -
Blinks red when open command is received. LED **DOES NOT** function when using wireless.

Wiegand Output -
Blinks red when wiegand data is sent.
LED **DOES NOT** function when using wireless.

RESET Button
Resets board after adjustments have been made.

LED Display
Press ▼▲ buttons or **ENT** button to activate LED display.

Programming Buttons

IMPORTANT Display Decimal Point Note

When decimal point is displayed: Indicates you are **SELECTING** a program step.

When decimal point is **NOT** displayed: Indicates you are **IN** a program step.

4.2 Programming

Basic Programming Sequence on EACH Board

Follow these basic steps to perform desired programming, See programming options table for **PROGRAM STEPS** on next 2 pages. **EACH** tracker expansion board in the system **MUST** be physically programmed.

1. Press ▼▲ arrow buttons or **ENT** button to **ACTIVATE** LED display.

2. Press ▼▲ arrow buttons again to **SELECT** desired **PROGRAM STEP**.

3. Press **ENT** button to **ENTER** desired **PROGRAM STEP**. (LED display number will blink after **ENT** button has been pressed).

4. Press ▼▲ arrow buttons to select **SELECTION NUMBER** for desired program step.

5. Press **ENT** button to program **SELECTION NUMBER** for desired program step. (Function has now been programmed into board).

6. Press **ENT** button again to exit programming **OR** after 10 seconds, board will automatically exit programming.

Note: Repeat these steps for all other desired programming functions for **THIS** tracker expansion board.
Each tracker expansion board will have to be **INDIVIDUALLY** programmed with desired functions.

Programming Options on EACH Board

Select desired program steps and **PHYSICALLY** program **EACH** tracker expansion board being used with the access control system.
"Basic programming sequence on EACH board" on previous page explains how to program the functions into the board.

Program Step	Description	Options	Selection Number	Function	Factory Default
1	Door Strike Timer	00 - 99		**Sets Strike Time for output relay (term 25 & 26)**	01:
			00	0.25 second strike time	1 second
			01 - 99	Strike time in 1-second increments	
2	Free Exit Timer, Strike Time	00 - 99		**Set Strike Time for RX (Request to Exit) of output relay (input at term 18)**	01:
			00	0.25 second Egress Strike time	1 second
			01 - 99	Egress Strike time in 1-second increments	
3	Door Ajar Timer	01 - 99		**Timer starts when valid access has been granted.**	12:
			00	1 second Door Ajar Timer	60 secs
			01 - 99	Timer set in 5-second increments: 01 = 5 seconds, 10 = 50 seconds	
4	Aux Relay Timer	00 - 99		**Timer setting for Aux Relay activation in 5-second increments**	12:
			00	1 second Door Ajar Timer	60 secs
			01 - 99	Timer set in 5-second increments: 01 = 5 seconds, 10 = 50 seconds	
5	Free Exit Timer, Aux Relay	00 - 99		**Set Strike Time for RX of Aux relay (ONLY available if Dual Door Mode step 12 is ON)**	01:
			00	0.25 second Egress Strike time	1 second
			01 - 99	Egress Strike time in 1-second increments	
6	Free Exit, No Strike	0 - 1		**Set RX (Request to Exit) function. Activate Output Relay or do not Activate Output Relay**	01:
			0	Do Not Activate Output Relay or Reader Beeper/LED when RX input is received	Activate
			1	Activate Output Relay and Reader Beeper/LED for Free Exit Strike Time when RX received	
7	Not Used				
8	Door Switch Logic	0 or 1		**Sets type of Door Switch contacts**	0:
			0	N.O. contact from door switch with Door Closed (Circuit Open - CO)	N.O.
			1	N.C. contact from door switch with Door Closed (Circuit Close - CC)	
9	Auto Relock	0 or 1		**Turns on Auto Relock function (not available if Dual Door Mode, step 12 is ON)**	0:
			0	Output Relay is activated for Strike Time	Disabled
			1	Door Contact Switch required. If door returns to closed position during Strike Time door will "relock" after 1 second, even if strike time has not expired.	
10	Beeper / LED Hold Open	0 or 1		**Sets how BEEPER or LED will function during Hold Open**	0:
			0	When Hold Open occurs, Beeper or LED is active only during Strike Timer	
			1	When Hold Open occurs, Beeper or LED will remain active during Hold Open	
11	Hold Open or Hold Egress functions	0 or 1		**Sets how Aux & Alarm Relay responds during Hold Open or Hold Egress situation**	0: No Relay Function
			0	No Aux Relay functions. Alarm will be in "Reset". If Alarm Relay is set for "integral" mode, Alarm relay will not activate. If Alarm Relay set for "Bypass" mode, Alarm Relay will activate for Hold Open period or Extended Egress Hold.	
			1	Aux Relay will function for all settings. If Alarm Relay is set for "integral" mode, Alarm relay will not activate. If Alarm Relay set for "Bypass" mode, Alarm Relay will activate for Hold Open period or Extended Egress Hold.	
12	Dual Door Mode	0 or 1		**Sets Tracker to function as 2 Access Points (2 tracker addresses)**	0: Disabled
			0	Disabled, Tracker functions as single access point	
			1	Dual Mode: Tracker functions as set board address and next sequential address Card Read will be sent to controller as set board address, access is granted or denied Card then sent as set address +1, access granted or denied. Aux Relay becomes 2nd output relay. All other Aux Relay functions disabled. Door Contact switch becomes RX for 2nd address.	
13	Not Used				
14	Not Used				
15	Aux Relay Functions	0 - 12		**Sets function for Aux Relay**	0: Disabled
			0	Aux Relay Disabled	
			1	No Door Ajar Timer: Requires Door Contact Switch. Aux Relay activates when Door Not Closed.	
			2	No Door Ajar Timer, Pulse: Requires Door Contact Switch. Aux Relay "pulses" when Door Not Closed.	
			3	Door Ajar Timer: Requires Door Contact Switch. When door opens, start Door Ajar Timer. When timer expires Aux Relay activates for Aux Relay timer or until door closes, whichever occurs first.	
			4	Door Ajar Timer, Pulse: Requires Door Contact Switch. When door opens, start Door Ajar Timer. When timer expires Aux Relay Pulses for Aux Relay timer or until door closes, whichever occurs first.	
			5	Door Ajar, Pulse warning the ON: Requires Door Contact Switch. When door opens, Pulse Aux Relay and start Door Ajar Timer. When timer expires Aux Relay ON for Aux Relay timer or until door closes, whichever occurs first.	
			6	Door opens for any reason, Start Door Ajar timer and pulse Aux Relay. When Door Ajar timer expires, start Aux Timer and continue Pulsing Aux Relay. When Door Closes or both timers expire, turn off Aux Relay.	

15	**Aux Relay Functions**	**0 - 12**	7	Aux Relay as 2nd Alarm Relay. Aux Relay will mirror Alarm Relay functions.	**0: Disabled**
			8	Aux Relay as 2nd Alarm Relay, PULSE. Aux relay will Pulse during any Alarm Relay activation.	
			9	Good Card: Aux Relay will activate for Aux Relay timer for any Access Granted Card	
			10	Any Card: Aux Relay will activate for Aux Relay Timer when any card has been presented.	
			11	Bad Card: Aux Relay will activate for Aux Relay timer when a card has been denied	
			12	Warn before Hold Open or Release of Hold Open: Aux relay will activate for Aux Relay timer when scheduled Hold Open begins or ends. Output Relay will be delayed until Aux Timer expires. Do not set Aux Timer above 60 seconds in this mode.	
16	**Alarm Relay Functions** Door Operation Note: **PROPER Condition:** The access control system **OR** request to exit device **HAS** activated the **OUTPUT RELAY** on the tracker expansion board and the door contact switch is **CLOSED** (Door is OPEN). This indicates that the door has been **PROPERLY OPENED**. **FORCED Condition:** The access control system **OR** request to exit device has **NOT** activated the **OUTPUT RELAY** on the tracker expansion board and the door contact switch is **CLOSED** (Door is OPEN). This indicates that the door has been **FORCED OPENED**.	**0 - 4**		**Sets function for Alarm Relay**	**0: Disabled**
			0	Alarm Relay Disabled	
			1	**Bypass Mode:** Alarm Relay provides "Bypass" to Alarm Door Switch. With proper door input (access or egress) activate Alarm Relay, start Strike timer and Door Ajar timer. When Door Ajar timer expires, deactivate Alarm Relay. If second Door Contact Switch is provided, generate transaction for Door Ajar and Door Closed following Door Forced condition. Also generate transaction for Door Forced condition.	
			2	**Integral Mode, Door Ajar Timer:** Door Contact Switch connected to Tracker, Alarm Relay provides connection directly to Alarm System. When door is opened for any reason, start Door Ajar timer. When Door Ajar timer expires and Door is still OPEN, activate Alarm Relay. Reset when door closes. Send Door Ajar and Door Close transactions.	
			3	**Integral Mode, Proper and Forced condition:** Door Contact Switch connected to Tracker, Alarm Relay provides connection directly to Alarm System. With proper door input (access or egress) start Strike timer and Door Ajar timer. When Door Ajar timer expires and Door is still OPEN, activate Alarm Relay. Reset when door closes. If door is opened without proper condition, activate alarm relay. When door closes deactivate Alarm Relay. Send Door Ajar, Door Close and Door Forced transactions.	
			4	**Gate Alarm Function:** Alarm Relay will activate for 1 second when tracker board receives a "Gate Forced" or "Gate Obstructed" transaction from the operator control board.	
17 18 19 20 21 22 23 24 25 26	**See Wireless Programming**				

4.3 Programming Step Descriptions

Program Step 1: Door Strike Timer
Sets the amount of time the door lock will remain unlock after the Output Relay has been activated **(Terminals 25 & 26)**.

Program Step 2: Free Exit Timer, Strike Time
Sets the amount of time the door lock will remain unlock after the Request to Exit has been activated **(Input at terminal 18)**.

Program Step 3: Door Ajar Timer
Sets the amount of time the door contact switch **(Input at terminal 15)** can remain open until terminals 21 & 22 (Aux relay) and 23 & 24 (Alarm relay) will be activated. Timer will start after a valid access and egress has been granted.

Program Step 4: Aux Relay Timer
Sets the amount of time the aux relay will activate terminals 21 & 22. Timer will start after a valid access and egress has been granted.

Program Step 5: Free Exit Timer, Aux Relay
Sets the amount of time the aux relay will activate terminals 21 & 22 upon Request to Exit. This feature can **ONLY** be used when using step 12 (Dual Door Mode).

Program Step 6: Not Used

Program Step 7: Not Used

Program Step 8: Door Contact Switch Logic
Sets how the door contact switch will operate. Normally Open (NO)/Circuit Open (CO) is typically used (Factory default setting of 0). Normally Closed (NC)/Circuit Closed (CC) can be used if required (set to 1).

Program Step 9: Auto Relock
When turned on (set to 1), will relock the door 1 second after door returns to closed position, even if the strike timer has not timed out. The alarm relay and aux relay will NOT reset after door returns to closed position. A door contact switch is required for this feature. This feature cannot be used when using step 12 (Dual Mode).

Program Step 10: Beeper / LED Hold Open
Sets how the card reader's beeper or LED will respond when the door is held open longer than the programmed strike time. When turned on (set to 1), will activate card reader's beeper or LED on after strike timer has timed out.

Program Step 11: Hold Open or Hold Egress Functions
When set to 0, Aux relay will **NOT** function. Alarm relay will "**Reset**" and if it is set for **Integral mode** (step 16), it will **NOT** activate.
If the Alarm relay is set for **Bypass mode** (step 16), it will activate after the Hold Open (Entry) or Hold Egress (Exit) timer has timed out.
When set to 1, Aux relay will function normally. Alarm relay set for **Integral mode** (step 16) will **NOT** activate.
If the Alarm relay is set for **Bypass mode** (step 16), it will activate after the Hold Open (Entry) or Hold Egress (Exit) timer has timed out.

Program Step 12: Dual Door Mode
When turned on (set to 1), one tracker expansion board will control 2 access points using the board address number that has been physically set on the tracker expansion board and the next sequential board address number after that. When the access device gets activated from the physically set tracker expansion board address number and access is granted or denied, the board will then automatically send out the same access device information to the next sequential board address number to grant or deny access to the second access point. See section 3.8 for wiring.

Program Step 13: Not Used

Program Step 14: Not Used

Program Step 15: Aux Relay Functions

Sets how the Aux relay will function **(Terminals 21 & 22)**.

Set to 0, Aux relay is disabled.

Set to 1, No door ajar timer has been set. Requires a door contact switch. Aux relay will activate when door is not closed.

Set to 2, No door ajar timer has been set. Requires a door contact switch. Aux relay will pulse on and off when door is not closed.

Set to 3, Door ajar timer has been set. Requires a door contact switch. When door opens, door ajar timer starts. After timer expires, Aux relay will activate for the Aux relay timer setting (step 4) or until door closes, which ever occurs first.

Set to 4, Door ajar timer has been set. Requires a door contact switch. When door opens, door ajar timer starts. After timer expires, Aux relay pulses on and off for the Aux relay timer setting (step 4) or until door closes, which ever occurs first.

Set to 5, Door Ajar timer Pulse Warning. Requires a door contact switch. When door opens, door ajar timer starts and Aux relay pulses on and off. After door ajar timer times out, Aux relay activates for the Aux relay timer setting (step 4) or until door closes, which ever occurs first.

Set to 6, Door Ajar timer Pulse continuously. Requires a door contact switch. When door opens, door ajar timer starts and Aux relay pulses on and off. After door ajar timer times out, Aux relay continues to pulse on and off for the Aux relay timer setting (step 4) or until door closes, which ever occurs first.

Set to 7, Aux relay is used as a second Alarm relay and will activate whenever the Alarm relay is activated.

Set to 8, Aux relay is used as a second Alarm relay and will pulse on and off whenever the Alarm relay is activated.

Set to 9, Good Card. Aux relay will activate for the Aux relay timer setting (step 4) when access is granted.

Set to 10, Bad Card. Aux relay will activate for the Aux relay timer setting (step 4) when access is denied.

Set to 11, Any Card. Aux relay will activate for the Aux relay timer setting (step 4) when any card is presented.

Set to 12, Warn before starting Hold Open and ending of Hold Open. Aux relay will activate for the Aux relay timer set duration (step 4) before a scheduled hold open starts and then again when a hold open schedule is about to end. Step 4 **MUST NOT** be set for more than 60 seconds.

Program Step 16: Alarm Relay Functions

Sets how the Alarm relay will function **(Terminals 23 & 24)**. **Note:** Not all steps require a door contact switch wired to function.

Door Operation Note:

PROPER Condition: The access control system **OR** request to exit device **HAS** activated the **Output Relay** on the tracker expansion board and the door contact switch is opened (Door is OPEN). This indicates that the door has been **PROPERLY opened**.

FORCED Condition: The access control system **OR** request to exit device has **NOT** activated the **Output Relay** on the tracker expansion board and the door contact switch is opened (Door is OPEN). This indicates that the door has been **FORCED opened**.

Set to 0, Alarm relay is disabled.

Set to 1, Bypass Mode. Alarm Relay provides "Bypass" to Alarm the Door Contact Switch to the existing alarm system but it MUST be wired as shown below. When door is opened under PROPER condition, Alarm relay will activate. Strike timer starts and Door ajar timer starts. When Door ajar timer times out, alarm relay will deactivate.

If a second Door Contact Switch is provided and wired as shown below (Integral), tracker expansion board generates event transactions for Door Ajar and Door Closed following Door Forced condition. It will also generate a event transaction for Door Forced condition.

Alarm relay functions program step 16 continued on next page.
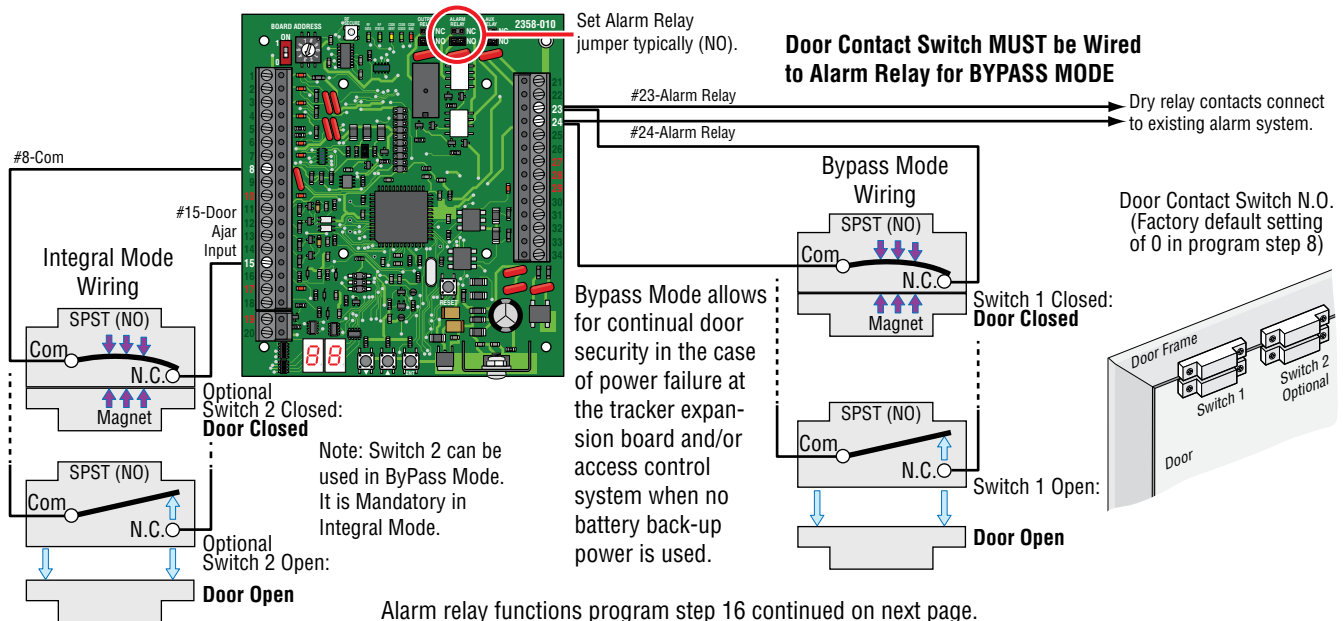
4.3 Programming Step Descriptions Continued

Program Step 16: Alarm Relay Functions Continued

Set to 2, Integral Mode Door Ajar Timer. Door contact switch **(Input at terminal 15)** connected to tracker expansion board (see previous page for wiring). When door is opened, Door Ajar timer starts (step 3). If door is still open when door ajar timer times out, alarm relay will activate. Alarm relay will reset when door closes. Door Ajar and Door Close event transactions will be sent from tracker expansion board to access control system.

Set to 3, Integral Mode Proper and Forced Condition. Door contact switch **(Input at terminal 15)** connected to tracker expansion board. Alarm Relay provides connection directly to Alarm System. If door is still open when door ajar timer times out, alarm relay will activate. Alarm relay will reset when door closes.

If door is opened without Proper condition (see previous page), alarm relay will activate. Alarm Relay deactivates when door closes. Tracker expansion board sends Door Ajar, Door Close and Door Forced event transactions to access control system.

Set to 4, Gate Alarm Function. Alarm Relay will activate for 1 second when tracker expansion board receives a "Gate Forced" or "Gate Obstructed" transaction from the gate operator control board (DoorKing gate operators ONLY).

Program Step 17: Not Used

Program Step 18: Not Used

Program Step 19: Reset to Factory Defaults

Sets all parameters to Factory Defaults (See table in section 4.2 for factory default settings).

Program Step 20: Display RF Range Setting (Wireless ONLY)

Sets the maximum amount of allowable signal strength loss between the wireless tracker expansion board and the wireless baseboard (ONLY works on WIRELESS tracker expansion board).

Program Step 21: Display RF Signal Loss (Wireless ONLY)

Displays current signal loss between the wireless tracker expansion board and the wireless baseboard (ONLY works on WIRELESS tracker expansion board).

Program Step 22: Card Code Forwarding, Tracker as Repeater (Wireless ONLY)

ONLY USE THIS FEATURE AS DIRECTED BY DOORKING TECH SUPPORT. Sets wireless tracker expansion board to operate as a wireless repeater and forward card codes (access codes) to the next board in the wireless system when the wireless signal range needs to be extended (ONLY works on WIRELESS tracker expansion board).

SECTION 5 - TROUBLESHOOTING

Before beginning any troubleshooting, check all wiring and look for any loose connections. Double check your wiring! The tracker expansion board in some applications may have over 20 wires connected directly to the board terminal strips. Be sure that you have a good VOM (Volt-Ohm-Meter) to assist you when checking voltages and continuity.

Check the programming to be sure that the tracker expansion board is setup to operate as desired. If more that one tracker expansion board is connected in the system, be sure the board addresses are set correctly.

Be sure that the tracker board is powered (16 VAC, 20 VA). The LEDs should be ON when power is applied to the tracker expansion board. Battery back-up may be connected to the tracker expansion board as shown in section 3.7.

5.1 Wiegand Device Data

The wiegand device (card reader, RF receiver, digital, etc.) must output data in the **26, 30, 31-bit** wiegand format. **The tracker expansion board is not capable of receiving any other wiegand format.**

The wiegand device must be connected to terminals #6-#7-#8-#9 as described in section 3.3 of this manual.

Two wiegand devices may be connected in parallel to the wiegand input on the tracker expansion board. Be aware that both devices will appear to the access control system and the Remote Account Manager software as the **same device**.

Power for the wiegand devices is provided on terminals #8 (common) and #9 (+10 to +12 VDC). To check this power:
  1. Set your VOM to the 50-volt DC range.
  2. Connect the positive lead (red) to #9 and the negative lead (black) to #8. The meter should indicate +10 to +12 volts DC.

The tracker expansion board outputs data on terminals #27-#28-#29. When the tracker expansion board is sending data to the access control system on these lines, the LED near these terminals will light. The voltage to operate these terminals comes from the access control system. Normal voltage on these terminals is +4.5 to +5 volts DC. To check this voltage:
  1. Set your VOM to the 50-volt DC range.
  2. Connect the negative (black) lead to #27 and then check #28 and #29 with the positive (red) lead. The meter should indicate +4.5 to +5 volts DC.

The data from the wiegand devices is inputed to the tracker expansion board on terminals #6 and #7. The normal voltage for these terminals are +4.5 to + 5 volts DC. This can be checked by connecting the negative (black) lead of your meter to #8 and then checking for voltage with the positive (red) lead on terminals #6 and #7.

When a wiegand device sends data to the tracker expansion board on terminals #6 and #7, the LED's associated with these terminals will flash. **These flashes are very fast and may be difficult to see.** If a 26, 30, 31-bit wiegand input is received, the tracker expansion board makes the lines on terminals #2 and #4 busy to prevent the gate operators from sending any transactions. It then checks for a busy signal on terminal #10. If this pin is not busy, the tracker expansion board will make this pin busy itself and then wiegand out the data to the access control system (If terminal #10 is busy, the tracker expansion board simply waits for this terminal to go un-busy and then sends the data). After the tracker expansion board sends the data, it will wait for a reply from the access control system (The wiegand output LED will flash when the data is sent to the access control system). Once the data is received by the access control system, the access control system will make the decision to grant or deny access. If the decision is to **deny access**, the tracker expansion board will release the busy signal on terminal #10, and will not activate it's output relay. If the decision is to **grant access**, the access control system will activate its relay, which causes the tracker expansion board to activate its output relay, and then releases the busy signal on terminal #10 allowing other tracker expansion boards to communicate with the access control system.

The above operating sequence takes place in less than one second. In applications where the system is operating at its maximum (48 tracker expansion boards), and in the unlikely event that all devices are activated at precisely the same moment in time, there could be a delay of a few seconds for the last tracker expansion board to activate its output relay if the access control system decides to grant access to the person using the device connected to this tracker expansion board.

5.2 Gate Operator Data

Be sure that the gate operator has Gate Tracker capability. This can be determined by checking the revision letter of the control board in the operator. Gate operator control boards with Gate Tracker capability are listed below.

- 4402-010 Rev A or higher. 1150 overhead gate operator
- 4100-010 Rev AA or higher. 6524 swing and 9024 slide gate operators (AC Powered ONLY)
- 4404-010 Rev A or higher 9200, 9500 slide gate operators
- 4405-010 Rev A or higher. 6500 swing and 9000 slide gate operators
- 4502-010 Rev A or higher. 6050, 6100, 6300 swing gate operators
- 4602-010 Rev A or higher. 9100, 9150 slide gate operators
- 1601-010 Rev Q or higher. 1601, 1602, 1603 barrier gate operators

If the control board that you are working with has a lower revision letter than those listed above, the control board does not have the capability to send operator data to the tracker expansion board.

The Gate Tracker outputs from the 4402, 4404, 4405, 4502 and 4602 control boards must be wired to tracker expansion board terminal #1, #2 #5. Gate Tracker outputs from the 1601 control board must be wired to tracker expansion board terminals #3, #4, #5.

Normal voltage at terminals #1, #2, #3, #4 is -8 to -12 VDC. To check this:

1. Set your VOM to the 50-volt DC range.

2. Connect the positive lead (red) to terminal #5, then touch the negative lead (black) to terminals #1-#2-#3-#4. Each should indicate 8 to 12 volts on your meter. Note: the meter reading is actually a negative voltage because the positive lead of your meter is connected to a common point (terminal #5). If you reverse the meter leads, the needle should move off scale to the left indicating a negative voltage.

3. As the tracker board is receiving data from the gate operator on terminals #1 or #3, the LED's associated with these terminals will light and the voltage on terminals #1 or #3 will go positive. Note: the transfer of data from the gate operator to the tracker board is extremely fast. It may be difficult to see the LED's light and unless you have a very good digital type meter, measuring the voltage change from negative to positive will be very difficult.

4. The tracker board will send a busy signal back to the gate operator on terminals #2 or #4. When this happens, the LED's associated with these terminals will light and the voltage on terminals #2 or #4 will go positive. Note: the busy signal from the tracker board to the gate operator is extremely fast. It may be difficult to see the LED's light and unless you have a very good digital type meter, measuring the voltage change from negative to positive will be very difficult.

5. After the tracker board has received the data from the gate operator, it will send the data to the access control system. When this happens, the **wiegand output** LED (terminal #29 LED) will light, and the tracker board **busy** LED (terminal #10 LED) will light. After the data has been sent, these LED's will turn OFF.

6. The tracker board cannot receive any data if the **busy** LED (terminal #10 LED) is ON.

5.3 Gate Operator Event (transaction) Reports

The tracker expansion interface board sends the following gate operator data to the DKS access control system. This data is stored in a separate file in the access control system and can be viewed by clicking the GATE button on the transaction report screen in the DoorKing Remote Account Manager for Windows software. Each event is date and time stamped.

Event (transaction)	Description
Gate Operate 100 Times	Transaction sent each time gate operator goes through 100 operations. If 10 of these transactions show on report, the operator has cycled 1000 (10 x 100) times.
Gate Forced	An attempt was made to force open the gate.
Gate Hit Obstruction	The Type A (inherent) entrapment prevention device was activated.
Gate Power On	Power applied to the operator control board.
Gate Key 1 On 5 Minutes	Input is activated continuously (shorted) for at least 5-minutes.
Gate Key 2 On 5 Minutes	Input is activated continuously (shorted) for at least 5-minutes.
Gate Reverse On 5 Minutes	Reverse input is activated continuously (shorted) for at least 5-minutes.
Gate 5/14 On 5 Minutes	Partial open input is activated continuously (shorted) for at least 5-minutes.
Gate Input On 5 Minutes Rels	Shorted input has been cleared.
Gate Stop On 5 Minutes	Stop (3-button) input is activated continuously (shorted) for at least 5-minutes.
Gate Reverse Loop On 5 Minutes	Detector plugged into control board reverse port activated at least 5-minutes.
Gate Exit Loop On 5 Minutes	Detector plugged into control board open port activated at least 5-minutes.
1601 Up On 5 Minutes	Up input to 1601/1602 operator activated continuously for at least 5-minutes.
1601 Down On 5 Minutes	Down input to 1601/1602 operator activated continuously for at least 5-minutes.
1601 Up Loop On 5 Minutes	Detector plugged into control board up port activated at least 5-minutes.
1601 Up Loop Down 5 Minutes	Detector plugged into control board down port activated at least 5-minutes.
1601 Power On	Power applied to the operator control board.
1601 Input On 5 Minutes Rels	Shorted input has been cleared.
Pedestrian Gate Stuck Open	Alarm relay activated on 2358 tracker expansion board.
Pedestrian Gate Closed	Alarm reset activated on 2358 tracker expansion board.
1601 Hit Obstruction	The Type A (inherent) entrapment prevention device was activated.
Gate Open On 5 Minutes	Open (3-button) input is activated continuously (shorted) for at least 5-minutes.
Gate Close On 5 Minutes	Close (3-button) input is activated continuously (shorted) for at least 5-minutes.
Gate 1 Power Off	Power applied to the operator control board has been lost.
1601 Power Off	Power applied to the operator control board has been lost.
Open Beam On 5 Minutes	Input is activated continuously (shorted) for at least 5-minutes.
Close Beam On 5 Minutes	Input is activated continuously (shorted) for at least 5-minutes.
Open Edge Activated	Reverse edge has been activated.
Close Edge Activated	Reverse edge has been activated.
Gate Shut Down	Slide gate hard shutdown, entrapment alarm activated.
Reset Pushed	Slide gate reset button activated.
Alarm On	Swing gate hard shutdown, entrapment alarm activated.
Reset Pushed	Swing gate reset button activated.
Beam On 5 Minutes	Swing gate beam input is activated continuously (shorted) for at least 5-minutes.

5.4 Complete System Information

Filling out this form will allow you to better keep track of the entire system at a glance. This will assist you when programming the system and/or any maintenance information about the system that may be required in the future.

Board Address # 3-10	Relay 2 / Wiegand 2 Access Control System Connection	
Board Address #	**Location and/or Description**	**Board Serial # and Rev Letter**
# 3		

5.4 Complete System Information Continued

Filling out this form will allow you to better keep track of the entire system at a glance. This will assist you when programming the system and/or any maintenance information about the system that may be required in the future.

Board Address # 11-18	Relay 1 / Wiegand 1 Access Control System Connection	
Board Address #	**Location and/or Description**	**Board Serial # and Rev Letter**
# 11		

HARDwired Installation/ Owner's Manual

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