

GE  
Security

# Transition Series

Multi-Technology Readers



This publication may contain examples of data reports used in daily business operations. Examples include fictitious names of individuals and companies for illustration only; any similarity to names and addresses of actual business enterprises and persons is entirely coincidental.

This document is distributed on an *as is* basis, without warranty either expressed or implied. Successful implementation depends solely upon the customer's ability to integrate each product into the total inventory of "in-house" products. While each offering has been reviewed for its compatibility and maintainability, no assurance of successful installation can be given.

The customer accepts full maintenance responsibility. (A full scope of software and hardware maintenance contracts are available to the customer.)

© 2005 GE Security, Inc.  
All Rights Reserved  
Printed in the USA

Picture Perfect, Proximity Perfect, and ProxLite, Secure Perfect, and Transition are trademarks of GE Security, Inc.

HID is a registered trademark of HID Corporation

Mifare is a registered trademark of Philips Electronics, N.V.

All other trademark attributes are property of their respective owners.

## Electrostatic Discharge (ESD) Precaution



Circuit board components are vulnerable to damage by electrostatic discharge (ESD). ESD can cause immediate or subtle damage to sensitive electronic parts. An electrostatic charge can build up on the human body and then discharge when you touch a board. A discharge can be produced when walking across a carpet and touching a board, for example. Before handling any board, make sure you dissipate your body's charge.

# Contents

Overview .....	1
Product features .....	2
System compatibility specifications .....	3
Technical specifications .....	4
Installing the reader .....	5
Mounting the reader base .....	6
Removing the cover .....	9
Connecting the reader .....	14
Cable conductors .....	14
Wiring diagrams .....	15
Configuring the reader .....	32
Setup card summary .....	33
Using configuration cards .....	34
Using feature cards .....	35
Resetting the reader to a known state .....	36
Testing the reader .....	36
Indicators .....	37
GE indicators .....	37
HID indicators .....	37
Configuration card .....	38
Keypad configuration .....	39
Wiegand I'm Alive configuration card .....	41
HID indicator configuration card .....	42
Feature cards .....	43
Wiegand format definitions .....	45
4002 (40-bit format) .....	46
5502 (55-bit format) .....	48
6400 (64-bit format) .....	50
Safety .....	52
Radio Interference .....	52
CE Manufacturers Declaration of Conformity .....	53

# Figures

Figure 1: Mounting the T-500SW Readers ..... 7

Figure 2: Model T-500SW Gang Box Mounting .....10

Figure 3: Model T-500SW Direct Wall Mounting.....11

Figure 4: Model T-52XSW Gang Box Mounting .....12

Figure 5: Model T-52XSW Direct Wall Mounting.....13

Figure 6: Supervised, 2-State, F/2F Wiring Diagram .....16

Figure 7: Supervised, 4-State, F/2F Wiring Diagram .....18

Figure 8: Unsupervised F/2F Wiring Diagram .....20

Figure 9: Wiegand Wiring Diagram .....22

Figure 10: Wiegand 2SRP Wiring Diagram .....24

Figure 11: ACU 2X or XL with an IKE Panel.....26

Figure 12: ACU 2X or XL with RRE.....28

Figure 13: ACU RS2/4.....30

# Overview

GE Transition™ Series multi-technology card readers feature simultaneous compatibility with multi-vendor credential technologies—GE and HID 125 Khz Proximity, Mifare® (ISO 14443A) and Vicinity (ISO 15693)—all in one reader. Using this technology combination, system administrators can now deploy the Transition readers into existing or new facilities or systems—continuing to serve existing card-carrying users while migrating to the latest in security and smart-card advancements.

The Transition Series readers feature a rugged design and can be installed almost anywhere. Durable, weatherproof, UV-resistant materials, along with advanced electronics and circuitry, protect readers against inclement weather and exposure to sunlight.

## Transition Series



# Product features

The Transition Series readers combine the convenience of contactless technology with flexibility of operation.

The features include:

- Interoperable with: GE Proximity, HID Proximity, Mifare (ISO 14443A) and Vicinity (ISO 15693) credentials
- Output modes include: F/2F, Supervised F/2F, and Wiegand
- 4-State Supervision monitors: Open, Closed, Short, and Cut Supervision on REX and DI lines.
- Exceptional read-range performance in all types of installation environments
- Tri-state (red, green, yellow) LED visual indicator and audio feedback for status and activity information
- Hold capability for preventing unwanted multiple reads
- Keypad modes supports standard and customizable keypad output formats.
- Tamper protection
- Available in: Light gray, black, and charcoal gray
- Accommodates interior, exterior, metal and non-metal installation environments
- Lifetime warranty against defective workmanship and materials.

Some micros may require firmware customization to support Wiegand formats 5502 and 6400. Contact GE Security Sales Engineering for assistance.

# System compatibility specifications

Access Control Systems	<ul style="list-style-type: none"> <li>• Secure Perfect® with micro firmware version 5.0.02 and later</li> <li>• Picture Perfect™ with micro firmware version 1.72 and later</li> <li>• ACUXL version 5.76</li> <li>• ACURS version 5.76</li> </ul>
Microcontrollers and Reader Interfaces	<ul style="list-style-type: none"> <li>• Micro/5-PX and Micro/5-PXN: 2RP, 2SRP, 8RP, STI/CK8RP, and WIU-2/4</li> <li>• Micro/PX-2000 and Micro/PXN-2000: Directly wired and WIU-2/4</li> <li>• ACUXL: RRE and IKE</li> <li>• ACURS: Directly wired</li> <li>• Other: Micro Reader Junction Box, Bioscript V-Flex, Universal Wedge, and Fiber Options Transceiver</li> </ul>
Credential Technologies	<ul style="list-style-type: none"> <li>• GE Proximity Perfect cards: Not supported.</li> <li>• GE Proximity (125 kHz): ProxLite, ISO ProxLite, and ProxLite keytag and patches</li> <li>• HID Proximity (125 khz): ProxCard II, ISO ProxCard II, ProxKey II, ProxCard, and Corp 1000 (all formats)</li> <li>• HID iClass SN</li> <li>• Mifare® (ISO 14443A) SN: Mifare Standard, Mifare Light, and DESFire</li> <li>• Vicinity (ISO 15693) SN: Infineon Technologies My-D 2K-S, My-D 2K-P, My-D 10K-S, My-D 10K-P, Philips SLI-2, and disc tags</li> </ul>
Wiegand Formats	<p>GE Proximity, Mifare, and Vicinity</p> <ul style="list-style-type: none"> <li>• 4001 (40-bit)</li> <li>• 4002 (40-bit)</li> <li>• 5502 (55-bit)</li> <li>• 6400 (64-bit)</li> </ul> <p>Some micros may require firmware customization to support Wiegand formats 5502 and 6400. Contact GE Security Sales Engineering for assistance.</p> <p>HID Proximity:</p> <ul style="list-style-type: none"> <li>• Up to 64-bit (Wiegand)</li> <li>• Corp 1000 (Custom formats)</li> </ul>

# Technical specifications

Operating Temperature Range	-13° F (-25° C) to 149° F (+65° C)
Relative Humidity	5% to 95% (non-condensing)
Physical Dimensions (HWD)	<b>T-500SW:</b> 5.85" (148.6 mm) x 1.75" (44.5 mm) x 1.16" (29.5 mm) <b>Model 520SW and 525SW:</b> 5.85" (148.6 mm) x 4.50" (114.3 mm) x 1.24" (3.17 mm)
Power Consumption	120 mA @ 12 VDC (average)
Recommended Cable Specification	12 Conductors: Belden 9874 or equivalent, 20 AWG individually shielded pairs
Cabling Distance	<ul style="list-style-type: none"> <li>• <b>F/2F:</b> Up to 3,000 ft. (914.4 m) @ 12 VDC with 20 AWG shielded cable</li> <li>• <b>Wiegand:</b> Up to 500 ft. (152.4 m) @ 12 VDC with 20 AWG shielded cable</li> </ul>
Read Range <i>(Distances may vary depending on environment.)</i>	<b>Model T-500SW:</b> - GE Proximity: up to 3.5" (8.89 cm) - HID Proximity: up to 3.5" (8.89 cm) - Mifare: up to 1" (2.54 cm) - Vicinity: up to 5" (12.7 cm) <b>Model T-520SW and T-525SW:</b> - GE Proximity: up to 5" (15.24 cm) - HID Proximity: up to 5" (15.24 cm) - Mifare: up to 1" (2.54 cm) - Vicinity: up to 5" (12.7 cm)



<p>Standard Operating Modes See “Configuring the reader” on page 32</p>	<p><b>Reader Configuration:</b></p> <ul style="list-style-type: none"> <li>- Supervised F/2F Output, 2-State Door DI/REX</li> <li>- Supervised F/2F Output, 4-State Door DI/REX</li> <li>- Wiegand Output Modes:                             <ul style="list-style-type: none"> <li>- GE Proximity: 4002 format</li> <li>- HID Proximity: determined by card</li> <li>- Mifare (ISO 14443A): 4002 format (40-bit)</li> <li>- Vicinity (ISO 15693): 5502 format (55-bit)</li> </ul> </li> </ul>
<p>Agency Approvals See Regulatory Compliance</p>	<ul style="list-style-type: none"> <li>- FCC Class A</li> <li>- CE</li> <li>- UL 294</li> </ul>

## Installing the reader

Follow these steps to install the Transition Series reader. These steps are explained in more detail in the following sections. The recommended sequence is:

1. Mount the reader base.  
*See “Mounting the reader base” on page 6.*
2. Connect the reader.  
*See “Connecting the reader” on page 14.*
3. Configure the reader.  
*See “Configuring the reader” on page 32.*
4. Test the reader.  
*See “Testing the reader” on page 36.*

# Mounting the reader base

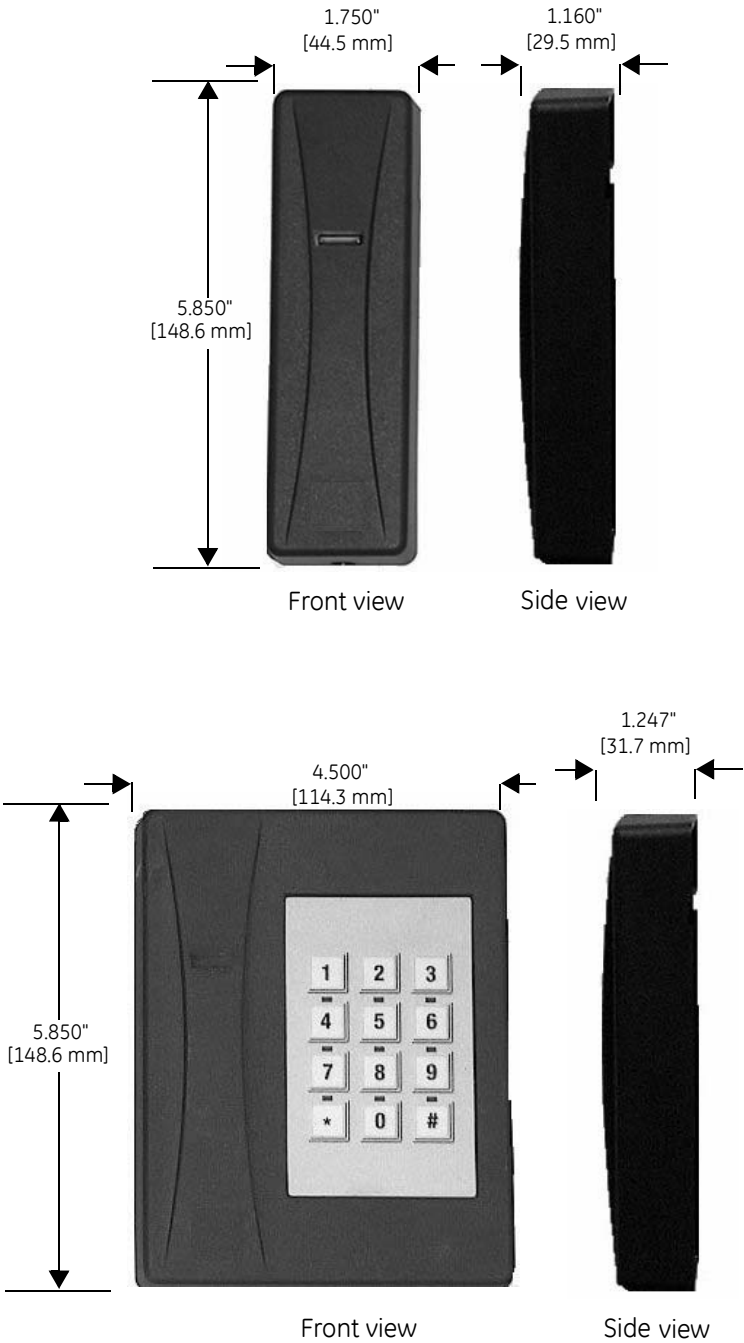
The reader is suitable for mounting directly onto standard U.S. electrical gang boxes. The reader can also be mounted directly on a hollow wall.

- For gang box mounting instructions:  
See Figure 3, “Model T-500SW Gang Box Mounting,” on page 10.
- For direct wall mounting instructions:  
See Figure 4, “Model T-500SW Direct Wall Mounting,” on page 11.

To mount the T-500SW/T-52XSW readers:

1. Find a suitable mounting position on the door frame or wall.
2. Drill two mounting holes a minimum of 4.125” (104.8 mm) apart on the mounting surface of the door frame or wall. Refer to Figure 1, “Mounting the T-500SW Readers,” on page 7.

**FIGURE 1: Mounting the T-500SW Readers**



3. Drill one 0.625" (15.87 mm) diameter hole in wall for the pigtail wire connection. See "Cable conductors" on page 14 to connect the reader to the field panel and external door equipment.

For dimensions, refer to:

- Figure 4, "Model T-500SW Direct Wall Mounting," on page 11.
  - Figure 5, "Model T-52XSW Gang Box Mounting," on page 12.
4. Mount the reader base to the wall using the supplied screws.
  5. Install the top cover to the reader base. The base plate and top cover guides should be aligned, so the connectors seat correctly.

# Removing the cover

## To remove the cover:

1. Using a screwdriver, place the handle next to the top-left side of the reader. Do not remove the tamper screw.

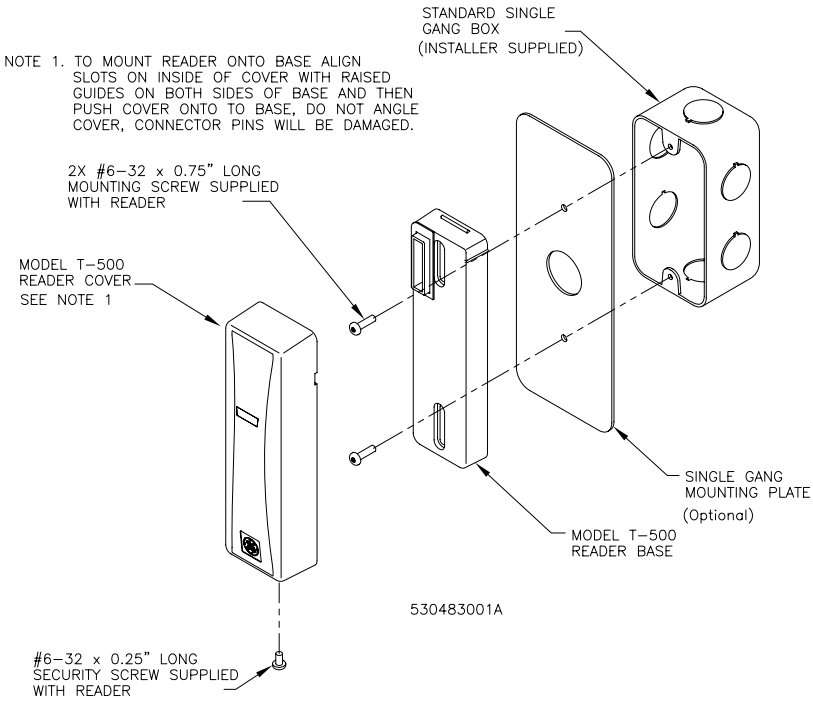
**FIGURE 2: Removing the reader cover**

---

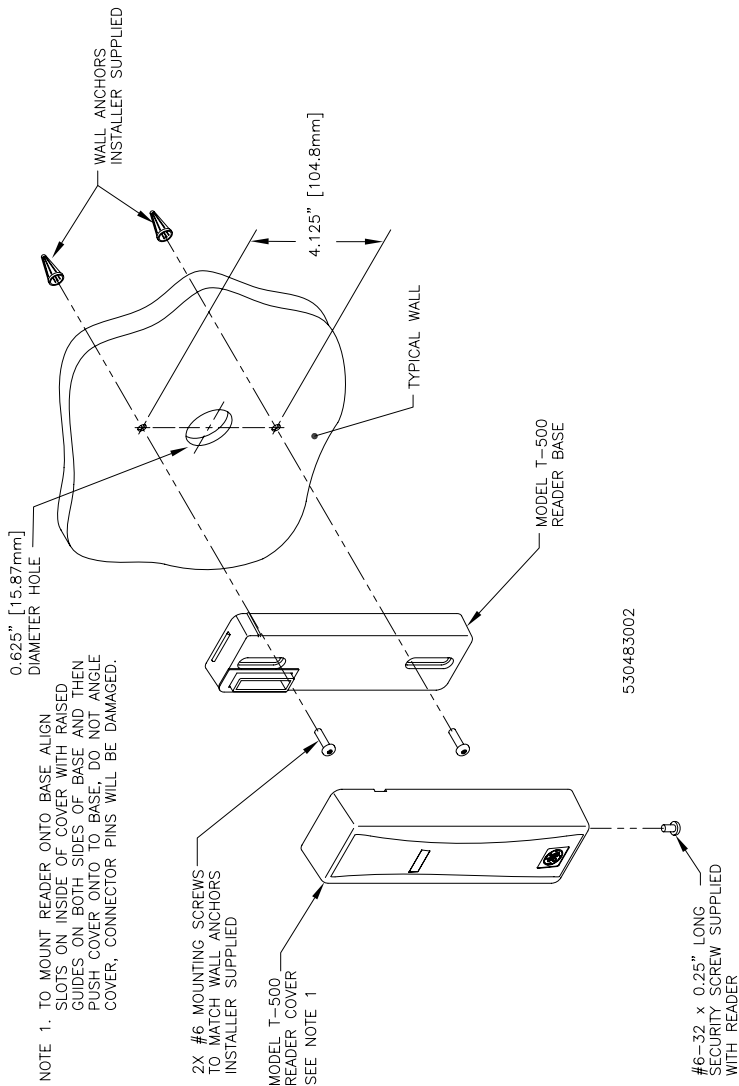


2. Insert the screwdriver tip in guide between the cover and base plate.
3. Pry the top-left side of the reader housing.
4. Repeat the previous steps to remove the right-hand side of the reader housing.
5. Remove tamper screw.

# FIGURE 3: Model T-500SW Gang Box Mounting



**FIGURE 4: Model T-500SW Direct Wall Mounting**



**FIGURE 5: Model T-52XSW Gang Box Mounting**

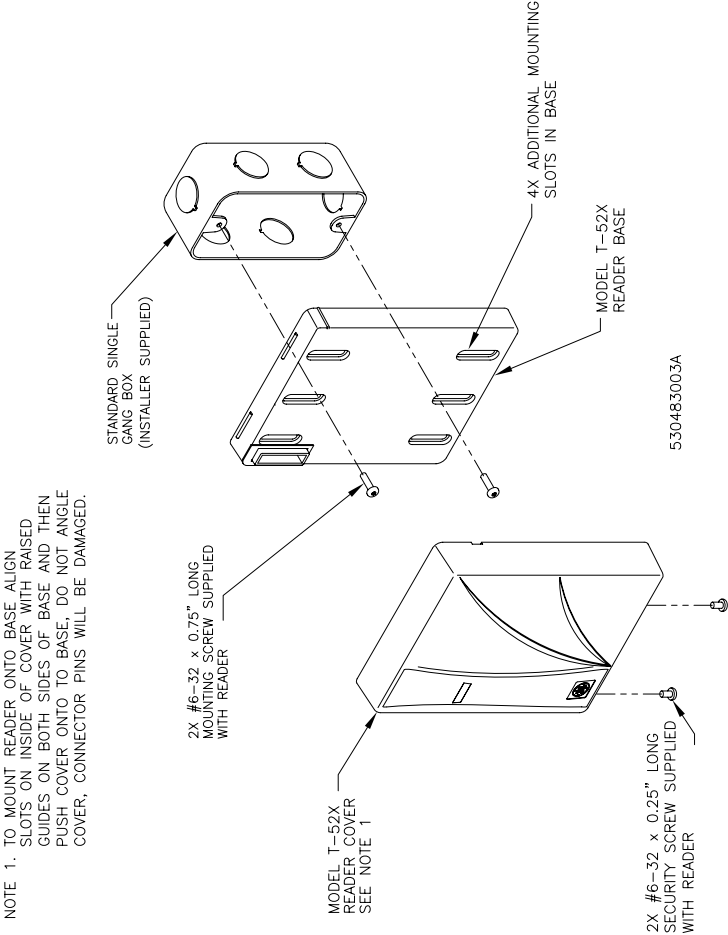
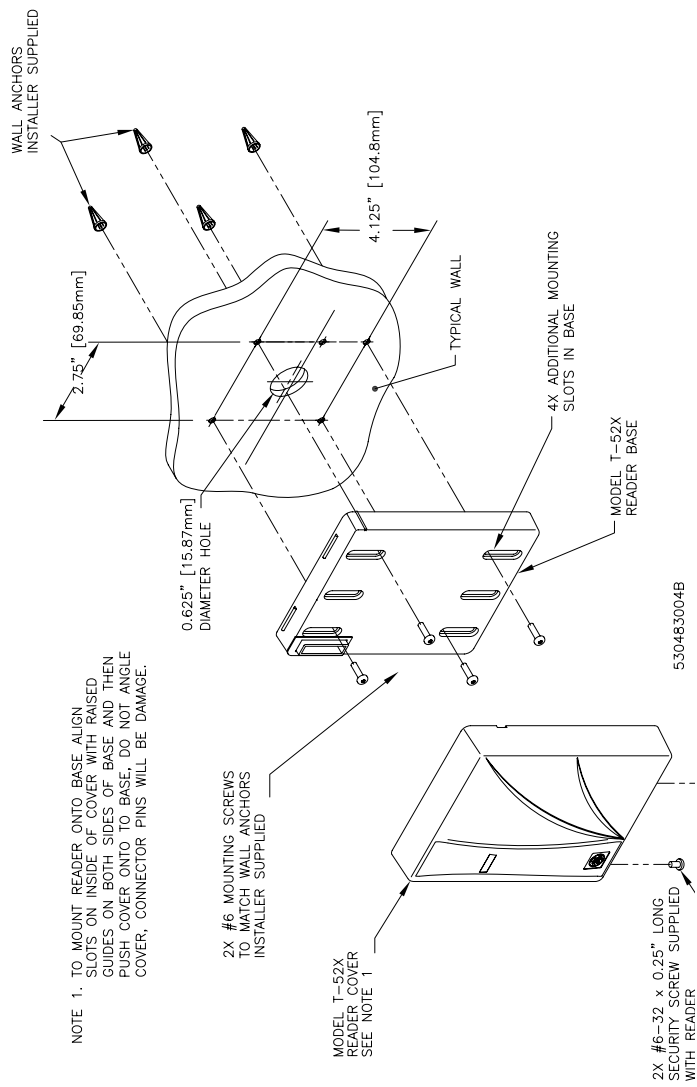




FIGURE 6: Model T-52XSW Direct Wall Mounting



# Connecting the reader

Transition Series readers are supplied with a 12-conductor cable pigtail, which is used to connect to the host panel. Refer to the cable conductors chart to correctly match the color of each wire.

Refer to “Wiring diagrams” on page 15 for more information on connecting the reader:



**It is important to ensure all connections are made prior to applying power.**

## Cable conductors

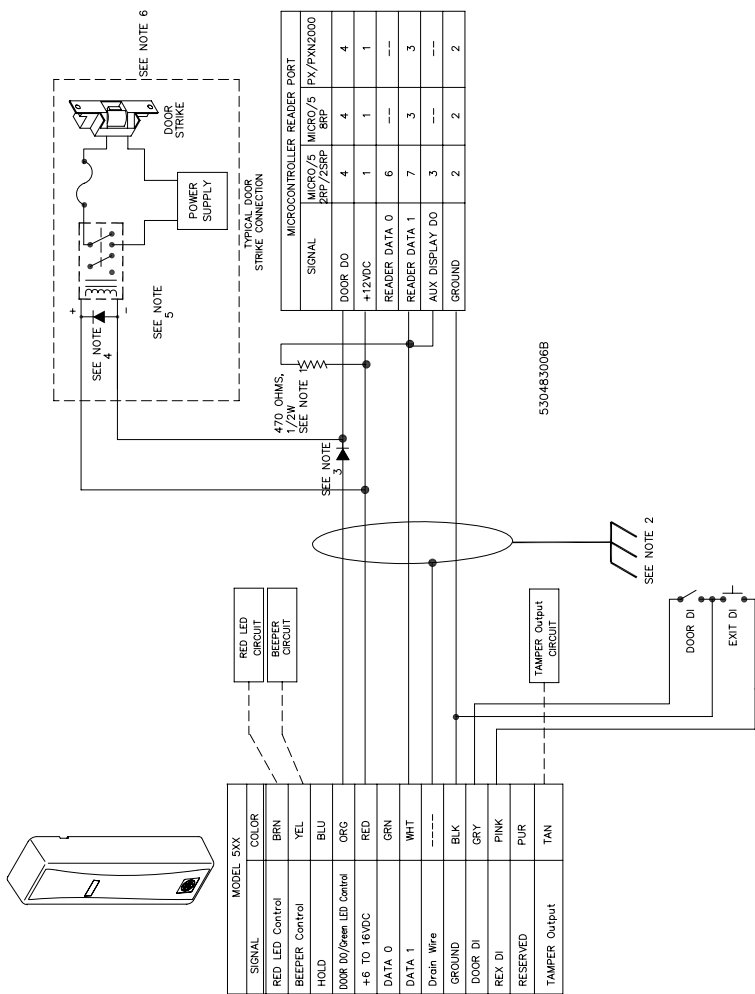
Color	Signal
Black	Ground
Blue	Hold
Brown	Red LED Control
Gray	Door DI
Green	Data 0
Orange	Green LED Control
Pink	REX DI
Purple	Reserved
Red	6 to 16 VDC
Tan	Tamper Output
White	Data 1
Yellow	Beeper Control
.....	Drain Wire

# Wiring diagrams

See the following wiring diagrams for details on connecting the reader to the microcontroller:

- “Supervised, 2-State, F/2F Wiring Diagram” on page 16
- “Supervised, 4-State, F/2F Wiring Diagram” on page 18
- “Unsupervised F/2F Wiring Diagram” on page 20
- “Wiegand Wiring Diagram” on page 22
- “Wiegand 2SRP Wiring Diagram” on page 24
- “ACU 2X or XL with an IKE Panel” on page 26
- “ACU 2X or XL with RRE” on page 28
- “ACU RS2/4” on page 30

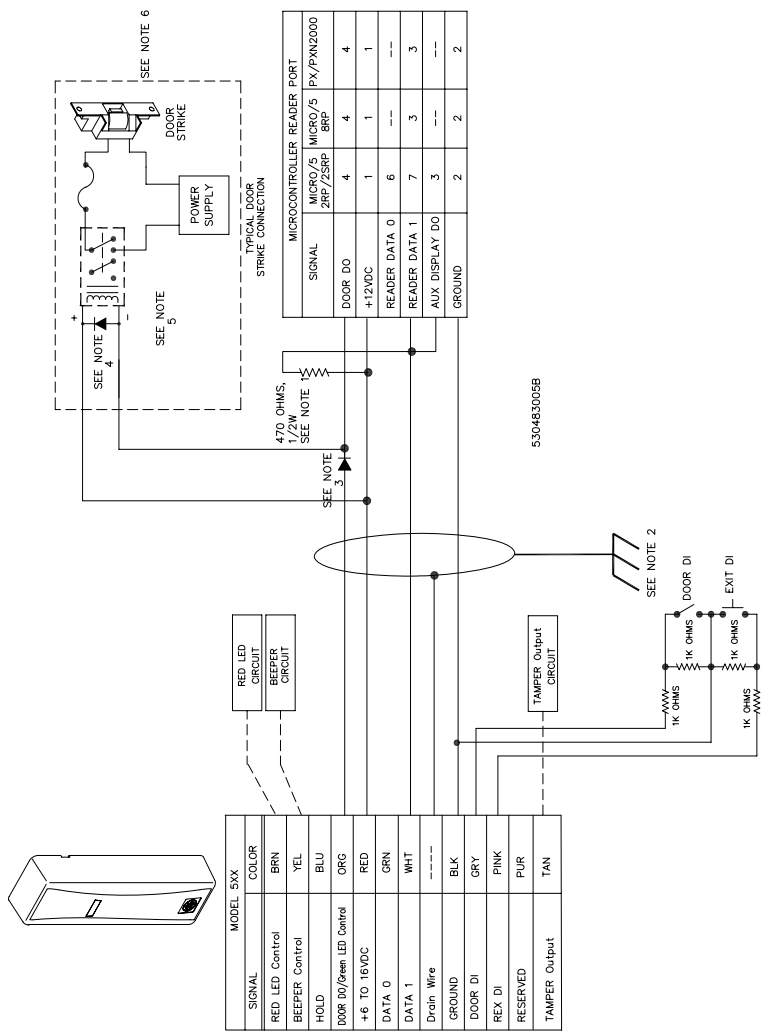
FIGURE 7: Supervised, 2-State, F/2F Wiring Diagram



## NOTES

1. A 470 ohm, 1/2W, pull-up resistor may be required between +12 VDC and READER DATA 1. The pull-up resistor should be installed at the microcontroller's terminal block. Refer to the appropriate micro manual for installation requirements.
2. Shielded cable is required. Connect reader's drain wire to the cable shield. Do not connect shield wires at the microcontroller.
3. Blocking diodes must be 1N5817 or equivalent, located on the secured side of the door.
4. Protection diodes must be 1N4002, 1N4003, or 1N4004 for the door strike assembly.
5. Fuse, power supply, door strike, diodes, and relay are provided by the installer.
6. 2RP/2SRP boards are equipped with onboard door strike relay. Refer to the *Micro5 Installation Guide*.

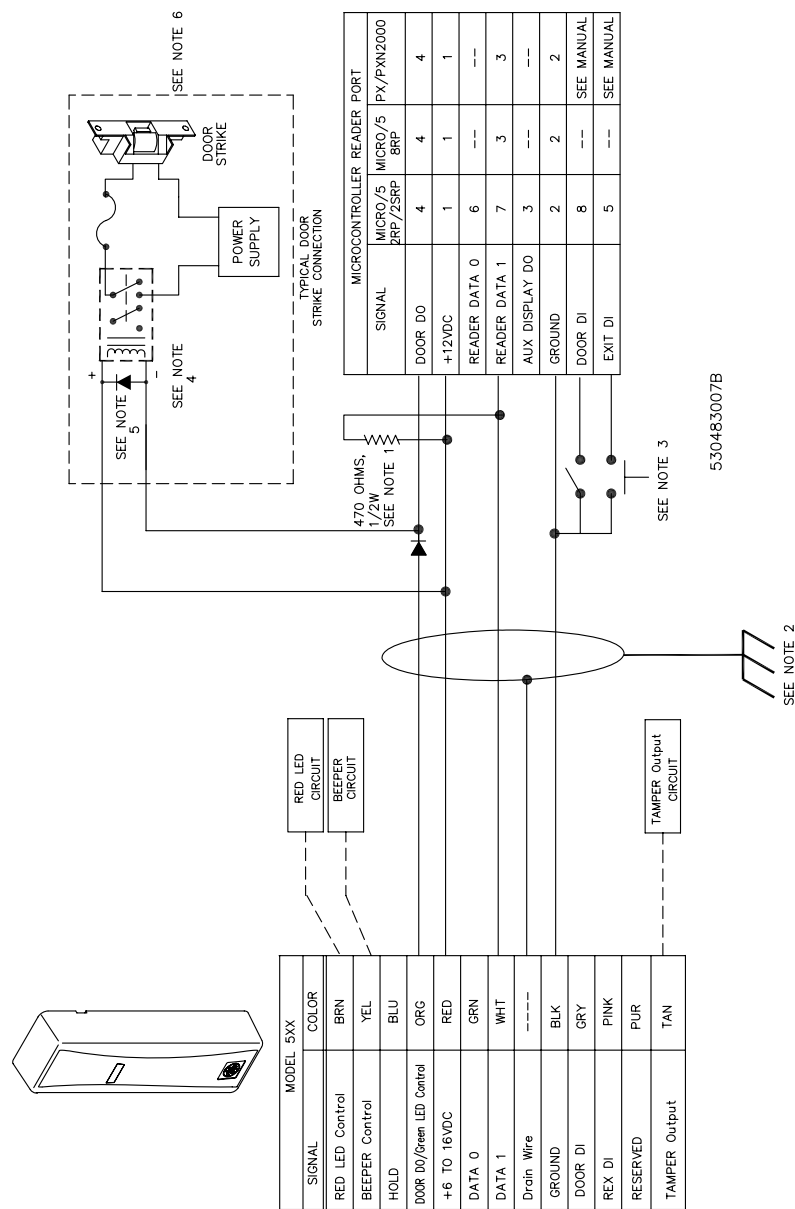
FIGURE 8: Supervised, 4-State, F/2F Wiring Diagram



#### NOTES:

1. A 470 ohm, 1/2W, pull-up resistor may be required between +12 VDC and READER DATA 1. The pull-up resistor should be installed at the microcontroller's terminal block. Refer to the appropriate micro manual for installation requirements.
2. Shielded cable is required. Connect reader's drain wire to the cable shield. Do not connect shield wires at the microcontroller.
3. Blocking diodes must be 1N5817 or equivalent, located on the secured side of the door.
4. Protection diodes must be 1N4002, 1N4003, or 1N4004 for the door strike assembly.
5. Fuse, power supply, door strike, diodes, and relay are provided by the installer.
6. 2RP/2SRP boards are equipped with onboard door strike relay. Refer to the *Micro5 Installation Guide*.

FIGURE 9: Unsupervised F/2F Wiring Diagram

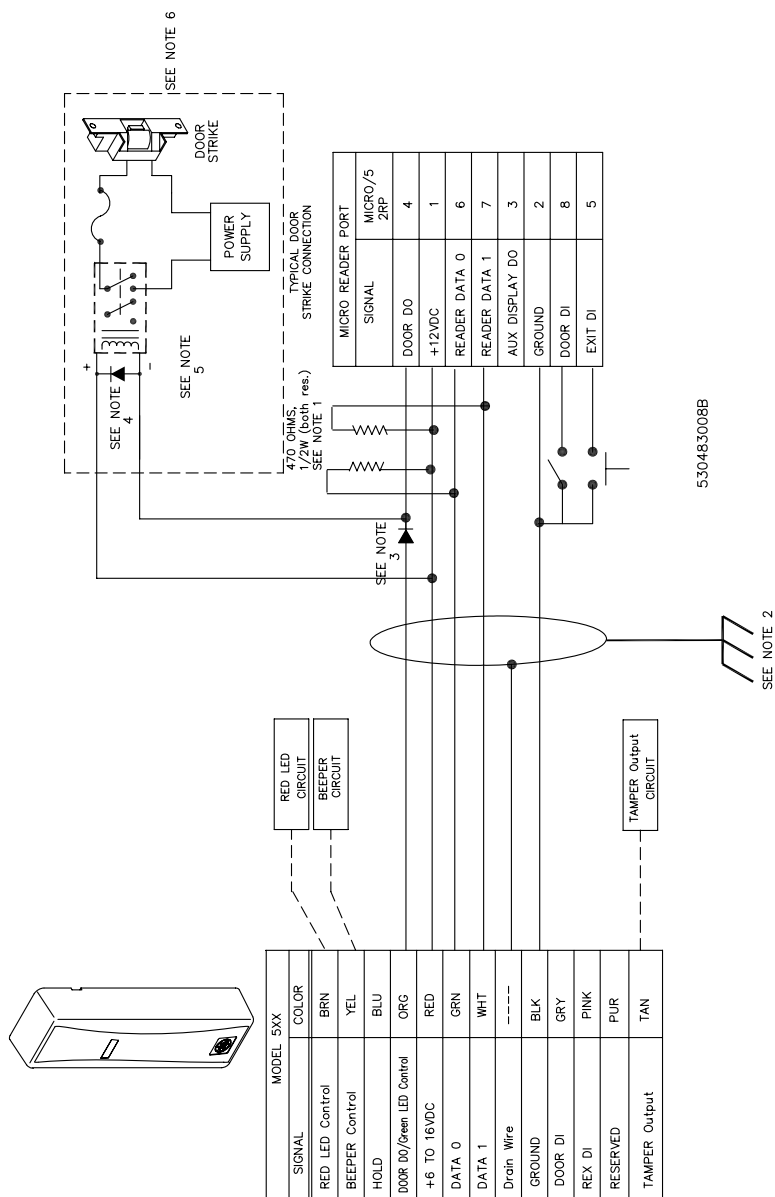




## NOTES:

1. A 470 ohm, 1/2W, pull-up resistor may be required between +12 VDC and READER DATA 1. The pull-up resistor should be installed at the microcontroller's terminal block. Refer to the appropriate micro manual for installation requirements.
2. Shielded cable is required. Connect reader's drain wire to the cable shield. Do not connect shield wires at the microcontroller.
3. Blocking diodes must be 1N5817 or equivalent, located on the secured side of the door.
4. Protection diodes must be 1N4002, 1N4003, or 1N4004 for the door strike assembly.
5. Fuse, power supply, door strike, diodes, and relay are provided by the installer.
6. 2RP/2SRP boards are equipped with onboard door strike relay. Refer to the *Micro5 Installation Guide*.

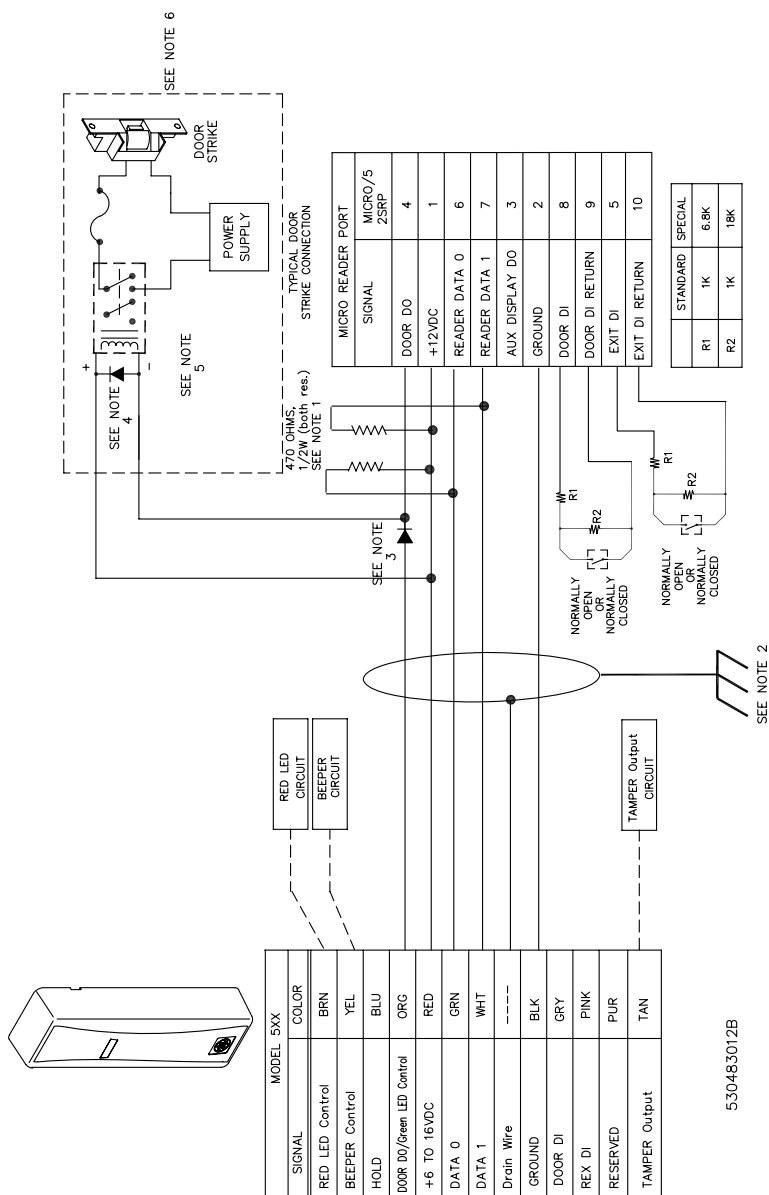
### FIGURE 10: Wiegand Wiring Diagram



## NOTES:

1. A 470 ohm, 1/2W, pull-up resistor may be required between +12 VDC and Reader Data 0 and Data 1. The pull-up resistor should be installed at the microcontroller's terminal block. Refer to the appropriate micro manual for installation requirements.
2. Shielded cable is required. Connect reader's drain wire to the cable shield. Do not connect shield wires at the microcontroller. Do not pair reader Data 0 and Data 1.
3. Blocking diodes must be 1N5817 or equivalent, located on the secured side of the door.
4. Protection diodes must be 1N4002, 1N4003, or 1N4004 for the door strike assembly.
5. Fuse, power supply, door strike, diodes, and relay are provided by the installer.
6. 2RP/2SRP boards are equipped with onboard door strike relay. Refer to the *Micro5 Installation Guide*.

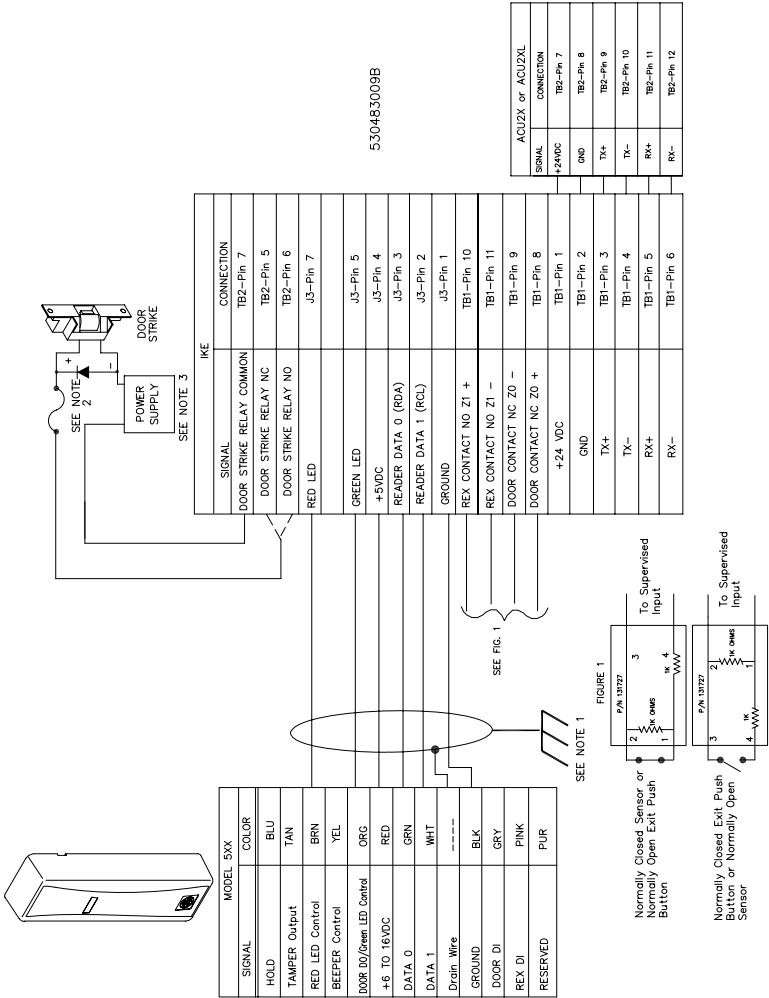
**FIGURE 11: Wiegand 2SRP Wiring Diagram**



**NOTES:**

1. A 470 ohm, 1/2W, pull-up resistor may be required between +12 VDC and Reader Data 0 and Data 1. The pull-up resistor should be installed at the microcontroller's terminal block. Refer to the appropriate micro manual for installation requirements.
2. Shielded cable is required. Connect reader's drain wire to the cable shield. Do not connect shield wires at the microcontroller. Do not pair reader Data 0 and Data 1.
3. Blocking diodes must be 1N5817 or equivalent, located on the secured side of the door.
4. Protection diodes must be 1N4002, 1N4003, or 1N4004 for the door strike assembly.
5. Fuse, power supply, door strike, diodes, and relay are provided by the installer.
6. 2RP/2SRP boards are equipped with onboard door strike relay. Refer to the *Micro5 Installation Guide*.

FIGURE 12: ACU 2X or XL with an IKE Panel



**NOTES:**

1. Shielded cable is required. Connect reader's drain wire to the cable shield. Do not connect shield wires at the microcontroller. Do not pair reader Data 0 and Data 1.
2. Protection diodes must be 1N4002, 1N4003, or 1N4004 for the door strike assembly.
3. Fuse, power supply, door strike, diodes, and relay are provided by the installer.

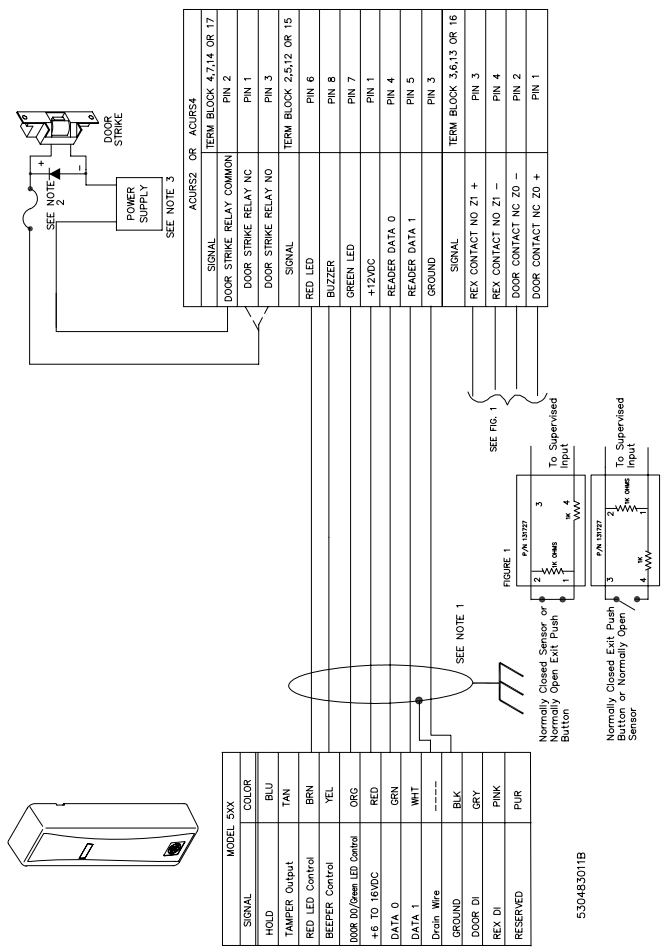




**NOTES:**

1. Shielded cable is required. Connect reader's drain wire to the cable shield. Do not connect shield wires at the microcontroller. Do not pair reader Data 0 and Data 1.
2. Protection diodes must be 1N4002, 1N4003, or 1N4004 for the door strike assembly.
3. Fuse, power supply, door strike, diodes, and relay are provided by the installer.

FIGURE 14: ACU RS2/4



**NOTES:**

1. Shielded cable is required. Connect reader's drain wire to the cable shield. Do not connect shield wires at the microcontroller. Do not pair reader Data 0 and Data 1.
2. Protection diodes must be 1N4002, 1N4003, or 1N4004 for the door strike assembly.
3. Fuse, power supply, door strike, diodes, and relay are provided by the installer.

# Configuring the reader

Transition Series readers are configured using setup cards, which are badges encoded with special instructions that change the reader's behavior.

The readers are shipped pre-configured for Supervised F/2F, 2-state REX/DI operation (see Card 1, Mode 1) to support GE Proximity, HID Proximity, Mifare, and Vicinity credentials.

Configuration cards define a set of operational parameters such as output format, supervision, REX/DI operation, and LED indicators. There are two types of setup cards available: configuration cards and feature cards.

Use the supplied configuration card to advance through modes (1-3) by presenting the card to the reader multiple times. The yellow LED and long beeps indicate changes in the reader's configuration.

A configuration card is supplied with every reader and allows you to configure the reader for these modes:

- Mode 1: 2-State Supervised F/2F
- Mode 2: 4-State Supervised F/2F
- Mode 3: Wiegand only output

Feature cards enable or disable only one parameter at a time, such as setting the beeper on or off. Feature cards act like a switch inside the reader, turning a feature on or off each time the card is presented. The red or green LED and short beeps indicate changes in a particular feature.

See “Setup card summary” on page 33 for a comparison of the two types of setup cards.

# Setup card summary

Card Type	Behavior	LED	Beeper
Configuration Card	Sequences through modes, advancing one position each time the card is presented.	Yellow LED flashes one long flash N times.  N equals the current mode value.	One long beep N times.  N equals the current mode value.
Feature Card	Toggles the feature on-to-off (disabled), or off-to-on (enabled) each time the card is presented.	Disabled: Red LED flashes two times. Enabled: Green LED flashes three times.	Disabled: Two short beeps. Enabled: Three short beeps.

# Using configuration cards

Configuring the reader starts with identifying the configuration, or mode, that best fits your application. Refer to Appendix A for a listing of the currently supported modes. Once the mode has been identified, follow the steps below to configure the proper reader.



**It is important to ensure all connections are made prior to applying power.**

1. Select the configuration mode. See “Configuration card” on page 38.
2. Place the reader in tamper mode by briefly removing and replacing the reader’s cover while the power is on. The reader stays in tamper mode for a minimum of 60 seconds after power is applied or the cover is replaced.
3. Present the card to the reader.
  - The yellow LED flashes and the beeper beeps a number of times equal to the mode value.  
For example, if the yellow LED flashes twice and the beeper beeps twice, the reader is in mode 2.
4. Remove the card from the field (approximately 8 inches away from the face of the reader) for two seconds and present the card again.
  - Each time the card is presented, the mode value increases by one. If there are no additional modes, the value starts over beginning with mode one.

When the configuration or mode of operation you have configured exactly matches the application, then configuration is complete and no feature cards are required. However, if the configuration requires modification, continue configuring the reader with a feature card.

Once the configuration is set, it is stored in the reader and will not change even after power is disconnected or turned off.

## Using feature cards

1. Select the feature card from “Configuration card” on page 38 that supports the installation application.
2. Place the reader in tamper mode by briefly removing and replacing the reader’s cover while the power is on. The reader stays in tamper mode for 60 seconds (minimum) after power is applied or the cover is replaced.
3. Present the card to the reader; observe the LED and beeper.
  - If the red LED flashes twice and the beeper beeps twice, the feature identified by the card is disabled.
  - If the green LED flashes three times and the beeper beeps three times, the feature is enabled.
4. Remove the card from the field (approximately 8 inches away from the face of the reader) for two seconds and present the card. Once the feature is configured, it is stored in the reader and will not change even after power is disconnected or turned off.
5. If required, select the next feature card and repeat the steps above. When all features have been configured, the reader is ready for use.

## Resetting the reader to a known state

At times, it may be necessary to start the configuration process over again. Under these circumstances, it is best to reset the reader to a known state.

To reset the reader:

1. Select a configuration card, and identify the correct mode value from “Configuration card” on page 38.
2. Place the reader in tamper mode as described above.
3. Present the card to the reader until the correct mode value is indicated by the yellow LED and beeper.
4. The reader is now in the appropriate mode and ready to be reconfigured using the feature cards.

## Testing the reader

To verify basic reader operation:

1. Ensure the reader is installed correctly.
2. Verify the reader is not in tamper mode. To do this, make sure the reader cover and base are securely joined.
3. Apply power to the reader and verify that the power-on self test completes. See “Indicators” on page 37.
4. Verify that the reader is not beeping and the red LED is not flashing. If either of these two conditions exist, refer to “Indicators” on page 37.
5. Verify proper reader operation.
  - a. Ensure the door is securely closed.
  - b. Present a badge to the reader, using a badge which is properly enrolled in the host system.
  - c. Observe that the reader behaves as described in “Indicators” on page 37.
  - d. Observe that the proper LED turns on, indicating a valid access has been granted.
  - e. Open the door to verify the reader strike relay operates properly.



# Indicators

## GE indicators

Condition	Indicators
Power-on Self Test	<ul style="list-style-type: none"><li>- Green LED flashes; two short beeps,</li><li>- Yellow LED flashes; three short beeps</li><li>- Red LED flashes</li><li>- Yellow LED flashes</li></ul>
Reader Ready	Yellow LED on continuously
Badge Read	Yellow LED flashes briefly, one short beep
Valid Access	Green LED on until door strike is deactivated
Loss of Communication (Supervised)	Red LED flashes slowly, three short beeps every 30 seconds
Tamper (Supervised mode)	Red LED flashes quickly, three short beeps every 30 seconds

## HID indicators

Condition	Indicators
Power-on Self Test	<ul style="list-style-type: none"><li>- Green LED flashes; two short beeps,</li><li>- Yellow LED flashes; three short beeps</li><li>- Red LED flashes</li><li>- Yellow LED flashes</li></ul>
Reader Ready *	Default setting. Yellow LED on continuously.
Badge Read *	Yellow LED flashes briefly, one short beep.
Valid Access *	Default setting. No LED indication. The LED color is set by the DO connection.
Loss of Communication (Supervised)	Red LED flashes slowly, three short beeps every 30 seconds
Tamper (Supervised mode)	Red LED flashes quickly, three short beeps every 30 seconds

\* Note: Configuration cards can be used to change this setting.

# Appendix A: Configuration card

Card No.	Mode	Name	Action
1	1	Universal F/2F, 2-State  (Factory default setting)	<ul style="list-style-type: none"> <li>• Sets reader to output Supervised F/2F protocol</li> <li>• Sets Door DI/REX supervision to 2-state (open or closed)</li> <li>• Sets output format by card technology as follows:               <ul style="list-style-type: none"> <li>- GE Proximity: 12-digit standard CASI output</li> <li>- HID Proximity: number of digits determined by card</li> <li>- Mifare (ISO 14443A): 12-digit output</li> <li>- Vicinity (ISO 15693): 16-digit output</li> </ul> </li> </ul>
	2	Universal F/2F, 4-State	<ul style="list-style-type: none"> <li>• Sets reader to output Supervised F/2F protocol</li> <li>• Sets Door DI/REX supervision to 4-state (cut, short, open or closed)</li> <li>• Sets output format by card technology as follows:               <ul style="list-style-type: none"> <li>- GE Proximity: 12-digit standard CASI output</li> <li>- HID Proximity: number of digits determined by card</li> <li>- Mifare (ISO 14443A): 12-digit output</li> <li>- Vicinity (ISO 15693): 16-digit output</li> </ul> </li> </ul>
	3	T-Series Wiegand	<ul style="list-style-type: none"> <li>• Sets reader to output Wiegand protocol</li> <li>• Sets output format by card technology as follows:               <ul style="list-style-type: none"> <li>- GE Proximity: 4002 12- digit output</li> <li>- HID Proximity: number of digits determined by card</li> <li>- Mifare (14443A): 4002 12-digit output</li> <li>- Vicinity (15693): 5502 16-digit output</li> </ul> </li> </ul>

# Appendix B: Keypad configuration

For modes 1-6, follow these steps:

1. Place the reader in tamper mode by briefly removing and replacing the reader's cover while the power is on. The reader stays in tamper mode for 60 seconds (minimum) after power is applied or the cover is replaced.
2. Present the Configuration Card (See Appendix A) within one minute. Cycle through the modes until Mode 3 is reached.
3. Enter the keypad entry within five seconds. The LED turns green and a short triple-beep indicates the configuration is accepted. Use the chart on the next page to identify the appropriate keypad entry.

Output Format			Key Press Sequence			
No Parity Formats	Bits Sent	Parity	Press 1	Press 2	Press 3	Press 4
1 key	4	None	0	1		
1 key buffer GE default setting	8	None	*	0		
2 key buffer	8	None	0	2		
3 key buffer	12	None	0	3		
4 key buffer	16	None	0	4		
5 key buffer	20	None	0	5		
6 key buffer	24	None	0	6		
7 key buffer	28	None	0	7		
8 key buffer	32	None	0	8		
9 key buffer	36	None	0	9		
10 key buffer	40	None	0	*		
11 key buffer	44	None	0	#		
Parity Formats	Bits Sent	Parity	Press 1	Press 2	Press 3	Press 4
1 key	6	2 bit	1	1		
2 key buffer	10	2 bit	1	2		
3 key buffer	14	2 bit	1	3		
4 key buffer	18	2 bit	1	4		
5 key buffer	22	2 bit	1	5		
1 to 5 key buffer	26	2 bit	#	1	2	3
6 key buffer	26	2 bit	1	6		
7 key buffer	30	2 bit	1	7		
8 key buffer	34	2 bit	1	8		
9 key buffer	38	2 bit	1	9		
10 key buffer	42	2 bit	1	*		

# Appendix C: Wiegand *I'm Alive* configuration card

Card	Setting	Description
Time Interval between <i>I'm Alive</i> messages	1 (Factory default setting.)	Off. No <i>I'm Alive</i> message. (2 beeps, 2 red LED flashes)
	2	1 sec. <i>I'm Alive</i> message is sent every second. 3 beeps, 3 green LED flashes = enabled
	3	5 sec. <i>I'm Alive</i> message is sent every five seconds. 4 beeps, 4 green LED flashes = enabled

# Appendix D: HID indicator configuration card

Card	Setting	Description
1 Ready LED color	1 (Factory default setting.)	Yellow. 2 beeps, 2 red LED flashes = enabled
	2	Red 3 beeps, 3 green LED flashes = enabled
	3	Green 4 beeps, 4 green LED flashes = enabled
	4	Off 5 beeps, 5 green LED flashes
2 Valid badge read LED color	1 (Factory default setting.)	Off. The LED color is set by DO connection. 2 beeps, 2 red LED flashes
	2	Green 3 beeps, 3 green LED flashes = enabled
	3	Yellow 4 beeps, 4 green LED flashes = enabled
	4	Red 5 beeps, 5 green LED flashes = enabled

# Appendix E: Feature cards

Card No.	Feature Description
1	Unsupervised F/2F communications <hr/> <ul style="list-style-type: none"><li>• Enabled (Default setting): BIDs are formatted as described below and sent unsupervised to host.<ul style="list-style-type: none"><li>- GE Proximity: 12 Digits</li><li>- HID Proximity: number of digits determined by card</li><li>- Mifare (14443A): 12 Digits</li><li>- Vicinity (15693): 16 Digits</li></ul></li></ul> <hr/> <ul style="list-style-type: none"><li>• Disabled: Badge ID is output according to configuration mode.</li></ul> <hr/>
2	Beeper output <hr/> <ul style="list-style-type: none"><li>• Enabled (Default setting): Beeper Audible</li><li>• Disabled: Beeper Silenced</li></ul> <hr/>
3	4001 Wiegand output <hr/> <ul style="list-style-type: none"><li>• Enabled: Badge ID read from all credentials is sent to host in 4001 format.</li></ul> <hr/> <ul style="list-style-type: none"><li>• Disabled (Default setting): Badge ID is output according to configuration mode.</li></ul> <hr/>

Card No.	Feature Description
4	4002 Wiegand output
	<ul style="list-style-type: none"> <li>Enabled: Badge ID read from all credentials is sent to host in 4002 format.</li> </ul>
	<ul style="list-style-type: none"> <li>Disabled (Default setting): Badge ID is output according to configuration mode.</li> </ul>
5	5502 Wiegand output
	<ul style="list-style-type: none"> <li>Enabled: Badge ID read from all credentials is sent to host in 5502 format.</li> </ul>
	<ul style="list-style-type: none"> <li>Disabled (Default setting): BID is output according to configuration mode.</li> </ul>
6	6400 Wiegand output
	<ul style="list-style-type: none"> <li>Enabled: Badge ID read from all credentials is sent to host in 6400 format.</li> </ul>
	<ul style="list-style-type: none"> <li>Disabled (Default setting): Badge ID is output according to configuration mode.</li> </ul>



# Appendix F: Wiegand format definitions

This section describes the different formats:

- See “4002 (40-bit format)” on page 46
- See “5502 (55-bit format)” on page 48
- See “6400 (64-bit format)” on page 50

Some micros may require firmware customization to support Wiegand formats 5502 and 6400. Contact GE Security Sales Engineering for assistance.

# 4002 (40-bit format)

Summary	<ul style="list-style-type: none"><li>• 40 bits total</li><li>• 38 bits badge ID</li><li>• 2 bits parity</li><li>• 12 digits</li></ul>
---------	--

The first bit transmitted is the first parity bit, P1. It is even parity calculated over the first 20 bits. The last bit transmitted is the second parity bit, P2. It is odd parity calculated over the total 40 bits.

4002			
First bit	Data	P1-first	P2-last
1	P1	E	O
2	N	E	O
3	N	E	O
4	N	E	O
5	N	E	O
6	N	E	O
7	N	E	O
8	N	E	O
9	N	E	O
10	N	E	O
11	N	E	O
12	N	E	O
13	N	E	O
14	N	E	O
15	N	E	O
16	N	E	O
17	N	E	O
18	N	E	O
19	N	E	O
20	N	E	O
21	N		O
22	N		O
23	N		O
24	N		O
25	N		O
26	N		O
27	N		O
28	N		O
29	N		O
30	N		O
31	N		O
32	N		O
33	N		O
34	N		O
35	N		O
36	N		O
37	N		O
38	N		O
39	N		O
40	P2		O

# 5502 (55-bit format)

Summary	<ul style="list-style-type: none"><li>• 55 bits total</li><li>• 53 bits badge ID</li><li>• 2 bits parity</li><li>• 16 digits</li></ul>
---------	--

The first bit transmitted is the first parity bit, P1. It is even parity calculated over the first 27 bits. The last bit transmitted is the second parity bit, P2. It is odd parity calculated over the total 55 bits.

5502			
First bit	Data	P1-first	P2-last
1	P1	E	O
2	N	E	O
3	N	E	O
4	N	E	O
5	N	E	O
6	N	E	O
7	N	E	O
8	N	E	O
9	N	E	O
10	N	E	O
11	N	E	O
12	N	E	O
13	N	E	O
14	N	E	O
15	N	E	O
16	N	E	O
17	N	E	O
18	N	E	O
19	N	E	O
20	N	E	O
21	N	E	O
22	N	E	O
23	N	E	O
24	N	E	O
25	N	E	O
26	N	E	O
27	N	E	O
28	N		O
29	N		O
30	N		O
31	N		O
32	N		O
⋮	⋮		⋮
52	N		O
53	N		O
54	N		O
55	P2		O

# 6400 (64-bit format)

Summary	<ul style="list-style-type: none"><li>• 64 bits total</li><li>• 64 badge ID bits</li><li>• 0 bits parity</li><li>• 20 digits</li></ul>
---------	--

The 64-bit transmission consists entirely of code bits. The bits are transmitted in the order described below, from 1 to 64. (N represents the bade number, which is 20 digits.)

6400	
First bit	Data
1	N
2	N
3	N
4	N
5	N
6	N
7	N
8	N
9	N
10	N
11	N
12	N
13	N
14	N
15	N
16	N
17	N
18	N
19	N
20	N
21	N
22	N
23	N
24	N
25	N
26	N
27	N
28	N
29	N
30	N
31	N
32	N
⋮	⋮
61	N
62	N
63	N
64	N

# Safety

## Radio Interference



This is an FCC Class A product. In a domestic environment, this product may cause radio interference, in which case, the user may be required to take adequate measures.



# CE Manufacturers Declaration of Conformity



GE Security



## MANUFACTURERS DECLARATION OF CONFORMITY

For

**Product identification:**

Model/type : 5XX(4302XX00X) BOM revision level : A  
Category (description) : Reader Contactless Smart Card, Proximity  
Brand : GE Security/ Casi Rusco

**Manufacturer:**


GE Security-Casi Rusco  
791 Park of Commerce  
Blvd Suite 100  
Boca Raton  
USA

**EU Representative:**

GE Security B.V.  
Kelvinstraat 7  
6003 DH Weert  
The Netherlands

Concerning	RTTE		
	EMC	Safety	Radio
A sample of the product has been tested by:	CKC Labs, Inc. 5473A Clouds Rest Mariposa, CA 95338		CKC Labs, Inc. 5473A Clouds Rest Mariposa, CA 95338
Test report reference	IM04-002 ETS04-013B ETS04-029B ETS04-028B		ETS04-013A ETS04-028A ETS04-029A
Applied standards	EN301 489-3 v1.3.1 EN301 489-3 v1.4.1 EN50130-4 (1995 w/A1 :98 & A2 :03		EN300330-2 v1.1.1 (06-2001)

**Equipment class identifier** (RF products falling under the scope of R&TTE)

☐ Not Applicable ☒ None (class 1 product) ☐  (class 2 product)

**Means of conformity**

We declare under our sole responsibility that this product is in conformity with Directive 93/68/EEC (Marking) and/or complies to the esse relevant provisions of the 1999/5/EC (R&TTE) based on test results using (non)harmonized standards in accordance with the Directives me





GE Infrastructure  
Security  
791 Park of Commerce, Suite 100  
Boca Raton, FL 33487  
USA  
T + 1 888 GE Security (1 888 437 3287)

Visit us online at:  
[www.gesecurity.com](http://www.gesecurity.com)

© 2004-2005 General Electric Company  
All Rights Reserved.

460597001C/8-05

