

CASI-RUSCO...Security Solutions for the 21st Century

**Model 1000/1010
Dual Tech
(Proximity/
Magnetic Stripe)
Reader
Installation Guide**

Draft



**791 Park of Commerce Boulevard
Boca Raton, Florida 33487
(561) 998-6100**

Part Number: 460350002D2
June 2000

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.)

Copyright 1998 - 2000 CASI-RUSCO
All Rights Reserved.
Printed in the USA.

ProxLite and Proximity Perfect are trademarks of CASI-RUSCO.

WARNING

This is a 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.

Contents

- Introduction 1
- Product Features 2
- Installation Overview 3
- Mounting the Reader 4
- Setting Switches..... 13
 - Supervised/Unsupervised13
 - Fixed Frequency13
 - Door Strike Relay Output14
 - Beeper Sound Level14
 - Power Setting14
- Connecting the Reader 16
 - FCC Compliance16
 - FCC Rules16
 - Pinouts.....18
 - Wiring Diagrams20
- Testing the Reader 30
- Troubleshooting the Reader 32
- Technical Specifications 37
- Functional Specifications 38

Figures

Figure 1:	Backplate Preparation	6
Figure 2:	Model 1000/1010 Reader Dual Gang Box Mounting	7
Figure 3:	Model 1000/1010 Reader, Dual Gang Box Mounting, Continued.....	8
Figure 4:	Model 1000/1010 Reader, Direct Wall Mounting	9
Figure 5:	Model 1000/1010 Reader, Surface Mount Box	10
Figure 6:	Model 1000/1010 Reader, Surface Mount Box, Continued	11
Figure 7:	Model 1000/1010 Reader, 5029 Back Box or Environmental Hood Mounting	12
Figure 8:	Model 1000/1010 Reader, Jumper Setting	15
Figure 9:	Typical Installation Using Shielded Cable/Drain Wire ..	16
Figure 10:	Wiring Diagram for 12V Operation, Model 1000/1010 Reader to Door Strike and Microcontroller (Connection to J13 DB9)	20
Figure 11:	Wiring Diagram for 48V Operation, Model 1000/1010 Reader to Door Strike and Microcontroller (Connection to J13 DB9)	22
Figure 12:	Wiring Diagram for 12V Operation, Model 1000/1010 Reader to Door Strike and Microcontroller (Connection to J8 11-Pin Phoenix - Unsupervised DI)	24
Figure 13:	Wiring Diagram for 12V Operation, Model 1000/1010 Reader to Door Strike and Microcontroller (Connection to J8 11-Pin Phoenix - Supervised DI)	26
Figure 14:	Wiring Diagram for 48V Operation, Model 1000/1010 Reader to Door Strike and Microcontroller (Connection to J8 11-Pin Phoenix)	28
Figure 15:	Badge to Reader Presentation	38

Introduction

This manual is an installation guide for the CASI-RUSCO Model 1000/1010 Dual Tech (Prox/Magstripe) Reader.

The Models 1000 and 1010 Readers are identical in their functionality, except that the Model 1010 includes an integrated keypad used for the entry of a personal identification number (PIN).

The reader communicates with the microcontroller through a bidirectional data link which carries:

- Keypad data (Model 1010 only).
- Magnetic stripe data and/or Proximity card data.
- Command responses.
- Exit request switch and door status switch messages.
- Supervision messages.

IBM Model 5029 Reader Compatibility:

- The reader replaces the IBM Model 5029 Reader physically and operationally.
- The wiring and connection to the reader is identical to that of the Model 5029 Reader.
- The reader sends magnetic stripe data and/or proximity card data to the microcontroller.
- You can replace an existing Model 5029 Reader without any changes to the equipment to which it is connected. Simply unplug an existing Model 5029 Reader and plug in the Model 1000 or 1010 Reader.
- The reader contains a jumper-selectable option for silent supervision.

Product Features

The CASI-RUSCO Models 1000 and 1010 Dual Tech Readers offer:

- State-of-the-art architecture.
- Communication between the reader and microcontroller up to one mile* over a standard telephone cable.
- Reads ABA track 2 format magnetic stripe cards of any length, up to the first 16 numeric digits that are sent to the microcontroller.
- Reads ProxLiteTM and Proximity PerfectTM proximity cards.
- A compact, aesthetically pleasing design.
- Weather resistant for outdoor use. **
- Built-in intelligence for communication with the microcontroller.
- 12V to 48VDC operation.
- Power-on self test.
- A clear user interface.
- A tactile keypad (Model 1010) for personal identification number (PIN) entry and LED indicators in the same package.
- Rugged polycarbonate construction.
- A door strike relay for AC or DC operation, selectable normally open or normally closed contacts.
- Built-in tamper alarm with external option.
- Automatic self-tuning to compensate for component aging and mounting location.
- Switch-selectable supervised or unsupervised operation.
- Switch-selectable 40-bit Wiegand output.
- Switch-selectable normal 12-digit output or custom 10-digit.
- Switch-selectable door, exit request switch supervision.

* See the reader wiring diagrams section of this manual.

** Although the reader is weather resistant, it is not weatherproof; therefore, the reader must be mounted out of direct exposure to rain and/or snow.

2 Model 1000/1010 Dual Tech (Prox/MagStripe) Reader

Installation Overview

The following is the general sequence of steps to follow in installing the 1000/1010 reader. Each step is explained in further detail in the sections that follow:

1. Prepare the backplate. Refer to Figure 1, “Backplate Preparation,” on page 6.
2. Install reader mounting. Refer to “Mounting the Reader” on page 4.
3. Set the switches. Refer to “Setting Switches” on page 13.
4. Connect the reader. Refer to “Connecting the Reader” on page 16.
5. Mount the reader. Refer to “Mounting the Reader” on page 4.
6. Test the reader. Refer to “Testing the Reader” on page 30.
7. If necessary, refer to “Troubleshooting the Reader” on page 32.

Mounting the Reader

The reader comes with a backplate suitable for mounting directly onto standard U.S. electrical dual gang boxes. For other mounting applications, see Figures 2 through 7.

A gasket is supplied with the reader to form a weather-resistant seal between the backplate and the reader housing. This gasket is used to make the reader weather resistant, not weatherproof. Mount the reader out of direct exposure to rain or snow. Order and install the optional Cold Weather Kit for installations where below-freezing temperatures are anticipated.

- Readers should be mounted with their centers offset by at least 10 inches to provide interference-free operation.
- If readers are mounted side-by-side within 5 inches of each other, jumper setting JP7 Shorted needs to be used.
- If readers are mounted back-to-back, use metal mounting plate.

Wiring diagrams are included in this manual. When replacing a Model 5029 with the Model 1000 or 1010, no change of wiring is required when the existing cable does not exceed one mile and is 20 AWG or larger.

For 12V operation over distances greater than 500 feet or with wire smaller than 20 AWG, an auxiliary power supply may be required at the reader. If this situation arises:

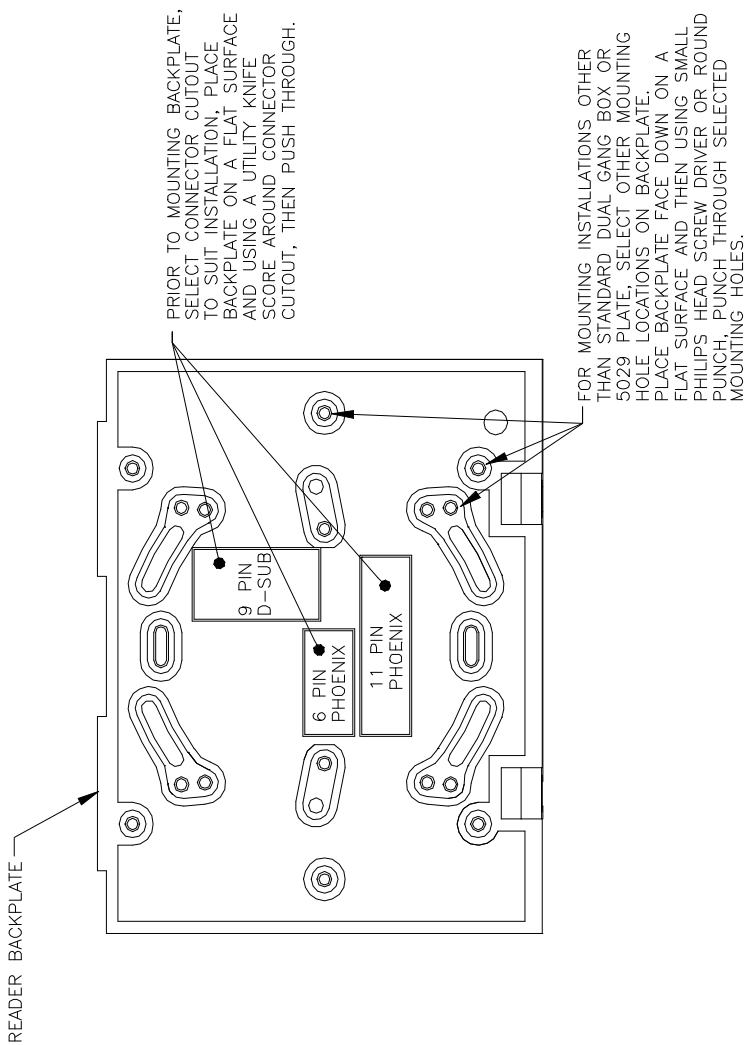
1. Disconnect the power supply wire at the reader (J13 pin 7) from the microcontroller supply and connect a local power supply to this pin.
2. Connect the power supply return to the ground wire (J13 pin 1), leaving the ground wire to the microcontroller connected.
3. Fold and tape the power wire from the microcontroller to prevent a short circuit.

The local supply must be able to deliver approximately 250 mA of regulated direct current at the voltage of choice.

There are four different methods of mounting the reader:

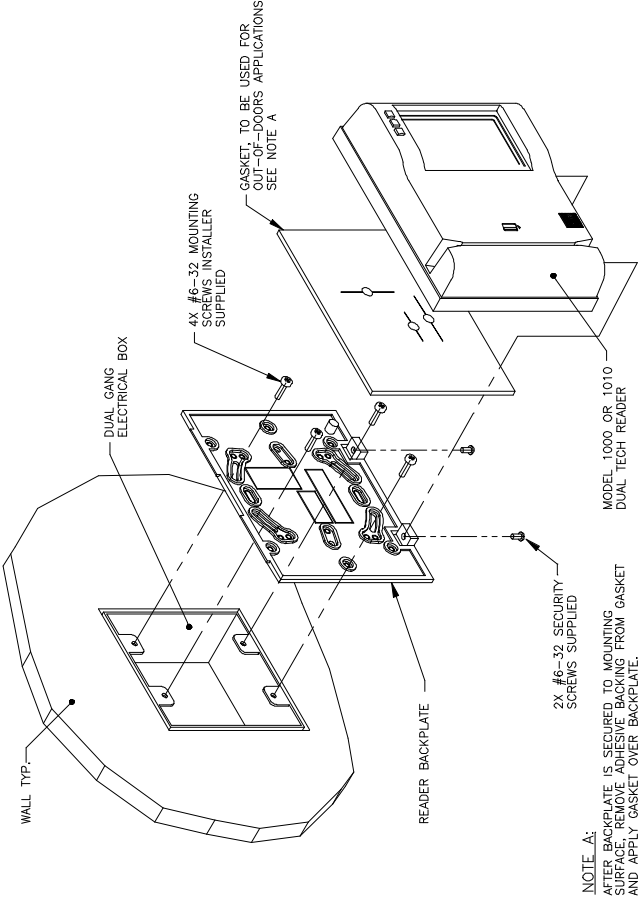
1. **Dual Gang Box Mounting.** Refer to Figure 2, “Model 1000/1010 Reader Dual Gang Box Mounting,” on page 7 and Figure 3, “Model 1000/1010 Reader, Dual Gang Box Mounting, Continued,” on page 8.
2. **Direct Wall Mounting.** Refer to Figure 4, “Model 1000/1010 Reader, Direct Wall Mounting,” on page 9.
3. **Surface Box Mounting.** Refer to Figure 5, “Model 1000/1010 Reader, Surface Mount Box,” on page 10 and Figure 6, “Model 1000/1010 Reader, Surface Mount Box, Continued,” on page 11.
4. **5029 Back Box and Environmental Hood Mounting.** Refer to Figure 7, “Model 1000/1010 Reader, 5029 Back Box or Environmental Hood Mounting,” on page 12.

FIGURE 1: Backplate Preparation



530165014D

FIGURE 2: Model 1000/1010 Reader Dual Gang Box Mounting



530165006E

FIGURE 3: Model 1000/1010 Reader, Dual Gang Box Mounting, Continued

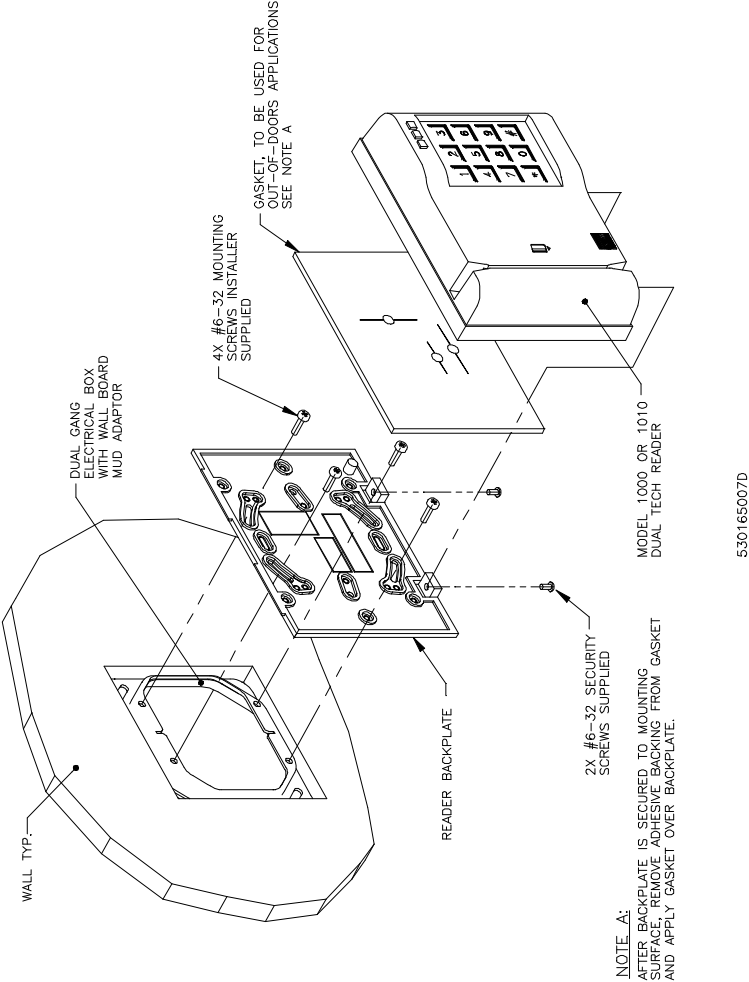
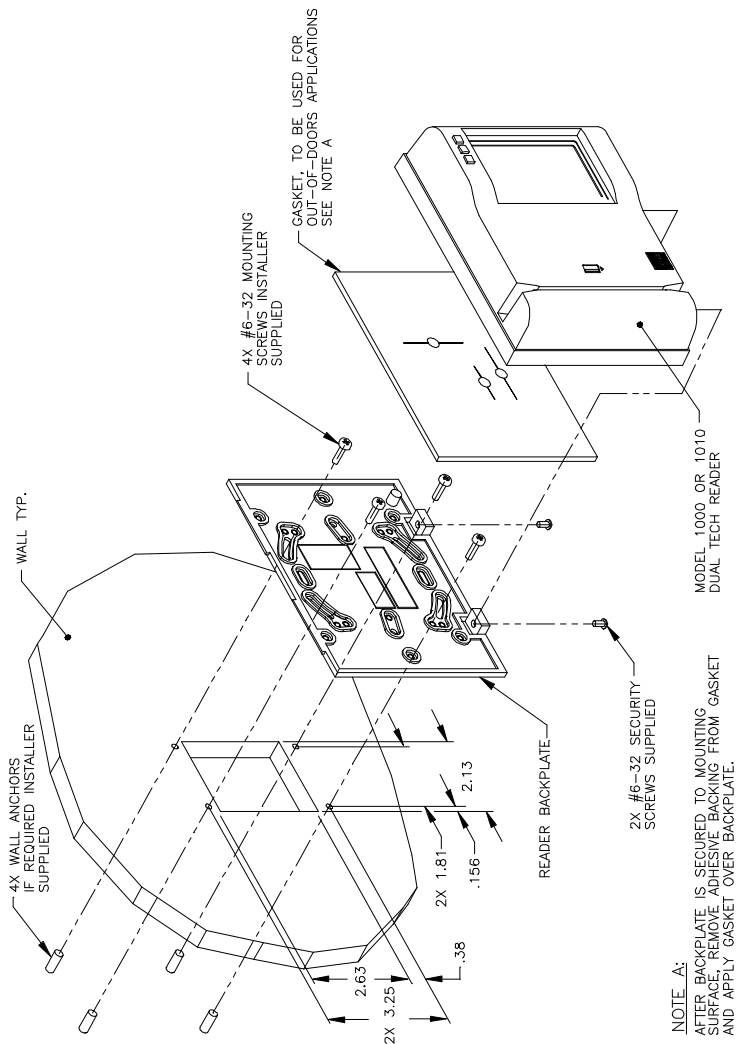
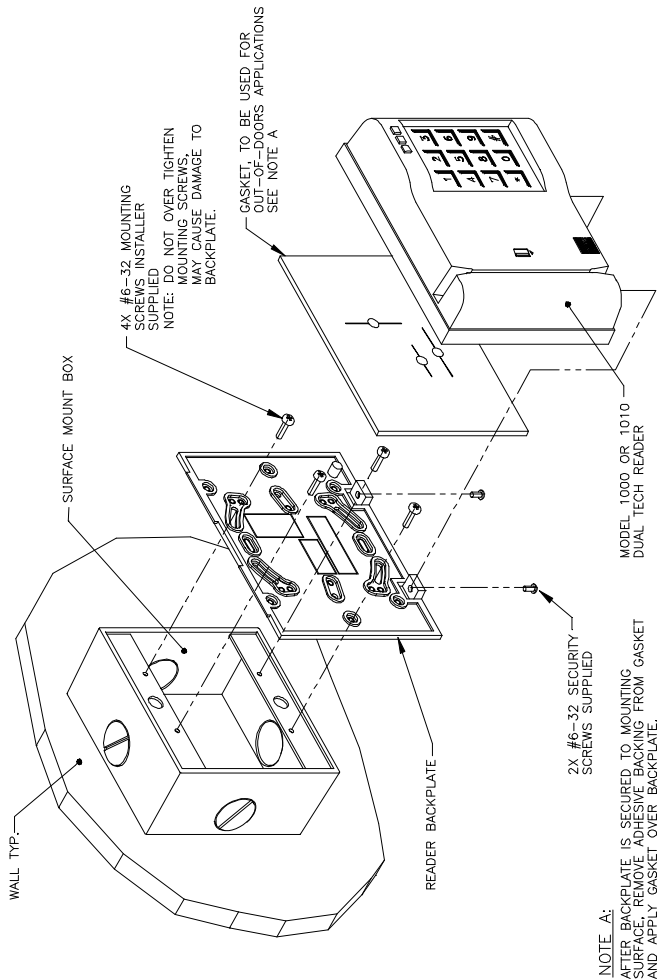


FIGURE 4: Model 1000/1010 Reader, Direct Wall Mounting



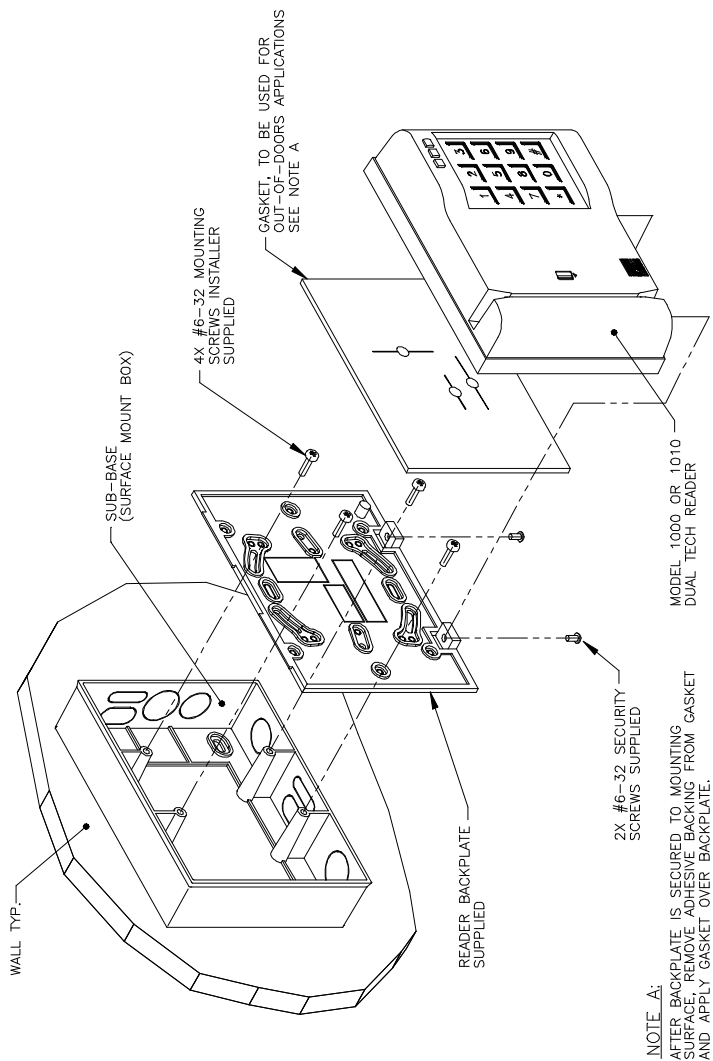
530165008D

FIGURE 5: Model 1000/1010 Reader, Surface Mount Box



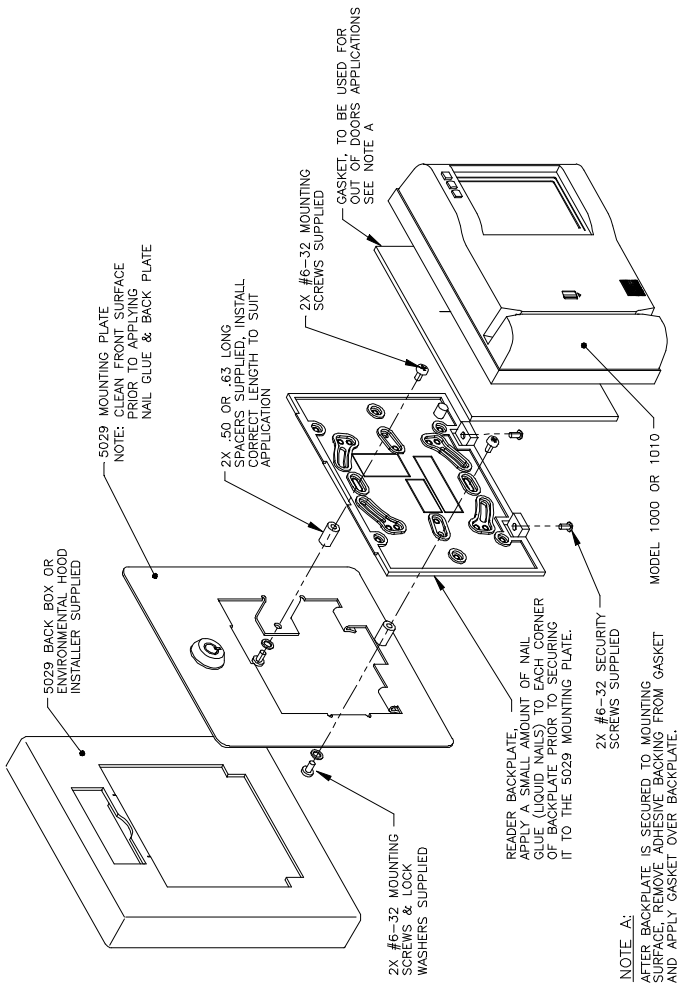
530165009E

FIGURE 6: Model 1000/1010 Reader, Surface Mount Box, Continued



5301650100

FIGURE 7: Model 1000/1010 Reader, 5029 Back Box or Environmental Hood Mounting



530165011E

Setting Switches

Refer to Figure 8 on page 15 for the location of the jumpers.

Supervised/Unsupervised

In the Supervised mode, there is regular communication with the micro. If communications is lost to the micro, the red LED will give three short, rapid blinks every few seconds. In the Unsupervised mode, there is no regular communication with the micro.

TABLE 1: Mode Jumpers

Brand	JP1	JP4	JP5
Unsupervised, IBM ¹	ON	ON	ON
Supervised, IBM DIs Unsupervised	OFF	ON	ON
Unsupervised, Generic ¹	ON	OFF	ON
Supervised, Generic DIs Unsupervised	OFF	OFF	ON
Supervised, Generic ² DIs Supervised	OFF	OFF	OFF
Wiegand Out, Generic ¹	ON	OFF	OFF
Wiegand Out, IBM ¹	ON	ON	OFF

1. DI information is transmitted only in F/2F supervised mode.
2. 1K resistors need to be installed.

Fixed Frequency

NOTE: Fixed frequency may need to be selected when readers are less than 10 inches away from each other and not back-to-back.

TABLE 2: Fixed Frequency

Power	JP7
Self-Tuned	Open
Fixed Frequency	Shorted

Door Strike Relay Output

JP2 - Selects the normally closed contacts for use with fail-safe door strikes.

JP3 - Selects the normally open contacts for use with fail-secure door strikes.

TABLE 3: Door Strike Relay Output

Jumper	Jumper Selection	Contacts
JP2	Open	-
	Shorted	Normally Closed Selected
JP3	Open	-
	Shorted	Normally Open Selected

Beeper Sound Level

TABLE 4: Beeper Sound Levels

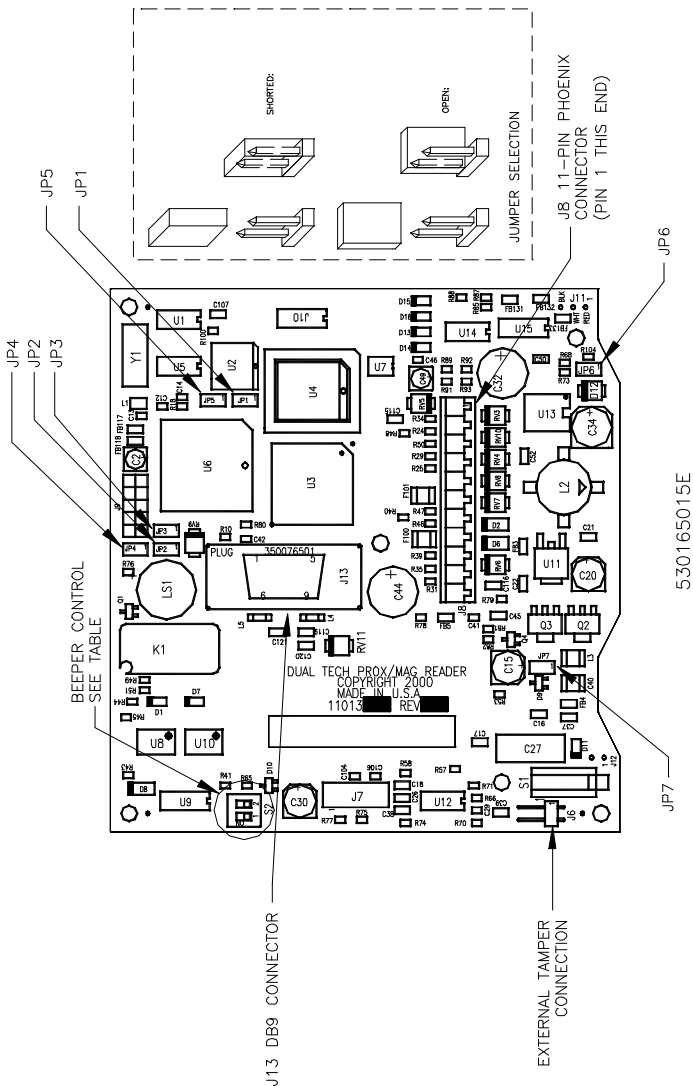
Beeper Sound Level	Switch S2	
	Position 1	Position 2
Normal	ON	ON
Low	ON	OFF
Off	OFF	OFF

Power Setting

TABLE 5: Power Setting

JP6	Power
Open	Normal
Shorted	High Power

FIGURE 8: Model 1000/1010 Reader, Jumper Setting



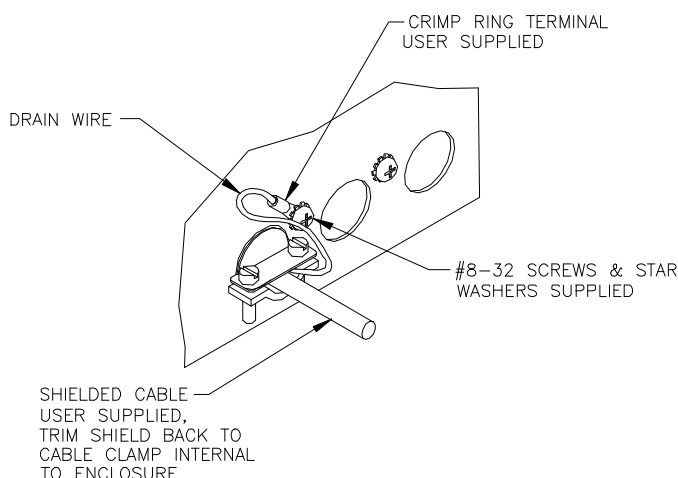
Connecting the Reader

FCC Compliance

To make the Model 1100/1081 Reader installation FCC compliant, the following conditions must be met:

- The cable connecting the Model 1100/1081 Reader to the Micro/5 must have its shield grounded at the Micro/5 according to Figure 9.
- One ferrite must be placed around each cable inside the bottom panel of the reader.

FIGURE 9: Typical Installation Using Shielded Cable/Drain Wire



FCC Rules

Information to User

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for Class B Digital Device, pursuant to Part 15 of the FCC Rules. These limits

are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures.

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Any changes or modifications not expressly approved by the part responsible for compliance could void the user's authority to operate the equipment.

Pinouts

The Model 1000/1010 Reader contains two connectors: a standard 9-pin D-subminiature connector (DB9) and a phoenix connector. The pinouts for the DB9 connector are in Table 6 below. The pinouts for the phoenix connector are in Table 7 on page 19.

TABLE 6: Pinouts for DB9 Connector J13

Pin #	Signal	Standard Color
1	Ground	Black
2	Switch common	Orange
3	F/2F	Red
4	Strike relay output	Blue
5	Exit DI (Exit Request Button)	Violet
6	Strike relay return	White
7	12 to 48V DC	Yellow
8	Door DI (Door Contact Switch)	Grey
9	Door DO input from microcontrollers (to control the strike relay)	Brown

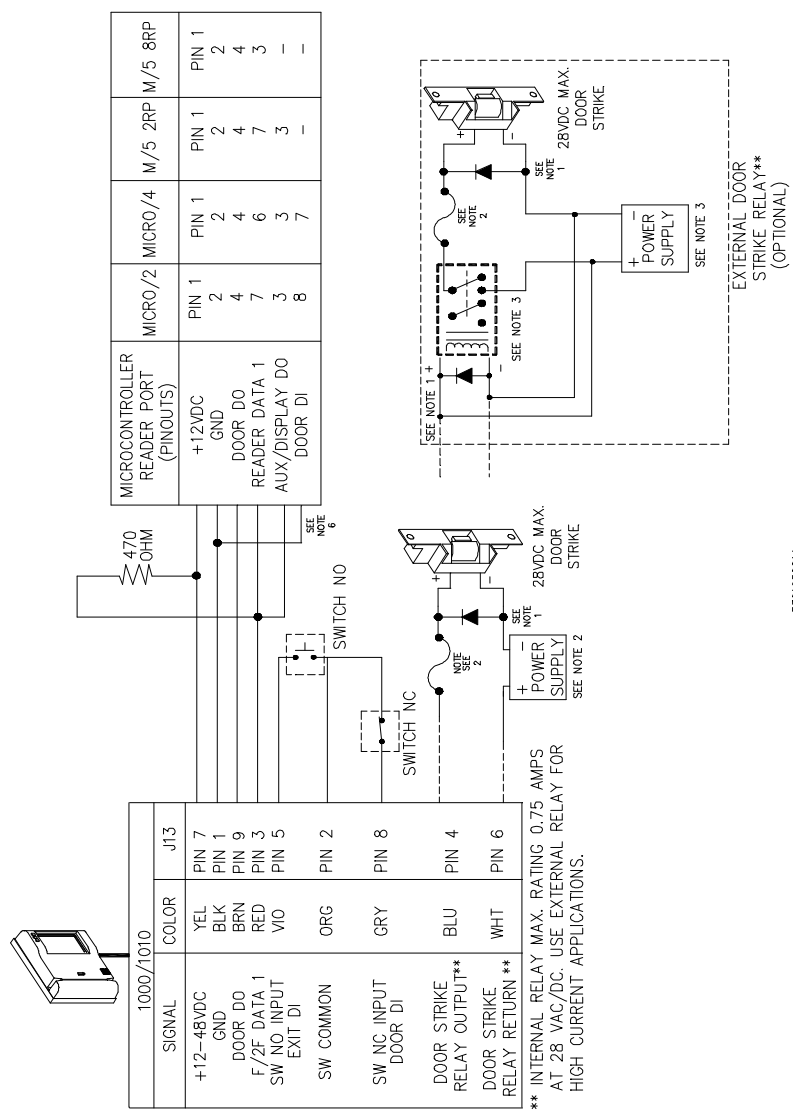
NOTE: Signals on the DB9 connector are also available on the phoenix connector to allow the installer to choose either the DB9 or the 11-pin phoenix for connecting the reader.

TABLE 7: Pinouts for Phoenix Connector J8

Pin #	Signal	Standard Color
1	Exit Request Return	Black
2	Door Return	Orange
3	Door DO input from microcontrollers (to control the strike relay)	Red
4	Door DI (Door Contact Switch)	Blue
5	12 to 48V DC	Violet
6	Strike relay return	White
7	Wiegand Data 0	Yellow
8	Strike relay output	Grey
9	F/2F or Wiegand Data 1	Brown
10	Exit DI (Exit Request Button)	
11	Ground	

Wiring Diagrams

FIGURE 10: Wiring Diagram for 12V Operation, Model 1000/1010 Reader to Door Strike and Microcontroller (Connection to J13 DB9)

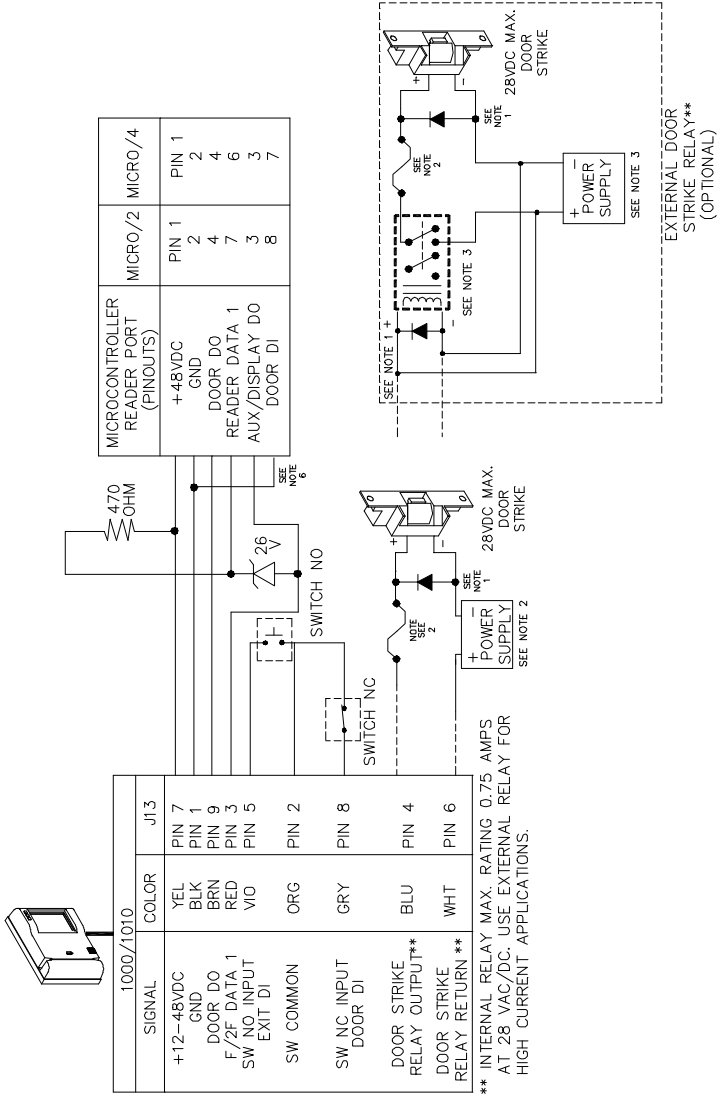


530165001A

NOTES: Unless otherwise specified:

1. Protection diodes may be 1N4002, 1N4003, or 1N4004 for the door strike assembly (supplied by the installer) for DC strikes only.
2. One amp fuse, power supply (fused primary), and relay provided by the installer/customer.
3. Relay coil resistance must be 100 ohms or greater at 12VDC.
4. Maximum cabling distance using 20 AWG telephone wire is 500 feet for 12VDC micros. Shielded cable is recommended in electrically-noisy environments.
5. If using shielded cable, connect all shields together at the micro end, connect to ground stud in lower left corner of cabinet using 14 AWG wire. No shield connections at reader.
6. Micro/2 and Micro/4 only: If wiring door DI switch through reader (as shown), door DI on reader board must be connected to Ground.

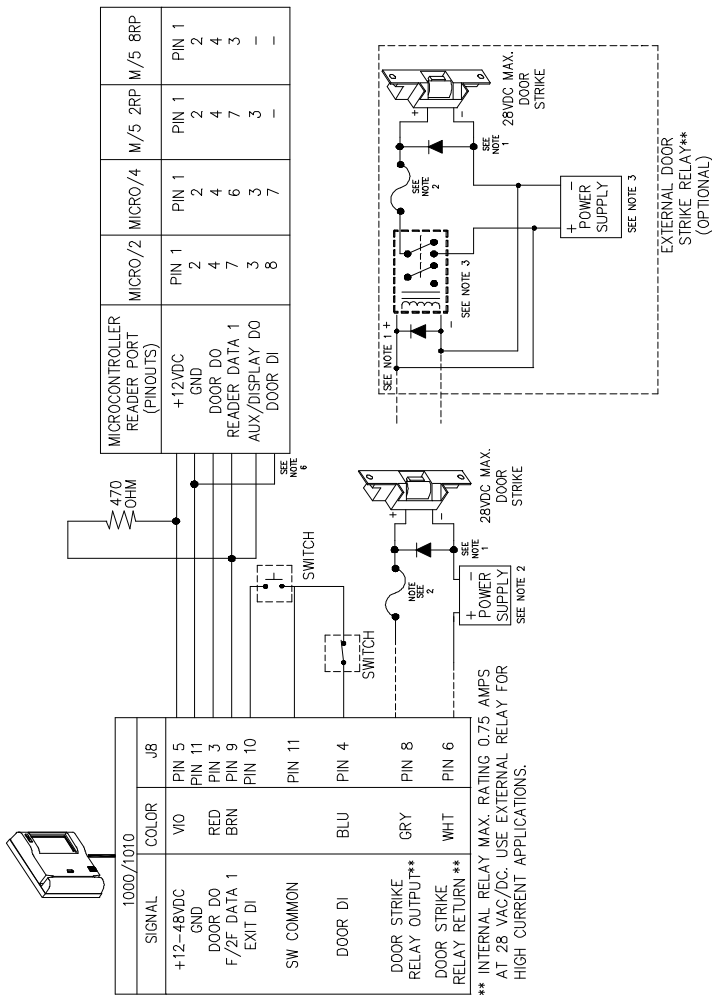
FIGURE 11: Wiring Diagram for 48V Operation, Model 1000/1010 Reader to Door Strike and Microcontroller (Connection to J13 DB9)



NOTES: Unless otherwise specified:

1. Protection diodes may be 1N4002, 1N4003, or 1N4004 for the door strike assembly (supplied by the installer) for DC strikes only.
2. One amp fuse, power supply (fused primary), and relay provided by the installer/customer.
3. Relay coil resistance must be 100 ohms or greater at 48VDC.
4. Maximum cabling distance using 20 AWG telephone wire (shielded) is 6,000 feet for 48VDC micros. The use of unshielded cable may allow longer distances or similar distances with smaller gauge wire; however, noise problems may result. Shielded cable is recommended in electrically-noisy environments.
5. If using shielded cable, connect all shields together at the micro end, connect to ground stud in lower left corner of cabinet using 14 AWG wire. No shield connections at reader.
6. Micro/2 and Micro/4 only: If wiring door DI switch through reader (as shown), door DI on reader board must be connected to Ground.

FIGURE 12: Wiring Diagram for 12V Operation, Model 1000/1010 Reader to Door Strike and Microcontroller (Connection to J8 11-Pin Phoenix - Unsupervised DI)



NOTES: Unless otherwise specified:

1. Protection diodes may be 1N4002, 1N4003, or 1N4004 for the door strike assembly (supplied by the installer) for DC strikes only.
2. One amp fuse, power supply (fused primary), and relay provided by the installer/customer.
3. Relay coil resistance must be 100 ohms or greater at 12VDC.
4. Maximum cabling distance using 20 AWG telephone wire is 500 feet for 12VDC micros. Shielded cable is recommended in electrically noisy environments.
5. If using shielded cable, connect all shields together at the micro end, connect to ground stud in lower left corner of cabinet using 14 AWG wire. No shield connections at reader.
6. Micro/2 and Micro/4 only: If wiring door DI switch through reader (as shown), door DI on reader board must be connected to Ground.

NOTES: Unless otherwise specified:

1. Protection diodes may be 1N4002, 1N4003, or 1N4004 for the door strike assembly (supplied by the installer) for DC strikes only.
2. One amp fuse, power supply (fused primary), and relay provided by the installer/customer.
3. Relay coil resistance must be 100 ohms or greater at 12VDC.
4. Maximum cabling distance using 20 AWG telephone wire is 500 feet for 12VDC micros. Shielded cable is recommended in electrically noisy environments.
5. If using shielded cable, connect all shields together at the micro end, connect to ground stud in lower left corner of cabinet using 14 AWG wire. No shield connections at reader.
6. Micro/2 and Micro/4 only: If wiring door DI switch through reader (as shown), door DI on reader board must be connected to Ground.

NOTES: Unless otherwise specified:

1. Protection diodes may be 1N4002, 1N4003, or 1N4004 for the door strike assembly (supplied by the installer) for DC strikes only.
2. One amp fuse, power supply (fused primary), and relay provided by the installer/customer.
3. Relay coil resistance must be 100 ohms or greater at 48VDC.
4. Maximum cabling distance using 20 AWG telephone wire (shielded) is 6,000 feet for 48VDC micros. The use of unshielded cable may allow longer distances or similar distances with smaller gauge wire; however, noise problems may result. Shielded cable is recommended in electrically-noisy environments.
5. If using shielded cable, connect all shields together at the micro end, connect to ground stud in lower left corner of cabinet using 14 AWG wire. No shield connections at reader.
6. Micro/2 and Micro/4 only: If wiring door DI switch through reader (as shown), door DI on reader board must be connected to Ground.

Testing the Reader

Perform the following test procedure to verify correct operation of the Models 1000 and 1010 Dual Tech Readers:

1. Check all cabling and electrical connections from reader to microcontroller.
2. Verify that the microcontroller is properly configured (refer to the appropriate CASI-RUSCO microcontroller manual).
3. Verify that the reader jumpers are properly set. Refer to Figure 8 on page 15.
4. Apply power to the reader and verify that the power-on self test completes and that the red LED is on.

It may be desirable to test the connections with a multimeter by testing voltage levels at the 9-pin D-subminiature connector. All measurements are done on connector J13. Using ground (pin 1) as a reference, the power (pin 7) and data (pin 3) lines should measure 9 to 14 volts on a 12-volt system and 40 to 51 volts on a 48-volt system. The door DO (pin 9) should measure approximately 12 volts on a 12-volt system and greater than 30 volts on a 48-volt system.

5. Ensure the proper version of the firmware is installed in the microcontroller. Refer to the appropriate microcontroller manual.
6. Close the tamper switch by joining the reader and backplate so that the tamper alarm is suppressed. When all wires are connected to the reader, ensure that the supervision function is operating properly by verifying that the reader is not beeping. If the reader is beeping, refer to the troubleshooting guide at the end of this manual.

7. Verify proper reader operation as follows:
 - A. Select a known good test badge. Be sure that the badge is properly enrolled in the host system. If the reader is used with a keypad, assign a proper PIN.
 - B. Ensure that the door is secure. This is the first step to verify that the reader strike relay is wired properly.
 - C. Pass the card through the reader. Observe that the yellow LED lights and the reader beeps briefly.
 - D. If used with a keypad, enter the PIN number when the yellow LED lights. Refer to the appropriate host manual for the correct PIN entry sequence.
 - E. Observe that the green LED turns on and remains on, indicating a valid access has been granted by the host.
 - F. Open the door. This verifies that the reader strike relay operates properly.

Troubleshooting the Reader

If the operation of a component is in doubt, substitute a known good component and retry the system.

Always verify wiring against the wiring diagrams before powering up the system.

Refer to the following Troubleshooting Chart.

IF YOU SEE THIS:	EXPLANATION/ACTION:
None of the LEDs are on.	Swipe a badge through the reader and listen for the beep while watching the yellow LED. • If the beeper sounds and the yellow LED lights briefly, the reader has power. Replace the reader. • If the beeper does not sound and the yellow LED is off, check the power connection to the reader as described in step 4 of the Test Procedure on page 26.

IF YOU SEE THIS:	EXPLANATION/ACTION:
Reader LED gives three short, rapid blinks every few seconds.	The reader has lost communications with the microcontroller. 1. Check reader-to-microcontroller wiring (refer to the appropriate installation drawing in this manual). Verify that the AUX DO is jumpered to the READER IN on the microcontroller. If the cable length is longer than 500 feet, be sure that the correct pull-up resistor is installed on the microcontroller. 2. Verify that the microcontroller has the correct selection for a supervised reader (refer to the appropriate microcontroller manual). 3. Try the reader on a different reader input of the microcontroller. If this corrects the problem, the problem is probably in the microcontroller. 4. Replace the reader with a known good reader. If this corrects the problem, return the defective reader for repair. 5. If you have eliminated all of the above possibilities (steps 1 through 4), there may be a significant electrical noise source present in the installation that is interfering with the reader-to-microcontroller communications. If so, the use of shielded wire for the reader-to-microcontroller connections is recommended.
Reader beeps three short, rapid beeps per second and red LED flashes at the same rate.	Indicates a tamper violation. Verify that the tamper switch is held closed by fastening the reader back to the reader. If this does not correct the problem, return the reader for repair.

IF YOU SEE THIS:	EXPLANATION/ACTION:
Beeper is always on.	• In the supervised mode, the microcontroller may command the reader to turn on the beeper. If the beeper is always on, verify that the system has not told the reader to turn on the beeper. Refer to the appropriate system manual for details. • Replace the reader with a known good reader. If this corrects the problem, return the defective reader for repair.
Yellow LED and/or beeper do not turn on briefly when a badge is swiped.	The yellow LED and the beeper turn on briefly to indicate a valid badge read. Perform the following tests using a known good badge: 1. Swipe a known good badge through the reader. If the yellow LED and the beeper do not turn on briefly, replace the reader with a known good reader. If the replacement reader works correctly, return the defective unit for repair. 2. If the yellow LED and the beeper do not turn on briefly on the replacement reader, the badge is probably defective.

IF YOU SEE THIS:	EXPLANATION/ACTION:
Green LED turns on but the door does not unlock properly OR Green LED does not turn on and door does not open with a valid badge.	The green LED is turned on by an external source. When the green LED is on, the door strike relay is on. 1. Verify that the door strike is wired correctly and that the relay jumper is set correctly. Be sure the door is locked when the red LED is on. 2. Remove the wire from J13 pin 9 and place a jumper wire from J13 pin 9 to ground (J13 pin 1). Verify that the green LED is now on. If the door is unlocked, the reader and door strike are operating correctly. If the door does not unlock, reconnect the wire on J13 pin 9 and proceed to step 3. 3. Remove the wires from J13 pin 6 and J13 pin 4. This disconnects the door strike from the reader. If a fail-safe door strike was used, the door should now be open. If a fail-secure door strike was used, the door should now be locked. Take the two wires that were removed from J13 pin 6 and J13 pin 4 and short them together. Note that the status of the strike has reversed; a fail-secure strike is now unlocked and a fail-safe strike is now locked. If the door strike is working as described above, the reader is defective and should be returned for repair. If the door strike is not working, reconnect the wires and return to step 1.

IF YOU SEE THIS:	EXPLANATION/ACTION:
Reader beeps more than once when a valid badge is presented. NOTE: Applies to supervised mode only.	The reader beeps and the yellow LED lights briefly each time badge data is sent to the microcontroller. When a badge is swiped, the reader reads the badge and tests to see if the badge was read correctly. If the badge was read correctly, the reader sends the data to the microcontroller and waits approximately 1/3 second for the microcontroller to acknowledge receipt of the badge data. If the microcontroller does not acknowledge receipt of the data, the reader sends the data again until it is acknowledged by the microcontroller. Each time the data is sent, the reader beeps briefly. After the reader has sent the badge data unsuccessfully three times, it will stop trying and sound an error signal (three short beeps). This feature is useful in troubleshooting marginal installations. A high level of electrical interference may cause the reader to make multiple attempts at communications with the microcontroller. If multiple beeps occur regularly, refer to the installation diagrams to verify that the correct pull-up resistor has been added to the microcontroller. In the presence of high electrical noise levels, this pull-up resistor should improve communications, even on short cable runs. If the problem persists, the use of shielded cable is recommended.

Technical Specifications

Operating Temperature Range: 5 to 66° C (41 to 150° F)

With Optional Cold Weather Kit: -35 to 66° C (-31 to 150° F)

Humidity Range: 0 to 95%, noncondensing

Physical Dimensions: 4.75" (H) x 6.00" (W) x 1.63" (D)

121 mm (H) x 152 mm (W) x 42 mm (D)

Index of Protection: IP34

Maximum Cabling Distance: The reader will work well with unshielded cable in most environments. No company, including CASI-RUSCO, can guarantee that data will be reliably transmitted for long distances on unshielded cable in every installation. The following distances are for reference only. Refer to the appropriate installation wiring diagrams for specific information.

12V operation: * 500 feet on standard 20 AWG telephone wire

48V operation: One mile on standard 20 AWG telephone wire

- * 12V operation implies that a 12V power supply is located up to 500 feet from the reader. The use of an auxiliary power supply close to the reader may allow operation at greater distances.

Power Supply: Nominal 12 to 48V DC, 200 mA at 12V and 70 mA at 48V

Color: Light grey

Door Strike Relay: Maximum contact rating of 0.75 amperes*.

Maximum contact voltage of 28V AC or DC.

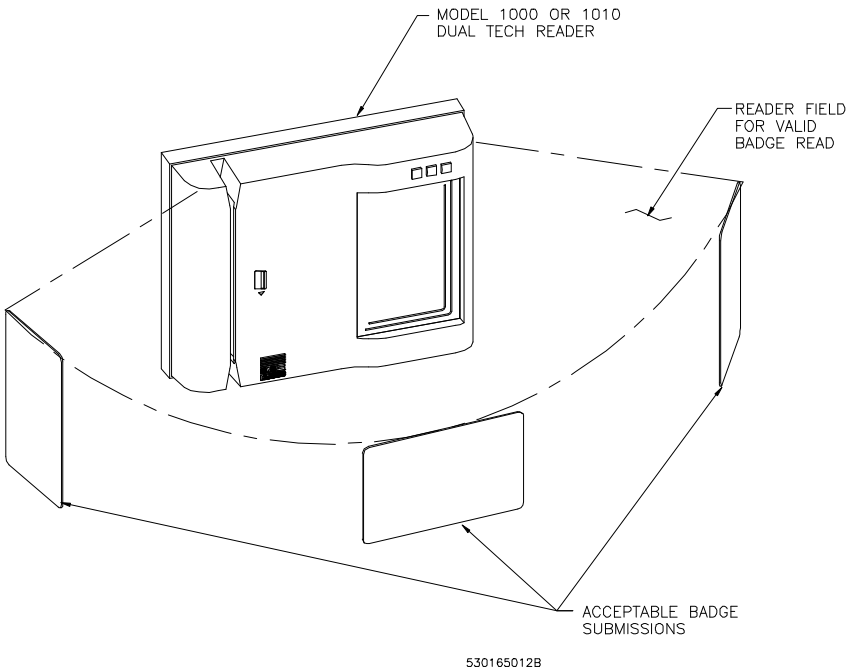
Maximum Reader Range: 6 inches with a ProxLite or Proximity Perfect badge. The read range depends on many variables, such as the interference from other electronics equipment (like computer monitors or two-way radios).

- * A relay has been designed into the reader for maximum flexibility. The life of the relay will decrease as the current switched by the contacts is increased. Use low current door strikes for high traffic doors to maximize the relay life. Use an external relay for high current applications.

Functional Specifications

Product Operation: The reader transmits a *wake-up* field extending all around the reader. When a badge is presented, energy from the field powers the electronics inside the badge allowing it to transmit its unique data to the reader. The reader receives, interprets, and checks the data, sending only uncorrupted badge data to the microcontroller. Due to the nature of the *wake-up* field, the maximum read range will be realized only if the badge is presented to the reader on an imaginary semi-circle centered on the reader, as shown below.

FIGURE 15: Badge to Reader Presentation



In the supervised modes, the reader also monitors and reports the status of a normally-closed door contact switch and a normally-open exit request push button.

A magnetic read head detects ABA encoded numeric data on track two of a magnetic stripe card when the card is passed across the head. The reader interprets this data and sends only valid card data to the host

controller. The reader monitors and reports the status of a door contact and an exit request pushbutton (in supervised mode).

Application: Intended for areas requiring a moderately high level of security for controlled access.

Compatibility: All CASI-RUSCO systems.

Reader Technology Type: F/2F magnetic stripe technology reading track two and CASI-RUSCO ProxLite and Proximity Perfect Read-Only Technology.

Parts List:

Model 1000 Reader

Model 1010 Reader

Optional 1000/1010 to 5029 Mounting Plate

Optional Housing, Surface Mount

Optional Tool, 1/8 inch Hex Tamper Key

Optional 1000/1010 Cold Weather Kit

Weather-Resistant Gasket

Badge Formats: First 4- to 16-digit number conforming to the ABA (IBM) Standard for track two numeric data for magnetic stripe and 10-digit or 12-digit for proximity badges.

Mounting: The reader offers great flexibility in mounting. It is supplied with a backplate suitable for mounting on a gang box. Optional surface mount back boxes and a 5029 backplate are available. Most existing mountings for the Model 5029 are compatible with this unit. A hex tamper key tool must be purchased to install the reader.

Appearance: Attractive and durable light grey polycarbonate housing.

Indicators: Red, yellow, and green LEDs and a beeper are incorporated into the reader.

- **Red LED:** Normally on when power is applied to the reader. The red LED flashes to indicate a tamper condition or the loss of communication with the microcontroller. In either case, the reader will not read badges.
- **Yellow LED:** Blinks off briefly to indicate that a badge has been read and sent to the microcontroller. When using the keypad (Model 1010), the LED turns on to indicate a keypress has been received by the microcontroller and remains on to indicate that the microcontroller is still waiting for remaining keys; if it goes off before all keys are pressed, the sequence must be started again.

The first 5 seconds after power-up indicate the status of the Exit request switch. If the Exit request switch is closed, the yellow LED will be on; if open, the LED will be off.

- **Green LED:** When on, indicates that the microcontroller has activated the door strike; it remains on for as long as the door strike is activated. The first 5 seconds after power-up indicate status of the door DI switch. If this switch is closed, the green LED will be on; if open, the LED will be off.
- **Beeper:** The beeper sounds briefly to indicate that a valid badge has been read or that a key has been pressed (Model 1010). A short triple beep sounds to indicate a tamper condition or lack of communication with the microcontroller.

Reader/Microcontroller Communications: The reader sends badge data or reader status data to the microcontroller approximately once every second and waits for an acknowledgment from the microcontroller. The reader continues sending the data every second until an acknowledgment is received. If an acknowledgment is not received after the third attempt, the red LED starts flashing. Once the reader receives an acknowledgment, the red LED stops flashing.

Badge Read Operation: Each time the reader sends badge data, the yellow LED blinks off briefly and the beeper sounds. On systems set up for PIN entry only, the yellow LED is on to indicate that keypad data is expected.

Keypad Operation (Model 1010 only): This function requires supervised mode. The reader sends each new keypress to the microcontroller and blinks the yellow LED off. The beeper sounds while a key is pressed.

Reader Tamper Operation: The readers incorporate a tamper switch. While the reader is separated from its backplate, all badge-reading functions are disabled, a tamper condition is indicated by a triple beep, the red LED flashes, and all communications with the microcontroller are suspended, taking the reader off line.

The reader is also equipped with an external tamper feature. To activate this feature, connect a single-pole, single-throw (SPST), normally-closed push-button switch (installer supplied) to connector J6 on the printed circuit board assembly and install the switch between the wall and reader backplate. When the reader and the backplate are removed from the wall, the switch will close; therefore, closing the connection at J6 causing a tamper condition.

Door Contact and Exit Request Inputs: The readers have a door contact switch input and an exit request switch input. In supervised mode, the state of both switch inputs is periodically reported to the microcontroller, but changes to switch inputs are reported immediately.

Relay: Jumper-selectable normally closed and normally open contacts are supplied for use with fail-safe or fail-secure door strikes.

NOTES