



Zodiac Link

OPERATOR GUIDE

June 2012



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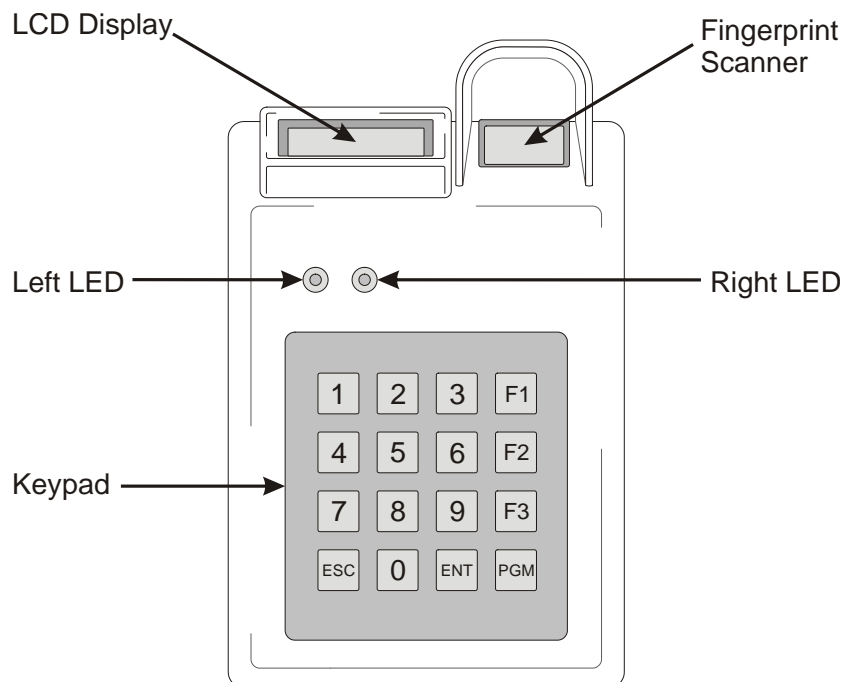
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Introduction



Enrollment:

Administrators and users are enrolled directly into the Zodiac Link reader. This is done by entering information on the keypad, following the prompts displayed on the LCD display and using the fingerprint scanner to enroll fingerprints. The keypad, LCD and fingerprint scanner are also used when accessing a controlled area.

Fingerprint Scanner:

The fingerprint scanner reads fingerprints for both enrollment and authentication. The scanner will turn on when you are supposed to place your finger on the scanner.

LCD Display:

The LCD display will show information such as the time, systems settings and user information, as well as prompt you with questions you will need to answer in order to complete certain functions.

LED Indicators:

- The left LED is internally controlled by the Zodiac Link and is normally **RED** in colour. It turns **GREEN** when the reader authenticates a user. It will flash **RED** three (3) times if the reader fails to authenticate a user.
- If the reader is set to reader mode and is connected to a controller, the right LED is externally controlled by the host controller and is normally **RED** in colour. It turns **GREEN** when the LED line from the controller is pulled low.

Keypad:

The keypad is used for entering data into the Zodiac Link.

Master Reader:

When multiple readers are configured to use the RS-485 bus, one must be designated as a Master and the rest designated as Slaves. All enrollment and administrative functions should be performed from the Master Reader.

When the map of the Slave Readers is set (*see map slave section*), the user fingerprint templates enrolled at the Master Reader are automatically replicated to all Slave Readers. However, the fingerprint templates of the administrators and the reader's settings are not replicated. These must be programmed at each Slave Reader.

Slave Reader:

The Slave Readers cannot be used to perform any enrollment or administrative function with the exception of copying all user fingerprint templates to other readers. This bulk copy feature is provided in the event that one of the readers is down and the Master Reader is not available. Slave Readers cannot be used to copy individual fingerprint templates to other readers, they may only be copied in bulk.

Manual Replication:

From a Master Reader, a single fingerprint template or all fingerprint templates may be manually replicated to other readers one at a time. This feature is provided in the event that the Slave Reader was down or was not available during the auto replication process, and is now available for a manual replication.

Administrators

On the very first power up of Zodiac Link, the unit's memory is blank. This is known as virgin mode (factory default). The following message will scroll on the LCD screen:

“The unit is in virgin mode. Setup required press PGM key *****”

Press **PGM**. You will be asked if you want to add an administrator. While the reader is in virgin mode, an administrator must be added in order to further set up the reader.

Press **1** (YES). The reader will issue a Personal Identification Number (PIN) number from 1 to 9. Record the PIN.

The fingerprint scanner will turn on; place a finger on the scanner. When the message “Remove and Verify” appears on the display, remove and replace the finger on the scanner.

If scanning was successful, the message “Function Complete” will be displayed and you will enter the SETUP menu. If the scanner does not successfully capture your fingerprint the message “Scanner Timeout” will be displayed and you will have to attempt to add an administrator again.

Up to 9 administrators may be enrolled. If there is only one administrator enrolled, and because an administrator can only enroll a single fingerprint template, it is recommend that you enroll yourself a second time as an administrator, with an alternate fingerprint. This will give you another opportunity to enter the menu in case there is ever a problem reading your Primary Fingerprint.

- Press the **ESC** key at any time to cancel entries in progress or to bring you to the previous menu.
- When in Admin or Setup menu, press the **PGM** key to exit the menu immediately if desired.
- If no key is pressed for 45 seconds the reader will automatically exit the menu.

MENU OVERVIEW

As an administrator, follow these steps to enter the menu at any time:

1. Press **PGM**.
2. Enter your PIN.
3. Press **ENT**.
4. Present your fingerprint to the fingerprint scanner. When accepted, you can choose one of two main menus, **Admin Menu** or **Setup Menu** by pressing 1 or 2 respectively. There are sub menus following each main menu.

ADMIN MENU =1

- ADD USER =1
- DELETE USER =2
- DISPLAY USER =3
- DISPLAY COUNT =4
- SECURITY LEVEL =5
- GET LOCAL ID =6
- COPY TO SLAVE =7

SETUP MENU =2

- ADD ADMIN =1
- DELETE ADMIN =2
- WIEGAND FORMAT =3
- SET SYS CODE =4
- SELECT MODE =5
- SET TIME =6
- DEL ALL USERS =7
- FACTORY RESET =8
- MAP SLAVES =9
- OTHER OPTS. =F1
 - COPY INDIVIDUAL RECORD =1
 - COMMUNICATE TO A SPECIFIC UNIT =2
 - NOT USED =3
 - SYNC ALL CLOCKS =4
 - CHANGE BAUD =5

- Press the **ESC** key at any time to cancel entries in progress or to bring you to the previous menu.
- Press the **PGM** key to exit the menu immediately.
- If no key is pressed for 45 seconds the reader will automatically exit the menu.

Setup Menu

To enter the SETUP menu:

1. Press **PGM**.
2. Enter your **PIN**.
3. Press **ENT**.
4. Present your finger to the fingerprint scanner.
5. When accepted, press **2** to enter the SETUP menu.

- Press the **ESC** key at any time to cancel entries in progress or to bring you to the previous menu.
- Press the **PGM** key to exit the menu immediately.
- If no key is pressed for 45 seconds the reader will automatically exit the menu.

ADD ADMIN

Up to nine (9) administrators can be stored in Zodiac Link.

1. Press **1** from the SETUP menu.
2. Confirm by pressing **1** (YES) or **2** (NO).
3. If YES, a PIN will be issued. Record this number. Place a fingerprint on the scanner when it turns on. When the message “Remove and Verify” appears on the display, remove and replace the finger on the scanner. The administrator will be added.
4. If NO, you will return to the previous menu.

DELETE ADMIN

1. Press **2** from the SETUP menu.
2. Confirm by choosing **1** (YES) or **2** (NO).
3. If YES, enter the PIN of the administrator you wish to delete. Press **ENT**. The administrator will be deleted.
4. If NO, you will return to the previous menu.

WIEGAND FORMAT

1. Press **3** from the SETUP menu.
2. The LCD will show the current format in bits (26 or 37).
3. To change the format press **1** for 26-bit or **2** for 37-bit.
4. If the reader is set to DCM mode, changing bit format to 37 will be denied.

SET SYSTEM CODE

This is applicable only when the reader is set to Reader Mode and connected to a controller.

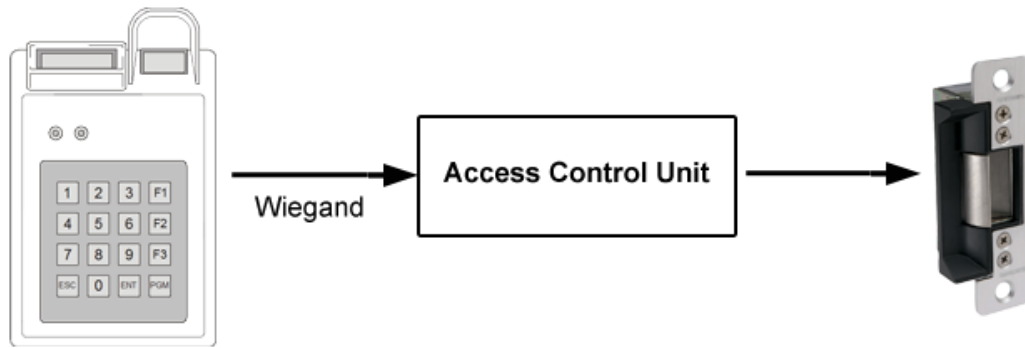
1. Press **4** from the SETUP menu.
2. The current System Code will be displayed.
3. If desired, enter a new System Code and press **ENT**.

<p>When the Wiegand format is 26-bit, the system code range is 0 to 255. When the Wiegand format is 37-bit, the system code range is 0 to 32767.</p>
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SELECT MODE

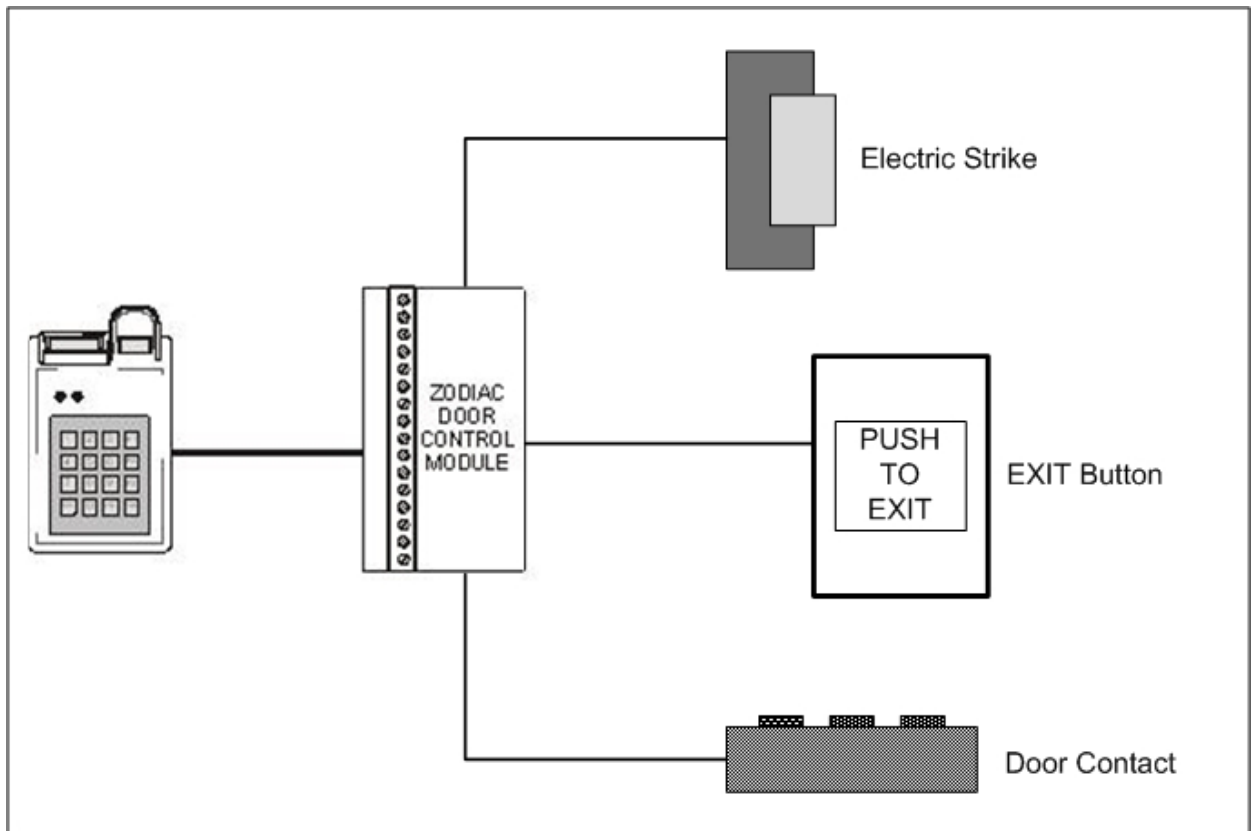
Reader Mode:

Use this mode when the Zodiac Link is connected to an access control unit. When a user is authenticated, System Code and user ID are sent to the access control unit. If the reader's System Code and the user's ID number matches that which is used by the host controller, access will be granted.



DCM Mode

Only the Zodiac Link reader will authenticate the user. The DCM will grant access to all authenticated users. This mode only works when the reader is wired to a Zodiac Door Control Module, which controls the locking device.



RS-485 Network:

If the readers are connected together in an RS-485 bus for the purpose of communication and data replication, then RS-485 network should be selected.

1. Press 5 from the SETUP menu.
2. Select the mode of operation by pressing 1 for Reader mode or 2 for DCM mode.
3. The reader prompts for RS-485 Network selection.
4. Press 1 for YES and 2 for NO.
5. If 1 is pressed, the reader prompts to Select Type.
6. Press 1 for Slave or 2 for Master.

NOTE: When the Master Reader exits programming mode, the banner should initially display “Zodiac Link S” even if it was set to master mode. It is in the pending state. You must perform the “Map Slave” function (*see map slaves section*). When the map is done, the reader automatically removes the pending state and turns itself into a Master Reader. The banner should then display “Zodiac Link M”.

When the Slave Reader exits programming mode, it should display “Zodiac Link S”.

SET TIME

1. Press **6** from the SETUP menu.
2. The LCD will show the date (YY/MM/DD), day of the week and the time (24-hour clock).
3. To change the date, press **1**. To change the time, press **2**.

If you are changing the date, include a leading zero in your entry if it is a single-digit number. Enter the last 2 digits for the year, then the numerical value for the month, then the day of the month. For example, if the date is October 1, 2012, you would enter “121001”. Then choose the day of the week by pressing the appropriate key:

Sunday = 1	Monday = 2	Tuesday = 3	Wednesday = 4	Thursday = 5	Friday = 6	Saturday = 7
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If you are changing the time, enter the time in a 24-hour format. See below for conversion from a 12-hour clock to a 24-hour clock.

12-HOUR CLOCK	24-HOUR CLOCK
1:00 AM	01:00
2:00 AM	02:00
3:00 AM	03:00
4:00 AM	04:00
5:00 AM	05:00
6:00 AM	06:00
7:00 AM	07:00
8:00 AM	08:00
9:00 AM	09:00
10:00 AM	10:00
11:00 AM	11:00
12:00 PM	12:00

12-HOUR CLOCK	24-HOUR CLOCK
1:00 PM	13:00
2:00 PM	14:00
3:00 PM	15:00
4:00 PM	16:00
5:00 PM	17:00
6:00 PM	18:00
7:00 PM	19:00
8:00 PM	20:00
9:00 PM	21:00
10:00 PM	22:00
11:00 PM	23:00
12:00 AM	24:00

DELETE ALL USERS

The deletion of all users affects only the reader being worked on regardless of whether it is a Master or a Slave Reader.

1. Press 7 from the SETUP menu.
2. Confirm by pressing 1 (YES) or 2 (NO).
3. Confirm again by choosing 1 (YES) or 2 (NO).
4. The message “Deleting Users” will be displayed on the LCD.
5. When complete, the message “Function Complete” will be displayed.

FACTORY RESET

The factory reset affects only the reader being worked on regardless of whether it is a Master or a Slave Reader.

1. Press 8 from the SETUP menu.
2. Confirm by pressing 1 (YES) or 2 (NO).
3. Confirm again by choosing 1 (YES) or 2 (NO).
4. The message “Clearing Memory” will be displayed on the LCD.
5. When complete, the message “The unit is in virgin mode. Setup required press PGM key *****” will be displayed on the LCD. If you wish to set up the reader again, refer to the Administrators section in this manual.

MAP SLAVES (APPLIES ONLY IF MULTIPLE READERS ARE CONNECTED & RS-485 ENABLED)

When the RS-485 mode is enabled and the reader is set to Master, the Master role is still in the pending state until the map slaves function is performed on the Master Reader. Until then, the user enrollment and other functions may not be performed. In the mapping process, the Master Reader sequentially communicates with all the Slave Readers and makes an internal map of which readers are available and what their addresses are. This helps the Master Reader in its replication process to all Slave Readers.

1. Press 9 from the SETUP menu.
2. Confirm by pressing 1 (YES) or 2 (NO).
3. The reader displays “Trying 2 Connect”
4. As Slave Readers are found, the message “Found ID” is displayed followed by the addresses of the found readers. When the process is finished, it displays the total number of readers found followed by “SAVE=1 EXIT=2 RETRY=3”
5. Press the desired number (1 or 2 or 3) before proceeding - e.g. 1 to save the map.
6. When no Slave Readers are found, the message “Found No Slaves” is displayed followed by the message “Check Cables/Setup Exit=1 Retry=2”

OTHER OPTS (OTHER OPTIONS)

○ COPY INDIVIDUAL RECORD (APPLIES ONLY IF MORE THAN ONE READER IS CONNECTED)

From a Master Reader, you may copy an individual record or a fingerprint template to all Slave Readers. This function is not applicable on a Slave Reader.

1. From the Setup menu, press F1.
2. Press 1 to select “Copy Individual Record”.
3. The Master Reader checks if it has communication to all Slave Readers before proceeding. If one of the Slave Readers is down, the Master Reader displays the ID of the down reader, and it aborts the copy process. You may fix the down reader then try again, or remap (*see map slaves section*) to eliminate the down reader and try again.
4. If the communication is established, the reader prompts for the PIN number of the record or template to be copied. Input the PIN number and press Enter.
5. If the PIN number is valid, the Master Reader sequentially replicates the template to all Slave Readers.
6. If the PIN number is invalid, an error message “Invalid PIN #” will be displayed.

○ COMMUNICATE TO A SPECIFIC UNIT (APPLIES ONLY IF MORE THAN ONE READER IS CONNECTED)

This function is used to test if a reader is reachable. It may be carried out at any time, from any reader, to ensure that communication among readers is established in order for any function such as replication, copy or synchronization to be successful.

1. Press F1 from the Setup menu.
2. Press 2 to select “Communicate To a Specific Unit”.
3. Input the ID of the desired reader and press Enter.
4. If communication is established then the message “Comms OK” will be displayed, and the left LED will flash continuously. Press ESC to stop the test.
5. If communication fails, then the message “No Comms Push Esc” will be displayed. Press ESC to stop the test.

○ SYNC ALL CLOCKS (APPLIES ONLY IF MORE THAN ONE READER IS CONNECTED)

The clock on all Slave Readers may be synchronized only from the Master Reader.

1. From the Master Reader, enter the Setup menu.
2. Press F1 to select “Other Opts.”.
3. Press 4 to select “Sync All Clocks”.
4. Press 1 (YES) or 2 (NO).
5. If 1 is pressed, the Master Reader checks for communication to all Slave Readers before it synchronizes the clock. If one of the Slave Readers fails to communicate, the Master Reader displays the message “Error on Unit #” followed by that reader’s ID, and it aborts the synchronization. You may fix the down reader then try again, or remap (*see map slaves section*) to eliminate the down reader and try again.
6. If 2 is pressed, the Master returns to the previous menu.

○ CHANGE BAUD

The baud rate for RS-485 communication of the readers can be changed from 38.4K to 115K. However, for all readers to be able to communicate with each other the baud rate must be the same.

IMPORTANT: The default baud rate is 38.4K and should not be changed without consulting the factory.

1. Press F1 from the Setup menu.
2. Press 5 to select “Change Baud”.
3. The reader displays the current baud rate.
4. Press 1 for 38.4K or 2 for 115K.
5. A message “Function Complete” will be displayed.

Admin Menu

To enter the ADMIN menu:

1. Press **PGM**.
 2. Enter your PIN.
 3. Press **ENT**.
 4. Present your finger to the fingerprint scanner.
 5. When accepted, press **1** to enter the ADMIN menu.
- Press the **ESC** key at any time to cancel entries in progress or to bring you to the previous menu.
 - Press the **PGM** key to exit the menu immediately.
 - If no key is pressed for 45 seconds the reader will automatically exit the menu.

ADD USER

Users can be granted access in one of two ways using Zodiac Link, with a *Bypass Number* or *Fingerprint*. A bypass number is a user-defined number, 5 to 8 digits in length, which can be entered on the keypad instead of using a fingerprint. **IMPORTANT:** It should only be used if all attempts to enroll a user have failed.

For fingerprint access, a PIN (one-digit for administrators, and two- to four-digits for users) is entered prior to presenting a fingerprint to the fingerprint scanner. Each user can have two fingerprints enrolled, a Primary Fingerprint and a Backup Fingerprint. A Backup Fingerprint can only be enrolled if a Primary Fingerprint is enrolled; you do not have to enroll a backup finger. Fingerprint access is the more secure method of access. Bypass numbers should **ONLY** be assigned to users whose fingerprints cannot be enrolled.

At the very least, a Primary Fingerprint *or* a bypass number must be enrolled for the user.

When a user is enrolled at a Master Reader where multiple readers are connected, the fingerprint template is automatically replicated to all other Slave Readers. See *Master Reader* and *Slave Reader* section.

1. Press **1** from the ADMIN menu.
2. Confirm by pressing **1** (YES) or **2** (NO).
3. If YES a **PIN** (see Glossary p. 26) will be issued for the user you are adding. You can either:
 4. Press **1** (ACCEPT) to accept this PIN. Record the PIN.
 5. Press **2** (CHANGE) to change your PIN. Enter a PIN and press **ENT**. Record the PIN. NOTE:
6. If NO you will return to the ADMIN menu.
7. You will be prompted if you want to issue a **Bypass Number** (see Glossary p. 26). Press **1** (YES) or **2** (NO).
8. If YES, enter any available 5- to 8-digit bypass number and press **ENT**. **NOTE:** a longer bypass number is more secure and harder to guess.
9. If NO, you will proceed to step 10.
10. You will be prompted to enter a **User ID** (see Glossary p. 27). In the case where the user has an existing ID number (i.e. cards/keys) you should use that number (as long as it is in the range of 1-65,000). **(NOTE: this step is skipped if in DCM mode).**
11. You will be prompted to enroll a primary finger.
12. Press **1** (YES) or **2** (NO).
13. If YES, place a finger on the fingerprint scanner when it turns on. When the message “Remove and Verify” appears on the display, remove and replace the finger on the scanner.
- 14.(i) If NO and a bypass number was entered in Step 7 above, the enrollment process is complete.
(ii) If no bypass number was entered in Step 7, the enrollment process is cancelled. You must specify a bypass number OR enroll a Primary Fingerprint in order to be enrolled.
15. If you enrolled a primary finger, you will be prompted to enroll a **Backup Finger** (see Glossary p. 26) for the user. Press **1** (YES) or **2** (NO).
16. If YES, place an alternate finger on the fingerprint scanner when it turns on. When the message “Remove and Verify” appears on the display, remove and replace the finger on the scanner.
17. If NO, there will not be a backup finger enrolled.
18. Upon successful completion the user will be added. The user will also be replicated to all other Slave Readers if the readers are configured to use the RS-485 bus.

Having trouble? Read the troubleshooting section.

USER INSTRUCTIONS

After users are enrolled they can attempt to gain access through the Zodiac Link in two different ways:

- **PIN + Fingerprint**

Using the keypad, enter the PIN and press **ENT**.

When the fingerprint scanner turns on, place the enrolled fingerprint on the scanner.

NOTE: If the user presents his/her backup finger, the reader will take slightly longer to recognize it because the reader will first search for the primary template before attempting to read the backup finger.

- **Bypass Number**

Enter the 5-8 digit bypass number on the keypad and press **ENT**.

NOTE: Users cannot gain access through Zodiac Link while in the programming menu.

DELETE USER

This function should be done at a Master Reader of more than one reader is connected. It is not applicable for a Slave Reader.

1. Press **2** from the ADMIN menu.
2. Confirm by pressing **1** (YES) or **2** (NO).
3. If YES, the Master Reader checks for communication to all Slave Readers. If the communication fails to communicate with at least one reader, the process is aborted. Otherwise, input the user's PIN and press **ENT**. The user will be deleted and replicated to all Slave Readers.
4. If NO you will return to the previous menu.

DISPLAY USER

1. Press **3** from the ADMIN menu.
2. Enter the PIN of the user and press **ENT**.
3. The LCD will show the user's bypass number, the number of fingerprints enrolled and the user ID.

DISPLAY COUNT

1. Press **4** from the ADMIN menu.
2. The LCD will show the total number of users enrolled in the reader.

You cannot edit existing users. To make changes to an existing user you must delete the user from the database and enroll the user again.

SECURITY LEVEL

1. Press **5** from the ADMIN menu.
2. Enter a value from 1 to 4.

Security Level represents the degree to which the live fingerprint must match the stored template during authentication. The higher the value the more precise the match must be.

It is recommended that this value be set to (4) by default and should be lowered if the overall user population is experiencing a high number of false rejects. This can occur in environments where users' fingers are dry or prints are badly worn.

GET LOCAL ID

Retrieves the ID or the address of the reader without having to physically open the reader and check for the dipswitch settings.

1. Press 6 from the ADMIN menu.
2. Record the local ID displayed on the LCD screen.

COPY TO SLAVE (APPLIES ONLY WHERE MULTIPLE READERS ARE CONNECTED)

This function is available from all readers regardless of whether they are a Master or a Slave Reader.

1. Ensure that the remote reader has at least one administrator programmed into it.
 2. At the local reader, select option 7 from the ADMIN menu. Enter the remote ID of the reader where the user fingerprint templates are to be copied to.
 3. Press **ENT** to initiate the transfer.
 4. When complete, the message "Function Complete" will be displayed.
- During the user database transfer, the remote reader continues to operate normally - e.g. authenticate user fingerprints.
 - Only the user fingerprint templates are transferred.
- NOTE:** Administrator's fingerprint templates and reader settings are not transferred.

Troubleshooting

If you are experiencing problems with your Zodiac Link reader, please go through the solutions listed here in the troubleshooting section. If you continue to experience problems, contact your dealer.

GENERAL

PROBLEM	POSSIBLE CAUSES	SOLUTIONS
Pressed a key and nothing happened.	Key was pressed too soon.	Wait for the prompt and press the key again. The keypad is working if you hear an audible tone.
The LCD backlight is on but does not display text.	Error.	Press the ESC key.
The LCD backlight is off, does not display text and the LEDs are off.	No power to the unit.	Have the installer check if the correct power is applied to the reader.
Entered a bypass number and received the message "Invalid Bypass #".	Incorrect bypass number was entered.	Enter a correct bypass number.
Entered a bypass number and received the message "Invalid PIN #".	A number less than 5 digits was entered.	A bypass number has to be 5 to 8 digits in length including the leading zeros. The number of leading zeros does not matter as long as it makes the number at least 5 digits in length (example – 00123 is the same as 00000123). Try again.
Entered a PIN and received the message "Invalid PIN #"	An incorrect PIN was entered.	Enter a correct PIN.
Entered a correct PIN and presented a fingerprint but received the message "Auth. Failed".	An un-enrolled fingerprint was presented to the scanner.	Present an enrolled fingerprint.
	The fingerprint was placed on the scanner incorrectly.	Read the "Fingerprint Enrollment Overview" and follow the suggestions.
	A PIN of another user was entered.	Enter your PIN.

Accidentally deleted the wrong Administrator or User.	You cannot retrieve the deleted information.	You must enroll the Administrator or User again.
Entered a new System Code and received the message "Invalid Entry".	A number was entered outside the range that is accepted by the Wiegand format (26- or 37-bit).	Check the Wiegand format and choose an acceptable System Code.
An enrolled user cannot gain access.	The reader is not in the correct operating mode.	Refer to the Setup Menu, step 5. Select Mode.

ADDING AN ADMINISTRATOR OR A USER

PROBLEM	POSSIBLE CAUSES	SOLUTIONS
Did not see what PIN the reader issued me.	The message disappeared too quickly.	For administrators, the PINs are 1 to 9, issued one at a time starting at 1, and are matched to your fingerprint. Try to enter the menu with each PIN until you find a match.
		For users, halt the enrollment process and press the ESC key repeatedly until you reach the beginning and start the enrollment process again.
Cannot enroll a fingerprint; received the message "Scanner Timeout".	No fingerprint was present on the scanner.	You have to present your finger to the fingerprint scanner when it turns on.
	The fingerprint was placed on the scanner incorrectly.	Read the "Fingerprint Enrollment Overview" and follow the suggestions.
Followed the suggestions in the "Fingerprint Enrollment Overview" and still can't enroll a fingerprint.	The fingerprint is not readable by the scanner.	Try another fingerprint.
		Use a bypass number instead (Users only).
Started entering the wrong PIN/bypass number/ID number.		Press the ESC key to cancel the current data entry.
Entered the wrong PIN/bypass number/ID number and pressed ENT .		Press the ESC key to go back to the previous question.

Entered a bypass number and the reader prompts to enter a bypass number again.	A number less than 5 digits was entered.	A bypass number must be 5 to 8 digits in length including the leading zeros. The number of leading zeros doesn't matter as long as it makes the number at least 5 digits in length (example – 00123 is the same as 00000123). Try again.
Entered a bypass number and received the message "Invalid BYPASS #".	The bypass number is assigned to another user.	Enter a different bypass number.
Entered a User ID and received the message "This ID is taken".	The ID number is taken by another user.	Enter a different ID number.
Tried to add an Administrator but received the message "Invalid Entry Push ESC to Exit".	The maximum allowable amount of administrators for that reader has been reached.	Delete an Admin from the reader or do not add any more administrators.

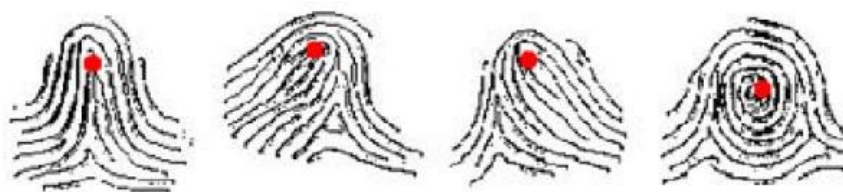
Glossary

- **Administrators:** Personnel who are authorized to make changes to the user database and system information. You can enroll up to nine administrators. Administrators can only access the menu and need to be enrolled as a user if they intend to gain access to the controlled area.
- **Backup Finger:** An alternate fingerprint a user can present to the fingerprint scanner to gain access.
- **Bypass Number:** A user-defined number five to eight digits in length that the user may use instead of his/her PIN + fingerprint. Bypass numbers count leading zeros as digits (example - 00123 is a valid bypass number). However the number of leading zeros will not make a difference (example - 00123 is the same as 00000123).
- **DCM Mode:** Only the Zodiac Link reader will verify the user before granting access. This mode only works when the reader is wired to a Zodiac Door Control Module.
- **Function Complete:** A message shown on the LCD screen when the desired actions that an administrator has made are saved and complete.
- **PIN:** A one-digit number used to recognize an administrator or a two-to four-digit number used to recognize a user. When entering your PIN you may exclude the leading zeros (example - If your PIN is 0010, you may enter 10). You cannot change your PIN. Administrators will need their PIN to access the system menu or user information. Users will need their PIN to present their fingerprint to the reader to gain access.

- **Primary Finger:** The main fingerprint a user will present to the fingerprint scanner to gain access.
- **Reader Mode:** The Zodiac Link reader is connected to an access control unit. Wiegand data (System Code and ID) is sent to the control unit when a user successfully authenticates.
- **Scanner Timeout:** The fingerprint scanner has unsuccessfully captured the image of your fingerprint.
- **System Code:** A number used to distinguish one system from the next and is normally used in conjunction with ID numbers. System Code is also known as Site Code or Facility Code.
- **User ID:** A number used by a controller to identify a user. The highest ID number you can enter is 65535 for both 26-bit and 37-bit. In cases where the user has an existing ID number (i.e. cards/keys) you should use these numbers to keep consistency. The User ID is the part of the Weigand data that will be sent to the controller when in *Reader Mode*.
- **Users:** Personnel who will use the reader to gain access to controlled areas.
- **Virgin Mode:** The reader is cleared of all administrators and users. Readers are in this mode by factory default.
- **Wiegand:** A standard communications format for access control devices.
- **Local ID:** Each reader has a physical address assigned. Local ID refers to the physical address being set on the reader.
- **Remote ID:** The physical address of the remote reader.

Fingerprint Enrollment Overview

When a user places his/her finger on the fingerprint scanner for the first time, the fingerprint is scanned and a 3-D fingerprint image is captured. All fingerprints contain a number of unique physical characteristics called minutiae, which include certain visible aspects of fingerprints such as ridges, ridge endings and bifurcation (forking) of ridges. Most of the minutiae are found in the core points of fingerprints, and the core points themselves are found near the center of the fingerprint on the fleshy pad. The illustration below shows the positions of core points within fingerprints.



When a user is enrolled, a special minutiae-based algorithm extracts key minutiae points from the live image at the time of acquisition and converts the data into a unique mathematical template comparable to a 60-digit password. This unique template is then encrypted and stored within the user record in the Zodiac Link controllers. It is important to note that **no actual image of the fingerprint is stored**, only the minutiae-based template.

FACTORS AFFECTING ENROLLMENT

The quality of a fingerprint image is relative to the number of minutiae points captured. If the number and locations of the minutiae remain consistent whenever an individual's fingerprint image is scanned and captured, the fingerprint image is successfully matched to the pre-existing template. Fingerprint images that do not possess an adequate number of minutiae points may be unusable.

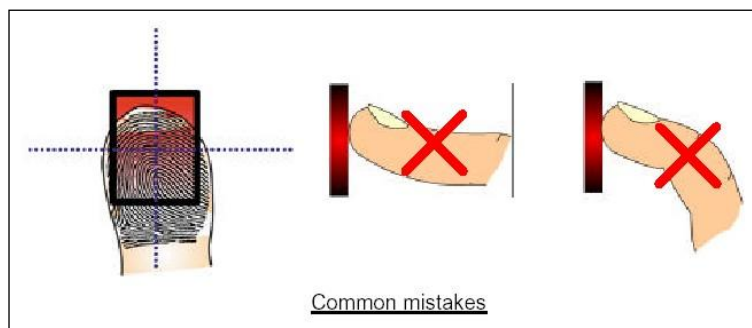
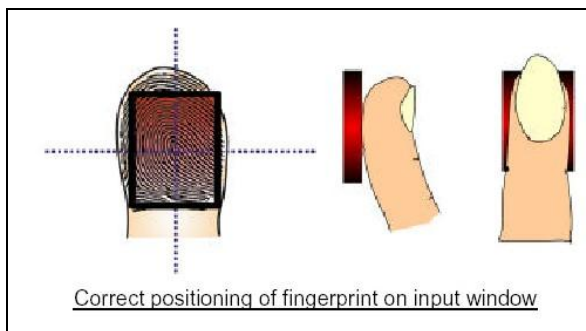
The Zodiac Link fingerprint matching algorithm is capable of extracting the correct minutiae even without benefit of a perfect print. However, the positioning of the finger and the relative wetness or dryness of the fingerprint when it is placed on the optic window for scanning are both important factors in getting a match.

CORRECTING WET/DRY FINGERPRINT IMAGES

When the temperature is low, or just after handwashing, the fingerprint is often dry. In this case, the user may moisturize their fingerprint simply by breathing on it before applying it to the optic window. If the fingerprint is too wet, the ridges and valleys are rendered indistinguishable. The lack of minutiae data causes wet fingerprints to be rejected. This can be remedied simply by swiping the fingerprint on a clean towel or cloth.

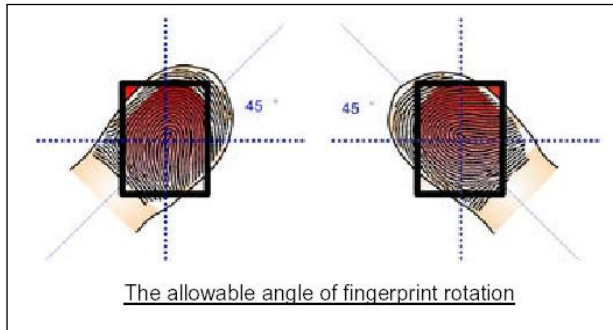
POSITION OF THE FINGERPRINT

In order to capture the most minutiae, maximize the surface area of the fingerprint on the fingerprint input window. The first illustration below shows the correct positioning of the fingerprint on the input window. Contrast this with the second illustration, which shows the most common mistake made during the initial phase of enrollment.



ALLOWABLE ANGLE OF FINGERPRINT ROTATION

The Zodiac Link scanner allows up to $\pm 45^\circ$ for input fingerprint rotation, as illustrated below.



PRESSURE REQUIRED FOR A GOOD-QUALITY FINGERPRINT

If too much pressure is applied to the sensor window, the ridges adhere to each other and are rendered indistinguishable. In this case, the net effect is similar to the hard-to-find minutiae of a wet fingerprint image. On the other hand, if too little pressure is applied, the resulting image is similar to a dry fingerprint. Issues related to pressure are easily addressed, however. A little practice is all that is needed for users to get the feel of it.

Administrator Database Form

Here is a sample form you may use to record the administrators you enroll in the Zodiac Link. Recording this information allows you to look up administrators' information or delete them from the reader. You may photocopy this form if you need more copies or you may create your own form.

PIN #	NAME
1	
2	
3	
4	
5	
6	
7	
8	
9	

IMPORTANT: You must maintain accurate records of all administrators enrolled.

User Database Form

Here is a sample form you may use to record the users you enroll in the Zodiac Link. Having this information handy allows you to look up user information, display user information on the reader and delete users from the reader. You may photocopy this form if you need more copies or you may create your own form.

PIN #	BYPASS #	USER ID	FINGERPRINTS	NAME

IMPORTANT: You must maintain accurate records of all users enrolled.