# User's Manual

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I.   Functions

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                              ┌─────────────────┐
                         ┌───▶│   Select User   │
                         │    └─────────────────┘
                         │    ┌─────────────────┐
                         ├───▶│   Save Image    │
                         │    └─────────────────┘
                         │    ┌─────────────────┐
                         ├───▶│      Exit       │
                         │    └─────────────────┘
                         │    ┌─────────────────┐
                         ├───▶│    Diagnose     │
                         │    └─────────────────┘
    ┌──────────┐         │    ┌─────────────────┐
    │   Main   │────────▶├───▶│      Snap       │
    └──────────┘         │    └─────────────────┘
                         │    ┌─────────────────┐
                         ├───▶│     Enroll      │
                         │    └─────────────────┘
                         │    ┌─────────────────┐
                         ├───▶│     Verify      │
                         │    └─────────────────┘
                         │    ┌─────────────────┐
                         ├───▶│    Identify     │
                         │    └─────────────────┘
                         │    ┌─────────────────┐
                         ├───▶│   Delete User   │
                         │    └─────────────────┘
                         │    ┌─────────────────┐
                         └───▶│    View Log     │
                              └─────────────────┘
```
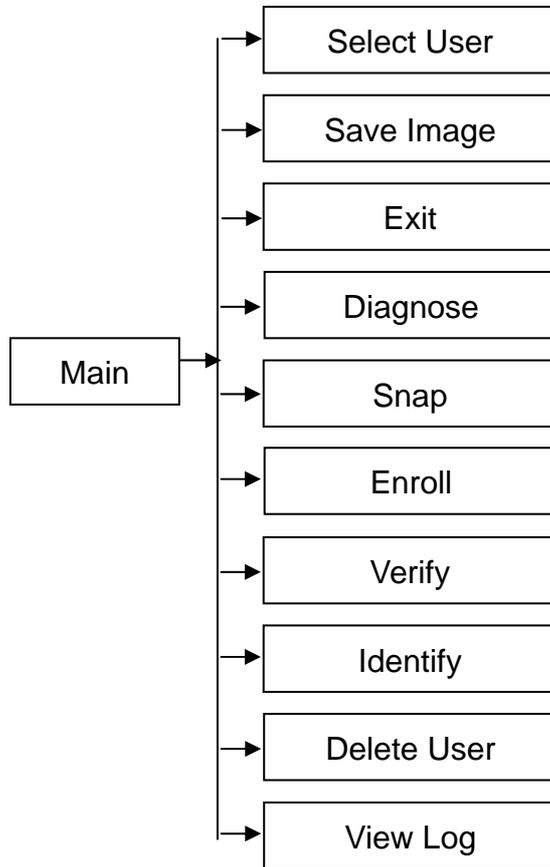
II. Operation

The demonstration program is a simple but helpful example that will help you to get acquainted with the features of the fingerprint device. Start the program by double-clicking on the **VC_Demo.exe** in the program directory of the SDK. The screen will show up as follow:
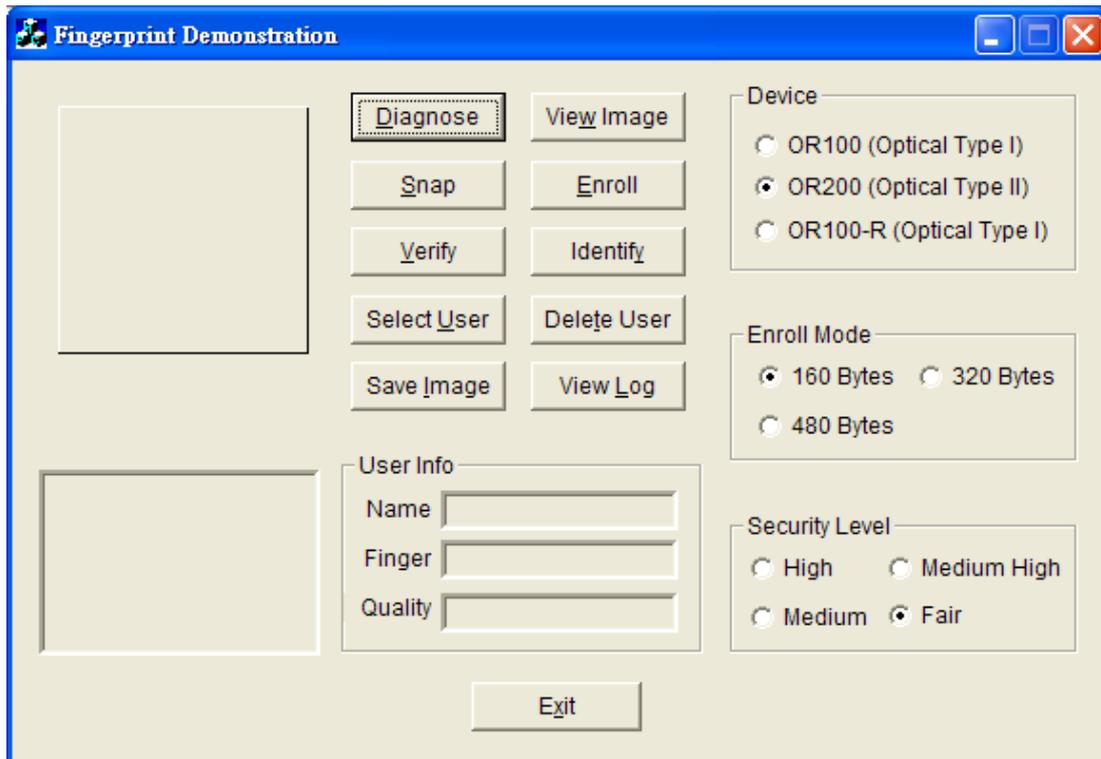
a. Diagnose

The definition of **Diagnose** is to diagnose the fingerprint reader. If the result is not OK, please contact your dealer.

Before testing, please clean the prism, and when testing the device, **please make sure that there is no finger on the reader**.

You can click the **Diagnose** by mouse or press the **ALT+D** by keyboard to enter the Diagnose mode. A message box will be popped up to tell if the diagnosis is OK,

b. Snap

The definition of **Snap** is to capture and displays a fingerprint.

The principal purpose of this function is to allow you to seek a sufficiently good fingerprint by displaying the status of the fingerprint image. You may use it for enrollment later.

This function snaps a fingerprint and shows the image of the fingerprint continuously. Please put your finger on the reader.

Fingerprint reader will snap your fingerprint automatically. The capture process will stop when a good quality fingerprint is captured, or by clicking **"Stop Snap"** to break the capture.

You can click the **Snap** by mouse or press the **ALT+S** by keyboard to enter the snap image mode. The following screen will appear. Please keep on putting your fingerprint on the reader until the fingerprint is snapped.
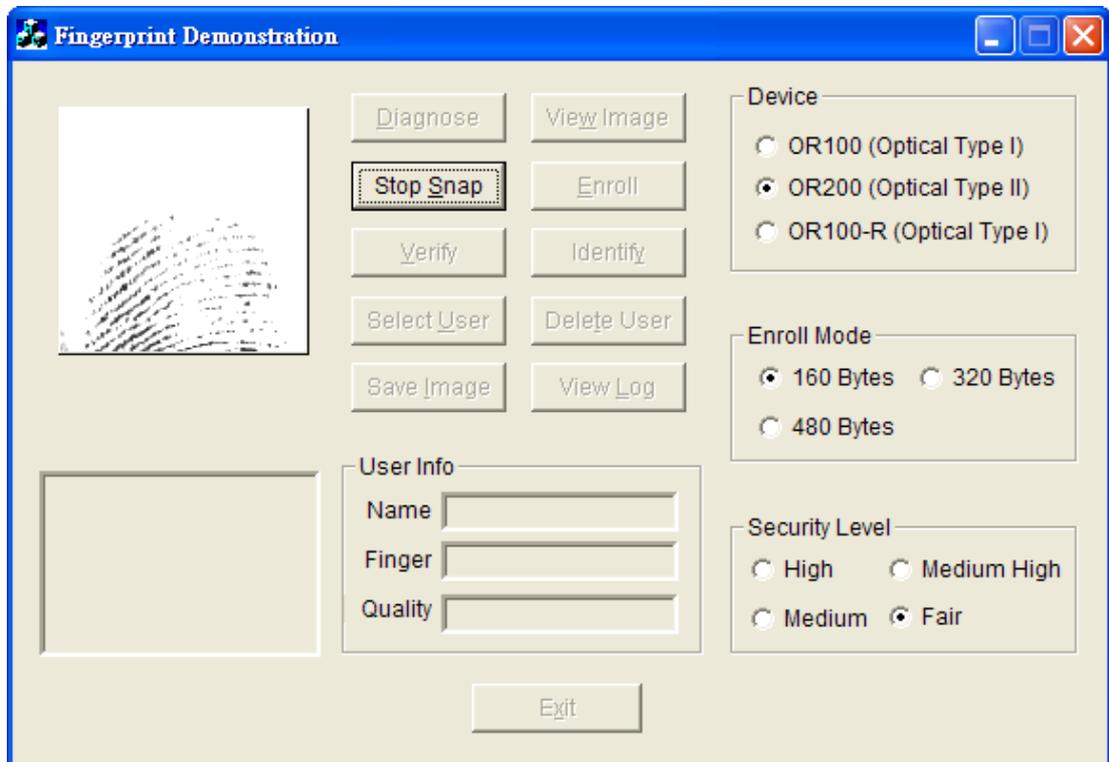
c. View Image

You can click the **View Image** by mouse or press the **ALT+W** by keyboard to view the image. This function is to adjust the image quality for the CMOS optical device. The default setting may be not suitable for some environment or fingers. The user can adjust the brightness, contrast and gamma to get a satisfied image quality for later enrollment or authentication.
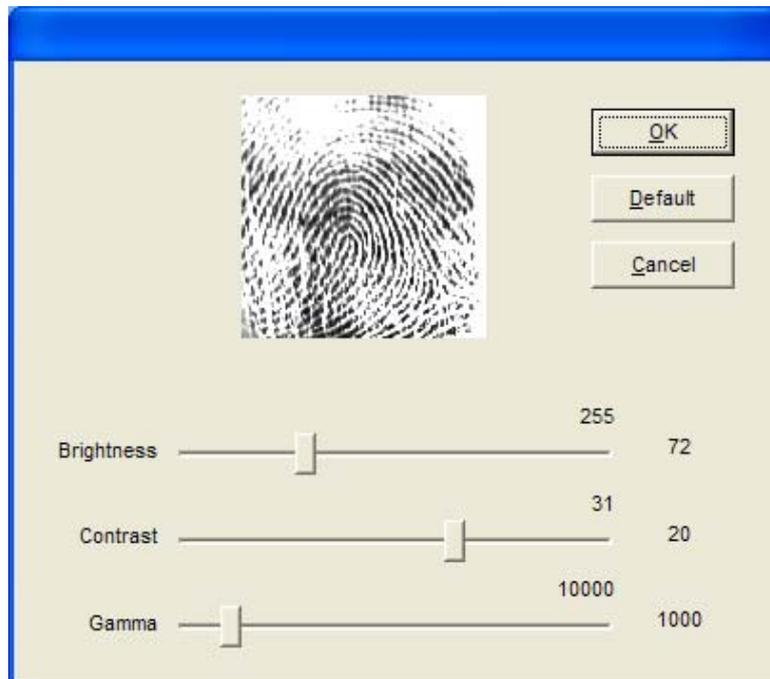
d. **Enroll**

The definition of **Enroll** is to enroll a New Fingerprint as Current User

At least three fingerprints are required for enrollment. Please refer to the fingerprint snapping procedure. Put your finger on the reader at least three times, and check the enrolled quality. The enrollment will be finished when the enrolled quality comes out.

The fingerprint reader will take the common features of these fingerprints. After a few seconds of processing, the reader will inform you the enrolled result.

The following are the five conditions that may be occurred:

Quality A	This means enrollment of your fingerprint is successful and your fingerprint very clear, has stable features, and is suitable for later verification.
Quality B	This signifies a successful enrollment. Your fingerprint is clear, has stable features, and is suitable for later verification.
Quality C	A successful enrollment, indicating your fingerprint is average with enough stable features to make it suitable for later verification.
Quality D	Although Quality D indicates a successful enrollment, your fingerprint may not be very clear, or may not have very good features. In this case, the false rejection rate in identifying this kind of fingerprint may be higher than that for Quality A, Quality B, or Quality C fingerprints.
Failed	Indicates an unsuccessful enrollment, please try again. If the enrollment of this finger fails many times, try to enroll the other fingers, choose the one with the highest quality and try to enroll that finger.

You can click the **Enroll** by mouse or press the **ALT+ E** by keyboard to enter the enrollment mode. The screen is the same as the snap function. After enrolling fingerprint successfully, A dialog box will be pop up showing the enrolled quality and require the user to input the name and choose the enrolled finger. Please input the desired data and click "**Save**" button to save the data.

e. Verify

The definition of **Verify** is to verify a live-scanned fingerprint from the current user. It does only one-to-one matching.

The matching compares a live-scanned fingerprint image against the previously enrolled fingerprints, checking if they came from the same finger. Please put your finger on the reader, and the fingerprint reader will check it out automatically according to the security level settings.

The objects to be compared are the live-scan fingerprint and the final fingerprint template - EnrlTemplate, which is the saved data in the enrollment. After a successful snapping, the live-scan fingerprint image data is kept in the main memory. You can choose the EnrlTemplate by clicking **Select User** or create a new user through the enrollment.

You can click the **Verify** by mouse or press the **ALT+V** by keyboard to enter the matching fingerprint mode. Before clicking the **Verify** button, you must first select a user. Otherwise the following screen will appear.


After verification, the score will be displayed on the screen to show if the verification is matched or failed. See **Identify** for details.

£. **Identify**

The definition of **Identify** is to identify a live-scanned fingerprint from the database. It does one-to-many matching.

The matching compares a live-scanned fingerprint image against the previously enrolled database. Please put your finger on the reader, and the fingerprint reader will check it out automatically according to the security level settings.

You can click the **Identify** by mouse or press the **ALT+Y** by keyboard to enter the matching fingerprint mode. After identification, the score will be displayed on the screen to show if the identification is matched or failed. If the identification succeeds, the user information will also be shown on the screen.
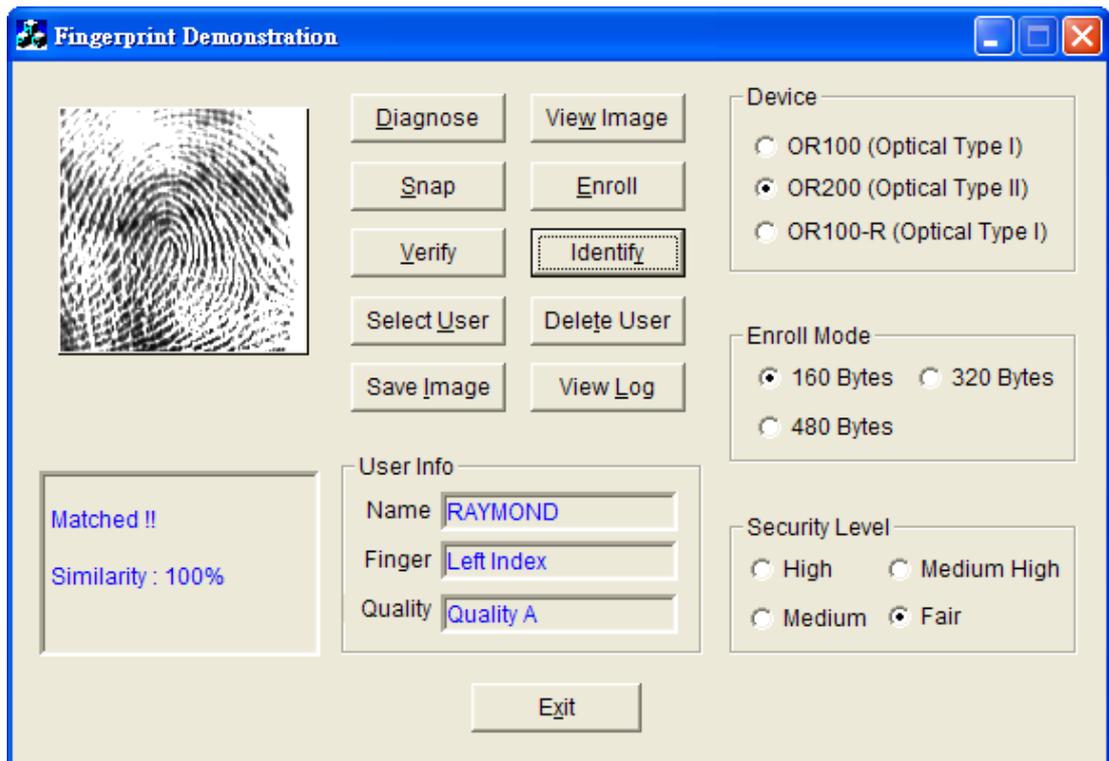
g. **Select User**

The definition of **Select User** is to select a User for verification.

The user data files are created after enrollment. Once you have selected a user, it will become the target to be verified, and the name of the user will be displayed on the screen of the demonstration program.

Two ways you can change the target that is to be verified:

i. Select another user from the function of **Select User**.

ii. After enrollment, the enrolled user will become the new target of matching automatically.

You can click **Select User** by mouse or press the **ALT+U** by keyboard to enter the Select User mode. The following screen will appear showing the user list (name, enrolled finger, enrolled class).

To select a user, choose the user and click the "OK" button or just double-click on the user desired.

h. Delete User

The definition of **Delete User** is to delete a User from the database.

Once you have selected a user, the user will be deleted from the list.

i. Save Image

The definition of **Save Image** is to save the fingerprint image to file.

After a successful fingerprint snapping, the fingerprint image will be kept on the main memory. You can save the fingerprint image with this function.

You can click the **Save Image** by mouse or press the **ALT+I** by keyboard to enter the Save Image mode. Please select a specified folder and input the filename.

According to the user's requirements, there are two file type can be selected:

i. File Type
- **BMP**：Save the fingerprint image in bitmap file format.
- **RAW**：Save the fingerprint image as plane raw file. This means there is no header, and the image data is stored pixel by pixel. The image will be 256 x 256 in size for CMOS.

j. View Log

You can click the **View Log** by mouse or press the **ALT+L** by keyboard to view the history of the operation. The log can be sorted by "Date", "Name" or "Action" by clicking the radio button. See below the dialog box.
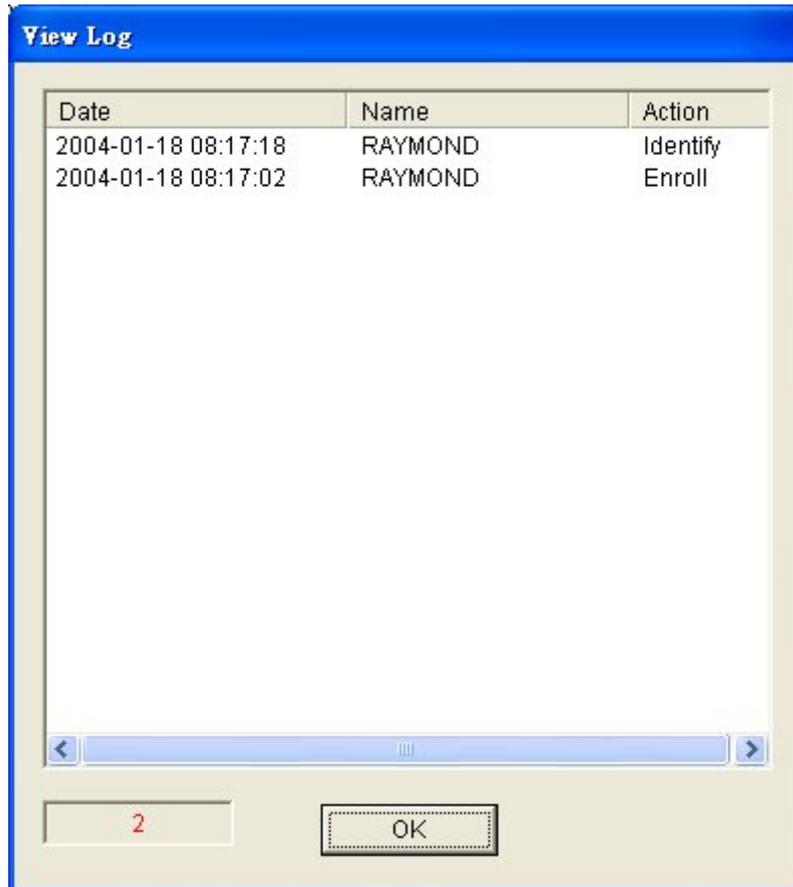
k. Settings

1. Security Level

The default security level is **Medium**. Set up the security level for matching by setting the verification threshold. **High** is the safest mode, providing an FAR less than 1/100,000. **Fair** is a looser mode, providing an FAR less than 1/1000.

2. Device

Select a device for the system.

3. Enroll Mode

Select an enrolled mode for the enrollment. All three modes will give the high performance of matching. However, larger template size will keep more information of the fingerprint and thus give a higher accuracy but lower speed. The user may use the different mode depending of the applications and capture device.

For smaller area of capture device or 1-1 verification or 1-Little of identification, the 480-byte mode is recommended. For identification of a lot of persons that speed is the main concern, the 160-byte or 320-byte mode is recommended.

l. Exit

The definition of **Exit** is to terminate the demonstration program.

You can click the **Exit** by mouse or press the **ALT+X** by keyboard to terminate the demonstration program.