GBMSGUI Library

User Guide

SDK Version 3.3

March 2015

GREEN BIT

BIOMETRIC SYSTEMS

Table of Contents

1 Introduction

This document provides useful information for the correct usage of GBMSGUI tool library.
This tool provides the developer with a graphical interface for image(s) acquisition. As options, it performs the segmentation, the fingerprint image quality assessment, the image enhancement and the sequence check. A lot of parameters are settable in order to fulfil the needs of any integrator: if these parameters have not been changed, they have the values recommended by Green Bit.
In case that some problems appear during the acquisition, the user is always advised through short and meaningful messages.
A complete example is provided ("GBMS Demo"), to show how this component should correctly be used and how to use it in conjunction with the top level and the BASIC SDK components (see chapter "FULL ENHANCED SDK" in MULTISCAN Overview document) in order to perform a complete acquisition process.
Even if GBMS Demo can be used "as it is" in order to have a complete acquisition system, the GBMSGUI library and GBMS Demo itself with their complete source code are provided to allow integrators to customize their own applications.

1.1 Documentation conventions

1.1.1 General Conventions

Green Bit saves the right to make changes, integrations or enhancements to this manual without notice, and this cannot be a reason to consider this present publication inadequate.
In this manual the following acronyms are used:

- IAFIS Integrated Automated Fingerprint Identification System
- IQS Image Quality Specifications

1.2 Documentation revisions

SDK Version	Date	Description and Components
V1.0	13/02/2009	Original
V2.0	November 2009	See Modification List
V2.5	March 2010	See Modification List
V2.7	November 2011	See Modification List
V2.8	August 2012	See Modification List
V2.9	September 2013	See Modification List
V3.1	May 2014	See Modification List
V3.3	March 2015	See Modification List

2 GBMSGUI Interface Description

In this chapter a description of GBMSGUI interface is given.

2.1 Acquisition Window description

The main acquisition window is structured as follows:

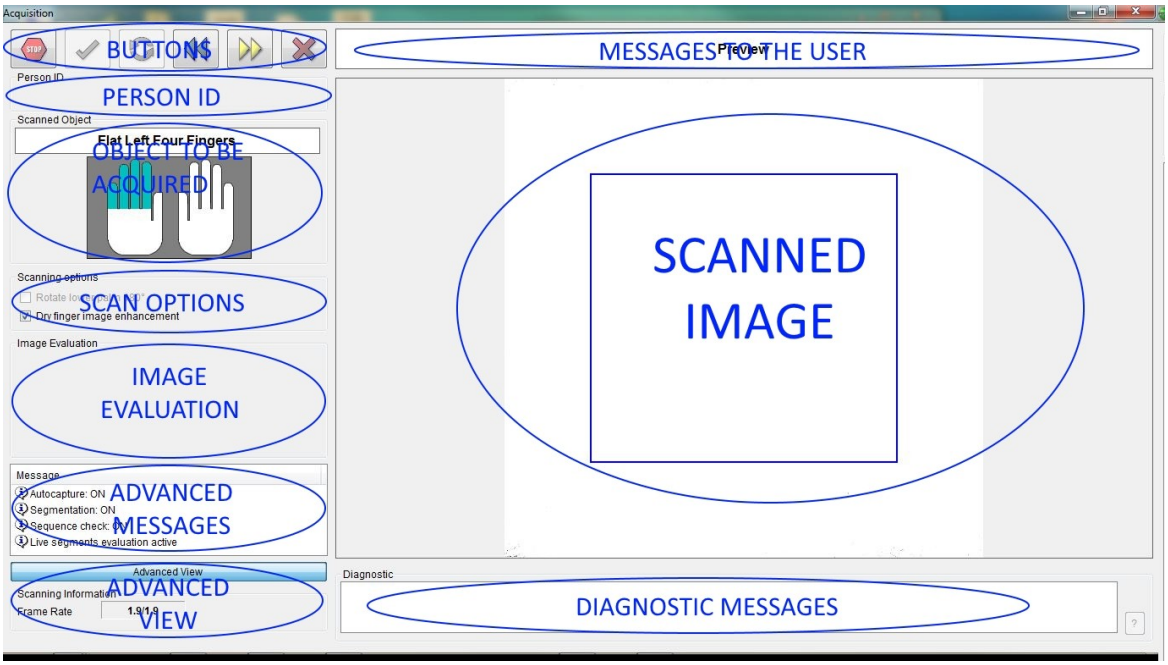


Figure 1 GBMSGUI Acquisition Window

The above window is divided in several sections that are here described.

2.1.1 Buttons section

In this section the control buttons are displayed. Buttons' job is described later, in the "Scanning Process Description" chapter.

In the displayed order, they are:

- "Stop Acquisition" button
- "Accept" button
- "Repeat" button
- "Back" button
- "Skip" button
- "Break Sequence" button

2.1.2 Person ID section

In this section the person identifier, as set by the application by using *PersonID* parameter in *GBMSGUI_StartSession* function, is displayed.

2.1.3 ScannedObject section

In this section a description of the object to be scanned is displayed together with a pictogram representing one hand and the name of the object(s) to be acquired; the highlighted fingers visually indicate this object(s).

2.1.4 Scan Options section

In this section some advanced scan options are listed, such as the possibility to rotate palm image by 180 degrees and the possibility to enable the dry finger enhancement option (see in the specific paragraph for further details). In order to activate the options, simply check the corresponding check box.

2.1.5 Image Evaluation section (for FLAT objects)

Here a description of this section, as it looks during a FLAT fingerprint (or SLAP) acquisition, is given:

- **Contrast**: The contrast is displayed in the user interface during the scanning phase, to help the operator to achieve a better image quality. If the application defines the thresholds (they can be different for each object type), the value is highlighted using red, yellow or green color. The contrast values range is from 0 to 255 and the evaluation scheme is:

Contrast < T1 (unacceptable)	Red
Contrast >= T1 and < Th2 (medium)	Yellow
Contrast >= T2 (good)	Green

- **IAFIS Quality:** The quality is displayed in the user interface at the end of the acquisition phase, to help the operator to evaluate image quality. If the application defines the thresholds (they can be different for each object type), the value is highlighted using red, yellow or green color. The quality values range, depending on the used algorithm, can be from 0 to 100 (for proprietary algorithm, 100 is the best) or from 1 to 5 (NFIQ quality, 1 is the best) and the evaluation scheme is:

1) Proprietary

Quality < T1 (unacceptable)	Red
Quality >= T1 and < T2 (medium)	Yellow
Quality >= T2 (good)	Green

2) NFIQ

Quality > T2 (unacceptable)	Red
Quality >= T1 and < T2 (medium)	Yellow
Quality <= T1 (good)	Green

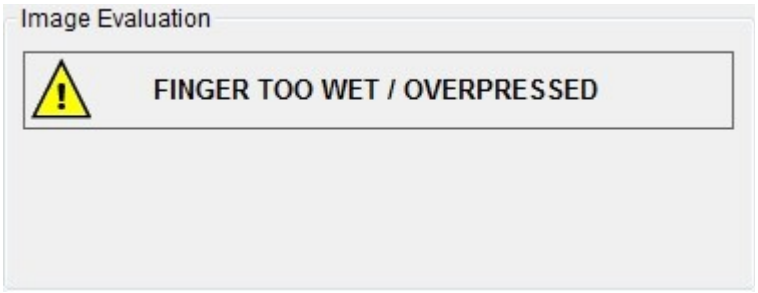
- **LOWER HALF PALM COMPLETENESS**: for half-palm image it specifically refers to dimensions of palm central "empty" zone that appears due to the fact that concave palm surface is scanned on flat scanner surface. It is displayed in the user interface during the scanning phase and only for LOWER HALF PALM objects, to help the operator to achieve a better image quality. If the application defines the thresholds, the value is highlighted using red, yellow or green color. The lower half palm completeness values range is from 0 to 100 and the evaluation scheme is:

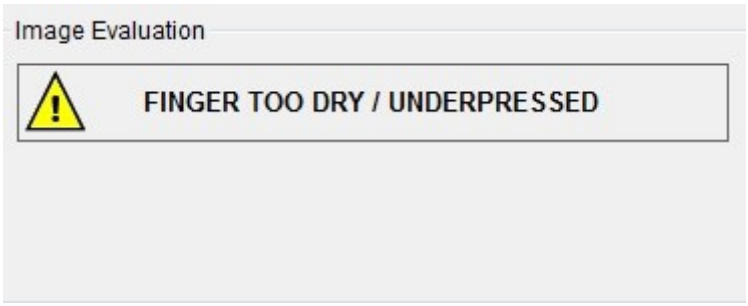
  Lower Half Palm Completeness < T1
  Red (unacceptable)

  Lower Half Palm Completeness >= T1 and < Th2 Yellow (medium)

  Lower Half Palm Completeness >= T2
  Green (good)

- **DRY/WET Finger Detection**: If the scanner supports this feature, whenever a DRY (Underpressed) or WET (overpressed) diagnostic is detected by the scanner, a special message like these appears in this section:



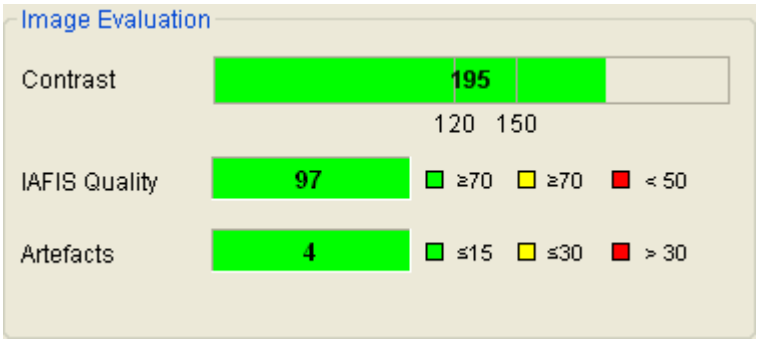


In such a case the operator should take the appropriate countermeasures, for example wipe the finger in case of “WET” message or arise/reduce the pressure of the object on the scanner.

NOTE: this indication replaces the contrast value displaying. If the contrast indication is preferred, the application can select the display mode by means of the "GBMSGUI_SelectFingerContactEvaluationMode(...) function. In case the scanner does not support the DRY-FINGER-ENHANCEMENT feature (see the "Scanner Features.pdf" document for getting this information) the contrast value is displayed as usual.

2.1.6 Image Evaluation section (for ROLLED fingers)

Here a description of this section, as it looks during a rolled fingerprint acquisition, is given:



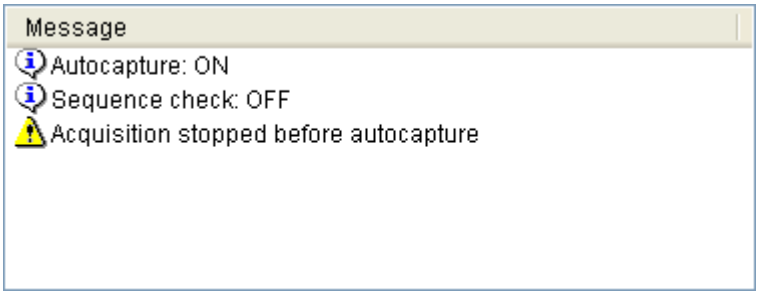
In addition to IAFIS quality and contrast, the evaluated area of rolling artefacts (see GBMSAPI_Defines.h file for further information about rolling artefacts) is here shown. At the end of the rolling procedure, if rolled artefacts are present, they are marked with a red border on the image, while the artefact area is displayed in the "Image evaluation" area using red, yellow or green color according to the defined threshold.
The default thresholds are T1=7 and T2 = 14 and the evaluation scheme is:

Size <=T1	green (good)
Size >T1 and <=T2	yellow (medium)
Size >T2	red (unacceptable)

The application can change the thresholds; if both are set to the same value, only red and green colors will be used.
It is also possible to set both thresholds to -1, in this case no evaluation is performed (no colors, grey is used).

2.1.7 Advanced Messages Section

In this section warnings and info useful for the operator are displayed, such as "auto-capture on/off" or "sequence check on/off" and so on. They can be useful in performing a correct acquisition process.



A complete list is given in Appendix B.

2.1.8 Scanning Information section

This section appears if the user clicks on the "Advanced view button" and the following types of information are displayed:

Frame rate: indicates the current and the nominal frame rate. If the label becomes red, it means that the current frame rate is less than 80% of the nominal frame rate.

2.1.9 Message to the user section

This section is divided in two subsections:

- **Diagnostics**: area where diagnostic messages, as they are defined in the BASIC SDK, are displayed (see *BASIC SDK* documentation). More than a message can appear at a time. Normally they are "self explaining", but in order to get more information about a diagnostic message, just double-click on it or select it and then click on "?" button: a message box with a more complete explanation will appear.
- **Messages**: area where instructions and messages for the operator appear. If the text appears in red, it indicates an error condition and it could be accompanied by a sound if the option is set (see GBMSGUI.h file).

A complete list is given in Appendix A.

2.1.10 Scanning area section

Here the image flow is displayed during the scanning process.

2.2 Scanning Process Description

In this chapter a description of the scanning process will be given.
The acquisition window displays the image flow from the scanner in real time (for rolled fingers, after the preview a composite fingerprint image is displayed).
At the scanning start, a message is displayed over the image "Wait, don't put finger". When this message disappears, the person can put his finger(s) on the scanner surface.
An operator can evaluate the scanned image and its contrast value in real-time.

If auto-capture option is set (for developers, see GBMSGUI.h file for setting this option), the acquisition is automatically stopped when the best image contrast and the fingerprint size have been achieved (for the rolled fingerprints acquisition process is automatically stopped when the finger is removed, while for LOWER HALF PALM objects also the Lower Half Palm completeness is considered).
The acquisition process can always be stopped by clicking on *Stop* button[1] (for the rolled fingerprint acquisition, stopping the acquisition before the automatic stop will result in an error, while for auto-capture mode it will result in a warning message in the "Advanced Messages" section).
After having stopped the acquisition, an operator should evaluate the final image, its quality value (for rolled fingerprints also the rolling artefacts area should be evaluated) and the possible diagnostic messages.

Press *Accept* button to return the final image to the calling application (if the "Auto-Accept" option is set, this is done automatically - see the below *Auto-Accept* option description– for developers, see GBMSGUI.h file for setting this option).
Accept button is disabled in some conditions:

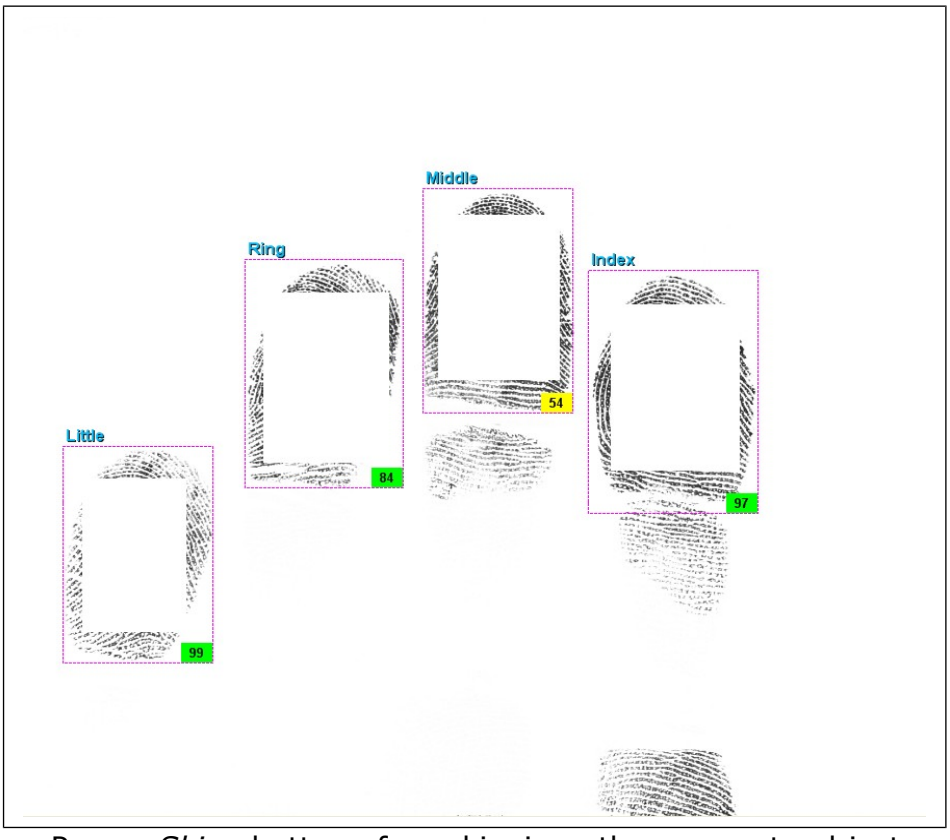
- rolled acquisition interrupted before the automatic stop

[1] When "Manual Roll Preview stop" option is set for those devices supporting this feature (see ScannerFeatures document in the BASIC sdk), the first pressure of the the "Stop" button results in the preview phase stop, while an eventual second pressure stops the acquisition

- no fingerprint detected on the scanner surface after a manual stop (Contrast = 0)
- slap segmentation failed in automatic mode (e.g. if any finger is missing)

When *Accept* button has been clicked, if the *Segmentation* option is active (for developers, see GBMSGUI.h file for setting this option) and *AskUnavailability Reason* option is active for the current acquisition session (for developers, see GBMSGUI.h file for setting this option), the completeness check is performed - all the finger segments are found or their unavailability reason is specified.

Press *Repeat* button to restart the acquisition.



Press *Skip* button for skipping the current object acquisition and going to the next in the sequence.

Press *Back* button for skipping the current object acquisition and going back to the previous in the sequence.

Press *Break sequence/Cancel* button to cancel the current person acquisition process.

2.3 Touch-screen LCD

For those devices supporting a LCD interface, *Stop* button is present on the display during the image acquisition, and *Accept* and *Repeat* buttons are displayed after the acquisition ends. They have the same meaning as described for the correspondent buttons in GBMSGUI main window.

2.4 Pedal

For those devices supporting the footswitch, the pedal pressure is used as an input for GBMSGUI library in order:

- For FLAT objects: to stop the preview phase
- For ROLL objects: if the device supports the Manual Roll Preview stop (see GBMSAPI_Defines.h file for a more detailed description of the rolled objects acquisition), to stop the roll preview phase; otherwise it has no effects.
- After ending the acquisition, a shorter pressure corresponds to pressing A*ccept* button, while a longer pressure (more than 2 seconds) corresponds to pressing *Repeat* button

2.5 Clipping

The application can specify the image size for each image type. The sizes defined in ANSI/NIST ITL 1-20xx standards are used by default:

Palms (upper half and lower half) 2500 x 2500 pixel (5000 x 5000 at 1000 Dpi)

Writer palms 900 x 2500 pixel (1800 x 5000 at 1000 Dpi)

Slaps (four fingers and two thumbs) 1600 x 1500 pixel (3200 x 3000 at 1000 Dpi)

Flat thumbs (single) 500 x 1000 pixel (1000 x 2000 at 1000 Dpi)

Rolled finger 800 x 750 pixel (1600 x 1500 at 1000 Dpi)

For those objects that are not defined in the standard (flat index, middle, ring and little) a default size of 500x500 (1000 x 1000 at 1000 Dpi) pixels is used.

200x200 (400 x 400 at 1000 Dpi) is the minimal possible image size.

If the specified image size is smaller than the maximum scanning area, a blue frame (the clipping rectangle) will be shown over the image in the user interface, automatically positioned following the actual fingerprint position within the original image: the area inside this rectangle represents the portion of the image that will be saved.

NOTE: When the acquisition is stopped, the operator can manually adjust the clipping rectangle position by mouse dragging.

2.6 GUI Settings (for developers)

The application can activate or read some settings that modify the behavior of the user interface. This chapter is especially reserved for application developers, who are kindly asked to refer to the GBMSGUI.h file for all below-described settings.

2.6.1 Language:

It's possible to set the language of the GUI texts. For more information please refer to the "GBMSGUI_SetLanguage(...)" function description in the GBMSGUI.h file.

2.6.2 Version:

It's possible to get the version of the GBMSGUI library. For more information please refer to the "GBMSGUI_GetVersion(...)" function description in the GBMSGUI.h file.

2.6.3 Window size and position:

It's possible to set and get the GUI size and position. For more information please refer to the "GBMSGUI_SetWindowSizeAndPosition(...)" and "GBMSGUI_GetWindowSizeAndPosition(...)" function description in the GBMSGUI.h file.

2.7 Acquisition Settings (for developers)

The application can activate some settings that modify the behavior of the user interface. This chapter is especially reserved for application developers, who are kindly asked to refer to the GBMSGUI.h file for all below-described settings.

2.7.1 Flat finger on roll area:

By using the "GBMSGUI_SetFlatFingerOnRollArea" function it's possible to acquire a flat finger on the roll

area, for those scanners that allow this choice. Please refer to the GBMSGUI.h file for more information.

2.7.2 Image Size:

By using the "GBMSGUI_SetImageSize" function it's possible to set the size of the final image produced by "GBMSGUI_Acquire(...)" function for a given object. Please refer to the GBMSGUI.h file for more information.

2.7.3 Segment Image Size:

By using the "GBMSGUI_SetImageSize" function it's possible to set the size of finger segments. Please refer to the GBMSGUI.h file for more information.

2.7.4 Roll Direction Forcing:

By using the "GBMSGUI_SetAdaptiveRollDirection" function it's possible to force the roll direction in a specific direction. Please refer to the GBMSGUI.h file for more information.

NOTE: this setting is taken in consideration only if the "GBMSGUI_ACQUISITION_OPTION_ADAPT_ROLL_AREA_POSITION" option for the "GBMSGUI_Acquire(...)" function.

2.7.5 Roll Area standard:

By using the "GBMSGUI_SetRollArea" function it's possible to set what standard for the roll area (IQS or GA) has to be used. Please refer to the GBMSGUI.h file for more information.

2.7.6 Block auto-capture feedback on LEDs:

By using the "GBMSGUI_EnableBlockAutocaptureLedColorFeedback" function it's possible to enable a special leds behavior with block/unblock autocapture (for scanners with leds interface).
By configuring appropriately the conditions that fires the BlockAutocapture (see GBMSGUI_SetBlockAutoCaptureMask), the led can inform about the proper finger placement on the scanner.
By default this is the behavior of the scanned object related led:

- when acquisition starts, led is turned on with fixed yellow light

- if BlockAutocapture fires, led blinks (always yellow)

- when BlockAutocapture conditions disappear, led stop blinking

Calling this function, the led behavior with BlockAutocapture changes in the following way:

- when acquisition starts, led is turned on with fixed yellow ligh

- if no BlockAutocapture conditions are met, led blinks green

- if BlockAutocapture fires, led blinks red

- if object is removed from the scanner, led turns back to yellow fixed

Please refer to the GBMSGUI.h file for more information.

NOTE: this setting is IGNORED if the "GBMSGUI_ACQUISITION_OPTION_LIVE_SEGM_EVAL" option for the "GBMSGUI_Acquire(...)" function is active.

2.7.7 Parameters that influence the auto-capture behaviour:

It's possible to set the thresholds that influence the auto-capture behaviour. For more information please refer to the description of the following functions in the GBMSGUI.h file:

- GBMSGUI_SetLowerPalmCompletenessThresholds
- GBMSGUI_SetBlockAutoCaptureMask
- GBMSGUI_SetBlockAutoCaptureContrast
- GBMSGUI_SetContrastThresholds
- GBMSGUI_SetQualityThresholds (see Note1)
- GBMSGUI_SetSegmentQualityThresholds (see Note1)
- GBMSGUI_SetLiveSegmEvalTimeout

NOTE 1: for slap objects only and only if "LiveSegmentsQualityEval" option is active

2.7.8 Parameters that influence the post processing behaviour:

It's possible to set the thresholds that influence the post processing behaviour (hence influencing the auto-accept conditions). For more information please refer to the description of the following functions in the GBMSGUI.h file:

- GBMSGUI_SetArtefactsThresholds
- GBMSGUI_SetQualityAlgorithm
- GBMSGUI_SetPatternValidityThreshold
- GBMSGUI_SetPatternCompletenessThreshold

- GBMSGUI_SetLowerPalmCompletenessThresholds
- GBMSGUI_SetInclinationThreshold
- GBMSGUI_SetContrastThresholds
- GBMSGUI_SetQualityThresholds
- GBMSGUI_SetSegmentQualityThresholds
- GBMSGUI_SetSegmentUnavailabilityReason
- GBMSGUI_SelectFingerContactEvaluationMode
- GBMSGUI_SetUpperLowerPalmIdentityCheckThreshold
- GBMSGUI_SetPalmInclinationThreshold
- GBMSGUI_SetInterdigitalCompletenessThreshold
- GBMSGUI_SetFingerPhalangesCompletenessThreshold
- GBMSGUI_SetFingerPhalangesQualityThresholds
- GBMSGUI_SetInterdigitalQualityThresholds

2.8 Acquisition Options (for developers)

The application can activate some options that modify the behavior of the user interface. This chapter is especially reserved for application developers, who are kindly asked to refer to the GBMSGUI.h file for all below-described options.

2.8.1 Segmentation:

By choosing this options, the developer causes GUI library to perform the segmentation of slap images containing 2/4 fingers simultaneously; i.e. upon completion of the image capture, an automatic attempt of separating and naming the single finger images is made. Segments are delimited by a rectangle (bounding box) that surrounds the top phalange of the finger. From 3.3 version of the SDK segmentation will be performed for upper half palm also.
In some conditions (e.g. missing fingers) the automatic segmentation may fail, so that the operator should manually assign the fingers names to single image parts: this can be done by right-clicking on the image there, where a fingerprint is present, and selecting the appropriate finger name from the popup menu. See next figure:

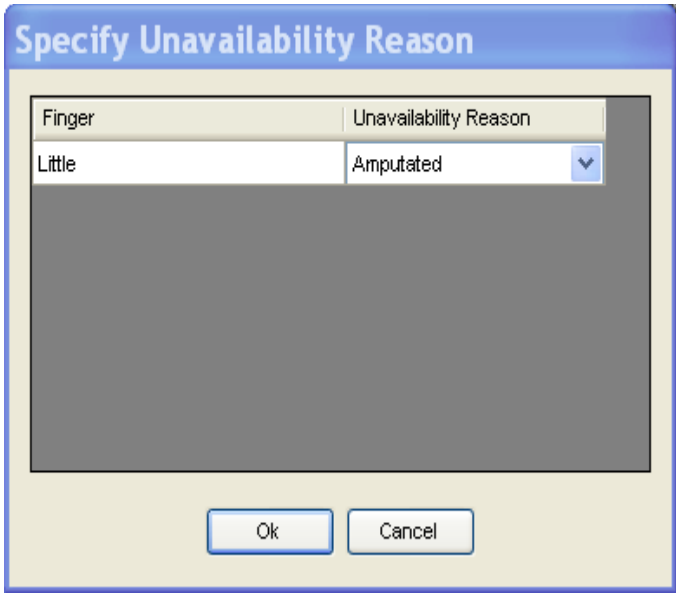
Figure 2 Segmentation

The found segments will be marked with a label indicating the finger name and will be surrounded by a bounding box. In the bottom right corner the quality of the segment is displayed, following the color conventions given in the paragraph 2.1.5.

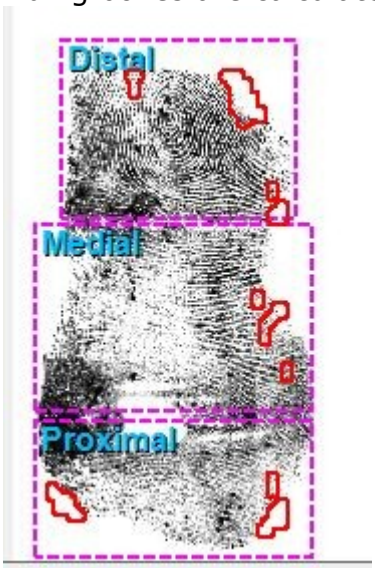
NOTE:
The bounding box can be manually adjusted by the operator by clicking on it and resizing and/or moving it.

The operator can remove possibly wrong segments by clicking on the finger label over the image and then selecting the item "Remove" from the popup menu.

The operator can view the image of a single segment by clicking on the finger label over the image and then selecting the item "View segment" from the popup menu. If a finger in a slap is missing, the operator can specify the reason by selecting it from the "Unavailability reason" dialog (that appears after *Accept* button has been pressed); the application can optionally choose to force the operator to specify the unavailability reason if a finger is not acquired by setting the "Ask unavailability" option.



A particular case of segmentation is represented, during single flat or rolled fingerprint acquisition, by the appearing of undesired segments (for example the operator fingerprint together with the user one). In such a case an "Ambiguous slap detected" message appears and a bounding box surrounds the wider segment. For more information, please see the "Auto clear outside roll" option.
When the acquired finger is a joint FV1 (or 2,3,4), all the finger phalanges (distal, medial and proximal for fingers different from thumbs and distal and proximal only for thumbs) bounding boxes are calculated.



If the system cannot calculate them for some phalanges, the "Incomplete pattern (missing phalanges)" is shown. If the phalanges are present but not retrievable (or if the

system wrongly calculates their bounding boxes) it is possible to add/correct them manually.

Figure 3: Before Correction

Figure 4: After correction

To add a missing phalange right click on the image: a context menu will appear with the name(s) of the not retrievable phalange(s). By clicking on one of its items, a rectangle (repositionable and resizable) will appear. Place this rectangle so that it bounds the phalange. To correct a wrongly bounding box, simply resize/move its correspondent rectangle. See pictures above.

2.8.2 Autocapture

The acquisition is automatically stopped when the best image in terms of contrast, fingerprint size and palm completeness (for Lower Half Palm objects) is obtained. This option is valid only for the flat fingers acquisition, while for the rolled print auto-capture it is always active. Optionally, the application can decide to block the auto-capture in some conditions (see *Block Autocapture* option).

2.8.3 Sound

Sound enabling. The device or the PC can produce sound in the following events:

- on acquisition end
- on "repeat" and "accept" events
- on error messages in message area

2.8.4 AutoAccept

It allows an acquisition to be automatically accepted (no operator intervention) if all the following requirements are satisfied:

(all objects)

- neither error conditions or diagnostic appears

(single finger, flat or rolled)

- the fingerprint quality is good (green) (it depends on the algorithm, for NFIQ Quality <= T1)

(rolled)

- the artefacts size is less or equal to T1 (green) and the sequence check is positive (if active).

(slaps)

- the automatic segmentation is completed successfully and single segments quality is good (green) (it depends on the algorithm, for NFIQ Quality <= T1)

(lower half palm)

- the palm completeness is good (green)

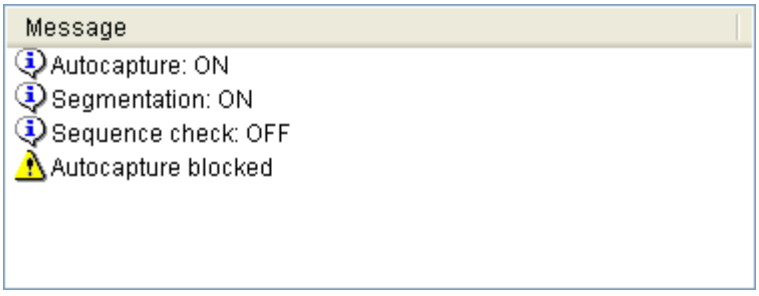
(upper half palm)

- check of segmentation result (as slap objects) and check of completeness and validity of intedigital and finger phalanges area

Note: If the image quality assessment is not active, the image quality conditions are believed unconditionally satisfied. So, it is recommended to activate the image quality assessment (that is, to select the algorithm and to specify the thresholds) when *AutoAccept* option is active to prevent the automatic acceptance of bad quality images.

2.8.5 Block Autocapture

Block the auto-capture in case a diagnostic message appears due to an improper user behavior (finger on scanner before scanning starts, finger displaced and finger sliding). When the auto-capture is blocked, in the "Advanced Messages" section a message appears. This option is valid only if *AutoCapture* option is also active.

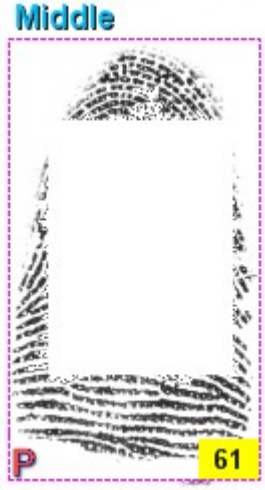


2.8.6 Remove Halo

Enable the "halo effect" and latent prints removal on the acquired image.

2.8.7 Detect Invalid Pattern

Enable the invalid pattern detection. The application can define the minimum acceptable pattern validity threshold (the default is 75/100).
When an invalid pattern is detected a "P" appears on the bottom-left corner of the segment rectangle:



2.8.8 Detect Incomplete Pattern

Enable the incomplete pattern detection. The application can define the minimum acceptable completeness threshold (the default is 85/100).
When an incomplete pattern is detected a "P" appears on the bottom-left corner of the segment rectangle (the same as the "Detect Invalid Pattern" option)

2.8.9 Detect Inclination

Enable the inclination detection. the application can define the acceptable inclination thresholds (±55°, default is ±35°).
When segment appears to be too much inclined, a yellow arrow appears on the bottom-left corner of the segment rectangle:

2.8.10 Sequence check

Enables the sequence check of the acquired fingerprints. In the sequence check the rolled fingerprints are compared with the corresponding fingerprints extracted from slaps, so that the acquisition sequence must respect this order: first slaps, then rolled fingerprints. From 3.3 version of the SDK sequence check will be performed for upper palm also.
For a proper functionality of this option it is required to specify the *Segmentation* option for slap acquisitions.
If this option is requested and the order is not respected (i.e. the rolling is requested first), an error will be returned to the application.
When the sequence check is active, in the "Advanced Messages" section a message appears.

From 3.3 version of the SDK, when the sequence check option is activated, automatically the "interdigital area identity check, explained below, is activated also (for scanners supporting both upper and lower palm objects).
The Interdigital area identity check enables the identity check between lower and upper palmprints of the same hand. In the identity check the interdigital areas extracted from both upper and lower palmprints are compared each other.

2.8.11 Ask unavailability reason

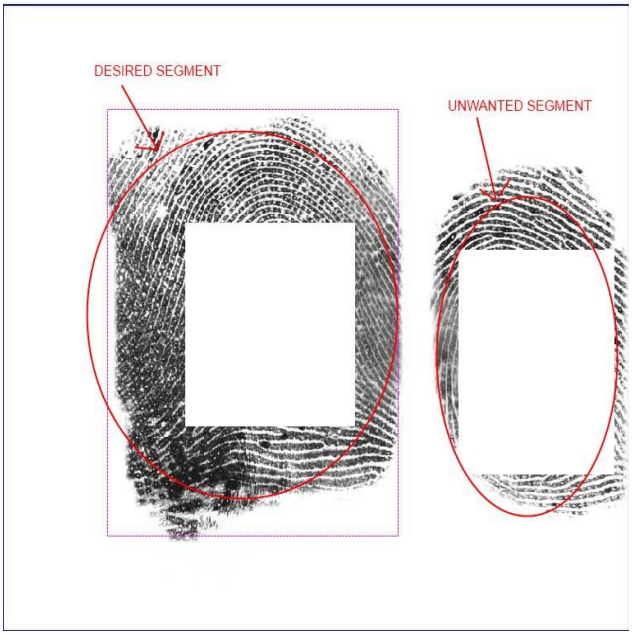
Force the operator to specify the reason of finger/slap unavailability when a finger/slap acquisition is skipped, or a segment in a slap is not assigned. If this option is active, the operator can't skip an image or accept a slap with missing fingers unless the unavailability reason is specified. See also Segmentation: chapter.

2.8.12 Rotate Finger

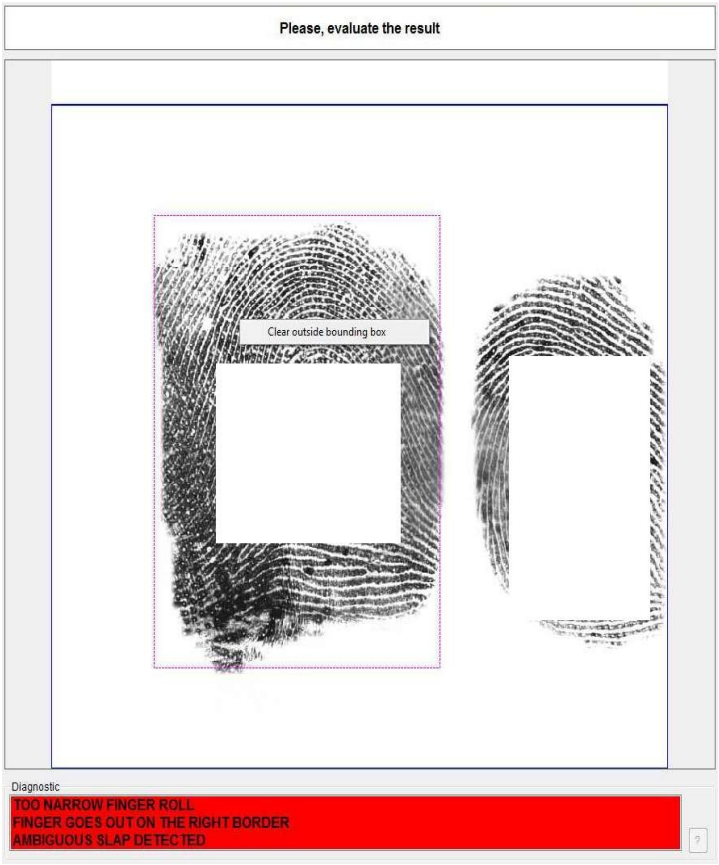
Rotate inclined fingerprints to vertical position; this option affects only segments of slaps.

2.8.13 Auto clear outside roll

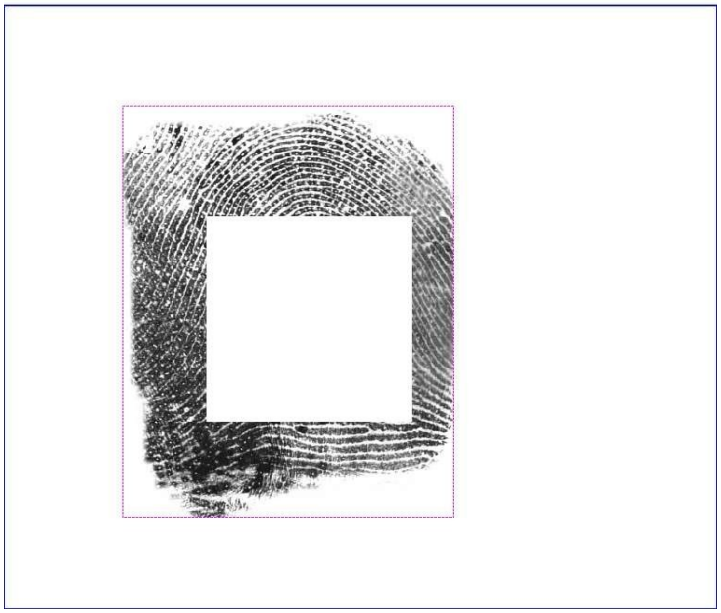
In some particular situations (for example in case of webbed fingers or when, during an assisted acquisition, the policeman finger appear), together with the desired fingerprint, an unwanted segment can appear in the image (see figure).



In such a case, when acquiring a rolled or a flat single finger image, an "Ambiguous slap detected" diagnostic message appears, and the same does a bounding box surrounding the wider segment. This bounding box can be resized and moved. Clicking with the right button inside the bounding box, a "Clear outside bounding box" option is shown.



By selecting this option, the desired fingerprint segment only remains in the image (see next figure).



Only in case of rolled fingerprints, this "cleaning operation" can be done automatically in case the "Auto clear outside roll" option is selected.

2.8.14 Segments quality evaluation in preview

By setting this option (GBMSGUI_ACQUISITION_OPTION_LIVE_SEGM_EVAL), segmentation during preview, with single segments quality evaluation, is enabled. Segments bounding boxes and segments quality are visible during preview phase.

Furthermore, until a good-enough quality (evaluated in terms of segments quality and pattern completeness) for each segment is not achieved, auto-capture (if active: this option can be used in manual mode also) is blocked. The auto-capture block, even if quality and completeness thresholds are not achieved, is removed after a given timeout set by means of the "GBMSGUI_SetLiveSegmEvalTimeout(...)" function (see the GBMSGUI.h file for more information). Block auto-capture feedback on leds (if supported by the scanner) is provided. This option is valid only for slap objects types (GBMSAPI_SBT_FLAT_SLAP_4, GBMSAPI_SBT_FLAT_THUMBS_2, GBMSAPI_SBT_FLAT_SLAP_2)

This option uses the fast segmentation process with data of the gbfinimg library (see overview document, in particular the section regarding the gbfinimg library, for further information).When this option is active, in the "Advanced Messages" section a message appears.

NOTE1: this option automatically activates also GBMSGUI_ACQUISITION_OPTION_SEGMENTATION, GBMSGUI_ACQUISITION_OPTION_FULL_RES_PREVIEW and GBMSGUI_ACQUISITION_OPTION_DETECT_INCOMPLETE_PATTERN; if GBMSGUI_ACQUISITION_OPTION_AUTOCAPTURE is active, also GBMSGUI_ACQUISITION_OPTION_BLOCK_AUTOCAPTURE is activated.

NOTE 2: this option is considered as valid only for slap objects.

2.8.15 Delete segments around palm-prints

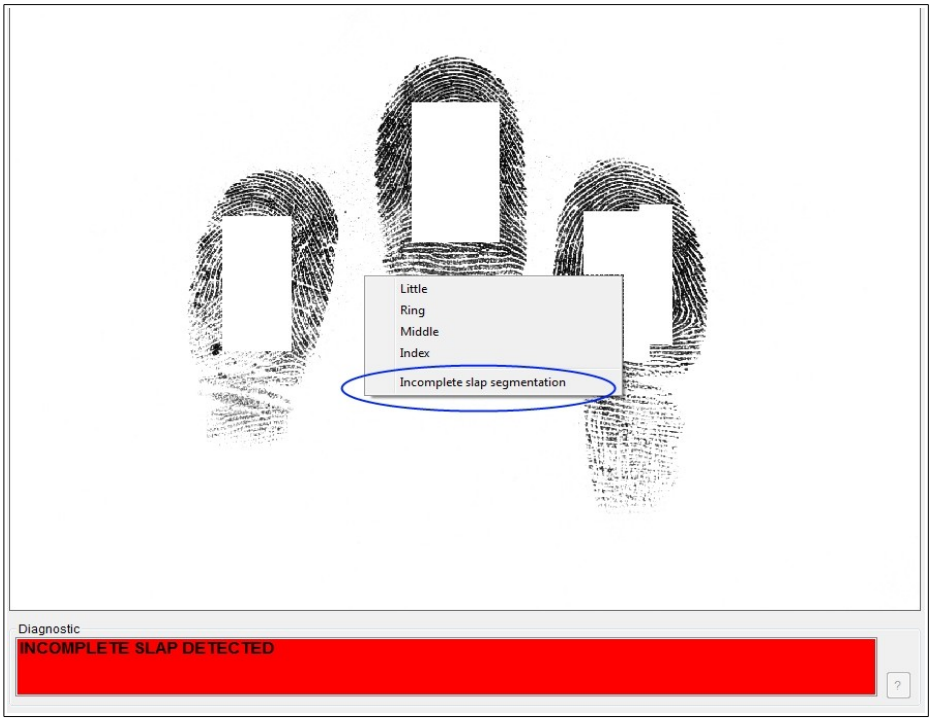
Set this option to delete possible fingerprint segments found around palm-prints.

NOTE: this option is considered as valid only if GBMSGUI_ACQUISITION_OPTION_REMOVE_HALO_LATENT is also active, and only for palm objects (except upper palm).

2.8.16 Segmentation data for incomplete slaps

Set this option to enable automatic attempt to perform segmentation of incomplete slaps.
If this option is set, system will not check left-right hand mix and will rely completely on the information about hand passed by application. So, application/human operator should ensure appropriate hand applying for correct result. This option uses the corresponding functionality in the gbfinimg library (see overview document, in particular the section regarding the gbfinimg library, for further information).

NOTE: Even if this option is not set, when segmentation fails, it's always possible to try automatic segmentation from the context menu right-clicking on the image (see the image below).



2.8.17 Dry Finger Enhancement

Set this option to enable the image enhancement feature that helps to improve the details of ridges and valleys in case of dry/hard finger skin.
When the feature is active, detected good-enough contact area with the fingerprint is denoted by darker (gray) background, while area where contact with the finger is not sufficiently good remains with white background.
This different-tone background approach provides a visual feedback that allows to improve dry-fingers acquisition applying more intensive pressing on the finger where is necessary in case of dry/hard skin. See the images below.

NOTE1: The dry-finger-enhancement feature can be activated regardless of the actual finger skin conditions (dry/normal/wet), so, it can be used as a permanently-active feature for every finger/palm acquisition. Dark background in image will be cleaned when the image is finalized, in order to ensure usual white background for every acquired fingerprint/palmprint.

NOTE2: This option is valid only for scanners supporting the DRY SKIN ENHANCEMENT feature (see the "Scanner Features.pdf" document for getting this information).

2.8.18 Adapt Roll Area Position

Set this option to enable the adaptative roll area positioning feature.

When the feature is active, the acquisition begins from low-resolution preview phase to detect where fingerprint (thenar) to be rolled is actually placed. Preview area is as wide as the entire scanner window to give a freedom in horizontal positioning and as high as specific rolled object needs (lower border of adaptive roll area is always aligned with lower scanning window edge for easier rolling operation).
NOTE: for some scanners, like M(S)C517, the preview area is as high as the entire acquisition window.
When the fingerprint position is detected the preview phase ends and the acquisition switches to the corresponding high-resolution high-frame-rate roll mode moving the roll area position where necessary.
Such approach allows for operator to place the finger anywhere (horizontally) within the entire scanner window and then system automatically adapts roll area position.
Specific behavior of adaptive roll area positioning algorithm depends on selected roll preview mode. For further details see the "ROLLED FINGERPRINT ACQUISITION" section in the GBMSAPI_Defines.h file.

Appendix A: Messages to the user

In the following table all the messages that can appear in the "Messages" section (see paragraph2.1.9) of the interface are given, with a brief explanation and a "What to do" recommendation.

MESSAGE TEXT	CATEGORY	DESCRIPTION	WHAT TO DO
Preview	ACQUISITION INFO	This message is displayed during the preview phase, when the image quality and the object position are being evaluated by the system or by the operator	Put the object to be scanned on the scanning window until the correct position and a good image quality have been achieved
Acquiring/Transmitting image...	ACQUISITION INFO	The final image is being acquired (for ROLL objects composition is being performed)	For FLAT objects, do not remove the object until this message disappears; for ROLLED ones, go on rolling
Processing image...	ACQUISITION INFO	After the image has been acquired, it is processed by the system (for example in order to extract segments from a slap or to calculate the image quality)	Wait until this message disappears: after that an evaluation of the image will be given (see next messages)
Acquisition successful	ACQUISITION INFO	The acquisition of the image has been successfully performed	The image can be saved
Please, evaluate the result	ACQUISITION INFO	Self explaining	The user/operator should carefully evaluate the image in order to decide whether to accept it or not. In general it is recommended to repeat the acquisition
Saving image...	ACQUISITION INFO	The image is being returned to the application. This message appears after "Accept" button has been pressed	NA
Repeating...	ACQUISITION INFO	This message appears after "Repeat" button has been pressed	NA
Acquisition timeout	ACQUISITION INFO	To avoid overheating, some devices provide a timeout mechanism: if after 20 s (approx) no objects have been detected on the scan-	Repeat acquisition

		ner surface, then the acquisition is automatically stopped and this message comes out	
Rotation not completed	ACQUISITION INFO	A rolled fingerprint acquisition was stopped by the operator (by pressing the STOP button)	It's recommended to repeat the acquisition
No object detected	ACQUISITION INFO	The acquisition was stopped before a finger was detected	Repeat the acquisition
Auto-accept conditions not satisfied	ACQUISITION INFO	Some quality parameters, such as NIST quality, are under an acceptable threshold. This could be due to a not-correct finger positioning or to some finger features	It's recommended to repeat the acquisition. If this message keeps on coming out, the operator should consider the possibility of accepting the image
Segmentation failed	ACQUISITION INFO	The system cannot perform slap segmentation: see diagnostic messages that normally are displayed in this case	Repeat the acquisition
Release pedal!	ACQUISITION INFO	This message comes out when the acquisition is started while the pedal is pressed	Release pedal
Sequence check: low matching score. Please, check the requested object.	ACQUISITION INFO	The matching algorithm returned a low matching score, so it cannot decide if the rolled and flat fingerprints belong to the same object	It's recommended to repeat the acquisition, making sure that the object to be acquired is correct
Segment bounding boxes go significantly outside the image. Please, repeat the acquisition repositioning the fingers	ACQUISITION INFO	Some fingers were positioned too much close to the borders of the scanning/clipping region.	Repeat the acquisition by repositioning the fingers
Segment bounding boxes go slightly outside the image. Bounding boxes will be cropped	ACQUISITION INFO	Some fingers were positioned too much close to the borders of the scanning/clipping region.	It's recommended to repeat the acquisition by repositioning the fingers

Segment bounding boxes overlap significantly Please, repeat the acquisition repositioning the fingers	ACQUISITION INFO	This message can be due to a too much big inclination	Repeat the acquisition by repositioning the fingers

Appendix B: Advanced Messages to the users

In the following table all the messages that can appear in the "Advanced Messages" section (see paragraph2.1.7) of the interface are given, with a brief explanation and a "What to do" recommendation.

MESSAGE TEXT	CATEGORY	DESCRIPTION	WHAT TO DO
Autocapture: ON	INFO	The Auto-Capture for FLAT objects is on	NA
Autocapture: OFF	INFO	The Auto-Capture for FLAT objects is off	The acquisition must be stopped manually
Roll preview manual stop (PEDAL)	INFO	The preview phase of a ROLLED object acquisition has to be stopped by pressing the pedal	NA
Roll preview automatic stop (CENTER)	INFO	The preview phase of a ROLLED object acquisition will be automatically stopped. The person should put the core of the finger on the scanning window, then rotate to the left or to the right and wait for the preview end signal, then rotate to the other side	NA
Roll preview automatic stop (SIDE)	INFO	The preview phase of a ROLLED object acquisition will be automatically stopped. The person should put the right or the left side of the finger on the scanning window, then wait for the preview end signal, then rotate to the other side	NA
Segmentation: ON	INFO	The segmentation for SLAP is enabled	NA
Segmentation: OFF	INFO	The segmentation for SLAP is disabled	NA

Sequence check: ON	INFO	The sequence check is enabled	NA
Sequence check: OFF	INFO	The sequence check is disabled	NA
Right-click on image for manually locating segments	INFO	System could not automatically detect the segments, so that it's up to the operator to locate them	Right click with the mouse on each segment and choose between the appearing options
Autocapture: OFF	WARNING	The Auto-Capture for FLAT objects is not supported. Do not confuse with "Autocapture: OFF" marked as "INFO" (they can be distinguished by means of the triangular yellow icon indicating a warning). This message appears when the Auto-Capture option has been set but it is not supported by the scanner and advises the operator that the acquisition should be manually stopped.	Stop manually the acquisition
Block Auto-Capture not supported	WARNING	This message comes out when the "Block Auto-Capture" option has been set but this feature is not supported. In this case the auto-capture is based only on size, contrast and Select Image Timeout expiration.	The operator should check the final image quality
Full resolution preview not supported	WARNING	The images resulting from the scanner during the preview phase normally are low resolution images, that means that their dimension are less or equal to the dimensions of the images in the full resolution phase of the acquisition (see the GBMSAPI_Defines.h file for a description of the acquisition phases). This option, that allows to get full resolution images also during the preview phase, has been kept for	NA

		those devices that do not support low resolution in the preview phase (like Visascan3), when, if not set, calling the Start Acquisition results in a “Unavailable option” error.	
Roll preview manual stop not supported	WARNING	ROLLED objects preview can be stopped automatically or, for those devices supporting this feature, manually by pressing the pedal. If this option was set but it is not supported by the device, the operator should be warned	Wait for the preview end signal before rotating the finger
Auto-capture blocked	WARNING	Due to some conditions (for example finger sliding), the FLAT auto-capture process could momentarily be blocked.	Remove the object from scanning window and put it again. Retry until this message disappears
Acquisition stopped before autocapture	WARNING	For the auto-capture process, normally the system decides when the preview phase has to be stopped. When, for some reasons, the operator decides to stop this phase, he is warned by means of this message	Image quality should be carefully evaluated
Some fingers are marked as unavailable	WARNING	This message appears when one or more fingers are marked as unavailable before a SLAP object acquisition	NA
Acquisition order does not allow sequence check	WARNING	The sequence check requires SLAP objects acquisition before ROLLED fingers acquisition	Repeat the sequence in order to have a sequence check
Adapt roll area position active	INFO	The adapt roll area position is active and the “Roll to Center” method is applied (for further details see the “ROLLED FINGERPRINT ACQUISITION” section in the GBMSAPI_Defines.h file)	NA
Roll direction forced to LEFT (or RIGHT)	INFO	It's not used the “Roll To Center” method, roll direction is forced to left (or right) instead (for further details see the “ROLLED FINGERPRINT ACQUISITION” section in the GBMSAPI_Defines.h file)	NA

Segments evaluation timeout	INFO	Segments evaluation timeout has elapsed	NA
Live Segments Evaluation active	INFO	Live segmentation evaluation is active: in this case the quality of each segment is displayed during preview phase	NA

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