

mobiFLOW SDK

Configuration Guide

Version 5

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About this guide

This guide describes and illustrates the use of most, if not all, of the parameters that are available on the mobiFLOW SDK.

This guide is an extension to the developer SDK guides for iOS and Android; it explains more about each parameter in the SDK.

Each parameter is explained from the user or designer point of view, rather than the developer point of view. This guide is a good tool for the design stage, or for understanding the different capabilities mobiFLOW has to offer. It can also help developers to understand the behavior changes when setting up the mobiFLOW SDK parameters through the code.

This guide includes mostly screenshots from iOS, but the Android look and feel is to a large extent identical.

This guide is aligned with the mobiFLOW SDK version to represent the relevant configuration of that version or any version thereafter, unless a newer version of this guide is available.

Audience

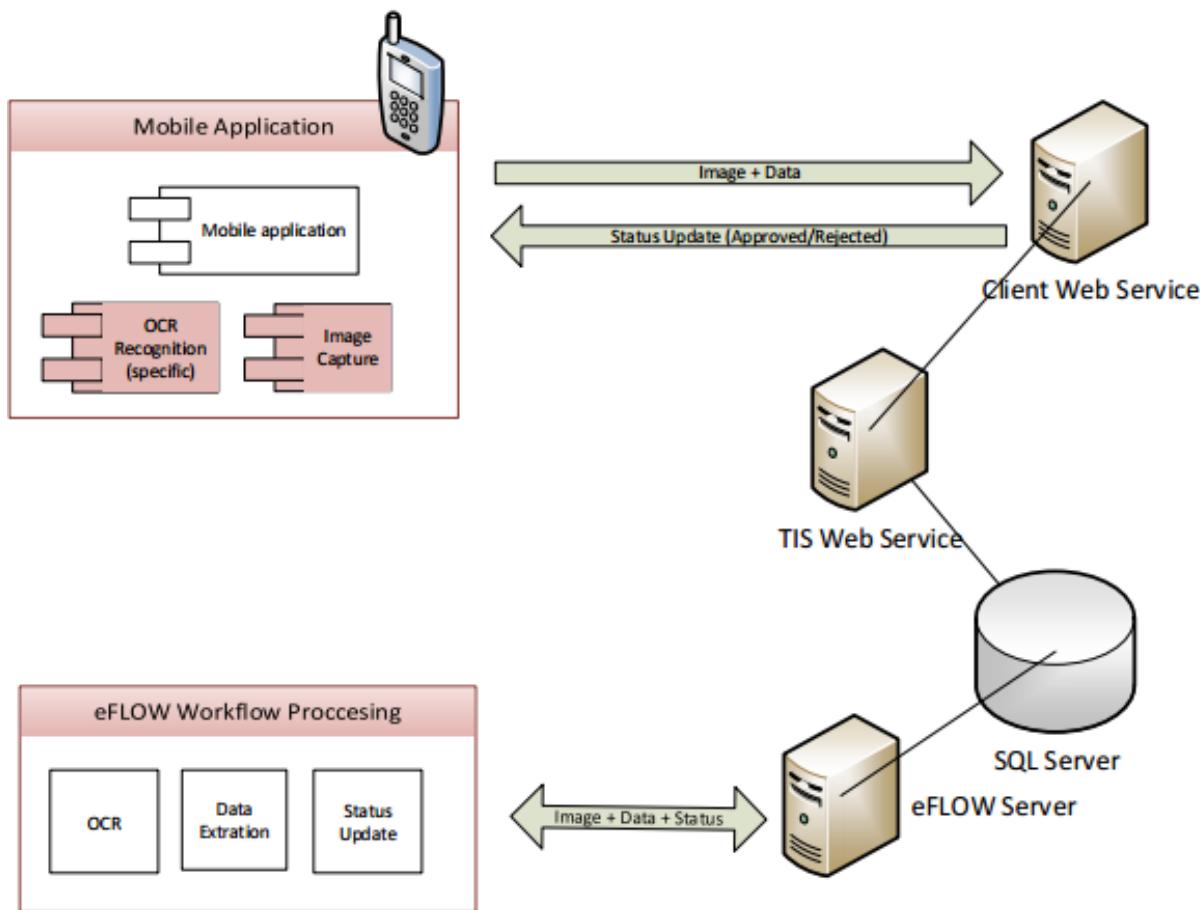
- Developers using TIS mobiFLOW SDK
- Designers integrating TIS mobiFLOW SDK
- TIS Mobile Partners
- TIS Mobile Sales/Presales
- Other decision makers

Related guides

Additional guides are available to assist in setting up and developing the solution. These guides are relevant mostly for developers using the mobiFLOW SDK, as they are very technical.

Guide name	Description
TIS Mobile Specifications	Describes the specifications and minimum requirements for using the SDK.
mobiFLOW iOS Library SDK Guide	Describes the SDK for Image Mobile Capture for iOS.
mobiFLOW Android Library SDK Guide	Describes the SDK for Image Mobile Capture for Android.

Example workflow



The user uses the mobile app on their smartphone or tablet to take a picture of the document. The device unique identifier and the images are uploaded to the hosting application web service, and submitted for OCR (in this example, using the Client web service and the TIS web service, and saving to the database).

The eFLOW server monitors the database, picks up new transactions, processes them, and extracts the data from the document. It then saves the extracted data to the database so that it can be picked up by the TIS web service.

The mobile app retrieves the status from eFLOW (through the web services channel) using the TIS web service, and sends the requested data elements to the user to display on their smartphone or tablet.

If the application only uses the capture side of the TIS solution, all the rest outside of the mobile application box is not relevant for the process. In this case, mobiFLOW generates the necessary images and OCR recognition on the device, and hands it over to the calling app. From there, it is the calling app's responsibility to continue the process with the image and data.

The configuration described in this guide covers only the Mobile Application box, and only explains the options available for setting up the TIS mobiFLOW SDK. Depending on specific implementation approaches, different APIs and OCR platforms may be used.

Mobile Capture parameters

This section describes the various parameters of the Mobile Capture module.

Basic parameters

This section describes the basic parameters of the Mobile Capture module.

Document types

The following document types are available.

Check (Cheque)

This document type is used for checks. With this document type, MICR recognition is possible and recommended.

- When the MICR type is set, mobiFLOW tries to recognize the MICR during capture of the check. In video mode, MICR recognition occurs while the user hovers the device over the check in the correct position. If recognition fails several times, mobiFLOW automatically switches to still mode. In still mode, mobiFLOW tries to recognize the MICR only after the capture. An error message is displayed if the MICR could not be read.
- Successful MICR recognition is an indication that the picture that was taken is sharp and of good quality.
- When MICR recognition is set to OFF, there is no blur/sharp validation of the picture that was taken.
- The MICR configuration can be turned on by setting the *OCR Type* to *E13B*, *CMC7*, or *OCRA*.
- Capture occurs while the device is in landscape orientation.

Bill Payment (Stub)

This document type is used for bill payment stubs (about a quarter to a third the size of a full page).

Full Page (Letter/A4)

- This document type is used for capturing any document that is around the size of a full page (either Letter or A4 size).
- Capture for this document type always uses portrait orientation and still mode, as the full resolution of the camera is required to produce a high quality image.

Passport

- This document type is used to capture of the main page of a passport (with the main information and the picture).
- The page must have MRZ lines (Machine Readable Zone – two lines at the bottom of the page). The user must adjust the MRZ, with the sample MRZ showing on the screen. Capture only takes place when mobiFLOW is able to read the MRZ lines.

- Only static capture is used (live/dynamic capture is not possible), in conjunction with video feed processing. Only devices that support video can capture this document type.
- OCR recognition of the MRZ line broken into the proper fields is returned on the device.

Card

- This document type is used to capture a card sized document (such as a driver's license, credit card, or any other card that is the size of a credit card).
- When using the OCR type *PanCard*, the card will also return OCR recognition results for the entire card (relevant to India only).

Custom

- This document type allows configuration of a custom document type that does not fit to any of the document types mentioned above.
- The document size or aspect ratio must be defined, as well as the capture orientation (portrait or landscape). The screen automatically adjusts in accordance with these settings to capture the document.

Debug Mode

- This parameter should be used only during the testing or development stage. It can be set to TRUE or FALSE.
- When set to TRUE, mobiFLOW saves all the result images and the captured image on the device, along with some logs. These are then available for submission to TIS for further investigation in the case of bugs or unusual behavior of the library.

Capture parameters

This section describes the capture parameters of the Mobile Capture module.

Aspect ratio

The aspect ratio is the most important parameter after the [document type](#).

This aspect ratio defines the size of the document that will be captured, and is calculated as the height of the document divided by the width of the document. For example:

- A document with a 6" width and 2.5" height has an aspect ratio of 2.5 divided by 6, which is 0.4166.
- A document with an 8.5" width and 11" height has an aspect ratio of 11 divided by 8.5, which is 1.29411.

The SDK has two parameters for the aspect ratio: *Minimum* and *Maximum*. This represents the size range within which the document must fall in order to be considered as a valid document for capture. This is used to avoid capturing a document that is in the wrong size or something we are not expecting.

To set the minimum and maximum aspect ratio, take the calculated aspect ratio, then add about 10% for *Maximum* and subtract about 10% for *Minimum*. For example, for an aspect ratio of 0.4166, *Maximum* should be $0.4166 * 110\% = 0.4582$, and *Minimum* should be $0.4166 * 90\% = 0.3745$. If you still experience difficulties with capture, increase up to 15% threshold instead.

In still capture, the screen adjusts the frame that is displayed to the specified aspect ratio, and maximizes the space of the screen to the largest rectangle possible for capture in the desired orientation.

In live (dynamic) capture, when the user is in the right position to capture, if the document does not fit within the range of the aspect ratio that was set, the rectangle that is displayed around the document will not turn to a valid color (default: green) and will keep showing as an invalid color (default: red).

The defaults for the different document types are:

Document type	Minimum aspect ratio	Maximum aspect ratio
Check *	0.35	0.50
Bill Payment	0.35	0.50
Card	0.582	0.7117
Full Page **	1.17	1.56
Passport	0.65	0.8

* The Check defaults are in accordance with the size of US checks.

** The Full page defaults are in accordance with A4 full page size.

Note: Do not rely on these defaults. You must ensure that the aspect ratio can accommodate the document size you are trying to capture. If you have different document sizes, just get the minimum and maximum from all the sizes combined.

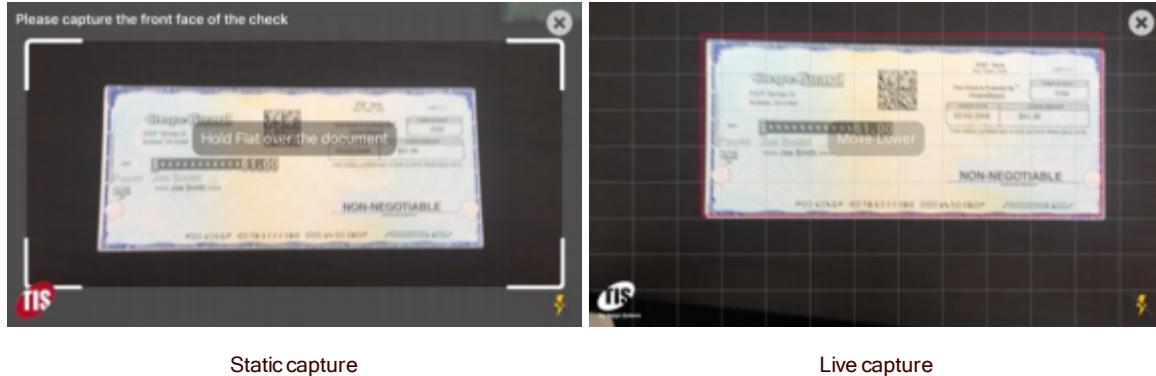
In live (dynamic) capture, if you set the minimum and maximum aspect ratio to 0.0, you can capture any size of document; the aspect ratio will not be validated. This can be a good choice when you have a large variety of documents with different sizes (for example, receipts).

Capture type

The parameter *uxType* can be set to either *Live (Dynamic)* or *Static* capture. In the Showcase, this is represented by *Dynamic Capture* turned ON or OFF.

Static capture shows a frame on the screen and the user must adjust the document within the frame for the picture to be taken automatically. The frame is displayed according to the aspect ratio that was set.

Live capture shows an empty screen with a grid and lets the user freely adjust the device to the document. mobiFLOW displays a rectangle around the document once it is found, and the only thing the user has to do is to get close enough to the document that mobiFLOW can take the closest picture possible of the document.



Video feed processing

Setting up this parameter (*Enable Video Capture* in Showcase) directs mobiFLOW to use the video feed for capture instead of switching to still mode to take the picture.

The differences between the two modes are as follows:

- Still capture uses the full resolution of the camera, resulting in a better picture at a higher resolution. Video feed results in a lower resolution picture, however, this is still sufficient for OCR in most cases.
- Video feed capture is much quicker; one of the last frames of the video feed is used as the final image. In still capture, we have to switch from video capture once in position to stills capture, then auto focus and take the picture in stills mode. Depending on the device, this may take another 1-3 seconds; during this time, there is the risk that the user will move while mobiFLOW takes the picture, resulting in an error message.
- With still capture, all validations and OCR on the image is done after the picture was taken. With video feed capture, validation of blurriness and OCR recognition (in most cases) is done during the video session.

The following table summarizes the differences:

Still capture	Video capture
Highest camera resolution	Uses 1920x1080 resolution
OCR after capture	OCR during video feed
Blur detection after capture	Blur detection during video feed
Switch from video to still, auto focus and then capture	Uses one of the last frames as the final image
User must hold still for 1-3 seconds	User must hold still for 1 second
Supported on all devices	Not supported on low end devices

Still capture	Video capture
Can be used for any sized document	Only recommended for documents smaller than half a full page

Note: If a device does not support video capture, the SDK automatically defaults to still capture. See the *TIS Mobile Specifications* for a list of supported devices.

There may be issues using video capture with some Android devices, so there is a list of exceptional devices that will run still capture even though video capture was enabled. This makes it possible to achieve good capture results even for devices with known issues.

Max video frame to capture

This parameter enables you to control which frame mobiFLOW uses as the final image. Once mobiFLOW found a good frame, or the user is in the correct position, mobiFLOW can check a specified number of frames prior to that frame and take the best of those frames as the final image.

Soft capture

Soft capture allows the user to capture the document while the device is held in an angle, rather than in a flat position over the document. This can be useful when direct light from above casts a shadow of the device over the document, for example:



Note: Soft capture may also take a picture that can be somewhat distorted from the angle, and some data loss may occur, because mobiFLOW has to flatten the image into a rectangle from the trapezoid shape that resulted from the angled capture.

Scan front

mobiFLOW is set up to capture documents assuming every document is two sided, so every session is composed of front side capture followed by back side capture. Setting this parameter to *True* directs mobiFLOW to capture only the front side.

This parameter can also be used when capturing two sided documents, but splitting the capture to different sessions for the front and the back.

Scan back only

mobiFLOW is set up to capture documents assuming every document is two sided, so every session is composed of front side capture followed by back side capture. Setting this parameter to *True* directs mobiFLOW to capture only the back side.

This parameter can also be used when capturing two sided documents, but splitting the capture to different sessions for the front and the back.

Multipage capture

This parameter allows you to direct mobiFLOW to capture more than one document, or an unknown number of pages. After every capture session, the user is asked if they wants to capture another page/document until they choose to finish capturing.

Note: The session can be front and back, so in this case the user will be asked after he captured both, the front and back, if he wants to continue and the next session will also be front and back until finished.

mobiFLOW however, will send the result to the calling app after each session when the user receives the message if he wants to capture another document. It is the calling app responsibility to manage all the pages that were captured in the multipage session.

Portrait capture

This parameter is only relevant when using the [Custom](#) document type.

It allows you to choose the device orientation during the capture session (whether you want the capture to happen in portrait mode or landscape mode). We advise you to choose it smartly according to the document size to maximize the usage of the device screen.

Capture frame location (iOS Only)

This parameter is only relevant when using the [Custom](#) document type.

This parameter called CustomROI and it gives you the option to define the rectangle in the screen where the capture preview screen will be displayed. It will give you more screen space to add your own components around in custom view in the expense of the capture rectangle.

We recommend using this carefully and only if it is really needed as it will make the capture view smaller which can result in lower quality pictures eventually.

Validation parameters

This section describes the validation parameters of the Mobile Capture module.

Blur detection

Blur detection only applies to the document types [Bill Payment](#) and [Full Page](#).

mobiFLOW can validate that the picture that was taken is not blurry and show an error message in case it is. This validation can be enabled or disabled.

Note: For the Check document type, the sharpness is already verified where the MICR is read successfully.

Image quality assurance (IQA)

IQA validations only apply to the [Check](#) document type and should only be enabled for checks.

All IQA validations run on the black and white &W TIFF image that is generated by mobiFLOW, so the [output of the B&W image](#) configuration must be enabled in order to run IQA validations.

As most of the validations are in inches and not pixels, the size of the document is calculated according to the size of the MICR height. The MICR height is a constant and is the same for all checks, so mobiFLOW can discern the size of the total check accordingly and validate measurements in inches.

For all IQA parameters below there are defaults that are set up to be aligned with US Federal Reserve Bank regulation for Check 21 compliance. So there is no need to change them unless you desire to make them more restricted. For all other countries, you should change the settings according to specific regulation of the country. For list of all the defaults please refer to the Android Developer Guide IQA section.

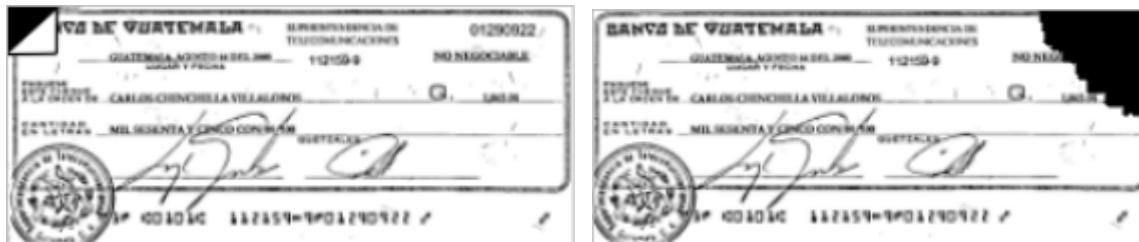
Enable IQA

Gives the option to enable or disable the IQA validations for the check. This must be enabled to complete all the validations below.

Folded or torn corners

You can set different thresholds for each corner of the check separately for the front and the back, so total of 8 corners. Each corner is defined as the height and width in inches along with the total area of the triangle that is created from the missing corner in square inches.

The validation runs on each corner and checks that each one is within the thresholds of the height, width, and total missing area. If any of the validations fail, mobiFLOW generates a corner validation error. This is just a general message that does not specify which corner is the problematic one.



Folded or torn edges

You can set different thresholds for each edge of the check both for the front and the back, so total of 8 edges. Each edge is defined as the height and width in inches along with the total area of the triangle that is created from the missing edge in square inches. We aware that missing edge may not be in the shape of a triangle but this is the way it is measured to be the closest to correct measurement.

The validation will run on each edge and validate that each one is within the thresholds of the height, width and total missing area. If any of the validation fails, an edges validation error will be generated by mobiFLOW. mobiFLOW does not specify which edge is the problematic one, but just give a general message about the edges validation.



Skewing

You can define the maximum skewing of the picture that was taken in angles. The angle that is specified will check both ways on positive and negative angle, so for example if you set an angle of 5 degrees, it will validate 5 degrees to the right and 5 degrees to the left so 5 and -5 basically. If the image is skewed more than the threshold, a skewing issue error will be generated by mobiFLOW.



Brightness and darkness

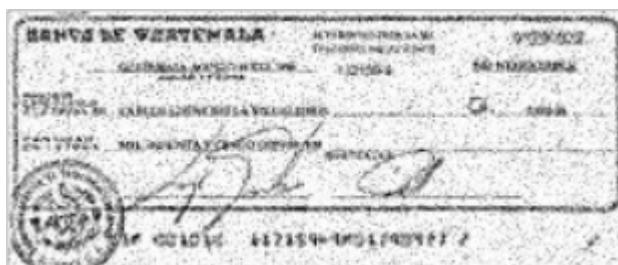
You can define for each side (back and front) thresholds for darkness, which are defined as maximum and minimum darkness. The threshold for the front and the back can be different.

The darkness is calculated as the amount of black pixels vs the total pixels on the image in percentage (number between 0.0 and 1.0). If the image exceeds the maximum or below the minimum threshold, a darkness/brightness error will be generated by mobiFLOW.



Noise/spots

You can define for each side the threshold for the amount of acceptable noise. The noise is defined as number of spots per square inch, while each spot is considered any contagious group of less than 20 black pixels surrounded by white pixels, basically an island of 20 or less black pixels connected. Anything more than 20 black pixels connected is considered to be valid data. If the image exceeds the threshold for the number of spots detected in one of the square inches, a noise validation error will be generated by mobiFLOW.



File size

You can define the minimum and maximum acceptable file size for the front and the back of the B&W TIFF image. If the file size does lie between the thresholds, mobiFLOW generates a file size error message.

Minimum requirements

Minimum requirements only applies to Android devices. For iOS devices, there is a supported device list, but there are too many Android devices to actually check them all. See the *TIS Mobile Specifications* for information about the minimum requirements for the camera and CPU.

Camera

If the camera on the device does not meet the minimum requirements for the camera MP, mobiFLOW generates a *Camera not supported* error. mobiFLOW will not start at all, and no camera preview session will be displayed.

Auto-Focus

If the camera on the device does not meet the minimum requirements for the camera auto focus feature, mobiFLOW generates an *Auto focus camera* error. mobiFLOW will not start at all, and no camera preview session will be displayed.

CPU

If the device does not meet the minimum requirements for the CPU speed, mobiFLOW generates a *CPU speed support* error. mobiFLOW will not start at all, and no camera preview session will be displayed.

MICR length

This validation is only relevant for the [Check](#) document type.

The validation applies when MICR recognition is enabled and is defined with 2 parameters for minimum and maximum length. In video feed processing, it will be validated on the video session while the MICR is being read from the video feed, while in stills capture it will be validated only after the capture itself and can generate an error message in case the MICR length is not between the minimum and maximum thresholds.

In video feed processing, if the MICR isn't found, mobiFLOW will switch to still capture and take the picture, since mobiFLOW assumes the video is in low resolution. In this case an error message then can be generated if the validation failed after the stills capture.

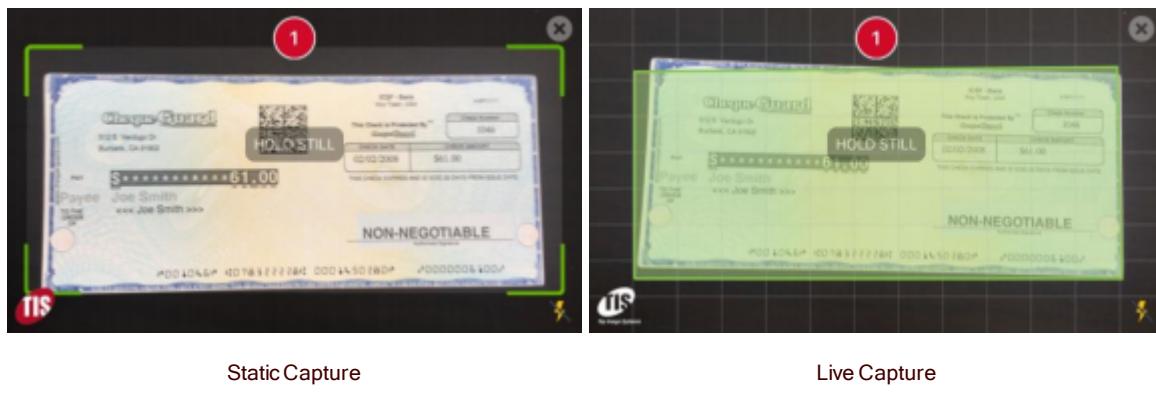
User interface parameters

This section describes the user interface parameters of the Mobile Capture module.

Countdown

Countdown is only relevant when using still capture ([video feed processing](#) is off), or when mobiFLOW defaults to still capture because video mode is not supported on the device's camera.

The countdown shows when the *HOLD STILL* message is present. In this time mobiFLOW switches from video feed to stills mode, auto focus on the document and take the picture of the document. The countdown indicates to the user how long he must hold the device until he can move away from the document. Though sometimes the countdown can be even longer than the time it took the device to do those steps. Make sure the countdown is not set to too many or too few seconds then.



Countdown has the following additional configurations.

Show countdown

When set to **True** the countdown will be shown on the screen.

When set to **False** there will be no countdown and the user will see the hold still message until mobiFLOW switches from video feed to stills capture, focus on the document and take the picture. The user will only see the hold still message until the picture is taken.

Countdown start and stop values

Relevant only when Show countdown is set to **True**.

Those 2 parameters will have the number the countdown will start counting from and the number it will count down to. Please be aware that the countdown is in seconds, and sometimes the capture may be quicker than the countdown. Please test and make sure the countdown is not too long, we recommend 3 seconds should be more than enough.

Countdown sound

Relevant only when Show countdown is set to **True**.

Can be set to **True** to have a beep sound for every count, or **False** to have no sound.

The sound that will be played can be configured as well with any sound file.

Default processing view

The default processing view can be set to **True** and in this case a red spinner (see figure below) will be shown on the screen after the picture was taken and while mobiFLOW is processing the image (cropping and creating grayscale and B&W images from the original image and running OCR if needed).

When set to **False**, no spinner will be shown on the screen, in this case it is recommended that you will show your own spinner (maybe one that is aligned with the rest of your app), otherwise the user experience will be that the screen is stuck and nothing is happening while the image is being processed (same view as on the figure without the spinner).



Static Capture



Live Capture

Info screen

The Info screen is a popup screen that drops down from the top of the screen when the user has difficulty capturing the document within a reasonable time. This screen contents and layout are completely customizable to fit the feel and look of the hosting app.

The screen also contains a **Close** button to dismiss the popup, and a **Never Show Again** option that allows the user to suppress this popup for future captures.



The text showing on the figures is completely configurable and the look and feel is customizable (color, fonts, size, locations etc).

The following parameters control the behavior of the Info screen.

Enable Info screen

When set to **True** the info screen will be displayed according to the [interval](#) that was set and in case the user has not seen this screen before and chose not to show it again.

When set to **False** the info screen will not be displayed.

Info screen interval

The number of seconds from the time the capture preview screen appears until the info screen will be displayed. The info screen will be displayed only if the user was not able to lock in position and successfully have mobiFLOW taking the picture of the document before that number of seconds passed. Recommended interval is 10 seconds.

Show guidelines indicators

The guidelines indicators are the hints the user sees on the screen and are meant to guide the user to the right position in order to have mobiFLOW taking the picture of the document. Those hints can be something like: Move Left, Move Lower etc. This setting does not affect the hold still message that appears once mobiFLOW detects that the user is in the right position to take the picture.

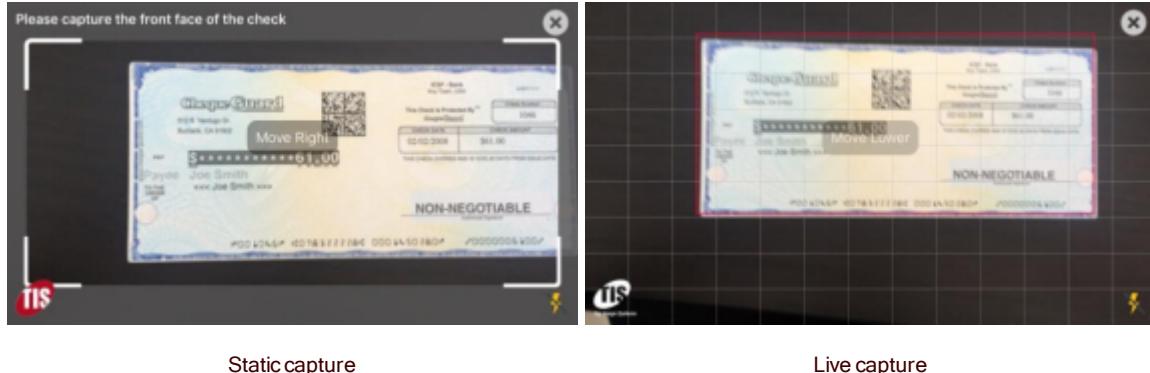
The following indicators are available and configurable:

Indicator	Description
TISFlowIndicatorAlign	Indicator to hold the device flat over the document.
TISFlowIndicatorDown*	Indicator to move the device towards the bottom of the document.
TISFlowIndicatorLeft*	Indicator to move the device left.
TISFlowIndicatorRight*	Indicator to move the device right.
TISFlowIndicatorTop*	Indicator to move the device towards the top of the document.
TISFlowIndicatorRotateLeft*	Indicator to rotate the device left (document is in an angle).
TISFlowIndicatorRotateRight*	Indicator to rotate the device right (document is in an angle).
TISFlowIndicatorZoomIn	Indicator to move closer to the document (document is too far from the frame).
TISFlowIndicatorZoomOut*	Indicator to move away from the document (document is exceeding the frame).
TISFlowIndicatorLight	Indicator to turn on the flash (there is not enough light).
TISFlowIndicatorHold	Indicator to hold the camera when document was found before the picture is taken.
TISFlowIndicatorScanBarcode	Indicator to move towards the barcode

* Only relevant to static capture, hint will not be shown in live (dynamic) capture.

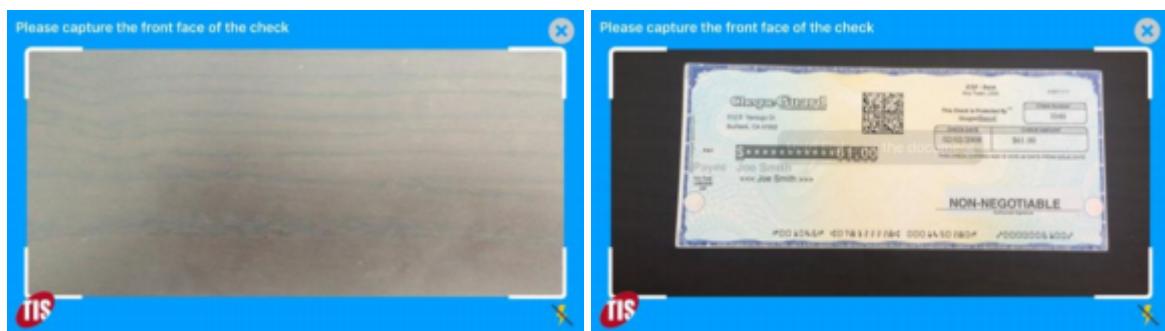
When set to **True** all those guidelines will be shown on the screen to guide the user.

When set to **False** only one guideline will be displayed and will stay constant on the screen, to give some guidance to the user, and when he is in position the hold still message will appear.



Surrounding color for document frame

This parameter is relevant only for static capture, and enables you to change the color of the screen that is shown around the capture preview frame. See figure for an example.



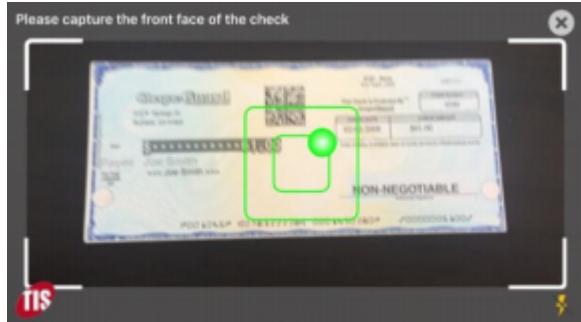
Leveler

The leveler is a graphic indicator that can be shown on the capture preview to indicate to the user when they are holding the device flat over the document and not at an angle (tilted).

You can enable or disable the leveler by setting the `enableLeveler` parameter. Three types of leveler are available.

One unit leveler

This leveler is designed as 2 squares and a ball, while the ball flies around in red color when the device is tilted and will center and turn green when the device is flat.



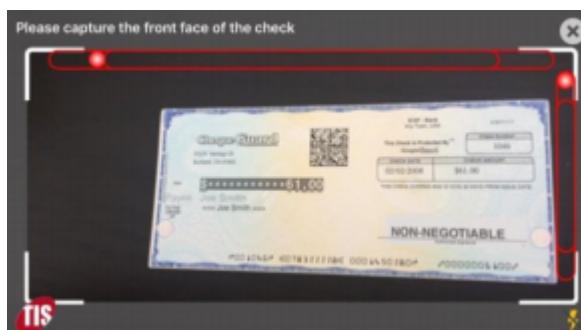
Static Capture (leveled)



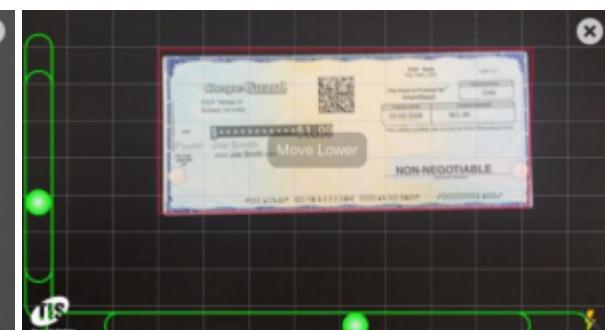
Live Capture (unleveled)

Two units leveler

This leveler is designed as 2 bars that can appear on 2 edges (top/bottom and left/right). Each bar has a ball inside it and control the horizontal or vertical motion of the device and will turn green or red when the device is tilted horizontally or vertically accordingly.



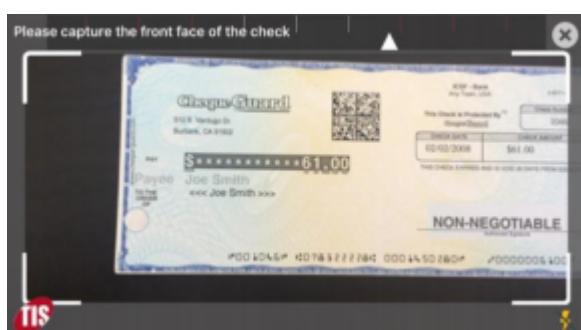
Static Capture (unleveled)



Live Capture (leveled)

Scale leveler

This leveler is designed as one or two bars that displayed on the edges of the device. Each bar has a triangle pointer that moves along the bar as the device is tilted, each bar is only working on one layer either horizontal or vertical and will change the color between red (device tilted) and white (device is balanced) in that layer.



Static Capture (leveled horizontal)



Live Capture (unleveled vertical)

Leveler parameters

All 3 levelers have some common parameters and some unique parameters specifically to the leveler.

The following parameters can be adjusted for all levelers:

Parameter	Description
Enable Fadeout	When set to True the leveler will fade out from the preview screen to make the screen clear for the capture. When set to False , it will stay on the screen even if the device is balanced through the entire capture phase.
Enable Dragging	When set to True , the user will be able to drag/move the leveler position when it is displayed on the screen. When set to False , no dragging is possible and leveler will be static on the screen.
Rectangle Size	Relevant for One unit leveler type only. The size of the leveler rectangle which can range between 80.0 and the height of the capturing frame.
Rectangle Center	Relevant for One unit leveler type only. Indicated the location of the leveler's center on the screen.
Alignment to Frame	Relevant for Two units leveler and Scale leveler only. The alignment of the two leveler units to the capturing frame: topLeft , bottomLeft , topRight , bottomRight .
Leveler Thickness	Relevant for Two units leveler and Scale leveler only. The thickness of the leveler units' frames (between 10.0 and 30.0).
Padding from Frame	Relevant for Two units leveler and Scale leveler only. The distance of the leveler units' rectangles from the capturing frame.
Leveler Display	Relevant for Scale leveler type only. Define where the leveler to be presented on the screen, both scales, horizontal, vertical or none.
Scale Unit Gap	Relevant for Scale leveler type only. The distance between the leveler's units.

Parameter	Description
User Colors in Scale	Relevant for <u>Scale leveler</u> type only. Customize scale leveler and set its colors – can be set to multi colors or single color.

Dynamic strings

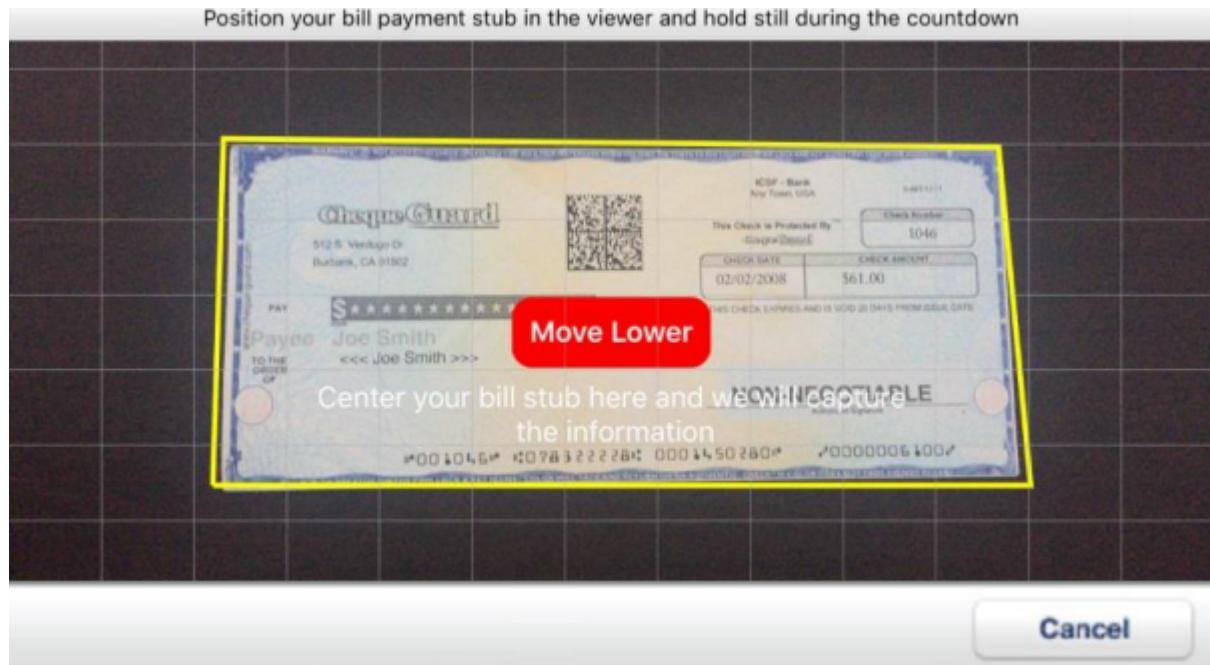
The hosting app can change and set up in development time all the captions and message that mobiFLOW is using on the capture screen and on errors and alerts that are displayed during the session.

This parameter allows you to override any parameter that was set up in development time in runtime by setting them up while the app is running. For example, get the message from a web service and apply them, or change them according to the user type etc. It gives you the control and flexibility over the UI in runtime.

Custom View

Custom view allows you to change the look and feel (user interface) of the capture screen and the info screen. You can change or hide some elements on the screen and also add your own elements.

Here is a sample of how you can change the screen to look like:



The implementation is different for Android and iOS, so refer to the appropriate developer guide for more information.

OCR parameters

This section describes the OCR parameters of the Mobile Capture module.

Barcode

The SDK allows you to recognize barcode on the document while this option can be turned on or off.

Barcode Type

You can define the type of barcode you want to recognize. You can set it up for a specific type or a range of several different types which will be detected from.

The following barcode types are available:

Code39	Code93	Aztec
Code39Mod43	Code128	Interleaved2of5
EAN13	PDF417	ITF14
EAN8	QR	DataMatrix

Barcode Location

You can instruct mobiFLOW about the location of the barcode, whether it is on the front or the back side of the document or both sides. Setting this to none will basically disable the barcode recognition altogether.

OCR type

There are several OCR types that can be set up, and each one is associated with a specific document type.

Check

MICR E13B – US, Canada, UK, Australia and others.

MICR CMC7 – European countries, Brazil, Mexico, Israel and others.

MICR OCRA – A few countries and bills.

MICR UNKNOWN – When we are not sure which MICR type to capture

Passport

MRZ – Machine Readable Zone (2 lines at the bottom of the passport main page)

Card

PAN – Indian Pan card recognition (4 fields: Name, Father's Name, DOB, Account No)

MRZ – Machine Readable Zone (2-3 lines at the bottom of the back of European ID Card)

All Document Types

OFF – No OCR recognition occurs

When working in [Video feed processing](#), mobiFLOW gives you the option to validate the OCR recognition and accept or reject it, if rejected the user will have to try and align the device for another capture.

Output parameters

This section describes the output parameters of the Mobile Capture module.

mobiFLOW generates several different images as the output and allows you to control which output you are interested in receiving as a result. Each one of the images can be enabled or disabled as an output.

Disclaimer

A truly 200dpi adjustment in terms of the image dimensions applies to the [Check](#) document type only.

This is because on a check the code line is a fixed height that can tell us the real size of the document in cm/inches, and therefore adjust the size of the document to a true 200dpi (as dpi is measured by inches and not pixels). For all other document types, the dpi tag is being set to 200dpi but no adjustment to the actual image dimensions is being applied, therefore the actual dimensions of the image are not truly 200dpi.

DPI is a term that is coming from the printing and scanning world, when we can actually measure the document in the printer or scanner, and decide how many dots to print or scan per inch. In the capture world it loses its meaning, since we don't have the tools to measure the actual size of the document just from a picture unless we have some known anchor.

Original image

This is the original image as it was captured from the camera preview screen including the background. This image is in color and jpeg format.

Color image

This is the cropped color version of the original image. It contains only the document without the background after it was cropped from the picture that was taken. This image is in color and jpeg format.

Color compression threshold

This is the level of compression that will be applied to the color image. This should be used if you want to reduce the file size of the color image in exchange to the reduction in quality. The threshold can be set between 1.0 which is best quality (no compression) and 0.0 for lowest quality (maximum compression).

Grayscale image

This is the cropped grayscale version of the cropped color image. It contains only the document without the background after it was cropped from the picture that was taken and then converted to grayscale and adjusted to 200dpi or to the [grayscale size](#). This image is in grayscale and jpeg format.

Grayscale compression threshold

This is the level of compression that will be applied to the grayscale image. This should be used if you want to reduce the file size of the grayscale image in exchange to the reduction in quality. The threshold can be set between 1.0 which is best quality (no compression) and 0.0 for lowest quality (maximum compression).

Black and white image

This is the B&W (black and white) version of the cropped color image. It also contains only the document without the background. This image is in B&W and tiff format CCITT 6.0 Compression group 4 in 200dpi. On Android we also have this image in jpeg format as well for display purposes (as Android do not support image display of tiff format).

Binarization Threshold

This is the strength of the binarization that will be applied while converting the image into B&W image. It can be set between 0.01 (lightest) to 1.0 (darkest/boldest) or to 0.0 which direct mobiFLOW to use internal optimization for the threshold.

This should be set only if you are using one sided or one-page document which is always the same, as setting the threshold to different types of document will not achieve the desired output, and in this case it is better to leave it to the optimization algorithm.

Grayscale size

This allows you to scale the grayscale image to a certain height and width if required. If this parameter is set to a value other than (0,0) it will be scaled accordingly.

Binarize back same as front

When this set to **True** we will run the same binarization algorithm we use on the front page also on the back page.

If set to **False** in some cases (specific document types) we will run a different algorithm on the back side of the document.

A good example is check document type which has different algorithm for front and back.

Binarization type

This is relevant only when using [Custom](#) document type.

It allows you to choose between the general binarization that is used for most documents or the check binarization that is used specifically for checks.

Front image size

This is relevant only when using [Check](#) document type.

It is relevant if you use split capture to capture the front and back of the check separately in 2 different sessions. In this case we need to adjust the size of the image of the back side to the size of the image of the front side for IQA. Therefore, when capturing the front, we will get this information in the results and will pass it for the back capture session so the adjustment in size of the back side will take place for a valid IQA result.

Licensing

Each version of mobiFLOW requires a license. If a license was not configured, mobiFLOW will show an error on the device's screen and will not start the capture process.

The license is individual per implementation and is a combination of the customer name, the license key, and the license itself. The license can have an expiration date or can be unlimited.

The license is valid per mobiFLOW version and can only be used on that version, so upgrading to a newer version requires a request to TIS to generate a new license.

The following 3 values must be initialized with the license information that you receive from TIS. See the developer guide for more details.

Value	Description
Licensee	The name of the licensee that this license is associated with. Usually this will be the customer name or the project name.
License Key	A unique key that is given to each license or customer.
Active License	An encrypted string that contains the license information.

Collecting results

Each successful capture will generate the output according to the settings in the [output parameters](#).

Each result will include 4 images for the front and 4 images for the back. In Android, there is also an additional image for the front and back, which is the Jpeg representation of the B&W Tiff image. This is required to be able to display the image on Android, as Android does not support the display of Tiff images.

Available images are:

- Original Color
- Cropped Color
- Cropped Grayscale
- Cropped B&W
- Tiff Cropped B&W Jpeg (Android Only)

Each set is available for the front and the back. In the case of front capture only, or back capture only, the images for the irrelevant side will be empty (null). They will also be empty if they were excluded from the output in the settings.

Barcode results

If [barcode recognition](#) was set up, the results of the barcode will be available both for the front and back. For each side, the barcode recognition result will be available as a string, along with the barcode type that was detected.

For barcode PDF417, additional parsing is available when the results come from a US/Canada driver's license. See [Card results](#) for more details.

Check results

If OCR recognition was set up and the document type is [Check](#), the OCR results will be available as part of the results.

The results that are available for Check are:

Parameter	Description																																				
result	The MICR result formatted in TIS format (special characters are represented by a dash).																																				
rawResult	<p>The result while every character in the MICR is represented by a number, separated by commas</p> <p>0,1,2,3,4,5,6,7,8,9,10,12,11,13</p> <p>Numbers represent the MICR in the order in the table.</p> <table border="1"> <thead> <tr> <th>Character</th><th>0</th><th>1</th><th>2</th><th>3</th><th>4</th><th>5</th><th>6</th><th>7</th></tr> </thead> <tbody> <tr> <td>MICR</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>?</td></tr> <tr> <th>Character</th><th>8</th><th>9</th><th>0</th><th>/</th><th>:</th><th>:</th><th>-</th><th></th></tr> <tr> <td>MICR</td><td>8</td><td>9</td><td>0</td><td>,</td><td>;"</td><td>;"</td><td>"</td><td></td></tr> </tbody> </table>	Character	0	1	2	3	4	5	6	7	MICR	0	1	2	3	4	5	6	?	Character	8	9	0	/	:	:	-		MICR	8	9	0	,	;"	;"	"	
Character	0	1	2	3	4	5	6	7																													
MICR	0	1	2	3	4	5	6	?																													
Character	8	9	0	/	:	:	-																														
MICR	8	9	0	,	;"	;"	"																														
resultsScores	The score for each one of the recognized characters separated by commas, respectively to the rawResult.																																				

Passport results

In case OCR recognition was set up and the document type is [Passport](#), the OCR results will be available as part of the results.

The results that are available for passport are the recognition of the MRZ line:

Type	Nationality
Issuing Country	Date of Birth
Surname	Sex
First Name	Expiration Date
Passport Number	Personal Number

Card results

In case OCR recognition was set up and the document type is [Card](#), the OCR results will be available as part of the results. Each card type has different results according to the OCR Type that was used. See the developer guide for more details.

The results for card are available in an array which changes dynamically according to the type of card that was recognized and the amount of fields found on the card. The order of the results is according to the location of the field on the card from top to bottom and left to right. For MRZ recognition on European ID cards the following fields are available:

Type	Expiration Date
Issuing Country	Nationality
Document Number	Surname
Date of Birth	First Name
Sex	Middle Name

For US/Canada Driver's License barcode recognition, the following results are available:

First Name	Date Of Birth	Audit Information
Middle Name	Sex	Ethnicity
Last Name	Issue Date	Compliance Type
Name Suffix	Restriction Code	First Name Truncation
Address	Endorsement Code	Middle Name Truncation
City	Limited Duration Document Indicator	Last Name Truncation
State	Document Number	Federal Commercial Vehicle Code

Postal Code	Country ID	Customer Specific Control Number
ID Number	Inventor Control Number	WA Specific Endorsements
Class	Card Revision Date	Transaction Types
Height	Temp Visitor	Under 18 Until
Weight	Address	Under 21 Until
Eye Color	Address Additional info	Revision Date
Hair Color	Duplicates	Social Security Number
Expiration Date	Organ Donor	

Events and errors

mobiFLOW gives you the option to catch different errors and events, while letting you handle the behavior of your app when such occurs.

Error handling

mobiFLOW can throw any of the following errors (most of them related to the [Validations](#)):

The order in which the validations run is different when using stills mode and video mode, and so are the messages that are used. The following table shows the order of the validations and their application per document type and capture mode:

Validation description	Validation error code (enum)	Error message name	Display message Message on video feed processing	Message on stills
Image Contrast	TISFlowErrorImageContrast	TISFlowErrorImageContrast	NO*	YES
Blur Detection**	TISFlowErrorBlurDetected ERROR_BLUR_DETECTED	TISErrorBlurFail	NO*	YES

Validation description	Validation error code (enum)	Error message name	Display message Message on video feed processing	Message on stills
Look For Document Rectangle	TISFlowErrorNoValid BoundingBox ERROR_NO_VALID_BOUNDING_BOX	TISFlowErrorNoValid BoundingBox	NO*	YES
User is capturing the front side instead the of back side of the check***	TISFlowWarningMICR DetectedOnCheckBack ERROR_MICR_ON_BACK	TISFlowWarningMICR DetectedOnCheckBack	YES	YES
OCR Validation	TISFlowErrorOCR ReadingCheck ERROR_OCR_READING	TISFlowErrorReading Message TISFlowErrorReading OCRCMessage	YES NO	YES
MICR Length Validation***	TISFlowError MICRLength ERROR_MICR_LENGTH	TISFlowDigitalRow NotInScope TISFlowErrorReading Message	YES	YES
MICR Line Interruption By Signature.CMC7 Only***	TISFlowWarning MicrlInterrupted ERROR_MICR_INTERUPPTED	TISFlowWarningMicr Interrupted TISFlowMicrlInterrupted	YES	YES
IQA Folded Corner***	TISFlowErrorIQA CornerData ERROR_IQA_CORNER_DATA	TISFlowErrorIQA CornerData	YES	YES

Validation description	Validation error code (enum)	Error message name	Display message Message on video feed processing	Message on stills
IQA Folded Edge***	TISFlowErrorIQA EdgeData ERROR_IQA_EDGE_DATA	TISFlowErrorIQA EdgeData	YES	YES
IQA Skew***	TISFlowErrorIQASkew ERROR_IQA_SKEW	TISFlowErrorIQASkew	YES	YES
IQA Darkness***	TISFlowErrorIQA Darkness ERROR_IQA_DARKNESS	TISFlowErrorIQA Darkness	YES	YES
IQA Number of Spots***	TISFlowErrorIQA NumSpots ERROR_IQA_NUM_SPOTS	TISFlowErrorIQA NumSpots	YES	YES
IQA Horizontal Streaks***	TISFlowErrorHorizontal Streaks ERROR_IQA_HORIZONTAL_STREAKS	TISFlowErrorHorizontal Streaks	YES	YES
IQA Carbon Strip***	TISFlowErrorCarbonStrip ERROR_IQA_CARBON_STRIP	TISFlowErrorCarbonStrip ERROR_IQA_CARBON_STRIP	YES	YES
IQA Piggy Back***	TISFlowErrorPiggyback Found ERROR_IQA_PIGGY_BACK	TISFlowErrorPiggyback	YES	YES

* When no message is thrown, mobiFLOW will proceed to process the next frame.

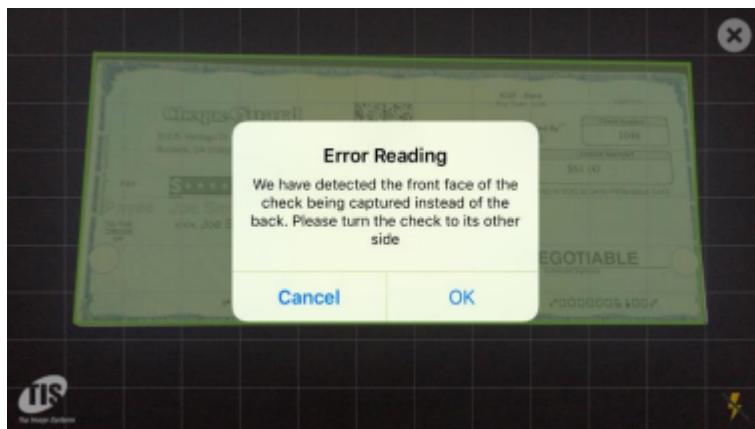
** Enabled on documents without OCR.

*** Checks only.

Note: IQA validations are performed only for Checks and on B&W images.

The errors are being generated in the order within the table. Each error has an enum associated with it and error message that can be set up to be shown if that error occurred.

Here is a sample of how an error handling by mobiFLOW would look like:



There are 3 ways to handle each error:

Way to Handle	Description
mobiFLOW Handles	Default message alerts will be displayed set up by mobiFLOW (text of the message can be changed by the app) and the user will have another attempt to capture.
Close Session	App handles the error and close the capture session. User does not have another attempt to capture. Capture session is over.
App Handles	App is handling the error by showing its own customized alert or any other way and return the control to mobiFLOW for another capture attempt.

Events handling

mobiFLOW handles events on iOS and Android a bit differently so please refer to the developer guide for more information.

Multi-capture finished

This event is fired when the user presses the finish button on the alert if he would like to capture another document/page in a [multipage capture](#) session. It allows you add special handling if needed or to be notified that this event occurred.

Hint changed

This event is fired when each of the [hints/guidelines](#) on the screen is changing, it will be fired many times just before it changes. This allows you to control the label of the hint and change any of its properties in runtime, like font, color, location, text, accessibility settings etc.

Validating OCR results

This event is fired only when [video feed processing](#) is enabled and [OCR recognition](#) is not OFF. You will receive the OCR recognition result from the selected frame and have the option to analyze the result and then accept it or reject it. If accepted, mobiFLOW will continue with the selected frame to continue processing the image. If rejected, mobiFLOW will try another frame and will fire the OCR results from that frame to this event again, if all frames have been rejected mobiFLOW will switch to stills capture to take the picture in higher resolution.

Processing events

This is a series of events that can be fired as we process the image, mobiFLOW will give you notifications about when the countdown started and finished and when the processing of the image started and finished. In this event it is common to implement your own spinner that will be shown on the screen while mobiFLOW processes the image.

Capture back (Android only)

This event is fired when the front side capture ended before switching to capture the back side.

Back button pressed (Android only)

This event is fired when the user pressed on the back button on the device while in the capture screen. On this event you can cancel the back action, or accept it and close the capture screen.

Initialize layout (Android only)

This event is fired when the screen is initialized or refreshed.

Look and feel

The entire user interface within mobiFLOW is completely customizable to match the look and feel that you desire to align with the same scheme of your application.

The only thing that is not controlled is the space needed on the screen for the capture. mobiFLOW maximizes the capture area in order to take a picture in the highest possible resolution, so changes over the capture area are not recommended.

The [Custom](#) view gives you the ability to control some of those changes but not all. Other changes can be made in runtime or development time by changing the resources that are supplied with the SDK.

Here are some examples of elements that can be changed or controlled:

- Any caption or text that appears anywhere in mobiFLOW, including all alerts.
- Changing font and colors of hints/labels.
- Any image or icon that appears on the screen.
- Changing the frame of the static capture.
- Accessibility settings of labels and alerts.
- Hiding any elements from the screen.
- Adding new elements to the screen.
- Creating your own waiting/processing indicator/spinner.
- Changing the countdown sound file.
- Changing the color of the invalid and valid rectangle in live capture.
- Changing the look and feel of the info screen.

Please refer to the developer guide for more information and examples how to customize mobiFLOW and use the custom view.

Guidelines for successful capture

To ensure successful, optimal capture from the mobiFLOW library, you should include the following guidelines in your application's instructions, which should be followed before the user starts the capture process. These guidelines are not mandatory, and a document can still be captured even if the guidelines are not followed, but following them will ensure optimal capture and the best result.

Contrast

The document should be positioned on a background with a different color. Strong visual contrast near the document's boundaries is particularly advised. For documents with multiple colors around the boundaries,

the document background should be a different color from any color on the document's boundaries.

Background homogeneity

The background should be clean and homogenous. In particular, strong lines on the background that do not belong to the document should be avoided. It is best to have the surface around the document clear of any objects about 6" (15cm) from each side of the document.

Lighting

Strong direct sunlight or artificial lighting on the document is not recommended. In particular, having strong light on one part of the document and shade over another part should be avoided at all times. Such a situation can result in a very poor B&W image of the part that was not in the shade.

Shooting and rotation angles

The phone's camera should be lying as flat as possible relative to the document's surface. Moreover, the in-plane rotation of the camera should be similar to that of the document, that is, the picture should be taken in landscape. The document should be positioned in the center of the screen within the frame that is displayed, as close as possible to the frame sides.

Taking the picture

When the *hold still* wording appears, stand still with the device over the document until the countdown is over and the still picture is taken. Moving or shaking during this process can result in a blurry image, which will lead to a failure or an unclear B&W image.

Checks only: Digital row (MICR)

Make sure that the digital row is clean and the signature is not stretching over it. Ensure that all the digits and special characters are readable.