Kofax mobiFlow
iOS Developer's Guide

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Table of Contents

Preface

This guide describes how to use the mobiFlow image capture library to integrate mobiFlow into other iOS apps using the Objective C language and XCode IDE.

The mobiFlow SDK is packaged as a framework that is referenced from your project.

- This SDK is relevant only to the applications running on iOS 14.0 or later.
- Image boundaries detection and image contrast verification are done on video frames with medium quality.
- For checks, digital row detection is done on the captured still image or on the video feed. mobiFlow tries to use the best available image quality under the limitations of memory consumption.
- The library crops the image using a special algorithm for boundaries detection then binarizes (with 1 channel) from a color image to a B&W image, and then sets it to TIFF with Group 4 Fax Encoding (CCITT T.6).
- For iOS 14 and above integration, see Linkage.
- An integration sample in Objective-C is available in mobiFlowShowCase application.

Product documentation

To access the full Kofax mobiFlow documentation set online, see the Kofax mobiFlow Product Documentation page. If the security policy for your organization restricts Internet access, you can access the Kofax mobiFlow documentation offline. See Offline mode.

Full documentation set

The complete set of Kofax mobiFlow documentation is included in the following table.

Document	Description
Android Developer's Guide	Provides details about supported architectures, libraries, reporting issues, how to set up a custom capture user interface, and guidelines for successful capture.
iOS Developer's Guide	Provides information on project settings, use of various parameters of camera capture flow, and how to custom capture user interface setup.

Document	Description
Release Notes	Details the list of newly added features, resolved issues, known issues with applicable workaround, and the changes done since the previous release.
SDK Developer's Guide	Provides information on mobile capture parameters, licensing, collecting results, events and errors, look and feel, and guidelines for successful capture.
Technical Specifications	Describes the prerequisites including hardware, software, and third-party technologies to ensure proper functionality of the Kofax mobiFlow application.

Offline documentation

To make the documentation available for use in offline mode, obtain the documentation files from the Kofax mobiFlow product package that you downloaded from the Kofax Fulfillment Site. The file you need is KofaxmobiFlowDocumentation_6.2.0_EN.zip.

1. Extract the contents of KofaxmobiFlowDocumentation_6.2.0_EN.zip to a folder on your computer.
2. Copy the folder to a location that is accessible while you are working with Kofax mobiFlow.

Getting help with Kofax products

The Kofax Knowledge Portal repository contains articles that are updated on a regular basis to keep you informed about Kofax products. We encourage you to use the Knowledge Portal to obtain answers to your product questions.

To access the Kofax Knowledge Portal, go to https://knowledge.kofax.com.

The Kofax Knowledge Portal is optimized for use with Google Chrome, Mozilla Firefox, or Microsoft Edge.

The Kofax Knowledge Portal provides:

- Powerful search capabilities to help you quickly locate the information you need.
  Type your search terms or phrase into the **Search** box, and then click the search icon.
- Product information, configuration details and documentation, including release news.
  To locate articles, go to the Knowledge Portal home page and select the applicable Solution Family for your product, or click the View All Products button.

From the Knowledge Portal home page, you can:

- Access the Kofax Community (for all customers).
  On the Resources menu, click the **Community** link.
- Access the Kofax Customer Portal (for eligible customers).
  Go to the Support Portal Information page and click **Log in to the Customer Portal**.

- Access the Kofax Partner Portal (for eligible partners).
  Go to the Support Portal Information page and click **Log in to the Partner Portal**.
- Access Kofax support commitments, lifecycle policies, electronic fulfillment details, and self-service tools.
  Go to the Support Details page and select the appropriate article.

Training

Kofax offers both classroom and online training to help you make the most of your product. To learn more about training courses and schedules, visit the Kofax Education Portal on the Kofax website.

Chapter 1

Project settings

This chapter describes the settings required to create an iOS project.

The mobiFlow SDK package includes the KofaxmobiFlowWidget.xcframework and opencv2.xcframework frameworks. We strongly recommend that you use them instead of the existing `.framework` files. The XCFramework is an innovative method for packaging and distributing libraries. It includes distinct libraries optimized for both simulator and device architectures. This approach is more effective when executed on the simulator architectures of the latest Mac models, such as M1, M2, and M3.

Manual installation

You can install the mobiFlow project manually. To install the mobiFlow project manually, do the following:

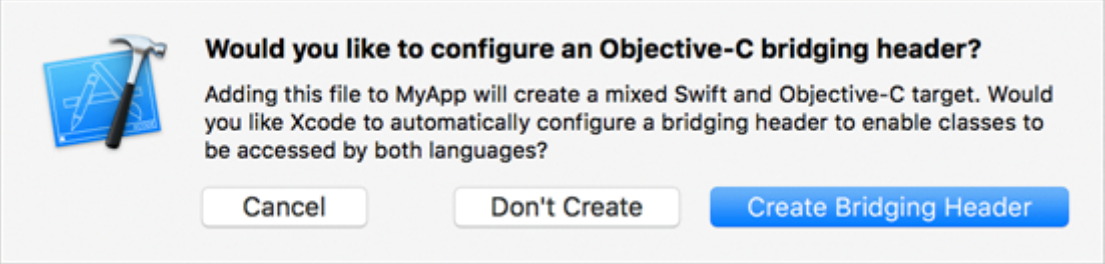
1. Add the following frameworks to the project:
   - libz.tbd
   - libc++.tbd
   - AVFoundation.framework
   - CoreVideo.framework
   - CoreMedia.framework
   - CoreMotion.framework
   - AudioToolbox.framework
   - Photos.framework
   - QuartzCore.framework
   - ImageIO.framework
   - Accelerate.framework
   - CoreGraphics.framework
   - UIKit.framework
   - Foundation.framework
   - AssetsLibrary.framework
2. Add the KofaxmobiFlowWidget.xcframework and OpenCV.xcframework version 4.5.5 to the project.
3. Copy the opencv2.xcframework to your project folder in Finder, then add it to the project in Xcode.
4. In **Build Settings**, make sure you include “$(inherited)” and “$(SRCROOT)” in the non-recursive mode under **Framework Search Paths**.

Other settings

Go to **TARGETS** > **General**, and under **Device Orientation**, enable **Landscape Left** and **Landscape Right**.

Linkage

1. Go to the **Build Settings** of your project and scroll down to the **Linking** section. For the property **Other Linker Flags**, add **-ObjC**.
2. For iOS 14 and above integration, add to your .plist file the key Privacy - Camera Usage Description and the value "Used to capture documents". You can edit this value for your own purposes. When using Debug Mode, you will need to also add the key Privacy - Photo Library Usage Description.
3. Go to the **Build Settings** of your project and scroll down to the **c++ Language Dialect** to **Compiler Defaults**.
4. (Objective C projects only): Change the file extension of the controller that uses the framework to .mm (not .m), and use #import <KofaxmobiFlowWidgett/TISMobiFlowWidget.h>.
5. Swift projects only. Skip this step if you already have the Objective-C bridging header.
   a. To import a set of Objective-C files into the same app target as your Swift code, you rely on an Objective-C bridging header to expose those files to Swift. Xcode offers to create this header file when you add an Objective-C file to an existing Swift app.



   b. In the Objective-C bridging header, add #import <KofaxmobiFlowWidget/TISMobiFlowWidget.h>.
   c. In your .swift class, declare the delegate TISMobiFlowDelegate and add its functions.
   d. To start a session, add the following code:

```
if let sessionParams = TISSessionParameters(documentType:
 TISDocumentTypeCheck)
{
   if let captureManager = TISCaptureManagerViewController(sessionParameters:
 sessionParams)
   {
   captureManager.captureManagerDelegate = self
   self.present(captureManager, animated: true, completion: nil)
   }
}
```

6. You should also change the extension of the files that import this controller to mm, or change the **File Type** to **objective c++ source** in the **Utilities** menu (right pane).

Resources

1. Add the `resources` folder to your project's resources.

   KofaxmobiFlowWidget.bundle holds resources vital for the algorithm to function properly. If the bundle is not added correctly, image detection will not work.

2. To edit the default app string or change the string to another language, add .strings file from the following list for the required document type.
   - PayLocalizable.strings
   - CheckLocalizable.strings

Chapter 2

Camera capture flow

To launch the camera session, you must create an instance of TISSessionParameters and perform all the changes you want before you initialize TISCaptureManagerViewController.

If you want to use a CustomViewController, you must initialize it before you initialize TISCaptureManagerViewController.

You can initialize TISCaptureManagerViewController using either option:

```
(nullable instancetype) initWithSessionParameters:(nonnull
 TISSessionParameters*)sessionParameters andCustomView:(nullable
 UIViewController*)customViewController;
```

With this option user can pass custom view controller.

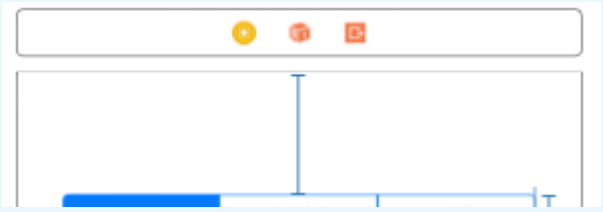
or

```
(nullable instancetype) initWithSessionParameters:(nonnull
 TISSessionParameters*)sessionParameters;
```

With this option custom view controller cannot be passed.

The implementation file that contains the reference to TISCaptureManagerViewController should have the extension .mm, not .m.

The ViewController that is used to present the camera should not contain a Navigation bar and the top view should be connected to the View and not to the Top Layout Guide. This will make the animation smoother.



Example with default parameters

This example depicts how to run the camera with the default parameters.

```
TISSessionParameters* sessionParameters = [[TISSessionParameters alloc]
 initWithDocumentType: TISDocumentTypeCheck];
TISCaptureManagerViewController * captureManagerViewController =
 [[TISCaptureManagerViewController alloc] initWithSessionParameters:
 sessionParameters];
captureManagerViewController.captureManagerDelegate = self;
[self presentViewController:captureManagerViewController animated:YES completion:nil];
```

Example with configured parameters (recommended method)

This example depicts how to run the camera and configure parameters.

```
TISSessionParameters* sessionParameters = [[TISSessionParameters alloc]
 initWithDocumentType:  TISDocumentTypeCheck ];

//(This is only an example of how to initialize the TISSessionParameters, see the table
 below with all possible values)
sessionParameters.enableIQA = NO;
sessionParameters.showGuidelinesIndicators = YES;
sessionParameters.outputGrayscaleImage = YES;
sessionParameters.outputOriginalImage = YES;
sessionParameters.outputBinarizedImage = YES;
sessionParameters.outputColorImage = YES;
sessionParameters.enableBlurDetection = YES;
sessionParameters.enableCountdownSound = NO;
sessionParameters.enableLeveler = YES;

//Sample Parameters for checks only
sessionParameters.scanFrontOnly = YES;
sessionParameters.ocrType =  OCRType_MICR_E13B ;

//load information view
sessionParameters.showInfoScreen = YES;
sessionParameters.infoScreenInterval = 10.0;

//IQA init will load the default 21 IQA settings
TISCheckIqaParameters* iQAParameters = [[TISCheckIqaParameters alloc] init];

//To load default 51 IQA settings
TISCheckIqaParameters* iQAParameters = [TISCheckIqaParameters IQA51Defaults];

[iQAParameters setCornerFrontSameToAllCorners:0.8f width:0.8f area:0.3f];
[iQAParameters setCornerBackSameToAllCorners:3.0f width:3.0f area:1.0f];
[iQAParameters setEdgeSameToAllSides:0.8f width:0.8f area:0.3f];
[iQAParameters setRotationSkew:7.5f];
[iQAParameters setMaxDarknessBack:0.98f];
[iQAParameters setMaxDarknessFront:0.9f];
[iQAParameters setMinDarknessBack:0.0038f];
[iQAParameters setMinDarknessFront:0.009f];
[iQAParameters setNumberOfSpotsBack:5852];
[iQAParameters setNumberOfSpotsFront:5852];
[iQAParameters setMaxImageFileSizeBack:200.00];
[iQAParameters setMinImageFileSizeBack:0.50];
[iQAParameters setMaxImageFileSizeFront:200.00];
[iQAParameters setMinImageFileSizeFront:0.50];

//This line must be called each time you start a new session
sessionParameters.IQASettings = iQAParameters;

//Leveler
TISLevelerParameters* levelerParameters = [[ TISLevelerParameters alloc] init];
```

```
//init will load the default leveler settings

[levelerParameters setLevelerType:oneUnitLeveler];
[levelerParameters setIsFadeOutEnable:TRUE];
[levelerParameters setIsDraggingEnable:TRUE];
[levelerParameters setLevelerRectSize:150.0f];

//The following initialization can be done for the Two Units Leveler:
[levelerParameters setLevelerType:oneUnitLeveler];
[levelerParameters setLevelerThickness:20.0f];
[levelerParameters setPaddingFromFrame:60.0f];
[levelerParameters setAlignmantToFrame:topRight];

sessionParameters.levelerParameters =  levelerParameters ;

TISCaptureManagerViewController* captureManagerViewController =
 [[TISCaptureManagerViewController alloc] initWithSessionParameters:sessionParameters];

captureManagerViewController.captureManagerDelegate = self;
[self presentViewController:captureManagerViewController animated:YES  completion:nil];
```

A more detailed example is available in the mobiFlow ShowCase app sample, which is included in the SDK Bundle package.

Session parameters

Set the parameters for TISSessionParameters according to this table.

Parameter	Default	Description
documentType	None. You must set this parameter.	Document type set to one of the enums: • TISDocumentTypeCheck • TISDocumentTypeBillPayment
debugMode	NO	In debug mode, images are stored on the device, and logs are written to the console.
uxType	TISFlowUXTypeLive	Static capture sets predefined boundaries on the screen according to the aspect ratio, while the document must be placed within the shown boundaries. Live capture looks for a quadrilateral of a document of any size, with optional additional settings according to the document type, and validates that the document is in the correct aspect ratio. Setting the aspect ratio to 0.0 both for Minimum and Maximum skips validation in dynamic mode and lets you capture any document. uxType can be set to one of the following enums: • TISFlowUXTypeStatic • TISFlowUXTypeLive
minHeightWidthAspectRatio	Checks and bills: 0.35	The minimum ratio between the height and width of a captured image.

Parameter	Default	Description
maxHeightWidthAspectRatio	Checks and bills: 0.50	The maximum ratio between the height and width of a captured image.
enableIQA	NO	Enable or disable the IQA validations.
IQASettings		A class of type TISCheckIqaParameters to set all the threshold parameters for the IQA validations. You can leave it to defaults if not in use.
showInfoScreen	YES	Shows the information screen if there is difficulty capturing the document after a specific set time.
InfoScreenInterval	10.0	The number of seconds until the information screen appears on the camera overlay.
showGuidelinesIndicators	YES	When set to NO, only two static indicators are presented. • TISFlowIndicatorAlign: Indicator for alignment (the device should be aligned with the document) • TISFlowIndicatorHold: Indicator for hold (the device should be held over the document) When set to YES, dynamic indicators are presented.
outputGrayscaleImage	YES	Enables the output of a grayscale JPG.
grayscaleImageCompression	1.0	A value of the factor by which the cropped grayscale JPG image is compressed. The value ranges from 0.0 for the highest compression (lowest quality) to 1.0 (highest quality).
outputOriginalImage	YES	Enables the output of the captured original image.
outputColorImage	YES	Enables the output of the captured cropped color image.
colorImageCompression	1.0	A value of the factor by which the cropped color JPG image is compressed. The value ranges from 0.0 for highest compression (lowest quality) to 1.0 (highest quality).
outputBinarizedImage	YES	Enables the output of the captured black and white image.
grayScaleSize	{0,0}	Set the width and height of the grayscale output image. The parameter is of typeCG. IQA requires black and white images. If you enable the IQA settings, a black and white image is generated regardless of the output image configuration.

Parameter	Default	Description
enableBlurDetection (Beta feature)	NO	When set to YES, mobiFlow checks the sharpness of an image and notifies when the image is blurred. Currently, the blur detection does not apply to the back side of a document. Set to NO for Checks.
videoFeedProcessing	YES for Check and NO for other types.	When set to YES, the picture is taken directly from the video feed when the document is aligned properly with the frame. In this case, the device does not switch to still mode and does not present the countdown sequence. When set to NO, the device switches to still mode to take the picture.
maxVideoFrameToCapture	7	When video feed processing is enabled the library tries to process the captured image. In case of failure, this parameter is set to the maximum attempts to capture via video mode before switching back to still mode and countdown. For better performance, set this parameter between 5 and 10. This parameter is relevant only when videoFeedProcessing is set to YES.
showCountDown	NO	Only applicable to still mode. When set to YES, once the user is ready to take a picture, the frame turns green, and a countdown is shown until the picture is taken automatically. When set to NO, no countdown is shown. The picture is taken when the frame is green and the HOLD STILL message appears on the screen.
countDownStartValue	2	The number from which the countdown starts when the counter for taking a still image is set in this parameter.
countDownStopValue	0	The number at which the countdown stops when the counter for taking a still image is shown. The countDownStopValue must be lower than the countDownStartValue.
enableCountdownSound	NO	When set to TRUE, enables a sound along with the image capture countdown. The sound that is played is beep.aiff from the bundle.
dynamicStrings	Nil	NSDictionary which enables an alternative dynamic input of strings to be used instead of the checkLocalizable.strings file. Keys to be used in this dictionary are equivalent to the strings name described in Use the mobiFlow capture screen.

Parameter	Default	Description
showDefaultProcessingView	YES	Shows the processing screen (red spinner). If set to NO, you must implement a custom processing screen using the mobiFlow notifications (See Receive mobiFlow notifications).
surroundingColorForDocumentFrame	[UIColor colorWithRed:0 green:0 blue:0 alpha:0.8]	The color surrounding the document capture frame.
enableLeveler	YES	Enables a leveler to be added to the capture frame. The leveler provides visual guidance to the user on how to level the device for successful capture.
multiPageCapture	NO	When set to YES, this parameter enables the capture of multiple documents. After each capture, a prompt screen is displayed asking whether you would like to capture another image. If you select Finish, the framework calls the finishedMultiPageCaptureSession delegate method. After every captured image, the submitImageResult delegate method is called, but the camera session stays open until you finish the multipage session.
enableAutoCaptureInManualMode	NO	When set to YES, the Auto capture experience will be launched in the manual capture (enableManualCapture). Thus, a user can auto-capture the document, and manually capture the document if the user is unable to auto capture.
binarizeBackSameAsFront	NO	When set to YES, the same binarization algorithm that runs on the front side runs on the back side of the check.
showInfoScreenMultipleTimes	NO	When set to YES, the Info screen appears multiple times. To hide the Info screen, set the "showInfoScreen" and "showInfoScreenMultipleTimes" properties to False.
binarizationThreshold	0.0	The threshold for the strength of the binarization algorithm. Values can be between 0.0 and 1.0. Set only when capturing a single-size document. If the size varies, like Bills, then set to 0.0 for optimization. 1.0: Darkest 0.0: The SDK calculates the optimal threshold according to the image size.
scanFrontOnly	NO for Check Document YES for BillPayment Document	When set to YES, only the front side is captured. When set to NO and scanBackOnly is also set to NO, both front and back sides are captured.
scanBackOnly	NO	When set to YES, only the back side is captured. If scanFrontOnly is also YES, the system fails to initialize the Library.

Parameter	Default	Description
softCapture	NO	Provides the ability to capture the document while the device is held at an angle and not necessarily flat over the document. In this case, the document image is straightened and aligned from the angled position to a flat position. This method may impact the quality of the final image.
scanBarcodeLocation	TISScanBarcodeNone	Specify whether to scan the barcode in addition to the document capture session. Specify the side of the document from which capture the barcode. • TISScanBarcodeFront • TISScanBarcodeBack • TISScanBarcodeFrontAndBack • TISScanBarcodeNone This feature is deprecated, and it will be removed in a future release.
showAlertAfterBarcodeRead		Provides an option to show an alert after the barcode is detected.

Parameter	Default	Description
barcodeTypes	All barcode types	Relevant only when it is not TISScanBarcodeNone Contains the barcode types that are recognized during the barcode scan session. Once a barcode is detected, if there is a match with one of the barcode types, the barcode is parsed, and the SDK continues to capture the document. If one of the barcode types includes TISBarcodeTypeQRCode, TISBarcodeTypeAztecCode, or TISBarcodeTypeDataMatrixCode, a square appears instead of a rectangle for the barcode detection. Supported barcode types in the array: • TISBarcodeTypeUPCECode • TISBarcodeTypeCode39Code • TISBarcodeTypeCode39Mod43Code • TISBarcodeTypeEAN13Code • TISBarcodeTypeEAN8Code • TISBarcodeTypeCode128Code • TISBarcodeTypeCode93Code • TISBarcodeTypePDF417Code • TISBarcodeTypeQRCode • TISBarcodeTypeAztecCode • TISBarcodeTypeInterleaved2of5Code • TISBarcodeTypeITF14Code • TISBarcodeTypeDataMatrixCode ⓘ This feature is deprecated, and it will be removed in a future release.
ocrType	OCRType_OFF	OCRType enum: • OCRType_MICR_Unknown (For Check only) • OCRType_MICR_E13B (For Check only) • OCRType_MICR_CMC7 (For Check only) • OCRType_OFF
minOCRLength (Check document type only)	Check (MICR) – 15	Minimum number of characters to be recognized. Relevant for the check.
maxOCRLength (Check document type only)	Check (MICR) – 50	Maximum number of characters to be recognized. Relevant for check.

Parameter	Default	Description
frontImageSize (Check document type only)	0	Size of the front black and white and grayscale images output. Should be passed as a parameter to the back scan according to the size output of the front scan when the back scan is done separately. See Split capture front and back for more details. The first value in the array is the image width and the second is the image height. Parameter type is Int[].
searchForSignature (check document type only)	TISSignatureNone	Verifies if there is a signature on the check. Relevant for the front or back of the check, or front and back of the check. TISSearchForSignature enum type. Possible values are: • TISSignatureOnFront • TISSignatureOnBack • TISSignatureOnFrontAndBack • TISSignatureNone When set to TISSignatureNone, no signature is searched.
binarizationType	TISGeneralBinarization: The default value for all document types except Check. TISCheckBinarization: The default value for Check.	TISGPUBinarization TISSauvolaBinarization TISOtsuAdaptiveBinarization
license		Of the type TISLicenseParameters class, which includes three members that must be initialized. A valid license must be coded for the camera session to start; otherwise, a license error message is displayed. See License parameters for more information.
animateTransitionInLivePreview	YES (BOOL)	For TISFlowUXType.LIVE. When set to YES, the green and red rectangles switch with a smooth transition animation.
softCaptureThreshold	0 (float)	When enabled, the calling app displays the option to control the strictness/softness of the capture and can allow wider angles and higher capture distance from the frame. Possible values are 0–1. A higher value makes the capture experience less strict. ⓘ At the maximum threshold, capture at a wide angle may affect image quality.

Parameter	Default	Description
tapToFocus	YES (BOOL)	When set to YES, allows you to tap on the camera overlay to focus explicitly.
enableManualCapture	NO (BOOL)	When set to YES, a button is added to the screen, allows you to take a still image immediately that will be sent to processing or the Crop Controller.
enableCropController	NO (BOOL)	When set to YES, the image that is taken by manual capture, or automatically by the SDK, is sent to the Crop Controller to confirm the quality and cropping of the image, or to correct the cropping, before it is sent to processing.
shouldDismissWithAnimation	YES (BOOL)	Dismisses the capture screen with animation.
showErrorSignatureOverCMC7 (Check document type only)	NO (BOOL)	When set to YES, if a signature is detected over a CMC7 MICR, sends an error to the calling app.

License parameters

Each version of the SDK requires a license. If a license is not configured, mobiFlow displays an error on the device's screen and does not start the camera session.

The license is individual per implementation and is made up of the licensee's name, the license key, and the license itself. The license is limited by expiration date or unlimited.

The license is valid per SDK version and can only be used on that version. Upgrading to a newer version requires a new license that matches the version of the SDK used.

You must initialize the following three values (which are provided by mobiFlow).

Parameter	Description
licensee	The name of the licensee that the license is associated with such as the customer or the project name.
licenseKey	A unique key provided to each license or customer.
activeLicense	An encrypted string that contains the license information.

Following is the sample code for license.

```
sessionParameters.licenseParams = [[TISLicenseParameters alloc]
 initWithLicensee:@"ABCD" licenseKey:@"a70e52b0-e499-3562-afb1-17f04038356b"
 activeLicense:@"TqeRDhExXuGCLNdIcvb4OR9+QJYiTnWQ3ooFtcWx39OkkNeUYf4Ph0U
+P5x6DaRIdA84HwlWUzF5YMLA5k=="];
```

If the license information is validated successfully, the camera session starts.

If the license validation fails, an error is displayed on the screen to the user and the camera session closes.

IQA parameters

IQA is used to define validation for image quality.

Set the parameters for iQAParameters according to the following table.

Parameter	Default	Description
RotationSkew	7.5	The maximum skewing angle.
minDarknessFront	0.009	The minimum ratio of black pixels to total pixels for the front side.
maxDarknessFront	0.9	The maximum ratio of black pixels to total pixels for the front side.
minDarknessBack	0.0021	The minimum ratio of black pixels to total pixels for the back side.
maxDarknessBack	0.98	The maximum ratio of black pixels to total pixels for the back side.
numberOfSpotsFront	5750	The maximum number of spots per square inch on average for the front side. Black areas are counted as spots if the size of the area is greater than 3 pixels and less than 20 pixels and the black area is surrounded by white pixels.
numberOfSpotsBack	5750	The maximum number of spots per square inch on average for the back side. Black areas are counted as spots if the size of the area is greater than 3 pixels and less than 20 pixels and the black area is surrounded by white pixels.
CornerDataArrayFront	Does not have a default value. Refer to the ShowCase app sample for the threshold values.	Thresholds for height, width, and area (in inches) for every corner of the check on the front side. Use the setCornerFrontSameToAllCorners function to set the same height, width, and area for all corners, or use SetCornerFrontAll to set a different threshold for each corner.
CornerDataArrayBack	Does not have a default value. Refer to the ShowCase app sample for the threshold values.	Thresholds for height, width, and area (in inches) for every corner of the check on the back side. Use the setCornerBackSameToAllCorners function to set the same height, width, and area for all corners, or use SetCornerBackAll to set a different threshold for each corner.
EdgeDataArray	Does not have a default value. Refer to the ShowCase app sample for the threshold values.	Thresholds for height, width, and area (in inches) for every side of the check (top/bottom/left/right). Use the function setEdgeSameToAllSides to set the same height, width, and area to all corners, or use SetEdgeAll to set a different threshold for each corner.

Parameter	Default	Description
MinImageFileSizeFront	500	The minimum file size for the TIFF image for the front side.
MaxImageFileSizeFront	200000	The maximum file size for the TIFF image for the front side.
MinImageFileSizeBack	500	The minimum file size for the TIFF image for the back side.
MaxImageFileSizeBack	200000	The maximum file size for the TIFF image for the back side.
horizontalStreakSumOfBlackPixels	25	The minimum number of black pixels required to determine if the line is black.
horizontalStreakLineWidth	12	The minimum width of the black line to detect.
horizontalStreakNumLines	3	The minimum number of black lines for the horizontal streaks alert.
carbonStripSumOfBlackPixels	25	The minimum number of black pixels required to determine if the line is black.
carbonStripLineWidth	12	The minimum width of the black line to detect.
carbonStripNumLines	1	The minimum number of black lines for the horizontal streaks alert.
piggyBackMaxWidth	0.5	The maximum width threshold between two checks that overlap each other.
piggyBackMaxHeight	0.5	The maximum height threshold between two checks that overlap each other.
piggyBackMaxAR	3.1	The maximum aspect ratio between the two checks.
piggyBackMinAR	1.5	The minimum aspect ratio between the two checks.

Leveler parameters

Set the parameters for LevelerParameters according to this table.

Parameter	Description
levelerType	Defines the leveler type. Possible values: • oneUnitLeveler • twoUnitsLeveler • scaleLeveler Default value: scaleLeveler

Parameter	Description
isFadeoutEnabled	Relevant for all leveler types. Defines whether the leveler should fade out when the device is leveled. Default value: YES
isDraggingEnabled	Relevant for all leveler types. Enables the user to drag the leveler on the screen. Default value: YES
levelerRectSize	Relevant for the oneUnitLeveler type only. The size of the leveler. The leveler rectangle size range is between 80.0 and the height of the capturing frame. Default value: 150.0
levelerRectCenter	Relevant for the oneUnitLeveler type only. Indicates the location of the leveler on the screen. Default value: the center of the capturing frame.
alignmentToFrame	Relevant for twoUnitLeveler and scaleLeveler only. The alignment of the two leveler units to the capturing frame: • topLeft • bottomLeft • topRight • bottomRight Default value: topRight
levelerThickness	Relevant for twoUnitLeveler and scaleLeveler only. The thickness of the leveler unit's frames. The leveler thickness ranges between 10.0 and 30.0. Default value: 10.0
paddingFromFrame	Relevant for twoUnitLeveler and scaleLeveler only. The distance of the leveler unit's rectangles from the capturing frame. The leveler padding range is between 25.0 and a maximum padding value that is dynamically calculated by the following formula: (Capturing frame width/height – leveler minimum size)/2 Default value: 25.0 ⓘ The padding is from both sides of the capturing frame and therefore its value is multiplied by 2.

Parameter	Description
levelerDisplay	Relevant for the scaleLeveler type only. Defines where the leveler is to be presented on the screen, using the enum TISScaleLevelerDisplay: • TISScaleLevelerShowBothScales • TISScaleLevelerShowHorizontalScale • TISScaleLevelerShowVerticalScale • TISScaleLevelerShowNone Default value: TISScaleLevelerShowHorizontalScale
scaleUnitGap	Relevant for the scaleLeveler type only. The distance between the leveler's units. The number of units is dynamically calculated accordingly. Default value: 60.0
userColorsInScale	Relevant for the scaleLeveler type only. Customizes the scale leveler and set its colors. It can be set to multiple colors or a single color. Initialize the array in this form: (A color, B color ,…,B color, A color). There should be a minimum of one object in the array. Default value: white

Handling messages, errors, and results

To get camera session results, set TISMobiFlowDelegate and implement the methods didFinishWithResults and cancel.

Result delegate

Following is the signature of TISMobiFlowDelegate.

```
(void) captureManager:(TISCaptureManagerViewController *)captureManagerViewController
 didFinishWithResults:(TISProcessingResults *)imageResults
```

This method is called once the image is captured successfully.

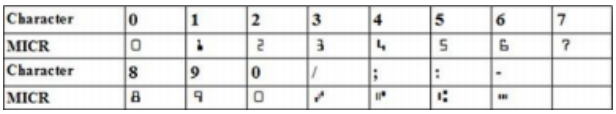
The TISProcessingResults class contains the following properties with the results.

Parameter	Description
originalFront	The JPEG representation of the front original image.
originalBack	The JPEG representation of the back original image.
tiffFront	The TIFF representation of the front image.
tiffBack	The TIFF representation of the back image.

Parameter	Description
grayscaleFront	The grayscale JPEG image of the front side of the image.
grayscaleBack	The grayscale JPEG image of the back side of the image.
colorFront	The color JPEG image of the front side of the image.
colorBack	The color JPEG image of the back side of the image.
barcodeResult	A dictionary that contains two or four objects in the following format: • TISBarcodeType Front, barcode parsed string for Front. • TISBarcodeType Back, barcode parsed string for Back. If scanBarcodeLocation is set to TISScanBarcodeNone, an empty dictionary is returned.
captureManagerViewController	A reference to the TISCaptureManagerViewController.

For document type Check only

The TISCheckProcessingResults class inherits from TISProcessingResults and contains the following properties with the results.

Parameter	Description
result	The MICR result available in the mobiFlow format (special characters represented by a dash).
rawResult	The result of every character in the MICR is represented by a number and separated by commas. 0,1,2,3,4,5,6,7,8,9,10,12,11,13 The numbers represent the MICR in the order given in the following table: 
resultsScores	The score for each of the recognized characters separated by commas, respective to rawResult.


```
- (void)
captureManager:(TISCaptureManagerViewController*)captureManagerViewController
didFinishWithResults:(TISProcessingResults*)imageResults
{
   if ([imageResults isKindOfClass:[TISCheckProcessingResults class]])
   {
      NSString *caption;
      NSString *micrResult = [(TISCheckProcessingResults*)imageResults
 getFormattedMICRString:captureManagerViewController.sessionParameters.ocrType];
      if (micrResult.length)
```

```
      {
         self.strMicr = [NSString stringWithFormat:@"Check MICR is %@", micrResult];
caption = [NSString stringWithFormat:@"Front Original Colored Jpeg image,
%@", self.strMicr];
      }
   }
}
```

For document type Check only, with CMC7 MICR

The TISCMC7CheckProcessingResults class inherits from TISCheckProcessingResults and contains the following properties with the results.

Parameter	Description
signatureOverCMC7MicrDetected	Indicates if a signature is detected on the CMC7 MICR.

didOutputVideoFeedResultsForValidations

The signature of didOutputVideoFeedResultsForValidations is as follows:

```
-(BOOL) captureManager:(TISCaptureManagerViewController*)captureManagerViewController
didOutputVideoFeedResultsForValidations:(TISProcessingResults*)imageResults;
```

This optional method for the delegate TISMobiFlowDelegate is called when OCR results were detected on the video feed for each successful frame that passed mobiFlow internal validations for Check.

The main use of this method is to allow the hosting app to run additional validations on the raw OCR results. Then the hosting app can return YES if the results are valid, or NO to continue the video feed processing of other frames and get another result.

Parameter	Description
TISCaptureManagerViewController	A reference to the TISCaptureManagerViewController.
TISProcessingResults	Contains the OCR results, as detailed in the TISProcessingResult section.
captureManagerViewController.validationType	This property is of the type TISFlowValidationType. You must verify which validation is needed. Possible value for TISFlowValidationType is the following: TISFlowMICRValidation

Return value.

Value	Description
BOOL	Return YES if the results are valid, or NO to continue the video feed processing and get another result.

A more detailed example is available in the Kofax mobiFlow ShowCase app sample, which is included in the SDK Bundle package.

Whenever you set MICR OCR in the session parameters you must use the validationType enum.

captureDidFail

The signature of captureDidFail is as follows:

```
- (BOOL) captureManager:(TISCaptureManagerViewController*)captureManagerViewController
captureDidFail:(TISCaptureErrorCode)TISErrorCode;
```

This method is optional to implement. It informs of an error and allows the delegate to handle the error and how the library should handle the error.

Parameter	Description
TISFlowErrorCode	TISCaptureErrorCode enum: • TISFlowErrorGeneralFail • TISFlowErrorOCRReading • TISFlowErrorImageContrast • TISFlowErrorNoValidBoundingBox • TISFlowErrorIQACornerData • TISFlowErrorIQAEdgeData • TISFlowErrorIQASkew • TISFlowErrorIQADarkness • TISFlowErrorIQANumSpots • TISFlowErrorBlurDetected • TISFlowErrorMICRLength • TISFlowWarningMICRInterupted (Only for CMC7) • TISFlowWarningMICRDetectedOnCheckBack • TISFlowErrorLicenseInvalid • TISFlowErrorLicenseExpired • TISFlowErrorHorizontalStreaks • TISFlowErrorCarbonStrip • TISFlowErrorPiggybackFound • TISFlowErrorUnauthorized In the sample app, if you do not grant camera permissions, an error is triggered.
captureManagerViewController.captureResults	This property is of the type TISProcessingResults. If an error occurs or the SDK fails for some reason, all available output is returned.

Return value

Value	Description
BOOL	If YES, the error handling is in the delegate and closes the library and returns control to the calling app. If NO, the error handling to take place in the mobiFlow framework.

See the following sample codes for the captureDidFail implementation options.

Option 1: SDK handles errors

```
- (BOOL) captureManager:(TISCaptureManagerViewController *)
 captureManagerViewController
captureDidFail:(TISFlowErrorCode)TISErrorCode
{
return NO;
}
```

Option 2: Close the camera when receiving an error

```
- (BOOL) captureManager:(TISCaptureManagerViewController *)
captureManagerViewController captureDidFail:(TISFlowErrorCode)TISErrorCode
{
   [captureManagerViewController.cameraOverlayViewController closeCamera];
   return YES;
}
```

Option 3: The host app handles the error, and the session continues to another retry

```
- (BOOL) captureManager:(TISCaptureManagerViewController *)
captureManagerViewController captureDidFail:(TISFlowErrorCode)TISErrorCode
{
if (TISErrorCode == TISFlowErrorNoValidBoundingBox){//TISFlowErrorMICRReadingCheck
dispatch_sync(dispatch_get_main_queue(), ^{

UIAlertController *alertController = [UIAlertController
alertControllerWithTitle:@"Custom Error Message"

message:@"TISFlowErrorMICRReadingCheck"

preferredStyle:UIAlertControllerStyleAlert];

UIAlertAction *okAction = [UIAlertAction
actionWithTitle:@"OK"
style:UIAlertActionStyleDefault
handler:^(UIAlertAction *action)
{
[captureManagerViewController.cameraOverlayViewController
restartVideoSession];
}];
[alertController addAction:okAction];
[captureManagerViewController.cameraOverlayViewController
presentViewController:alertController animated:YES completion:nil];

    });
   return YES;
}
else if (TISErrorCode==TISFlowWarningMICRInterupted)
{
dispatch_after(dispatch_time(DISPATCH_TIME_NOW, 1.5 * NSEC_PER_SEC),
dispatch_get_main_queue(), ^(void){
if ([captureManagerViewController.captureResults
isKindOfClass:[TISCheckProcessingResults class]]) {
```

```
UIAlertController *alertController = [UIAlertController
alertControllerWithTitle:@"MICR Interrupted"
message:[NSString
stringWithFormat:@"The digital line is in bad quality or interrpted by signature.
\nplease check
MICR:%@",[(TISCheckProcessingResults*)captureManagerViewController.captureResults
result]]

preferredStyle:UIAlertControllerStyleAlert];

UIAlertAction *okAction = [UIAlertAction
actionWithTitle:@"OK"
style:UIAlertActionStyleDefault
handler:^(UIAlertAction *action)
{
[captureManagerViewController.cameraOverlayViewController restartVideoSession];

}];
[alertController addAction:okAction];
[captureManagerViewController.cameraOverlayViewController
presentViewController:alertController animated:YES completion:nil];

     }
});
return YES;
}
return NO;}
}
```

A more detailed example is available in the Kofax mobiFlow ShowCase app sample, which is included in the SDK Bundle package.

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 on video feed processing	Message on stills
Image Contrast	TISFlowErrorImageContrast	TISFlowErrorImageContrast	NO*	YES
Blur Detection**	TISFlowErrorBlurDetected	TISErrorBlurFail	NO*	YES
Look For Document Rectangle	TISFlowErrorNoValidBoundingBox	TISFlowErrorNoValidBoundingBox	NO*	YES
The user is capturing the front side instead of the back side of the check***	TISFlowWarningMICRDetectedOnCheckBack	TISFlowWarningMICRDetectedOnCheckBack	YES	YES
OCR Validation	TISFlowErrorOCRReadingCheck	TISFlowErrorReadingMessage	YES	YES
MICR Length Validation***	TISFlowErrorMICRLength	TISFlowDigitalRowNotInScope	YES	YES

Validation description	Validation error code (enum)	Error message name	Display message on video feed processing	Message on stills
MICR Line Interruption By Signature.CMC7 Only***	TISFlowWarningMicr Interrupted	TISFlowWarningMicr Interrupted	YES	YES
IQA Folded Corner***	TISFlowErrorIQACorner Data	TISFlowErrorIQACornerData	YES	YES
IQA Folded Edge***	TISFlowErrorIQAEdgeData	TISFlowErrorIQAEdgeData	YES	YES
IQA Skew***	TISFlowErrorIQASkew	TISFlowErrorIQASkew	YES	YES
IQA Darkness***	TISFlowErrorIQADarkness	TISFlowErrorIQADarkness	YES	YES
IQA Number of Spots***	TISFlowErrorIQANumSpots	TISFlowErrorIQANumSpots	YES	YES
IQA Horizontal Streaks***	TISFlowErrorHorizontal Streaks	TISFlowErrorHorizontal Streaks	YES	YES
IQA Carbon Strip***	TISFlowErrorCarbonStrip	TISFlowErrorCarbonStrip	YES	YES
IQA Piggy Back***	TISFlowErrorPiggyback Found	TISFlowErrorPiggyback	YES	YES

* When no message is thrown, mobiFlow proceeds to process the next frame.

** Enabled on documents without OCR.

*** Checks only.

IQA validations are performed only for Checks and black and white images.

generalMessages

```
- (void) captureManager:(TISCaptureManagerViewController*)captureManagerViewController
 generalMessages:(TISFlowGerneralMessagesCode)TISGeneralMessageCode;
```

This delegate method is called when the SDK informs about actions.

A more detailed example can be found in the Kofax mobiFlow ShowCase app sample, which is included in the SDK Bundle package.

Continue anyway

```
- (void) captureManager:(nonnull TISCaptureManagerViewController
 *)captureManagerViewController continuingWithOutSignature:(BOOL)isFrontCheque;
```

This delegate method is not called when the signature is not found on a captured check. It is only called when a user taps the **Continue anyway** button.

When a user captures the front side of a check, the "isFrontCheque" parameter is set to TRUE, otherwise the "isFrontCheque" parameter is set to FALSE.

Security recommendations

The mobile calling application has the responsibility to protect the data returned by the SDK in the downstream flow until the mobile application is closed. The mobile calling application implementing the mobiFlow SDK should adhere to security best practices to protect any sensitive data and customer information.

Some of the considerations while implementing and configuring the SDK are the following:

- The mobile calling application is responsible for ensuring that any sensitive data received from the SDK process follows existing processes for safeguarding the data. It is assumed that whatever processes are used for manually entered data would be applied to data extracted from the SDK process.
- On closing the SDK, images and/or data are erased from memory. It is the responsibility of the mobile calling application to ensure that the SDK is closed and objects are released upon completion of the SDK process.
- When debugMode is set to TRUE, images captured by the SDK are stored on the device (as well as the logs). It is strongly recommended to always set IsDebug to FALSE in the release mode of the application build (Production code), as the images and application data should not be physically stored outside the context of the mobile application. The images and data should only exist in the temporary memory of the mobile application and should not be accessible outside the application context.
- For on-device OCR of Checks (for account funding use cases), it is not recommended to return the check image to the user. Only the extracted data should be returned. To do this, set the output settings to **FALSE**:
  - outputGrayscaleImage = FALSE
  - outputOriginalImage = FALSE
  - outputColorImage = FALSE
  - outputBinarizedImage = FALSE
- The Android SDK documentation provides additional code samples (saveImagesToDevice()) to save the images on the device after retrieving them from the SDK. Similar code may also be implemented for iOS as well. It is the responsibility of the application team to ensure any images/data available from the SDK are not stored on the device, especially in the release mode of the application (Production code). This code should only be used for testing and troubleshooting issues in the development cycle.

Chapter 3

Set up a custom capture user interface

This chapter explains how to customize the capture user interface (UI).

You can use one of the following two options when implementing the library:

- Keep the same capture screen that mobiFlow provides, and change the logo, icons and captions.
- Design your UI or hide some controls in the mobiFlow screen by inheriting and overriding the current UI.

Be aware that you are unable to change the frame control because it includes all the functionality for automatically capturing the image.

Use the mobiFlow capture screen

To use this method, you need to change some files in the `resources\KofaxmobiFlowWidget.bundle` folder.

To change icons in the capture screen, do the following:

1. Find the KofaxmobiFlowWidget.bundle file in Finder and remove the .bundle suffix.
2. Open the KofaxmobiFlowWidget directory and replace the desired file.
3. Add the .bundle suffix to the KofaxmobiFlowWidget directory.
4. Compile and run.

You must include the rest of the files that you did not change in the new bundle.

File name	Description
logoWatermark.png	The logo of the company.
btnTorch.png	The flash icon when not selected.
btnTorchSelected.png	The flash icon when selected.
beep.aiff	The sound to play along with the image capture countdown. The sound is only played if EnableCountdownSound is set to YES.

Each icon should also have an X2 version for the Retina display version.

You can also change the icons of the indicators and the frame (Static capture only).

File name	Description
boundaryBottom.png	The bottom-right boundary of the frame when the document is not found.
boundaryTop.png	The top-left boundary of the frame when the document is not found.
boundaryBottomV.png	The bottom-right boundary of the frame when the document is found.
boundaryTopV.png	The top-left boundary of the frame when the document is found.
boundaryBottomLeft.png	The bottom-left boundary of the frame when the document is not found.
boundaryTopRight.png	The top-right boundary of the frame when the document is not found.
boundaryBottomLeftV.png	The bottom-left boundary of the frame when the document is found.
boundaryTopRightV.png	The top-right boundary of the frame when the document is found.

Each icon should also have an X2 version for the retina display version.

Do not change any other images or files in this folder.

Change the dynamic capture colors

To change the color of the dynamic overlay rectangle when TISFlowUXTypeLive is used, you must set the TISOverlayDynamicRectangleColors TISDynamicRectangleColors parameter with the desired colors.

The array app should fill this array in this specific order with four UIColor objects:

```
[validRectStrokeColor, validRectFillColor, invalidRectStrokeColor,
 invalidRectFillColor]
```

The validRectStrokeColor, validRectFillColor, invalidRectStrokeColor, and invalidRectFillColor strings are not active. These strings will be removed in a future mobiFlow release.

The following example includes the default colors to show how this can be done (default colors are green frame and fill for the valid, and red frame and clear fill for invalid).

```
TISCaptureManagerViewController *captureManagerViewController = [[TISCaptureManagerV
iewController alloc] initWithSessionParameters:sessionParams]; ... captureManagerView
Controller.cameraOverlayViewController.TISOverlayDynamicRectangleColors = [NSArray arr
ayWithObjects:[UIColor colorWithRed:0.480 green:0.754 blue:0.234 alpha:1.000],[UIColor
 colorWithRed:0.675 green:0.853 blue:0.505 alpha:0.500],[UIColor colorWithRed:0.914 gre
en:0.058 blue:0.214 alpha:0.500], [UIColor clearColor], nil]; //defaults colors
```

Change labels and messages

To change the caption of the message and the label on the top, you must change the messages in the Localizable.strings per language and document.

The relevant messages to change are as follows.

String Name	Description
TISFlowPleaseCaptureImage	The label's caption at the top of the capture screen
TISFlowPleaseCaptureImageBack	The label's caption at the top of the capture screen (for back)
TISSuccessfulReadingTitle	For combined front and back capture, the title of the message that is displayed after successful capture of the front
TISSuccssfulReadingMessage	For the combined front and back capture, the contents of the message that is displayed after successful capture of the front
TISFlowPleaseCaptureBarcode	Instruction for the user to capture the barcode with Static capture, when barcode capture is enabled

Change the text indicators

In the Localization files per document and language, change the relevant string:

String name	Description
TISFlowIndicatorAlign	Indicator to hold the device flat over the check
TISFlowIndicatorDown	Indicator to move the device towards the bottom of the check
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 check
TISFlowIndicatorRotateLeft	Indicator to rotate the device left (check is at an angle)
TISFlowIndicatorRotateRight	Indicator to rotate the device right (check is at an angle)
TISFlowIndicatorZoomIn	Indicator to move closer to the check (check is too far from the frame)
TISFlowIindicatorZoomOut	Indicator to move away from the check (check is exceeding the frame)
TISFlowIndicatorLight	Indicator to turn on the flash (there is not enough light)
TISFlowIndicatorHold	Indicator to hold the camera when the check is found before the picture is taken

String name	Description
TISFlowScanBarcode	Indicator to move towards the barcode
TISFlowInvalidRotation	An indicator that the phone and document do not have the same orientation

Info screen popup

The info screen popup is displayed when the user has difficulties capturing the document after a certain time (customizable).

The popup will animate from the top screen to the center, in landscape mode.

Change the text in the localization file.

String name	Description
TISFlowInfoScreenText	The Text in the instructions screen
TISFlowInfoScreenTitle	The Title of the instructions screen
TISFlowInfoScreenButtonCaption	The Caption of the close button
TISFlowInfoScreenCheckBoxCaption	The Text of the checkbox caption

Design or change the UI

To implement your UI, changing the locations of the mobiFlow control or hiding mobiFlow controls, you must create a new class in your implementation that inherits TISCaptureViewController.

1. Create a new class.
2. In the new class, import TISCaptureViewController.h and rename your .m file to .mm.
3. Implement the method (void) viewDidLoad.
4. In this method, call [super viewDidLoad].
5. Include your implementation.

You can use the instructions in the Use the mobiFlow capture screen section to change icons and messages as you need, and the changes will apply in this method as well.

The mobiFlow library has a few UI controls where the controls' properties are exposed and can be set from the viewDidLoad method.

The following UI controls are available.

UI control name	Description
counterLabel	Count down label
counterImage	Count down image

UI control name	Description
btnTorch	Flash button
btnCancel	Cancel button
instructionsLabel	Instructions label
hintLabel	Indicator label
watermark	Logo image

You can also write your code to add new controls to the screen, for example, if you want to add other labels, pictures, or buttons.

If you choose to hide the original Cancel button (which is not recommended), you must implement a call to the mobiFlow Close action from the main class; this is essential for the proper functioning of the library. When creating your Close button, you will allocate a method to handle the click action on the button. From this method, you will need to create a call to [self cancelAction], and then implement the rest of your implementation for the action.

hintDidChange

Implement hintDidChange when the hint that shows on the screen changes. This method is fired, and you can set different properties to the UI elements including, but not limited to, text, accessibility settings, color, fonts, and so on.

setInstructionLabelText

Override this method if you want to customize the string to insert into the instruction label. When you have finished customizing the string, or when no customization is needed, add the string to the instruction label using self.instructionsLabel.text = text or by calling [super setInstructionLabelText:text].

If you change the string to NSMutableAttributedString, you must change the label text using [self.instructionsLabel setAttributedText: attributedInstruction], (do not call super).

bringButtonsToForground

This method brings the UI to the foreground every time the session is restarted.

If you use a custom view, you must override this method to bring your UI to the foreground as well. Call super if you also use the default UI.

Accessibility

mobiFlow exposes all the elements in the view and allows changing any properties of the elements. This means that the accessibility properties of these elements can be changed by the hosting app in runtime when using a custom view.

A sample code for creating such a class can be as follows:

CustomView.h file

```
#import <UIKit/UIKit.h>
#import <KofaxmobiFlowWidget/TISMobiFlowWidget.h>
@interface CustomView : TISCaptureViewController
@end
```

CustomView.mm file

```
#import "CustomView.h"
@implementation CustomView
{
CGRect frameRect;
}
- (void)viewDidLoad
{
[super viewDidLoad];
[[NSNotificationCenter defaultCenter] addObserver:self
selector:@selector(receiveTISNotification:)
name:TIS_PROCESS_NOTIFICATION
object:nil];
frameRect =[[UIScreen mainScreen] bounds];

[self hideParentButtons];

//Change instructionLabel position and UI
self.instructionsLabel.textColor = [UIColor redColor];
CGRect frame = self.instructionsLabel.frame;
frame.origin.y += 30;
self.instructionsLabel.frame = frame;

//Add bottom banner image
UIImage *bottom_image = [UIImage imageNamed:@"banner_bottom.png"];
_banner_bottom = [[UIImageView alloc] initWithImage:bottom_image];
[_banner_bottom setFrame:CGRectMake(0, frameRect.size.height-bottom_image.size.height,
 frameRect.size.width, bottom_image.size.height)];
[_banner_bottom setUserInteractionEnabled:YES];
[self.view addSubview:_banner_bottom];

//Add cancel button
_btnCancelOverlay = [UIButton buttonWithType:UIButtonTypeCustom];
UIImage *cancel_image = [UIImage imageNamed:@"cancel_btn.png"];
[_btnCancelOverlay setImage:cancel_image forState:UIControlStateNormal];
[_btnCancelOverlay setFrame:CGRectMake(_banner_bottom.frame.size.width-
cancel_image.size.width-10,
(_banner_bottom.frame.size.height-cancel_image.size.height)/2.0,
cancel_image.size.width,
cancel_image.size.height)];

[_btnCancelOverlay addTarget:self action:@selector(customCancelAction:)
 forControlEvents:UIControlEventTouchUpInside];
[_banner_bottom addSubview:_btnCancelOverlay];

if (self.sessionParameters.enableManualCapture)
{
//Add auto capture button
_autoCaptureButton = [[UIButton alloc] initWithFrame:CGRectMake(10.0, 5.0, 80.0,
 _banner_bottom.frame.size.height - 10.0)];
_autoCaptureButton.layer.borderWidth = 2.0;
_autoCaptureButton.layer.borderColor = [UIColor blackColor].CGColor;
[_autoCaptureButton setTitle:@"Auto On" forState:UIControlStateNormal];
[_autoCaptureButton setTitleColor:[UIColor blackColor] forState:UIControlStateNormal];
[_autoCaptureButton addTarget:self action:@selector(customToggleAutoCaptureAction)
 forControlEvents:UIControlEventTouchUpInside];
```

```
[_banner_bottom addSubview:_autoCaptureButton];

//Move manual capture button position
CGRect frameBtnNew = CGRectMake(frameRect.size.width -
 self.btnManualCapture.frame.size.width - 5.0, (frameRect.size.height -
 self.btnManualCapture.frame.size.height)/2.0, self.btnManualCapture.frame.size.width,
 self.btnManualCapture.frame.size.height);
self.btnManualCapture.frame = frameBtnNew;
}

//Add top banner image
UIImage *top_image = [UIImage imageNamed:@"banner_top.png"];
_banner_top = [[UIImageView alloc] initWithImage:top_image];
[_banner_top setFrame:CGRectMake(0, 0, frameRect.size.width, top_image.size.height)];
[self.view addSubview:_banner_top];

//Add description label
descriptionLabel = [[UILabel alloc] initWithFrame:CGRectMake(0,
 frameRect.size.height/2+20, frameRect.size.width, 50)];
[descriptionLabel setBackgroundColor:[UIColor clearColor]];
[descriptionLabel setTextColor:[UIColor whiteColor]];
[descriptionLabel setFont:[UIFont systemFontOfSize:16]];
[descriptionLabel setTextAlignment:NSTextAlignmentCenter];
[descriptionLabel setNumberOfLines:2];
[descriptionLabel setText:@"Center your bill stub here and we will capture\n the
 information"];
[self.view addSubview:descriptionLabel];

//Adding Activity Indicator for Processing stage
_indicator = [[UIActivityIndicatorView
 alloc]initWithActivityIndicatorStyle:UIActivityIndicatorViewStyleWhiteLarge];
_indicator.frame = CGRectMake((frameRect.size.width - _indicator.frame.size.width)/2.0,
(frameRect.size.height - _indicator.frame.size.height)/2.0 ,
 _indicator.frame.size.width, _indicator.frame.size.height);

[self.view addSubview:_indicator];

self.TISOverlayDynamicRectangleColors = [NSArray arrayWithObjects:
[UIColor blueColor],
[UIColor clearColor],
[UIColor yellowColor],
[UIColor clearColor],  nil];

//you can add or remove the grid view as well
//uncomment if you want to remove the grid
//[self removeTisGrid];

}
-(void) hideParentButtons
{
if (self.sessionParameters.enableManualCapture) {
self.btnAutoCapture.hidden = YES;
}

self.btnCancel.hidden = YES;
self.watermark.hidden = YES;
self.btnTorch.hidden = YES;
self.counterLabel.hidden = YES;
}
-(void) setInstructionLabelText:(NSString*)text
{
if ([text isEqualToString:NSLocalizedStringFromTable(@"TISFlowPleaseCaptureImage",
 @"CheckLocalizable", "")])
{
```

```
NSRange boldRange = [text rangeOfString:@"front"];
if (boldRange.location == NSNotFound)
{
[super setInstructionLabelText:text];
}
else
{
NSMutableAttributedString *attributedInstruction = [[NSMutableAttributedString alloc]
 initWithString:text];
[attributedInstruction addAttribute: NSFontAttributeName value:[UIFont
 boldSystemFontOfSize:18] range:boldRange];
[self.instructionsLabel setAttributedText: attributedInstruction];
}
}
else if([text
 isEqualToString:NSLocalizedStringFromTable(@"TISFlowPleaseCaptureImageBack",
 @"CheckLocalizable", "")])
{
NSRange boldRange = [text rangeOfString:@"back"];
if (boldRange.location == NSNotFound)
{
[super setInstructionLabelText:text];
}
else
{
NSMutableAttributedString *attributedInstruction = [[NSMutableAttributedString alloc]
 initWithString:text];
[attributedInstruction addAttribute: NSFontAttributeName value:[UIFont
 boldSystemFontOfSize:18] range:boldRange];
[self.instructionsLabel setAttributedText: attributedInstruction];
}
}
else
{
[super setInstructionLabelText:text];
}
}
- (void)hintDidChange:(HintTypeIndicator)hint
{
//    [super hintDidChange:hint];

self.hintLabel.textColor = [UIColor whiteColor];
self.hintLabel.backgroundColor = [UIColor redColor];
self.hintLabel.alpha = 1.0;
self.hintLabel.font = [UIFont boldSystemFontOfSize:16];
[self.hintLabel setCenter:CGPointMake(frameRect.size.width/2,
 frameRect.size.height/2)];
UIAccessibilityPostNotification(UIAccessibilityAnnouncementNotification,
 self.hintLabel.text);
}
-(void)bringButtonsToForeground
{
[self.view bringSubviewToFront:_banner_top];
[self.view bringSubviewToFront:_banner_bottom];
[self.view bringSubviewToFront:_autoCaptureButton];

[super bringButtonsToForeground];
}
#pragma mark - override methods
//Uncomment to implement
//-(void) initDisplay
//{
//
//}
```

```
//-(void)initMustHaveDisplayElements
//{
//    [super initMustHaveDisplayElements];
//}
-(void)customCancelAction:(id)sender
{
[self cancelAction:(id)sender];
}
-(void)customToggleAutoCaptureAction
{
[_autoCaptureButton setTitle: self.isBtnAutoCaptureToggleOn ? @"Auto Off" : @"Auto On"
 forState:UIControlStateNormal];

[self toggleAutoCapture];
}
@end
```

For the mobiFlow library to use your custom view, add your custom view to your project (for example, CustomView.h).

Example:

```
...
TISSessionParameters* sessionParameters =[[TISSessionParameters alloc]
 initWithDocumentType:TISDocumentTypeCheck];

CustomView* myView = [[CustomView alloc] init];

TISCaptureManagerViewController* captureManagerViewController =
 [[TISCaptureManagerViewController alloc] initWithSessionParameters:sessionParams
 andCustomView:myView];

captureManagerViewController.captureManagerDelegate = self;
[self presentViewController:captureManagerViewController animated:YES  completion:nil]
```

Receive mobiFlow notifications

When the countdown sequence starts or when image processing starts or ends, mobiFlow sends the following notifications to any registered observers:

```
[[NSNotificationCenter defaultCenter] addObserver:self
selector:@selector(receiveTISNotification:)
name:TIS_PROCESS_NOTIFICATION
object:nil];
```

Each mobiFlow notification includes information about the event that triggered the notification.

You can access this information from the userInfo NSDictionary.

- When implementing the Cancel button, you should disable its action when getting TISNotificationStatusCountDownStarted and enable it again on captureDidFail, or when processing is finished if you are planning to capture another document in the same session. Refer to the customView class in the sample app for more information.
- A more detailed example is available in the Kofax mobiFlow ShowCase app sample, which is included in the SDK Bundle package.

Design or change the Guidelines popup UI

To implement your own Guidelines Popup UI, changing the locations of the mobiFlow control or hiding mobiFlow controls, you must create a new class in your implementation that inherits TISInfoScreenView.

1. Create a new class.
2. In the new class, import <KofaxmobiFlowWidget/TISInfoScreenView.h>, and rename your .m file to .mm.
3. Implement one of the following methods:
   - -(instancetype) initWithFrame:(CGRect)frame
   - -(instancetype)initWithFrame:(CGRect)frame andDocType:(TISDocumentType)docType
   - -(instancetype)initWithIsPortraitCapture:(BOOL)portraitCapture andDocType: (TISDocumentType)docType
4. In this method, call to super according to the method you implemented, such as [super initWithFrame:frame].
5. Include your implementation.

The mobiFlow library has a few UI controls where the properties of the controls are exposed and can be set from the initWithFrame method.

The following UI controls are available.

Controls name	Description
infoTxtTitle	Title label
textField	Text to be shown
btnClose	Close button
checkBox	Check box button
checkBoxLabel	Check box label

You can also write your own code to add new controls to the screen. For example, you can write the code to add other labels, pictures, or buttons. If you choose to hide the original Cancel button (which is not recommended), you must implement a call to the mobiFlow Cancel action from the main class; this is essential for the proper functioning of the library. When creating your Cancel/Back button, you will allocate a method to handle the click action on the button. From this method, you will need to create a call to [self cancelAction], and then implement the rest of your implementation for the action.

If you choose to hide the original checkBox button (which is not recommended), you must implement a call to the mobiFlow dontShowAgain action from the main class; this is essential for the proper functioning of the library. When creating your checkBox button, you will allocate a method to handle the click action on the button. From this method, you will need to create a call to [self showAgainAction:(bool)toShow], and then implement the rest of your implementation for the action.

Following are the sample codes for creating such a class.

CustomInfoScreenView.h file

```
#import <UIKit/UIKit.h>
#import <KofaxmobiFlowWidget/TISInfoScreenView.h>
@interface CustomInfoScreenView : TISInfoScreenView
@end
```

CustomInfoScreenView.mm file

```
#import "CustomInfoScreenView.h"

@implementation CustomInfoScreenView

-(id) initWithFrame:(CGRect)frame
{
if((self = [super initWithFrame:frame]))
{
self.infoTxtTitle.hidden = YES;
self.textField.hidden = YES;
self.checkbox.hidden = YES;
self.checkboxLabel.hidden = YES;
self.btnClose.hidden = YES;

//adding custom close button
UIButton *btnOverlay = [UIButton buttonWithType:UIButtonTypeCustom];
[btnOverlay setBackgroundColor:[UIColor blueColor]];
[btnOverlay setTitle:@"Close Button" forState:UIControlStateNormal];
[btnOverlay.titleLabel setFont:[UIFont boldSystemFontOfSize: 15.0]];
[btnOverlay setFrame:CGRectMake(10, 225, 100, 30)];
[btnOverlay setTitleColor:[UIColor whiteColor] forState:UIControlStateNormal];
[btnOverlay addTarget:self action:@selector(customAction:)
forControlEvents:UIControlEventTouchUpInside];
[self addSubview:btnOverlay];

//adding custom dont show again button
UIButton *dontShowAgain = [UIButton buttonWithType:UIButtonTypeCustom];
[dontShowAgain setBackgroundColor:[UIColor blueColor]];
[dontShowAgain setTitle:@"Dont Show Again Button" forState:UIControlStateNormal];
[dontShowAgain.titleLabel setFont:[UIFont boldSystemFontOfSize: 15.0]];
[dontShowAgain setFrame:CGRectMake(135, 225, 180, 30)];
[dontShowAgain setTitleColor:[UIColor whiteColor] forState:UIControlStateNormal];
[dontShowAgain addTarget:self action:@selector(dontShowAgain)
forControlEvents:UIControlEventTouchUpInside];
[self addSubview:dontShowAgain];

//adding custom instruction label
UILabel *uiLabel = [[UILabel alloc] initWithFrame:CGRectMake(20, 20, 440, 150)];
[uiLabel setBackgroundColor:[UIColor clearColor]];
[uiLabel setFont:[UIFont boldSystemFontOfSize: 18.0]];
uiLabel.numberOfLines = 4;
[uiLabel setTextColor:[UIColor whiteColor]];
uiLabel.text = @"TIPS:\n1. Lay bill on dark surface. \n2. Fit entire bill in guides.
\n3.
Hold phone flat.";
[self addSubview:uiLabel]
}
return self;
}
-(void)customAction:(id)sender{
[self closeAction];
```

```
}
-(void)dontShowAgain{
[self showAgainAction:NO];
[self closeAction];
}
@end
```

A more detailed example is available in the mobiFlow ShowCase app sample, which is included in the SDK Bundle package.

For the mobiFlow library to use your custom view, do the following:

1. Add your custom view to your project (for example, CustomInfoScreenView.h)
2. Add the two lines shown in the following code to the code for initializing TISCaptureManagerViewController (see Camera capture flow). Make sure that the rectangle in the initialization is the final size and location of the popup.

```
...
CustomInfoScreenView *infoScreen = [[CustomInfoScreenView alloc]
initWithFrame:CGRectMake(10, 10, 460, 300)];

checkCaptureManagerViewController.cameraOverlayViewController.infoScreenView =
infoScreen;
```

A more detailed example is available in the mobiFlow ShowCase app sample, which is included in the SDK Bundle package.

Split capture front and back (Check only)

To separately capture the front side and back side of the check in separate sessions:

1. Launch the camera session with scanFrontOnly set to YES in the TISSessionParameters.
2. Launch the camera session again with scanBackOnly set to YES in the TISSessionParameters, and the MICR type set to OCRType_OFF and frontImageSize, as retrieved from the didFinishWithResults delegate of the front capture.

Front capture

```
- (IBAction)scanFront:(id)sender {

TISSessionParameters* checkSessionParameters = [[TISSessionParameters alloc]
 initWithDocumentType:TISDocumentTypeCheck];

//Manual Settings
checkSessionParameters.isDebug=NO;
checkSessionParameters.scanFrontOnly=YES;
checkSessionParameters.ocrType =  OCRType_MICR_E13B ;

TISCaptureManagerViewController
*checkCaptureManagerViewController=[[TISCaptureManagerViewController alloc]
 initWithSessionParameters: checkSessionParameters];
checkCaptureManagerViewController.captureManagerDelegate=self;

[self presentViewController:checkCaptureManagerViewController animated:YES
 completion:nil];
}
```

Back capture

```
- (IBAction)scanBack:(id)sender {
TISSessionParameters* checkSessionParameters =[[TISSessionParameters alloc]
 initWithDocumentType:TISDocumentTypeCheck];
checkSessionParameters.scanBackOnly=YES;
checkSessionParameters.ocrType=OCRType_OFF;

//the frontImageSize can be retrieved from the result of frontTiff.size
checkSessionParameters.frontImageSize = savedFrontImageSize;
TISCaptureManagerViewController
 *checkCaptureManagerViewController=[[TISCaptureManagerViewController alloc]
 initWithSessionParameters: checkSessionParameters];
checkCaptureManagerViewController.captureManagerDelegate=self;
[self presentViewController:checkCaptureManagerViewController animated:
YES completion:nil];
}
```

A more detailed example is available in the mobiFlow ShowCase app sample, which is included in the SDK Bundle package.

Captions and messages

The relevant Localization files are available in the resources in different languages. You can change the captions and messages used in the Library during the process.

See the following table for the messages.

Message Name	Description
TISFlowPleaseCaptureImage	The caption displayed when capturing the image/check on the preview screen.
TISFlowPleaseCaptureImageBack	The caption displayed when capturing the back side of the check.
TISFlowCancel	The Cancel button is displayed in the error messages.
TISFlowOK	The OK button is displayed in the error messages.
TISFlowPleaseCaptureBarcode	Instruction to capture the bar code in Static capture, when bar code capture is enabled.
TISFlowDigitalRowNotInScope (Checks only)	Message when the digital row is not within the set length.
TISFlowErrorReading	Title for all error messages.
TISFlowErrorReadingMessage	Message when reading the OCR in stills mode failed, recapture of the front is needed.
TISFlowErrorImageContrast	Message when there are contrast issues in detecting colors on the image in stills mode.
TISFlowErrorReadingGeneral	General message about failure to validate the image; displayed if a specific message does not apply.

Message Name	Description
TISFlowErrorNoValidBoundingBox	Message when the rectangle of the image was not detected by the Library. Message when the bounding box of the image was not detected by the Library.
TISFlowErrorIQACornerData	Message when one of the corners of the check is missing and over the accepted threshold.
TISFlowErrorIQAEdgeData	Message when one of the edges of the check is missing and over the accepted threshold.
TISFlowErrorIQASkew	Message when the check is skewed over the accepted threshold.
TISFlowErrorIQADarkness	Message when the image is too darker the accepted threshold.
TISFlowErrorIQANumSpots	Message when the image has too much noise and the number of spots per square inch exceeds the accepted threshold.
TISFlowErrorFileTooSmall	Message when the file generated by the Library is smaller than the minimum accepted threshold.
TISFlowErrorMinImageDimensions	Message when the image is not within the dimensions or aspect ratio that is expected.
TISFlowErrorUnknown	Message about IQA validation failure, issued if a more specific message does not apply.
TISErrorBlurFail	Message when the image is detected as blurred.
TISFlowWarningMICRDetectedOnCheckBack (Checks only)	Message when the MICR was detected while the user tried to capture the front of the check instead of the back.
TISFlowWarningMicrInterrupted (Checks only)	Message when the recognition of the MICR detects that there is interruption such as stains or the signature is detected in the MICR recognition. Works on Checks with CMC7 MICR line only.
TISFlowFinish	The caption on the button to finish multi-capture.
TISFlowCapture	The caption on the button to continue and capture another document.
TISFlowCancel	The caption of the Cancel button on alerts.

Reporting issues

To report issues to Kofax, you must reproduce the issue on the mobiFlow Showcase app, setting the debug mode ON.

When the debug mode is ON, images and logs are saved on the device for debugging purposes. These images and logs can be sent to the Kofax Support Team to enable them to investigate any issues or bugs that you may encounter. In debug mode, every image that is captured is saved, even if you receive an error message after the capture.

To access these images and logs, you need a program on your computer that can explore the file system of your device when it is connected to the computer via USB. An example of such an app is iFunbox, which can be downloaded from the Internet for free.

As there is only one log file, it grows with every capture. Therefore it is important to delete it before logging something that you want to report. Make sure the log contains only the data from the relevant capture you had issues with.

For every capture, all four images for the front and four for the back will be saved, depending on which images you decided to output (see Handle messages, errors and results).

When reporting an issue, please send the following to Kofax:

- The log file containing only the issue you are reporting.
- All relevant images regarding the issue.
- A detailed description of the issue and step-by-step instructions on how to reproduce.
- Information about the device or devices and the operating system of the device relevant to the issue.
- Information about the Showcase or SDK version relevant to the issue.
- The configuration of all the parameters in the Showcase or SDK where the issue occurs.

If the issue is related to capture, and you are not able to capture the document, you can take a picture of the document with your native camera app on the device and send it to the Support Team instead. Additionally, you can scan the document and send a copy that the Support Team can print and test themselves.

Guidelines for successful capture

This chapter provides the guidelines that you should follow to ensure successful and optimal capture from the mobiFlow library. These guidelines are not mandatory and a document can still be captured, however, following them will ensure best results.

Contrast

Position the document on a background with a different color. Use strong visual contrast near the document's boundaries. For documents with multiple colors around the boundaries, use 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. Avoid strong lines on the background that do not belong to the document. Keep the surface around the document clear of any objects about 6" (15 cm) from each side of the document.

Lighting

Avoid strong direct sunlight or artificial lighting on the document. Avoid having strong light on one part of the document and shade over another part. Such a situation can result in an unusable black and white image of the part that is not in the shade.

Shooting and rotation angles

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

Taking the picture

When the HOLD STILL message appears, the device should be held still over the document until the countdown is over and the still picture is taken. Moving or shaking during this process may result in a blurry image and leads to a failure or an unclear black and white image.

Digital row (MICR): Checks only

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.