

Cognex Mobile Barcode SDK for iOS (v2.2.x)

Overview

Cognex Mobile Barcode SDK (cmbSDK) is a tool for developing mobile barcode scanning applications. CmbSDK is based on Cognex's DataMan technology and the Manatee Works Barcode Scanning SDK and it allows you to create barcode scanning applications for mobile devices. Mobile devices used for barcode scanning range from smartphones to the MX Series industrial barcode readers. CmbSDK abstracts the device through a *ReaderDevice* connection layer. Once the application establishes its connection with the reader, a single, unified API is used as interface to configure the device, eliminating the need to write too much conditional code.

CmbSDK provides two basic *ReaderDevice* connection layers:

- *MX reader* for barcode scanning with devices like the MX-1000 and MX-1502
- *Camera reader* for barcode scanning with the built-in camera of the mobile device or an MX-100 barcode reader (iOS only).

Barcode Scanning with an MX Mobile Terminal

The cmbSDK supports Cognex's MX Series Mobile Terminals and some of their features using cmbSDK are the following:

- **Hardware trigger:** MX Mobile Terminals include two built-in triggers for barcode scanning. They also support a pistol grip with trigger that is an optional accessory.
- **Illumination and aiming:** MX Mobile Terminals have built-in illumination and aiming, making it unnecessary to have a live preview on the smartphone's screen.
- **Configurations:** You can export and import configuration sets to MX Mobile Terminals using Cognex's DataMan Setup Tool for Windows, the Quick Setup mobile application or cmbSDK.
- **High-capacity battery:** MX Mobile Terminals have an integrated battery that powers the MX scanning engine and the mobile device. The optional pistol grip includes a second battery that doubles the power capacity of the MX Mobile Terminal.

Getting your MX Mobile Terminal Enabled App into the App Store

Before submitting your MX-1000 Enabled app to the Apple App Store, your app must be added to the Cognex MX-1000 MFi product plan. This is a critical step for your app to be approved by Apple. (If your app isn't added to the plan, Apple will reject it.)

Please submit a request on <https://cmbdn.cognex.com/mfi/apply> for each iOS app you plan to submit to the App Store.

- Name of app as it will appear in App Store
- App version number
- App Store category
- Bundle identifier
- External Accessory protocols (which must include at least com.cognex.dmcc)
- Brief functional overview of app and its key features
- Name of the developer that will submit the app to the App Store
- Expected release date

You will also need to update your app's notes before submitting to the App Store. Please follow the instructions to do this below:

- Log in to iTunes Connect
- Click on "My Apps"
- Select your app
- Click on the app version on the left side of the screen
- Scroll down to "App Review Information"
- Update "Notes" with:

The related product plan is:

Accessory Name: DataMan 9050

Product Plan ID: 144826-0004

Status: Active Type: Manufacturing Process

Phase: Production

- Click "Save"
- Once you've completed all changes, click the "Submit for Review" button at the top of the App version information page.

Once this information has been received, Cognex will add your app to the MX-1000 product plan. You will receive an email confirmation when this step is completed at which time you can submit your app to Apple directly.

Debugging on MX Mobile Terminal

Normally you connect your mobile device (phone or tablet) to your PC via the USB or lightning port to start debugging. If an MX Mobile Terminal is attached to your mobile device via the USB or lightning port while your application is running, you need to debug your application via Wi-Fi.

Debugging on iPhone using XCode:

Requirements:

- XCode 9 or newer
- iPhone running iOS 11 or newer

If you are running your application with XCode, make sure your device is plugged in via lightning cable and enable *Connect via network* on your mobile device as follows.

1. Open XCode and choose *Window > Devices and Simulators* from the top menu.
2. Select your device from the connected list of devices on the left side and check the *Connect via network* checkbox.



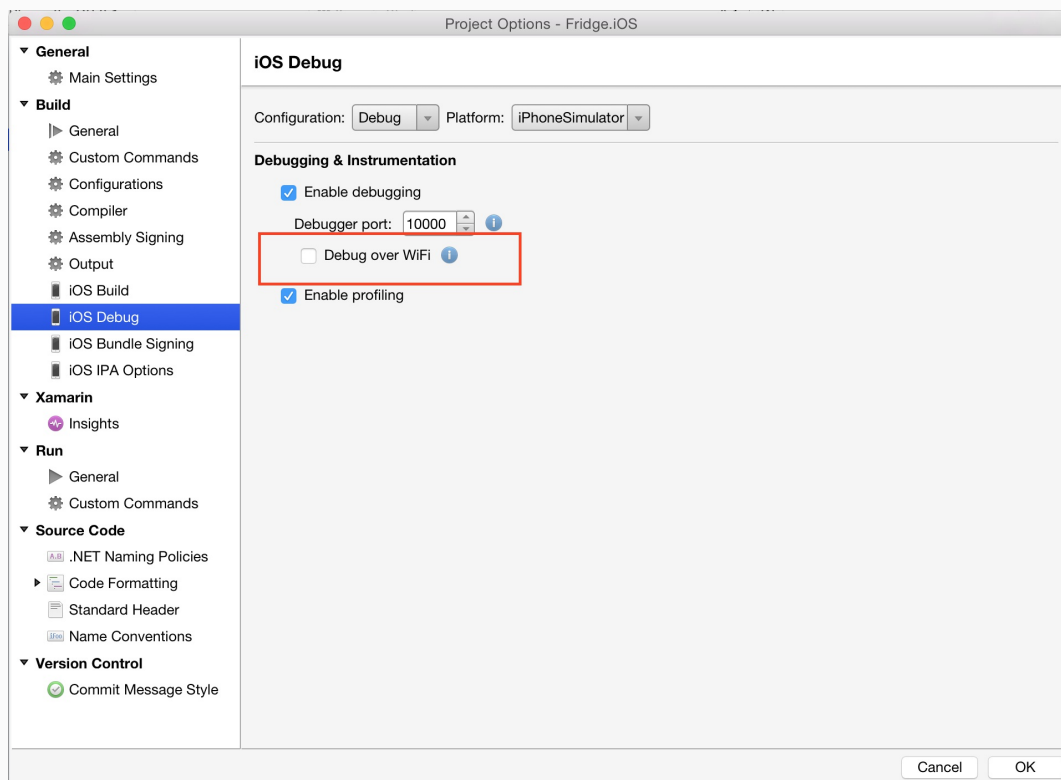
Now you can close the Devices window and run your application without using the lightning cable.

Debugging on iPhone using Xamarin or Visual Studio:

1. Make sure your iPhone is connected using the lightning cable and open your Xamarin.iOS project.
2. Choose *Options* by right-clicking on the project file.
3. Navigate to *iOS Debug* from the left menu and check the *Debug over WiFi* checkbox.

Launching the application is still done through the USB cable, so the initial launch requires you to have the cable plugged.

Once started, you can safely unplug and continue your debugging session over Wi-Fi.



Barcode Scanning with a Smartphone

Barcode Scanning with a Smartphone or Tablet

The differences in the capabilities of smartphones as barcode scanning devices result in a user experience different from purpose-built scanners, impacting the design of the mobile barcode scanning application. By following a few simple guidelines, you can develop applications with the cmbSDK that work the same way when using an MX Mobile Terminal or the built-in camera of a mobile device.

- To initiate barcode scanning without a dedicated hardware trigger, see [Mobile Device Triggering](#).
- To aim for barcode scanning with a smartphone that does not have an aimer, see [Mobile Device Aiming](#).
- To choose the most suitable orientation for barcode scanning, see [Mobile Device Orientation](#).
- To reduce the CPU usage of the mobile device when it performs image analysis and barcode decoding, see [Optimizing Mobile Device Performance](#).

Mobile Device Triggering

Without a hardware trigger, mobile devices must use alternative methods to initiate barcode scanning. The cmbSDK supports three methods to trigger barcode scanning:

- **Application or workflow driven trigger:** The application code or the business logic/workflow of the application invokes the scanning module. In simple programming terms, it is calling a function like *startScanner()*.
- **Virtual trigger:** To start or stop the scanning process the application provides a button on the screen. Depending on the application design, you need to press and hold the virtual button to keep the scanner running, this invokes the scanning module.
- **Simulated trigger:** Press one of the volume buttons to start or stop the scanning process just like when you pull a trigger on a purpose-built scanner.

Mobile Device Aiming

The built-in camera provides a live-stream preview on the display of the mobile device for barcode aiming. Reposition the mobile device until the barcode appears in the field of view of the built-in camera and the application decodes it. CmbSDK provides a built-in preview control that can be displayed in partial or full screen, and in either portrait or landscape orientation.

The cmbSDK also supports passive aimers: devices attached to the mobile device or its case that use the LED flash of the device as a light source to project an aiming or targeting pattern. The mobile device can project an aimer pattern similar to a purpose-built scanner so live-preview is not needed. However, by using the LED flash as an aimer, general scanning illumination is not available.

In addition to passive aimers, cmbSDK also supports an active aimer that has its own built-in LEDs for illumination and aiming: the MX-100 Barcode Reader. The MX-100 is a mobile device accessory for iOS smartphones attached to the mobile device with a mobile device case. The built-in LED of the MX-100 projects a green dot to help in reading the barcode.

Mobile Device Orientation

The cmbSDK supports portrait orientation, landscape orientation and auto-rotation for both the presentation of the barcode preview and the scan direction. Mobile devices can scan most barcodes regardless of the orientation of the application and/or the mobile device.

PORTRAIT OR LANDSCAPE	PORTRAIT ONLY	
Most barcodes can be scanned in either portrait or landscape orientation.	Most well defined and moderately sized barcodes can be scanned in a portrait orientation, which is the most natural way to hold the mobile device. Example: QR, Data Matrix, Maxicode.	Long, barcode, landsc

Optimizing Mobile Device Performance

Mobile devices are an ideal platform for barcode decoding. The cmbSDK is optimized for mobile environment, but image analysis and barcode decoding is still a CPU intensive activity. Since these processes share the mobile device's CPU with the mobile operating system (OS), services, and other applications, these processes optimize your barcode scanning application and limit it to only using the features of the cmbSDK that they need.

To optimize your application:

- Enable decoding only for the barcode types the application needs to scan. The cmbSDK supports the decoding of almost 40 different barcode types and subtypes, enabling all results in low performance and unexpected errors.
- Do not enable certain symbologies and/or advanced features at the same time.
- Optimize your camera resolution. By default, the cmbSDK uses HD images for barcode decoding.
- Use an appropriate decoder effort level. The cmbSDK has a configurable effort level that controls how aggressively it performs image analysis. The cmbSDK uses a default value (level 2) that is sufficient for most barcodes. Using a higher level can result in better decoding of poorer quality barcodes, resulting in slower performance.

No barcode symbologies are enabled by default, when the cmbSDK is initialized for use with the mobile device's built-in camera.

Using cmbSDK

Using cmbSDK in XCode

To set up your application to use the iOS cmbSDK:

1. Open XCode and start a new project.
2. Add the following lib and frameworks to your project:

```
* SystemConfiguration.framework
* AVFoundation.framework
* CoreGraphics.framework
* CoreMedia.framework
```

```
* CoreVideo.framework
* MediaPlayer.framework
* Security.framework
* AudioToolbox.framework
* libDataManSDK.a
```

To use device discovery, you may need to add CocoaAsyncSocket.framework located in dependencies of cmbSDK zip file to the "Embedded Binaries" section of the General tab in Xcode.

3. Go to your project's **Info.plist** file and add the Privacy - Camera Usage Description or NSCameraUsageDescription to display a message about how your application uses the camera of the user's mobile device.

Creating a Swift Bridging Header

To write your app in Swift, you need a bridging header to be able to use the cmbSDK:

1. Create the header by selecting File -> New File -> Header File
2. Save the header file and name it for example **YourApp-Bridging-Header**
3. Open your project settings, under the "Build Settings" tab search for "Objective-C Bridging Header" and add "**\$(PROJECT_DIR)/YourApp/YourApp-Bridging-Header.h**". Replace YourApp with the name of your app, and YourApp-Bridging-Header.h with the name of your bridging header.
4. Open your bridging header and import the headers that you would like to use from the cmbSDK. For example, import the following headers for basic functionality:

```
#import "CMBReaderDevice.h"
#import "CMBReadResult.h"
#import "CMBReadResults.h"
```

Writing a Mobile Application

The cmbSDK has been designed to provide a high-level, abstract interface for supported scanning devices. This includes not only the MX series of mobile terminals, but also for applications that intend to use the mobile device camera as the imaging device. The

intricacies of communicating with and managing these devices is encapsulated within the SDK itself: leaving the application to just connect to the device of choice, then using it.

The primary interface between your application and a supported barcode scanning device is the `CMBReaderDevice` class. This class represents the abstraction layer to the device itself, handling all communication as well as any necessary hardware management (e.g., for smartphone scanning).

Perform the following steps to use the cmbSDK:

1. Initialize a Reader Device for the type of device you want to use (MX reader or camera reader).
2. Connect the Reader Device.
3. Configure the reader (if necessary).
4. Start scanning.

Initialization, connection, and configuration generally need to be performed only once in your application, except for the following cases:

- An MX reader can become disconnected (times out from disuse, dead battery, etc.). A method has been provided to handle this case, and is discussed in a later section.
- Your application has been designed to allow the user to change devices. The cmbSDK is explicitly designed to support this: your application simply disconnects from the current device and establishes a new connection to a different device. The provided sample application has been written to explicitly demonstrate this capability.

Setting up an Application to Use cmbSDK for iOS

Perform the following steps to set up and start using cmbSDK:

1. Import the following package members, or just the classes you use:
 - Swift
 - Objective-C

```
import DataManFW
```



```
#import <DataManFW/DataManFW.h>
```

2. According to your needs:

- If you want to show partial camera preview, you need a **View** container, for example a **UIView**, otherwise if you want to use full screen preview (default) you don't need any additional containers. For example if we want to use partial view in our sample application add a **UIView** in the Main storyboard with the desired dimensions and constraints, and use it in reader device constructor (previewView parameter) when reader device is initialized.
- If you want to display the last scanned image, add a **UIImageView** for container instead of **UIView** for showing the last frame of a preview or scanning session.
- If you want to display the scanned result as a text, you need a **UILabel**.

3. Set up the following interfaces to monitor the connection state of the reader and receive information about the read code:

- Swift
- Objective-C

```
// MARK: OBSERVER METHODS

//-----
// When an applicaiton is suspended, the connection to the scanning device is
// automatically closed by iOS; thus when we are resumed (become active) we
// have to restore the connection (assuming we had one). This is the observer
// we will use to do this.
//-----

@objc func appBecameActive() {
    if readerDevice != nil && readerDevice.availability == CMBReaderAvailabilityAvailable && readerDevice.connectionState != CMBConnectionStateConnecting && readerDevice.connectionState != CMBConnectionStateConnected {
        readerDevice.connect(completion: { error in
            if error != nil {
                // handle connection error
            }
        })
    }
}

// MARK: VIEWCONTROLLER METHODS

override func viewDidLoad() {
    super.viewDidLoad()
    // Add our observer for when the app becomes active (to reconnect if necessary)
    NotificationCenter.default.addObserver(self, selector: #selector(self.appBecameActive), name: UIApplication.didBecomeActiveNotification, object: nil)
}
```

```

// MARK: MX Delegate methods

// This is called when a MX-1xxx device has become available (USB cable was plugged, or MX device was turned on),
// or when a MX-1xxx that was previously available has become unavailable (USB cable was unplugged, turned off due to inactivity or battery drained)
func availabilityDidChange(ofReader reader: CMBReaderDevice) {
    self.clearResult()

    if (reader.availability != CMBReaderAvailabilityAvailable) {
        showAlert(title: nil, message: "Device became unavailable")
    } else if (reader.availability == CMBReaderAvailabilityAvailable) {
        self.connectToReaderDevice()
    }
}

// This is called when a connection with the self.readerDevice has been changed.
// The self.readerDevice is usable only in the "CMBConnectionStateConnected" state
func connectionStateDidChange(ofReader reader: CMBReaderDevice) {
    self.isScanning = false
    self.clearResult()

    if self.readerDevice.connectionState == CMBConnectionStateConnected {
        // We just connected, so now configure the device how we want it
        self.configureReaderDevice()
    }

    self.updateUIByConnectionState()
}

// This is called after scanning has completed, either by detecting a barcode, canceling the scan by using the on-screen button or a hardware trigger button, or if the scanning timed-out
func didReceiveReadResult(fromReader reader: CMBReaderDevice, results readResults: CMBReadResults!) {
    self.isScanning = false
    self.btnScan.isSelected = false

    if (readResults.subReadResults != nil) && readResults.subReadResults.count > 0 {
        scanResults = readResults.subReadResults as! [CMBReadResult]
        self.tvResults.reloadData()
    } else if readResults.readResults.count > 0 {
        scanResults = [readResults.readResults.first as! CMBReadResult]
        self.tvResults.reloadData()
    }
}

```

```

#pragma mark OBSERVER METHODS

```

```

//-----
// When an applicaiton is suspended, the connection to the scanning device is
// automatically closed by iOS; thus when we are resumed (become active) we
// have to restore the connection (assuming we had one). This is the observer
// we will use to do this.
//-----
-(void)appBecameActive {

    if (self.readerDevice != nil &&
        self.readerDevice.availability == CMBReaderAvailabilityAvailable &&

```

```

        self.readerDevice.connectionState != CMBConnectionStateConnecting &&
        self.readerDevice.connectionState != CMBConnectionStateConnected)
    {
        [self.readerDevice connectWithCompletion:^(NSError *error) {
            if (error) {
                // handle connection error
            }
        }];
    }
}

#pragma mark VIEWCONTROLLER METHODS

-(void)viewDidLoad {
    [super viewDidLoad];

    // Add our observer for when the app becomes active (to reconnect if necessary)
    [[NSNotificationCenter defaultCenter] addObserver:self
                                             selector:@selector(appBecameActive)
                                             name:UIApplicationDidBecomeActiveNotification
                                             object:nil];
}

#pragma mark MX Delegate methods

// This is called when a MX-1xxx device has become available (USB cable was plugged, or MX device was turned on),
// or when a MX-1xxx that was previously available has become unavailable (USB cable was unplugged, turned off due to inactivity or battery drained)
- (void)availabilityDidChangeOfReader:(CMBReaderDevice *)reader
{
    [self clearResult];

    if (reader.availability != CMBReaderAvailabilityAvailable)
    {
        [self showAlertWithTitle:@"Device became unavailable" message:nil];
    }
    else if (self.readerDevice.availability == CMBReaderAvailabilityAvailable) {
        [self connectToReaderDevice];
    }
}

// This is called when a connection with the self.readerDevice has been changed.
// The self.readerDevice is usable only in the "CMBConnectionStateConnected" state
- (void)connectionStateDidChangeOfReader:(CMBReaderDevice *)reader
{
    self.isScanning = NO;
    [self clearResult];

    if (self.readerDevice.connectionState == CMBConnectionStateConnected){
        // We just connected, so now configure the device how we want it
        [self configureReaderDevice];
    }

    [self updateUIByConnectionState];
}

// This is called after scanning has completed, either by detecting a barcode, canceling the scan by using the on-screen button or a hardware trigger button, or if the scanning timed-out
- (void)didReceiveReadResultFromReader:(CMBReaderDevice *)reader results:(CMBReadResults *)readResults

```

```

{
    self.isScanning = false;
    [self.btnScan setSelected:self.isScanning];

    if (readResults.subReadResults && readResults.subReadResults.count > 0) {
        scanResults = readResults.subReadResults;
        [self.tvResults reloadData];
    } else if (readResults.readResults.count > 0){
        CMBReadResult *result = readResults.readResults.firstObject;
        scanResults = @[result];
        [self.tvResults reloadData];
    }
}

```

4. Instantiate a *CMBReaderDevice* object.

Using the MX Reader

Initializing the Reader Device for use with an MX mobile terminal like the MX-1000 or MX-1502 is easy: simply create the reader device using the MX device method (it requires no parameters), and set the appropriate delegate (normally self):

- [Swift](#)
- [Objective-C](#)

```

let readerDevice:CMBReaderDevice = CMBReaderDevice.readerOfMX()
readerDevice.delegate = self

```

```

CMBReaderDevice *readerDevice = [CMBReaderDevice readerOfMXDevice];
readerDevice.delegate = self;

```

The availability of the MX mobile terminal can change when the device turns ON or OFF, or if the lightning cable gets connected or disconnected. You can handle those changes using the following CMBReaderDeviceDelegate method.

- [Swift](#)
- [Objective-C](#)

```

func availabilityDidChange(ofReader reader: CMBReaderDevice)

```

```
- (void)availabilityDidChangeOfReader:(CMBReaderDevice *)reader
```

Using the Camera Reader or MX-100 Barcode Scanner

Barcode scanning with the built-in camera of the mobile device can be more complex than with an MX mobile terminal. The cmbSDK supports several configurations to provide the maximum flexibility. This includes support of optional, external aimers/illumination, as well as the ability to customize the appearance of the live-stream preview.

To scan barcodes using MX-100 or the built-in camera of the mobile device, initialize the CMBReaderDevice object using the readerOfDeviceCameraWithCameraMode static method. The camera reader has several options when initialized. The following parameters are required:

```
* CDMCameraMode  
* CDMPreviewOption  
* UIView
```

The *CameraMode* parameter is of the type CDMCameraMode (defined in **CDMDataManSystem.h**), and it accepts one of the following values:

- **kCDMCameraModeNoAimer**: This initializes the reader to use a live-stream preview (on the mobile device screen) so the user can position the barcode within the camera's field of view for detection and decoding. Use this mode when the mobile device does not have an aiming accessory.
- **kCDMCameraModePassiveAimer**: This initializes the reader to use a passive aimer, which is an accessory that is attached to the mobile device or a mobile device case that uses the built-in LED flash of the mobile device as a light source for projecting an aiming pattern. In this mode, no live-stream preview is presented on the device screen, since an aiming pattern will be projected.
- **kCDMCameraModeActiveAimer**: This initializes the reader to use an active aimer, such as the MX-100, which is an accessory that is attached to the mobile device or a mobile device case. The active aimer has a built in LEDs for projecting an aiming pattern, and for illumination, and are powered by a built in battery. In this mode, no live-stream preview is presented on the device screen, since an aiming pattern will be projected.
- **kCDMCameraModeFrontCamera**: This initializes the reader to use the front facing camera of the mobile device, if available (not all mobile devices have a front camera). This is an unusual, but possible configuration. Most front-facing cameras do not have auto focus and illumination, and provide significantly lower resolution images. This option should be used with care. In this mode, illumination is not

available.

All of the above modes provide the following default settings for the reader:

- The rear camera is used.
- The zoom feature is available and a button to control it is visible on the live-stream preview (if displayed).
- The simulated hardware trigger is disabled.
- When startScanning() is called, the decoding process is started. (Seek CDMPreviewOptionPaused for more details.)

Based on the selected mode, the following additional options and behaviors are set:

- **kCDMCameraModeNoAimer** (NoAimer)
 - The live-stream preview is displayed when the startScanning() method is called.
 - Illumination is available and a button to control it is visible on the live-stream preview.
 - If commands are sent to the reader for aimer control, they will be ignored.
- **kCDMCameraModePassiveAimer**(PassiveAimer)
 - The live-stream preview will not be displayed when the startScanning() method is called.
 - Illumination is not available and the live-stream preview will not have an illumination button.
 - If commands are sent to the reader for illumination control, they will be ignored, since it is assumed in this mode that the built-in LED of the mobile device is being used for the aimer.
- **kCDMCameraModeActiveAimer**(MX-100)
 - The live-stream preview will not be displayed when the startScanning() method is called.
 - Illumination is available and if a preview option for camera preview is used, the preview will have an illumination button.
 - If commands are sent to the reader for illumination or aimer control, they will be accepted.
- **kCDMCameraModeFrontCamera**(FrontCamera)
 - The live-stream preview is displayed when the startScanning() method is called.
 - The front camera is used.

- Illumination is not available, and the live-stream preview will not have an illumination button. o If commands are sent to the reader for aimer or illumination control, they will be ignored.

The `previewOptions` parameter (of type *CDMPreviewOption*, defined in **CDMDataManSystem.h**) is used to change the reader's default values or override defaults derived from the selected *CameraMode*. Multiple options can be specified by OR-ing them when passing the parameter. The available options are the following:

- **kCDMPreviewOptionDefaults**: Use this option to accept all defaults set by the *CameraMode*.
- **kCDMPreviewOptionNoZoomBtn**: This option hides the zoom button on the live-stream preview, preventing a user from adjusting the zoom of the mobile device camera.
- **kCDMPreviewOptionNoIllumBtn**: This hides the illumination button on the live-stream preview, preventing a user from toggling the illumination.
- **kCDMPreviewOptionHwTrigger**: This enables a simulated hardware trigger (the volume button) for starting scanning on the mobile device. This button only starts scanning when pressed. It does not need to be held like a more traditional purpose-built scanner's trigger. Pressing the button a second time does not stop the scanning process.
- **kCDMPreviewOptionPaused**: If using a live-stream preview, when this option is set, the preview will be displayed when the `startScanning()` method is called, but the reader will not start decoding (i.e. looking for barcodes) until the user presses the on-screen scanning button to actually start the scanning process.
- **kCDMPreviewOptionAlwaysShow**: This forces alive-stream preview to be displayed, even if an aiming mode has been selected (e.g. *CameraMode == kCDMCameraModePassiveAimer*)
- **kCDMPreviewOptionPessimisticCaching**: Used only when *CameraMode == kCDMCameraModeActiveAimer*, this will read the settings from the *ActiveAimer* when the app resumes from background, in case the aimer settings were changed from another app.
- **kCDMPreviewOptionHighResolution**: This will use the device camera in higher resolution. The default resolution is 1280x720. With this option is enabled, the resolution will be 1920x1080 on devices that support it, and the default one on devices that do not. This can help with scanning small barcodes, but will increase the decoding time since there is a lot more data to process in each frame.
- **kCDMPreviewOptionHighFrameRate**: This will use the device camera in 60 FPS instead of the default 30, and provide a much smoother camera preview.

The last parameter of type *UIView* is optional and is used as a container for the camera preview. If the parameter is left nil, a full screen preview will be used.

Examples:

Create a reader with no aimer and a full screen live-stream preview:

- [Swift](#)
- [Objective-C](#)

```
let readerDevice:CMBReaderDevice = CMBReaderDevice.readerOfDeviceCamera(with: CDMCameraMode.noAimer,
    previewOptions:CDMPreviewOption.init(rawValue: 0), previewView:nil)
readerDevice.delegate = self
```

```
CMBReaderDevice *readerDevice = [CMBReaderDevice readerOfDeviceCameraWithCameraMode:kCDMCameraModeNo
Aimer previewOptions:kCDMPreviewOptionDefaults previewView:nil];
readerDevice.delegate = self;
```

Create a reader with no aimer, no zoom button, and using a simulated trigger:

- [Swift](#)
- [Objective-C](#)

```
let readerDevice:CMBReaderDevice = CMBReaderDevice.readerOfDeviceCamera(with: CDMCameraMode.noAimer,
    previewOptions:[CDMPreviewOption.noZoomBtn, CDMPreviewOption.hwTrigger], previewView:nil)
readerDevice.delegate = self
```

```
CMBReaderDevice *readerDevice = [CMBReaderDevice readerOfDeviceCameraWithCameraMode:kCDMCameraModeNo
Aimer previewOptions:(kCDMPreviewOptionNoZoomBtn | kCDMPreviewOptionHwTrigger) previewView:nil];
readerDevice.delegate = self;
```

Connecting to the Device

After initializing the Reader Device and setting a delegate to handle responses from the reader, you are ready to connect using `connectWithCompletion`:

- [Swift](#)
- [Objective-C](#)

```
// Make sure the device is turned ON and ready
if self.readerDevice.availability == CMBReaderAvailibilityAvailable {
    // create the connection between the readerDevice object and device
    self.readerDevice.connect(completion: { (error:Error?) in
```



```

        if error != nil {
            // handle connection error
        }
    })
}

```

```

// Make sure the device is turned ON and ready
if (readerDevice.availability == CMBReaderAvailabilityAvailable) {
    // create the connection between the readerDevice object and device
    [readerDevice connectWithCompletion:^(NSError *error) {
        if (error) {
            // handle connection error
        }
    }];
}

```

If everything was done correctly, *connectionStateDidChangeOfReader* in the delegate will be called, where you can check the connection status in your Reader Device's *connectionState* parameter. It should be *CMBConnectionStateConnected*, which means that you have successfully made the connection to the Reader Device, and can begin using the Cognex Mobile Barcode SDK.

Configuring the Reader Device

After connecting to the scanning device, you may want (or need) to change some of its settings. The *cmbSDK* provides a set of high-level, device independent APIs for setting and retrieving the current configuration of the device.

Like in the case of initializing the Reader Device, there are some differences between using an MX reader and the camera reader for scanning. These differences are detailed in the following sections.

MX Mobile Terminals

The MX family of mobile terminals provides sophisticated device configuration and management, including saved configurations on the device itself. In general, these devices come from Cognex preconfigured for an exceptional out-of-the-box experience with most symbologies and features ready to use.

When custom reconfiguration is desired, this is typically done using either the DataMan Setup Tool, or the Cognex Quick Setup as these tools can be used to distribute saved configurations easily to multiple devices, thereby greatly simplifying configuration management.

However, it is still possible (and sometimes desirable) for the mobile application itself to configure the MX device:

- You can have multiple scanning applications, each of which requires a different set of device settings.
- You may simply want to guarantee that the certain options are in a “known” state and not rely on the fact that the device has been pre-configured correctly.

Built-in Camera

Much like an MX mobile terminal, the cmbSDK employs a default set of options for barcode reading with the built-in camera of the mobile device, providing a good out-of-box experience. However, there are two important differences to keep in mind:

- The cmbSDK does not implement saved configurations for the camera reader. This means that every time an application that uses the camera reader starts, it starts with its defaults.
- The cmbSDK does not enable any symbologies by default: you as the application programmer must enable all barcode symbologies your application needs to scan. By requiring the application program to explicitly enable only the symbologies it needs, the most optimal scanning performance can be achieved.

MX-100

MX-100 is a device-case attachment that provides additional functionalities to the built-in camera, like aiming and better illumination control. Being a hybrid of an MX device and a built in scanner, it has it's own settings for aimer intensity, illumination intensity and aimer modulation stored on the device itself, and the rest of the settings, like symbologies, stored in the cmbSDK.

Here are a few things to keep in mind when using an MX-100 device:

- By default, MX-100 does not require a license to work with the device camera, but one can be generated for tracking purposes, free of charge.
- MX-100 comes pre-configured for a better out-of-the-box experience, and the cmbSDK has the following symbologies enabled by default:
 - Code 39
 - Code 128
 - Databar
 - PDF417
 - QR
 - UPC/EAN
- cmbSDK is extended with a cache mechanism to strengthen optical communication with MX-100. The cache stores all MX-100 settings and it is transparent and available in cmbSDK. Initializing and updating of the cache is the responsibility of cmbSDK itself. Different settings are stored in different cache:

- *Persistent cache*: These are settings/values that do not change very often (if at all) and SDK can cache on the iPhone for an extended period of time. These items are the MX-100 Serial number, model number and firmware version. The persistent cache is updated in every 7 days.
- *Session cache*: These are settings/values that may change while an application is using an MX-100 (though not likely), but should be read from the MX-100 at least on SDK load/initial connection to the MX-100. These items are: Aimer intensity, Aimer modulation, Aimer timeout, Illumination intensity, Illumination state. When the SDK initially connects to an MX-100, these values are read from the MX-100. By default, the session cache will be maintained optimistically for the best performance. By this, we mean that the SDK will assume that another application is not changing the settings of the aimer (SDK only needs to read the aimer's settings one time, when the initial connection is established). If this happens, the cache may become out of sync with the aimer (e.g. another app on the same device changes a setting on the aimer). cmbSDK gives the possibility to handle the session cache *pessimistically* which means that above written aimer's configuration is loaded again each time when application is resumed. This behavior is accomplished by adding an additional option flag to the camera connector: **kCDMPreviewOptionPessimisticCaching**.

Enabling Symbologies

Individual symbologies can be enabled using the following method of the Reader Device object:

```
-(void) setSymbology:(CMBSymbology)symbology
enabled:(bool)enabled
completion:(void (^)(NSError *error))completionBlock;
```

All symbologies used for the symbology parameter in this method can be found in CMBReaderDevice.h.

Examples

- Swift
- Objective-C

```
self.readerDevice.setSymbology(CMBSymbologyQR, enabled: true, completion: {(_ error: Error?) -> Void
in
    if error != nil {
        // Failed to enable that symbology, Possible causes are: reader disconnected, out of battery
        or cable unplugged, or symbology not supported by the current readerDevice
    }
}))
```

```
[readerDevice setSymbology:CMBSymbologyQR enabled:YES completion:^(NSError *error){
    if (error) {
        // Failed to enable that symbology, Possible causes are: reader disconnected, out of battery
        or cable unplugged, or symbology not supported by the current readerDevice
    }
}];
```

The same method can also be used to turn symbologies off:

- Swift
- Objective-C

```
self.readerDevice.setSymbology(CMBSymbologyUpcEan, enabled: false, completion: {(_ error: Error?) ->
Void in
    if error != nil {
        // Failed to enable that symbology, Possible causes are: reader disconnected, out of battery
        or cable unplugged, or symbology not supported by the current readerDevice
    }
})
```

```
[readerDevice setSymbology:CMBSymbologyUpcEan enabled:NO completion:^(NSError *error){
    if (error) {
        // Failed to enable that symbology, Possible causes are: reader disconnected, out of battery
        or cable unplugged, or symbology not supported by the current readerDevice
    }
}];
```

Illumination Control

If your reader device is equipped with illumination lights (e.g. LEDs), you can control whether they are ON or OFF when scanning starts using the following method of your Reader Device object:

- Swift
- Objective-C

```
self.readerDevice.setLightsON(true) { (error:Error?) in
    if error != nil {
        // Failed to enable illumination, Possible causes are: reader disconnected, out of battery o
        r cable unplugged, or device doesn't come with illumination lights
    }
}
```

```
}
```

```
[readerDevice setLightsON:YES completion:^(NSError *error) {  
    if (error) {  
        // Failed to enable illumination, Possible causes are: reader disconnected, out of battery o  
r cable unplugged, or device doesn't come with illumination lights  
    }  
}];
```

Keep in mind that not all devices and device modes supported by the cmbSDK allow for illumination control. For example, if using the built-in camera in passive aimer mode, illumination is not available since the LED is being used for aiming.

Camera Zoom Settings

If built-in camera is used as reader device you have the possibility to configure zoom levels and define the way these zoom levels are used.

There are 3 zoom levels for the phone camera, which are:

- normal: not zoomed (100%)
- level 1 zoom (default 200% on iOS)
- level 2 zoom (default 400% on iOS)

You can define these zoom levels with "SET CAMERA.ZOOM-PERCENT [100-MAX] [100-MAX]" command. It configures how far the two levels will zoom in percentage. 100 is without zoom, and MAX (goes up to 1000) will zoom as far as the device is capable of. First argument is used for setting level 1 zoom, and the second for level 2 zoom.

When you want to check current setting, you can do this with the "GET CAMERA.ZOOM-PERCENT" that returns two values: level 1 and level 2 zoom.

Example

- Swift
- Objective-C

```
readerDevice.dataManSystem()?.sendCommand("SET CAMERA.ZOOM-PERCENT 250 500")
```

```
[readerDevice.dataManSystem sendCommand:@"SET CAMERA.ZOOM-PERCENT 250 500"];
```

Note: Camera needs to be started within SDK at least once to have a valid maximum zoom level. It means that if you set the zoom level to 1000 and the device can go up to 600 only, "GET CAMERA.ZOOM-PERCENT" command returns 1000 as long as camera is not opened (e.g. with [readerDevice startScanning];), but it returns 600 afterwards.

here is another command that sets which zoom level you want to use or returns the actual setting: "GET/SET CAMERA.ZOOM 0-2".

Possible values for the SET command are:

- 0 - normal (un-zoomed)
- 1 - zoom at level 1
- 2 - zoom at level 2

You can call this command before scanning or even during scanning, the zoom goes up to the level that was configured.

If the scanning is finished, the values is reset to normal behavior (0).

Example

- Swift
- Objective-C

```
readerDevice.dataManSystem()?.sendCommand("SET CAMERA.ZOOM 2")
```

```
[readerDevice.dataManSystem sendCommand:@"SET CAMERA.ZOOM 2"];
```

Camera Overlay Customization

When using the Mobile Camera, cmbSDK allows you to see the Camera Preview inside a preview container or in full screen. This preview also contains an overlay, which can be customized in many ways. The cmbSDK camera overlay is built from buttons for zoom, flash and closing the scanner (in full screen), a progress bar indicating the scan timeout, and lines on the corners of the camera preview.

To use the legacy camera overlay, which was used in the cmbSDK v2.0.x and the ManateeWorks SDK, use this property from MWOverlay before initializing the readerDevice:

- [Swift](#)
- [Objective-C](#)

```
MWOverlay.setOverlayMode(Int32(OM_LEGACY.rawValue))
```

```
[MWOverlay setOverlayMode:OM_LEGACY];
```

The LEGACY overlay has limited customizability, so it is preferred to use the CMB overlay.

When using the CMB overlay, you can copy the layout files found in the Resources/layout directory into your project and modify them as you like. The files are:

CMBScannerPartialView.xib used when the scanner is started inside a container (partial view), and **CMBScannerView.xib** when the scanner is started in full screen. After copying the layout that you need, or both layouts, you can modify them, for example by changing the sizes, positions or color of the views, removing views and even add your own views, like an overlay image. The views that are used by the cmbSDK (zoom, flash, close buttons, the view used for drawing lines on the corners, and the progress bar) are accessed by the sdk using the *Tag* attribute, so while you can change everything about those views, make sure the *Tag* attribute remains unchanged, otherwise the cmbSDK will not be able to recognize those views and continue to function as if those views were removed.

Both the CMB and the LEGACY overlay allow you to change the images used on the zoom and flash buttons. To do that, first copy the assets folder

MWBScannerImages.xcassets from the Resources dir into your project. In XCode you can look at the images contained in this assets folder, and replace them with your own while keeping the image names unchanged.

Both the CMB and the LEGACY overlay allow you to change the color and width of the rectangle that is displayed when a barcode is detected. Here's an example on how to do that:

- [Swift](#)
- [Objective-C](#)

```
MWOverlay.setLocationLineUIColor(UIColor.yellow)
MWOverlay.setLocationLineWidth(5)
```

```
[MWOverlay setLocationLineUIColor:UIColor.yellowColor];
[MWOverlay setLocationLineWidth:5];
```

Target Decoding

In scenario when you have a lot of barcodes on small surface, very close one to another there is new feature available from cmbSDK v.2.2.0 called **Target (centered) decoding**. There is 3 DMCC's that are used to configure this mode. Use them after valid connection to reader device:

- (GET|SET) DECODER.TARGET-DECODING [ON|OFF]
- (GET|SET) DECODER.CENTERING-WINDOW [0-100] [0-100] [1-100] [1-100]
- (GET|SET) DECODER.DISPLAY-TARGET [ON|OFF]

GET/SET DECODER.TARGET-DECODING command is used to enable or disable target decoding. **By default OFF.**

Example

- [Swift](#)
- [Objective-C](#)

```
self.readerDevice.dataManSystem().sendCommand("SET DECODER.TARGET-DECODING ON")
```

```
[self.readerDevice.dataManSystem sendCommand:@"SET DECODER.TARGET-DECODING ON"];
```

DECODER.CENTERING-WINDOW command is used to set (or get) the size of the centering window. The numbers are in percent of the image. centerX and centerY defines where the middle of the centering window should be in the image. sizeX and sizeY define the size of the centering window.

If a barcode touches the centering window it is accepted. The barcode doesn't have to be contained in the window, but just touch it. **By default [50 50 10 10].**

Example

- [Swift](#)
- [Objective-C](#)

```
self.readerDevice.dataManSystem().sendCommand("SET DECODER.CENTERING-WINDOW 50 50 5 5")
```



```
[self.readerDevice.dataManSystem sendCommand:@"SET DECODER.CENTERING-WINDOW 50 50 5 5"];
```

DECODER.DISPLAY-TARGET command is used to set (or get) if the centering window should be shown on the SVG result. **By default OFF**

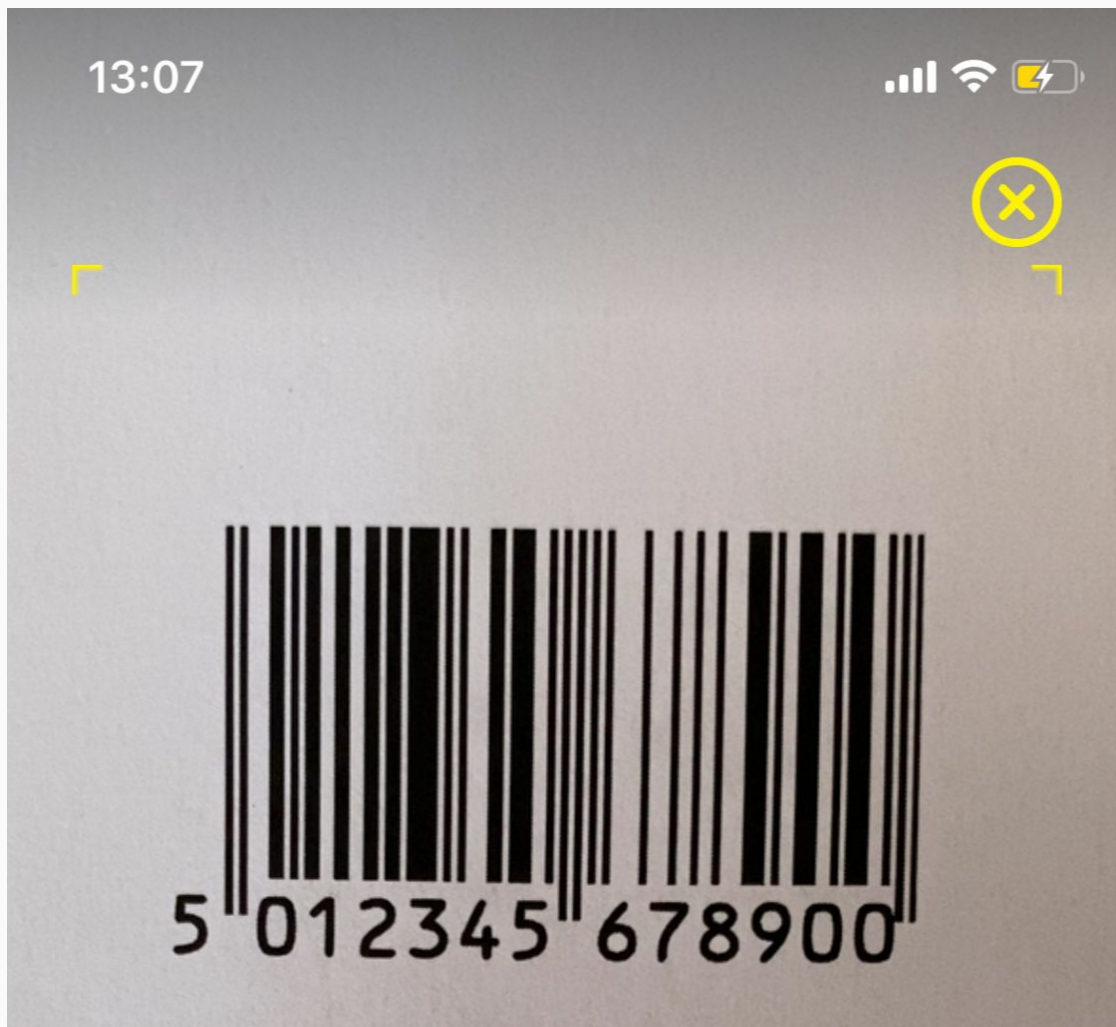
Example

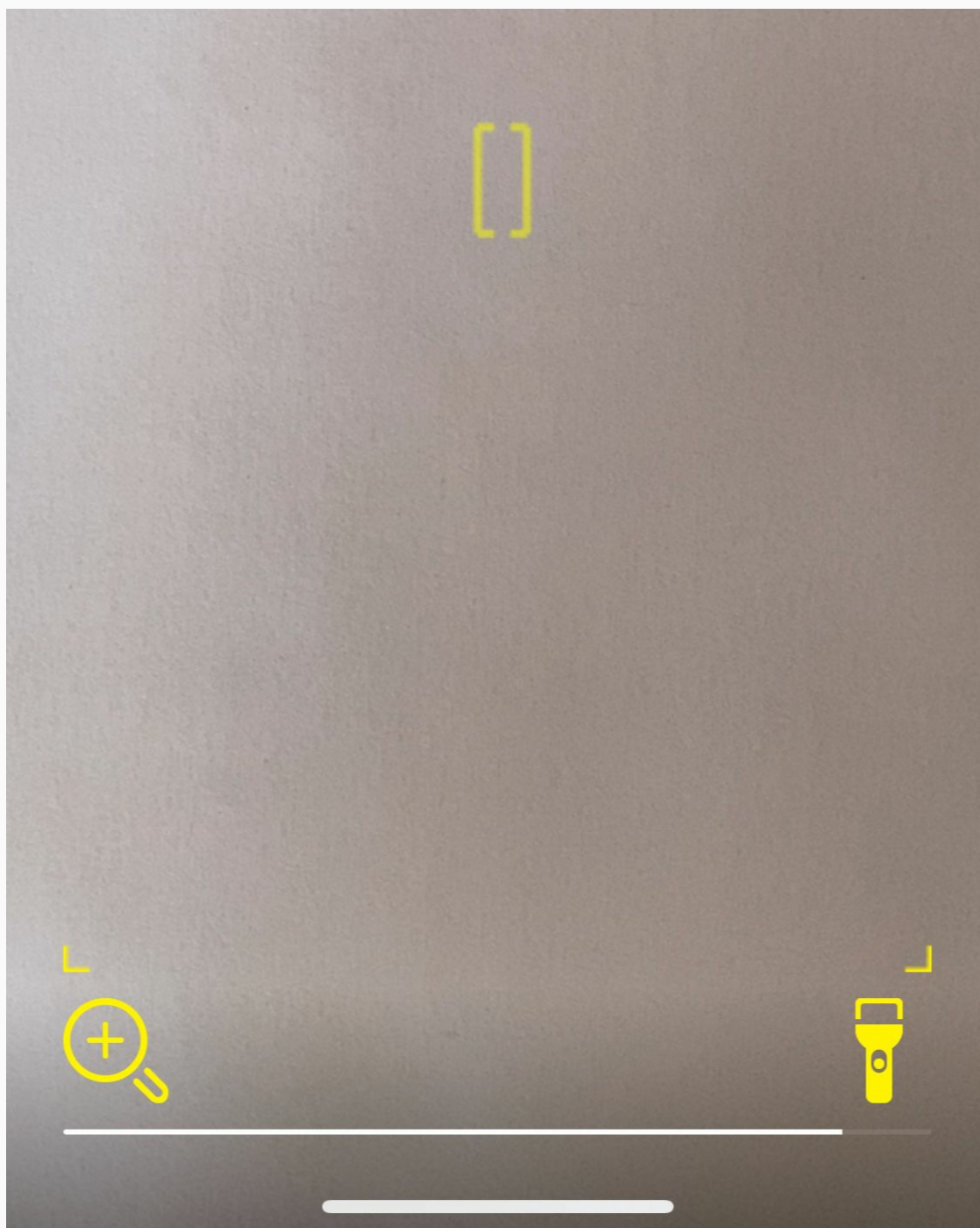
- [Swift](#)
- [Objective-C](#)

```
self.readerDevice.dataManSystem().sendCommand("SET DECODER.DISPLAY-TARGET ON")
```

```
[self.readerDevice.dataManSystem sendCommand:@"SET DECODER.DISPLAY-TARGET ON"];
```

Here is example of scanning preview when target decoding is enabled:





Centering window (rectangle) color and width can be changed with:

- Swift
- Objective-C

```
MWOverlay.setTargetRectLineUIColor(UIColor.red)
MWOverlay.setTargetRectLineWidth(2)
```

```
[MWOverlay setTargetRectLineUIColor:[UIColor redColor]];
[MWOverlay setTargetRectLineWidth:2];
```

Multicode

If you want to scan more barcodes at once and in one scanning session you can use **Multi code mode**. This mode is available from cbmSDK v.2.2.x. To configure this mode 4 DMCC's are used. Use them after valid connection to reader device:

- (GET|SET) MULTICODE.NUM-CODES [1-255]
- (GET|SET) MULTICODE.PARTIAL-RESULTS [ON|OFF]
- (GET|SET) DECODER.REREAD-NOT-LAST-N [0-100]
- (GET|SET) MULTICODE.MAX-NUM-CODES [1-5] [1-255]

GET/SET MULTICODE.NUM-CODES command is used to set number of codes reader must find for a successful read result. **By default 1.**

Example

- [Swift](#)
- [Objective-C](#)

```
self.readerDevice.dataManSystem().sendCommand("SET MULTICODE.NUM-CODES 3")
```

```
[self.readerDevice.dataManSystem sendCommand:@"SET MULTICODE.NUM-CODES 3"];
```

GET/SET MULTICODE.PARTIAL-RESULTS command is used to set how the reader interprets the number of codes to find. ON = reader will return a successful read if 1 or more codes are found. OFF = reader will return a successful read only if number of codes found equals MULTICODE.NUM-CODES value. **By default OFF.**

Example

- [Swift](#)
- [Objective-C](#)

```
self.readerDevice.dataManSystem().sendCommand("SET MULTICODE.PARTIAL-RESULTS ON")
```

```
[self.readerDevice.dataManSystem sendCommand:@"SET MULTICODE.PARTIAL-RESULTS ON"];
```

GET/SET DECODER.REREAD-NOT-LAST-N command is used to define N, do not read code if this code was read within the last N reads. **By default 0, no restriction.**

Example

- [Swift](#)
- [Objective-C](#)

```
self.readerDevice.dataManSystem().sendCommand("SET DECODER.REREAD-NOT-LAST-N 1")
```

```
[self.readerDevice.dataManSystem sendCommand:@"SET DECODER.REREAD-NOT-LAST-N 1"];
```

GET/SET MULTICODE.MAX-NUM-CODES command is used to set expected maximum number of codes to find for each symbology grouping 1 - 5:

1. DataMatrix
2. QR Code/MaxiCode/AztecCode
3. Linear/ Postal/ Stacked
4. VeriCode
5. DotCode

No expected value for any single symbology can exceed parameter MULTICODE.NUM-CODES, the total number of codes to find. 1st param is symbology group, secont one is max num of codes. **By default 1 for all.**

Example

- [Swift](#)
- [Objective-C](#)

```
self.readerDevice.dataManSystem().sendCommand("SET MULTICODE.MAX-NUM-CODES 1 3")
```

```
[self.readerDevice.dataManSystem sendCommand:@"SET MULTICODE.MAX-NUM-CODES 1 3"];
```

When multi code mode is enabled, in the **didReceiveReadResultFromReader:(CMBReaderDevice *)reader results:(CMBReadResults *)readResults** delegate method from the CMBReaderDeviceDelegate delegate, you can get list of all results from the **readResults.subReadResults** property of the CMBReadResults object. If multi code mode is disabled this property will be nil.

Parsers

Starting from v.2.2.x we add parsers plugin in cmbSDK. Parsers help us to extract decoded results into a structured format (JSON, Key-Value) for search, sort, and validation. There are six types of parsers:

1. CMBResultParserAAMVA
2. CMBResultParserGS1
3. CMBResultParserHIBC
4. CMBResultParserISBT128
5. CMBResultParserIUID
6. CMBResultParserSCM

Also there is option to use CMBResultParserAuto parser type in our SDK and we will try to find which one should be used.

Use the **parser** property from the CMBReaderDevice object to set parser type that you want to use, or to get selected type. Set parser type after valid connection to reader device. **CMBResultParserNone by default.**

Example

- [Swift](#)
- [Objective-C](#)

```
self.readerDevice.parser = CMBResultParserAAMVA
```

```
self.readerDevice.parser = CMBResultParserAAMVA;
```

After you enable the needed parser type, in the **didReceiveReadResultFromReader:**

(CMBReaderDevice *)reader results:(CMBReadResults *)readResults delegate method from the CMBReaderDeviceDelegate delegate you can get the structured format from the received result:

- [Swift](#)
- [Objective-C](#)

```
let results:[CMBReadResult] = readResults?.readResults as? [CMBReadResult] ?? []
//Returns parsed text in json format from the result
let parsedJSON = results.first?.parsedJSON
//Returns parsed text from the result
let parsedText = results.first?.parsedText
```

```
NSArray<CMBReadResult*>* results = readResults.readResults;
//Returns parsed text in json format from the result
NSString* parsedJSON = [[results firstObject] parsedJSON];
//Returns parsed text from the result
NSString* parsedText = [[results firstObject] parsedText];
```

ROI (region of interest)

If you want to edit/resize region of interest for your scanning process while you are using phone camera as reader device you can use (GET|SET) DECODER.ROI-PERCENT [X W Y H] DMC command (available from cmbSDK v2.2.x), where X and Y represent the starting point of the ROI in each axis, and W H represent the ROI width and height starting from the starting point, with values in **percentages**. The range of 0-100 is checked, as well as minimum values of 5 for width and height, and the constraints implied between args, such as the total sum for a given axis to be no more than 100. Use this DMCC after valid connection to reader device.

Example

- [Swift](#)
- [Objective-C](#)

```
self.readerDevice.dataManSystem().sendCommand("SET DECODER.ROI-PERCENT 10 80 10 80")
```

```
[self.readerDevice.dataManSystem sendCommand:@"SET DECODER.ROI-PERCENT 10 80 10 80"];
```

Advanced Configuration

Every Cognex scanning device implements DataMan Control Commands (DMCC), a method for configuring and controlling the device. Virtually every feature of the device can be controlled using this text based language. The API provides a method for sending DMCC commands to the device. Commands exist both for setting and querying configuration properties.

Appendix A includes the complete DMCC reference for use with the camera reader. DMCC commands for other supported devices (e.g. the MX-1000) are included with the documentation of that particular device.

Appendix B provides the default values for the camera reader's configuration settings as related to the corresponding DMCC setting.

The following examples show different DMCC commands being sent to the device for more advanced configuration. Change the scan direction to omnidirectional:

- [Swift](#)
- [Objective-C](#)

```
self.readerDevice.dataManSystem()?.sendCommand("SET DECODER.1D-SYMBOLORIENTATION 0", withCallback: {
    (response:CDMResponse?) in
        if response?.status == DMCC_STATUS_NO_ERROR {
            // Command was executed successfully
        } else {
            // Command failed, handle errors here
        }
    })
})
```

```
[readerDevice.dataManSystem sendCommand:@"SET DECODER.1D-SYMBOLORIENTATION 0" withCallback:^(CDMResponse *response){
    if (response.status == DMCC_STATUS_NO_ERROR) {
        // Command was executed successfully
    } else {
        // Command failed, handle errors here
    }
}];
```

Change the scanning timeout of the live-stream preview to 10 seconds:

- [Swift](#)
- [Objective-C](#)

```

self.readerDevice.dataManSystem()?.sendCommand("SET DECODER.MAX-SCAN-TIMEOUT 10", withCallback: { (response:CDMResponse?) in
    if response?.status == DMCC_STATUS_NO_ERROR {
        // Command was executed successfully
    } else {
        // Command failed, handle errors here
    }
})

```

```

[readerDevice.dataManSystem sendCommand:@"SET DECODER.MAX-SCAN-TIMEOUT 10" withCallback:^(CDMResponse *response){
    if (response.status == DMCC_STATUS_NO_ERROR) {
        // Command was executed successfully
    } else {
        // Command failed, handle errors here
    }
}];

```

Get the type of the connected device:

- Swift
- Objective-C

```

self.readerDevice.dataManSystem()?.sendCommand("GET DEVICE.TYPE", withCallback: { (response:CDMResponse?) in
    if response?.status == DMCC_STATUS_NO_ERROR {
        // Command was executed successfully
        let deviceType:String = response?.payload
    } else {
        // Command failed, handle errors here
    }
})

```

```

[readerDevice.dataManSystem sendCommand:@"GET DEVICE.TYPE" withCallback:^(CDMResponse *response){
    if (response.status == DMCC_STATUS_NO_ERROR) {
        // Command was executed successfully
        NSString *deviceType = response.payload;
    } else {
        // Command failed, handle errors here
    }
}];

```

Resetting the Configuration

The cmbSDK includes a method for resetting the device to its default settings. In the case of an MX mobile terminal, this is the configuration saved by default (not the factory defaults), while in the case of the built-in camera, these are the defaults identified in **Appendix B**, where no symbologies will be enabled. This method is the following:

- Swift
- Objective-C

```
self.readerDevice.resetConfig { (error:Error?) in
    if error != nil {
        // Failed to reset configuration, Possible causes are: reader disconnected, out of battery o
r cable unplugged
    }
}
```

```
[readerDevice resetConfigWithCompletion:^(NSError *error) {
    if (error) {
        // Failed to reset configuration, Possible causes are: reader disconnected, out of battery o
r cable unplugged
    }
}];
```

Scanning Barcodes

With a properly configured reader, you are now ready to scan barcodes. This is simply accomplished by calling the *startScanning()* method from your Reader Device object. What happens next is based on the type of Reader Device and how it has been configured, but in general:

- If using an MXreader, the user can now press a trigger button on the device to turn the scanner on and read a barcode.
- If using the camera reader, the cmbSDK starts the camera, displays the configured live-stream preview, and begins analyzing the frames from the video stream, looking for a configured barcode symbology.

Scanning stops under one of the following conditions:

- The reader found and decoded a barcode.
- The user released the trigger or pressed the stop button on the live-stream preview screen.
- The camera reader timed out without finding a barcode.
- The application program itself calls the *stopScanning()* method.

When a barcode is decoded successfully (the first case), you will receive a `CMBReadResults` array in your Reader Device's delegate using the following `CMBReaderDeviceDelegate` method:

- [Swift](#)
- [Objective-C](#)

```
func didReceiveReadResult(fromReader reader: CMBReaderDevice, results readResults: CMBReadResults!)
```

```
- (void)didReceiveReadResultFromReader:(CMBReaderDevice *)reader results:(CMBReadResults *)readResults;
```

The following is an example to simply display a `ReadResult` after scanning a barcode:

- [Swift](#)
- [Objective-C](#)

```
func didReceiveReadResult(fromReader reader: CMBReaderDevice, results readResults: CMBReadResults!)
{
    if readResults.readResults.count > 0 {
        let readResult:CMBReadResult = readResults.readResults?.first as! CMBReadResult
        if readResult.image != nil {
            self.ivPreview.image = readResult.image
        }
        if readResult.readString != nil {
            self.lblCode.text = readResult.readString
        }
    }
}
```

```
- (void)didReceiveReadResultFromReader:(CMBReaderDevice *)reader results:(CMBReadResults *)readResults {
    if (readResults.readResults.count > 0) {
        CMBReadResult *readResult = readResults.readResults.firstObject;
        if (readResult.image) {
            self.ivPreview.image = readResult.image;
        }
        if (readResult.readString) {
            self.lblCode.text = readResult.readString;
        }
    }
}
```

In the example above, `ivPreview` is an `UIImageView` used to display an image of the

barcode that was scanned, and *lblCode* is a UILabel used to show the result from the barcode. You can also use the BOOL from *readResult.goodRead* to check whether the scan was successful or not.

Working with Results

When a barcode is successfully read, a *CMBReadResult* object is created and returned by the *didReceiveReadResultFromReader:results:* method. In case of having multiple barcodes successfully read on a single image/frame, multiple *CMBReadResult* objects are returned. This is why the *CMBReadResults* class has an array of *CMBReadResult* objects containing all results.

The *CMBReadResult* class has properties describing the result of a barcode read:

- **goodRead** (BOOL): tells whether the read was successful or not
- **readString** (NSString): the decoded barcode as a string
- **image** (UIImage): the image/frame that the decoder has processed
- **imageGraphics** (NSData): the boundary path of the barcode as SVG data
- **XML** (NSData): the raw XML that the decoder returned
- **symbology** (CMBSymbology): the symbology type of the barcode. This enum is defined in **CMBReaderDevice.h**.

When a scanning ends with no successful read, a *CMBReadResult* is returned with the *goodRead* property set to false. This usually happens when scanning is canceled or timed out.

To enable the *image* and *imageGraphics* properties being filled in the *CMBReadResult* object, you have to set the corresponding *imageResultEnabled* and/or *SVGResultEnabled* properties of the *CMBReaderDevice* object.

To see an example on how the image and SVG graphics are used and displayed in parallel, refer to the sample applications provided in the SDK package.

To access the raw bytes from the scanned barcode, you can use the XML property. The bytes are stored as a Base64 String under the "full_string" tag. Here's an example how you can use the iOS XML parser to extract the raw bytes from the XML property.

Parsing the XML and extracting the Base64 String is done using the XMLParserDelegate delegate. Add this delegate and the following methods from it in your ViewController:

- Swift
- Objective-C

```
// XMLParserDelegate
var currentElement = ""
var base64String = ""
func parser(_ parser: XMLParser, didStartElement elementName: String, namespaceURI: String?, qualifi
```

```

edName qName: String?, attributes attributeDict: [String : String] = [:]) {
    currentElement = elementName
}

func parser(_ parser: XMLParser, foundCharacters string: String) {
    if currentElement == "full_string" {
        base64String = string
    }
}

```

```

#pragma NSXMLParserDelegate
NSString *currentElement;
NSString *base64String;
- (void)parser:(NSXMLParser *)parser didStartElement:(NSString *)elementName namespaceURI:(NSString *)namespaceURI qualifiedName:(NSString *)qName attributes:(NSDictionary<NSString *, NSString *> *)attributeDict {
    currentElement = elementName;
}

- (void)parser:(NSXMLParser *)parser foundCharacters:(NSString *)string {
    if ([currentElement isEqualToString:@"full_string"]) {
        base64String = string;
    }
}

```

After you have set the XMLParserDelegate to extract the base64 string from the XML result, you need to create a XMLParser object and parse the result.xml using this delegate. This can be done when receiving the scan result in the CMBReaderDeviceDelegate, or when accessing a CMBReadResult object. Here's how you can get the raw bytes using the delegate that you created earlier:

- Swift
- Objective-C

```

let xmlParser:XMLParser = XMLParser.init(data: result.xml)
xmlParser.delegate = self
if xmlParser.parse() {
    // Access the raw bytes via this variable
    let bytes:Data? = Data.init(base64Encoded: base64String)
}

```

```

NSXMLParser *xmlParser = [NSXMLParser.alloc initWithData:result.XML];
xmlParser.delegate = self;
if ([xmlParser parse]) {
    // Access the raw bytes via this variable
    NSData *bytes = [NSData.alloc initWithBase64EncodedString:base64String options:0];
}

```

Image Results

By default, the image and SVG results are disabled, which means that when scanning, the CMBReadResults will not contain any data in the corresponding properties.

Not all supported devices provide SVG graphics.

To enable image results, set the `imageResultEnabled` property from the `CMBReaderDevice` class by using the following method:

- [Swift](#)
- [Objective-C](#)

```
self.readerDevice.imageResultEnabled = true
```

```
[readerDevice setImageResultEnabled:YES];
```

To enable SVG results, set the `imageResultEnabled` property from the `CMBReaderDevice` class by using the following method:

- [Swift](#)
- [Objective-C](#)

```
self.readerDevice.svgResultEnabled = true
```

```
[readerDevice setSVGResultEnabled:YES];
```

Handling Disconnects

1. Disconnects:

There may be cases when a device disconnects due to low battery condition or manual cable disconnection. These cases can be detected by the `connectionStateDidChangeOfReader` callback of the *CMBReaderDeviceDelegate*.

Note: The [availabilityDidChangeOfReader](#) method is also called when the device becomes physically unavailable. It means that the (re)connection is not possible. Always check the `availability` property of the *CMBReaderDevice* object before trying to call the [connectWithCompletion](#) method.

2. Re-Connection:

After you return to your application from inactive state, the reader device remains initialized, but not connected. This means there is no need for reinitializing the SDK, but you will need to re-connect.

Some iOS versions will send a "Availability" notification when resuming the application that the External Accessory is available. You can use this in the *CMBReaderDeviceDelegate*'s method: `(void)availabilityDidChangeOfReader:(CMBReaderDevice *)reader`. In it, when the reader becomes available, you can connect to it.

For example:

- [Swift](#)
- [Objective-C](#)

```
func availabilityDidChange(ofReader reader: CMBReaderDevice) {
    if (reader.availability == CMBReaderAvailabilityAvailable) {
        readerDevice.connect(completion: { error in
            if error != nil {
                // handle connection error
            }
        })
    }
}
```

```
- (void)availabilityDidChangeOfReader:(CMBReaderDevice *)reader {
    if (readerDevice.availability == CMBReaderAvailabilityAvailable) {
        [readerDevice connectWithCompletion:^(NSError *error) {
            if (error) {
                // handle connection error
            }
        }];
    }
}
```

```
}
```

Some iOS versions do not report availability change on resume, so you will have to handle this manually. For this, you will have to add an observer for "UIApplicationDidBecomeActiveNotification" and do some checks before connecting, so you don't connect while the reader is already in "connecting" or "connected" state. For example:

- Swift
- Objective-C

```
override func viewDidLoad() {
    super.viewDidLoad()
    // Reconnect when app resumes
    NotificationCenter.default.addObserver(self, selector: #selector(self.appBecameActive), name: NSNotification.Name.UIApplicationDidBecomeActive, object: nil)
}

// handle app resume
func appBecameActive() {
    if readerDevice != nil
        && readerDevice.availability == CMBReaderAvailabilityAvailable
        && readerDevice.connectionState != CMBConnectionStateConnecting && readerDevice.connectionState != CMBConnectionStateConnected {
        readerDevice.connect(completion: { error in
            if error != nil {
                // handle connection error
            }
        })
    }
}
```

```
- (void)viewDidLoad {
    // Reconnect when app resumes
    [[NSNotificationCenter defaultCenter] addObserver:self
                                             selector:@selector(appBecameActive)
                                             name:UIApplicationDidBecomeActiveNotification
                                             object:nil];
}

// handle app resume
-(void) appBecameActive {
    if (readerDevice != nil
        && readerDevice.availability == CMBReaderAvailabilityAvailable
        && readerDevice.connectionState != CMBConnectionStateConnecting && readerDevice.connectionState != CMBConnectionStateConnected) {
        [readerDevice connectWithCompletion:^(NSError *error) {
            if (error) {
                // handle connection error
            }
        }];
    }
}
```

```

    }];
}
}

```

Appendix A - DMCC for the Camera Reader

Appendix A - DMCC for the Camera Reader

The following table lists the various DMCC commands supported by the cmbSDK when using the built-in camera for barcode scanning.

Note: Many of these commands are also supported by the MX mobile terminals. Commands that are unique to the camera reader or MX-100 are indicated as such with an X in the last column.

GET/SET	COMMAND	PARAMETER(S)	DESCRIPTION	CAM
GET/SET	BATTERY.CHARGE		Returns the current battery level of the device as a percentage.	
	BEEP		Plays the audible beep (tone).	
GET/SET	BEEP.GOOD	[0-3] [0-2]	Sets the number of beeps (0-3) and the beep tone/pitch (0- 2, for low, medium, high). For the built-in camera, only a single beep with no pitch	

			control is supported. Thus, 0 1 turns the beep off, 1 1 turns the beep on.	
GET/SET	CAMERA.ZOOM	0-2	The possible values for the SET command are: 0 - normal (un-zoomed), 1 - zoom at level 1, 2 - zoom at level 2. This zoom level is used during scanning. When scanning ends it reset to 0.	
GET/SET	CAMERA.ZOOM-PERCENT	[100-MAX] [100-MAX]	Sets/Returns level 1 zoom (default 200% on iOS, 150% on Android), and level 2 zoom (default 400% on iOS, 300% on Android). Note: The camera needs to be started at least once from sdk to have a proper value for max capable zoom (MAX)	
GET/SET	CODABAR.CODESIZE	ON min max OFF min max	Accepts any length Codabar. Sets min/max length of accepted Codabar.	
GET/SET	C11.CHKCHAR	ON OFF	Turns Code 11 check digit on/off.	
			Requires single	

GET/SET	C11.CHKCHAR-OPTION	1 2	checksum. Requires double checksum.	
GET/SET	C11.CODESIZE	ON min max OFF min max	Accepts any length Code 11. Sets min/max length of accepted Code 11.	
GET/SET	C25.CODESIZE	ON min max OFF min max	Accepts any length Code 25. Sets min/max length of accepted Code 25.	
GET/SET	C39.ASCII	ON OFF	Turns Code 39 extended ASCII on/off.	
GET/SET	C39.CODESIZE	ON min max OFF min max	Accepts any length Code 39. Sets min/max length of accepted Code 39.	
GET/SET	C39.CHKCHAR	ON OFF	Turns Code 39 check digit on/off	
GET/SET	C93.ASCII	ON OFF	Turns Code 93 extended ASCII on/off	
GET/SET	C93.CODESIZE	ON min max OFF min max	Accepts any length Code 93. Sets min/max length of accepted Code 93.	
			Resets most of the camera API settings to default, except those noted as not	

	CONFIG.DEFAULT		resetting (see Appendix B). To reset all settings, use DEVICE.DEFAULT.	
GET/SET	DATA.RESULT-TYPE	0 1 2 4 8	Specifies results to be returned (sum of multiple values): None Text string result (default) XML results XML stats Scan image (see IMAGE.* commands)	
GET/SET	DATABAR.EXPANDED	ON OFF	Turns the DataBar Expanded symbology on/off.	
GET/SET	DATABAR.LIMITED	ON OFF	Turns the DataBar Limited symbology on/off.	
GET/SET	DATABAR.RSS14	ON OFF	Turns the DataBar RSS14 symbology on/off.	
GET/SET	DATABAR.RSS14STACK	ON OFF	Turns the DataBar RSS14 Stacked symbology on/off.	
GET/SET	DECODER.1D-SYMBOLORIENTATION	0 1 2 3	Use omnidirectional scan orientation. Use horizontal and vertical scan orientation. Use vertical scan orientation. Use horizontal scan orientation.	
			Sets the effort level for image analysis/decoding.	

GET/SET	DECODER.EFFORT	1-5	The default is 2. Do not use 4-5 for online scanning.	
GET/SET	DECODER.MAX-SCAN-TIMEOUT	1-120	Sets the timeout for the live-stream preview. When the timeout is reached, decoding is paused; the live-stream preview will remain on-screen.	
GET	DECODER.MAX-THREADS		Returns the max number of CPU threads supported by the device.	
GET/SET	DECODER.THREADS-USED	[0-MAX]	Specify the max number of CPU threads that the scanner can use during the scanning process.	
	DEVICE.DEFAULT		Resets the camera API settings to default (see Appendix B).	
GET	DEVICE.FIRMWARE-VER		Gets the device firmware version.	
GET	DEVICE.ID		Returns device ID assigned by Cognex to the scanning device. For a built-in camera, SDK returns 53. For MX-100 Barcode Scanner, SDK returns 56.	
			Returns the name assigned to the	

GET/SET	DEVICE.NAME		device. By default, this is “MX-” plus the last 6 digits of DEVICE.SERIAL-NUMBER.	
GET	DEVICE.SERIAL-NUMBER		Returns the serial number of the device. For a built-in camera, the SDK assigns a pseudo-random number.	
GET	DEVICE.TYPE		Returns the device name assigned by Cognex to the scanning device. For a built-in camera, SDK returns “MX-Mobile”. If MX-100 is available, SDK returns "MX-100".	
GET/SET	FOCUS.FOCUSTIME	0-10	Sets the camera’s auto-focus period (how often the camera should attempt to refocus). The default is 3, but it is 1 for MX-100.	
GET/SET	I2O5.CHKCHAR	ON OFF	Turns Interleaved 2 of 5 check digit on/off.	
GET/SET	I2O5.CODESIZE	ON min max OFF min max	Accepts any length Interleaved 2 of 5. Sets min/max length of accepted Interleaved 2 of 5.	

GET/SET	IMAGE.FORMAT	0 1 2	Scanner returns image result in bitmap format. Scanner returns image result in JPEG format. Scanner returns image result in PNG format.	
GET/SET	IMAGE.QUALITY	10, 15, 20, ...90	Specifies JPEG image quality.	
GET/SET	IMAGE.SIZE	0 1 2 3	Scanner returns full size image. Scanner returns 1/4 size image. Scanner returns 1/16 size image. Scanner returns 1/62 size image.	
GET/SET	LIGHT.AIMER	0-1	Disables/enables the aimer (when the scanner starts).	
SET	LIGHT.AIMER-CONFIG	[32-100] [0-15] [32-100]	Sets MX-100's configuration; parameters are aimer intensity, aimer modulation, illumination intensity	
GET	LIGHT.AIMER-CONFIG	0 1	Get's all of the MX-100 configuration parameters (see above) at one time. Using option 0 reads the settings from the cache; using option 1 always reads from the device.	
			Sets/gets the	

GET/SET	LIGHT.AIMER-INTENSITY	32-100	aimer LED's intensity (as a percentage)	
GET/SET	LIGHT.AIMER-MODULATION	0-15	Sets/gets the aimer LED's modulation (blink rate); parameter is milliseconds	
GET/SET	LIGHT.AIMER-TIMEOUT	0-600	Timeout in seconds for an aimer. This value is always overridden by DECODER.MAX-SCAN- TIMEOUT.	
GET/SET	LIGHT.INTERNAL-ENABLE	ON OFF	Enables/disables illumination (when the scanner starts).	
GET/SET	MSI.CHKCHAR	ON OFF	Turns MSI Plessey check digit on/off.	
GET/SET	MSI.CHKCHAR-OPTION	0 1 2 3 4 5	Use mod 10 checksum Use mod 10 mod 10 checksum Use mod 11 checksum (IBM algorithm) Use mod 11 mod 10 checksum (IBM algorithm) Use mod 11 checksum (NCR algorithm) Use mod 11 mod 10 checksum (NCR algorithm)	
GET/SET	MSI.CODESIZE	ON min max OFF min max	Accepts any length MSI Plessey. Sets min/max length of accepted MSI Plessey.	

GET/SET	SYMBOL.AZTECCODE	ON OFF	Turns the Aztec Code symbology on/off.	
GET/SET	SYMBOL.CODABAR	ON OFF	Turns the Codabar symbology on/off.	
GET/SET	SYMBOL.C11	ON OFF	Turns the Code 11 symbology on/off.	
GET/SET	SYMBOL.C128	ON OFF	Turns the Code 128 symbology on/off.	
GET/SET	SYMBOL.C25	ON OFF	Turns the Code 25 symbology on/off (standard).	
GET/SET	SYMBOL.C39	ON OFF	Turns the Code 39 symbology on/off.	
GET/SET	SYMBOL.C93	ON OFF	Turns the Code 93 symbology on/off.	
GET/SET	SYMBOL.COOP	ON OFF	Turns the COOP symbology (Code 25 variant) on/off.	
GET/SET	SYMBOL.DATAMATRIX	ON OFF	Turns the Data Matrix symbology on/off.	
GET/SET	SYMBOL.DATABAR	ON OFF	Turns the DataBar Expanded and Limited symbologies on/off.	
GET/SET	SYMBOL.DOTCODE	ON OFF	Turns the DotCode symbology on/off.	
GET/SET	SYMBOL.IATA	ON OFF	Turns the IATA symbology (Code 25 variant) on/off.	
			Turns the Inverted	

GET/SET	SYMBOL.INVERTED	ON OFF	symbology (Code 25 variant) on/off.	
GET/SET	SYMBOL.ITF14	ON OFF	Turns the ITF-14 symbology (Code 25 variant) on/off.	
GET/SET	SYMBOL.UPC-EAN	ON OFF	Turns the UPC-A, UPC-E, EAN-8, and EAN-13 symbologies on/off.	
GET/SET	SYMBOL.MATRIX	ON OFF	Turns the Matrix symbology (Code 25 variant) on/off.	
GET/SET	SYMBOL.MAXICODE	ON OFF	Turns the MaxiCode symbology on/off.	
GET/SET	SYMBOL.MSI	ON OFF	Turns the MSI Plessey symbology on/off.	
GET/SET	SYMBOL.PDF417	ON OFF	Turns the PDF417 symbology on/off.	
GET/SET	SYMBOL.PLANET	ON OFF	Turns the PLANET symbology on/off.	
GET/SET	SYMBOL.POSTNET	ON OFF	Turns the POSTNET symbology on/off.	
GET/SET	SYMBOL.4STATE-IMB	ON OFF	Turns the Intelligent Mail Barcode symbology on/off.	
GET/SET	SYMBOL.4STATE-RMC	ON OFF	Turns the Royal Mail Code symbology on/off.	
GET/SET	SYMBOL.QR	ON OFF	Turns the QR and MicroQR symbologies on/off.	

GET/SET	TRIGGER.TYPE	0 1 2 3 4 5	Not supported Not supported Manual (default) Not supported Not supported Continuous	
GET/SET	UPC-EAN.EAN13	ON OFF	Turns the EAN-13 symbology on/off.	
GET/SET	UPC-EAN.EAN8	ON OFF	Turns the EAN-8 symbology on/off.	
GET/SET	UPC-EAN.UPC-A	ON OFF	Turns the UPC-A symbology on/off.	
GET/SET	UPC-EAN.UPC-E	ON OFF	Turns the UPC-E symbology on/off.	
GET/SET	UPC-EAN.UPCE1	ON OFF	Turns the UPC-E1 symbology on/off.	
GET/SET	UPCE- AN.SUPPLEMENT	0 1-4	Turns off UPC supplemental codes. Turns on UPC supplemental codes.	
GET/SET	VIBRATION.GOOD	ON OFF	Sets/gets whether to vibrate when a code is read (default is ON)	

Appendix B - Camera Reader Defaults

Appendix B - Camera Reader Defaults

The following table lists the defaults the SDK uses on startup for the camera reader.

--

Note: At the low-level, the cmbSDK supported devices can perform two types of configuration resets: a device reset and a config reset. A device reset restores all configuration properties to their saved defaults, while a config reset restores mostly the scanning settings, leaving communication settings alone. In the table below, those items that are only reset by a device reset are indicated.

Note: The Reader Device method [resetConfig\(\)](#) performs a config reset. To perform a device reset, the [DMCC](#) command [DEVICE.RESET](#) would need to be issued.

SETTING	DEFAULT VALUE	DEVICE RESET ONLY?
BEEP.GOOD	1 1 (Turn beep on)	
C11.CHKCHAR	OFF	
C11.CHKCHAR-OPTION	1	
C39.ASCII	OFF	
C39.CHKCHAR	OFF	
C93.ASCII	OFF	
COM.DMCC-HEADER	1 (Include Result ID)	Y
COM.DMCC-RESPONSE	0 (Extended)	Y
DATA.RESULT-TYPE	1	Y
DECODER.1D-SYMBOLORIENTATION	1	

DECODER.EFFORT	2	
DECODER.MAX-SCAN-TIMEOUT	60	
DEVICE.NAME	“MX-” + the last six digits of DEVICE.SERIAL-NUMBER	
Symbologies (SYMBOL.*)	OFF (all symbologies are disabled)	
Symbology sub-types (groups): DATABAR.EXPANDED DATABAR.LIMITED DATABAR.RSS14 DATABAR.RSS14STACK UPC- EAN.EAN13 UPC-EAN.EAN8 UPC-EAN.UPC-A UPC-EAN.UPC-E UPC-EAN.UPCE1	ON OFF OFF OFF ON ON ON ON OFF	
FOCUS.FOCUSTIME	3	
I2O5.CHKCHAR	OFF	
IMAGE.FORMAT	1 (JPEG)	
IMAGE.QUALITY	50	
IMAGE.SIZE	1 (1/4 size)	
LIGHT.AIMER	Default based on cameraMode: 0: NoAimer and FrontCamera 1: PassiveAimer and ActiveAimer	Y
LIGHT.AIMER-TIMEOUT	60	

LIGHT.INTERNAL-ENABLE

OFF

Appendix B - Camera Reader Defaults

Setting	Default Value	Device Reset Only?
Minimum/maximum code lengths	ON 4 40	
MSI.CHKCHAR	OFF	
MSI.CHKCHAR-OPTION	0	
TRIGGER.TYPE	2 (Manual)	
UPC-EAN.SUPPLEMENT	0	

Precautions

Precautions

- Observe these precautions when installing the Cognex product, to reduce the risk of injury or equipment damage:
- To reduce the risk of damage or malfunction due to over-voltage, line noise, electrostatic discharge (ESD), power surges, or other irregularities in the power supply, route all cables and wires away from high-voltage power sources.
 - Changes or modifications not expressly approved by the party responsible for

regulatory compliance could void the user's authority to operate the equipment.

- Cable shielding can be degraded or cables can be damaged or wear out more quickly if a service loop or bend radius is tighter than 10X the cable diameter. The bend radius must begin at least six inches from the connector.
- This device should be used in accordance with the instructions in this manual.
- All specifications are for reference purpose only and may be changed without notice.

Migration from mwSDK to cmbSDK

Difference between mwSDK and cmbSDK

The Manatee Works Barcode Scanner SDK has been fully integrated into the Cognex Mobile Barcode SDK (cmbSDK). Therefore, we are shifting our focus to the cmbSDK.

The good news is that the cmbSDK is backward compatible with the MW SDK. The cmbSDK simply adds a higher-level API to the scanning methods that utilize the camera of a smartphone or tablet. Or, you can continue to use the lower-level methods you have become familiar with in the Manatee Works SDK. Your account, login, license(s), and key(s) remain the same. If you do decide to program to the higher-level API, you will have the added benefit of your app(s) supporting the Cognex MX Series mobile barcode readers, and MX Series mobile terminals, with a single code base.

Remove mwSDK

To avoid collision between mwSDK and cmbSDK we need to completely remove the MW library.

Please remove the following files from the mwSDK:

- libBarcodeScanner.a
- MWResult.h/m
- MWOverlay.h/m
- MWParser.h/m

Optionally, if you don't use the helper classes MWImageGetter.h/m and MWImageScanner.h/m you can remove them as well.

Add cmbSDK

Next step is to add **DataManFW framework** and use in your project. Please navigate to [this](#) url to check step by step how to integrate cmbSDK inside your project.

After that please remove all API's and methods that you are using from mwSDK, and follow our guide from [here](#) to see how to implement cmbSDK in your project.

Here are some of the main differences in code between mwSDK and cmbSDK:

1. **Initialize, create and connect reader device**

- Using mwSDK we don't have that **CMBReaderDevice** object and we use API methods from the **BarcodeScanner** class to initialize decoder before starting the scanner process: set active codes, set scanning rect, set decoder level, register sdk, etc. When we use cmbSDK all of these things are done in code behind with default values when we create a CMBReaderDevice object. Here some of the settings can be set in the constructor as input parameter and others can be set/changed after we create and connect to reader device. Using cmbSDK not only creating reader device is enough to start scanning process, we also need to connect to reader device and set necessary delegate methods that will handle response from connection state changed, availability, result received, etc.

2. **Start scanning process**

- With mwSDK after we initialize decoder we are ready to start the scanning. We do that by creating an AVCaptureDevice object with AVCaptureSession and use that to capture frames from the device's camera, which we then decode with the mwSDK. Using cmbSDK there is only one method to start the scanning process and comes from CMBReaderDevice object (startScanning). We can't start scanning process if we don't have valid connection to reader device. Here we can scan in full screen mode if we create reader device without setting a previewContainer, or if we want to scan in a partial view, we need to create a UIView container for the preview that container in our layout and use it as an input parameter. Result from scanning process will be received in didReceiveReadResultFromReader:(CMBReaderDevice *)reader results: (CMBReadResults *)readResults function from the CMBReaderDeviceDelegate delegate.

3. **Result received**

- If we have a successful read or we stop the scanning process and have no read, result object will be received in the didReceiveReadResultFromReader: (CMBReaderDevice *)reader results:(CMBReadResults *)readResults function. In cmbSDK the result object is more extended than in mwSDK. From that object we can read our barcode result, symbology, image from the last frame, SVG result, etc.