# bark<del>o</del>der

## Mobile Barcode Scanner Development Kit (SDK)

Whether you're developing a mobile, webbased or a desktop application, the barKoder SDK provides a comprehensive solution that ensures reliable and efficient barcode scanning across various devices and platforms. With continuous updates and dedicated technical support, utilizing our mobile barcode scanner SDK opens up a world of possibilities for your application, empowering you to deliver a superior barcode scanning experience to your users and unlocking new opportunities for your business.



By integrating our Barcode Scanner SDK into your application, you gain access to a powerful set of tools and functionalities that will revolutionize the way you handle barcode scanning. Our SDK offers seamless integration with your existing software, allowing you to effortlessly incorporate barcode scanning capabilities into your own application or system. With our SDK, you can harness the full potential of barcode scanning technology, enabling you to automate processes, improve data accuracy, and enhance user experiences.



#### Simple Usage

Our decoder is simple and easy to use! Just point to your barcode and liftoff!



## **Time & Cost Reduction**

Increase efficiency, greatly reduce costs & improve customer & employee satisfaction with the barKoder SDK.



## **High Performance**

Scan poorly printed, damaged or partially obscured barcodes in any environment with very high accuracy.



Simplify your business processes by encouraging the Bring Your Own Device concept.

BYOD

# bark<del>o</del>der

# Broad range of symbologies and platform support

The barcode scanner SDK by barKoder supports iOS devices including Apple®'s iPhone® and iPad®, as well as most Android™ smartphones and tablets for mobile barcode reading. It can read over 30 different 1-D and 2-D barcode symbologies used across a wide range of industries.



## **1D Barcodes**

Codabar, Code 11, Code 25 (Standard/Industrial 2 of 5), Code 39 (including Code 39 extended), Code 93, Code 128, COOP 2 of 5, Datalogic 2 of 5, EAN-8, EAN-13, IATA 2 of 5, Interleaved 2 of 5, Matrix 2 of 5, MSI Plessey, Italian Pharmacode, Telepen, UPC-A, UPC-E, UPC-E1



## **2D Barcodes**

Aztec Code, Aztec Compact, Data Matrix, DotCode, PDF417, Micro PDF417, QR Code, Micro QR Code

## Platforms

#### Mobile:

Android, iOS, Flutter, React Native, Xamarin, Capacitor, Cordova, NativeScript, .NET Maui

Web: WASM

**Desktop/Server:** Windows, Linux



# barkeder

## Barcode Capture SDK Unique Features

With the integration of barKoder, it is no longer necessary to develop separate applications and manage multiple software and hardware solutions for mobile device barcode reading. Our SDK offers to developers a robust set of tools in a single solution, allowing maximum control over the user experience. It provides a high-level, simple to use interface for device management, whether using a smartphone or tablet.



## **DPM Processing**

Unique Direct Part Marking (DPM) reading algorithm which allows for even the hardest possible engraved Data Matrix and QR Code samples to be decoded. Judging by our own internal tests, it is already better than any competitor alternative in the market by a large margin, even with its first version!



## PDF417-LineSight® Scanner

Applying what we learned from MatrixSight® to our PDF417 barcode recognition led us to the PDF417-LineSight® algorithm. PDF417 barcodes, usually applied to identification documents, due to wearing and extensive use naturally fade and lose their basic elements. PDF417-LineSight detects any PDF417 code in its entirety, regardless if they miss its start & stop patterns, start & stop row indications and even entire data columns.

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#### **Batch MultiScan®**

Special AR algorithm allowing realtime scanning with results caching and location reconstructions of multiple barcodes within a single camera view in a continuous manner, providing smooth visual experience and stable output.



#### **MatrixSight®**

The capabilities of MatrixSight® transcend beyond anything a traditional barcode scanner, be that hardware or software-based, can achieve. Simply put, there's no QR Code or Data Matrix barcode that is safe from the barKoder MatrixSight® algorithm. They can have absolutely no finder, alignment or timing patters and can even miss entire data segments but it still won't keep their data safe from being read.



#### **DeBlur Mode**

One of the latest technological advancements of the barKoder SDK is the unparalleled capability to decode heavily blurred EAN & UPC barcodes, even when there's a fusion between the separate bars. This technological breakthrough is a game-changer, especially in scenarios where UPC & EAN barcodes may undergo severe distortions and degradations due to poor printing quality, environmental conditions or other factors.

#### **VIN Scanning**

barKoder's VIN Scanning Mode, powered by its MatrixSight(r) & Segment Decoding(r) algorithms, offers an unrivalled experience in scanning even the most stubborn VIN-enabled Code 39, Code 128, Data Matrix and QR Codes. Moreover, the barKoder Barcode Scanner SDK can capture even multiple VIN barcode from a single camera view by utilizing the Batch MultiScan engine!

#### MRZ Scanning Engine

The barKoder MRZ scanning solution provides the fastest, most accurate scanning of Machine Readable Zone (MRZ) data directly from passports, ID cards, and travel documents, ensuring streamlined, reliable identity verification. With its easy integration and seamless setup, it allows developers to quickly embed MRZ scanning functionality across iOS and Android platforms without extensive configuration.

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#### Segment Decoding<sup>®</sup>

The barKoder SDK stands out for its unique ability to scan all supported 1D barcodes with significant deformation along the Z axis, like barcodes found on bottles, test tubes and other surfaces with rounded, curved, hollowed or otherwise irregular shapes. Unlike other decoders, both software and hardware-based, which struggle when at least one straight line can't intersect through all bars, the barKoder API excels in handling such deformations due to its advanced Segment Decoding(R) algorithm.

#### **DotCode**

The barKoder barcode scanning API features the best DotCode reading algorithm by a significant margin when compared to any competitor product in the software-based barcode reading market, be that closed or open-source, taking in mind reading rate, accuracy, speed, light, scanning angles and other performance metrics.







## bark<del>o</del>der

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## Download our barKoder Demo App

To experience the speed of our barKoder Demo App for testing, on your iOS or Android device, simply head to your prefered App Store by clicking on the buttons, or you can scan the code with your camera app.



## barKoder Mobile Demo App for Android



## barKoder Mobile Demo App for iOS





## barKoder WASM Demo





https://barkoder.com/barkoder-wasm-demo

## Testing, Testing, Testing Sheet!

Optimizing your experience with our app is effortless using our comprehensive testing sheet encompassing a variety of 1D and 2D barcode types. Simply print or display the sheet on your device, and proceed to scan each barcode using our application. This efficient testing method ensures that our app seamlessly recognizes and processes diverse barcode formats, assuring you of its reliability and versatility across different code types.





## **1D Barcodes**

Codabar, Code 11, Code 25 (Standard/Industrial 2 of 5), Code 39 (including Code 39 extended), Code 93, Code 128, COOP 2 of 5, Datalogic 2 of 5, EAN-8, EAN-13, IATA 2 of 5, Interleaved 2 of 5, Matrix 2 of 5, MSI Plessey, Italian Pharmacode, Telepen, UPC-A, UPC-E, UPC-E1



Code 128



## **2D Barcodes**

Aztec Code, Aztec Compact, Data Matrix, DotCode, PDF417, Micro PDF417, QR Code, Micro QR Code



## Batch MultiScan. Ultimate tool to scan multiple barcodes.

The Batch MultiScan is a special ability of the barKoder Barcode Scanner SDK that grants an ability to scan multiple barcodes in a single camera view





## Warehouse Inventory Management

Driven by safety, convenience and low-cost, many warehouses turn to tracking inventory using all kinds mobile devices and not just smartphones or tablets, but also automated guided vehicles (AGV), mobile robots or drones. To expedite the counting procedure, the barKoder SDK's Batch MultiScan feature is optimized for scanning dozens of codes at once.



## **Specimen Traceability**

It is a widespread practice to attach each tube, vial or specimen cassette with a QR code or a Data Matrix code for identification. Using the Batch MultiScan feature of the barKoder Barcode Scanner SDK speeds up registering samples in a database significantly.



## Library Bookshelf Management

The Batch MultiScan can capture the content of multiple barcodes printed on books and placed on bookshelves. The scanned barcode values can afterwards be sent to the database to query its correct position in real time or to confirm/deny their presence.



## Pharma Track And Trace

Data Matrix is the most used barcode symbol for tracing pharmaceutical products and the Batch MultiScan can help you meet the track and trace requirements of medicine packages, bundles or cases throughout the entire logistics supply chain from the manufacturer to the wholesaler, and then to a pharma store.

#### Batch Multiscan Sheet



#### MatrixSight

## MatrixSight<sup>®</sup> - Ultimate 2D Barcode Scanner SDK Algorithm

At the core of our cutting-edge barcode scanning solution lies MatrixSight, an algorithm that some among us dare to deem groundbreaking.

Exclusively featured in our barKoder API, MatrixSight is meticulously designed to redefine the very standards of mobile barcode recognition. This exceptional algorithm transcends the constraints of conventional decoding, establishing a new benchmark for reliability, accuracy, and versatility.

In a landscape where traditional hardware scanners falter, MatrixSight stands out with its unique approach to locating and processing 2D patterns, particularly in the case of Data Matrix, QR Code and Micro QR variants. This enables the barKoder barcode scanner SDK to effortlessly capture data within barcodes with levels of damage that were once deemed

#### **QR Barcode**

For optimal barcode detection, the majority of decoders in the market rely on the three finder patterns prescribed by the QR standard specification. This includes:

**Positioning Markers:** The finder pattern comprises three square markers, often referred to as squares or modules. These squares are positioned at the corners of the QR code.

Alignment: The three squares are arranged to form a larger square, helping the QR code reader identify the code's orientation and perspective. This alignment is crucial for accurate code recognition.

**Quiet Zone:** The QR code's finder pattern is surrounded by a quiet zone or margin, which is an empty space with no data. This allows the QR code reader to distinguish the code from its surroundings and helps prevent misinterpretation.

The presence of the finder pattern in a QR code makes it easily detectable by image-processing algorithms used in QR code readers. Once the finder pattern is identified, the QR code reader can then proceed to decode the information contained within the code. The finder pattern specification is part of the overall QR code standard, which ensures interoperability and uniformity in QR code usage.



While some advanced decoders can manage slight damage on these patterns, many struggle even with moderate impairment.





#### Slight Damage - Missing one finder pattern

Furthermore, the best of scanners on the market, be that software or hardware based, can accommodate a single missing or damaged finder pattern, demonstrated on the image.





#### **Missing 2 finder patterns**

But once there is more damage to the QR Code, all of them struggle scanning, i.e. none can endure the absence of two or more finder patterns missing or being damaged.

#### **Missing 3 finder patterns**

barKoder, empowered with MatrixSight can easily scan these barcodes, and even the ones that are missing all three finding patterns.

Image shows a QR barcode that has only the alignment pattern present, while all 3 finder patterns are completely missing. Still scannable with barKoder.





#### Missing all finder patterns and alignment patterns

Finally, with barKoder even heavily damaged barcodes pose no challenge. As shown here, this barcode is missing all 3 finder patterns and the alignment pattern.

Taking innovation to the next level, our cutting-edge technology can scan even the barcodes that have a remarkable degree of damage.

## Micro QR Barcode

A similar scenario unfolds Micro QR Code variant, which is a smaller and more compact version of the traditional QR Code. It was specifically designed to encode a smaller amount of data and to be scanned quickly, making it suitable for applications with limited space or where larger QR codes might be impractical. Like the standard QR Code, the Micro QR Code also contains a finder pattern to help QR code readers locate and properly interpret the code.

The finder pattern in Micro QR Code is adapted to fit the smaller size while maintaining the essential features for reliable scanning.



So in a nutshell, it only has one finder pattern.



Even the slightest damage to this pattern proves insurmountable for almost all barcode scanners,, causing them to fail. In contrast, for the barKoder barcode scanner SDK utilizing MatrixSight, reading a Micro QR barcode without any finder pattern is a straightforward task. MatrixSight goes above and beyond, effortlessly handling more extensive damage across the barcode.

## Missing all finder patterns and alignment patterns and random damage

Remarkably, what may be considered a worst-case scenario for other decoders, as shown here, where not only there are no finder patterns and an alignment pattern, but there's also damage in the data of the image, is still not a challenge for the MatrixSight algorithm. It goes beyond, addressing damages until the missing portion of the barcode reaches a theoretically unrecoverable size, showcasing the exceptional resilience of our technology.





#### Funky use cases

This leads to barKoder being able to scan even some funky codes out there, for example you could slap this barcode on your donut company and make for great PR. Obviously your donut consumers would need to use our scanner to read it, so most of them will be left scratching their head when they try to read it with a stock barcode scanner, but your proprietary app that uses MatrixSight could scan it.



#### Completely missing finder pattern

Micro QR Code barcodes that are missing the finder pattern will not be recognized by any scanner on the market, however barKoder's MatrixSight will handle this effortlesly.

The image shows a complete lack of Finder Pattern.

#### Missing Finder pattern and corner damage

However, that's not all that MatrixSight can do in regards to Micro QR Code scanning. Here's an example where the finder pattern is completely gone but we there's also severe damage to the corners of the barcode and random damage in the data patterns.

This doesn't present a problem for the barKoder barcode scanner SDK.



#### Datamatrix

The Data Matrix barcode specifications outline the crucial components for locating the barcode - the distinctive L-shaped Finder pattern and Timing patterns positioned on opposite sides from the finder.

Similar to QR Codes, Data Matrix includes a finder pattern to assist barcode readers in locating and decoding the symbol. The finder patterns typically consist of solid borders around the data region, making it recognizable to scanning devices.

**Timing pattern** - is placed on the two opposite sides to Finder Pattern, with alternating black and white modules. The Timing Pattern (Clock Pattern) is used to determine the size of a module, the number of rows and columns, and possible distortion of the barcode.

When faced with challenges such as missing modules in the Timing pattern or slight damage to the Finder pattern, the decoding capabilities of m ost decoders diminish, with only the most advanced ones demonstrating resilience to this level of damage.



With barKoder the decoding journey takes a leap forward. Thanks to our MatrixSight algorithm, the barKoder Barcode Scanner SDK effortlessly handles barcodes with missing Timing patterns and slight damage to the Finder pattern. What sets barKoder apart is its ability to transcend the conventional need for finder or timing patterns altogether.



#### **Missing finder pattern**

Only a select few decoders, alongside barKoder, can manage the complete absence of the finder pattern

Remarkably, MatrixSight can tolerate up to three entirely missing rows and/or columns from any side of a Data Matrix barcode with a size greater than 48 modules and up to two for smaller ones. This unparalleled level of tolerance, positions MatrixSight as the unrivaled leader in handling Data Matrix barcodes with varying degrees of damage and complexity.





#### Missing both top and left timing pattern

It's noteworthy that the barKoder Barcode Scanner SDK is the sole solution in the market capable of reading barcodes without the Timing pattern.

## Missing finder and both top and left timing patterns

Notably, the capabilities of barKoder extend even further, surpassing conventional expectations. In the event of encountering a barcode lacking not only the finder pattern but also both the top and left timing patterns, barKoder seamlessly continues its scanning process, demonstrating its remarkable ability to effortlessly decode such barcodes.





#### Missing finder, both top and left timing patterns, one whole row from top and column from right

Finally, barKoder showcases its exceptional barcode scanning prowess in the broader market, boasting nextlevel adaptability in decoding even the most challenging barcode samples. Shown here is the absence of critical elements such as the finder pattern, both top and left timing patterns, along with the omission of an entire row from the top and a column from the right, where the barKoder Barcode Scanner SDK remains undeterred.

Its advanced algorithms and robust design empower it to seamlessly scan and interpret barcodes with missing components, demonstrating unparalleled efficiency and reliability. In situations where other scanners may falter, barKoder consistently delivers accurate results, making it the optimal choice for industries and businesses requiring superior performance in diverse and complex scanning environments.

#### **Complete destruction**

As a PS let's show a barcode that has been completely destroyed, missing all the critical elements, as well as parts of the data elements.

Naturally, this should not be scanned, ever, however barKoder doesn't fail to adapt to this case too and scans it with ease.





In the automotive industry, VINs serve as unique identifiers for vehicles, carrying crucial information about their make, model, year of manufacturing and other specific details.

Traditionally, barcodes like Code 39 or Code 128 have been used to encode VINs on vehicle components and related paperwork. These barcodes are effective for basic identification purposes, but they have limitations when it comes to data capacity and quick readability.

Our barcode scanning SDK solution offers a specially tailored VIN reading mode that supports both the traditional Code 39 and Code 128 barcode formats, as well as the newer QR Code and Data Matrix VIN variants.

## VIN Encoding With Code 39 Barcodes

Code 39 has played a historical role and can still be found on many older cars that are currently in use. Recognized for its simplicity and widespread acceptance, Code 39 efficiently encodes alphanumeric characters, serving as a reliable method for tracking and managing vehicle information.

Code 39 has an alphanumeric compatibility, capable of encoding both letters (A-Z), numbers (0-9), and a few special characters, which makes it the perfect candidate for representing a VIN which is alphanumeric in its nature.



When used in VINs, the Code 39 symbology adheres to some specific rules inherited from the nature of the VIN itself. These are:

- Fixed length: This means that instead of the variable length of the data, when used to encode a VIN barcode the length is fixed and it's typically 17 characters long.
- Check character: Another specific feature of VIN codes is the check character, which is optional for a normal Code 39 barcode, but required when Code 39 is utilized as a VIN code.

These constraints make VIN Code 39's much safer for a barcode scanner to "know" it's dealing with a VINempowered barcode, but they also force us to use the scanner in a specific VIN mode. Our demo app Barcode Scanner by barKoder, available for both <u>iOS</u> and <u>Android</u> via Google Play Store and Apple App store, features this specifically tailored VIN Scanning mode that showcases the ability to decode these barcodes with ease. We're yet to encounter a solution which comes even close in terms of performance and reliability.

However, the barKoder Barcode Scanner SDK doesn't stop there. Empowered with the Segment Decoding<sup>®</sup> algorithm it can scan barcodes with significant deformation alongside the Z-axis, which makes it ideal for scanning VIN numbers that are slightly deformed, printed on paper for listing inventory, or taped to a car window.



## Empowered with the Segment Decoding<sup>®</sup> technology, the barKoder Barcode Scanner SDK handles these barcodes with extreme efficiency.

To fully experience the barKoder VIN scanning mode, start with downloading our demo apps from the public app stores for either iOS or Android powered smart devices.

Afterwards, simply follow the next steps:



#### Step 1

Use the VIN mode for optimal VIN barcode decoding experience.



#### Step 2

When the scanner starts make sure to go to the settings via the respective button in the top right corner and ensure that scanning misshaped codes is enabled. (disabled by default)

← Settings	:
Barkoder Settings	
Decoding Speed	Slow >
Barkoder Resolution	Full HD >
Continuous Scanning	
Continuous threshold	4 >
Allow pinch to zoom	
Beep on success	
Vibrate on success	
Narrow Viewfinder	
Enable Misshaped Code Capture	
Barcode Types	
All 1D Barcodes	>

#### Step 3

The specific setting is termed Enable Misshaped Code Capture. (highlighted with green on the image)

- Also worth mentioning is to have Decoding Speed setting at SLOW and Barkoder Resolution at Full HD. These settings are not a requirement, and the decoder will work even on Normal/HD, however some very damaged or otherwise altered barcodes will be scanned much faster if the settings are set as specified.
- Another thing worth mentioning is that due to the nature of VIN barcodes (they are 17 characters long), the best way to decode the misshaped VIN samples is via Landscape mode.





## Code 128 Barcodes & VIN Implementation

Code 128, a high-density, alphanumeric 1D barcode symbology, stands out in the automotive industry for encoding VINs. Known for its versatility, Code 128 efficiently represents alphanumeric characters, making it a good choice for encoding the diverse information embedded in VINs.

Code 128 is often considered superior when it comes to encoding VINs to Code 39, due to a few key features:

#### • Higher Data Density:

Code 128 has a higher data density compared to Code 39, which means that Code 128 can encode more information in a smaller space. VINs, which often contain a specific set of alphanumeric characters, benefit from the increased efficiency of Code 128 in terms of data representation.

#### • Higher Data Security:

Code 128 includes a built-in error-checking mechanism which Code 39 lacks, further enhancing data security. It uses a checksum formula to verify the accuracy of the encoded data during the scanning process. This greatly helps in ensuring that the scanned VIN is correct and reduces the likelihood of errors in data transmission.

#### • Wide character set

A Code 128 barcode can encode a full 128 ASCII character set, while Code 39 barcodes can enCode 39 characters in total.

Similarly to Code 39, empowered with the Segment Decoding® technology our barcode scanner SDK can easily recognize highly distorted and deformed Code 128 VIN codes:







Again, as in the case with Code 39, to experience this feature you'll need to Enable Misshaped Code Capture within the VIN Mode.

## **QR Code Utilization In VIN-Enabled Scenarios**

QR codes, or Quick Response codes, have gained widespread popularity due to their quick readability and ability to store a substantial amount of data in a two-dimensional format. While they find extensive uses across a variety of industries, their application in encoding Vehicle Identification Numbers (VINs) within the automotive sector is not as prevalent as the respective ID barcode types (Code 39 and Code 128).



However, there are specific applications and scenarios where QR Codes have been employed for VIN-related purposes.

The primary advantage of QR Codes lies in their efficiency in storing information. They can encode alphanumeric characters, binary data and even special characters, providing a versatile means of representing diverse types of information. This flexibility makes QR Codes valuable in numerous applications, ranging from marketing and logistics to healthcare and finance.

QR codes are fairly easy to scan even with open-source solutions. However, if there's any damage present to their finder patterns most of the barcode scanners will fail scanning such samples. Not barKoder. Using the cutting-edge <u>MatrixSight®</u> decoding algorithm, we can recognize significantly damaged QR barcodes. <u>MatrixSight®</u> enables the barKoder API with a capability of capturing the data even in VIN QR Codes that have damage to both the finder pattern and the alignment pattern.

We won't go into detail of how it works, but we will show a few damaged QR VIN codes that the barKoder SDK can reliably scan.



QR Code - Missing top left pattern



## Data Matrix & VINs - Match Made In Heaven

As technology advances, 2D barcodes like Data Matrix will continue to gain prominence. Data Matrix can store a significant amount of data in a compact space, providing a huge advantage over 1D barcodes. While not as commonly used for VINs, it finds applications in more dataintensive scenarios, offering increased information capacity.

As in the case of the capacity to capture QR Codes, MatrixSight® empowers the Barcode Scanner SDK to smoothly capture the data even within severely damaged Data Matrix samples that are not only missing their critical finder and/or timing patterns, but also ones with random damage throughout the data section of the barcode:

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ي وال			





Data Matrix - missing both patterns



## VIN - Multiscan

Finally, with our demo app you can scan multiple VIN barcodes on a single page, enable continuous scanning in the settings, and try it out on the image below:



DeBlur

# Cutting-Edge Barcode Scanner SDK for Decoding Blurred Barcodes

The barKoder Barcode Scanner API features a special algorithm that enables the Barcode SDK to easily decode heavily blurred EAN & UPC barcodes.

One of the latest technological advancements of the barKoder Barcode Scanner SDK is the unparalleled capability to decode heavily blurred EAN & UPC barcodes, even when there's a fusion between the separate bars. This technological breakthrough is a game-changer, especially in scenarios where UPC & EAN barcodes may undergo severe distortions and degradations due to various factors.

Traditional hardware-based barcode scanners often struggle when faced with heavily blurred or smudged barcodes. However, the advanced algorithm and image processing techniques embedded in the barKoder Barcode Scanner API enables it to decipher information from UPC & EAN barcodes that would otherwise be unreadable. Whether the blurring is a result of poor printing quality, environmental conditions or other factors, the barKoder Scanner API excels in delivering accurate and swift barcode recognition.

#### Fused Bars in an UPC or EAN Barcode? No Problem

One of the remarkable features of the barKoder SDK is the ability to handle situations where the barcode's bars are partially or completely smeared or overlapped, a common challenge in the world of barcode scanning. The algorithm intelligently analyzes the blurred or merged lines, reconstructing the original data accurately through advanced methods of pattern matching. This breakthrough ensures that even in less-than-ideal conditions, the barKoder Barcode Scanner SDK can extract the intended information, maintaining a high level of reliability.



The latest barKoder Barcode Scanner SDK DeBlur algorithm represents a significant leap forward in the broader barcode scanning technology. Its ability to decode heavily blurred EAN & UPC barcodes, handling fussed bars and support for various types of blur, including lens, motion, and focus blur, opens up new possibilities for all industries reliant on accurate and efficient data capture. This advancement underscores the commitment to deliver cutting-edge solution that pushes the boundaries of what is achievable in the dynamic realm of barcode scanning.

## **Comprehensive DeBlur Barcode Scanning Support**

The versatility of the barKoder API goes beyond decoding heavily blurred barcodes. The DeBlur algorithm is designed to tackle various types of blur scenarios, including lens blur, motion blur and focus blur. This means that whether a barcode is captured with a shaky hand, in motion or out of focus, the barKoder SDK compensates for these factors, ensuring successful and swift barcode recognition in diverse scenarios.

#### Lens Blur

The barKoder SDK leverages advanced optics algorithms to compensate for distortions caused by different lenses. This ensures that barcodes captured through a variety of devices, from high-end cameras to smartphones, can be reliably decoded.





#### **Motion Blur**

In scenarios where the barcode or the scanning device is in motion, the barKoder API's motion blur compensation algorithms come into play. This feature ensures that even rapid movements during the scanning process does not compromise the accuracy of barcode decoding.

#### **Focus Blur**

Whether dealing with close-up shots or situations where the camera struggles to focus, the barKoder API's focus blur support guarantees that the barcode decoding process remains robust and dependable.



Blurred Barcodes













Blurred Barcodes

















Misshaped

## Segment Decoding® - API for scanning deformed 1D barcodes

The barKoder Barcode Scanner SDK stands out for its unique ability to scan all supported 1D barcodes with significant deformation along the Z axis.

Unlike other decoders which struggle when at least one straight line can't intersect through all bars, the barKoder API excels in handling such deformations due to its advanced algorithm and image processing techniques.

## 

This feature allows successful scanning of various degrees of deformity and distortion that might be present in 1D barcodes, like the samples found on bottles, test tubes and other surfaces with rounded, curved, hollowed or otherwise irregular shapes.

This is the limit of deformation for most of advanced decoders on the market.

Once there's no straight line which can pass through all bars, there's seldom a solution, either software or hardware-based, apart from the barKoder Barcode Scanner SDK which is able to perform successful barcode recognition.

When you add the Segment Decoding to the already present algorithms which handle various degrees of damage on the barcode surface, as well as crumpled, wrinkled and otherwise distorted 1D barcodes, you get the perfect barcode scanning solution for any enterprise and industrial use-case.

#### Note:

The option for decoding deformed barcodes within the SDK or in the Barcode Scanner by barKoder public app is turned off by default. One has to enable it via the application settings or the barcode scanner SDK, which is described within the respective documentation.



## Decoding 1D Barcodes With Various Degrees Of Deformation

Here are some extreme deformation examples which barKoder can successfully handle:



# Unraveling the PDF417 Scanning Mastery by the barKoder API

PDF417 is a two-dimensional stacked barcode symbology capable of encoding large amounts of data in a compact space. Detailed data for this type of barcode can be found on our site in the barcode types section.

The PDF417 barcode by design has stacked data rows columns enclosed by Start and Stop patterns which are mandatory by specification for detecting its location within an image. Following the Start pattern and all the way to the Stop pattern are the "Row Indicator" columns where all necessary info for correctly decoding PDF417 is encoded, like the number of rows and columns, the error correction level and so on.

Better barcode decoders on the market can handle missing the Stop pattern and the Stop row indicator, since by specification there's already a similar PDF417 variant with only a Start pattern and a Start Row indicator column, known as Compact PDF 417 barcode.

Better barcode decoders on the market can handle missing the Stop pattern and the Stop row indicator, since by specification there's already a similar PDF417 variant with only a Start pattern and a Start Row indicator column, known as Compact PDF 417 barcode.

However, they all start to fail once both the Start and the Stop patterns are missing. The MatrixSight® detection algorithm of the barKoder Barcode Scanner SDK can handle all of these cases as it doesn't rely on the existence of these barcode elements.

Even if we go as far as to remove the Stop Row Indicator it's still not a problem for the barKoder barcode reader API.





Full sized PDF417 barcode with all its elements









But it gets even better than that! We can also remove a complete DATA column from the right side and the barKoder SDK will still decode it with ease.

Or instead of the rightmost column, we can take out any columns from the middle of the barcode. It's against all rules and algorithms which are proposed by the respective PDF417 specifications, but it doesn't stop the barKoder barcode scanner SDK to extract all data from it with 100% accuracy.

Finally, of course, various mixed set of damages are also handled expertly by the barKoder SDK, where no other decoder even tries to perform a scan.

Even if we go as far as to remove the Stop Row Indicator it's still not a problem for the barKoder barcode reader API.

## PDF417 Reading Performance

We made a series of internal tests in which we compared the reading rate of most providers in our competitive landscape, utilizing the most damaged and hard-to-read PDF417 barcodes from real-life samples that we have in our database. A total of 22 samples were utilized, part of them that can't be shared due to privacy concerns.

The final result puts barKoder API firmly in the lead with a 90.4% reading rate, **outscoring the nearest competitor by almost 50%**. Following were Scanbot (52.38%), Scandit (47.61%), Dynamsoft (42,85%), Viziotix (38.10%) and Cognex (23.80%)















Direct Part Marking (DPM) Data Matrix and QR codes present unique challenges due to the nature of the surfaces they are marked on and the environmental conditions in which they are scanned.

The barKoder SDK is designed to tackle these challenges head-on through its unique software-based barcode scanning algorithm. Unlike traditional hardware-based solutions, the barKoder SDK uses advanced image processing techniques and machine learning models to adapt to the complex nature of DPM surfaces. By enhancing contrast, compensating for surface irregularities, and reducing noise, the SDK ensures accurate detection even in difficult scanning environments.

## **Common Applications**



#### Automotive

DPM codes are widely used to mark components and parts, allowing for easy tracking throughout the supply chain. This aids in quality control, recalls, and compliance with industry standards.



**Electronics & Aerospace** 

Manufacturers use DPM codes for maintenance, inventory management and traceability of individual components. DPM codes provide essential data for inspections, repairs, improving production efficiency and reducing errors.



**Healthcare and Pharmaceuticals** 

DPM codes are used on medical packaging, medical instruments, equipment and implants to ensure patient safety, track usage history, monitoring drug distribution and meeting regulatory requirements.



Logistics and Supply Chain

DPM codes are essential for tracking packages, pallets and shipments across the entire supply chain, providing real-time visibility and improving logistics operations.

DPM

#### **Unique Features**



#### **Color and Contrast**

DPM barcodes, etched into surfaces, often lack contrast with their background. The color of the barcode matches the surface, and shadows can create variations in contrast, making decoding difficult.



#### **Dots Instead of Lines**

DPM uses dots instead of traditional lines found in common barcodes. The spacing and shape of these dots can impact code readability. Dots that are too close or too far apart can result in decoding errors, and the irregular shape of the dots adds to the complexity.



#### **Surface Imperfections**

The quality of DPM etchings can be affected by the texture of the surface they are marked on. Surfaces may be reflective, uneven, or curved, with their own imperfections such as damage or abrasions, which can hinder the scanning process.



#### **Challenges in Lighting**

DPM barcodes are often found on curved metal surfaces and may not have ideal contrast under ambient lighting conditions. The placement of DPM barcodes in areas with poor lighting can introduce additional challenges for decoding.



#### **Reliability in Confined Spaces**

In electronic manufacturing, DPM codes can be particularly challenging due to their low contrast and tiny size, as they are directly printed on electronic components. Reliably reading such codes is crucial.



## DotCode Scanning for Mobile and Web.

The industry-leading DotCode scanning capabilities of the barKoder Barcode Scanner SDK are now available for all Enterprise & Consumer Mobile & Web Apps.

## DotCode: The Rapidly Emerging Barcode Format

DotCode might be one of the fastest-growing barcode formats in terms of adoption in multiple industries, mainly due to the fact that its structure allows it to be utilized in high-speed printing environments, allowing it to be applied via various methods, including industrial inkjet printers and laser coding systems, such as CO2 and fiber lasers.

Moreover, DotCodes can encode data using all 7-bit ASCII (American Standard Code for Information Interchange) characters, as well as all extended 8-bit ASCII characters. Unlike other 2D codes, DotCodes are not technically limited to any functional capacity with regards to data capacity. There is no fundamental maximum capacity to the amount of data that can be stored in a DotCode, though in practice, printers are likely to be restricted to a size limit of 124 dots in either direction.



You can read more about the characteristics and features of the DotCode barcodes here.

## **DotCode Reading Performance**

The barkoder barcode scanning API features the best DotCode reading algorithm by a significant margin when compared to any competitor product in the software-based barcode reading market, be that closed or open-source. Our internal tests conducted by utilizing the most hard-to-read DotCode barcode samples, numbering 34, puts the barkoder SDK firmly ahead by more than 26,5% then the next highperforming solution.

Scores were made based on reading rate, accuracy, speed, light and scanning angles.



## **Common Applications**

#### Food & Beverage

DotCode is gaining ground in another fast-paced production industry, that is in the beverage sector, especially in the manufacturing and packaging of alcohol products. Serialization by incorporating the serial number within a DotCode is already massively being adopted throughout the industry, promoting tracking & tracing as well as authentication applications throughout the supply chain. It is further used for tracking raw materials, monitoring production batches and ensuring compliance with food safety regulations.



#### **Tobacco Manufacturing**

Following the issuance of the Tobacco Product Directive TPD II, and in compliance with the global standards set by GSI for utilization of DotCode in various tobacco applications in order to meet the requirements of the EU Tobacco Traceability Regulation EU 2018/574, DotCode barcodes started to be printed in the entirety of the tobacco manufacturing supply chain, especially on the package level. This DotCode application has made track & tracing of tobacco products a highly-sought solution in both enterprise and consumer-facing applications.



#### Logistics and Supply Chain

DPM codes are essential for tracking packages, pallets and shipments across the entire supply chain, providing real-time visibility and improving logistics operations.





## Experience barKoder's MRZ module.

BarKoder's MRZ Scanner mobile technology brings you automation, speed, efficiency and excellence to all of your business processes and procedures.

### **SDK Features**

#### **Data Security**

We do not collect personal information! The app however does need to process the personal information that is on the MRZ of the identity document. This includes privacy-sensitive information like name, date of birth, personal number and document number. In addition, the app scans via OCR technology for the date of expiry and any optional data on the document, because all these are needed for information processing.

The personal information is secured since all the processing is done on the phone. Confidentiality of this information is also protected by using encrypted network connections for any requested communication.



#### **High Performance**

Scanning with MRZ Scanner is way faster than manual input. Mobile OCR also removes any human error from your processes. This means the accuracy of your scans will be higher than manual verification. You can use MRZ Scanner to provide the most reliable service possible to your customers. It provides you with near instant scan results once you point your device at your target. Average scan time takes less than half a second.

You can optimize your company processes and procedures by adding the fastest scanning ever to your mobile app. This will also give you more time to focus on other aspects of your business.



#### Work Offline

MRZ Scanner works in real-time, locally on a device, without the need of internet connection. Since the scan happens right on the spot, the data never leaves your phone unless you want it to. All the processing is done at that very moment, right away. This means the results never pass any external servers. That makes MRZ Scanner the perfect tool for completing scans of sensitive information.

Based on your demands our software can, however, transfer data to your servers using a secured end-to-end encryption. When using our SDK (Software Development Kit) you can customize things on both ends.



#### **Cost Reduction**

MRZ Scanner works on your mobile device so there is no need to spend money on expensive external readers. This reduces the cost of equipment and employee training. MRZ Scanner's high accuracy also removes false readings from your processes. More successful scans means more successful transactions. A penny saved is a penny earned. Scanning a passport, visa, ID cards with a mobile device works lightning faster.

With MRZ Scanner you can drastically improve your processes and stay on top on your business at the same time.

























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## barKoder Barcode Scanner SDK

Unique product with state-of-the-art barcode localization algorithm to enhance all kinds of mobile apps, be that Enterprise or Consumer in nature, with a unique mobile barcode scanning engine.





## **Connect With Us!**

## bark<del>o</del>der

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