2D Code Scanning Systems

Responding to the Challenges of the Future
In the rapidly growing area of 2D detection, numerous providers are competing to win the favour of trade and industry. But with so many companies on the market, how can you possibly identify the ideal partner? After all, you don’t want to take any unnecessary risks and you need a company you can trust. With this in mind, look no further than SICK. SICK offers innovative 2D code detection solutions and systems that fulfil all your requirements and help you achieve sustained success.
No question: 2D codes are the future!

In the future, the systematic use of 2D codes will help ensure reliable 1D verification, parts tracking, and variant production control.

In addition, compact 2D codes are an efficient means of fulfilling increasingly stringent requirements regarding quality.

Scanning codes before and after each production phase allows parts to be traced back to suppliers or batches, which not only significantly reduces product recall charges if any faults occur later on, but also ensures that spare parts can be ordered more quickly and repairs carried out more easily.

In automation technology, cost-driving parts must be avoided: high-performance scanners and compact 2D codes with high information density are the only solution. The combination of innovative coding and identification methods also offers effective protection against counterfeiting, another major issue with which companies will increasingly be confronted.

Variant production control ultimately depends on highly flexible production lines with distributed target control, whereby production, assembly, and test programs must be correctly assigned. Using 2D codes ensures that flexible assembly lines can be reliably controlled and synchronizes the assignment of module variants to the main assembly line.

Thanks to their high information density, 2D codes have a wide variety of applications and enable you to respond to the challenges of tomorrow.

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**SICK knows its market and our customers know the benefits!**

SICK is one of the world’s leading providers of sensory detection and measurement systems. Our products can be implemented in almost any area of trade and industry.

In addition, SICK is one of the leading providers of 2D detection solutions, which makes us the world leader when it comes to offering clear technical solutions that cater for all current coding methods and fulfil industry requirements.

In close collaboration with our customers, we can develop practical innovations that are firmly geared toward future market trends.

**You can rely on SICK to help boost your company’s performance.**

Relying on our expertise can help you achieve your production objectives in a time-efficient manner. You can rely on SICK to help boost your company’s performance.

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**We aim for success by focusing on efficient solutions.**

Of course, we seek to collaborate with our customers as closely as possible. Once all the requirements have been clarified, we choose the most effective system solution for the customer.
New and improved codes that offer a level of performance that would have been unimaginable even just a few years ago are being developed at an ever increasing rate. The success of 2D codes is particularly significant as they offer high information density, which means they can be implemented in a wide range of applications, thereby boosting efficiency. In response, SICK has developed flexible 2D code scanners that satisfy all the requirements of 2D coding and are a clear investment in the future.

The range of optical codes in use today includes simple bar codes (e.g. EAN, Code 128, or EAN 128), “stacked” codes, and 2D codes, which have an exceptionally high storage capacity.

With bar codes, the data is simply stored on one level. With “stacked” codes, the data is “stacked” on top of each other, which offers greater storage capacity.

2D codes, however, offer the greatest storage capacity (up to five times as much data as Code 128, for example) and are, therefore, ideal for use on very small objects.

2D codes support the encryption of numerous different characters and fonts and, thanks to their error correction algorithm, are extremely reliable. Even if up to 25% of a code is damaged, it can still be identified.

For detailed information, see: www.2d-code.com

The 2D code hand-held scanner – success is in your hands! Our extremely reliable and high-performance 2D code hand-held scanners help you focus on success.
**2D Code Hand-Holder Scanners**

Hand-held scanners are used primarily for identifying bar codes. Device variants are now also available for scanning 2D codes, which are becoming increasingly common. These devices are extremely robust and ideal for industrial applications. The flexible scanning systems can be connected to standard PCs, mobile data recording systems, POS systems, and other terminals by means of an RS 232, USB, or keyboard loop-in.

**Stationary 2D Code Scanners**

As the symbols and codes used in the area of electronics and component manufacture become ever smaller, scanners that offer maximum performance even in the most compact of areas are a must. Alongside the capability to reliably detect a wide variety of different codes, it must be possible to integrate the scanners quickly and easily in the specific machine environment. Another key benefit of our stationary scanners is that they can be easily integrated in control systems or other higher-level computer systems.

**Compatible with Your System Too**

SICK also offers connection modules that allow you to connect a SICK scanner to a higher-level system, which makes installation and maintenance much easier.

They also allow you to set up special cost-effective SICK networks quickly and easily.

Stationary 2D code scanners: perfect for any application

Our 2D code scanners support all code standards and can be integrated in any environment – from machines to control systems.
With an ever more diverse range of identification methods, numerous different object properties, and specific cycle times, high-performance 2D detection solutions are essential. In response to this demand, SICK offers optimized solutions tailored to your specific requirements making us a partner you can really count on.

To provide an optimized 2D code detection solution, we need to know all the requirement parameters, such as degree of contrast, object sequence, and object speed. Alongside cell sizes, code resolution, scanning distance, and depth of focus, potential problems (such as reflections, poor code marker quality, and distortion) have to be taken into account. Two basic scanning methods, each with different strengths for different applications, have prevailed: line scanning and matrix scanning.

THE DATA MATRIX CODE

Durable codes: maximum data within minimum space!

Data Matrix codes are by far the most widespread code in use today and, with the development of numerous different coding methods, Data Matrix codes can now be marked on almost any object. Since they are marked directly onto a surface (Direct Part Marking “DPM”), they are indestructible and can be scanned reliably.
THE LINE SCANNING

Line-by-line snapshots
With line scanning, the data in the 2D code is read line by line and then converted by means of software algorithms to create a 2-dimensional image. The 2D code line scanners used for this purpose read the individual lines at a frequency of up to 45 kHz with an extremely high resolution. Reading codes on curved objects or at high conveyor speeds couldn’t be easier. They also have an impressive storage capacity that allows them to store and analyze up to 4,000 lines. In addition, the lines to be read can be up to 80 mm long, which means that the 2D code can be found and identified regardless of where it is located. As with traditional bar code scanners, the scanner is triggered by the moving object. To ensure that this is carried out smoothly, certain parameters (such as object velocity, scanning frequency, and cell size) must be properly synchronized.

THE MATRIX SCANNING

Image-by-image snapshots
The principle of matrix scanning is similar to that of a camera, since the second dimension is already automatically integrated. This does mean that a specific section of an image has to be scanned. The scanner is triggered directly by the 2D code, explaining the need for more sophisticated sensors and control systems. The advantage of this method is the exceptional depth of focus that can be achieved. At an image refresh rate of 25 Hz, even objects moving at a medium speed can be identified. CMOS technology also allows sections of images to be selected.
Responding to the challenges of the automotive industry ...

... by ensuring component traceability with zero error tolerance.

Image processing systems for tracking components are increasingly becoming a key component of quality assurance – and it’s not just suppliers in the automotive industry who demand highly reliable and cost-effective scanning systems. Coding marked directly on components by means of lasers, inkjets, or needles makes the most exacting demands on image processing. Code scanners from SICK have long been tried and tested in the automotive industry and can reliably decode everything from bar codes to 2D codes.
Task
Identify 2D codes on a camshaft

Procedure
The ICR850 2D code scanner, which is ideal for curved objects, is used here. During the tests, the camshaft is identified on the test bed by means of a laser-marked 2D code. The camshaft rotates at a speed of one revolution per second.

Result
The data is archived together with the test data ensuring traceability throughout the entire lifetime of the camshaft.

Task
Scan 2D codes on a motor block

Procedure
The ICR840 2D code scanner is ideal for this purpose. The conveyor belt stops momentarily when it reaches the scanning point so that the scanner can scan the code. The belt then starts up again and continues until the next motor block reaches the scanning point.

Result
The data is archived here too ensuring traceability throughout the entire lifetime of the camshaft.

Task
Read 2D codes on body shells

Procedure
The ICR860 camera system is the ideal solution here. It is installed vertically above the conveyor belt and is particularly suitable for reading at distances of up to 2 m. The independent lighting systems and interchangeable lens allow the ICR860 to be adapted to a wide range of different identification applications. As a result, the Data Matrix codes are reliably detected and the body shells guided to the correct assembly line.

Result
The data is recorded continuously, which enables production control to be adjusted accordingly throughout the final assembly process for the vehicle.
In the electronics industry, reliable code detection at a high clock frequency in the smallest of areas is a minimum requirement of 2D code scanners. In practice, however, the required technology has always fallen short – but not any more. The 2D code scanners from SICK offer the required level of efficiency, flexibility, and reliability – detect the difference!
Task
Scan 2D codes on PCBs

Procedure
In the first step on the assembly line, a 2D code is lasered onto the PCB. Once this is complete, the ICR840 2D code scanner is activated, the 2D code is read while stationary and the quality checked so that the laser can be adjusted if required. At the same time, the PCB is “posted” to the production line with its ID number.

Result
• 2D codes undergo quality check
• Each individual PCB can be identified
• Traceability

Task
The production line at a manufacturer of PCBs for the automotive supply industry needs to be upgraded to allow 2D codes to be scanned. 2D codes are preferred because they are so small. The manufacturer needs to find a solution that allows codes to be read on objects being conveyed at speeds of 0.3 m/s, whereby an object might also be marked with more than one code.

Procedure
The ICR850 2D code scanner is the ideal solution for this purpose. Unlike matrix scanning systems, the ICR850 does not have to be adjusted to take into account where the code is positioned, which can vary from board to board. The line scanner searches for the mini label automatically within an 80 mm-wide scan field without the need to be reset or carry out additional searches. The scanner only has to be set once to handle all scanning tasks. The scanner is triggered by the PCB (not the code) via a proximity sensor, which is installed on the conveyor system.

Result
Since the scanner is triggered by the PCB rather than the code, the trigger time does not need to be specially reset for different types of PCB. As a result, no extra time needs to be spent setting or positioning the 2D code scanner when the production line is upgraded.
Responding to the safety requirements of the pharmaceutical and cosmetics industry.

It’s good to know that your medicine and cosmetics are packaged properly.

Whether medical instruments, test tubes, or packaging for medicines and cosmetics, 2D codes are being used more and more in the pharmaceutical and cosmetics industry. They can be reliably identified and assigned, which is absolutely essential when you consider what the consequences could be if things go wrong. There’s no doubt: 2D code scanners from SICK are a healthy investment.

Task
Scan 2D codes on folded boxes for pharmaceutical products

Procedure
The ICR840 is ideal for this purpose. In the final stage on the production line, an inkjet printer prints a 2D code on the box. This code can contain the following information:
• Distribution number to identify the product
• Serial number
• Line ID
• Date of packaging
• Expiry date

Result
• The stringent requirements of the pharmaceutical industry are fulfilled
• Traceability right back to the individual box
Effective document management solutions.

Intelligent 2D code scanners help you achieve success.

For many companies, public authorities, and institutions, 2D document coding is the key to boosting efficiency. The implementation of high-performance scanners ensures that sorting machines can correctly compile and assign individual letters, official documents, bank statements, and much more. Once again, SICK is your address for success.

Task
Scan bar codes and 2D codes on letters and circulars

Procedure
With its ability to handle short cycle times and high speeds as well as read bar codes and 2D codes, the ICR850 is ideal for this purpose. Scanners are installed for each DIN A4 track and are triggered via the machine controller.

Result
- Automatic detection of a diverse range of documents
- Complete dispatch record
# 2D code hand-held scanners

## Scanning range

<table>
<thead>
<tr>
<th>PRODUCT</th>
<th>iT4600g1)</th>
<th>iT48202)</th>
<th>iT48001)</th>
<th>iT48201)</th>
<th>iT63001)</th>
<th>iT6320DPM2)</th>
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<tbody>
<tr>
<td>Scanning range</td>
<td><img src="image1" alt="Graph" /></td>
<td><img src="image2" alt="Graph" /></td>
<td><img src="image3" alt="Graph" /></td>
<td><img src="image4" alt="Graph" /></td>
<td><img src="image5" alt="Graph" /></td>
<td><img src="image6" alt="Graph" /></td>
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<tr>
<td>Technical data</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Applications

- Electronics industry
- Clinical analysis devices
- Document management
- Logistics and distribution
- Automotive industry
- Parcel service
- Aviation industry

## Identification (omnidirectional)

- DPM code
- Data Matrix code
- QR
- Aztec
- Maxicode
- Bar code
- PDF417, RSS14, RSS-Limited, Expanded
- OCR-A/OCR-B
- Image acquisition (BMP, JPEG, TIFF)

## Technical data

- Camera type: Matrix camera
- Resolution: 752 x 480 Pixel
- Operating voltage: 4.5 to 14 V DC
- Interfaces: RS 232 TTL/True, USB, keyboard loop-in, wall emulation
- Switching inputs/outputs: Application specific
- Dimensions (L x W x H): 157/135/81 mm
- Weight: 185 g
- Enclosure rating: IP 41
- Drop tests: 50 x from 1.8 m

## Special features

- 2D imager (IT4820 with cable, IT6320 radio variant)
- Min. operating temperature: -10 °C
- 10 m data transfer range (IT4820)
- RS 232 TRUE (IT4820)

## Accessories

- Visual Xpress software
- Base and charging station IT2020 for IT4820
- Holders
- Tripods
- DPM Setup Tool
- Base station IT2020 for IT6320 DPM

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1) With cable
2) Radio variant (Bluetooth)
# Stationary 2D Code Scanners

## ICR803
- **Module width (mm):** 50
- **Scanning distance (mm):**
  - 0:21 (2D)
  - 0:19 (1D)

## ICR840
- **Module width (mm):** 50
- **Scanning distance (mm):**
  - 0:21 (2D)
  - 0:19 (1D)

## ICR850/852
- **Module width (mm):** 50
- **Scanning distance (mm):**
  - 0:21 (2D)
  - 0:19 (1D)

## ICR855
- **Module width (mm):** 50
- **Scanning distance (mm):**
  - 0:21 (2D)
  - 0:19 (1D)

## ICR860/862
- **Module width (mm):** 50
- **Scanning distance (mm):**
  - 0:21 (2D)
  - 0:19 (1D)

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### Lens selection
- **ICR852:** focus at 60 mm

### Specifications
- **Clinical Analysis Devices:**
  - Automotive Industry
  - Electronics Industry
  - Document Management
  - Access Control (E-Ticketing)
- **Automotive Industry:**
  - Electronics Industry
  - Pharmaceuticals/Cosmetics
- **Electronics Industry:**
  - Document Management
  - Packaging Machines
  - Pharmaceuticals/Cosmetics

### Features
- **Auto Setup**
- **Ethernet Assistant**
- **Code Quality Evaluation**
- **Host and Aux Interface**
- **Minimum Cell Size 0.1 mm at ICR852**
- **Conveyor Speed Max. 7.8 m/s at Cell Size 0.7 mm**
- **Suited for CS- and C-Mount Lenses**

### Optional Features
- **Visual Xpress Software**
  - CLV setup software, CLV connect software
  - CDB420, CDM420 connection modules
  - Gateways for Profibus, DeviceNet or Ethernet
  - Reading trigger sensors
  - Mounting brackets
- **ICR Setup Software, ImageFTP Software**
  - Lenses
  - Protective Cover
  - CDB420 connection module
  - Lighting
  - Reading Trigger Sensors
  - Holder

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### Optional Features
- **Standard**
- **Optional**

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[3) see page 5]
Online processes to boost efficiency

www.mysick.com – your partner portal for sensor technology

The ability to process data quickly and efficiently is becoming ever more important in all areas of industry. SICK has responded to this demand by introducing the online partner portal.

www.mysick.com features an extensive range of e-commerce tools and information that help you plan your sensor technology projects. For example, the order management system provides you with information regarding availability, quotations, and order conditions, as well as the placement of contracts and their status. Thanks to the assignment of individual user authorizations, the SICK partner portal helps support your workflow. Easy online access to application examples as well as downloadable technical specifications, drawings, and graphics allows you to plan your sensor technology projects more quickly and easily.

Plan your sensor technology project online in the SICK partner portal

Easy to use:
The menu options “Products”, “My Info”, and “My Account” provide everything you need to plan your sensor technology projects.

Available round the clock:
It doesn’t matter where you are or when you need to find something out, www.mysick.com offers all the information you need at the click of a mouse.

Secure:
Your data is password protected and can only be viewed by you. The user management system allows you to define who can view which data and who can carry out which actions.

Product Finder

www.mysick.com/Products

The Product Finder allows you to enter specific criteria and, on the basis of these, find the right solution for your application among an extensive range of factory equipment.

Applications Finder

www.mysick.com/Applications

The Application Finder allows you to select a description of an application with regard to a problem, industry, or product group.

Literature Finder

www.mysick.com/Literature

The Literature Finder allows you to call up a variety of publications, including operating manuals, technical information, customer magazines, and other material about SICK products.
Order online now!

Price and availability query:
Find out the price and delivery date of the required product quickly and easily.

Quotation query:
You can enter a reference number for your quotation. The quotations can be accessed online. Each quotation is sent to you by e-mail.

Online order:
Your online order is complete in just a few easy steps.

LEVERAGE THE BENEFITS OF THE SICK PARTNER PORTAL

• Working online boosts your efficiency
• User management supports your workflow
• Current product availability is displayed
• Activities can be carried out much more quickly (e.g. price queries, quotations, orders)
• You can find products, applications, circuits, and accessories more quickly
• Product searches, products, and detailed information are linked in a logical manner
• All the functions and data you need are just a mouse-click away (product search, quotations, order status etc.)
• Exclusive download options (e.g. technical specifications, drawings, graphics etc.)
SICK service for optimized Auto Iden solutions

Pre-Sales

Application consulting
SICK offers the right solution for your identification tasks. To ensure that this is within your budget, we assess the various cost-relevant parameters and use these to propose an optimized solution tailored to your needs.

Engineering
Our teams of engineers elaborate intelligent solutions and combine them to create custom-fit systems. The SICK quality management system ensures that customer systems function properly and with a high degree of reliability.

Project management
Our project management teams ensure that the projects run as smoothly as possible. They provide support every step of the way, from planning right up to the acceptance phase.

After-Sales

Installation
SICK service technicians install bar code and 2D scanners, RFID systems, installation racks, and scanner networks all over the world, and prepare systems for commissioning.

Commissioning
SICK commissioning engineers provide their expertise in configuring the application-specific scanning properties of bar code/2D scanners and RFID systems.

Site management
SICK site managers ensure that the project runs as smoothly as possible on the customer site. They coordinate the work carried out by the SICK technicians with a high degree of flexibility and act as contacts for customers.

Acceptance
SICK service specialists carry out extensive tests to ensure that the agreed performance characteristics of the installed scanners and RFID systems are fulfilled. After successful completion of these tests, the identification system can then be handed over to the operator.
Services for the operational phase

CUSTOMIZED, RAPID RESPONSE, TEAMWORK

Maintenance
SICK scanners and RFID systems are maintenance free. Depending on external influences, however, regular cleaning and adjustments are recommended. This allows us to respond to any changes in the customer application or repair damage, thereby ensuring optimum system performance over the long term.

Troubleshooting and spare parts
SICK offers spare parts and repair services designed to meet customer requirements. We elaborate cost-effective concepts that can be defined as part of a service contract in conjunction with other services.

Hotline
You can contact the SICK sales organizations via a free hotline. This allows us to respond to any questions you may have about SICK products quickly by phone. More complex queries are forwarded to the relevant specialist departments without delay.

Training
SICK instructors offer an extensive training program either at SICK or on site at the customer. We offer configuration engineers, commissioning engineers, and maintenance technicians tailored, product-specific training courses that help them carry out their duties more effectively.

Offering a range of optimized, cost-effective solutions, SICK supports you every step of the way.
INDUSTRIAL SENSORS
Our complete range of sensors provides answers to suit any application in the field of automation. Even under rugged ambient conditions objects are reliably detected, counted and positioned in respect of their form, location and surface finish, as well as their distances established with pin-point accuracy.

INDUSTRIAL SAFETY SYSTEMS
Comprehensive protection for man and machine – advanced SICK products developed and manufactured by a sensor specialist for the protection of hazardous areas, hazardous points and for access protection. SICK is setting new standards with services related to machine safety.

AUTO IDENT
Whether the tasks involve identification, handling, classification or volume measurement, innovative Auto Ident systems and laser measuring systems function extremely reliably, even under rapid cycle times. They conform to the latest Standards and can be simply and speedily integrated in all industrial environments and external applications.

ANALYZERS AND PROCESS INSTRUMENTATION
System control, maintaining setpoints, optimising process control and monitoring the flow of materials – the instruments and services for Analysis and Process Measurement, supplied by SICK MAIHAK, are setting the standards for these applications in terms of Technology and Quality.

Worldwide presence with subsidiaries in the following countries:

Australia  
Belgium/Luxembourg  
Brasil  
Ceska Republika  
China  
Danmark  
Deutschland  
España  
France  
Great Britain  
India  
Italia  
Japan  
Nederlands  
Norge  
Österreich  
Polska  
Republic of Korea  
Republika Slovenija

Russia  
Schweiz  
Singapore  
Suomi  
Sverige  
Taiwan  
Türkiye  
USA/Canada/México

Please find detailed addresses and additional representatives and agencies in all major industrial nations at www.sick.com