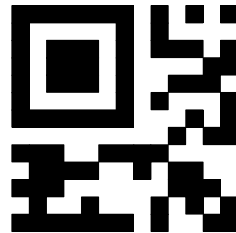# *New Work Item Proposal*

Micro QR Code

Inclusion to ISO/IEC 18004 QR Code

14 – 15 May, 2003

SC31 Plenary

ISO/IEC SC31 National Body of Japan

Review of QR Code

- **Standardized by AIM (1997) then ISO/IEC (2000)**

- **Adopted by major industry such as AIAG, JAMA, JTA, JEITA, etc. and government**

- **Pursuing easy reading**

- **Equipped with all features of other 2Ds**
    - ◆ **High data capacity**
    - ◆ **High density storage**
    - ◆ **High-speed reading**
    - ◆ **Omni-directional reading**
    - ◆ **Error correction**

- **Kanji is supported as a default character set.**

2
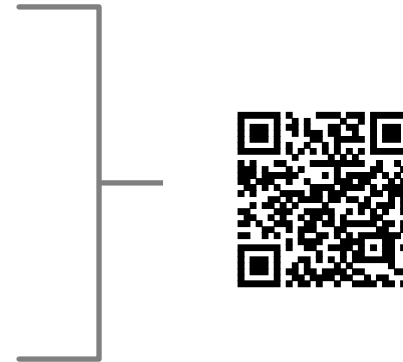
QR Code - National Standard

- **Japan**
  - **Japanese Industrial Standard JIS X 0510**

- **People's Republic of China**
  - **Chinese National Standard GB/T 18284**

- **Republic of Korea**
  - **Korean National Standard KSXISOIEC 18004**

- **Socialist Republic of Viet Nam**
  - **Vietnamese National Standard (under standardization process)**

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QR Code Features

■ **High capacity and reduced space encoding**

- ◆ **Up to 7,089 characters (numeric)**
- ◆ **300 characters (numeric) in 5mm square (0.1mm module)**
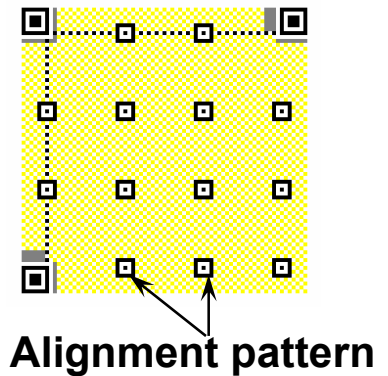
■ **High-speed and omni-directional reading**

360deg

■ **High resistant to damage**

- ◆ **Up to 30% of codewords can be recovered.**

■ **Distortion corrected capability**

- ◆ **Alignment pattern enables correction of local distortion.**

Alignment pattern

■ **Efficient encoding of Kanji/Kana**

- ◆ **20% fewer bits (13 bits) are used to encode Kanji as a default character set.**

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Benefits of Easy (High-Speed) Reading

Easy reading

(High-speed reading)

Fixed reader

Read high-speed moving objects

⬇

Maximize the performance of conveyors

Hand-held reader

Achieve high response and instant reading

⬇

Provide high operability

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QR Code Major Applications

JAMA Label/Kanban (Japan & USA)

Part Label (UK)

Livestock Ear/Tail Tag (Australia)

Product Package Label (Japan)

Soul City Tax Form (Korea)

QR Code Implementation – JAMA Members

- **DAIHATSU MOTOR CO., LTD.**
  - After market parts deliver card & label

- **FUJI HEAVY INDUSTRIES, LTD.**
  - Parts label (Glove box, etc.)

- **HINO MOTORS, LTD.**
  - Assembly line control

- **HONDA MOTOR CO., LTD.**
  - Assembly line control

- **ISUZU MOTORS LIMITED**
  - JAMA standard slips

- **KAWASAKI HEAVY INDUSTRIES, LTD.**
  - JAMA standard slips

- **MAZDA MOTOR CORPORATION**
  - Assembly line control

- **MITSUBISHI MOTORS CORPORATION**
  - Production data control

- **NISSAN DIESEL MOTOR CO., LTD.**
  - JAMA standard slips

- **NISSAN MOTOR CO., LTD.**
  - General material control, etc.

- **SUZUKI MOTOR CORPORATION**
  - JAMA standard slips

- **TOYOTA MOTOR CORPORATION**
  - JAMA standard slips, Parts label, etc.

- **YAMAHA MOTOR CO., LTD.**
  - Direct parts marking

  -
  -
  -

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QR Code Implementation – JEITA Members

- **CANON INC.**
  - Shipping control for printer

- **DENSO CORPORATION**
  - Manufacturing process control for EL display glass

- **FUJITSU LIMITED**
  - Manufacturing process control for hard disk

- **HITACHI, LTD.**
  - Manufacturing process control for personal computer

- **MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD. (Panasonic)**
  - Shipping/receiving control for equipment parts

- **MITSUBISHI ELECTRIC CORPORATION**
  - Manufacturing process control for products

- **SANYO ELECTRIC CO., LTD.**
  - Receiving control for battery

- **SEIKO EPSON CORPORATION**
  - Manufacturing process control for printer head

- **SHARP CORPORATION**
  - Manufacturing process control for MD devices

- **SONY CORPORATION**
  - Manufacturing process control for video camera

- **T D K CORPORATION**
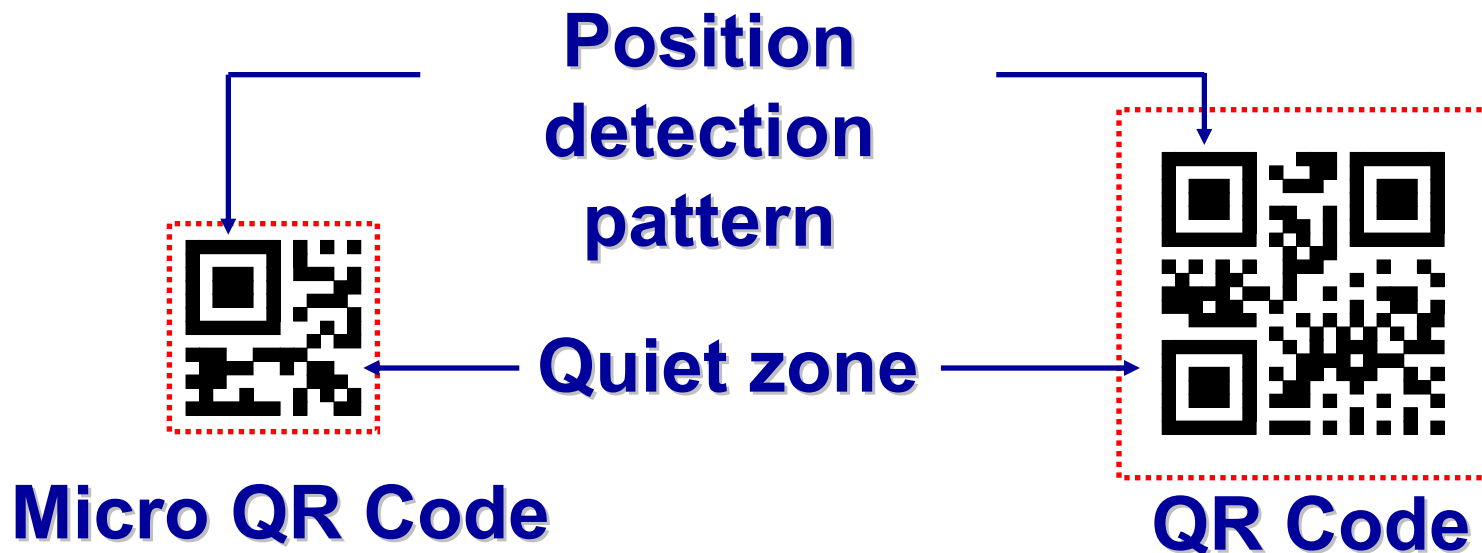 - Shipping control for electronics parts

- **TOSHIBA CORPORATION**
  - Manufacturing process control for personal computer
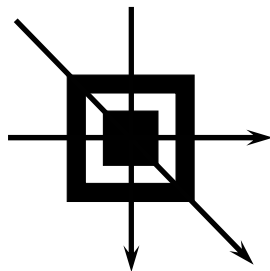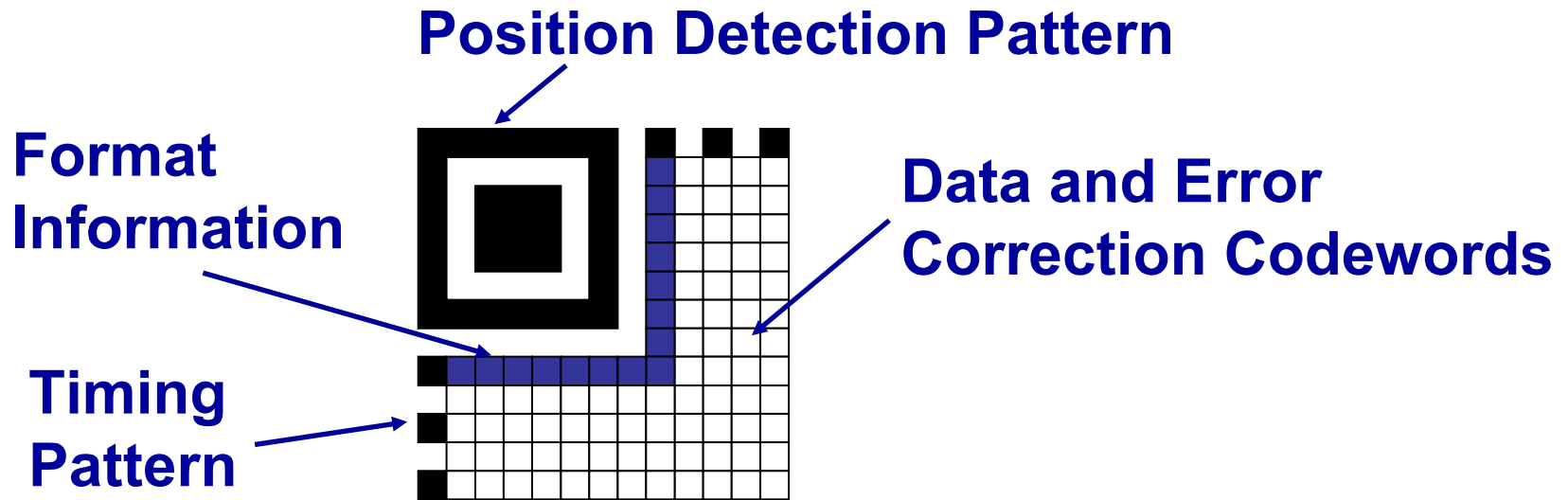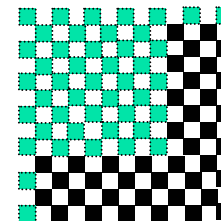 - •
  - •
  - •

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What is Micro QR Code?

- **Only with one PDP to achieve more efficient data encoding and smaller size**
- **Maintain the most beneficial feature of QR Code; "Easy reading"**
- **Suitable for small data/space applications**

Position detection pattern

Quiet zone

Micro QR Code

QR Code

Micro QR Code Structure

Position Detection Pattern

Format Information

Data and Error Correction Codewords

Timing Pattern

B:W:B:W:B = 1:1:3:1:1

Apply masking

Stable high speed reading without effect of background

Data Capacity of All Micro QR Code

Version	Modules per side	Error detection/correction	Data capacity			
			Numeric	Alpha-numeric	8-bit byte	Kanji
M1	11	Error detection only	5	-	-	-
M2	13	Level L (7% corrected)	10	6	-	-
		Level M (15% corrected)	8	5	-	-
M3	15	Level L (7% corrected)	23	14	9	6
		Level M (15% corrected)	18	11	7	4
M4	17	Level L (7% corrected)	35	21	15	9
		Level M (15% corrected)	30	18	13	8
		Level Q (25% corrected)	21	13	9	5

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QR Code Family

■ **QR Code Model 2**

  ◆ **Standard version**

  ◆ **Added aliment patterns to correct more distortion**

  ◆ **Increased data capacity; Up to 7,089 characters** (numeric)

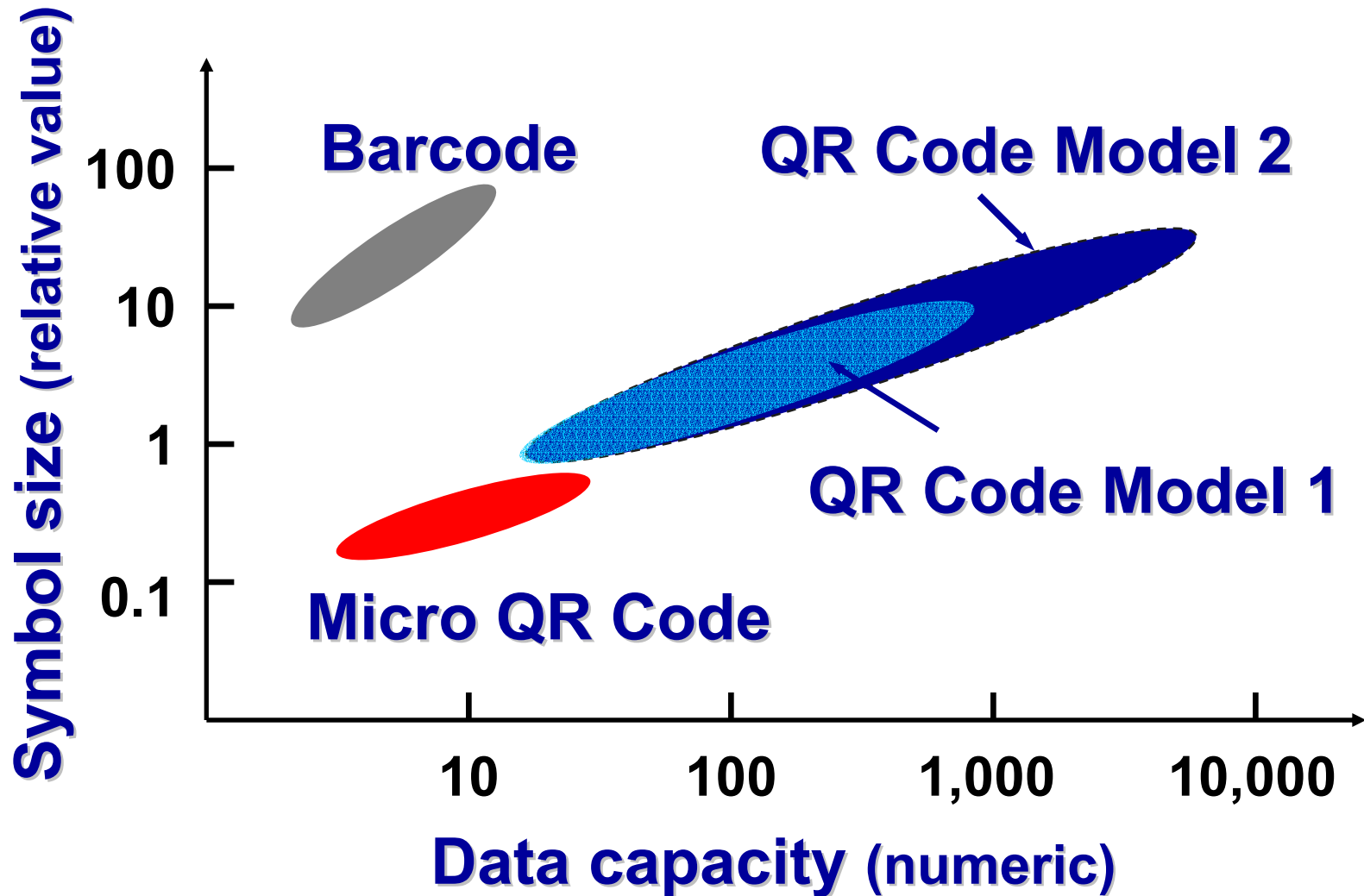 ◆ **Wide range of applications, such as high volume data processing and high-speed reading**

■ **QR Code Model 1**

  ◆ **Original version**

  ◆ **Data capacity; Up to 1,167 characters** (numeric)

■ **Micro QR Code**

  ◆ **Small QR Code with one position detection pattern**

  ◆ **Suitable for small data and limited space applications**

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Comparison of QR Code Data Capacity

Symbol size (relative value) vs Data capacity (numeric)

Barcode, QR Code Model 2, QR Code Model 1, Micro QR Code

Micro QR Code Applications

■ **Ultra small label**

Labels/tags attached to small parts, jewelry etc. where space for a barcode is not available.

■ **Small item marking**

Direct marking on electronic parts, medical supplies, etc.

■ **Data entry sheet**

Catalogue, inspection sheet, etc. where many symbols are printed as data entry media.

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Micro QR Code Application

1. Price tag used in jewelry shop

■ **Item management and sales data entry**

Version: M4
Data: ASB9601Z08

ASB9601Z08
¥18,000

Price Tag

System Configuration
(Price tag used in jewelry shop)

Shop

Sales/inventory data collection

ABC1234Z09
¥35,000
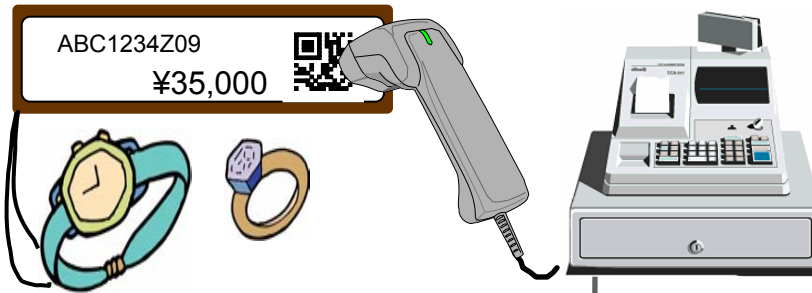
Office

Sales/inventory management
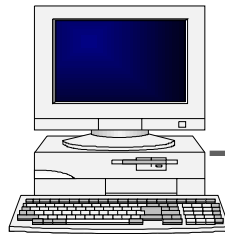
Sales/inventory /client data

Head office

Sales/inventory/client management

Shop   Sale date   Product name
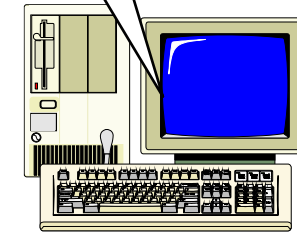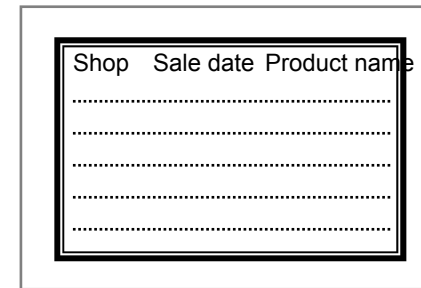
Manufacturers

- **Establish sales system for small jewel and watches**
- **Improve sales/inventory management**

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2. Paperback Book Control

■ **Inventory control/replenishment in book stores**

■ **Country code: 1 digit**
■ **Publisher/title code: 8 digits**
■ **Category code: 4 digits**
■ **Price: Up to 5 digits**
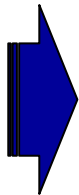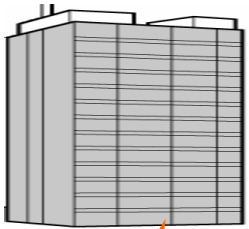
Micro QR Code is printed on book cover

ISBN4-12345-123-3 C1011 ¥1200E

国別記号　書名記号　分類コード　本体価格
出版者（社）記号

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System Configuration
(Paperback book control)

Book store

Center

Order out-of stock books

Download data of books

Read Micro QR Code

- ■ Inventory control is significantly improved
- ■ One salesperson can visit more book stores

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3. Book Label

■ **Book stock control at university library**

Version: M4
Data: 2000N00902210

Book Label

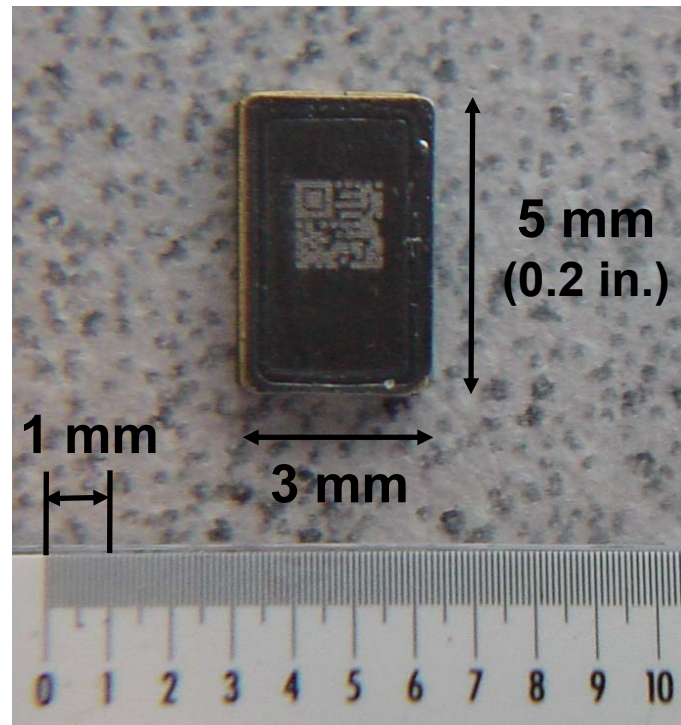# 4. Blood Test Sheet

■ **Efficient data entry of various test items**

Version: M4
Data: 200003340000000000

Blood test sheet

5. Marking on Electronics Parts

■ **Assembly instruction and part tracking in manufacturing process**

5 mm (0.2 in.)

1 mm

3 mm

Direct marking on micro sensor

6. Manufacturing Process Control

■ Automatic assembling and manufacturing data control

Micro QR Code attachment

Issue label

↓

Attach label

↓

Read Micro QR Code

↓

Automatic set-up
■Change line width
■Provide assembled parts info

Assembling process
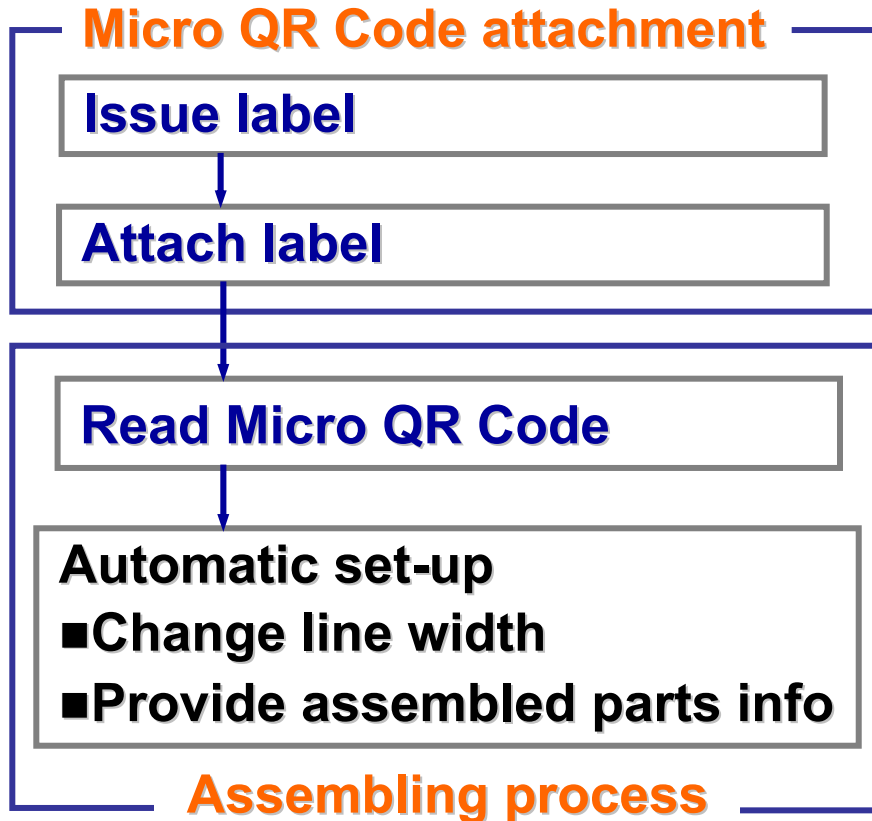
**Symbol size: Approx. 5mm square
Data (26 digits): Product/Serial No,
PCB data, Date**

■ **Automatic set-up system without host PC is realized.**
■ **Manufacturing data is automatically managed.**

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Reference – Support QR Code

■ Reading devices

Major scanner manufactures provide 2D scanners which read QR Code as well as other ISO/IEC 2D symbologies.

Scanner

Pen type

Camera type

Handy terminal

Fixed type

■ Printing devices (printers, software, etc.)

Major bar code printing/marking device manufactures provide devices which generate QR Code
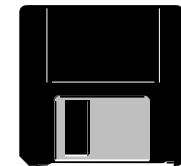

Label printer

Page printer

Marking equipment

PC software

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Add Micro QR Code to ISO/IEC

Excelling features in QR Code Family
（**Technical needs**）

Users need ISO/IEC Standard of Micro QR
（**Business needs**）

■ **Add Micro QR Code to ISO/IEC**

■ **Promote 2D market**

Global product support for QR Code family

Appropriate reference standard exists
(ISO/IEC 18004 QR Code)

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Thank you very much for your kind attention !!