

Icare QR code scanner v2.0.0

Since the version 2.0.0, the QR code scanner is compliant to the last ISO/IEC 18004 norm. The following document describes how the QRCode data are returned while using SmartScan to read Quick Response Codes.

(NB: If you already integrated SmartScan QR Code scanner in your project prior the V2.0.0, there might be some changes you **HAVE TO** implements)

Two outputs

When you scan a QR code with our library, you will have access to two outputs:

1. The raw output that contains all the information needed to interpret the content of the QR code as specified by the norm.
2. The formatted output. If you only scan QR codes that contain text (ex: URL, QR-Bills), then it is the output you most likely want to use.

Terminology

- **ECI:** The Extended Channel Interpretation (ECI) protocol allows the output data stream to have interpretations different from that of the default character set. The ECI protocol provides a consistent method to specify particular interpretations of byte values before printing and after decoding. An ECI is transmitted as sequence \nnnnnn, where nnnnnn is a 6 digits that specifies the desired encoding. A QR code can contain multiple different ECIs.
The default interpretation for QR Code is ECI 000003 representing the ISO/IEC 8859-1 character set.
- **FNC1:** FNC1 mode is used for messages containing specific data formats. In the “1st position” it designates data formatted in accordance with the GS1 General Specifications. In the “2nd position” it designates data formatted in accordance with a specific industry application previously agreed with AIM Inc. FNC1 mode applies to the entire symbol and is not affected by subsequent mode indicators.

Changes to the RAW output

Notice: If you just want to scan text and URLs, reading this section may not be necessary.

Changes since the last version:

- A. The raw output now always starts with a three letters sequence “]QX”, where **X** can hold the value 1 to 6 inclusif, called a Symbology Identifier. The value of **X** indicates the following:

1	QR Code symbol, ECI protocol not implemented
2	QR Code symbol, ECI protocol implemented
3	QR Code symbol, ECI protocol not implemented, FNC1 implied in first position
4	QR Code symbol, ECI protocol implemented, FNC1 implied in first position
5	QR Code symbol, ECI protocol not implemented, FNC1 implied in second position
6	QR Code symbol, ECI protocol implemented, FNC1 implied in second position

- B. When an ECI is present in the QR code, which is indicated by a Symbology Identifier with one of the values **Q2, Q4 or Q6**, **all bytes with the hexadecimal value 0x5C (which corresponds to the ASCII character “\”)** in the content of the QR are **doubled in the raw output (but not in the formatted output)**. So in the raw output, a double backslash “\\” indicates the presence of a real backslash in the content of the QR, while the presence of one backslash “\” indicates the start of an ECI sequence.
- C. The presence of an FNC1 (position 1 and 2) is indicated by the Symbology Identifier (SI). In the presence of an FNC1 in position 2 (SI equal to Q5 or Q6), an Application Indicator follows the Symbology Identifier directly. The Application Indicator consists of either one alpha character (a-z, A-Z) either from a two digits number. The GS1 separator is transmitted as a 0x1D byte value in the QR content as specified by the norm.

Change to the formatted output

If you use our scanner to scan QR with text and URLs, it is easier to use the formatted output rather than the raw output.

Difference between the raw and formatted output:

1. In the formatted output, the symbology Identifier has been striped away.
2. In the formatted output, the ECI sequences are used to encode all the contents in one encoding (UTF-8 on Android / UTF-16 NSString on iOS) if possible and are then stripped away.
3. In the formatted output, when in FNC1 mode, the GS1 separator 0x1D is replaced with “<GS>”. If you don’t know what FNC1 is or if you don’t use it, this will allow you to display the content of such QR. If you plan to use the GS1 separator for specific needs, then it is better to use the raw output.
4. In the formatted output, in FNC1 mode in position 2, the Application Indicator displayed at the start of the output and between brackets.

Examples:

Here are few examples that showcase different types of QR symbols. **Characters in bold indicate the value of a byte in hexadecimal (for bytes that does not represent a displayable character).**

Symbols with Symbology Identifier]Q1



Raw:]Q1Institut Icare\Welcome to the matrix
Formatted: Institut Icare\Welcome to the matrix



Raw:]Q1 **0x00 0x01 0x02 0x03 0xff 0x00 0x01 0x02 0x03 0xff 0x1e**
Formatted: cannot be displayed

Symbols with Symbology Identifier]Q2



Raw:]Q2\000026Institut Icare\\Welcome to the matrix
Formatted: Institut Icare\Welcome to the matrix

Symbols with Symbology Identifier]Q3



Raw:]Q3Institut Icare\Welcome to the matrix123 **0x1D** 45
Formatted: Institut Icare\Welcome to the matrix123<GS>45

Symbols with Symbology Identifier]Q4



Raw:]Q4\000026Institut Icare\\Welcome to the matrix123 **0x1D** 45
Formatted: Institut Icare\Welcome to the matrix123<GS>45

Symbols with Symbology Identifier]Q5



Raw:]Q5AInstitut Icare\Welcome to the matrix123 **0x1D** 45
Formatted: (A) Institut Icare\Welcome to the matrix123<GS>45

Symbols with Symbology Identifier]Q6



Raw:]Q637\000026Institut Icare\\Welcome to the matrix123 **0x1D** 45

Formatted: (37)Institut Icare\Welcome to the matrix123<GS>45