

# QR Code

**QR Code**, in full **Quick Response Code**, a type of bar code that consists of a printed square pattern of small black and white squares that encode data which can be scanned into a computer system. The black and white squares can represent numbers from 0 to 9, letters from A to Z, or characters in non-Latin scripts such as Japanese kanji.



QR Codes were developed in 1994 by the Japanese corporation Denso Wave—a division of Denso, which is a subsidiary of the automobile company Toyota Motor Corporation—to track automobile parts during the assembly process. QR Codes are often used in advertising to encode the URL of a Web site that contains a coupon or information about a product. They also have been used on tickets at

sporting events and concerts. QR Codes are usually read with laser scanners or cameras on mobile telephones, which then use special software to decode the pattern.

Three corners of the QR Code contain the finder pattern, a nested series of black and white squares that, when detected by an optical scanner and interpreted by software, allow the scanning device to determine the orientation of the QR Code. Two other patterns are also present. The alignment pattern, smaller squares containing yet smaller squares, is used in all but the smallest codes to determine if the QR Code has been distorted, and the timing pattern, a row and column of alternating black and white squares connecting the large squares of the finder pattern, serves as the coordinate system of the QR Code.

The largest possible code, Version 40, allowed under the QR Code standard is a matrix of  $177 \times 177$  pixels, and the smallest, Version 1, is  $21 \times 21$  pixels. A Version 40 QR Code can contain 7,089 numeric characters or 4,296 alphanumeric characters. (For comparison, this article contains 2,006 alphanumeric characters.) Denso Wave also created a smaller version of the QR Code for use in tracking small objects. Called Micro QR Code, it comes in four versions ranging in size from  $11 \times 11$  to  $17 \times 17$  pixels.

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