

Arduino QR code generator

Introduction:

The "Quick Response" code or abbreviated as QR code has become an essential part of our digital lives, chances are that you're already subconsciously familiar with them by now you've probably been roaming around your local grocery store, or maybe you are reading through your favourite book, or even possibly you are making an online payment with Google Pay, PhonePe or Paytm, or surfing the web, etc. (I suppose I could go on and on with examples huh?) and you happened to have come across this weird looking square thing and thought, what is this square thing anyway and if you haven't...well, don't worry it's bound to happen sooner or later, so to understand the topic better we are going to do a fun little project with Arduino.

What is QR code?

QR code (Quick Response code) is a matrix 2D code for reading data at high speed, developed by DENSO WAVE in 1994 for the automotive industry of Japan. A QR code compresses data very efficiently compared to the standard barcode, to achieve this it uses four standardized encoding modes (numeric, alphanumeric, byte/binary, and kanji), the technology was made "open source" i.e. available for everyone so, it gained popularity very rapidly. Significant advantages of QR Codes over conventional barcodes are larger data capacity and high fault tolerance.

How QR Code Works?

QR codes (and other data matrix codes) are designed to be read by special tools, not by humans, so there's only a specific amount we can understand by studying visually, although every code is different in various ways though they contain a few interesting common features by observing the circuitdigest.com QR code we will study some of them

Finder Patterns: Large square boxes with a solid box inside in the three corners of the code make it easy to confirm that it's a QR code since there are only three of them, so it's pretty obvious that in which way the code is oriented.

Alignment Pattern: This makes it certain that whatever the orientation the code can be readable.

Timing Pattern: This runs horizontally and vertically between the three finder patterns, using these lines the reader can determine the size of the code.

Version Information: There are currently 40 different versions of the QR code standard, this section of the code determines the QR code version which is being used, for marketing version 1-7 used normally.

Format Information: The format partners have information about error tolerance and data masking.

Data Area: This section of the code contains all the data elements and error correction code along.

Quit Zone: The spacing in every QR code is mandatory in order to differentiate the code from its surroundings.