2-D Barcode Technology

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Missouri
DEPARTMENT OF REVENUE

2-D Barcode - General Information

WHAT IS IT?

2-D barcode technology allows designated Missouri tax forms to display a special barcode that contains the tax return data so the information can be scanned, instead of key entered, resulting in fewer errors and a faster refund.

PRINTERS

Any printer capable of printing graphics can print PDF417 Barcodes. This includes laser, ink jet, bubble jet, and dot matrix printers. A high resolution printer is not required as many label printers are only 200 dpi and they print very high quality PDF417 barcodes.

BARCODE SIZE

The barcode width is 3.45". The maximum height depends on the number of lines passed. 5/8” is the best height.

FILE SPECIFICATIONS

Use defined maximum field lengths. The fields need not be padded to reach the maximum lengths. If a field exceeds the maximum field an error will be generated and the return must be keyed manually. For example, a taxpayer's name is 40 characters in length. The maximum number of characters accepted by the Department’s mainframe system for the last name and first name is 29 characters, including a comma which separates the names. If a name exceeds 29 characters, the return will generate an error during the scanning process and must be manually keyed.

WHAT IS A PDF417?

PDF417 is a two-dimensional stacked barcode symbology providing sufficient information density and capacity for both Portable Date File and small item marking applications.

PDF417 Anatomy

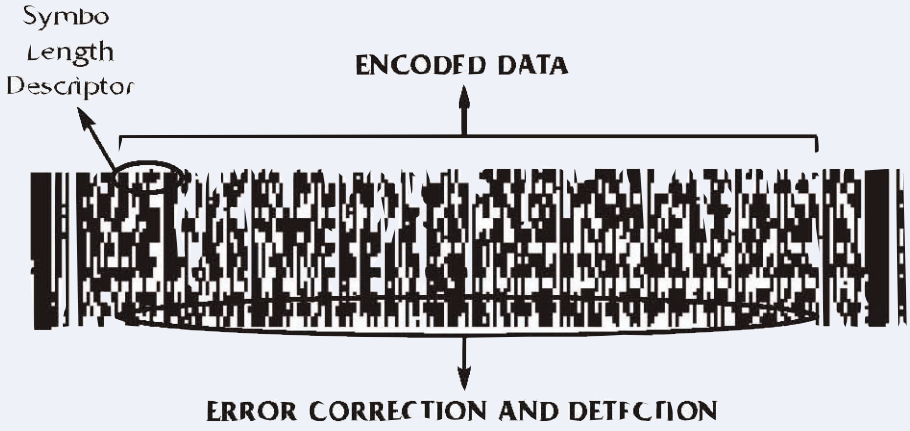
Start and stop patterns are used to delineate where a PDF417 begins and ends and makes reading symbol bi-directional.

Row indicators are located on the left and right side. The row indicators contain information on number of rows, number of colums, and the error correction level.

Data columns are where date and error correction information are located. Data columns are flexible and can e between 1 and 30.

Rows are variable; can be between 3 and 90. Row height, or Y dimension, is user selectable. Recommended Y dimension is 3X.

PDF417 Anatomy



Codewords are the basic unit of storage in a PDF417 barcode. They contain data or error correction information and are used for row indicator information.

Encoded Data is located in the upper part of the data codeword section. It includes "Symbol Length Descriptor" or SLD. First codeword in Symbol. Total number of data codewords including itself.

Error Correction Codewords - There are 9 levels of error correction from 0 to 8. Level 0 allows only error detection. Levels 1 through 8 allow for correction and detection and is located in the lower part of the data codeword section. Error detection and correction is one of the most important features of the PDF417. It is a means of compensating for label defects and misdecodes. Data error are detected and data integrity is maintained. In the event the symbol is damaged, the data originally encoded must be recoverable.

PRINTER REQUIREMENTS

In order to print barcodes, a printer must have graphics capability or embedded barcode capability and have sufficient resolution.

X Dimension - Barcode size is specified by its X dimension. The X dimension is defined as the width of the narrowest bar. Each bar and space is an exact multiple of the X dimension. The single X dimension is also referred to as a module.

Resolution - X dimension is determined by printers DPI and the number of Pixels Per Module (PPM) X = PPM / DPI. Example of 3 PM PDF417 Start Pattern: On a 300 DPI laser X = 3 /300 = .01 = 10 mil.

Ink Spread - Like other barcodes, PDF417 is capable of with standing uniform ink spread. A software technique called Pixel shaving (or bar with reduction), takes advantage of T sequences. Bar width reduction uniformly reduces ink spread.

Scalling Errors - Scalling errors are introduced when barcode images are stretched or shrunk. A 100 module barcode must be printed in multiple of 100 pixels.