DataMatrix Barcode

http://barcoderesource.com/datamatrixbarcode.shtml

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1. DataMatrix Barcode

1.1 DataMatrix Barcode

DataMatrix is a two-dimensional matrix symbology made up of square modules arranged in a square or rectangle shaped pattern. This barcode is capable of packing large amount of data and has the capability of recovering the original data encoded even when it is partially damaged through an error correction technique. The DataMatrix barcode is composed of solid adjacent patterns known as the "finder patterns" in L-shape for locating and orienting the symbol.

1.2 ConnectCode DataMatrix Barcode Font package

This is a professional True Type (TTF) barcode font package that is used to create a DataMatrix barcode by selecting a font in the text editor. The package includes a standalone encoder, a .Net Dynamic Link Library (for application integration) and a true type font for creating a DataMatrix barcode that strictly adheres to the industry specifications ISO/IEC 16022:2006 (ECC200).

1.2.1 Error Correction

The DataMatrix barcode uses the Reed-Solomon error correction technique for data recovery. This allows a partially-damaged barcode to be read and decoded. A partially-damaged barcode could be the result of a partially-torn printed barcode. The original data encoded in the barcode could be retrieved by encoding additional codewords in the barcode for redundancy and error correction.

1.2.2 Data Encodation

The DataMatrix Barcode is able to pack large amount of data using various encodation methods. Each encodation method is optimized for a specific type of data. For example, the C40 method is optimized for upper case alphanumeric characters.

The list below shows the different encoding methods specified in the DataMatrix specification.

- ASCII - ASCII 0 - 127
- C40 - Upper case alphanumeric
- Text - Lower case alphanumeric
- X12 - ANSI X12 EDI Data Set
- EDIFACT - AASCII 32 - 94
- Base 256 - Byte values 0 - 255
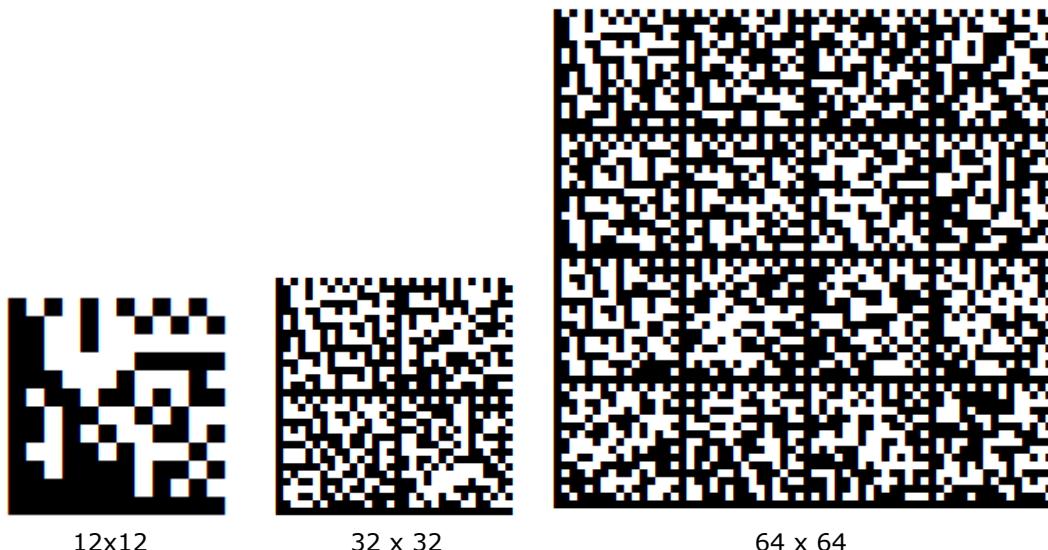
1.2.3 <u>Shape</u>

The DataMatrix barcode supports 24 square symbols and 6 rectangular symbols. The sizes of the different symbols are shown below.

- Square

Square	Row	Column
	10	10
	12	12
	14	14
	16	16
	18	18
	20	20
	22	22
	24	24
	26	26
	32	32
	36	36
	40	40
	44	44
	48	48
	52	52
	64	64
	72	72
	80	80
	88	88
	96	96
	104	104
	120	120
	132	132
	144	144

The diagrams below illustrate the 12 x 12, 32 x 32 and 64 x 64 DataMatrix symbols.

12x12   32 x 32   64 x 64

- Rectangle

Rectangle	Row	Column
	8	18
	8	32
	12	26
	12	36
	16	36
	16	48

The diagram below illustrates an **8 x 18** Rectangular DataMatrix barcode.

8 x 18

1.2.4 Prefix

The DataMatrix barcode supports the following prefixes in the symbol. A prefix is used to adhere to barcode industry standards such as one authorized by AIM International/GS1 or for abbreviating a header to the symbol.

- None
- FNC1 – GS1 FNC1 character
- 05 Macro – Macro codeword 236
- 06 Macro – Macro codeword 237
- Reader Programming – Indicates the symbol encodes a message used to program the reader system

1.3 Parameters of the DataMatrix Code Barcode

The following sections detail the different configurable parameters of the DataMatrix barcode using ConnectCode's package. If you are new to this barcode, it is recommended that you use the default settings mentioned below.

1.3.1 Error Correction

ConnectCode's DataMamatrix Encoder or .Net DLL automatically applies the ECC200 error correction technique on all DataMatrix barcodes generated without requiring the specification of any parameters.

1.3.2 Data Encodation

ConnectCode's Encoder automatically scans through the data and detects the most optimized encodation method. On top of that, it also switches among the different methods if one method is unable to fully encode the data. No parameters are required for the specification of the encodation methods.

1.3.3 Shape

A Square or Rectangle DataMatrix symbol can be selected through the Encoder or the .Net DLL.

- Square (Default)
- Rectangle

1.3.4 Prefix

The prefix for the DataMatrix symbol can be selected through the Encoder or the .Net DLL.

- None (Default)
- GS1 FNC1
- 05 Macro
- 06 Macro
- Reader Programming

1.4 DataMatrix Barcode Font

The following is the description of the DataMatrix Barcode Font used by the Encoder or .Net DLL.

| Font Name	Description	Recommended Sizes
CCodeDataMatrix (CCodeDataMatrix_Trial for the Trial version)	Standard DataMatrix Barcode Font.	Font Size 2..64
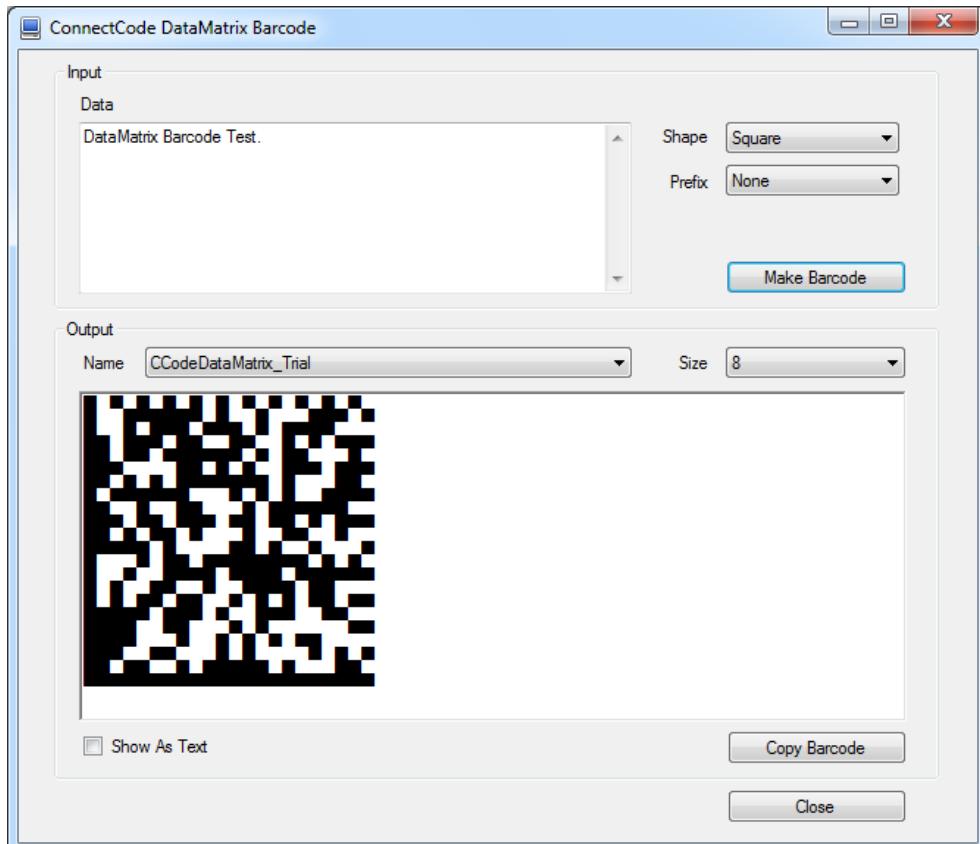
Note
1. You may see spaces (though rare) between multiple Rows when you use the DataMatrix Code barcode fonts in certain font sizes. The DataMatrix barcodes at these sizes should be avoided. The spaces can be easily removed by increasing or decreasing the font size by 1 point.

2. Font Encoder

ConnectCode's DataMatrix barcode font package comes bundled with a Font Encoder that allows you to encode the barcode quickly and easily. This is useful if you like to encode a single barcode to be pasted on your brochure or product items. The Encoder supports all parameters as described in the sections above.

The Shape and Prefix parameters can be easily specified through the user interfaces shown below.

The Font Name and Font Size in the "Output" section can be changed after the DataMatrix barcode is created. This allows the height and size of the barcode to be changed and catered to your needs.

The "Show As Text" option allows you to see the text output of the barcode in a normal text font. The "Copy Barcode" button allows the barcode to be copied and pasted to other applications easily.

3. .Net SDK

A .Net Barcode SDK is also bundled in the ConnectCode DataMatrix Barcode Font package. This SDK can be bundled in your applications if you purchase the necessary distribution licenses.

Library Name
DataMatrix.dll

Namespace
ConnectCode.BarcodeFonts2D

Class Name
DataMatrix

Requirements
.Net 2.0 and onwards

Constructors and Functions

DataMatrix(String data, int shape, int prefix);

This is the constructor for the DataMatrix barcode. It is used for initializing the DataMatrix barcode.

data : The data input string to be encoded as a barcode.
shape : 0 for Square and 1 for Rectangle
prefix : DataMatrix prefix. 0 for None, 1 for GS1 FNC1, 2 for 05 Macro, 3 for 06 Macro and 4 for Reader Programming.

String Encode();

This function encodes the barcode based on the parameters specified in the constructor. The result is returned as a string.

Sample Usage (C#)

```
Using ConnectCode.BarcodeFonts2D;
.
.
.
DataMatrix barcode = new DataMatrix("12345678",0,0);
String result = barcode.Encode();
Font font = new Font("CCodeDataMatrix", 8);
richTextBox1.Text = outputstr; //private System.Windows.Forms.RichTextBox richTextBox1;
richTextBox1.SelectAll();
richTextBox1.SelectionFont = font;
```

Sample Visual Studio Project

1. Name - ConnectCode Encoder
2. Solution Name - ConnectCode.sln
3. Language - C#
4. Requirements - .Net 2.0 and onwards, Visual Studio 2005, 2008, 2010 and onwards.

3.1   .Net Framework 4.0 Notes

.Net Framework 4.0 includes and uses CLR 4.0. It does not automatically use its version of the common language runtime to run applications that are built with earlier versions of .NET Framework. This is unlike .Net 2.0-3.5 where the framework uses CLR 2.0 to run applications. Basically, there is no version 3 of the CLR.

Hence, ConnectCode 2D Barcode SDK provides two sets of .Net DLLs for different versions of the .Net Framework as shown below:

For .Net 2.0 to 3.5 please use the DLLs and samples in

- /Resource subdirectory
- /.Net Samples subdirectory

For .Net 4.0 please use the DLLs and samples in

- /Net4 subdirectory
- /Net4/.Net Samples subdirectory