ARTICLE
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Acrobat® 8 and Barcoded Forms

Creating Adobe® LiveCycle® Barcoded Forms with Adobe® Acrobat® 8

Overview

If you are familiar with the forms capabilities of Adobe® Acrobat® then you may have already discovered a new icon on the Forms toolbar that resembles a barcode. This is the 2 dimensional bar code object, the technology behind LiveCycle® Barcoded Forms.

LiveCycle® Barcoded Forms automates the capture of **user-supplied** data from **printed forms** using 2D barcode technology. It eliminates the requirement to process incoming paper-based forms using OCR (Optical Character Recognition) or manual data entry. Form users simply complete their forms using the free Adobe Reader®, print them, sign them, and then submit them by fax, or by mail. In some cases the form author may even provide the end user with the choice between electronic submission with digital signatures or paper based submission with an ink signature.
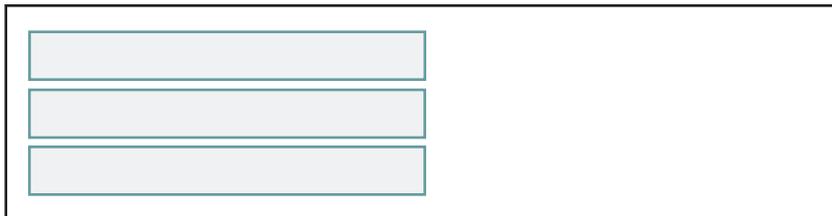
Try changing the information in this small form example to see how a 2D barcode captures data in real-time. The barcode will change each time you modify and then exit the fields (by using the Tab key for example). The data itself can be stored in any number of formats including tab-delimited, your own custom format, or even XML.

Applying the 2D Barcode

Before applying a 2D barcode, you need to create a PDF form that can be filled in before it is printed (a fill-and-print PDF form). If you do not already have one, open one of your print-and-fill forms (printed out and then filled in by hand) and use the new "Run Form Field Recognition" tool from the Forms menu. This will scan through the entire form automatically creating fields where they are required. You can literally convert a paper based form to a fill-and-print form in seconds.
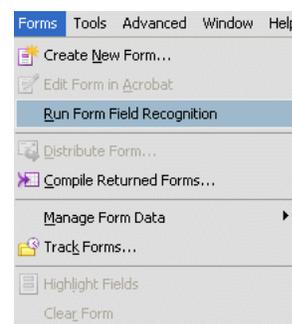
If the Forms toolbar is not already displayed in your workspace, click on Tools, then Forms, and finally "Show Forms Toolbar". This will give you quick and easy access to create additional fields, modify existing ones, and apply the 2D Barcode.
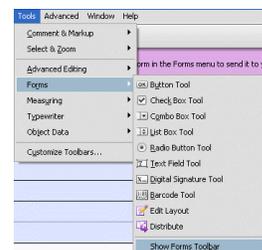
With your fill-and-print form you have a choice to either distribute the form as-is and spend a lot of time and money entering in data manually when forms are returned, or you can add a 2D barcode to capture the data and completely eliminate any requirement for manual data entry.

Before selecting the barcode tool, be sure you fill in your form with as much sample data as possible to reflect what you expect end-users to provide.

FOR MORE INFORMATION
- Adobe® LiveCycle™ Barcoded Forms Datasheet
  (PDF: 468 KB)
- Adobe® LiveCycle® Reader Extensions Datasheet
  (PDF: 520 KB)

Find some free real-estate on your form where you can apply the 2D Barcode. The physical space required will depend on the barcode type (symbology) you plan on using. If you chose PDF417, you will need a rectangle shape that is wider than it is longer and for QRCode as well as DataMatrix you will need a square space.

Click on the icon of the barcode in the Forms toolbar and you will see a cross-hair cursor. Select an open area on your page and "draw" the barcode the same way you would a text field. Before you click on the OK button on the first screen displayed after releasing the mouse button, take a moment to read the notice. You will see the text "separate license required". It is important to note that there are possibly licensing requirements to use this technology. I will provide some examples of license use cases further on.

Once the barcode is drawn, the **properties box** will appear and the 2d barcode will be rendered on the form. If sample data was not entered prior to creating the barcode there will be a warning letting you that there could be a problem with the barcode size. Entering sample data is actually an important step as Adobe® Acrobat® will try to estimate the barcode size required to hold all of the form data. In fact, the barcode rendered may not be exactly the size you designed.
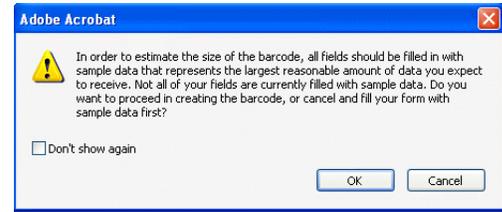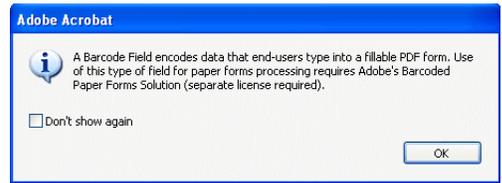
Barcode Properties

In the **General tab** you simply need to provide a name for the Barcode if the one that was automatically generated is not suitable.

The **Options tab** lets you decide which barcode symbology will be used. Each symbology has unique properties although the choice is frequently defined by region. For example, PDF417 is the de facto standard for North America and QRCode is more popular in countries using double-byte character set languages, like Japan. The compression option should only be turned on if you plan on using Adobe's decoder. With compression on, the data is "FLATE" compressed before being rendered in the barcode, so hand-scanners and third-party barcode readers may not be able to decode the data.
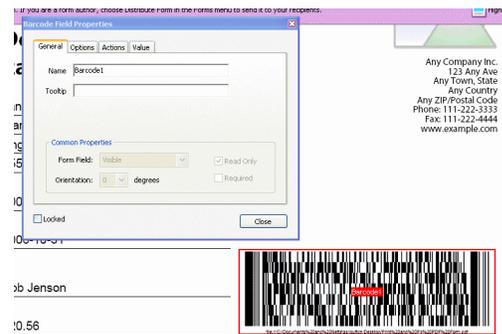
The Decode Condition is probably one of the most important configurations of the Barcode. If you plan on receiving the filled-in and printed documents physically, and then scanning them with a document scanner, select Document Scanner. If the documents are going to be faxed to a fax server then you must select "Fax Server" as the decode condition. This setting automatically changes the sizing and error correction properties of the barcode to allow it to be decoded even if it is damaged. There is a "Custom" button available that allows you to change sizing and error correction of the barcode but I would not advise changing these values unless you are familiar with the barcode symbology and have to make specific changes to support your form workflow. For example, you may discover that by reducing the error correction level to 2 allows you to put significantly more data into the Barcode. However, you would more than likely have a barcode that could not be decoded, or the read rates would be extremely low.
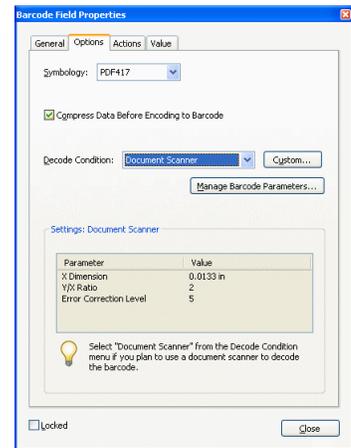
The **Value tab** allows you to select the items to include in the barcode as well as how the data should be encoded. Selecting "Encode using..." will encode data automatically. You may also write your own script by choosing "Custom calculation script". If you take the automated route, select the **Tab Delimited** format and then which fields to include by clicking on the "Pick" button. You will notice that XML is available as an encoding method but compared to a delimited format it will take up much more space in the barcode.
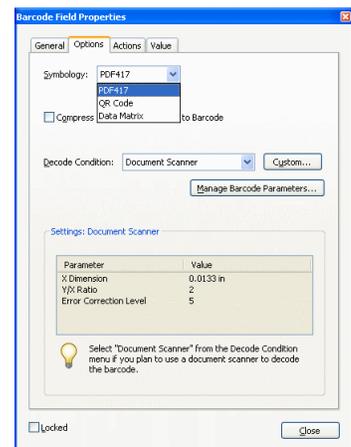
XML Encoding	Tab Delimited Encoding	
<?xml version="1.0" encoding="UTF-8"?>	FirstName	LastName
<xfa:datasets xmlns:xfa="http://www.xfa.org/schema/xfa-data/1.0/">	John	Smith
<xfa:data><form1>		
<FirstName>John</FirstName>		
<LastName>Smith</LastName>		
</form1><xfa:data>		
</xfa:datasets>		

If you do select "Tab Delimited" you have the option to include the field names along with the data. This may facilitate easy conversion to other formats when the forms are decoded.

If you opt for custom coding in the barcode then you can encode the fields in the order and format that you chose.

Custom Calculation Script

```
event.value = this.getField("FirstName").value + ","
        + this.getField("LastName").value + ","
        + this.getField("Init").value;
```

The "Reference to published form:" is simply a label placed at the bottom of the barcode. You can either reference the form location or provide other information such as the form type, page number and barcode number.

Sizing and Capacity

If at any point you notice that the barcode turns into a gray box, this is an indication that you have put more data into the barcode than it can handle. You may want to try reducing the number of fields included in the Barcode or increase the size of the barcode itself. Keep in mind that there is no limit to the number of barcodes you can use in a PDF or their location. For example, in a 4 page document, a barcode on page 4 can capture data from pages 1 and 2 while a second barcode on page 4 captures the remaining data from pages 3 and 4.

The capacity of a barcode is based on a number of factors including error correction, size, and content. A 3" wide by 1" high PDF417 barcode with "fax" based error correction will be able to hold approximately 300 *upper-case* characters. A 7" wide by 1" high PDF417 barcode with "document scanner" based error correction will be able to hold approximately 1,688 *upper-case* characters. Without having to understand all of the concepts of 2D barcodes, try to be sure that you create maximum lengths for all of your form fields and test the form with different data types to ensure that the barcode never "grays out". You may want to restrict the type of data that is entered into fields by using regular expressions. A good capacity test is to fill all fields to their maximum length with the repeating characters "HeLlO1Y3!". This will force the barcode encoder to switch back and forth between different encoding methods and in-turn thoroughly testing your barcode capacity. It will however, encode more data than a user would actually enter.

An Adobe® Acrobat® Standard or Professional Workflow

If the forms you create are going to be **filled in and printed using Adobe® Acrobat® Standard or Professional**, then no additional licensing is required. When printed from Standard or Professional, the 2D barcodes are in a **plain text format**. As long as you do not turn on data compression in the barcode properties, you will be able to read the barcode using any decoder capable of reading 2D symbologies including hand-held scanners.

If you already have a high speed document scanner, it more than likely has 2D barcode reading capability built in. If you do not have a decoder you can acquire the Adobe® LiveCycle® Barcoded Forms Decoder. In an **Adobe® Acrobat® Standard or Professional** based workflow, you need only the decoder. You will not need to license any forms unless you wish to publish forms and have them filled in and printed using the free **Adobe® Reader®**.

An Adobe® Reader® Workflow

A license is required if the *2D* **barcoded** PDF forms you create are going to be filled in and printed using the **free Adobe Reader®**. If the form is unlicensed, when the fill and print form is printed or saved, the barcode is encrypted and can not be decoded. If the 2D barcode is scanned with a hand-scanner, it would produce a positive read but the result would be garbled data. The same result would be true of a software-based decoder such as those built into some high-speed scanners.
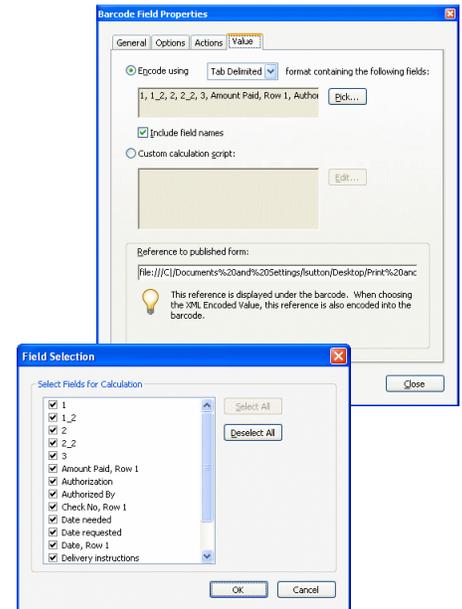
When licensed, as long as you do not turn on data compression in the barcode properties, you will be able to read the barcode using any decoder capable of reading 2D symbologies including hand-held scanners.

The encryption of the barcode is not a "feature" that can be turned on or off by the form designer, it is simply a licensing mechanism.

Form Deployment for An Adobe® Reader® Workflow

Licensed Fill-and-print **barcoded** PDF forms are prepared for deployment by using Adobe® LiveCycle® Reader Extensions to enable the 2D capability of the form. The file that needs the 2D "right" is selected and uploaded using the easy-to-use web-based interface. The rights you wish to enable are selected and Adobe® LiveCycle® Reader® Extensions creates the *extended* barcoded PDF form for you to distribute to your customers or constituent base.

If you do not already own Adobe® LiveCycle® Reader Extensions and are not ordering it with your Adobe LiveCycle® Barcoded Forms license, a "bundled" version of Adobe® LiveCycle® Reader Extensions is provided to you at no additional charge. This bundled version provides you with the software "rights" to enable the 2D functionality on PDF forms. This does not include other Adobe® LiveCycle® Reader® Extensions rights such as save-off-line.

If you already own Adobe® LiveCycle® Reader® Extensions or are ordering it with your Adobe's LiveCycle® Barcoded Forms license, you will be provided with the software "rights" to not only enable 2D functionality on PDF forms but all of the features of Adobe® LiveCycle® Reader Extensions such as save-off-line, commenting, as well as many others.

"What about electronic submission?"

If you have the option for your form to be submitted electronically instead of the end-user printing it, by all means, save a tree. LiveCycle® Barcoded Forms is meant to be applied to forms that have to be printed. This can be for any number of reasons including ink or multiple ink signature legal requirements, supplemental attachments, or even a customer or internal workflow preference.

2D barcoded PDF forms make a great *stepping-stone* or *bridge* technology. If you have a paper based form and you would like to move it into an electronic format but that change may be too "radical" for your organization, start off by eliminating data entry with 2D and then move to electronic submission once your infrastructure is ready for it. You will be respecting the existing paper-based workflow while eliminating the costly manual data entry.

"What about OCR?"

The accuracy of OCR or ICR (Intelligent Character Recognition) can be good in some cases but it is not 100% reliable. In a TAWPI study it was found that in the best case OCR would capture form data with 90% accuracy and again, this was a best case. This means that at least 10% of the data coming into the organization was incorrect and needed to be manually processed. Typically this is called the Verification or Validation step. As a 2D barcode does not give any false positives, if you can read the barcode you can be certain that you have 100% of the data with 100% accuracy completely eliminating any manual verification or validation steps.

ALBF-Oct 2006-Adobe Acrobat 8 and Barcoded Forms.pdf