

Barcoding User Guide

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Preface

DFdiscover Release 5.11.0

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Getting Help

For software support, Please contact the DFdiscover team:

- via email, help@dfnetresearch.com.
- Visit our website, <https://www.dfnetresearch.com>.

Conventions

A number of conventions have been used throughout this document.

Any freestanding sections of code are generally shown like this:

```
# this is example code  
code = code + overhead;
```

If a line starts with # or %, this character denotes the system prompt and is not typed by the user.

Text may also have several styles:

- Emphasized words are shown as follows: **emphasized** words.
- Filenames appear in the text like so: dummy.c.
- Code, constants, and literals in the text appear like so: main.c.
- Variable names appear in the text like so: nBytes.
- Text on user interface labels or menus is shown as: **Printer name**, while buttons in user interfaces are shown as `Button`.
- Menus and menu items are shown as: `File` > `Exit`.

Introduction

This guide describes the tools in **DFdiscover** that are available for barcoding CRFs. For studies that are EDC only, or never expect to receive study data on paper CRFs, barcoding is not needed and these tools are not needed.

Barcoding can significantly streamline the process of receiving paper CRFs and automatically directing them to a study.

Barcoding CRFs

DFdiscover includes two methods for barcoding CRFs,

- A **FrameMaker®** plug-in that creates barcodes directly within **FrameMaker®** and inserts them into the current CRF (supported for FrameMaker 10 through FrameMaker 2017 only), and
- **DFbarcode**, a standalone application that creates barcode image files, in TIFF, PNG or BMP format, for inclusion into CRFs via other desktop publishing software.

While both methods will be described, the **FrameMaker®** plug-in is a legacy tool not supported for newer versions of **FrameMaker®**, therefore the **DFbarcode** application is recommended for most users.

If barcoding is needed and the **DFdiscover** methods cannot be used, the final chapter provides the technical details needed to create barcodes from scratch.

DFdiscover Plug-in for FrameMaker® Installation

Before the **DFdiscover** plug-in for **FrameMaker®** can be used from within **FrameMaker®**, there is an installation procedure which your administrator must perform. Refer to [Software Installation Guide, DFdiscover barcoding plug-in for FrameMaker installation \[PK02\]](#) for additional information.

Barcoding with the DFdiscover Plug-in for FrameMaker®

NOTE: The **DFdiscover** Barcode plug-in for **FrameMaker®** is a legacy tool supported for older versions of **FrameMaker®** only (FrameMaker 10 through FrameMaker 2017). For newer versions, use the **DFbarcode** desktop application instead, available for both Windows and macOS. See [Using the DFbarcode Application](#) for details.

After installation of the plug-in for the local instance of **FrameMaker®**, you can create barcodes and insert them directly into the current document.

Accessing the Plug-in

The plug-in is installed in the **FrameMaker®** menubar under the **DFdiscover** > **Barcode Tool** menu item. The **DFdiscover** menu typically appears between the **Table** and **Window** menus. Confirm successful installation before proceeding.

Select **DFdiscover** > **Barcode Tool** to start the plug-in. The user interface is displayed.

Barcode Tool

Specify values for the desired barcode attributes

	Number	Label
Study:	123	DFdiscover #
Plate:	3	Plate #
Visit:	1	Visit #

OK Cancel

Creating a Barcode

The plug-in can create a complete barcode or any individual component (study number, plate number, and visit number) of a barcode, and position it directly on the current CRF at its required location.

Each component of the barcode is labeled with default text or user-specified text. The text labels play an important role in CRF routing. It is highly recommended that you indicate with a label below the barcode what the actual values are. This will greatly assist the user responsible for routing any CRFs that could not be routed automatically.

The steps in creating a barcode with the plug-in are:

1. The value is entered under the **Number** column in the row appropriate to the component.

The barcode graphic that is produced depends on the values entered for **Study**, **Plate** and **Visit**. If the value is blank that portion of the barcode will not be created. For example, in CRFs where the visit number is the first data field and hence is not part of the barcode, the **Visit** value must be left blank.

The legal integer values that can be entered are:

- **Study** 1 to 255, inclusive
 - **Plate** 1 to 500, inclusive
 - **Visit** 0 to 511, inclusive
2. The number equivalent of each barcode component is always printed below the component. In addition to the number, it is recommended to combine the number with a descriptive label. The default labels are **[DFdiscover #]**, **[Plate #]** and **[Visit #]**. The text of any label may be edited in the dialog and applied when the barcode is created.

For the barcode labels, the font family, style, and size are taken from the current **FrameMaker®** character format, not the current paragraph format. These must be set appropriately before the barcode is created.

The text labels and/or font settings may also be subsequently edited directly with **FrameMaker®** tools.

The number for the component *always* appears *after* the label. If a label is left blank, only the number

appears. If the number is left blank, that component of the barcode is not created.

3. The barcode is created and positioned at the correct location on the current CRF.

To cancel the operation without creating a barcode (or editing an existing barcode), click .

Editing a Barcode

Once a barcode has been created for a CRF it can subsequently be moved, cut, or pasted just like any other object. It can also be edited.

Editing a barcode allows any/all of the study, plate or visit numbers to be changed.

To edit an existing barcode:

1. The CRF containing the barcode to be edited must be the current page.
2. The plug-in dialog is displayed with the current values pre-filled from the existing barcode on the CRF.

The settings for an existing barcode are stored as attributes of the anchored frame that contains the image. While it is possible to delete the anchored frame without deleting the image, this will cause any subsequent edits to not reflect the current settings.

3. The number or label for any component can be updated, added, or deleted (by leaving that value blank).
4. The existing anchored frame, image, and text labels are deleted, and new ones are created. The current character format will be applied whenever a new text label is created.

Using Master Pages

In **FrameMaker®** it is convenient to create a master page that includes text and graphics that will form a background common to all CRFs.

In the context of the barcode, the registration bar and the **DFdiscover** study number are common to all CRFs for the study. Hence it makes sense to create and position that barcode component on a master page. The plug-in can be used to generate this graphic by entering only the number and label for the study component and leaving everything else blank.

The unique barcodes for plate and visit number will subsequently be added to each CRF. These barcodes will be created by leaving the study number component blank and only specifying the plate and/or visit number. The plate and visit portion of the barcode are then imported directly onto the body page (rather than the master page). With default positioning, the registration bar from the master page and the body page will be automatically aligned to create one contiguous bar.

Using the DFbarcode Application

DFbarcode creates barcodes in the same fashion as the **DFdiscover** plug-in for **FrameMaker®** (see [Barcoding with the DFdiscover Plug-in for FrameMaker®](#)). Rather than positioning the barcode on a CRF, **DFbarcode** saves the image of the barcode to a file or the system clipboard. The barcode can subsequently be pasted (or imported from the saved file) as a graphic image into a desktop publishing package and positioned by the user on a CRF.

Each barcode image is saved as a separate file. The use of meaningful names for the images is left to the user.

Creating Barcodes with DFbarcode

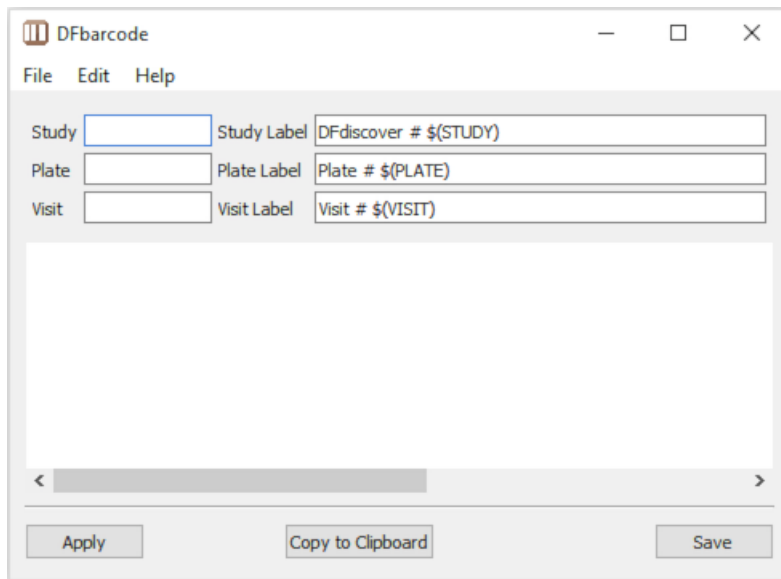
1. Start **DFbarcode**

- For Linux users, starting **DFbarcode** requires a command shell. At a shell prompt, type

```
% /opt/dfdiscover/bin/DFbarcode
```

- On Windows or macOS, click (or double-click) the **DFbarcode** icon.

DFbarcode starts and displays the main window interface.



2. Specify the barcode components to be created.

The barcode graphic that is produced depends on the numeric values entered for **Study**, **Plate**, and **Visit**. If the value is blank, that portion of the barcode graphic will not be created. For example, in cases where the visit number is the first data field and hence is not part of the barcode, **Visit** value can be left blank.

The legal integer values that can be entered are:

- **Study** 1 to 255, inclusive
- **Plate** 1 to 500, inclusive
- **Visit** 0 to 511, inclusive

1. Modify the label (optional)

The numeric equivalent of each barcode component should always appear below the component. In addition to the number, it is recommended to combine the number with a descriptive label. The default labels are **DFdiscover # \$(STUDY)**, **Plate # \$(PLATE)** and **Visit # \$(VISIT)**, where **\$(STUDY)**, **\$(PLATE)** and **\$(VISIT)** are placeholders for the respective number. The text of any label may be edited in the dialog - it is applied, including number replacement of the placeholder, in the preview and when the barcode is created.

For the barcode labels, the font family, style, and size can be changed by selecting **Edit** > **Fonts...**. The same font styling is applied to each of the barcode labels. Changes to font styling also apply to each of the labels.

If a label is left blank (not recommended), then no label appears below that barcode component. If the number is left blank, that component of the barcode is not created.

4. Click **Apply** to create a preview of the barcode.

If it is necessary to edit the image, re-specify the component numbers and labels and click **Apply** again before proceeding to the next step.

5. Click **Save** to save the barcode image.

In the file selection dialog, navigate to the desired directory and provide a meaningful name, with the desired extension (BMP, PNG or TIFF), for the file and then click **Save**.

6. Click **Copy to Clipboard** to copy the barcode image to the system clipboard.

Once copied to the clipboard, the barcode image can be pasted in any application that supports images and clipboard operations.

Repeat this procedure as necessary to create barcodes for each CRF that requires barcoding.

NOTE:The imported barcodes will appear with the correct size so long as you adhere to the following criteria:

- If importing the saved image into a Word document, the document's top and side margins must be defined as 0.5 inch. If the margins are defined differently, the barcode size will be adjusted to accommodate the margin size and the result will be an incorrect placement and/or sizing of the barcode.
- If importing the saved image into a **FrameMaker®** document, the import setting must be specified at 100 dpi.

Creating Barcodes from the Command-line

DFbarcode can also run from the command-line if the required arguments are supplied; otherwise the tool will start in display mode.

From the command-line, enter

```
% DFbarcode study_number plate_number visit_number outfile file_format (TIF|PNG|BMP)
```

DFbarcode creates a barcode from the provided arguments and saves it in the desired format by creating or overwriting outfile. **DFbarcode** outputs any error messages to the command-line.

study_number	Study number between 1-255 (required).
plate_number	Plate number between 1-500 (required).
visit_number	Visit number between 0-511 (optional).
outfile	File name where the barcode image will be saved (required).
file format	Must be one of TIF, PNG or BMP (if provided). If not specified, then output file's extension is used to determine the expected output format. If the output file extension is not supplied, or is not one of TIF, PNG or BMP, the image is created in TIFF format.

Create a barcode for study 253 plate 50 and save it to plate50barcode.tif as a TIFF image

```
% DFbarcode 253 50 plate50barcode.tif
```

Example 3.2. Create a barcode for study 253 plate 10 visit 1 and save it to plate10barcode as a PNG image

```
% DFbarcode 253 10 1 plate10barcode PNG
```

or

% DFbarcode 253 10 1 plate10barcode.png

Creating Barcodes from Scratch

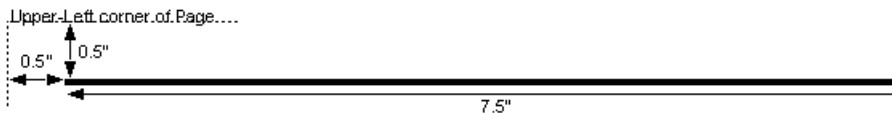
A barcode is a series of vertical bars having known widths placed in sequence at fixed positions. Hence it is also possible to create barcodes by simply creating and positioning graphic elements that have the dimensions of the needed vertical bars.

NOTE: Creating barcodes from scratch is not recommended and should only be used if your desktop publishing package does not support either the **DFdiscover** plug-in for **FrameMaker®** or barcode images created by **DFbarcode**.

Barcode Requirements

The **DFdiscover** barcode across the top of each CRF is used to automatically route incoming documents to a specific study database. Proper barcoding is integral to the success of the automated **DFdiscover** processing, and as such it must be done with care.

A horizontal rectangle .06 inch in width and 7.5 inch in length, referred to as the CRF registration bar, must be positioned near the top of the page, above the barcodes. Its upper-left corner must be 0.5" down and 0.5" in from the upper-left corner of each printed CRF. This line is used to distinguish the top of the page (from the bottom) and also serves as an origin for the barcode.



The barcode itself encodes the study number and the plate number, and optionally, the visit number. The study number is represented by an 8-item barcode while the plate and sequence numbers are 9-item barcodes.

If you are not able to import TIFF files into your desktop publishing package, you may be able to create the barcodes from individual graphic elements within the desktop publishing package you use. In this case you will need to read and follow these specifications.

To construct the barcode for a number:

- Determine the binary representation of the number. The binary number must be padded with leading zeroes if necessary to make the number of digits match the number of bars in the barcode (8 bars for study number, 9 otherwise).
- Each 1 within the binary number is represented by a black bar .12" wide while each 0 is represented by a black bar .04" wide.
- Each bar is .25" high.
- Bars are aligned at their left edges on .25" intervals. The first bar on the left is positioned with its upper-left corner exactly .5" right and .125" down from the upper-left corner of the top of the CRF registration bar. The remaining bars are positioned from left to right on .25" intervals with no gaps.

Example Barcode for Study 139, Plate 070, Visit 001

The binary representations for study number 139, plate 70, visit 1 are 10001011, 001000110, and 000000001 respectively, which translates to the following bar widths (in inches) placed from left to right on the page: .12 .04 .04 .04 .12 .04 .12 .04 .04 .12 .04 .04 .04 .12 .12 .04 .04 .04 .04 .04 .04 .04 .04 .12. The barcode has the following appearance.

The text labels DFdiscover #, Plate #, and Visit # are arbitrary. Use whatever seems most appropriate for your study. The creation and positioning of text labels must also be done with text or graphic elements.

Each text label must be followed by the numeric value of the barcode that it represents. These labels must be spaced 0.125" below the bottom of the barcode. The first label should be left-justified with the first bar, the second label with the 9th bar, and the third label with the 18th bar.

In cases where the visit number is the first data field and hence is not part of the barcode, the last nine bars are omitted from the barcode.

Example Barcode for Study 139, Plate 070 in which the visit number is omitted



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DCMTK software package

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RSA Data Security, Inc., MD5 message-digest algorithm

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mpack/munpack

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c3.js

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d3.js

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jwt-cpp

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QXlsx

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