FenForm

A document formatting and printing system

Version 1.4

User Guide

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<u>Introduction</u>

The purpose of FenForm is to merge text with a form in the same way that the text could be printed by a line printer or dot matrix printer onto pre-printed stationery. This saves the expense and inconvenience of keeping stocks of, often expensive, pre-printed forms such as Invoices, Credit Notes, Purchase Orders, Remittance Advices etc. Instead, the forms are stored as images on a disk. FenForm is not an "all or nothing" solution - company letterheads, perhaps using "corporate colours", can be used as the base stationery with FenForm adding the specifics of the required form.

FenForm is designed to act as a direct replacement for a dot-matrix type printer. It accepts fairly standard control codes (see below) embedded in the print file so there should be no need to make any changes to your existing application software. In the majority of cases, FenForm is completely interchangeable with a dot-matrix printer.

The text is read from STDIN or a specified input file, merged with a form, and written to STDOUT or a specified output file in the PostScript™ format. The output can then be sent to a printer or, with a little additional software, a fax or email system. For example, if you currently print with a command like -

> *application-pgm* | **lpr -P***dot-matrix*

you can simply replace it with -

> *application-pgm* | **fenform -f** *formname* | **lpr -P** *ink-jet-printer*

(The printer "ink-jet-printer" must be able to print PostScript files.)

The form is optional, if it isn't specified FenForm just prints the plain text.

Other methods of using FenForm are shown in the Installation section. Details of setting up a Windows ™ client to use FenForm on a print server are also given.

To print FenForm output, either a PostScript printer or a suitable filter is required. This is all transparent to the user who can simply treat FenForm as just another printer.

Command Line Parameters

-c */file-name* - Specify a configuration file. When FenForm starts, it reads configuration parameters from **/etc/fenform.cfg**. This command line parameter allows a different configuration file to be used. FenForm will use default values if **/etc/fenform.cfg** is not found and no alternative configuration is specified.

-f */form-name* -The form to be used for the print. If no form is given, the effect is the same as printing to a blank sheet of paper.

-i */input-file* - Read from *input-file* instead of stdin.
-o */output-file* Write to *output-file* instead of stdout . These options allow the command -

       cat *print-file* | **fenform -f** *form-name* **>** *output-file*

to be replaced with

       fenform -f *form-name* **-i** *print-file* **-o** *output-file*

-t Test the configuration file. Calling FenForm with this parameter causes it to read the configuration file and list any invalid parameters found. This option can be used with the **-c** option to specify the configuration file.

-h and **-v** Print version information.

The Configuration File

All the fonts and directories used by FenForm can be specified in a configuration file. By default, this file is **/etc/fenform.cfg** but a different configuration file can be specified with the **-c** command line parameter. e.g.-

> **cat** *textfile* | **fenform -c** *config-file* **-f** *form-name* | **lpr**

or, using the **-i** parameter,

> **fenform -c** *config-file* **-f** *form-name* **-i** *textfile* | **lpr**

The following options can be set and are given in the form **PARAMETER=value**. The values shown in the list are the defaults.

MAILER=/usr/bin/sendmail
This is your Mail Transport Agent. If **FenForm** finds an invalid parameter in either the configuration file of the form file, it can send an error report by email to a specified person.

ADMINISTRATOR=*admin@your.domain*
This is the email address of the person to receive error reports from **FenForm**.

FORMDIR=/var/spool/forms
This is the directory which contains the forms.

STDFONT=Courier
BOLDFONT=Courier-Bold
DBLSTRIKEFONT=Courier-Bold
ITALICS=Courier-Oblique
BOLDITALICS=Courier-BoldOblique
DBLSTRIKEITALICS=Courier-BoldOblique
NLQFONT=Times-Roman
BOLDNLQFONT=Times-Bold
DBLSTRIKENLQFONT=Times-Bold
NLQITALICS=Times-Italic
BOLDNLQITALICS=Times-BoldItalic
DBLSTRIKENLQITALICS=Times-BoldItalic
These options allow different fonts to be selected.

COLOUR=No
This parameter allows the print file to control the colour of the text. If this parameter is not set, colour control commands in the print file will be silently ignored.   See the **Colour Printing** section for details.

FenForm Control Codes

As well as plain text, a print file may contain control characters to format the page. Below is a list of those characters showing the action FenForm will take upon receiving them. The codes marked as (IGNORED) are either irrelevant or can not be actioned by FenForm. By silently ignoring them, FenForm is able to process print files written for other printers which do use these codes.

Code	Dec	Hex	Function
BEL	7	&07	(IGNORED)
BS	8	&08	Backspace
HT	9	&09	Horizontal Tab Jump
LF	10	&0A	Line Feed
VT	11	&0B	Vertical Tab Jump
FF	12	&0C	Form Feed
CR	13	&0D	Carriage Return
SO	14	&0E	(IGNORED)
SI	15	&0F	Select Condensed
DC1	17	&11	(IGNORED)
DC2	18	&12	Cancel Condensed
DC3	19	&13	(IGNORED)
DC4	20	&14	(IGNORED)
CAN	24	&18	(IGNORED)
ESC LF A	27 16 65	&1B &10 &41	Select Barcode
ESC LF B	27 16 66	&1B &10 &42	Print Barcode
ESC !	27 33 <n>	&1B &21 <n>	(IGNORED)
ESC -	27 45	&1B &2D	Select/Cancel Underline
ESC 0	27 48	&1B &30	Set 8lpi
ESC 1	27 49	&1B &31	Set 7/72 lpi
ESC 2	27 50	&1B &32	Set 6lpi
ESC 4	27 52	&1B &34	Select Italic Font
ESC 5	27 53	&1B &35	Cancel Italic Font
ESC 6	27 54	&1B &36	(IGNORED)
ESC 7	27 55	&1B &37	(IGNORED)
ESC 8	27 56	&1B &38	(IGNORED)
ESC 9	27 57	&1B &39	(IGNORED)
ESC <	27 60	&1B &3C	(IGNORED)
ESC =	27 61	&1B &3D	(IGNORED)
ESC >	27 62	&1B &3E	(IGNORED)
ESC @	27 64	&1B &40	Reset Printer
ESC B	27 66 <n>..0	&1B &42 <n>..0	Set Vertical Tabs
ESC C	27 67 <n>	&1B &43 <n>	Set Page Length (by lines)
ESC D	27 68	&1B &44 <n>..0	Set Horizontal Tabs
ESC E	27 69	&1B &45	Set Bold
ESC F	27 70	&1B &46	Cancel Bold
ESC G	27 71	&1B &47	Set Double Strike
ESC H	27 72	&1B &48	Cancel Double Strike
ESC M	27 77	&1B &4D	Select 12cpi
ESC N	27 78 <n>	&1B &4E <n>	(IGNORED)
ESC O	27 79	&1B &4F	(IGNORED)
ESC P	27 80	&1B &50	Select 10cpi
ESC Q	27 81 <n>	&1B &51 <n>	Set Right Margin
ESC R	27 82 <n>	&1B &52 <n>	(IGNORED)
ESC S	27 83 <n>	&1B &53 <n>	Select Sub/Super Script
ESC T	27 84	&1B &54	Cancel Sub/Super Script
ESC U	27 85 <n>	&1B &55 <n>	(IGNORED)
ESC W	27 87 <n>	&1B &57 <n>	(IGNORED)
ESC g	27 103	&1B &67	Select 15cpi
ESC i	27 105 <n>	&1B &69 <n>	(IGNORED)

ESC l	27 108	&1B &6C <n>	Set Left Margin
ESC m	27 109 <n>	&1B &6D <n>	(IGNORED)
ESC p	27 112 <n>	&1B &70 <n>	Select/Cancel NLQ
ESC r	27 114 <...>	&1B &72 <...>	Select Colour
ESC s	27 115 <n>	&1B &73 <n>	(IGNORED)
ESC x	27 120 <n>	&1B &78 <n>	Select/Cancel NLQ

Notes.
<n> after a code indicates that a parameter is required (if followed by .. multiple parameters may be given, terminated with NULL). Parameters must be given as character codes (i.e. a parameter value of 56 should be sent as the character &38).

Barcode Printing

Fenform can print 13 different types of barcode. First the barcode type, height and width need to be set with the control codes **ESC LF A** *type height width* . The *height* and *width* must be given in 'points' (1 point = 1/72 inch = 0.35mm) and the *type* can be one of the following -

0	Autoselect
1	EAN
2	UPC
3	ISBN
4	Code 39
5	Code 128 (a,b,c autoselection)
6	Code 128 (Compact form for digits)
7	Code 128 (Full printable ASCII)
8	Interleaved 2 of 5 (Only digits)
9	Code 128 (Raw code 128)
10	Codabar
11	MSI
12	Plessey
13	Code 93

Once this is done, the barcode can be printed using the control sequence **ESC LF B** *text-length*. The subsequent *text-length* characters will be printed as a barcode. If an invalid *type* is specified of if an attempt is made to print an invalid barcode (e.g. alpha characters in a numeric only format) a rectangular box with two diagonal lines will be printed in the space reserved for the barcode.

To avoid over-printing text on a previous line with the barcode, ensure there is enough space above the line to accommodate it. At 6 LPI, 1 line feed is 12 points.

The readability of a barcode is highly dependent on the quality of the print. It is sometimes possible to compensate for poor quality printing by increasing the width of the barcode.

Barcodes can be printed in colour but, for good readability, black on white is probably best.

Colour Printing

If the configuration option **COLOUR=Yes** is set, Fenform will action colour control codes in the print file. Colours can be specified in two ways. For simple, coarse, control of colours, you can use the control sequence **ESC r** *n* (**1B 72** *n*) where *n* has a value between 0 and 6 (inclusive) to select the colour -

0	Black
1	Red (Magenta)
2	Blue (Cyan)
3	Violet
4	Yellow
5	Orange
6	Green

For fine colour control, set *n* to 255 (&ff) and specify the red, green and blue levels in the following three bytes e.g. **1B 72 FF 00 AA FF**.

The **palette** program will print out a table of colours with their corresponding RGB values. The values are given both in hexadecimal for FenForm control sequences and as a decimal for use in form files.

        palette > *output.ps*

FenForm Forms

A form file begins with some optional parameters specific to the form. The parameter block begins with *PARMS and ends with **END. There are 6 possible parameters:

LENGTH	The length of the form in "points" (1/72inch 0.35 mm)
WIDTH	The width of the form in "points"
LPI	Lines per inch
CPI	Characters per inch
HOFFSET	Move the text horizontally
VOFFSET	Move the text vertically

Note. The HOFFSET and VOFFSET parameters apply only to the variable text, not the form itself. Normally, the form file can be adjusted to fit the text but these parameters allow the text to be lined-up with a pre-printed form. The values should be given in "points" (1/72 inch 0.35 mm). VOFFSET can take a negative value to move the text up the page; HOFFSET only takes a positive value, which moves the text to the right.

Parameters must be entered as *PARAMETER*=**value** - see /var/spool/forms for examples. These parameters override the default form (A4 Portrait) but **LPI & CPI** can be overridden by control codes in the print file.

The remainder of the file is essentially a single page of simple PostScript instructions to draw lines, boxes, and print text.

Form files can be created in one of two ways:

Method 1. (The "Primitive" Method)
For simple forms, comprising just lines, boxes and text, a form file can be edited by hand. There are some example forms in the /var/spool/forms directory which can be edited for your own purposes. A list of the more common commands is given below but other postscript commands can also be used. This method produces the smallest, most compact form file but is not suitable if graphics are required on the form. It is possible to define a graphical image using this method but it is totally impractical.

The following is a list of the more common commands used in a form file.

/Times-Roman 40 selectfont	Set the font to 40 point Times-Roman
(nnnnnnn) 128 792 ms	Print the text nnnnnnn starting at 128 points from the left and 792 points from the bottom of the page. 1 point = 1/72 inches.
(nnnnnnn) 45 128 792 0.9 wm	Print the text nnnnnnn, in light gray, rotated 45 degrees anti-clockwise, starting at 128 points from the left and 792 points from the bottom of the page. 1 point = 1/72 inches. This can be used to print a "watermark" on the form.
0.8 setgray	Set the print to lightgray.
0.0 setgray	Set the print to black
0.17 0.17 0.83 setrgbcolor	Set the RGB levels of the colour. The values can be taken from the table of colours produced by the palette program. See the **Colour Printing** section.

1 setlinewidth	Set the line width to 1point.
36 610 252 96 rs	Draw a rectangle 252 points wide and 96 points high with the bottom left corner 36 points from the left and 610 points from the bottom of the paper.
36 553 558 553 ls	Draw a (horizontal) line starting 36 points from the left and 553 points from the bottom and ending 558 points from the left.
36 553 36 188 ls	Draw a (vertical) line starting 36 points from the left and 553 points from the bottom and ending 188 points from the bottom.

Method 2.

With this method, the entire form is a single graphical image which is effectively "overprinted" with the data. This produces a very large form file but does allow for graphics to be used on the form.

Use your preferred drawing package to draw the form and save it as a PDF file. You can do this with OpenOffice.org which we also supply. The PDF file is then processed by **pdf2form** to produce the form file.

> **pdf2form** *pdf-file [form-name]*

If *form-name* is not specified, *pdf-file*.form will be used.

A third method of creating forms is currently in development. It will be similar to Method 1 but will create a form from a list of more readable instructions and will include the ability to incorporate graphical images.

Post Installation Procedures

Test the Installation
There are some sample files in /usr/doc/fenform-1.2/samples which you can use for testing - e.g.

        cat invoice-smp | fenform -f invoice | lpr

or

        fenform -i invoice-smp -f invoice | lpr

You can do this for each form type using the appropriate form file and *-smp files. n.b. You may have to specify the printer

        ... | **lpr -P** *printer-name*

which must be able to print PostScript files.

Add to filter.
Using FenForm is easier if you make it part of the "print filter" and is necessary if you intend to use it from Windows clients (see "Additional set-up for Windows").

Define a printer (e.g. invoice-prt) for each form type in /etc/printcap (they can all use the same physical printer).

Write a print filter for each form type and add it to the printer's directory in /var/spool/lpd. There is an example filter in /usr/doc/fenform-1.4/samples.

Replace the filter in the /etc/printcap entry with your filter

Use the sample files in /usr/doc/fenform-1.4/samples for testing - e.g.

        cat invoice-smp | lpr -P invoice-prt

Do this for each printer using the appropriate *-smp file.

Additional set-up for Windows^{TM}

To make printers on a Linux server available to Windows you will also need the SAMBA file and print sharing system installed and running. This is included with most Linux distributions.

There is no simple way to specify the form type from Windows so the approach we suggest is to define a printer for each form type - i.e. invoice-prt, remits-prt etc. These printer definitions are then mapped to their equivalents on the server. All prints requiring a particular form can then be sent to the appropriate "printer". You might also like to consider running your printing applications on the server. We should be pleased to discuss this possibility with you.

Example Form File

```
*PARMS
NAME=Invoice
LENGTH=842
WIDTH=595
LPI=6
CPI=10
**END

/Courier 100 selectfont
(SAMPLE) 45 200 200 0.9 wm

/Times-Roman 30 selectfont
(The Test Company) 178 792 ms

/Times-Roman 14 selectfont
(1 Anyroad  Anytown  ZZ9 9ZZ) 206 770 ms
(INVOICE) 266 567 ms
260 563 330 563 ls

/Times-Roman 8 selectfont
(This is a test form produced by FenForm.) 228 58 ms
(For more details, please see our web site - www.fensoft.co.uk) 195 48 ms
(or contact Fenland Software Ltd on 08456 440296) 212 38 ms

/Times-Roman 10 selectfont
(Tele:- 1111 222 3333   Fax:- 1111 222 4444) 205 756 ms
(Email:-  enquiries@fensoft.co.uk   Web site:- www.fensoft.co.uk) 164 744 ms

(VAT Reg. No. XXX XXXX XX) 233 732 ms
(Invoice No.) 312 686 ms
(Customer No.) 312 674 ms
(Your Ref.) 312 662 ms
(Date:) 312 638 ms

(Description) 42 541 ms
(Qty) 351 541 ms
(Price) 397 541 ms
(Amount) 465 541 ms
(VAT) 526 541 ms
(Please make cheques payable to The Test Company) 36 168 ms
(Total Ex VAT) 380 168 ms
(Currency) 520 168 ms
(Or) 36 156 ms
(Total VAT) 394 156 ms
(Payment may be made by Credit Transfer) 36 144 ms
(to our bankers:  ) 36 132 ms
(TOTAL DUE) 383 132 ms
(Sort Code:  AA-BB-CC  A/c No. NNNNNNNN) 36 120 ms
(Swift Code: xxxxxxxx) 36 108 ms

0.8 setgray
36 604 252 98 rs
306 604 252 98 rs

36 553 558 553 ls
36 535 558 535 ls
36 553 36 182 ls
445 553 445 126 ls
378 553 378 182 ls
340 553 340 182 ls
518 553 518 126 ls
558 553 558 126 ls
36 182 558 182 ls
445 126 558 126 ls
```