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# Font User Guide

## for

### PostScript, PCL, Metacode, and

### TrueType

## Intelligent Mail<sup>®</sup> Barcode Fonts

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## 1.0 Background

### 1.1 Intelligent Mail Barcode Fonts: General Introduction

In support of the implementation of Intelligent Mail barcode services (formerly known as the 4-State Customer Barcode or 4-CB), the USPS has developed encoder software and a set of fonts for various print architectures and operating system environments. The encoder software is available as a separate download from the USPS RIBBS Web Site: <http://ribbs.usps.gov/onecodesolution>.

This guide provides details regarding the installation and use of the Intelligent Mail barcode fonts excluding the IBM AFP fonts, which are discussed elsewhere. It is assumed that the reader of this guide is familiar with the management and selection of fonts in the various printing environments.

The Intelligent Mail barcode fonts are available for each of the following major production printing architectures as included in this document including:

- PostScript (Type 1 and Type 3 fonts),
- HP PCL (Type 5),
- Xerox Metacode,
- TrueType.

The Intelligent Mail barcode fonts are supported across the major operating system environments as follows:

Operating System	Print architecture				
	AFP	Xerox Metacode	HP PCL	PostScript	TrueType
MVS, z/OS and OS/390	√	√			
VSE/ESA	√	√			
OS/400	√	√			
AIX, Solaris, HP-UX, Mac OS			√	√	√
Linux for pSeries			√	√	√
Linux for Intel			√	√	√
MS Windows			√	√	√

IBM Advanced Function Printing (AFP) fonts are distributed and documented separately.

## 1.2 Contents of Distribution Package

The Intelligent Mail barcode distribution package described in this document consists of the following components:

- Fonts for PostScript, HP PCL, Xerox Metacode, and TrueType environments.
- An Intelligent Mail barcode Font User's Guide (this document).
- A readme.txt file which describes the directory structure.
- A program called "Print Stream Generator" (PSG) is included to generate print ready streams with the included fonts.
- Test data required as input to the PSG program.
- "Printer Ready Files" produced by PSG are also included.

Each of these components is described in more detail later in this document. There are two font versions: Standard (16pt) and Compact (14pt). The Standard version produces standard-height barcodes and should be printed either at 16pt or 17pt (recommended is 16pt) The Compact version produces shorter-height barcodes and should be printed between 14pt and 16pt (recommended is 14pt).

## 1.3 Fonts Included in This Package

The following fonts are included in this distribution package:

Type	Description	Name
PostScript Type 3	Compact Height font 23 cpi	UC23P[o]
	Standard Height font 23 cpi	UR23P[o]
PostScript Type 1	Compact Scalable Font 14pt*	USPSIMBCompact.pfb
	Standard Scalable Font 16pt*	USPSIMBStandard.pfb
HP PCL	Compact Height font 23 cpi	UC23H[o]
	Standard Height font 23 cpi	US23H[o]
Xerox Metacode	Compact Height font 23 cpi	UC23M[o]
	Standard Height font 23 cpi	US23M[o]
TrueType	Compact Scalable Font 14 pt*	USPSIMBCompact.TTF
	Standard Scalable Font 16 pt*	USPSIMBStandard.TTF
*The Compact TrueType font, is USPS compliant between 14 and 16 pts (recommended 14 pt); the Standard between 15 and 17 pts (recommended 16 pt)		

**Table 1.        Fonts Included in Distribution Package**

Notes on the above table:

1. The character "o" in above table refers to the orientation of the fonts and should be replaced by either "**P**" for portrait fonts; "**L**" for landscape, "**I**" for inverse portrait, and "**J**" for inverse landscape fonts.
2. The HP PCL fonts in the above table do not include inverse portrait or inverse landscape font files.
3. All of the font files, except the scalable fonts, are included in file names of the form nnnnnn.FNT, using the format identified above, and the naming conventions described in "*Font Naming Conventions*".
4. The directory structure for the fonts is described in the following section 1.5, "*Distribution Directory Structure*".
5. The fonts described as "Scalable" in table 1 do not have separate orientations variants and consist of a single file.

## 1.4 Description of the Intelligent Mail Barcode Font Characters

The Intelligent Mail barcode fonts are fixed pitch fonts except for the scalable Postscript Type 1 and TrueType fonts. Each font contains four characters for the four states of the barcode. Character locations are defined for the uppercase letters "ADTF". The character locations "A", "D", "F", and "T" will produce the correct barcode character for the Ascender Bar, Descender Bar, Full Bar and Tracker Bar.

These characters use standard ASCII mapping for operating systems which operate in ASCII, and EBCDIC mapping for operating systems which use EBCDIC encoding.

The scalable fonts contain the "space", "notdef", "CR", and "LF" characters defined as fixed width blanks to facilitate certain printing applications. These characters are NOT intended for use in the print stream.

## 1.5 Distribution Directory Structure

Fonts for PostScript, HP's PCL, Xerox Metacode and TrueType are included in this Font distribution package. These Intelligent Mail barcode fonts are distributed in a zip-format with the file name of uspsFontsNonAFP-1.4.0.zip, available for download from the RIBBS site.

It is recommended that a new "base" directory is created prior to expanding the uspsFontsNonAFP-1.4.0.zip file, for example **/fonts**. This base directory can be used to avoid creating 7 sub-directories in the root directory. In this document, only the sub-directory names will be referenced.

The sub-directories **/fonts** contain the font files for the various print architectures.

When the zip file is expanded, the directory structure should be as follows:

readme.txt	This file provides summary information for the zip-file distribution.
/docs	Contains product documentation
FontUsersGuide.pdf input-UC23PP.ps input-UC23PP.pdf	font user's guide sample Postscript print-ready-file rendered output of input-UC23PP.ps
/fonts	USPS Intelligent Mail barcode fonts for Adobe Postscript (Type 1 and Type 3), HP PCL, Xerox Metacode and TrueType and associated Font Metric files.
/prfiles	Print-ready files suitable to be directed to a printer to validate rendering of fonts included in /fonts.
/src	Java source code used to produce the print-ready files in /prfiles for the fonts /fonts
/bin	Contains the java executable file for the PSG.java utility used to produce print-ready files.
psg.jar readme.txt input.txt	Java executable for PSG.java used to generate the print-ready files. Describes the operation of the PSG.java sample program Text file used for input for PSG.java to generate print-ready files
/lib	Libraries used by Java to call the USPS Encoder under MS Win32 and under Linux Intel/AMD-32-bit.
/data	Sample text input files used to produce print-ready files

## 1.6 Font Naming Conventions

The individual font files are named using the following convention (except for the TrueType and Post Script Type 1 fonts),

Uhccpo.FNT

where "Uhccpo" indicates the following font characteristics:

U	USPS Intelligent Mail barcode Font
h (height):	"C" = Compact height "S" = Standard height
cc (characters/bars per inch):	"23"
p (print technology):	"P" = PostScript "H" = HP's PCL "M" = Xerox Metacode
o (orientation) :	"P" = portrait "L" = landscape "I" = inverse portrait "J" = inverse landscape

Using this naming convention, it is possible to quickly locate and use any of the fonts supplied with this package to meet specific application requirements.

The specific font file names that are included and follow this convention are shown in Table 1.

Please note that the naming convention used for the Scalable Fonts, PostScript Type 1 and TrueType, differ from the other fonts and is described in Section 2.2 and 5.2 of this guide.

## 1.7 IBM AFP Fonts

Intelligent Mail barcode fonts for IBM Advanced Function Printing (AFP) environment are also provided by USPS. However, they are included in a separate download package available on RIBBS.

Please consult the *"Font User Guide: AFP"* included with that package for information on installing and using AFP fonts in the MVS, VSE and OS400 operating environments.

## 1.8 Font Specifications

USPS has defined specifications for the Intelligent Mail barcode fonts that will ensure that the mail processing equipment in the postal system will be able to read the barcodes correctly.

The fonts included with this package conform to the USPS specifications. However, if any of these fonts are modified (edited or converted), or fonts from other sources are used to



print barcodes, it should be verified that the selected fonts follow the specifications for the Intelligent Mail barcode.

There are two appendices included with this document that describe the font specifications in detail:

- The general specifications for the Intelligent Mail barcode fonts are included in Appendix A, "General Font Specifications".
- A detailed description of the characteristics of the fonts provided with this distribution is included in Appendix B, "Specifications for Supplied Fonts". Appendix B also includes specifications for the scalable font types.
- The scalable fonts (PostScript Type 1 and TrueType) are designed somewhat differently from the bitmapped fonts. Specifications for these fonts are included in "PostScript Type 1 and TrueType Scalable Fonts".

Additional information about the Intelligent Mail barcode specifications is available on the RIBBS Web Site.

### **1.8.1 Font Metric Files**

Attending Font metric files when available are included in the font subdirectory as dictated by common usage and are designated by 3 letter suffixes like TFM, AFM, PFA, etc.

## 2.0 PostScript Fonts

PostScript is a print architecture created by Adobe in 1985, which has become an industry standard across many printer manufacturers and operating system platforms. In contrast with other print architectures, which are based on sequences of control codes, PostScript is similar to a "programming language" which describes the appearance of a printed page, including text, fonts, and graphics.

This section describes the steps to be taken to install and test the Intelligent Mail barcode fonts in the PostScript print environment.

### 2.1 Environments Supported

There are two types of PostScript fonts delivered with the installation package:

Type 1 fonts:

Scalable "outline" fonts.

Type 3 fonts:

Fixed pitch bitmapped fonts

Both types of fonts are usable across a wide variety of printers that support the PostScript architecture, as well as across a variety of operating system environments.

### 2.2 Font Installation

Once the distributed files are expanded from the ZIP file distribution:  
the Postscript Type 3 font files should be resident in the directory: /fonts/postscript  
the Postscript Type 1 font files should be resident in the directory:  
/fonts/Scalable/postscriptType1

The PostScript fonts have names of the form:

for the Type 3 PostScript fonts:	UhccPo.FNT
for the Type 1 PostScript fonts.	USPSIMBCompact.pfb

See "1.6 Font Naming Conventions" for details on the font file naming conventions.

### 2.3 Loading PostScript Fonts

PostScript fonts can be installed on the printer or sent to the printer in-line with a print job. To install the fonts directly on the printer please refer to the user's manual provided by the printer manufacturer.

Fonts can also be included in-line with a print data stream. Use of this capability is described in the following section.

In some cases, standard off-the-shelf application programs may be able to load and use the PostScript fonts, either from the `/fonts/postscript` directory, or by copying the required fonts to a directory available to the specific application.

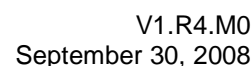
## 2.4 Using PostScript Fonts Inline: Type 3 Fonts

The Type 3 PostScript fonts are fixed size bitmapped fonts which meet the USPS font specifications.

PostScript fonts can be included with a print data stream. To send a PostScript font in-line to the printer within the print stream, place the font (i.e. the data contained within the font file) at the beginning of your print file. Following is an example of how this can be done.

**Figure 1. Use of Intelligent Mail Barcode Compact Fonts Inline with PostScript**

```
%!PS-Adobe-3.0 Resource-Font
%%Creator: BitCopy 2.0, Lytrod Software, Inc. (800)459-8763
%%CreationDate: Sat Feb 09 22:10:20 2008
%%FontName: UC23PP
%%Orientation: Portrait
%%Resolution: 300
%%Style: Normal
%%Pitch: Fixed
%%LineSpacing: 38
%%Baseline: 19
%%PointSize: 9.12
%%Copyright: Converted from Text Formatted format.
%%EndComments
10 dict dup begin
/FontName /UC23PP def
/FontType 3 def
/FontMatrix[1 0 0 1 0 0]def
/FontBBox[0 0 0 0]def
/Encoding 256 array def
0 1 255{Encoding exch/.notdef put}for
Encoding
dup 65/A put
dup 68/D put
dup 70/F put
dup 84/T put
32/space put
/BuildChar{0 begin
/char exch def
/fontdict exch def
/charname fontdict/Encoding get char get def
/charinfo fontdict/CharData get charname get def
/wx charinfo 0 get def
/charbbox charinfo 1 4 getinterval def
wx 0 charbbox aload pop setcachedevice charinfo 5 get charinfo 6 get true
```



**Note:** The “scalefont” parameter is set to “9.12” points when using compact height fonts.

**Figure 1. Use of Intelligent Mail barcode compact Fonts Inline with PostScript**

The following notes apply to the use of PostScript fonts as shown in Figure 1:

1. The barcode sequence shown on Figure 1 has been shortened to fit the space of this document and is not a valid PostScript printer file.
2. The in-line font UC23PP is defined and included in the print stream at the start of the example. This is an Intelligent Mail barcode compact PostScript Type 3

barcode font.

3. The example specifies Courier 12 for the human readable portion of the sample addresses but any appropriate and pre-installed font can be designated to print the sample addresses.
4. In the example, the selected barcode font, UC23PP, is scaled to 10.6 points.
5. The "scalefont" parameter should be set to "9.12" points.

## 2.5 Testing the Installed Fonts

Included in the distribution package is an Installation Verification Program (IVP) to ensure that the installed fonts are working correctly.

The IVP is a Java program, called the "Print Stream Generator" or PSG. This can be used to verify that the PostScript fonts which have been installed will function correctly within the selected operating environment.

Detailed operating instructions for the Print Stream Generator are included in "Print Stream Generator (PSG)". These instructions show how to select a specific font to be tested.

## 2.6 Print Ready Files

In addition to the IVP program described above, the font package includes a set of files called "Print Ready Files". These files are included in the directory:

/prfiles/postscript

These files use the same naming convention as their corresponding fonts, but are named as follows:

Input-font.ps

Where "input" is the input file name (defaults to "input" with the PSG), followed by compact or standard font name, and followed by ".ps" for PostScript files. An example of one of the print ready files for PostScript is: input-UC23PL.ps.

These files are print data streams that should print correctly when sent to a PostScript printer. These print files can be used to verify that the printer configuration and network environment are able to support the printing of PostScript output.

Sample commands to send the print ready files to the printer are shown below.

In the Windows environment:

```
LPR -S <printer_ip> -P <queue> -C"(lcdsformat=parallel)" <filename>
```

In the UNIX environment:

```
lpr -P <printer_ip>:<queue> -C"(lcdsformat=parallel)" <filename>
```

## **2.7 Postscript Type 3 Sample Output**

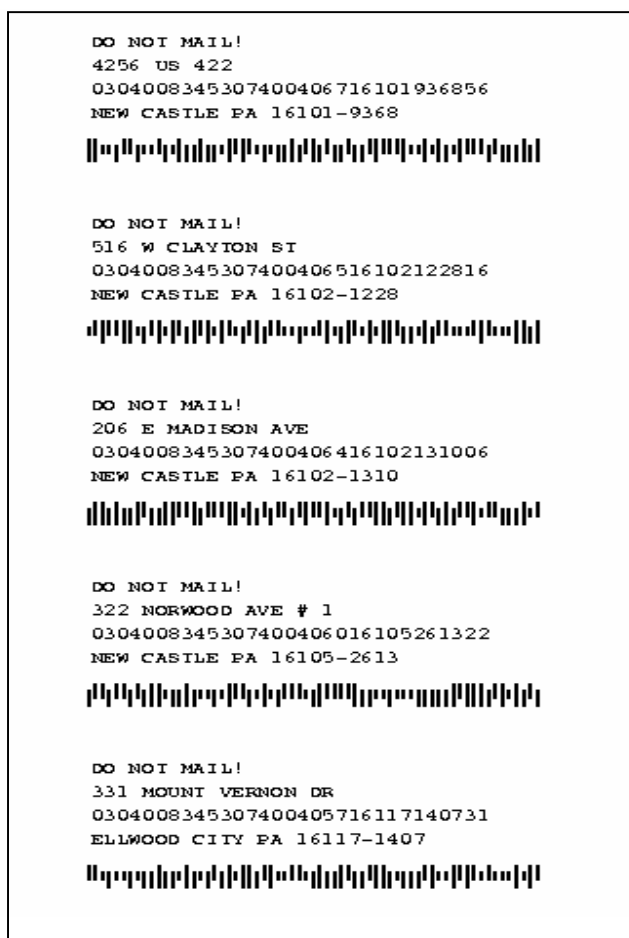
The output from the Print Stream Generator (PSG) includes a list of sample addresses, with appropriate barcodes. The PSG produces a set of PostScript print files which can then be sent directly to a PostScript printer to print the selected barcode fonts.

Sample output from the PSG is shown in Figure 2. Note that the output shown is a graphic image of the output, and has been rescaled for printing in this manual. The characters and barcodes shown here may not be the exact size of the actual printed output.

The 9.1 pointsize Compact Postscript Type3 65 character barcode string, from bar edge to bar edge, should be 2.79 inches long with the “F” glyph height, the symbol within the “F” character space, of 0.127 inches.

The 10.5 pointsize Standard Postscript Type3 65 character barcode string, from bar edge to bar edge, should be 2.79 inches long with the “F” glyph height, the symbol within the “F” character space, of 0.147 inches.

Figure 2 Sample PostScript IVP Output



## 2.8 Using PostScript Fonts Inline: Type 1 Fonts

Using the Intelligent Mail barcode Type 1 PostScript fonts is similar to using the Type 3 fonts described in the previous section.

The print stream example in Figure 1 can also be used to print the Type 1 PostScript fonts with some simple changes.

To print the Type 1 fonts, replace the text above the line "%%Trailer" from the beginning of the file with the text from USPSIMBCompact.pfa, the font ascii file accompanying USPSIMBCompact.pfb, the truetype font binary file. In the resulting print stream replace the font name "UC23PP" with "USPSIMBCompact". Be aware that the first several sheets printed by this method may be incorrectly rendered because USPSIMBCompact is not completely installed until the conveying print stream completes one cycle.

Note the following in the resulting print stream:

1. The in-line Intelligent Mail barcode PostScript Type 1 font defined in USPSIMBCompact.pfb or USPSIMBStandard.pfb is included.
2. Courier 12 point is used to print standard text-lines.
3. The selected barcode font, USPSIMBCompact, is scaled to 14 points; or, USPSIMBStandard, is scaled to 16 points.

Note: The vertical clear zone is included in the Type 1 font and the point size designation that yields barcode characters conforming to USPS specifications is 14 points for the Compact and 16 points for the Standard font. This is different from the Type 3 font described earlier. The fixed pitch Type 3 font described in Section 2.4, "Using PostScript Fonts Inline: Type 3 Fonts", do not include the vertical free space and therefore have a point size of 9.1 to conform to USPS specifications.

The characteristics of the scalable PostScript fonts are described in more detail in Appendix B.2, "PostScript Type 1 and TrueType Scalable Fonts."

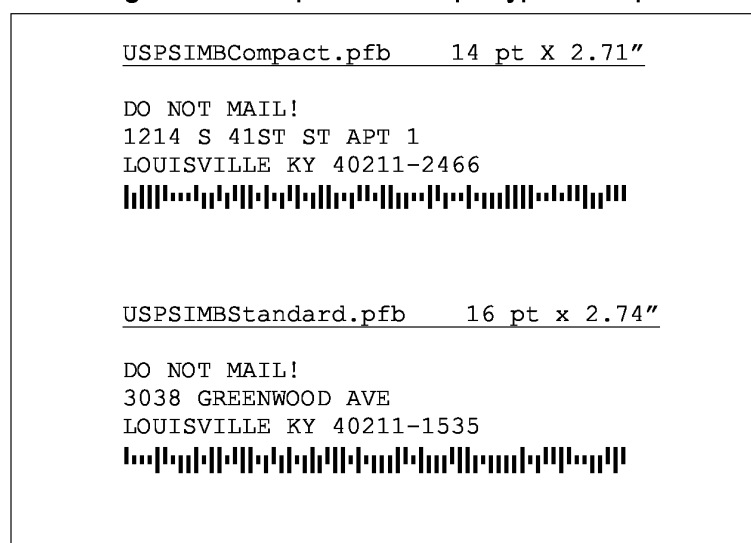
## **2.9 Postscript Type 1 Sample Output**

The 14 pointsize Compact Postscript Type1 65 character barcode string, from bar edge to bar edge , should be 2.71inches long with the "F" glyph height , the symbol within the "F" character space, of 0.128 inches.

The 16 Pointsize Standard Postscript Type1 65 character barcode string, from bar edge to bar edge, should be 2.74inches long with the "F" glyph height , the symbol within the "F" character space, of 0.144 inches.

Sample PostScript Type 1 Output is shown in Figure 2a. Note that the output shown is a graphic image of the output, and has been rescaled for printing in this manual. The characters and barcodes shown here may not be the exact size of the printed output.



**Figure 2a Sample PostScript Type 1 Output**

## 3.0 HP PCL Fonts

Hewlett-Packard developed the "Printer Command Language" or PCL to control early inkjet printers in 1984. It has subsequently been extended to a wide variety of printer types, including many laser printers, and has become a *de facto* industry standard.

PCL is a command-based language based on escape sequences that control the operation of the printer. USPS has developed Intelligent Mail barcode fonts that are compatible with PCL printers.

This section describes the steps to be taken to install and test the Intelligent Mail barcode fonts in the HP PCL print environment.

### 3.1 Environments Supported

The Intelligent Mail barcode fonts provided are usable with PCL 4, PCL 5 and subsequent versions of PCL. However, PCL 4 printers only support the Portrait and Landscape print orientations. All four orientations are supported for PCL 5 printers. HP PCL 5 printers can use any of the supplied fonts. HP PCL 4 printers only support 300 DPI (PCL 4) fonts. The four print orientations are Portrait, Landscape, Inverse Portrait and Inverse Landscape.

### 3.2 Font Installation

Once the distributed files are expanded from the ZIP file distribution, the HP PCL font files should be resident in the directory:

/fonts/hp

The PCL fonts have names of the form:

UhccHo.FNT

See Section 1.6, "Font Naming Conventions" for details on the font file naming conventions.

### 3.3 Loading HP PCL Fonts

The HP PCL fonts can be installed on the printer or sent to the printer in-line with the print job. To install the fonts directly on the printer please refer to the user's manual provided by the printer manufacturer. These procedures are unique to the specific printer model.

Fonts can also be included in-line with a print data stream. Use of this capability is described in the following section.

In some cases, standard off-the-shelf application programs may be able to load and use the PCL fonts, either from the /fonts/hp directory, or by copying the required fonts to a directory available to the specific application.

### 3.4 Using PCL Fonts Inline

If a font is not loaded directly into the printer, it is possible to send the font to the printer in-line within the print stream.

With the PCL architecture, font control is implemented with a series of "escape" control sequences, shown as <ESC> in the following examples.

To load the font dynamically, with the print stream, the following PCL escape sequences must be included in the print stream, and must surround the font data (i.e. the contents of the font file supplied with this package), shown as ...FONT DATA... in the following example.

```
<ESC>*c32545D - assigns 32545 as the Font ID number
...FONT DATA...
...FONT DATA...
...FONT DATA...
<ESC>*c5F - makes the font protected from "<ESC>E" printer reset
```

**Figure 3. Sample HP-PCL Inline Font Loading**

The value 32545 in the above FONT ID command is an arbitrary value selected for this example. Any value between 0 and 32767 can be used. Lower values tend to point to

resident fonts on the printers and so higher values, such as the above, should be used. This number must be unique for each font downloaded to the printer.

To select the font after loading into the printer, embed the following PCL escape sequence in the print stream before the barcode data being printed:

<ESC(32545X                      - *selects the font by font id*

**Figure 4. Selection of HP-PCL Font after Loading**

### 3.5 Testing the Installed Fonts

Included in the distribution package is an Installation Verification Program (IVP) that can be executed to ensure that the installed fonts are working correctly.

The IVP is a Java program, called the "Print Stream Generator" or PSG. This can be used to verify that the HP-PCL fonts that have been installed will function correctly within the selected operating environment.

Detailed operating instructions for the Print Stream Generator are included in "Print Stream Generator (PSG)". These instructions show how to select a specific font to be tested.

### 3.6 Print Ready Files

In addition to the IVP program described above, the font package includes a set of files called "Print Ready Files". These files are included in the directory:

/prfiles/pcl

These files use the same naming convention as their corresponding fonts, but are named as follows:

Input-font.pcl

Where "input" is the input file name (defaults to "input" with the PSG), followed by a standard font name, and followed by ".pcl" for PCL files. An example of one of the print ready files for PCL is: input-UC23HP.pcl.

These files are print data streams that should print correctly when sent to a PCL printer. These print files can be used to verify that the printer configuration and network environment are able to support the printing of PCL output.

Sample commands to send the print ready files to the printer are shown below.

In the Windows environment:

```
LPR -S <printer_ip> -P <queue> -C"(lcsformat=parallel)" <filename>
```

In the UNIX environment:


```
lpr -P <printer_ip>:<queue> -C"(lcsformat=parallel)" <filename>
```


### 3.7 Sample Output


The output from the Print Stream Generator (PSG) includes a list of sample addresses, with appropriate barcodes. The PSG produces HP-PCL print files which can then be sent directly to a PCL printer and should print the selected barcode fonts.


Sample output from the PSG is shown in Figure 5. Note that the output shown is a graphic image of the output, and has been rescaled for printing in this manual. The characters and barcodes shown here may not be the exact size of the actual printed output.


The Compact HP PCL 65 character barcode string, from bar edge to bar edge, should be 2.79 inches long with the “F” glyph height, the symbol within the “F” character space, of 0.127 inches; the Standard HP PCL 65 character barcode string, from bar edge to bar edge, should be 2.79 inches long with the “F” glyph height, the symbol within the “F” character space, of 0.147 inches.

DO NOT MAIL!  
4256 US 422  
0304008345307400406716101936856  
NEW CASTLE PA 16101-9368  


DO NOT MAIL!  
516 W CLAYTON ST  
0304008345307400406516102122816  
NEW CASTLE PA 16102-1228  


DO NOT MAIL!  
206 E MADISON AVE  
0304008345307400406416102131006  
NEW CASTLE PA 16102-1310  


DO NOT MAIL!  
322 NORWOOD AVE # 1  
0304008345307400406016105261322  
NEW CASTLE PA 16105-2613  


DO NOT MAIL!  
331 MOUNT VERNON DR  
0304008345307400405716117140731  
ELLWOOD CITY PA 16117-1407  


**Figure 5. Sample HP PCL IVP Output**

## 4.0 Xerox Metacode Fonts

Xerox Metacode is one of the earliest printer control languages developed to support advanced printing functions on laser printers. Metacode supports high volume printing of text, fonts, electronic forms, and graphics in production environments.

The controls for managing printing functions with a Metacode printer are referred to as *Dynamic Job Descriptor Entry* or DJDE. A series of DJDE statements in the print stream, in combination with the printer-resident JDL (Job Description Library), specify the format to be used for a given print job.

## 4.1 Environments Supported

This package includes several Metacode fonts that should print correctly on any Metacode-compatible printer. These are large printers produced by Xerox Corporation, although certain printers from other vendors also support the Metacode architecture.

The Intelligent Mail barcode Metacode fonts are provided in 300 DPI resolutions only. Metacode printers that run at 600 DPI will interpolate the fonts so that they print correctly at 600 DPI.

## 4.2 Font Installation

Once the distributed files are expanded from the ZIP file distribution, the Metacode font files should be resident in the directory:

/fonts/metacode

The Metacode fonts have names of the form:

UhccMo.FNT

See Section 1.6, "Font Naming Conventions", for details on the font file naming conventions.

## 4.3 Loading Metacode Fonts

Fonts can be installed on the printer or sent in-line with the print job. Most users of Metacode printers install a standard set of fonts on the printer before sending print jobs to the printer.

To install the fonts directly on the printer please refer to the user's manual provided by the printer manufacturer. The procedures for performing the font loading are specific to a given printer model.

In many organizations that use Metacode printers, a standard set of fonts are loaded when the printer is started, and are then available to all print jobs. For information about these operating conventions as they may apply to the Intelligent Mail barcode fonts, a local technical support organization should be contacted.

## 4.4 Using Metacode Fonts Inline

As an option, it is possible to load the barcode fonts within the required print stream.

To send the Intelligent Mail barcode fonts in-line to the printer within the print stream, place the font (the data contained within the font file, shown as ...font data... in the following example) at the beginning of the print file. The following example shows how this can be done.

To load the font in the printer, and have it deleted when the job is complete, use the following DJDE statements:

```
$DJDE$ FILE=(,L,D), END;  
...font data...  
...font data...  
...font data...  
$DJDE$ END;
```

**Figure 6. Loading Metacode Fonts Inline (Temporary Usage)**

To load the font into the printer permanently, use the following DJDE sequence:

```
$DJDE$ FILE=(,L,P), END;  
...font data...  
...font data...  
...font data...  
$DJDE$ END;
```

**Figure 7. Loading Metacode Fonts Inline (Permanent Usage)**

Note that the font name does not have to be specified with DJDE statements, since the fonts provided in this package come with the 128 byte "tape header" included in the font data. This header contains the filename and file type for the font. Care must be taken that the spooler sending these binary font resources does not strip off any blanks or nulls from the font data being spooled to the printer.

## 4.5 Identifying Metacode Fonts

Once the fonts have been loaded into the printer, by one of the methods identified in the previous sections, the barcode font must be identified to the printer for later selection within the print stream.

To identify a given font, use the DJDE FONTS command in the print data stream. For example, the following DJDE statement would identify font UC23MP as the second font for the FONTINDEX (the Fontindex is discussed later).

**\$DJDE\$ FONTS = (CC12NP, UC23MP), END;**

In the above example UC23MP (the Intelligent Mail barcode compact font) would be referenced using FONTINDEX 2 in your print data.

The "FONTINDEX" is normally the second character in the print record to be printed. The first character of a print file is typically ASA Carriage Control Character, specifying such print characteristics as skip-to-new-page, double space, overtype, etc. The convention used with Metacode printers is that the second character of a print record is used to identify the font to be used for that print line, and that character is called the "Fontindex".

An example of the use of the FONTINDEX to print the Intelligent Mail barcode font is included in Figure 8, where the sixth line (which specifies the barcode characters to be printed) has a "2" in the second position, indicating that the second font from the **\$DJDE\$ FONTS** statement shown above should be used.

## **4.6 Metacode JSL File**

The font distribution zip-file includes a JSL file to assist in managing the barcode fonts in the Metacode environment.

JSL stands for "Job Source Library", and a JSL file contains a description of the print data stream. JSL is used for Metacode printers as well as other types of printers which support the Xerox "LPS" (Line Printing System) architecture.

The sample JSL is provided in:

`/prfiles/metacode/C4BJSL.jsl`

This file can be compiled on any Xerox LPS, (Line Printing System), enabled printer. The JSL provided has eight job definitions; one for each of the Intelligent Mail barcode fonts included with this package.

It also specifies a 12-point Courier font for the human readable text for use with the Installation Verification Program (IVP) discussed later. The name of this font is CC12NP.

However, note that the human readable font can be any font meeting the USPS requirements for the applicable mail category.

## **4.7 Selecting a Metacode Font**

Once a JSL file is loaded to the printer, the appropriate fonts can be selected for use by means of the Font index specification, as discussed in a previous section.

An example print stream is shown below:



```
$DJDE$ JDL=C4BJSJ,JDE=UC23MP,END;  
11DO NOT MAIL!  
111214 S 41ST ST APT 1 - METACODE  
11LOUISVILLE KY 40211-2466  
11  
12FDFFFATTTADDADAFFTFTDAFTDFFDTDAATFFDDTTFADTTFTDDDDFFFTTATAAFDDAAA  
11DO NOT MAIL!  
113038 GREENWOOD AVE - METACODE  
11LOUISVILLE KY 40211-1535  
11  
12ATTTTFATDDFTFFTAFFTDADFTDFDAFFFTFTDDDFATFDDDAFFDTDDDDFTDAAFATTDDAFA
```

**Figure 8. Example Metacode Print Stream**

The print data here must occur after the \$DJDE FONTS statement described earlier, and the required fonts must be loaded into the printer by one of the techniques described above.

The "JDL" and "JDE" specifications are based on the use of the sample JSL file included with this package, and described in the previous section.

## **4.8 Sending Metacode Files to a Printer**

Once a Metacode print file has been created using the specifications described in the above sections, the file can be sent to an online Metacode printer using operating system commands.

If you are submitting files to an LPS-enabled Xerox EPS (Enterprise Printing System), you can submit them via LPR (Remote Line Printer command) in the following format:

In the Windows environment:

```
LPR -S <printer_ip> -P <queue> -C"(lcsformat=parallel)" <filename>
```

In the UNIX environment:

```
lpr -P <printer_ip>:<queue> -C"(lcsformat=parallel)" <filename>
```

For details about the syntax of the above commands, consult the applicable documentation from the operating system provider.

Using the above referenced JSL compiled file, the printer's queue must be defined as an LPS queue and should have its default JDL (Job Description Language) set to C4BJSJ and its default JDE (Job Description Entry) set to any one of the JDE's defined in the JSL.

## 4.9 Testing the Installed Fonts

Included in the distribution package is an Installation Verification Program (IVP) which can be executed to ensure that the installed fonts are working correctly.

The IVP is a Java program, called the "Print Stream Generator" or PSG. This can be used to verify that the Metacode fonts which have been installed will function correctly within the selected operating environment.

Detailed operating instructions for the Print Stream Generator are included in "Print Stream Generator (PSG)". These instructions show how to select a specific font to be tested.

## 4.10 Print Ready Files

In addition to the IVP program described above, the font package includes a set of files called "Print Ready Files". These files are included in the directory:

/prfiles/metacode

These files use the same naming convention as their corresponding fonts, but are named as follows:

Input-font.mc

Where "input" is the input file name (defaults to "input" with the PSG), followed by a font name, and followed by ".mc" for Metacode files. An example of one of the print ready files for PCL is: input-UC23MP.mc.

These files are print data streams that should print correctly when sent to a PCL printer. These print files can be used to verify that the printer configuration and network environment are able to support the printing of PCL output.

In the Windows environment:

```
LPR -S <printer_ip> -P <queue> -C"(lcsformat=parallel)" <filename>
```

In the UNIX environment:

```
lpr -P <printer_ip>:<queue> -C"(lcsformat=parallel)" <filename>
```


## 4.11 Sample Output

The output from the Print Stream Generator (PSG) includes a list of sample addresses, with appropriate barcodes. The PSG produces a set of Metacode print files which can then be sent directly to a Metacode printer and should print the selected barcode fonts.

Sample output from the PSG is shown in Figure 9. Note that the output shown is a graphic image of the output, and has been rescaled for printing in this manual. The characters and barcodes may not be the exact size of the actual printed output.


The Compact Xerox Metacode 65 character barcode string, from bar edge to bar edge, should be 2.79 inches long with the “F” glyph height, the symbol within the “F” character space, of 0.127 inches.


The Standard Xerox Metacode 65 character barcode string, from bar edge to bar edge, should be 2.79 inches long with the “F” glyph height, the symbol within the “F” character space, of 0.147 inches

DO NOT MAIL!  
4256 US 422  
0304008345307400406716101936856  
NEW CASTLE PA 16101-9368  


DO NOT MAIL!  
516 W CLAYTON ST  
0304008345307400406516102122816  
NEW CASTLE PA 16102-1228  


DO NOT MAIL!  
206 E MADISON AVE  
0304008345307400406416102131006  
NEW CASTLE PA 16102-1310  


DO NOT MAIL!  
322 NORWOOD AVE # 1  
0304008345307400406016105261322  
NEW CASTLE PA 16105-2613  


DO NOT MAIL!  
331 MOUNT VERNON DR  
0304008345307400405716117140731  
ELLWOOD CITY PA 16117-1407  


**Figure 9. Sample Metacode IVP Output**

## 5.0 TrueType Fonts

TrueType fonts were originally developed by Apple Computer and Microsoft as an outline (scalable) font standard. These fonts provide a high degree of control over how the fonts are displayed on a computer screen, and allow for a wide range of scalability. TrueType fonts are widely used in Microsoft Windows and Apple Macintosh desktop environments.

### 5.1 Environments Supported

The TrueType fonts included in this distribution are supported, and have been tested in, the Microsoft Windows and Apple Macintosh environments only.

However, they are complete TrueType fonts, and should be usable in any operating system that supports TrueType fonts.

For the Intelligent Mail barcode compact initiative, the TrueType fonts are designed primarily for use in the desktop computer environments, and are not supported by the Installation Verification Program (IVP) that is used to verify the correct installation of the other fonts described in this manual.

### 5.2 Font Installation

Once the distributed files are expanded from the ZIP file distribution, the TrueType font file should be resident in the directory:

`/fonts/scalable/truetype`

The TrueType fonts has the names:

`USPSIMBCompact.TTF`

`USPSIMBStandard.TTF`

These names have been selected to allow a simple and obvious name for the font when selecting it in desktop applications, and as a result the names do not conform to the naming conventions used for the other barcode fonts.

### 5.3 Windows Font Configuration

Downloading the supplied zip file, and expanding the file, will place the TrueType font into the `/fonts/Scalable/truetype` directory. However, to use the font in a Windows environment, it must be defined to Windows.

To complete the process of defining the font to Windows, follow this process:

1. Click on the START MENU.
2. Click on the Control Panel icon.
3. Click on the Fonts Directory.
4. Click File and Select "Install New Fonts".
5. Browse to the directory to which the font was downloaded and extracted from the uspsFontsNonAFP.zip file (the default is the /fonts/scalable/truetype directory).
6. Select the font in the TrueType subdirectory you wish to install and select "install".

At the completion of this process, the selected font should be available for use by Windows applications.

## **5.4 Macintosh Font Configuration**

To use the TrueType font in the Macintosh environment, use the following process:

1. Locate the USPSIMBCompact.TTF or USPSIMBStandard.TTF font file on the Macintosh system for which the font is required.
2. Click on the USPSIMBCompact.TTF or USPSIMBStandard.TTF file. This will start the Macintosh "Font Book" application.
3. The system should then respond with a pop-up menu prompting to install the font.
4. Click on "Install Font", and the system should then complete the installation of the Intelligent Mail barcode font.

At the end of the process, the TrueType font should be available for selection by Macintosh applications.

## **5.5 Selecting TrueType Fonts**

Because TrueType fonts are scalable, there is a relationship between the Point Size selected for the font, and the number of barcode characters per inch (CPI) that will result.

There are two font versions: Standard (16pt) and Compact (14pt). The Standard version produces standard-height barcodes and should be printed either at 16pt or 17pt (recommended is 16pt) The Compact version produces shorter-height barcodes and should be printed between 14pt and 16pt (recommended is 14pt). The point size specification can be made using the operating system Font Selection facilities.

## 5.6 Testing the Installed Fonts

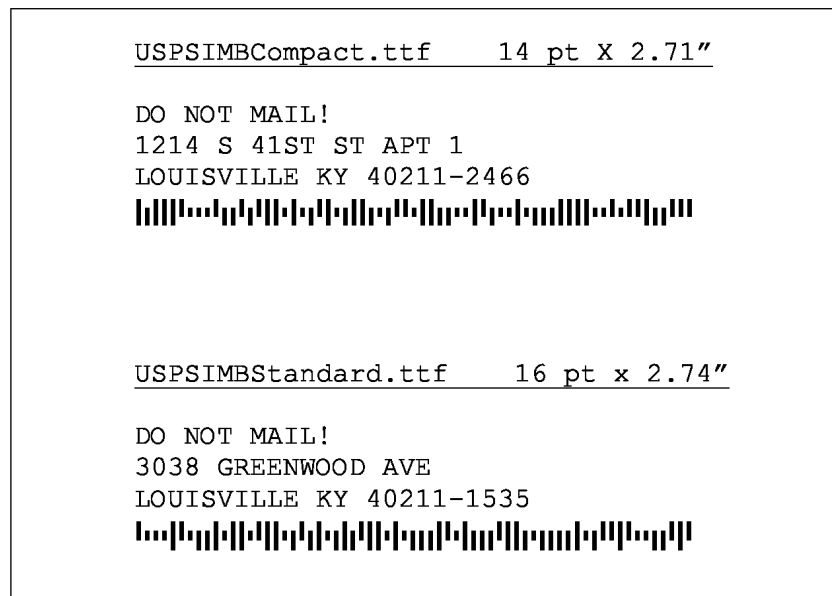
As noted earlier, the Installation Verification Program (IVP) provided with this package does not support the TrueType fonts.

However, two HTML files, USPSIMBCompact,HTML and USPSIMBStandard,HTML, are supplied in the /fonts/Scalable/truetype directory. Opening either of these files with the local web browser will confirm that the associated TrueType font is correctly installed by its illustration in the presented barcode string.

Further, invoke a Windows or Macintosh application, select a valid Intelligent Mail barcode string, available as mailtest50.txt and mailTest.txt in the downloaded and expanded /data directory of uspsFontsNonAFP.zip, and apply either USPSIMBCompact.TTF at 14 pointsize or USPSIMBStandard.TTF at 16 Pointsize to the encoded 65 characters strings and print the sample addresses with the rendered barcode string.

## 5.7 Example TrueType Font Output

Figure 5a Sample TrueType Output



## **6.0 Print Stream Generator (PSG)**

The Print Stream Generator, PSG.java, is a java program used to generate printer files that incorporate the Intelligent Mail barcode fonts. These printer files can be sent to a printer to test the fonts included in the Intelligent Mail barcode package.

The Print Stream Generator is the "Installation Verification Program" or IVP for the Intelligent Mail barcode fonts included in this package.

This program serves as an example of using the encoder and the installed fonts to produce a print stream that renders sample address blocks with Intelligent Mail barcodes so that the rendered barcode can be verified. The program has been tested on MS Windows and Linux 32-bit platforms, but should function correctly on any platform that supports Java.

### **6.1 Operation**

The Print Stream Generator utility program reads a sample input address file (supplied with this package) and produces a printer file consisting of the input data and the Intelligent Mail barcode produced by processing the input tracking and routing information through the Intelligent Mail barcode encoder routine.

#### **6.1.1 Processing Flow**

The PSG program scans the input file for a Tracking Number and a Route Number and generates the encoded 65-character barcode string by invoking the Intelligent Mail barcode encoder included in this package in file usps4cb.dll and usps4cb.so libraries for MS Windows and Linux 32-bit environments.

The default input file, input.txt, has five sets of address lines. Two of these sets include a 65-character encoded Intelligent Mail barcode string such as the one shown below. The other two sets of addresses do not include an encoded bar-code string and the Print Stream Generator program calls the Intelligent Mail barcode encoder to produce a bar code string. The addresses in the input file must be separated by blank lines.

Note: If you wish to test the fonts without invoking the encoder routine, a 65-character bar-code string may be included within the input data. If the program detects that the 65 character barcode string is already present, the program will use it in creating the output print stream and will not invoke the encoder routine.

### 6.1.2 Sample PSG Input Data

The sample data for the PSG program consists of a set of standard mailing addresses with routing and tracking codes. All addresses include the line “DO NOT MAIL!” since the addresses are not valid and the resulting output should not be mailed.

An example of the required input data for the PSG program:

```
DO NOT MAIL!  
1214 S 41ST ST APT 1  
LOUISVILLE KY 40211-2466  
FDFFFATTTADDADAFFFTDAFTDFFDTDAATFFDDTTFADTTFTDDDDFFFTTATAAFDDAAA  
  
DO NOT MAIL!  
3038 GREENWOOD AVE  
LOUISVILLE KY 40211-1535  
ATTTFATDDFTFFTAFFTDADFTDFDAFFFTDDDFATFDDDAFFDTDDDDFTDAAFATTDDAFA
```


**Figure 10. Sample PSG Input**

### 6.1.3 Sample PSG Output

An example of output file produced by the PSG.java program is shown in Figure 11.


This output file is a print-ready file containing input text and the rendered barcode formatted for printing in the selected printer architecture (PostScript, PCL or Metacode). The directory /prfiles include print-ready files produced by running PSG.java using the supplied input.txt default input file.




DO NOT MAIL!  
4256 US 422  
0304008345307400406716101936856  
NEW CASTLE PA 16101-9368  


DO NOT MAIL!  
516 W CLAYTON ST  
0304008345307400406516102122816  
NEW CASTLE PA 16102-1228  


DO NOT MAIL!  
206 E MADISON AVE  
0304008345307400406416102131006  
NEW CASTLE PA 16102-1310  


DO NOT MAIL!  
322 NORWOOD AVE # 1  
0304008345307400406016105261322  
NEW CASTLE PA 16105-2613  


DO NOT MAIL!  
331 MOUNT VERNON DR  
0304008345307400405716117140731  
ELLWOOD CITY PA 16117-1407  


**Figure 11. Sample PSG Output**

## 6.2 Command Line Specification

The PSG is designed to be executed from the command line in a Windows or UNIX environment.

The PSG.java program can be executed using the included compiled java, psg.jar, as follows (a Postscript Type3 Compact font has been selected in this example but any fonts in this package can be used except those in the Scalable subdirectories):

```
java -jar psg.jar [ -font UC23PP -if input.txt ]
```

The parameters controlling execution which is shown above are:

**-font UC23PP**

Selected font to be used for the Intelligent Mail barcode; see the font's directory for available fonts. UC23PP is the default.

Font names are normally defined in upper-case; however, lower-case and upper-case names may be used: example " -font UC23pp ".

**-if input.txt**

Input text file. A sample is provided in /data/input.txt

**Output file**

The psg.jar program produces an output file name by appending to the input file name and the font name given as parameters.

If the default parameters are used the output file name would be "input-UC23PP.ps".

The output file is ready to be sent to a printer which supports the selected print architecture (PostScript, PCL or Metacode).

When the PSG is run, it produces the following output to the console:

PSG Parameters:

```
-fn:      UC23PP
-font:    D:\@upsFonts\fonts\postscript\UC23PP.FNT
-if:      D:\@upsFonts\bin\input.txt
-of:      D:\@upsFonts \bin\input-UC23PP.ps
-pdl:     ps
```

The -of is the name of the file produced. In the example, the file name is:

input-UC23PP.ps

## 7.0 Print Ready Files

It is not necessary to run the PSG program in order to verify that the printing environment can support printing of the barcode fonts.

The directory /prfiles, included in the distribution package, contain "print-ready" files for all of the print technologies supported . These files were generated by running the PSG.java



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program for the distributed fonts (excluding the TrueType and PostScript Type1 fonts). These files are structured to download the fonts in-line within the print stream and then print test cases utilizing a standard Courier and the Intelligent Mail barcode fonts supplied in this package.

Sending these files to a given printer will confirm that the network connections and printer capabilities are compatible with the selected type of font.

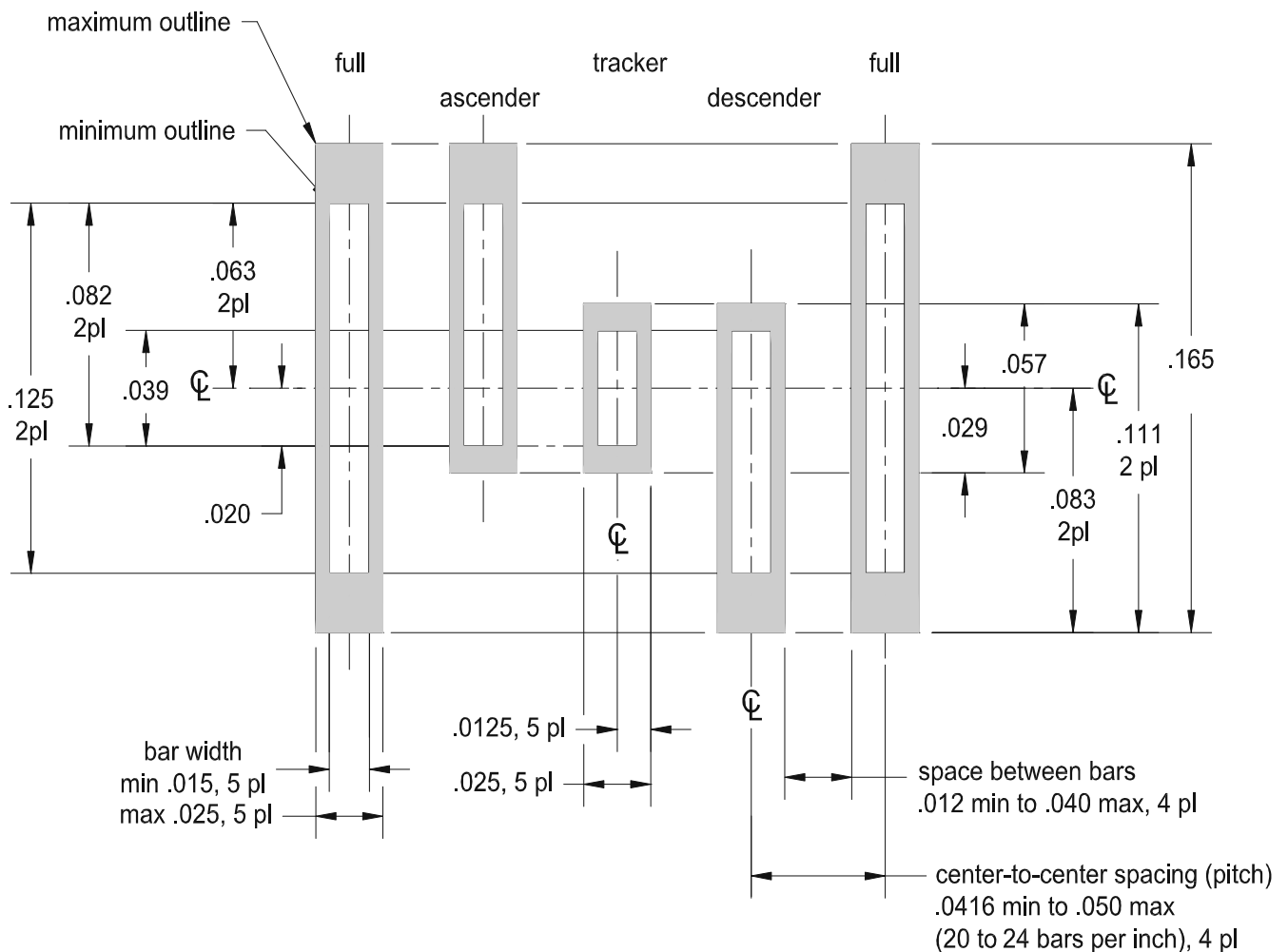
## Appendix A. General Font Specifications

### USPS Intelligent Mail barcode Font Specification

Below are the specifications of the minimum and maximum dimensions for the Intelligent Mail barcode as described in publication USPS-B-3200. This document is available at USPS's Rapid Information Bulletin Board System (RIBBS) website at <http://ribbs.usps.gov/onecodesolution>. This diagram is presented here for reference only.

**Physical Characteristics** – Physical dimensions for the four types of bars shall be as shown in the following Figure A1

Figure A1. Physical Dimensions



Vertical dimensions shall be based on the centerline of the barcode, forming an overall

barcode height of 0.125 inch to 0.165 inch. Any vertical jitter shall be contained within the vertical dimensions from the centerline.

Horizontal dimensions shall be based on the centerline of the individual bars, forming an overall barcode pitch of  $22 \pm 2$  bars per inch. Individual bars shall be printed with a width of  $0.020 \pm 0.005$  inch. The pitch and widths shall result in spacing between bars of 0.012 inch to 0.040 inch.

The distance from the lead (left) edge of the 1st (left most) bar to the lead (left) edge of the 65th (right most) bar shall never be less than 2.667 inches. The distance from the lead (left) edge of the 1st bar (left most) to the trail (right) edge of the 65th (right most) bar shall never be greater than 3.225 inches.

**Clear Zone** – A clear zone shall be placed around the barcode to ensure that readers can locate and read the barcode. A minimum clear zone shall be 0.028 inch above and below the barcode and 0.125 inch on each end of the barcode. Clear zones are shown in Figure A2.

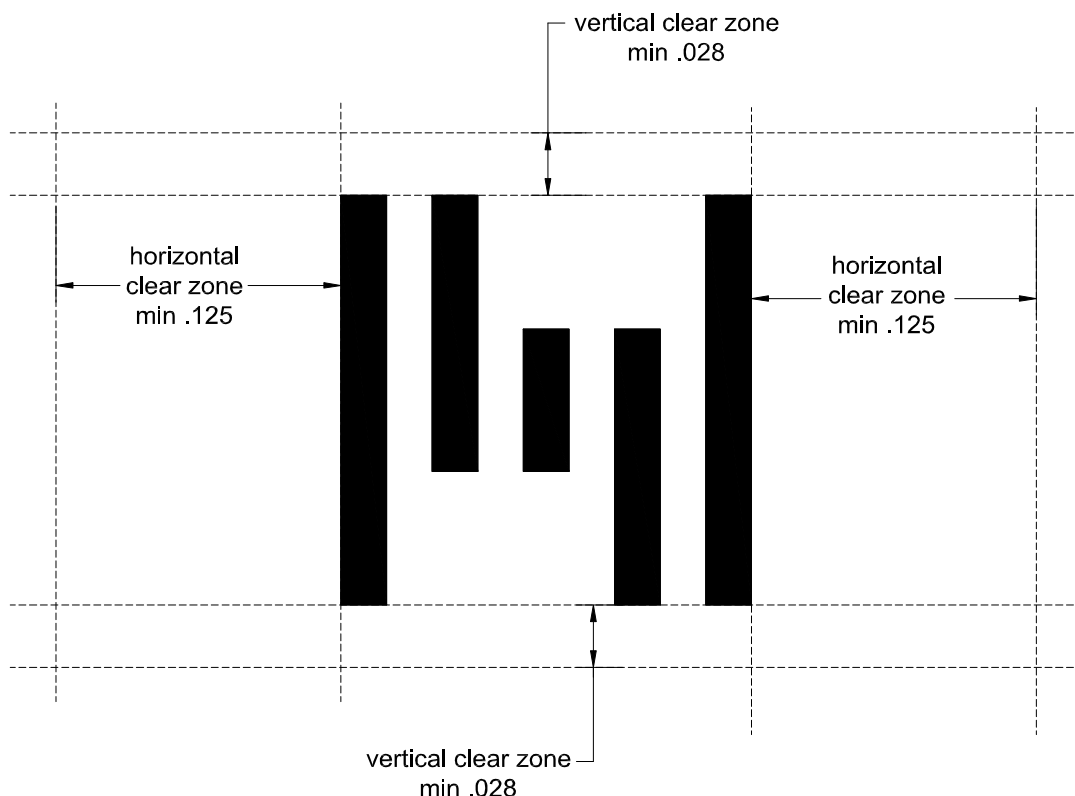


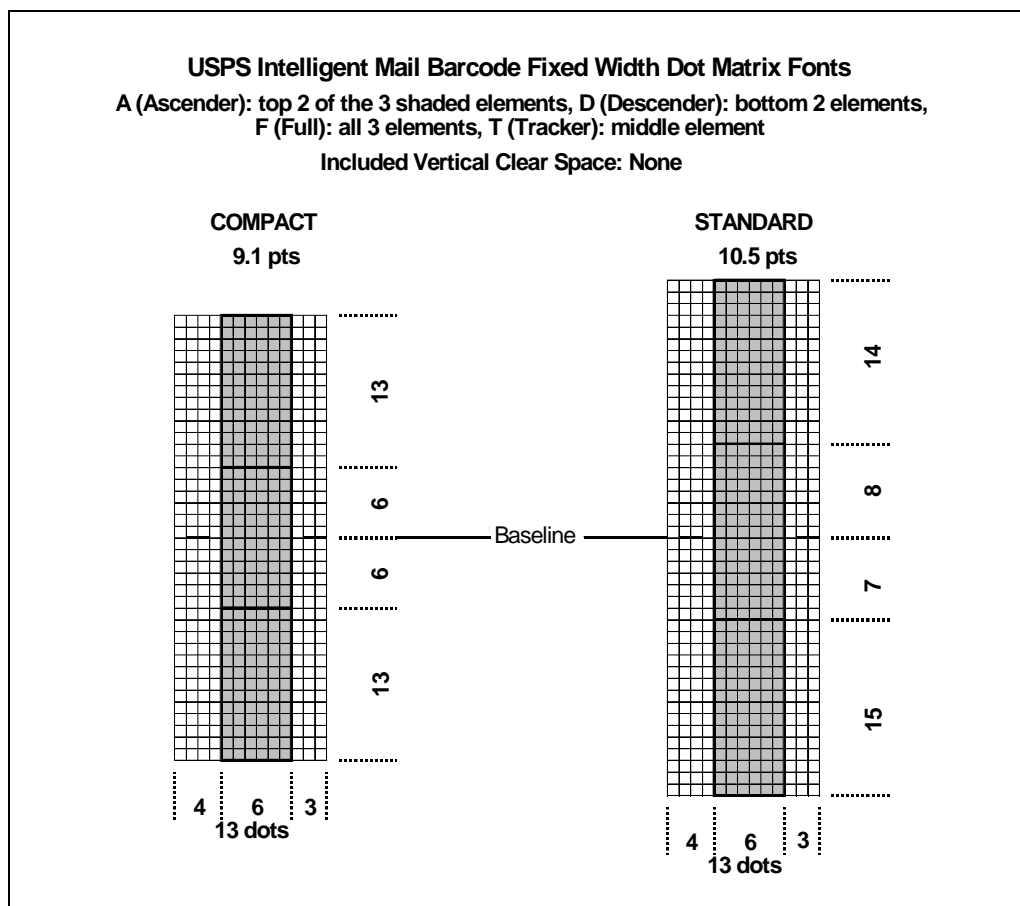
Figure A2. Clear Zones

## Appendix B. Specifications for Intelligent Mail barcode Fonts

### B.1 Fixed Pitch Dot Matrix Fonts (PostScript Type 3, HP PCL, Xerox Metacode)

The following diagrams illustrate the dot patterns of the two 300 dots per inch (dpi) fixed pitch bitmapped fonts supplied: 9.1 pt/23.07 CPI Compact and 10.5 pt/23.83 CPI Standard. Note that the symbols, glyphs, within the character can extend to the top and bottom of the character space affording no vertical Clear Zone within this font.

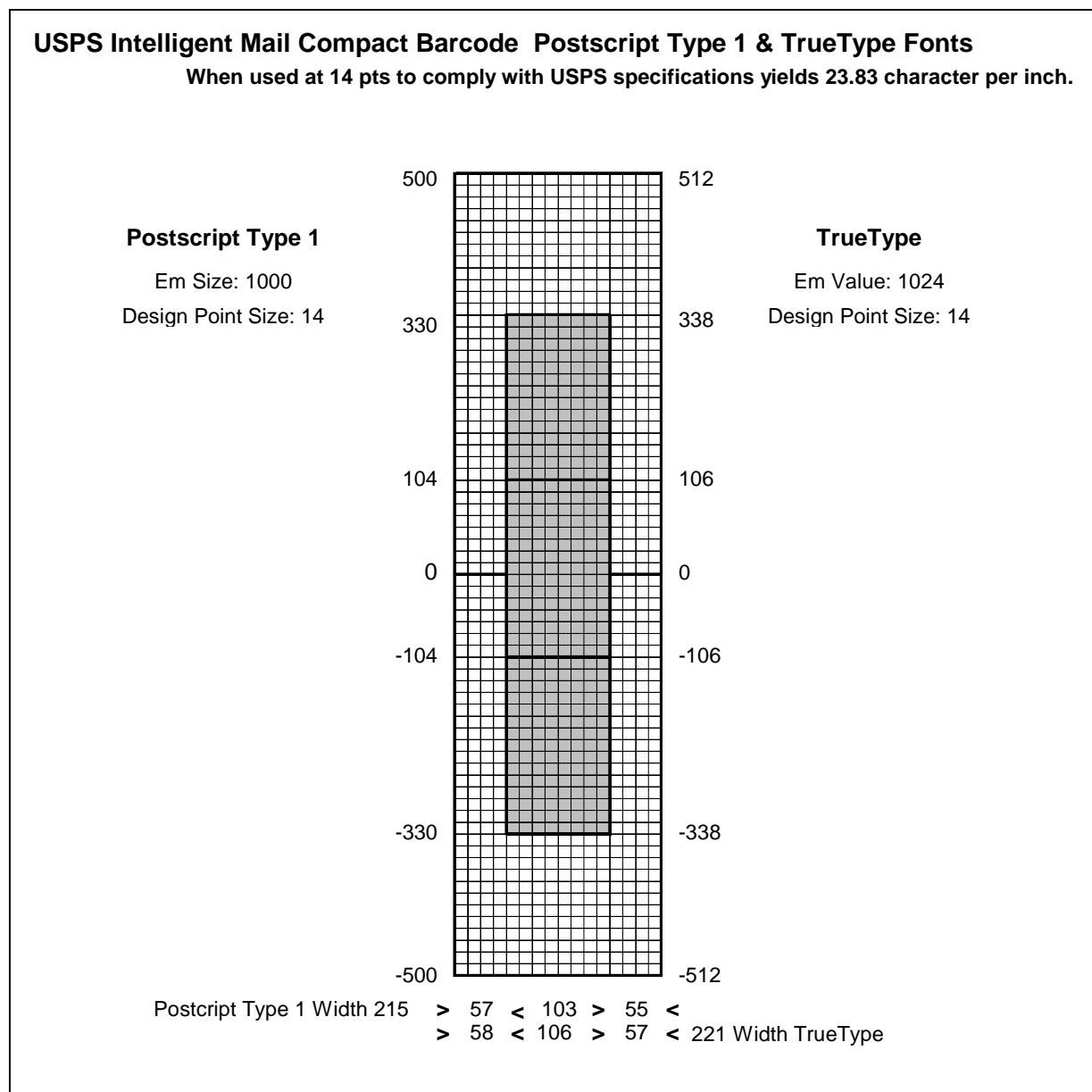
Each cell in rectangular matrices below represents a dot position. The shaded cells represent dots. The 3 outlined shaded areas in each matrix are variously contiguously combined to form each of the four character symbols, known as glyphs, of the font. The top and middle elements form the “A” (Ascender), the middle and bottom elements form the “D” (Descender), the top, middle and bottom elements form the “F” (Full), and the middle element alone forms the “T” (Tracker).



## B.2 PostScript Type 1 and TrueType Scalable Fonts

The diagram below describes the configuration of the PostScript Type 1 and the TrueType Fonts. Each have two font versions: Standard (16pt) and Compact (14pt). The Standard version produces standard-height barcodes and should be printed either at 16pt or 17pt (recommended is 16pt) The Compact version produces shorter-height barcodes and should be printed between 14pt and 16pt (recommended is 14pt).

Unlike the Bitmapped Fixed Pitch Fonts described in the previous section, these scalable fonts do include the specified Vertical Clear Zone above and below the glyph within the character limits; however, like the Bitmapped Fixed Pitch Fonts, they do not provide Horizontal Clear Space at the beginning or end of the barcode string.



**USPS Intelligent Mail Standard Barcode Postscript Type 1 & TrueType Fonts**

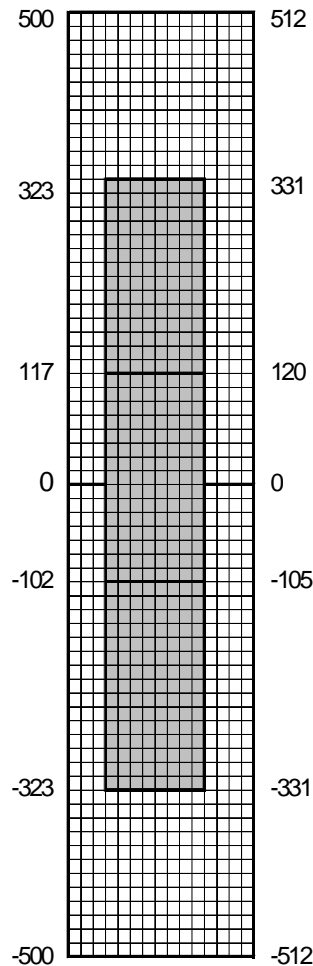
A (Ascender): top 2 elements of Full Bar, D (Descender): bottom 2 elements,  
F (Full): all 3 elements, T (Tracker): middle element

**Postscript Type 1**

Em Size: 1000  
Design Point Size: 16

**TrueType**

Em Value: 1024  
Design Point Size: 16



**PostScript Type1** Width 191 > 44 < 88 > 59 <  
> 45 < 91 > 60 < 196 Width **TrueType**

End of Document