

EDMSuite OnDemand



Mapping AFP Fonts

Version 2.2

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About this publication

This publication provides information about how to map the AFP™ fonts your documents were created with to fonts that can be displayed on the PC. If your documents were created with fonts that are not defined to IBM EDMSuite OnDemand Version 2.2 (OnDemand), if you have modified the IBM AFP fonts, or if you have created your own AFP fonts, you must define the fonts in font definition files so that OnDemand can correctly display the documents.

Note: The term *Win32* refers to the OnDemand client software that runs on Windows® 95, Windows 98, and Windows NT®.

Who should use this publication

This publication is of primary interest to administrators responsible for installing and configuring software products.

How this publication is organized

“Chapter 1. Mapping AFP fonts for the OS/2 client” on page 1 describes how to map user-defined AFP fonts for the OS/2® client.

“Chapter 2. Mapping AFP fonts for the Windows clients” on page 15 describes how to map user-defined AFP fonts for the Windows 3.1 and Win32 clients.

Product support

The IBM Support Center maintains current information about OnDemand, including product updates (PTFs).

Before you install OnDemand, contact the IBM Support Center for information about the latest PTF for OnDemand. (You can obtain the latest PTF from IBM service at <ftp://service.software.ibm.com/software/ondemand/fixes/v221>.)

If you encounter problems or errors running any of the OnDemand programs, you can call the IBM Support Center to obtain software problem and defect support. The phone number for the IBM Support Center is 1-800-237-5511. The OnDemand component ID is 5622-66200.

OnDemand documentation

The following publications contain information about OnDemand Version 2.2:

Introduction and Planning Guide, G544-5281

Installation and Configuration Guide for UNIX Servers, G544-5598

Installation and Configuration Guide for Windows NT Servers, G544-5526

Administrator's Reference, S544-5293

Indexing Reference, S544-5489

Getting Started with the Administrative Client, S544-5463

User's Guide, SC26-9810

OS/2 Client Customization Guide, S544-5465

OLE Control and Win32 Client Customization Guide and Reference, S544-5466

Chapter 1. Mapping AFP fonts for the OS/2 client

OnDemand needs to map the AFP fonts your document was created with to fonts that can be displayed on your workstation. For OnDemand to map the best matching outline fonts to display your AFP document, it needs to know certain characteristics about the fonts that were used to create your document. Mapping AFP fonts to outline fonts is done with the IBM-supplied font definition files installed as part of OnDemand. These files are stored in the `\ARSOS2\FONT` directory you specified when you installed OnDemand. You may edit them using any workstation editor. The shipped version of the font definition files maps the IBM Expanded Core (Latin only), compatibility, Sonoran, and Data1 fonts for you.

If your document uses an AFP font whose family isn't installed on your workstation, you can use the `ALIAS2.FNT` file to substitute that font family with a different one. The `ALIAS2.FNT` file remaps several of the AFP fonts to IBM Expanded Core fonts. If you have any outline fonts installed on your workstation, you may want to remove or comment out the font family name substitutions in the `ALIAS2.FNT` file. "Alias file" on page 11 provides details about using the `ALIAS2.FNT` file.

If you created your documents with only the unmodified IBM fonts, you won't need to remap fonts to view them in OnDemand.

When you need to map fonts

If you are using fonts that are not defined to OnDemand, if you have modified the IBM AFP fonts, or if you have created your own AFP fonts (for example, with PSF/2 Type Transformer), you need to define those fonts in the font definition files in order for documents using those fonts to display correctly with OnDemand.

- If you created a new coded font (or renamed one), you will need to define the coded font in the Coded Font file (`ICODED.FNT` or `CODED.FNT`) if your document contains coded fonts.
- If you created a new character set, you have to define it in the Character Set Definition file (`CSDEF2.FNT`).
- If you created a new code page, you have to define it in the Code Page Definition file (`CPDEF2.FNT`).
- If you have created a new code page or modified a code page by moving characters, you have to create a new Code Page Map file (`cpgid.CP2`).

If you only have modified an existing IBM font component, you may not need to perform any of the above steps. For example, if you have only deleted code points in the IBM code page, the font files supplied with OnDemand can be used without modification.

Files supplied for mapping fonts

The following types of files for font support are installed by default in the following subdirectories under the directory in which OnDemand was installed:

Table 1. OnDemand Font Files and Directories

File	File Name	Subdirectory	Description
Coded Font files	ICODED.FNT CODED.FNT ¹ ICODED.CHS ² ICODED.CHT ³ ICODED.JPN ⁴ ICODED.KOR ⁵	\FONT	Specifies which AFP code page and AFP character set make up the coded font.
Character Set definition file	CSDEF2.FNT CSDEF2.CHS ² CSDEF2.CHT ³ CSDEF2.JPN ⁴ CSDEF2.KOR ⁵	\FONT	Defines AFP character set attributes, such as point size. It also maps the font character set to its font global identifier (FGID).
Code Page definition file	CPDEF2.FNT CPDEF2.CHS ² CPDEF2.CHT ³ CPDEF2.JPN ⁴ CPDEF2.KOR ⁵	\FONT	Maps each AFP code page to an OS/2 code page and indicates which Code Page Map file for OnDemand to use.
Code Page Map file	<i>cpgid.CP2</i>	\FONT\MAPS	Defines character identifier mappings. It matches the IBM code page character identifiers and their hexadecimal code points with a corresponding character identifier and ASCII code point representing an OS/2 code page.
Alias File	ALIAS2.FNT	\FONT	Maps AFP font type families to Type 1 outline font family names.

Table 1. OnDemand Font Files and Directories (continued)

File	File Name	Subdirectory	Description
Note:			
1. CODED.FNT is an optional file. A sample can be found in the SAMPLES subdirectory of the \ARSOS2\FONT directory. The CODED.FNT file is meant to contain coded fonts you've created.			
2. Code page and character set files for the Simplified Chinese client.			
3. Code page and character set files for the Traditional Chinese client.			
4. Code page and character set files for the Japanese client.			
5. Code page and character set files for the Korean client.			

Steps for mapping your fonts

After reading the rest of this chapter to determine which font files you need to modify, follow these steps:

1. Gather the information needed to define the fonts in the font definition files. This information is described in the following sections of this chapter.
2. Make backup copies of any of the following font definition files that you plan to modify:
 - CSDEF2.FNT
 - CPDEF2.FNT
 - ICODED.FNT
 - ALIAS2.FNT

Note: Backup copies of these files should be made so that you have an unmodified copy in the event something happens to your modified copy that makes it inoperable.

3. Install any other outline fonts you are planning to use with OnDemand.
4. If you have created or modified a code page, use the BLDCPMAP REXX program to build the code page map file:
 - a. Substitute any non-matching characters in the code page map file or ALIAS2.FNT file if you wish (“Code page map files” on page 9 and “REXX program for building a code page map file” on page 10 provide details about code page map files).
 - b. Edit the CPDEF2.FNT file and add your code page name and the name of the code page map file to use.
5. If you have created a new character set or OnDemand tells you a character set name is undefined, edit the CSDEF2.FNT file and add your character set name in the [CHARSET] section and specify the correct attributes for your font. Add the appropriate information in the [FGID] section of the file if you are using a new font global identifier (FGID) for the character set.

6. If you have created a coded font, create or edit the CODED.FNT file and add your coded font.

Syntax rules for font definition files

Syntax rules for OnDemand font definition files are as follows:

- A semicolon (;) in the first column of any of these files will cause the line to be treated as a comment statement and ignored.
- Section headers within files are enclosed in brackets [] and must *not* be removed or changed.
- All values are case insensitive.
- If a parameter value is invalid and a default value exists, it will be substituted.
- All parameters are positional.
- Blanks are allowed between parameter values.

Coded font file

The IBM Coded Font file (ICODED.FNT) maps AFP coded fonts to their AFP character sets and AFP code pages. Two Coded Font files can be used with OnDemand:

ICODED.FNT

This file contains definitions for approximately 2500 IBM-supplied coded fonts.

CODED.FNT

You can create this optional file to define a list of any coded fonts you have created. If you create a CODED.FNT file, you must place it in the \ARSOS2\FONT directory. A sample of this file can be found in the SAMPLES subdirectory of the \ARSOS2\FONT directory.

If a CODED.FNT file exists in the \ARSOS2\FONT subdirectory, it is searched first for the coded fonts used in an AFP file. If the coded font name is not found in CODED.FNT or if CODED.FNT does not exist, only the OnDemand-supplied ICODED.FNT file will be searched. Performance can be improved by moving coded font file definitions you use most often from the ICODED.FNT file to the CODED.FNT file.

```

X?A155N2 = C?A155N1, T1DCDCFS
X?AE10   = C?S0AE10, T1S0AE10
X?GT10   = C?D0GT10, T1D0BASE
X?ST15   = C?D0ST15, T1D0BASE
X?A0770C = C?A07700, T1DCDCFS
X?A0770I = C?A07700, T1GI0361
X0T0550C = C0T05500, T1DCDCFS

```

Figure 1. Example of CODED.FNT File

Coded font file rules

- A question mark (?) can be used as the wild-card character only for the second character in the coded font name and the character set name. This allows all the character rotations of the coded fonts to be handled with one entry for searching.

Note: A sequential search is performed for the coded font, and the first match is used (including the wild-card character).

- After the coded font name, the character set name must be listed first, followed by the code page name.
- The character set and code page *must* be separated by a comma.

Character set definition file

The Character Set Definition file specifies the character set attributes and font global identifier of the font. It is split into 2 sections, one for character sets [CHARSET] and one for font global identifiers [FGID].

```

[CHARSET]
;charset = fgid, height, width, strikeover, underline
C?H200A0=2304,110,73,0,0
C?H200D0=2304,140,93,0,0
C?N200B0=2308,120,80,0,0
C?4200B0=416,120,144,0,0
C?D0GT15=230,80,96,0,0
C?A155A0=33207,110,73,0,0
C?A175A0=33227,110,73,0,0
C?T055D0=4407,140,93,0,0
C?T17500=4555,100,67,0,0
C?T17560=4555,60,40,0,0
DEFAULT =2308,80,0

```

Figure 2. Example of [CHARSET] section in Character Set Definition File

The first section identified by the section header [CHARSET] lists each AFP font character set and its corresponding attributes:

- Font global identifier (fgid)
- Font height
- Font width
- Strikeover
- Underline

Table 2. Character Set Definition File Attribute Values for [CHARSET]

Attribute	Possible Values	Shipped Default	Description
Fgid	IBM-defined FGID or your own defined FGID within this range: 3840 to 4095 or 65260 to 65534	2308	A unique value that identifies the type family, typeface, and sometimes the point size of the character set.
Height	1 to 990	80	The vertical size of the character set (minimal baseline-to-baseline value) expressed in tenths of a point. For example, a 9-point font would have a height of 90.
Width	0 to 99 (currently ignored)	0	The average horizontal size of the characters in 1440th of an inch. Currently, 0 is always used because OS/2 determines an appropriate font width based on the font height.
Strikeover	1 (means yes), 0 (means no)	0	A font whose characters all have a line, parallel to the character baseline, placed over the middle of the character.
Underline	1 (means yes), 0 (means no)	0	A font whose characters all have a line, parallel to the character baseline, placed under the character.

The second section, identified by the section header [FGID], lists each font global identifier and its corresponding attributes:

- Font type families
- Codepage

```

[FGID]
;fgid = familyname, codepage
230=Gothic,850
416=Courier,850
2304=Helvetica,850
2308=Times New Roman,850
4407=Sonoran Serif,850
4555=Sonoran Serif,850
33207=Sonoran Sans Serif,850
33227=Sonoran Sans Serif,850

```

Figure 3. Example of [FGID] section in Character Set Definition File

Table 3. Character Set Definition File Attribute Values for [FGID]

Attribute	Description	Possible Values	Shipped Default
Familyname ¹	An outline font name or an AFP type family name. This name appears on the OS/2 Palette if you have the font installed on your workstation.	Any Adobe Type 1 font name or AFP type family name	Times New Roman
Codepage	The code page encoding with which the font was created.	850, 65400 ²	
Note:			
1. "Familyname" is the same as "type family" in AFP fonts.			
2. "65400" is the font-specific encoding.			

Character set definition file rules

- Parameters must be separated by a comma. Table 2 on page 6 and Table 3 list the possible values and shipped default values for each parameter.
- In the [CHARSET] section of the file, only fgid and height (point size) are required.
- In the [FGID] section of the file, only the type familyname and codepage are required.
- A question mark (?) can be used as the wild-card character only for the second character in the character set name. This allows all the character rotations of the coded fonts to be handled with one entry while searching.

Note: A sequential search is performed for the character set, and the first match is used (including the wild-card character).

- The [CHARSET] section must come before the [FGID] section.

- You can set a default character set. The default character set that is defined in the file must be the last entry in the [CHARSET] section.
- If you add your own AFP font character set to the [CHARSET] section, you must assign it a font global identifier. Font global identifiers you create must be in the ranges of 3840 to 4095 or 65260 to 65534. If the new character set has the same familyname and codepage as an existing character set, you may use the same font global identifier; otherwise, you must add a unique font global identifier to the [FGID] section.

Code page definition file

The Code Page Definition file maps the IBM AFP code page name to its code page global identifier (CPGID). The section header [CODEPG] is followed by a list of AFP code pages and their AFP code page global identifier that maps to a Code Page Map file (“Code page map files” on page 9 provides details about mapping code pages). The last line gives the default code page map file.

```
[CODEPG]
;codepage = cpgid
T1DCDCFS=1003
T1DEBASE=2058
T1DOBASE=2063
T1D0GP12=2085
T1GI0395=2079
T1GPI363=2066
T1V10037=37
T1V10273=273
T1000290=290
T1000310=310
T1000423=423
T1000905=905
DEFAULT =361
```

Figure 4. Example of Code Page Definition File

Table 4. Code Page Definition File Attribute Values

Attribute	Possible Values	Shipped Default
Code Page Global Identifier	IBM-defined CPGID or your own defined CPGID within this range: 65260 to 65534	361

Code page definition file rules

- If you create your own code page, you must assign it a unique code page global (CPGID) identifier. Leading zeros are not valid. (You may use an IBM code page global identifier but only if the character-to-hexadecimal code mapping is the same for your code page.)

- You can set a default code page. The default code page that is set within the file must be the last entry in the file.

Code page map files

OnDemand provides one Code Page Map file for each AFP code page supplied with PSF and the Data1 and Sonoran licensed programs. These files are installed in their own subdirectory (MAPS) under the \ARSOS2\FONT directory. The file is named for its code page global identifier (CPGID) and has a file extension of .cp2 (for example, 2063.cp2 is the file name for the T1D0BASE code page map; its CPGID is 2063). Each file contains the character identifiers (and associated EBCDIC hexadecimal code points) for an AFP host code page and maps them to character identifiers (and associated ASCII code points) for the OS/2 ASCII code page.

```
;T1000395 to 850
LA020000 C1 LA020000 41
LO120000 EE LO120000 E0
LI510000 8E NOMATCH 00
LO110000 CE NOMATCH 00
LO610000 70 LO610000 9B
LY020000 E8 LY020000 59
ND030000 F3 ND030000 33
ND040000 F4 ND040000 34
SM900000 9A SM900000 C4
SM190000 90 SM190000 B0
LJ010000 91 LJ010000 6A
LF510000 A0 NOMATCH 00
;;;;;;;;; ; SS010000 02
;;;;;;;;; ; SP030000 FF
/*
```

Figure 5. Example of Code Page Map File

Code page map file rules

- Parameters must be separated by blanks.
- “NOMATCH” means there is not a matching character in the OS/2 code page.
- The “NOMATCH” hexadecimal code of 00 is mapped to the undefined code point. When a document contains a character that does not exist in the OS/2 code page, that character cannot be displayed on the screen. If the character has not been remapped in the Code Page Map file or the Alias file ¹, the undefined code point character will be displayed as a blank character.
- The string of semi-colons (;;;;;;;;;) means this line is ignored as a comment. It also indicates the OS/2 code page contains a character that doesn't exist in

1. “Alias file” on page 11 provides information about remapping code points.

the AFP code page. The code point for a OS/2 character not found in the AFP host code page can be used for replacing NOMATCH characters.

REXX program for building a code page map file

OnDemand supplies a sample Restructured Extended Executor Language (REXX) program (BLDCPMAP.REX) you can use to create Code Page Map files. This program executes in the MVS, OS/2, VM, and Windows NT REXX environments. The REXX program is in the SAMPLES subdirectory of the \ARSOS2\FONT directory.²

The BLDCPMAP.REX program requires a host AFP code page and the OS/2 code page file: CP850.MAP.³ The program's output is a Code Page Map file that maps the characters in the host code page to matching characters in the OS/2 code page so it can be used with OnDemand. It also identifies how many unmatched characters there are in the code page. Matching is done using graphic character identifiers, for example, LA010000.

If you are going to use the BLDCPMAP.REX EXEC on an MVS or VM system, you must upload it as an ASCII file with carriage return and line feed (CR/LF) as specified in the BLDCMAP.REX file prologue.

On a VM system, the BLDCPMAP.REX EXEC must be run from the command line rather than from a file listing.

Setting up to build a code page map file

You can either transfer the BLDCPMAP REXX program and the OS/2 code page file to an MVS or VM system and run the program there, or you can transfer your AFP code pages to a PC and run the program under OS/2 or Windows NT (if you have REXX installed on the PC). You can use any file transfer program that handles standard host record format files and ASCII CR/LF line endings, with or without ASCII to EBCDIC translation (we recommend using the IBM eNetwork Personal Communications program).

If you transfer the REXX program and the OS/2 code page file (this file has an extension of .MAP) to an MVS or VM system, they must be translated from ASCII to EBCDIC and CR/LF must indicate a new line. All of the files transferred to MVS or VM must be human-readable. If you transfer your AFP code pages to a PC, you *must* specify a **binary** format. If the file transfer is not correct, a REXX error occurs when you run the BLDCPMAP program.

On the PC, rename the BLDCPMAP.REX file to BLDCPMAP.CMD and ensure that REXX is installed. On VM, the filetype for the BLDCPMAP file must be

2. The \ARSOS2 directory is the directory in which you installed the OnDemand client.

3. The OS/2 code page files are shipped with OnDemand and can be found in the SAMPLES subdirectory of the \ARSOS2\FONT directory.

EXEC. On MVS, the program may be run explicitly with the EXEC command or implicitly by member name, if the partitioned data set containing the BLDCPMAP program was previously allocated to your system file that contains execs (usually SYSEXEC or SYSPROC). If the REXX program is named correctly, you can run the program without parameters to get the correct syntax of the command. You can also display the prologue for the EXEC for syntax.

When you run the BLDCPMAP program, and you have selected which Code Page Map file you want to use with OnDemand, place that Code Page Map file in the MAPS subdirectory of the \ARSOS2\FONT directory in the directory in which you installed OnDemand. Update the CPDEF2.FNT file in the \ARSOS2\FONT directory. In order for OnDemand to find the Code Page Map file, it must be named as follows:

```
code-page-global-identifier.CP2
```

For more information about using the Code Page Map file, refer to “Code page map files” on page 9. For more information about the BLDCPMAP program (for example, the syntax for running the program), refer to the prologue in the BLDCPMAP.REX file.

Alias file

The Alias File contains 2 sections: one section for font familyname aliases [FONT] and one section for character identifier aliases [CHARID].

The first section, identified by the section header [FONT], lists the font familyname aliases. Font familyname aliases allow you to change all of the requested instances of a font familyname (as defined in the Character Set Definition file) to another font familyname. For example, this file is used to change all requests for the Sonoran Serif font (which may not exist on the workstation) to requests for the Times New Roman font (which is one of the core fonts shipped with OS/2 and OnDemand) as shown in Figure 6.

```
[FONT]
; ***** Requested font = Type 1 font *****
Book=Times New Roman
CourierOverstrike=Courier
Sonoran Serif=Times New Roman,Times New Roman
Sonoran Sans Serif=Helvetica,Arial
Text=Courier,Courier New
```

Figure 6. Example of [FONT] section in Alias File

The second section, identified by the section header [CHARID], lists the character identifier aliases. Character identifier aliases (also known as glyph identifiers) allow you to change all of the requested instances of a character to

another character. For example, since the OS/2 code page does not contain the ff ligature (LF510000), it's not mapped to a character in the code page map files (refer to Figure 5 on page 9). Instead, it's mapped to NOMATCH 00. If you want to map all occurrences of LF510000 — NOMATCH 00 pair to a lower case f, you could do this in the [CHARID] section of the ALIAS2.FNT file with the following entry:

```
LF510000=LF010000
```

If you want to change one specific character for one specific code page, you may remap the character on that code page to another character as shown in Figure 5 on page 9.

The Alias file is checked only when a NOMATCH 00 is found in a character mapping.

Note: Using the Alias file for more than a few character substitutions is not recommended as program performance will be affected. If a lot of character substitutions are needed, it is better to make those changes directly to the mappings in the Code Page Map files you're using.

```
[CHARID]
LF510000=LF010000
SA000000=SP320000,SP100000
```

Figure 7. Example of [CHARID] Section in Alias File

Alias file rules

- For family name aliases, all requests for the first family name in the Character Set Definition file have the second family name substituted for them.
- Only 1 family name substitute per line is allowed (to the right of the equal sign), and they must be separated by a comma.
- If multiple mappings are listed in the file for the same family name, only the first match is used.
- The Alias file is processed sequentially and is *not* chained (for example, if “Century Schoolbook” is set equal to “Times”, and “Times” is set equal to “Times New Roman”, “Century Schoolbook” will *not* be set to “Times New Roman”).
- Blanks in family names are treated as characters (for example, “Times New Roman” is not the same font as “TimesNewRoman”).
- The [CHARID] section of the Alias file is only used if the second character identifier is NOMATCH 00.
- The character identifier that you want modified in the [CHARID] section must be followed by an equal sign and the character identifier to which it is

to be changed. A character remap occurs when the modified character identifier (the character to the left of the equal sign in the [CHARID] section) matches the first character identifier of a non-matching pair in the Code Page Map file.

- Several character identifiers (substitute char id) may be listed to the right of the equal sign separated by commas. The first substitute character identifier is substituted for the modified character identifier unless it doesn't exist in the OS/2 font. If it doesn't exist, the next substitute character identifier is used.
- A maximum of 4 substitute character identifiers are allowed.

Support for substituting fonts

OnDemand supports Type 1 fonts installed under the OS/2 Font Palette. Type 1 outline fonts are supplied with OnDemand. These fonts are installed in the fonts directory you specified when you installed OnDemand (the default directory is \PSFONTS). The installed OnDemand Type 1 outline fonts and their PC file names are as follows:

FONT NAME	PC FILE NAME
BarCode	bar*.*
Boldface	bfc*.*
Courier APL2	cou*.*
Gothic Text	got*.*
Letter Gothic	lgo*.*
OCR A	ocr_a.*
OCR B	ocr_b.*
Prestige	prs*.*
PostNet	V500001.*
FinCodes	V500003.*

OnDemand uses the Core Fonts already installed with OS/2:

```
cour*.*  
helv*.*  
tnr*.*
```

Make sure that these outline fonts are installed on your workstation. You can use the Selective Install to install the fonts.

Chapter 2. Mapping AFP fonts for the Windows clients

OnDemand needs to map the AFP fonts your document was created with to fonts that can be displayed on your workstation. For OnDemand to map the best matching outline fonts to display your AFP document, it needs to know certain characteristics about the fonts that were used to create your document. Mapping AFP fonts to outline fonts is done with the IBM-supplied font definition files installed as part of OnDemand. By default, these files are stored in the \ARS\FONT directory (Windows 3.1) or the \Program Files\IBM\OnDemand32\FONT directory (Win32). You may edit them using any standard text editor. The shipped version of the font definition files maps the IBM Core Interchange (Latin only), compatibility, coordinated, Sonoran, and Data1 fonts for you.

If your document uses an AFP font whose family (familyname) isn't installed on your workstation, you can use the ALIAS.FNT file (one of the font definition files installed with OnDemand) to substitute that font familyname with a different one. The ALIAS.FNT file remaps several of the AFP fonts to IBM Core Interchange fonts. If you have any outline fonts installed on your workstation, you may want to remove or comment out the font familyname substitutions in the ALIAS.FNT file. "Alias File" on page 26 provides more information about using the ALIAS.FNT file.

The IBM Core Interchange fonts (shipped with OnDemand) are in Type 1 outline format. These fonts are delivered in three type families: Times New Roman, Helvetica, and Courier. Each type family is provided in these character set groups:

Latin The Latin group is available in 4 typefaces: roman medium, roman bold, italic medium, and italic bold.

Symbols

The Symbols group is available in 2 typefaces: roman medium and roman bold.

Because the IBM Core Interchange fonts are also available for printing with PSF/2; Version 2 of PSF/MVS, PSF/VM and PSF/VSE; and PSF/AIX, they help standardize fonts across applications and installations.

If you created your documents with only the unmodified IBM fonts, you won't need to remap fonts to use OnDemand.

When You Need to Map Fonts

If you are using fonts that are not defined to OnDemand, if you have modified the IBM AFP fonts, or if you have created your own AFP fonts (for example, with PSF/2 Type Transformer), you need to define those fonts in the font definition files in order for documents using those fonts to display correctly with OnDemand.

- If you created a new coded font (or renamed one), you will need to define the coded font in the Coded Font file (ICODED.FNT or CODED.FNT).
- If you created a new character set, you have to define it in the Character Set Definition file (CSDEF.FNT).
- If you created a new code page, you have to define it in the Code Page Definition file (CPDEF.FNT).
- If you have created a new code page or modified a code page by moving characters, you have to create a new Code Page Map file (cp_id.CP).

If you only have modified an existing IBM font component, you may not need to perform any of the above steps. For example, if you have only deleted code points in the IBM code page, the font files supplied with OnDemand can be used.

Files Supplied for Mapping Fonts

The following types of files for font support are installed by default in the following subdirectories under the directory in which OnDemand was installed:

Table 5. OnDemand Font Files and Directories

File	File Name	Subdirectory	Description
Coded Font files	ICODED.FNT CODED.FNT ¹ ICODED.CHS ² ICODED.CHT ³ ICODED.JPN ⁴ ICODED.KOR ⁵	FONT	Specifies which AFP code page and AFP font character set make up the coded font.
Character Set definition file	CSDEF.FNT CSDEF.CHS ² CSDEF.CHT ³ CSDEF.JPN ⁴ CSDEF.KOR ⁵	FONT	Defines AFP character set attributes, such as point size. It also maps the font character set to its font global identifier.
Code Page definition file	CPDEF.FNT CPDEF.CHS ² CPDEF.CHT ³ CPDEF.JPN ⁴ CPDEF.KOR ⁵	FONT	Maps each AFP code page to a Windows character set ⁶ , and indicates which Code Page Map file for OnDemand to use.

Table 5. OnDemand Font Files and Directories (continued)

File	File Name	Subdirectory	Description
Code Page Map file	<i>cpgid.CP</i>	FONT\MAPS	Defines character identifier mappings. It matches the IBM code page character identifiers and their hexadecimal code points with a corresponding character identifier and ASCII code point representing a Windows ANSI or SYMBOL character set. ⁶
Alias File	ALIAS.FNT	FONT	Maps AFP font type families to Type 1 or TrueType outline font family names.
<p>Note:</p> <ol style="list-style-type: none"> 1. CODED.FNT is an optional file. A sample can be found in the \ARS\FONT\SAMPLES directory (Windows 3.1) or the \Program Files\IBM\OnDemand32\FONT directory (Win32). The CODED.FNT file is meant to contain coded fonts you've created. 2. Code page and character set files for the Simplified Chinese client. 3. Code page and character set files for the Traditional Chinese client. 4. Code page and character set files for the Japanese client. 5. Code page and character set files for the Korean client. 6. The Windows term "character set" is roughly equivalent to the AFP term "code page." 			

Steps for Mapping Your Fonts

After reading the rest of this chapter to determine which font files you need to modify, follow these steps:

1. Gather the information needed to define the fonts in the font definition files. This information is described in the following sections of this chapter.
2. Make backup copies of any of the following font definition files that you plan to modify:
 - CSDEF.FNT
 - CPDEF.FNT
 - ICODED.FNT
 - ALIAS.FNT

Note: Backup copies of these files should be made so that you have an unmodified copy in the event something happens to your modified copy that makes it inoperable.

3. Install any other outline fonts you are planning to use with OnDemand. (The *Adobe Type Manager User Guide* provides information about installing fonts with ATM.)
4. If you have created or modified a code page, use the BLDCPMAP REXX program to build the code page map file:
 - a. Determine which Windows character set (ANSI or SYMBOL) is a suitable match for the AFP code page.
 - b. Substitute any non-matching characters in the code page map file or ALIAS.FNT file if necessary. (Refer to “Code Page Map Files” on page 24 and “Code Page Map File REXX Program for Building a Code Page Map File” on page 25 for information about code page map files and the code page map file program respectively.)
 - c. Edit the CPDEF.FNT file and add your code page name, code page identifier, and the best matching Windows character set name for the fonts you are using.

Note: If you are specifying the SYMBOL Windows character set, the font familyname used with the code page must be a symbol font.

5. If you have created a new character set, edit the CSDEF.FNT file and add your character set name in the [CHARSET] section. Specify the correct attributes for your font in the CSDEF.FNT. Add the appropriate information in the [FGID] section of the file if you are naming a new font global identifier.
6. If you have created a coded font, create or edit the CODED.FNT file and add your coded font.

Syntax Rules for Font Definition Files

Syntax rules for OnDemand font definition files are as follows:

- A semicolon (;) in the first column of any of these files will cause the line to be treated as a comment statement and ignored.
- Section headers within files are enclosed in brackets [] and must *not* be removed or changed.
- All values are case insensitive.
- If a parameter value is invalid and a default value exists, it will be substituted.
- All parameters are positional.
- Blanks are allowed between parameter values.

Coded Font File

The IBM Coded Font file (ICODED.FNT) maps AFP coded fonts to their AFP character sets and AFP code pages. Two Coded Font files can be used with OnDemand:

ICODED.FNT

This file contains definitions for approximately 2500 IBM-supplied coded fonts.

CODED.FNT

You can create this optional file to define a list of any coded fonts you have created. If you create a CODED.FNT file, you must place it in the \ARS\FONT directory (Windows 3.1) or the \Program Files\IBM\OnDemand32\FONT directory (Win32). A sample of this file can be found in the SAMPLES subdirectory of the font directory.

If a CODED.FNT file exists in the font subdirectory, it is searched first for the coded fonts used in an AFP file. If the coded font name is not found in CODED.FNT or if CODED.FNT does not exist, only the ICODED.FNT file supplied by OnDemand will be searched.

```
X?A155N2 = C?A155N1, T1DCDCFS
X?AE10   = C?S0AE10, T1S0AE10
X?GT10   = C?D0GT10, T1D0BASE
X?ST15   = C?D0ST15, T1D0BASE
X?A0770C = C?A07700, T1DCDCFS
X?A0770I = C?A07700, T1GI0361
X0T0550C = C0T05500, T1DCDCFS
```

Figure 8. Example of CODED.FNT File

Coded Font File Rules

- A question mark (?) can be used as the wild-card character only for the second character in the coded font name and the character set name. This allows all the character rotations of the coded fonts to be handled with one entry for searching.

Note: A sequential search is performed for the coded font, and the first match is used (including the wild-card character).

- After the coded font name, the character set name must be listed first, followed by the code page name.
- The character set and code page *must* be separated by a comma.

Character Set Definition File

The Character Set Definition file specifies the character set attributes and font global identifier of the font. It is split into 2 sections, one for character sets [CHARSET] and one for font global identifiers [FGID].

```

[CHARSET]
;charset = fgid, height, width, strikeover, underline
C?H200A0=2304,110,73,0,0
C?H200D0=2304,140,93,0,0
C?N200B0=2308,120,80,0,0
C?4200B0=416,120,144,0,0
C?D0GT15=230,80,96,0,0
C?A155A0=33207,110,73,0,0
C?A175A0=33227,110,73,0,0
C?T055D0=4407,140,93,0,0
C?T17500=4555,100,67,0,0
C?T17560=4555,60,40,0,0
DEFAULT =2308,80,0

```

Figure 9. Example of [CHARSET] section in Character Set Definition File

The first section identified by the section header [CHARSET] lists each AFP font character set and its corresponding attributes:

- Font global identifier (fgid)
- Font height
- Font width
- Strikeover
- Underline

Table 6. Character Set Definition File Attribute Values for [CHARSET]

Attribute	Possible Values	Shipped Default	Description
Fgid	IBM-defined FGID or your own defined FGID within this range: 3840 to 4095 or 65260 to 65534	2308	A unique value that identifies the type family, typeface, and sometimes the point size of the character set.
Height	1 to 990	80	The vertical size of the character set (minimal baseline-to-baseline value) expressed in tenths of a point. For example, a 9-point font would have a height of 90.
Width	0 to 99 (currently ignored)	0	The average horizontal size of the characters in 1440th of an inch. Currently, 0 is always used because Windows determines an appropriate font width based on the font height.

Table 6. Character Set Definition File Attribute Values for [CHARSET] (continued)

Attribute	Possible Values	Shipped Default	Description
Strikeover	1 (means yes), 0 (means no)	0	A font whose characters all have a line, parallel to the character baseline, placed over the middle of the character.
Underline	1 (means yes), 0 (means no)	0	A font whose characters all have a line, parallel to the character baseline, placed under the character.

The second section, identified by the section header [FGID], lists each font global identifier and its corresponding attributes:

- Font type families
- Style
- Weight
- Italic

```
[FGID]
;fgid = familyname, style, weight, italic
230=Gothic,MODERN,MED,0
416=Courier,MODERN,MED,0
2304=Helvetica,SWISS,MED,0
2308=TimesNewRoman,ROMAN,MED,0
4407=SonoranSerif,ROMAN,MED,0
4555=SonoranSerif,ROMAN,BOLD,1
33207=SonoranSansSerif,SWISS,MED,1
33227=SonoranSansSerif,SWISS,BOLD,1
```

Figure 10. Example of [FGID] section in Character Set Definition File

Table 7. Character Set Definition File Attribute Values for [FGID]

Attribute	Description	Possible Values	Shipped Default
Familyname ¹	An outline font name or an AFP type family name. This name appears on the ATM Control Panel if you have the font installed on your workstation.	Any Adobe Type 1 font name or AFP type family name	TimesNewRoman

Table 7. Character Set Definition File Attribute Values for [FGID] (continued)

Attribute	Description	Possible Values	Shipped Default
Style ²	The same as a Windows “family”. It is approximately equivalent to type family plus typeface style in AFP fonts.	SWISS, ³ ROMAN, ⁴ SCRIPT, ⁵ MODERN, ⁶ DISPLAY ⁷	ROMAN
Weight	The degree of boldness of a typeface caused by different thickness of the strokes that form a graphic character.	LIGHT, MED, BOLD	MED
Italic	A font whose characters slant to the right.	1 (means yes), 0 (means no)	0
<p>Note:</p> <ol style="list-style-type: none"> 1. “Familyname” is the same as “type family” in AFP fonts and “typeface name” in Windows. 2. “Style” is the same as Windows “family” and is roughly equivalent to “typeface style” and “type family” in AFP fonts. 3. SWISS is a proportionally spaced font, without serifs. 4. ROMAN is a proportionally spaced font, with serifs. 5. SCRIPT is a fixed-pitch font designed to look like handwriting. 6. MODERN is a fixed-pitch font, with or without serifs. 7. DISPLAY is a decorative font. 			

Character Set Definition File Rules

- Parameters must be separated by a comma. Table 6 on page 20 and Table 7 on page 21 list the possible values, and shipped default values for each parameter.
- In the [CHARSET] section of the file, only fgid and height (point size) are required.
- In the [FGID] section of the file, only the type familyname and style are required.
- A question mark (?) can be used as the wild-card character only for the second character in the character set name. This allows all the character rotations of the coded fonts to be handled with one entry while searching.

Note: A sequential search is performed for the character set, and the first match is used (including the wild-card character).

- The [CHARSET] section must come before the [FGID] section.

- You can set a default character set. The default character set that is defined in the file must be the last entry in the [CHARSET] section.
- If you add your own AFP font character set to the [CHARSET] section, you must assign it a font global identifier. Font global identifiers you create must be in the ranges of 3840 to 4095 or 65260 to 65534. If the new character set has the same familyname, style, weight, and italic attributes as an existing character set, you may use the same font global identifier; otherwise, you must add a unique font global identifier to the [FGID] section.

Code Page Definition File

The Code Page Definition file maps the IBM AFP code page name to its code page global identifier (CPGID) and to a Windows character set. The section header [CODEPG] is followed by a list of AFP code pages and their parameters. The first parameter in each line is the AFP code page global identifier that maps to a Code Page Map file. (“Code Page Map Files” on page 24 provides information about mapping code pages.) The second parameter is the Windows character set that you decide is the best match for your AFP code page. The last line gives the default parameter values to be used when a default is required.

```
[CODEPG]
;codepage = cpgid,wincp
T1DCDCFS=1003,ANSI
T1DEBASE=2058,ANSI
T1D0BASE=2063,ANSI
T1D0GP12=2085,ANSI
T1GI0395=2079,ANSI
T1GPI363=2066,SYMBOL
T1V10037=37,ANSI
T1V10273=273,ANSI
T1000290=290,ANSI
T1000310=310,ANSI
T1000423=423,ANSI
T1000905=905,ANSI
DEFAULT =361,ANSI
```

Figure 11. Example of Code Page Definition File

Table 8. Code Page Definition File Attribute Values

Attribute	Possible Values	Shipped Default
Code Page Global Identifier	IBM-defined CPGID or your own defined CPGID within this range: 65280 to 65534	361
Windows Character Set	ANSI or SYMBOL	ANSI

Code Page Definition File Rules

- Parameters must be separated by a comma. Table 8 on page 23 lists the possible values and shipped default values for each parameter.
- Only the first parameter (code page identifier) is required.
- If you create your own code page, you must assign it a unique code page identifier. Leading zeros are not valid. (You may use an IBM code page global identifier but only if the character-to-hexadecimal code mapping is the same for your code page.)
- You can set a default code page. The default code page that is set within the file must be the last entry in the file.

Code Page Map Files

OnDemand provides one Code Page Map file for each AFP code page supplied with PSF and the Data1 and Sonoran licensed programs. These files are installed in their own subdirectory (MAPS) under the \ARS\FONT directory (Windows 3.1) or the \Program Files\IBM\OnDemand32\FONT directory (Win32). The file is named for its code page global identifier (CPGID) and has a file extension of .cp (for example, 2063.cp is the file name for the T1D0BASE code page map; its CPGID is 2063). Each file contains the character identifiers (and associated EBCDIC hexadecimal code points) for an IBM code page and maps them to character identifiers (and associated ASCII code points) for a Windows ANSI or SYMBOL character set.

```
;T1000395 to ANSI
SP010000 40 SP010000 20
LA150000 42 LA150000 E2
LA170000 43 LA170000 E4
LA130000 44 LA130000 E0
SP180000 8B SP180000 BB
SM560000 8C SM560000 89
SA000000 8D SP100000 2D
LI510000 8E NOMATCH 00
LF570000 8F NOMATCH 00
SM190000 90 SM190000 B0
LJ010000 91 LJ010000 6A
LF510000 A0 NOMATCH 00
;:::;::: ; SD150000 5E
;:::;::: ; SD130000 60
;:::;::: ; LT630000 FE
/*
```

Figure 12. Example of Code Page Map File

Code Page Map File Rules

- Parameters must be separated by blanks.

- “NOMATCH” means there is not a matching character in the Windows character set.
- The “NOMATCH” hexadecimal code of 00 is mapped to the undefined code point. When a document contains a character that does not exist in the Windows character set, that character cannot be displayed on the screen. If the character has not been remapped in the Code Page Map file or the Alias file ⁴, the undefined code point character will be displayed as a blank character.
- The string of semi-colons (;;;;;;) means this line is ignored as a comment. It also indicates the Windows code page contains a character that doesn't exist in the IBM code page. The code point for a Windows character not found in the IBM code page can be used for replacing NOMATCH characters.

Code Page Map File REXX Program for Building a Code Page Map File

OnDemand supplies a sample Restructured Extended Executor Language (REXX) program (BLDCPMAP.REX) you can use to create Code Page Map files. This program executes in the MVSTM, OS/2, VM, and Win32 REXX environments. The REXX program is in the \ARS\FONT\SAMPLES directory (Windows 3.1) or the \Program Files\IBM\OnDemand32\FONT directory (Win32).⁵

The BLDCPMAP.REX program requires a host AFP code page and one of the Windows character set files: ANSI.WCP or SYMBOL.WCP.⁶ The program's output is a Code Page Map file that maps the characters in the host code page to matching characters in the Windows character set so it can be used with OnDemand. It also identifies how many unmatched characters there are in the code page so that you can determine which Windows character set (ANSI or SYMBOL) contains the most matching characters. Matching is done using graphic character identifiers.

If you are going to use the BLDCPMAP.REX EXEC on your MVS or VM system, you must upload the file as an ASCII file with carriage return and line feed (CR/LF) as specified in the BLDCPMAP.REX file prologue.

On a VM system, the BLDCPMAP.REX EXEC must be run from the command line rather than from a file listing.

Setting up to Build a Code Page Map File

You can either transfer the BLDCPMAP REXX program and the Windows character set file to your host system and run the program there, or you can

4. “Alias File” on page 26 provides information about remapping code points.

5. The directory in which you installed the OnDemand client.

6. The Windows character set files are shipped with OnDemand and can be found in the \ARS\FONT\SAMPLES directory (Windows 3.1) or the \Program Files\IBM\OnDemand32\FONT directory (Win32).

transfer your AFP code pages to your workstation and run the program under Windows NT (if an OnDemand Windows NT server is available with DB2[®], then REXX is available on the server). You can use any file transfer program that handles standard host record format files and ASCII CR/LF line endings, with or without ASCII to EBCDIC translation. (We recommend using the IBM eNetwork[™] Personal Communications program.)

If you transfer the REXX program and the Windows character set files (these files have an extension of .WCP) to an MVS or VM system, they must be translated from ASCII to EBCDIC and CR/LF must indicate a new line. All of the files transferred to the host system must be human-readable. If you transfer your AFP code pages to a PC, you *must* specify a **binary** format. If the file transfer is not correct, a REXX error occurs when you run the BLDCPMAP program.

On the Windows NT server, rename the BLDCPMAP.REX file to BLDCPMAP.CMD and ensure that REXX is installed. On a VM host system, the filetype for the BLDCPMAP file must be EXEC. On an MVS system, the program may be run explicitly with the EXEC command or implicitly by member name, if the partitioned data set containing the BLDCPMAP program was previously allocated to your system file that contains execs (usually SYSEXEC or SYSPROC). If the REXX program is named correctly, you can run the program without parameters to get the correct syntax of the command. You can also list the prologue for the EXEC for syntax.

When you run the BLDCPMAP program, and you have selected which Code Page Map file you want to use with OnDemand, place that Code Page Map file in the \ARS\FONT\MAPS directory (Windows 3.1) or the \Program Files\IBM\OnDemand32\FONT directory (Win32). Update the CPDEF.FNT file in the \ARS\FONT directory (Windows 3.1) or the \Program Files\IBM\OnDemand32\FONT directory (Win32). In order for OnDemand to find the Code Page Map file, it must be named as follows:

```
code-page-global-identifier.CP
```

For more information about using the Code Page Map file, refer to “Code Page Map Files” on page 24. For more information about the BLDCPMAP program (for example, the syntax for running the program), refer to the prologue in the BLDCPMAP.REX file.

Alias File

The Alias File contains 2 sections: one section for font family name aliases [FONT] and one section for character identifier aliases [CHARID].

The first section, identified by the section header [FONT], lists the font familyname aliases. Font familyname aliases allow you to change all of the

requested instances of a font familyname (as defined in the Character Set Definition file) to another font familyname. For example, this file is used to change all requests for the SonoranSerif font (which may not exist on the workstation) to requests for the TimesNewRoman font (which is one of the core fonts shipped with OnDemand) as shown in Figure 13.

ATM is the supported font program, however, TrueType fonts can be used with OnDemand, but fidelity and character mapping will likely be incorrect. As a backup, a second font (TrueType) can be specified after the Type 1 font name. If the Type 1 font is not found, the TrueType font will be used to display your document.

Note: Be aware that font familyname remapping, especially to TrueType fonts, can cause some misalignment of text characters since the display font is not the same as the font used to create the AFP document. The font familyname can be found listed in the ATM Control Panel. Remapping of one font familyname to a different font familyname with very different characteristics (such as STYLE) may mean a matching font cannot be found. You will receive an error message if either font substitute cannot be found.

```
[FONT]
; ***** Requested font = Type 1 font, TrueType font *****
Book=TimesNewRoman,Times New Roman
CourierOverstrike=Courier,Courier New
SonoranSerif=TimesNewRoman,Times New Roman
SonoranSansSerif=Helvetica,Arial
Text=Courier,Courier New
```

Figure 13. Example of [FONT] section in Alias File

The second section, identified by the section header [CHARID], lists the character identifier aliases. Character identifier aliases (also known as glyph identifiers) allow you to change all of the requested instances of a character to another character. For example, since the Windows ANSI character set does not contain the ff ligature (LF510000), it's not mapped to a character in the code page map files (refer to Figure 12 on page 24). Instead, it's mapped to NOMATCH 00. If you want to map all occurrences of LF510000 — NOMATCH pair to a lower case f, you could do this in the [CHARID] section of the ALIAS.FNT file with the following entry:

```
LF510000=LF010000
```

If you want to change one specific character for one specific code page, you may remap the character on that code page to another character as shown in Figure 12 on page 24.

The Alias file is checked only when a NOMATCH 00 is found in a character mapping.

Note: Using the Alias file for more than a few character substitutions is not recommended as program performance will be affected. If a lot of character substitutions are needed, it is better to make those changes directly to the mappings in the Code Page Map files you're using.

```
[CHARID]
LF510000=LF010000
SA000000=SP320000,SP100000
```

Figure 14. Example of [CHARID] section in Alias File

Alias File Rules

- For family name aliases, all requests for the first family name in the Character Set Definition file have the second family name substituted for them. If the second family name is not found, the TrueType font (the third family name) is requested.
- Only 2 family name substitutes per line are allowed (to the right of the equal sign), and they must be separated by a comma.
- If multiple mappings are listed in the file for the same family name, only the first match is used.
- The Alias file is processed sequentially and is *not* chained (for example, if “Century Schoolbook” is set equal to “Times”, and “Times” is set equal to “TimesNewRoman”, “Century Schoolbook” will *not* be set to “TimesNewRoman”).
- Blanks in family names are treated as characters (for example, “Times New Roman” is not the same font as “TimesNewRoman”).
- The [CHARID] section of the Alias file is only used if the second character identifier is NOMATCH 00.
- The character identifier that you want modified in the [CHARID] section must be followed by an equal sign and the character identifier to which it is to be changed. A character remap occurs when the modified character identifier (the character to the left of the equal sign in the [CHARID] section) matches the first character identifier of a non-matching pair in the Code Page Map file.
- Several character identifiers (substitute char id) may be listed to the right of the equal sign separated by commas. The first substitute character identifier is substituted for the modified character identifier unless it doesn't exist in the Windows font. If it doesn't exist, the next substitute character identifier is used. If none of the substitute character identifiers exist, the undefined code point is used. If you want to examine the contents of the Windows character sets, list the .WCP files in the SAMPLES subdirectory of the

\ARS\FONT directory (Windows 3.1) or the \Program Files\IBM\OnDemand32\FONT directory (Win32).

- A maximum of 4 substitute character identifiers are allowed.

Support for TrueType Fonts

OnDemand supports Type 1 fonts installed under Adobe Type Manager (ATM). Type 1 outline fonts are supplied with OnDemand and provide better fidelity in general than mapping to TrueType fonts. These fonts are installed in the fonts directory you specified when you installed OnDemand (the default directory is \PSFONTS). The installed OnDemand Type 1 outline fonts and their PC file names are as follows:

FONT NAME	PC FILE NAME
TIMESNEWROMAN	tnr*.*
HELVETICA	helv*.*
COURIER	cou*.*
BOLDFACE	bfc*.*
COURIERAPL2	apl*.*
GOTHICTEXT	got*.*
LETTERGOTHIC	lgo*.*
OCR_A	ocr_a.*
OCR_B	ocr_b.*
PRESTIGE	prs*.*

OnDemand queries ATM when the OnDemand viewer is started. If ATM is not available or the Type 1 font you requested cannot be found, OnDemand uses TrueType fonts. If you don't install and use ATM, you may use TrueType fonts to display your documents. To use TrueType fonts, you must do the following:

1. If ATM is installed, it must be disabled, removed, or the Type 1 fonts installed with OnDemand must be removed (if they are not used by other applications on your workstation). You can use ATM to remove these fonts.
2. For Windows 3.1, to disable the check for ATM and the error message generated, you must edit the ARS.INI file in the Windows directory to add the following line in the [Misc] stanza:

```
TTONLY=TRUE
```

To request a specific TrueType font, use the second font substitution family name in the ALIAS.FNT file as described in "Alias File" on page 26.

TrueType Font Substitution Problems

Make sure that the TrueType font you have requested is installed on your workstation. Font substitutions that occur when fonts are not available may cause unexpected results when displaying your files. For example, Courier New is requested in the ALIAS.FNT file and is available with Windows 3.1, but is not available on Windows NT; the same document may appear

(display) differently on the two systems (note, however, that Courier New can be installed on Windows NT).

Appendix. Notices

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