AFP Fonts

A Guide to Understanding AFP Fonts

IBM Printing Systems

Latest Update: December 30, 1999 at 2:43:14 PM

First Edition (December 1999)

AFP Fonts: “From Bitmaps to Outlines”

This document is the fourth in a series of white papers on Advanced Function Presentation (AFP) fonts. Previous documents were for IBM internal use and carried catchy titles like “AFP Fonts: Back to the Future!” and “AFP Fonts: From Bitmaps to Outlines”.

Several events have occurred over the past year that make an update at this time desirable and it seemed like a good opportunity to remove proprietary information, add some information specifically for AFP font users, and make it available to anyone with an interest in AFP fonts. Once again the title has been changed, this time to: “A Guide to Understanding AFP Fonts” and it is hoped that it will prove useful to AFP font users as a source of information regarding AFP font products, migration issues, and a little of the history regarding AFP fonts.

1999 Highlights

- Migration - more information on migration scenarios and migrating to AFP outline fonts
- Font Naming Conventions - cracking the code
- Bar code printing - current status
- AFP Font Collection - latest info including DBCS release 2.1
- AFP Unicode Migration Fonts - AFP Unicode fonts are now available!

Y2K Compliance

All AFP fonts currently and previously provided by IBM are Y2K compliant.

Euro Currency Symbol

Over the next few years a group of countries in Europe will adopt a common currency. The printed glyph for this currency is called the euro currency symbol or euro sign. To support printing the euro in AFP, the euro glyph was added to all Latin1 fonts in AFP Font Collection V2.1 released late in 1998 and new Latin1 fonts containing the euro sign are now populating IBM Printing Systems printers that provide resident fonts. The euro was not added to the Compatibility fonts, nor was it added to any of the 240-pel font licensed products.

Please see **Printing the Euro Currency Symbol** in this document for more information on the euro.

Introduction

IBM has been providing AFP font products for 15 years. In the beginning we had one printer (3800-3), one font format (unbounded-box), one resolution (240-pel), and three operating system platforms on which the fonts were used (VM, MVS, and VSE). Today we support dozens of printers, five font formats, several resolutions, six IBM platforms, and two Windows operating systems.

In addition to the complexities surrounding the additions of printers, font architectures, print resolutions, and platforms, the printer hardware has also undergone substantial change as it evolved to include font download, printer-resident fonts, font cards, font diskettes, and font hard-drives. Also, the variety of print technologies has increased dramatically to include write-white, write-black, edge enhancement, stroke enhancement, print quality enhancement and others. In the midst of all this the fonts have been required to fit into each of the print environment models and still maintain high quality printing, all the while trying to minimize DASD and resource management burdens.

This document attempts to provide an overview of the various AFP font offerings; where they came from, what they contain, font data formats, and a discussion of issues regarding the migration from low resolution bitmap printing to printers capable of higher resolutions through the use of outline fonts.

Definitions

Here are some terms that will be used throughout this document.

- **AFP Font Collection:** Licensed products containing strategic AFP fonts and font-related programs. Includes: Expanded Core, Type Transformer, SBCS and DBCS AFP outlines, 240-pel DBCS, a code page editor, a coded font editor, and upload/reblock utilities. (See the **AFP Font Collection** section in this document.)
- **bitmap**: A term used to describe a font data type in which each character is composed of discrete pels arranged in such a manner as to produce a character shape when printed. The terms *bitmap font* and *raster font* are synonymous.
- **BookMaster fonts:** Gothic, Specials (symbols), and IBM logo fonts used by BookMaster.
- **character increment (setwidth):** The distance a printer or formatter will increment from its current print position to the point where the next character will be placed. Character increment is the sum of A-space (leftside bearing), B-space (width of the raster pattern), and C-space (rightside bearing). Note that leftside and rightside bearings can be positive, negative, or zero. The terms *character increment* and *setwidth* are used interchangeably.
- **CJK:** An abbreviation for Chinese (Simplified and Traditional), Japanese, and Korean.
- **Compatibility fonts:** Uniformly spaced typewriter font families provided with PSF and with some versions of AFP Font Collection. Examples include Gothic, Courier, and Letter Gothic.
- **Core Interchange fonts:** Strategic fonts that support most languages of the world in three type families: Courier, Helvetica, and Times New Roman.

- **double-byte character set (DBCS):** A font data format in which two bytes are used to address each character. Generally used where large numbers of characters are involved such as CJK and Unicode.
- **Expanded Core fonts:** Strategic AFP fonts; the single-byte font portion of AFP Font Collection. A term used to describe the strategic font set which includes Core Interchange, BookMaster, and additional uniformly-spaced fonts.
- **font licensed products:** priced font products such as Sonoran Serif, Century Schoolbook, and AFP Font Collection.
- **language complement:** A term used to reference a group of languages for which a typeface can be used. Examples include Latin1, Cyrillic/Greek, Arabic, and Symbols.
- **outline fonts:** Scalable fonts with characters described by mathematical equations rather than by discrete pels. Imaging programs create bitmaps for print/display at required sizes and resolutions by interpreting outline font data. Examples include Adobe Type1, Adobe CID-keyed, and AFP outlines.
- **pel:** A picture element or pixel; one printable or displayable unit. When used with a number, pel indicates resolution. Examples include 240-pel and 300-pel. When used in this way, *pel* and *dpi* (dots per inch) are interchangeable terms.
- **raster:** See bitmap.
- **single-byte character set (SBCS):** A font format in which one byte is used to address each character. Generally used where small numbers of characters are accessed by code pages with 256 or less code points.
- **Unicode:** a fixed-width (two-byte for our purposes) encoding scheme for written characters and text including characters from the major scripts of the world and commonly-used technical symbols.

Strategic AFP Fonts

The concept of providing a strategic set of AFP fonts to be used across IBM's operating systems, applications, and printers began around 1988 and was established in 1990 when the IBM Core Interchange fonts were first made available as part of the Print Services Facility (PSF) products. As time passed, the scope of these fonts was expanded through enhancements including: additional type families, additional language support, the euro currency symbol, and extensive double-byte language support. Today, an established base of strategic fonts exists that provides formatting and printing support for many of the world's languages.

AFP strategic fonts are composed of two font groups: the IBM Expanded Core fonts which provide a wide variety of typefaces supporting over 50 languages and the IBM Double-Byte Character Set (DBCS) Core fonts which provide typefaces that can be used for Chinese, Japanese, and Korean applications.

IBM Expanded Core Fonts

Background

The Expanded Core fonts make up the single-byte portion of the AFP Font Collection products. They include the following font groups:

- Core Interchange fonts
- Additional uniformly-spaced fonts (APL2, Boldface, Gothic Text, Gothic Katakana, Letter Gothic, OCR-A, OCR-B, and Prestige)
- BookMaster fonts

The Expanded Core fonts provide a rich assortment of familiar type families that are outline font based and can be used on any AFP device in any operating system environment in which AFP has been implemented. In 1998, the euro currency symbol was added to all Expanded Core Latin1 fonts.

There has been some misunderstanding as to exactly what the Expanded Core fonts contain in the way of type families and what languages are supported by these fonts. Let's look at each group of fonts that make up the Expanded Core fonts and see what we have.

IBM Core Interchange Fonts

Many years ago it became clear that to achieve document interchange across IBM's many operating systems it would be necessary to provide a common set of fonts that could be used by all operating systems and platforms. Common fonts would enable consistent print fidelity regardless of printer (or display) resolution or the platform on which the document was formatted.   In 1990, the IBM Core Interchange fonts were created to address this concern.

The Core Interchange fonts were provided with PSF/MVS, PSF/VSE, PSF/VM, PSF/2, and PSF/6000 as optional features, with OS/400 as an RPQ, and as part of OS/2 and the AFP Viewer. They were provided as 240-pel bounded-box rasters, unbounded-box rasters (for PSF/MVS and PSF/VSE), 300-pel rasters, and Type1 outlines on a wide range of media including tape, tape cartridge, diskette, and CD-ROM.

On May 1, 1995 (June 30, 1995 for AS/400) the Core Interchange fonts were removed from the PSF products and now form the backbone of the Expanded Core fonts in AFP Font Collection.

The Core Interchange fonts consist of the following type families. Each family is available in roman medium, roman bold, italic medium, and italic bold typefaces.

- Times New Roman
- Helvetica
- Courier

The Core Interchange fonts are packaged by language complement. The following language complements contain Core Interchange fonts:

- Latin1
- Latin235
- Latin4
- Cyrillic Greek
- Arabic
- Hebrew
- Symbols
- Thai (added in AFP Font Collection V2.1)
- Lao (added in AFP Font Collection V2.1)

The Core Interchange fonts support the following languages:

- Latin1 (ISO 8859-1): Danish, Dutch, English, Faeroese, Finnish, French, German, Icelandic, Irish, Italian, Norwegian, Portuguese, Spanish, and Swedish
- Latin2 (ISO 8859-2): Albanian, Czech, English, German, Hungarian, Polish, Romanian, Serbocroatian, Slovak, and Slovenian.
- Latin3 (ISO 8859-3): Afrikaans, Catalan, Dutch, English, Esperanto, French, German, Italian, Maltese, Spanish, and Turkish.
- Latin4 (ISO 8859-4): Danish, English, Estonian, Finnish, French, German, Greenlandic, Lappish, Latvian, Lithuanian, and Norwegian.

- Latin/Cyrillic (ISO 8859-5): Bulgarian, Byelorussian, English, Macedonian, Russian, Serbocroatian, and Ukranian.
- Latin/Arabic (ISO 8859-6): Latin and Arabic scripts.
- Latin/Greek (ISO 8859-7): Latin and Greek scripts.
- Latin/Hebrew (ISO 8859-8): Latin and Hebrew scripts
- Latin5 (ISO 8859-9): Danish, Dutch, English, Finnish, French, Irish,
- Italian, Norwegian, Portuguese, Spanish, Swedish, and Turkish.
- Thai
- Lao

Additional Uniformly-Spaced Fonts

To complement the Core Interchange fonts, a group of uniformly-spaced fonts was added when AFP Font Collection was produced. These fonts were once called the "Coordinated Set", a term that was ill-conceived, poorly received, and hastily removed! There is no name used to identify these fonts which include most of the Compatibility font typefaces and all but one of the 4028 resident font set. The following type families are included:

- Boldface Latin1 (roman bold; Latin1 language complement)
- Courier APL2 (roman medium and roman bold; APL2 language complement)
- Gothic Katakana (Katakana language complement)
- Gothic Text Latin1 (roman medium; Latin1 language complement)
- Letter Gothic Latin1 (roman medium and roman bold; Latin1 language complement)
- OCR-A and OCR-B (Optical Character Recognition (OCR) language complement)
- Prestige Latin1 (roman medium, italic medium, and roman bold; Latin1 language complement)

BookMaster Fonts

The last group of fonts added to complement the Core Interchange fonts are the BookMaster fonts. The BookMaster fonts differ from the rest of the Expanded Core fonts in the following ways.

1. The BookMaster fonts are not printer-resident.
2. The BookMaster fonts have their own set of code pages.
3. Here are no coded fonts because BookMaster does not use coded fonts.

The BookMaster fonts provide the following type families:

- BookMaster Latin1 (roman medium, italic medium, roman bold, italic bold; BookMaster language complement)
- BookMaster Latin1 Reverse (roman medium; BookMaster language complement)
- BookMaster Specials (roman medium, italic medium, roman bold, italic bold; BookMaster language complement)
- BookMaster Specials Reverse (roman medium; BookMaster language complement)

- IBM Logo (roman medium; BookMaster language complement)

Expanded Core Font Data Formats

Font data formats supported by the Expanded Core fonts include:

- 240-pel raster (bounded-box only)
- 300-pel raster
- AFP outline
- Type1 outline

Migration

Since the Expanded Core fonts are provided in all data formats and for all operating systems in which AFP is present, they should be the goal of font migration activities.

Future

From time to time language enhancements may be made to the Expanded Core fonts and typefaces may (or may not) be added, but these fonts will remain the nucleus of the single-byte and double-byte strategic AFP fonts into the foreseeable future. The Expanded Core and DBCS Core fonts form the basis for future AFP Unicode support.

DBCS Core Fonts

Background

The first AFP Double-Byte Character Set (DBCS) fonts were developed, distributed, and supported by the IBM Yamato lab. These fonts provided 240dpi-only font support for Japanese (Kanji), Korean, Simplified Chinese, and Traditional Chinese languages. The Kanji fonts were also provided on Read-Only-Memory (ROM) cards for the 3820, thus making the 3820 the first AFP printer to contain resident DBCS fonts.

Late in 1998, new DBCS versions of the AFP Font Collection V2.1 products were released that provide DBCS customers with a much broader selection of DBCS alternatives. For example, it is no longer necessary to create 240-pel and AFP outline DBCS font resources with Type Transformer as these font formats are now provided in AFP Font Collection V2.1.

Today, most IBM AFP printers either contain a full set of DBCS fonts or have features available that can be purchased to install them. The DBCS fonts resident in the printers are CID-keyed outline fonts that provide high resolution printing support for Japanese, Korean, Simplified Chinese, and Traditional Chinese languages.

Font Families

The DBCS Core fonts provide the following font families:

- Japanese Core Fonts
  - Heisei Kaku Gothic
  - Heisei Maru Gothic
  - Heisei Mincho
- Korean Core Fonts
  - Gothic
  - Myengjo
- Simplified Chinese Core Fonts
  - Fang Song
  - Hei
  - Kai
  - Song
- Traditional Chinese Core Fonts
  - Kai
  - Sung

Language Support

The DBCS Core fonts support the following DBCS languages:

- Japanese (Base and Extended)
- Korean
- Simplified Chinese (GB and GBK)
- Traditional Chinese

Font Data Formats

Font data formats supported by the DBCS Core fonts include:

- 240-pel raster
- AFP outline
- CID-keyed outline

Migration

In order to take advantage of the new high resolution printer capabilities it is necessary to migrate existing applications from the old 240-pel DBCS fonts to outline fonts. This presents a problem because the old 240-pel fonts and the new outline fonts use different character baselines, thus page fidelity is not maintained. To solve this problem, “simulation” coded fonts are provided with AFP Font Collection V2.1 that cause the printers to adjust the baselines of characters in the outline fonts so that the resulting print is identical to that of the old 240-pel fonts. This was accomplished by adding a new Font Object Content Architecture (FOCA) field called the Metric Adjustment Triplet. The Metric Adjustment Triplet was added to the Coded Font Control structured field for DBCS outline coded fonts and causes the printer to shift each character by a predefined amount in such a way that the resulting character placement is exactly as would be if the comparable old 240-pel font were used. The new coded fonts are called “simulation” coded fonts in that they simulate the character positions of the old 240-pel fonts with outline fonts on the new high resolution printers. By using the simulation coded fonts, all the advantages of high resolution outline font printing can be achieved while still maintaining page fidelity with applications using the old 240-pel raster fonts.

The following list shows the 240-pel DBCS font products that can be simulated with the simulation coded fonts:

- AFP Japanese Fonts V2 (5771-AGB)
- AFP Japanese Heisei Fonts (5648-104)
- AFP Korean Fonts (5771-AFW)
- AFP Simplified Chinese Fonts (5771-AEK)
- AFP Traditional Chinese Fonts (5771-AFZ)

Future

Enhancements will continue to be made to the DBCS Core fonts, mainly in the form of additional characters. The DBCS Core fonts and Expanded Core fonts form the basis for future AFP Unicode support.

Printer Resident Fonts

Background

Some raster printers have fonts that reside in the printer hardware as ROM data, font cards, diskettes, or a combination of the three. Prior to AFCCU outline font printers, the use of printer resident fonts in an IPDS environment was mainly limited to printers that support the 4028 resident font set.

Now that IPDS outline font printers are available which contain the Expanded Core font set, this picture has improved dramatically. With only a few outlines, thousands of fonts can be printed and no fonts need to be downloaded. AFP Font Collection provides host versions of the resident outlines so documents may be formatted and printed on any IPDS outline font printer at whatever resolution the printer supports.

Migration

Migrating applications to use printer-resident fonts follows the same path as migrating to the Expanded Core fonts. Once the transition is made to the Expanded Core fonts, using printer-resident fonts is seamless because the Expanded Core fonts are resident in the printers.

Future

Outline font technologies will continue to be monitored as will the potential for Unicode support. However, we are also aware of the investments our customers have made to establish printing environments based on the Expanded Core fonts. Maintaining consistency will be of utmost importance.

IBM AFP Font Collection

IBM AFP Font Collection is the vehicle used to provide IBM's strategic AFP fonts. It actually consists of two priced products: AFP Font Collection for MVS, OS/390, VSE, and VM (5648-B33) and AFP Font Collection for AIX, AS/400, OS/2, Windows NT, and Windows 2000 (5648-B45).

Background

In the past, strategic AFP fonts were distributed as features of the PSF products. This approach worked well in the beginning, but as time passed, it became increasingly difficult to sync the needs for font updates with PSF release cycles. To address this concern we decided to package the fonts as a separate product. We pulled all of the Core Interchange fonts from the PSF products, added Type Transformer, some other font utilities, some other fonts, and called it AFP Font Collection for IBM Operating Systems (5688-113). Later, the product was separated into two products, one for mainframes (5648-B33) and one for workstations and midrange computers (5648-B45).

There has been some confusion regarding AFP Font Collection, partly because of the way the product is structured and partly because there have been assumptions made as to what constitutes a "collection" of fonts.

AFP Font Collection is not...

AFP Font Collection is **not** a rollup of all the fonts we have ever provided. It does **not** contain the Sonoran fonts, bar code fonts, or any other font licensed product. It is **not** a direct replacement for old 240-pel font products.

AFP Font Collection is...

AFP Font Collection **is** a vehicle for providing a consistent set of outline-based fonts that can be used throughout AFP. It **is** the source for printing solutions for many of the worlds written languages. It **is** the source of strategic AFP fonts and provides host equivalents of printer resident fonts.

Packaging for multiple operating systems presents some interesting challenges when it comes to describing a product, particularly when one term, "AFP Font Collection" is used to reference two products and the two products have different contents! Let's try to sort this out.

We'll begin with AFP Font Collection's mainframe version, AFP Font Collection for MVS, OS/390, VM, and VSE (5648-B33). This product contains only AFP fonts. It has no programs and contains no Type1 outlines. The contents are the same on all three platforms and it is only available on tape media.

The following table identifies the various media features and what they provide.

AFP Font Collection for MVS, OS/390, VM, and VSE (5648-B33)

Fonts	Font Data Format	Operating System	Distribution Media	Feature
Expanded Core Fonts	240-pel, 300-pel, AFP outline	MVS, OS/390	3480 tape cart.	5802
		MVS, OS/390	4mm tape cart.	6200
		VSE	3480 tape cart.	5812
		VSE	4mm tape cart.	6203
		VM	3480 tape cart.	5822
		VM	4mm tape cart.	6205
DBCS Core Fonts				
Japanese	240-pel and AFP outlines	MVS, OS/390	3480 tape cart.	5832
		MVS, OS/390	4mm tape cart.	6490
		VSE	3480 tape cart.	5812
		VSE	4mm tape cart.	6204
Korean	240-pel and AFP outlines	MVS, OS/390	3480 tape cart.	5842
		MVS, OS/390	4mm tape cart.	6491
		VSE	3480 tape cart.	5882
		VSE	4mm tape cart.	6208
Simplified Chinese	240-pel and AFP outlines	MVS, OS/390	3480 tape cart.	5852
		MVS, OS/390	4mm tape cart.	6206
		VSE	3480 tape cart.	5892
		VSE	4mm tape cart.	6206
Traditional Chinese	240-pel and AFP outlines	MVS, OS/390	3480 tape cart.	5862
		MVS, OS/390	4mm tape cart.	6493
		VSE	3480 tape cart.	6002
		VSE	4mm tape cart.	6207

Next, we’ll look at the workstation and midrange computer version, AFP Font Collection for AIX, OS/400, OS/2, Windows NT, and Windows 2000 (5648-B45). This one is more complicated because the contents vary by platform. Here are some things to help you understand how it’s packaged.

1. There is a CD-ROM that contains Expanded Core and Compatibility fonts for OS/2, AIX, and Windows NT. The CD-ROM contains **only** fonts (no programs) and can be used on all three operating systems.
2. There is a CD-ROM that can only be used on OS/2. This is called Outline Fonts and Programs for OS/2 and contains all the font utility programs (Type Transformer, FontLab, a code page editor, and upload/reblock programs), as well as the Type1 and CID-keyed outline fonts.
3. AS/400 is packaged very similar to the operating systems in the mainframe product, the main difference being that along with tape media there is also a CD-ROM.

AFP Font Collection for AIX, OS/400, OS/2, Windows NT, and Windows 2000 (5648-B45)

OS/400 Fonts

Fonts	**Font Data Format**	**Operating System**	**Distribution Media**	**Feature**
Expanded Core and Compat Fonts	240-pel, 300-pel, AFP outlines (AFP outlines for Expanded Core only)	OS/400	4mm tape cart.	6206
			3480 tape cart.	5832
			.25” tape cart.	5824
			8mm tape cart.	5902
			CD-ROM	5957
DBCS Core Fonts				
Japanese	240-pel and AFP outlines	OS/400	.25” tape cart.	5823
			CD-ROM	5849
Korean	240-pel and AFP outlines	OS/400	.25” tape cart.	5833
			CD-ROM	5859
Simplified Chinese	240-pel and AFP outlines	OS/400	.25” tape cart.	5843
			CD-ROM	5869
Traditional Chinese	240-pel and AFP outlines	OS/400	.25” tape cart.	5853
			CD-ROM	5879

AIX, OS/2, and Windows NT Fonts

Fonts	**Font Data Format**	**Operating System**	**Distribution Media**	**Feature**
Expanded Core and Compat Fonts	240-pel, 300-pel, AFP outlines (AFP outlines for Expanded Core only)	OS/2, AIX, and Win-NT	CD-ROM	5970
DBCS Core Fonts				
Japanese	240-pel and AFP outlines	OS/2	CD-ROM	5889
Korean	240-pel and AFP outlines	OS/2	CD-ROM	5899
Simplified Chinese	240-pel and AFP outlines	OS/2	CD-ROM	6219

Traditional Chinese	240-pel and AFP outlines	OS/2	CD-ROM	6229
DBCS Core Fonts				
Japanese	240-pel and AFP outlines	AIX, Win-NT	CD-ROM	5809
Korean	240-pel and AFP outlines	AIX, Win-NT	CD-ROM	5819
Simplified Chinese	240-pel and AFP outlines	AIX, Win-NT	CD-ROM	5829
Traditional Chinese	240-pel and AFP outlines	AIX, Win-NT	CD-ROM	5839

OS/2 Outline Fonts and Programs

Fonts and Programs	**Data Format**	**Operating System**	**Distribution Media**	**Feature**
Expanded Core Fonts	Type 1 outlines	OS/2	CD-ROM	6208
DBCS Core Fonts	CID-keyed outlines	OS/2	CD-ROM	6208
OS/2 Font Utility Programs	Program Code	OS/2	CD-ROM	6208

Migration

One of the best features of AFP Font Collection is the fact that all of the Expanded Core and DBCS Core fonts are outline-based which provides consistency across all font data formats, raster and outline. This means that all raster font formats, regardless of resolution, were created from the same outline fonts. The result is consistency of character shapes and metrics across all resolutions.

Future

We will continue making new releases of AFP Font Collection available as new function is required. One example was a new release made available in 1998 that added the euro currency symbol and support for Thai and Lao languages.

AFP Font Collection Facts and Figures

Expanded Core

Family		Typefaces					Raster Point Sizes														
	TPM*	RM	IM	RB	IB	REV	5	6	7	8	9	10	11	12	14	16	18	20	24	30	36
Courier	M	x	x	x	x				x	x		x		x	x			x			
Helvetica	T	x	x	x	x			x	x	x	x	x	x	x	x	x	x	x	x	x	x
Times New Roman	T	x	x	x	x			x	x	x	x	x	x	x	x	x	x	x	x	x	x
Courier APL2	M	x		x										x							
Boldface	P			x										x							

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  Gothic Text       M   x               x x x x x x   x x     x
  Gothic Katakana   M   x                 x x x   x   x x     x
  Letter Gothic     M   x     x           x x x   x   x x     x
  Prestige          M   x  x  x             x x   x   x x     x
  OCR-A             M   x                         x
  OCR-B             M   x                         x
  BookMaster Latin1 M   x  x  x  x  x   x x x x x x x x x x x x x x x
  BookMaster Spec   M   x  x  x  x  x   x x x x x x x x x x x x x x x
  IBM logo          T   10, 12, 14, 16, 18, 20, 24, 28, 32, 36, 40, 48pt

* TPM = (T)ypographic, (P)roportionally Spaced Machine, (M)onospaced
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Expanded Core Font Data Formats

- 240-pel raster (bounded-box only)
- 300-pel raster
- AFP outlines
- Type1 outlines

DBCS Core Font Data Formats

- 240-pel raster
- AFP outlines
- CID-keyed outlines for CJK fonts (included with DBCS TypeTransformer)

Compatibility Font Data Formats (only for AS/400, AIX, and OS/2)

- 240-pel raster (bounded-box only)
- 300-pel raster

Language complements

The following table lists each language complement and its associated fonts. MVS FMIDs and VSE CLCs are packaged by language complement so questions such as "Where can I find the Letter Gothic fonts?" can be answered by using this list along with the FMID and CLC tables listed in the program directories.

Latin1	- Boldface, Courier, Gothic Text, Helvetica, Letter Gothic, Prestige, Times New Roman
Latin235	- Courier, Helvetica, Times New Roman
Latin4	- Courier, Helvetica, Times New Roman
Cyrillic Greek	- Courier, Helvetica, Times New Roman
Arabic	- Courier, Helvetica, Times New Roman
Hebrew	- Courier, Helvetica, Times New Roman
Symbols	- Courier, Helvetica, Times New Roman
BookMaster	- BookMaster Latin1 and BookMaster Specials
Thai	- Burirum, Thonburi, and Courier Thai
Lao	- Pusuwan, Kaewfah, and Courier Lao
OCR	- OCR-A and OCR-B

APL	Courier APL2
Japan SBCS	Gothic Katakana
Japan DBCS	Heisei Mincho, Heisei Maru Gothic, Heisei Gothic
Korean	Gothic and Myengjo
Simplified Chinese	Fang Song, Hei, Kai, and Song
Traditional Chinese	Kai and Sung

Legacy AFP Font Products

IBM-Supplied Compatibility Fonts

Background

The IBM-Supplied Compatibility fonts' ancestry dates back to Selectric typewriters. When the first AFP printer was produced (3800-3), the Compatibility fonts were provided so that 3800-3 customers would be able to print with typefaces they were accustomed to seeing on typewriters and some of the older printers such as 1403, 6670, and 3800-1.

Initially the Compatibility fonts were provided as features of PSF 1.0 for MVS, VM, and VSE specifically for the 3800-3 printer. Since their introduction, there have been several additions including bounded-box fonts (for 3820, 3825, and others), Proprinter Emulation fonts, and various enhancements such as national language support and additional sizes for some typefaces.

These fonts were initially provided for 240-pel printers as part of the PSF products. When 300-pel printers came on the scene, a conversion program was provided with PSF/MVS, PSF/VM, and PSF/VSE to allow customers to convert 240-pel fonts to 300-pel. PSF/AIX, PSF/2, and PSF/400 did not have the conversion program so IBM created 300-pel fonts using the PSF/VM conversion program and began providing the 300-pel fonts for those platforms. Soon, we began getting requests from MVS, VM, and VSE customers that we should also provide the 300-pel fonts for them so they would not be burdened with running the conversion program. To address this concern, we began providing the 300-pel Compatibility fonts created using the conversion utility with all PSF's.

Shortly after making the 300-pel fonts available, we began receiving complaints that the 300-pel Gothic fonts created with the conversion program were dark and blotchy. There were several reasons for this, but first it must be mentioned that low resolution bitmap conversion is a very difficult task. In looking at a variety of algorithms over the years, we feel that the one in the conversion program is quite good, but even so, it cannot perform miracles. The 240-pel Gothic fonts are a little dark to begin with, probably because they were converted from non-240-pel 3800-1 fonts. Couple that with the fact that 300-pel printers, especially the early ones, tend to print a little darker than 240-pel printers and you can begin to see why the 300-pel Gothic fonts were not well received. To address the character quality concern we replaced the converted bitmaps in 14 of the Gothic fonts with bitmaps created from the Gothic Text Latin1 outlines, and began providing them with the PSFs and AFP Font Collection. All Gothic fonts now exhibit consistent, clean shapes and smooth, consistent point size progressions.

Migration

The Compatibility fonts were intended to be an assortment of non-licensed fonts that could be given away to new PSF customers with the thought that once they had their operation running and were comfortable with AFP, would then progress from the Compatibility fonts to typographic fonts and other font licensed products. Several factors have slowed the transition: 1) The Compatibility fonts provided such a rich assortment of fonts that many felt there was no need to look further, 2) IBM did not offer a selection of uniformly-spaced font licensed products, 3) IBM used the Compatibility fonts as defaults, and 4) the need for typographic considerations in font selection was slow in coming. Since use of the Compatibility fonts has hung on longer than expected, migration to outline font printers presents some challenges.

When migration issues arise we must keep in mind that the ultimate goal is to end up at a point where all documents are formatted with relative metrics. This enables documents to be printed on any resolution IPDS printer and ensures page fidelity between 300-pel and outline font printers.

The migration path from the Compatibility fonts to 300-pel and outline font printers is through the Expanded Core fonts. The Expanded Core fonts, while not providing a direct replacement for each Compatibility font, do provide a collection of the most popular Compatibility font typefaces.

There are 124 character sets in the Compatibility fonts. Of these, 49 have equivalent Expanded Core font character sets, 15 can be approximated with similar typefaces that provide format fidelity, 7 can be approximated with similar typefaces that do not provide format fidelity, and 53 have no reasonable substitute outlines. Of the 53 that have no reasonable substitutes, 36 are little-used Proprinter Emulation fonts. (See **Appendix A: Compatibility Font Migration Tables**.)

Since many applications refer to fonts by coded font name, it was important to keep the coded font names used in the Expanded Core fonts uniquely separated from Compatibility coded fonts. It was realized that some users will desire a combination of Compatibility and Expanded Core fonts and for this reason, all of the font resource names are unique. For example, although similar, the Compatibility font Courier 10-pitch (C0S0CR10) and Courier Latin1 10-pitch from the Expanded Core fonts (C04200B0) do not print exactly the same because the character shapes came from different sources. By protecting the uniqueness of the font resource names, users are able to choose which works best for them.

Uniqueness of names requires that when migrating from the Compatibility fonts to Expanded Core fonts, changes to existing documents must be made. In some cases it is simply a matter of changing a coded font name and reformatting the document. Other situations require that different code points and possibly even font switching be used to access required characters. There are also cases where no migration path exists.

Compatibility font migration scenarios

The following is a summary of various Compatibility font migration scenarios. Note that the Compatibility fonts contain 1271 coded fonts. More detail on this topic can be found in the 240-pel to 300-pel Compatibility Font Migration Table found in Appendix A.

- 302 coded fonts can be directly replaced with equivalent Expanded Core coded fonts. In these cases the Compatibility fonts and the Expanded Core fonts use the same code pages and the only thing changing is the character set. For example, X0CB09 (Courier Bold 10-pitch with T1V10500) can be replaced by X04410BC or X040FB (Courier Latin1 roman bold 12-point with T1V10500) from the Expanded Core fonts.

- 193 coded fonts have comparable Expanded Core character sets, but coded fonts need to be created to use a Compatibility font code page. For example, X0GF10 (Gothic Text 10-pitch with T1L0FOLD) can be printed using the Expanded Core fonts by creating a coded font that pairs C06200B0 (Gothic Text Latin1 roman medium 12-pt) with T1L0FOLD.
- 270 coded fonts can be approximated by using existing Expanded Core coded fonts, or in some cases, by creating new coded fonts. Format fidelity will be maintained, but a different typeface will be used. For example, X0OB10 pairs Orator Bold with T1D0BASE. Since Orator Bold is not an Expanded Core typeface, a new coded font pairing Letter Gothic Bold (C05400B0) and T1001002 can be created. Letter Gothic Bold is very similar to Orator Bold and since the character setwidth metrics are the same, format fidelity will be maintained.
- 150 coded fonts can be approximated by using existing Expanded Core coded fonts, or in some cases, by creating a new coded font. A different typeface will be used, but format fidelity will not be maintained. For example, X0BITR pairs Book (Boldface) Italic with T1D0BASE. A coded font pairing Times New Roman italic (C0N300B0) and T1001002 can be created. Time New Roman italic is similar to Book Italic, but the character setwidth metrics are very different and format fidelity will not be maintained.
- 356 coded fonts have no migration path. In these cases there are no reasonable Expanded Core character sets that can be substituted. Even though 356 seems like a lot of coded fonts, the fonts involved are not widely used. They include fonts with unusual attributes such as overstrike, underscore, and the Proprinter Emulation fonts. The Proprinter Emulation fonts account for 180 of these coded fonts.
- One special case that should be mentioned is that of code page T1D0BASE, one of the most widely-used Compatibility font code pages. T1D0BASE has been registered as code page 1002 and is found in the AFP Font Collection as T1001002. The trouble is that T1D0BASE has two anomalies that cause it not to conform to its registered counterpart, T1001002. T1D0BASE, and all T1DxBASE national language variants, have three special space characters, SP010001, SP010002, and SP010003, that were used in the original release of DCF for formatting with fixed-pitch fonts and haven't been needed since the second release of DCF which occurred many, many years ago. Unfortunately, it has to be assumed that someone out there is actually using these characters so we cannot remove them from the T1DxBASE code pages. Documents that actually use these characters cannot be migrated without change because the SP01000x space characters are not found in the outline fonts.

  Another T1D0BASE anomaly is the fact that two characters are assigned to multiple code points. In T1D0BASE, SM110000 is found at '8B'x and 'C0'x; SM140000 is found at '9B'x and 'D0'x. In T1001002, SM110000 is found at '8B'x and SM140000 is found at '9B'x. This means that any document expecting to find SM110000 at 'C0'x or SM140000 at 'D0'x cannot use an equivalent Expanded Core outline font without first changing T1001002 or modifying the document.

All other documents can successfully be modified to use the comparable Expanded Core font by creating coded fonts pairing T1001002 with the appropriate Expanded Core character set.

Future

It is highly recommended that applications be migrated from the Compatibility fonts to the Expanded Core fonts as these will provide the link between 240-pel, 300-pel, and outline font printers.

The Compatibility fonts are no longer provided in AFP Font Collection for MVS, VM, and VSE. IBM is also removing them as defaults and replacing them with Expanded Core fonts. Eventually, the Compatibility fonts will no longer be provided.

Sonoran Serif and Sonoran Sans Serif

Background

The Sonoran font products were created to provide AFP customers with two of the most popular typefaces: Times New Roman and Arial (Monotype's equivalent of Helvetica). Due to licensing requirements in place at the time, the type family names used for the IBM-supplied versions of these fonts were changed from Times New Roman to Sonoran Serif and from Arial to Sonoran Sans Serif. These 240 dpi-only fonts were extensively hand-edited. Since the characters in the fonts were not derived from common databases, there is no linear progression of character size as point size increases, a requirement for migration to outline fonts.

Migration

It has been suggested for many years that applications using the Sonoran fonts be migrated to Helvetica and Times New Roman to gain the advantages of higher resolution printing. In many cases this has happened, but there are certain environments where absolute print fidelity is required and the Sonoran fonts must be used. Most are cases where documents have been created and registered using 240-pel Sonoran fonts and absolute print fidelity between 240-pel and 300-pel must be maintained. To address this concern, a PRPQ was released on June 3, 1994 that provides 300-pel versions of the Sonoran fonts. These fonts are of higher quality than fonts created with the 240-to-300-pel conversion program and can be used as direct replacements for the 240-pel fonts. The PRPQ number is 8A5061 (5799-FLK) and it provides 300-pel Sonoran Serif and Sonoran Sans Serif fonts for MVS, OS/390, VM, VSE, and AS/400. PRPQ 8A5061 does not provide 300-pel fonts for any Sonoran condensed, expanded, or headliner typefaces.

Since the linearity issue cannot be resolved (each character in each point size is unique and not linearly related to the same character in any other point size) there will be no outline font support for the Sonoran fonts and the migration path will stop at 300-pel..

Future
The Sonoran fonts will continue to be made available in both 240-pel and 300-pel resolutions.

Other Font Licensed Products

Background
In addition to Sonoran Serif and Sans Serif, there are 9 font licensed products available. These font products are only available at 240-pel and include:

- APL2
- DATA1
- Century Schoolbook
- Mathematics and Science
- Pi and Specials
- Sonoran Sans Serif Condensed
- Sonoran Sans Serif Expanded
- Sonoran Sans Serif Headliner
- Sonoran Serif Headliner

Migration
APL2, DATA1, Math and Science, and the Pi fonts are represented in whole or in part in the Expanded Core fonts. A close approximation of Sonoran Serif Headliner and Sonoran Sans Serif Headliner are Expanded Core fonts Times New Roman and Helvetica, which can be rasterized at the required point sizes by using Type Transformer. The rest are available in Type1 format from Adobe, possibly by different type family names, and can be used with Type Transformer to create AFP raster and outline fonts.

Future
IBM will gradually phase out these products.

Bar Code Fonts

Background
There is one bar code font product: Postal Bar Codes PRPQ 8A5043 (5799-DGX), which provides Postal bar code fonts for 240-pel and 300-pel. The Bar Code and OCR product, 5688-021, was discontinued 3/31/99.

Migration

Since most printers today utilize Bar Code Object Content Architecture (BCOCA), it is recommended that this facility be utilized whenever possible for all bar code printing, including Postal bar codes. In BCOCA, bar codes are defined using pagedefs and overlays thus eliminating the need for special bar code fonts.

Future

300-pel and all IPDS outline font printers have BCOCA capability and all the necessary controls for printing most popular bar code symbologies are included with each printer. No longer is a font/application subroutine required. To utilize BCOCA, pagedef and overlay support has been added to PPFA/370, OGL/370, and the PSF's.

Here is how BCOCA support looks as of 11/99:

- PSF/MVS

  - PPFA/370 with APAR PN79369
  - OGL/370 with APAR PQ29466
  - PSF/MVS 2.2 with APAR OW17445, PTF UW25289

- PSF/VM

  - PPFA/370 with APAR PN79369
  - OGL/370 with APAR PQ29466
  - PSF/VM 2.1.x with APAR PN83524

- PSF/VSE

  - PSF/VSE with APAR DY44139
  - OGL/370 with APAR PQ29466
  - PPFA/370 with APAR PN79369

- PSF/AIX

- PPFA/370 for AIX with APAR PN54401, PTF UN88660
- ACIF with APAR PN80403, PTF UN92025
- PSF/AIX Version 2 or PSF/6000 Release 2

- PSF/400

- PPFA/400 (11/96)
- Advanced Print Utility for OS/400 (11/96)

- GDDM V3R2 (MVS, VM, and VSE)

For more information on which printers support BCOCA see the AFP Printer Summary (G544-3135). The IBM PPFA User's Guide (S544-5284-03) and the IBM OGL User’s Guide (S544-3702-03) are also available as sources of information.

Legacy AFP Font Products Summary

This table identifies currently available legacy AFP font products, the data formats they support, and whether or not the fonts offered in the product are in AFP Font Collection. Headings and keywords are as follows:

240BB	: 240-pel bounded-box rasters (3820, 3825, 3900, and others)
240UB	: 240-pel unbounded-box rasters (3800-3,-6,-8)
BCOCA	: Postal bar codes supported by bar code architecture in printers
300	: 300-pel rasters (4028, 3916, 3935, and others)
Type1	: Adobe Type1 outlines (Viewer, Type Transformer, O/L printers)
AFP O/L	: Host outlines (FOCA "wrapped" Type1)
FontColl	: AFP Font Collection
PrtRes O/L	: Printer-resident outlines
OEM	: Similar fonts available as Type1 outlines from Adobe or other font vendor.

Font Product	240BB	240UB	300	Type1	AFP O/L	FontColl	PrtRes O/L
Sonoran Serif	yes	yes	yes(1)	no	no	no	no
Sonoran Sans Serif	yes	yes	yes(1)	no	no	no	no
APL2	yes	yes	yes(2)	yes(2)	yes(2)	yes(2)	yes(2)
Century Schoolbook	yes	yes	yes(3)	OEM	yes(3)	no	no
DATA1	yes	yes	yes(2)	yes(2)	yes(2)	yes(2)	yes(2)
Math and Science	yes	yes	yes(2)	yes(2)	yes(2)	yes(2)	yes(2)
Pi and Specials	yes	yes	yes(2)	yes(2)	yes(2)	yes(2)	yes(2)
S. Sans Serif Cond	yes	yes	no	no	no	no	no
S. Sans Serif Exp	yes	yes	no	no	no	no	no
S. Sans Serif Hdlnr	yes	yes	no(4)	no	no(4)	no	no
S. Serif Headliner	yes	yes	no(4)	no	no(4)	no	no
Postal Bar Code	yes	yes	yes	no	no	no	BCOCA

(1) PRPQ 8A5061 (5799-FLK) can be purchased to get 300-pel Sonoran fonts

(2) These fonts are represented in whole or in part by comparable fonts in the Expanded Core fonts.

(3) If Type1 outlines are purchased from a font vendor, Type Transformer can be used to create 300-pel and AFP outlines.

(4) Type Transformer can be used to create 300-pel and AFP outlines from Times New Roman from the Expanded Core fonts which will be close to Sonoran Serif Headliner and Sonoran Sans Serif Headliner.

Font Product Withdrawals and Service Discontinuance

The following font features were withdrawn from marketing on May 1, 1995:

Program	Version	Release	Feature	Font
PSF/MVS	2	all	6001, 6002	Core Interchange 240-pel
			6004, 6005	Core Interchange 240-pel
			6007, 6008	Core Interchange 240-pel
			6010, 6011	Core Interchange 240-pel
			6013, 6014	Core Interchange 300-pel
			6016, 6017	Core Interchange 300-pel
			6019, 6020	4028 Font Metrics
PSF/VM	2	all	5012, 5015	Core Interchange 240-pel
			5018, 5021	Core Interchange 300-pel
			5033	4028 Font Metrics
PSF/VSE	2	all	6021, 6022	Core Interchange 240-pel
			6023, 6024	Core Interchange 240-pel
			6088, 6089	Core Interchange 300-pel
			6090	4028 Font Metrics

The following font programs are no longer available.

Program #	Program Name	Rel	Description
5771-AAx	All 4250 Font Products		5771-AAA,AAB,AAE,AAK,and others
5771-ADL	ITC Avant Garde Gothic		240-pel Avant Garde for MVS, VM, VSE
5771-ADQ	ITC Souvenir		240-pel Souvenir for MVS, VM, VSE
5771-AFK	Monotype Garamond		240-pel Garamond for MVS, VM, VSE
5771-ADK	Hebrew Fonts		(Replaced by AFP Font Collection)
5771-AFC	Cyrillic Fonts		(Replaced by AFP Font Collection)
5771-AFC	Latin2 Fonts		(Replaced by AFP Font Collection)
5771-AFD	Latin3 Fonts		(Replaced by AFP Font Collection)

The following font program was withdrawn from marketing and service on June 30, 1995:

Program #	Program Name	Rel	Description
5799-FDK	AS/400 Core Int. PRPQ	V1R1	Core Interchange 240-pel & 300-pel 300-pel Compatibility fonts

The following program has been withdrawn from marketing effective March 31, 1999:

Program #	Program Name	Rel	Description
5688-021	Bar Code and OCR	V1R1	Bar code subroutine, fonts, and OCR fonts

Printing the Euro Currency Symbol

Support for the euro currency symbol is available in the AFP Font Collection products and in IBM printers with resident outline fonts. In this section we will discuss how the euro sign is provided and how it can be accessed for printing.

Code Pages with the Euro Sign

Several challenges were encountered when the euro sign was added to the AFP environment. One of the most significant, and one also faced by international standards bodies, was that the code pages which would be natural candidates to receive the euro sign were already fully populated. Replacing an existing character with the euro was not an option, so new code pages had to be created.

The methodology chosen was to pick code pages that would be likely candidates for the euro, replace an existing character with the euro, and register the new code pages with new names and GRIDs (Global Resource Identifiers). The code pages selected to receive the euro were from the Country Extended Code Pages (CECPs). New code pages with the euro are called Euro Country Extended Code Pages (ECECPs). In some cases, the euro was included in new code pages that had not previously been made available. In others, such as BookMaster, unassigned code points were available for the euro and no characters were replaced.

The table below shows the base code pages, new code pages, character replaced by the euro, and the code point to which the euro was assigned. All code pages in the table are provided in the AFP Font Collection products.

Base Code Page	Code Page with Euro	Character Replaced (if applicable)	Code Point	Description
T1V10037	T1001140	International Currency	'9F'	US, Canada ECECP
T1V10273	T1001141	International Currency	'9F'	Austria, Germany ECECP
T1V10277	T1001142	International Currency	'5A'	Denmark, Norway ECECP
T1V10278	T1001143	International Currency	'5A'	Finland, Sweden ECECP
T1V10280	T1001144	International Currency	'9F'	Italy ECECP
T1V10284	T1001145	International Currency	'9F'	Spain, Latin America ECECP
T1V10285	T1001146	International Currency	'9F'	United Kingdom ECECP
T1V10297	T1001147	International Currency	'9F'	France ECECP
T1V10500	T1001148	International Currency	'9F'	International ECECP
T1V10871	T1001149	International Currency	'9F'	Iceland ECECP
N/A	T1000424	N/A	'9C'	Israel (Hebrew)
N/A	T1000803	N/A	'9C'	Hebrew Character Set A
N/A	T1000856	N/A	'AD'	Hebrew - Personal Computer
T1000850	T1000858	dotless i	'D5'	PC - Multilingual with euro
N/A	T1000867	N/A	'AD'	Israel - Personal Computer
N/A	T1000923	N/A	'A4'	Latin 9
N/A	T1000924	N/A	'34'	Latin 9 EBCDIC
N/A	T1001252	N/A	'80'	Windows Latin1

N/A	T1B00037	N/A	'34'	USA/Canada
N/A	T1B00273	N/A	'34'	Germany/Austria
N/A	T1B00274	N/A	'34'	Belgium
N/A	T1B00275	N/A	'34'	Brazil
N/A	T1B00277	N/A	'34'	Denmark/Norway
N/A	T1B00278	N/A	'34'	Finland/Sweden
N/A	T1B00280	N/A	'34'	Italy
N/A	T1B00281	N/A	'34'	Japan (Latin)
N/A	T1B00282	N/A	'34'	Portugal
N/A	T1B00284	N/A	'34'	Spain/Latin America
N/A	T1B00285	N/A	'34'	United Kingdom
N/A	T1B00297	N/A	'34'	France
N/A	T1B00500	N/A	'34'	International #5
N/A	T1B00871	N/A	'34'	Iceland

Character Sets with the Euro Sign

The euro sign was added to all Latin1 and Hebrew character sets in AFP Font Collection and to the Latin and Hebrew printer resident fonts. The following table lists the code pages that support the euro and the character set groups in which they can be used.

Euro Code Page	Latin1 Character Sets	BookMaster Latin1 Csets	Hebrew Character Sets
T1001140	Yes	Yes	No
T1001141	Yes	Yes	No
T1001142	Yes	Yes	No
T1001143	Yes	Yes	No
T1001144	Yes	Yes	No
T1001145	Yes	Yes	No
T1001146	Yes	Yes	No
T1001147	Yes	Yes	No
T1001148	Yes	Yes	No
T1001149	Yes	Yes	No
T1000923	Yes	Yes	No
T1000924	Yes	Yes	No
T1001252	Yes	Yes	No
T1B00037	No	Yes	No
T1B00273	No	Yes	No
T1B00274	No	Yes	No
T1B00275	No	Yes	No
T1B00277	No	Yes	No
T1B00278	No	Yes	No
T1B00280	No	Yes	No
T1B00281	No	Yes	No
T1B00282	No	Yes	No

T1B00284	No	Yes	No
T1B00285	No	Yes	No
T1B00297	No	Yes	No
T1B00500	No	Yes	No
T1B00871	No	Yes	No
T1000424	No	No	Yes
T1000803	No	No	Yes
T1000856	No	No	Yes
T1000867	No	No	Yes

The table below identifies character sets and coded fonts that can be used to access the euro. This information was taken from *Font Summary for AFP Font Collection*, S544-5633-01. In the table, "n" is 0 or Z and "p" is the point size designator.

Typeface Name	**Style**	**Code Page**	**Character Set**	**Coded Font**	**Alternate CFont**	**GCSGID**	**FGID**
Boldface Latin1	RB	T10001148	Cn8400p0	Xn841EpC	Xn80Vp	2041	20224
BookMaster Latin1	RM	T1B00500	CnB200p0	N/A	N/A	2041	335
	RB	T1B00500	CnB400p0	N/A	N/A	2041	336
	IM	T1B00500	CnB300p0	N/A	N/A	2041	337
	IB	T1B00500	CnB500p0	N/A	N/A	2041	338
	Rev RM	T1B00500	CnB600p0	N/A	N/A	2041	339
Courier Latin1	RM	T1001148	Cn4200p0	Xn421EpC	Xn40Sp	2041	416
	RB	T1001148	Cn4400p0	Xn441EpC	Xn40Vp	2041	420
	IM	T1001148	Cn4300p0	Xn431EpC	Xn40Up	2041	424
	IB	T1001148	Cn4500p0	Xn451EpC	Xn40Wp	2041	428
Gothic Text Latin1	RM	T1001148	Cn6200p0	Xn621EpC	Xn60Sp	2041	304
Helvetica Latin1	RM	T1001148	CnH200p0	XnH21EpC	XnH0Sp	2041	2304
	RB	T1001148	CnH400p0	XnH41EpC	XnH0Vp	2041	2305
	IM	T1001148	CnH300p0	XnH31EpC	XnH0Up	2041	2306
	IB	T1001148	CnH500p0	XnH51EpC	XnH0Wp	2041	2307
Letter Gothic Latin1	RM	T1001148	Cn5200p0	Xn521EpC	Xn50Sp	2041	400
	RB	T1001148	Cn5400p0	Xn541EpC	Xn50Vp	2041	404
Narkiss Tam Hebrew	RM	T1000424	CnH205p0	XnH265pC	XnH2Cp	1362	2304
	RB	T1000424	CnH405p0	XnH465pC	XnH2Ep	1362	2305
	IM	T1000424	CnH305p0	XnH365pC	XnH2Dp	1362	2306
	IB	T1000424	CnH505p0	XnH565pC	XnH2Fp	1362	2307
Narkissim Hebrew	RM	T1000424	CnN205p0	XnN265pC	XnN2Cp	1362	2308
	RB	T1000424	CnN405p0	XnN465pC	XnN2Ep	1362	2309
	IM	T1000424	CnN305p0	XnN365pC	XnN2Dp	1362	2310
	IB	T1000424	CnN505p0	XnN565pC	XnN2Fp	1362	2311
Prestige Latin1	RM	T1001148	Cn7200p0	Xn721EpC	Xn70Sp	2041	432
	RB	T1001148	Cn7400p0	Xn741EpC	Xn70Vp	2041	318
	IM	T1001148	Cn7300p0	Xn731EpC	Xn70Up	2041	319
Shalom Hebrew	RM	T1000424	Cn4205p0	Xn4265pC	Xn42Cp	1362	416
	RB	T1000424	Cn4405p0	Xn4465pC	Xn42Ep	1362	420

	IM	T1000424	Cn4305p0	Xn4365pC	Xn42Dp	1362	424
	IB	T1000424	Cn4505p0	Xn4565pC	Xn42Fp	1362	428
Times New Roman Latin1	RM	T1001148	CnN200p0	XnN21EpC	XnN0Sp	2041	2308
	RB	T1001148	CnN400p0	XnN41EpC	XnN0Vp	2041	2309
	IM	T1001148	CnN300p0	XnN31EpC	XnN0Up	2041	2310
	IB	T1001148	CnN500p0	XnN51EpC	XnN0Wp	2041	2311

Printing the Euro Sign

Printing the euro is simply a matter of selecting a coded font or character set/code page pair and accessing the code point in the code page that is assigned to the euro. There are no migration issues because the euro sign is a new symbol and all the font resources involved are also new.

More information on the euro currency can be found on the following web sites:

http://amue.lf.net - EMU and its impact on the European Union
http://euro.eu.int - the euro home page
http://www.europe.ibm.com/Euro - IBM's EMU and euro web site

MICR

Magnetic Ink Character Recognition (MICR) text is commonly seen as the account information on checks and bank drafts. The MICR characters are printed with special magnetic ink and are read by scanners sensitive to the ink and to the shapes of the characters. MICR readers are very sensitive and care must be exercised to ensure the proper font/printer combinations are used.

There are two MICR font types provided: E13B and CMC7. E13B is used primarily in the United States; CMC7 is most prevalent in Europe. E13B fonts have an architected “key” set in the font character sets. The MICR key is used by PSF to determine if the selected printer is really a MICR printer. When the key is sensed, the printer is queried. PSF will only download the font if the printer responds that it has MICR capability. If the printer does not have MICR capability, an error condition is posted and no printing occurs. E13B test fonts without the MICR key are provided for application setup. The test fonts print hollow, non-readable characters on any AFP printer. CMC7 does not use the MICR key.

MICR fonts are provided for IBM MICR printers as a no-cost PRPQ, 8A8083 (5799-XDZ).

Printing MICR

There are two methods used to print MICR in AFP. In one method the fonts are used to print on special IBM MICR printers using magnetic ink. The other method involves a TROY post- processor that does the actual MICR printing. Let’s look at these methods.

Printing with MICR toner
An AFP printer capable of printing with magnetic toner is used and the fonts are designed specifically for the print engine. In this case, the fonts are actually used for printing and character design is critical. The **only** IBM printers capable of using these fonts for printing are the 3828 MICR printer, the 4028 MICR Printer (no longer available), and the Infoprint 4000.

The Infoprint 4000 can print with fonts provided in the PRPQ; however, we’ve seen some cases where read errors occur when these fonts are used. A better set of fonts for the Infoprint 4000 is available from: **ftp://ftp.software.ibm.com/printers/products/fonts/micr**/.

Printing with a TROY post-processor
A TROY printer is attached as a post-processor to an IBM Infoprint 4000, Infoprint 3900, or IBM 3835 Page Printer. In these cases, the TROY printer does the actual MICR printing and the MICR fonts are simply passed through the AFP printer where they are used by the TROY printer for hammer selection.

As you can see, the fonts used in case #1 are critical to print quality and are designed specifically for particular print engines. In case #2, the fonts are not used for printing and their design is immaterial to the process.

MICR Font Packaging

MICR fonts have been provided in several ways over the years. Initially, they were shipped with the printers, but today they are provided as a no-cost software PRPQ. When a MICR printer is ordered, the MICR font PRPQ, 8A8083 (5799-XDZ), should also be ordered.

The following table shows various sources for E13B MICR fonts and the printers with which they can be used. Remember that MICR fonts are no longer provided as printer features.

Source of E13B Font	**Infoprint 4000 IS1/ID1**	**TROY MICR Printer**	**3828**	**4028**
Printer Features		X	X	X
MICR RPQ 8A8083		X	X	X
Infoprint 4000 Upgrade	X	X		

Upgrades for the fonts provided in 8A8083 are available from the following ftp site for the Infoprint 4000: **ftp://ftp.software.ibm.com/printers/products/fonts/micr/**

For more information on IBM MICR printers, see the following publication:

Using the 3900 Advanced Function Printer with the TROY MICR Printer, GA32-0261

Unicode

Unicode is the information processing industry standard character encoding that enables multi-lingual computing using a two byte character representation. It is the emerging international standard for new programming languages such as Java, and has been adopted by
several major operating systems including Sun's Solaris (UNIX) operating system, Microsoft Windows NT, and Windows 2000.

Background
Two PRPQs have been made available 12/99 to address Unicode printing in the AFP environment. The PRPQs are:

- PRPQ 8A8087, *AFP Unicode Migration Fonts for MVS and OS/390*
- PRPQ 8A8090, *AFP Unicode Migration Fonts for AIX, AS/400, Windows NT, and Windows 2000*

These PRPQs contain 34 AFP DBCS outline font character sets and an AFP Unicode code page that together provide support for 35,411 of the 38,885 characters defined in The Unicode Standard 2.0. Most characters in the PRPQ came from the AFP Font Collection Expanded Core and DBCS Core fonts, but characters were also added to support Vietnamese, changes to ISO 8859-7, and recent enhancements made to the DBCS fonts.

Migration
Since most characters in the AFP Unicode Migration fonts are familiar, printing with the Unicode fonts will produce the same visual results as printing with resident fonts or fonts from AFP Font Collection. The major difference between the two methods is the encoding system. The AFP Unicode Migration fonts are designed to be used with Unicode-encoded data and the AFP Font Collection fonts are designed for ASCII and EBCDIC encoding.

For more information on Unicode, see:
http://www.unicode.org

For more information on the AFP Unicode Migration fonts, see:
http://www.printers.ibm.com/R5PSC.NSF/Web/font

Future
Unicode-encoded text will become more prevalent as applications and operating systems are enhanced to take advantage of the many benefits of Unicode. At present, AFP does not have all the pieces in place to utilize the full benefits of Unicode, but it is anticipated that Unicode usage in AFP will evolve over time.

AFP Font Publications

A wide assortment of AFP Font publications are available. Some are entitlement publications that are shipped with all AFP Font Collection products, others are hard copy books that can be purchased from IBM. Some of the more popular publications, including Installation Program Directories are provided online.

Entitlement Publications for AFP Font Collection

- Installation Program Directories for AFP Font Collection Fonts
- IBM AFP Font Collection Licensed Program Specification, G544-5229
- Font Summary for AFP Font Collection, S544-5633

Font Related Publications Available Online

- Font Summary for AFP Font Collection, S544-5633
- IBM AFP Font Collection Licensed Program Specification, G544-5229
- IBM AFP Fonts: Technical Reference for Expanded Core Fonts, S544-5228
- IBM AFP Fonts: Technical Reference for AFP Font Collection Japanese Fonts, S544-5685
- IBM AFP Fonts: Technical Reference for AFP Font Collection Korean Fonts, S544-5686
- IBM AFP Fonts: Technical Reference for AFP Font Collection Simplified Chinese Fonts, S544-5687
- IBM AFP Fonts: Technical Reference for AFP Font Collection Traditional Chinese Fonts, S544-5688
- IBM AFP Fonts: Type Transformer User's Guide, G544-3796
- Installation Program Directories for AFP Font Collection Fonts

Font Related Publications Available in Hardcopy

- Font Summary for AFP Font Collection, S544-5633
- IBM AFP Font Collection Licensed Program Specification, G544-5229
- IBM AFP Fonts: Technical Reference for Expanded Core Fonts, S544-5228
- IBM AFP Fonts: Technical Reference for Code Pages, S544-3802
- IBM AFP Fonts: Technical Reference for IBM CJK fonts, S544-5330
- IBM AFP Fonts: Technical Reference for AFP Font Collection Japanese Fonts, S544-5685
- IBM AFP Fonts: Technical Reference for AFP Font Collection Korean Fonts, S544-5686
- IBM AFP Fonts: Technical Reference for AFP Font Collection Simplified Chinese Fonts, S544-5687
- IBM AFP Fonts: Technical Reference for AFP Font Collection Traditional Chinese Fonts, S544-5688
- IBM AFP Fonts: Type Transformer User's Guide, G544-3796

- IBM AFP Fonts: Introduction to Typography, G544-3122
- IBM AFP Fonts: Font Samples, S544-3792
- Installation Program Directories for AFP Font Collection Fonts
- About Type: IBM's Technical Reference for 240-pel Digitized Type, S544-3516
- About Type: IBM's Technical Reference for 4028 Font Metrics, S544-3709

Program Directories

Program directories provide installation instructions and other important information regarding the products for which they are written. System specific information such as FMIDs, CLCs, library structure, data set attributes, and other such things are provided in the program directories.

AFP fonts and the Internet

In addition to the IBM Printing Systems web site, http://www.printers.ibm.com,
we also utilize an **ftp** site where you can get various font resources, program directories, and Preventive Service Planning (PSP) information. This site is open to the public and can be accessed "anonymous". The site is: **ftp.service.software.ibm.com/printers/products/fonts**.
Due to the expense involved refreshing large products like AFP Font Collection, we plan to provide as many font updates as possible utilizing web pages and ftp sites. Program directories and other font publications are also available online.

Outline Fonts in AFP

Unlike raster font technologies where each character in a given typeface must be replicated in bitmap form for each point size and resolution combination, outline font technologies describe each character once, and the imager takes care of rendering the character at the requested size
and resolution. Outline fonts provide several benefits:

- *Significant DASD savings*. Each character in a given typeface is described only once. Each outline character set requires approximately the same storage as a single 300-pel 16pt bitmap character set, and that single character set can provide all point size/resolution combinations.
- *No download time.* If an IBM outline font printer is used, all Expanded Core fonts are already resident in the printer and are "activated" by PSF. No font download occurs.
- *Easily updated*. Instead of creating and installing a multitude of bitmaps, a single outline font can be installed for downloading to the printer.
- *Display/print compatibility.* The same outline font can be used for printing or display thus enhancing the similarities between screen previews and actual printing.

There are three outline font data formats used in AFP.

Type1 Outlines

Outline fonts described according to Adobe's Type1 font architecture. These are the fonts typically associated with PostScript and are found in AFP as source fonts for Type Transformer, display fonts for AFP Viewer, and as resident fonts in IBM's outline font printers. Since the same imager (Adobe Type Manager, ATM) is used throughout, the look of the fonts when printed or displayed is the same across all presentation resolutions. Type1 fonts are resident in IBM outline font printers and are provided with the IBM AFP Font Collection Fonts and Programs feature for OS/2.

CID-Keyed Outlines

Double-Byte Character Set (DBCS) outlines described according to Adobe's architecture for double-byte fonts. CID-keyed fonts are resident in outline font printers where the DBCS feature has been installed, or in outline font printers that come preloaded with DBCS resident fonts. They are also provided with the IBM AFP Font Collection Fonts and Programs feature for OS/2. DBCS Type Transformer provided with the AFP Fonts and Programs feature uses the CID-keyed outlines to create 240-pel rasters and AFP outlines.

AFP Outline Fonts

In order to make Type1 and CID-keyed outline fonts useable in the AFP environment, they must be encapsulated in a Font Object Content Architecture (FOCA) wrapper that makes them look like AFP resources to PSF and other AFP applications. When wrapped in the FOCA wrapper they become AFP outline fonts that can be used for formatting and downloading to outline font printers. The download capability is only of interest if new or modified fonts are being used, since all IBM printers capable of receiving downloaded outlines have the Expanded Core Type1 outline fonts resident anyway. Type Transformer can be used to put FOCA wrappers on Type1 and CID fonts thus providing access to the thousands of typefaces available in Adobe outline font formats.

AFP outline fonts are used in much the same way as raster fonts. The main difference is that they only have one character set per typeface instead of one character set per point size. Also, the AFP outline coded fonts contain a size parameter that provides information to the printer so the correct point size is rendered.

Migration Topics

Migration, in its most basic sense, is moving from one place to another. Geese migrate. Humpback whales migrate. Caribou migrate. Why do we have to worry about fonts migrating? Actually, it isn't the fonts that are causing the migration headaches in AFP. It is simply the natural evolution of print technologies to higher quality output. The fonts must change to meet the needs of the printers and, unfortunately, applications must be changed to keep up with the fonts.

The first migration hurdle was encountered around 1984 when AFP began and the 240-pel 3800-3 printer was introduced to replace the lower resolution (180 x 144) 3800-1. A couple of years later, a more efficient font technology (bounded-box) was introduced along with a new line of 240-pel printers (3820 and others) and another migration occurred. Then came one of the biggest challenges of all: a new resolution (300-pel) and a new font metric base that would be applied to all future print resolutions. The jump to 300-pel and relative metrics was and continues to be, a difficult path to follow. The latest migration hurdle involves outline fonts, but this one isn't so bad if the migration to 300-pel was already made.

In any case, migrating applications to take advantage of higher quality printing environments is difficult, time-consuming, and costly.

Why migrate?

A fair question. In some of the cases mentioned above migration was necessary because newer print technologies were simply making previous technologies obsolete. Advantages of using the newer technologies (higher resolution, more efficient use of font resources, and availability of more printer types), provided the motivation.

Today, the decision is not always obvious. Most printers can accept a 300-pel data stream and many can accept 240-pel. Clearly, there are advantages to be gained by migrating to outline based font resources; however, since the printers can still handle downloaded raster fonts, is it worth the trouble to migrate? If you have already taken the plunge, great! You'll find that you are in good shape for the future. If you are still pondering this decision, here are a few things you might wish to consider.

- Conversion to relative metric fonts ensure that documents created today will be useful far into the future with virtually no limits on printer resolution.
- Conversion to the Expanded Core fonts in AFP Font Collection offers consistency across 240-pel, 300-pel and outline font printers.
- Outline fonts tend to save disk space because one outline font resource can be used to create any point size for that particular typeface.
- Outline fonts resident in the printers can be used in place of a multitude of individual raster fonts and they do not have to be downloaded.
- All future printers will utilize outline font technology.

- Many current and future printers print at 600dpi and above. Print quality at 600dpi is a vast improvement over that provided at low resolution (240-pel and 300-pel) and can only be achieved using outline fonts.
- Outline DBCS fonts offer significant saving in storage and extremely good print quality at the higher print resolutions currently available.
- The Expanded Core fonts form the basis for the General Scripts (non-CJK) portion of the AFP Unicode fonts.
- The DBCS Core fonts form the basis for the CJK portion of the AFP Unicode fonts.

At this point in time, it is hoped that most AFP font users are formatting and printing with outline-based fonts purchased from font vendors or with the Expanded Core fonts provided in the AFP Font Collection products and shipped as resident fonts in IBM AFP printers. In either case, using outline-based fonts will produce the highest levels of print quality and data interchange.

Migrating 240-pel Documents

Migration scenarios for AFP documents can take on many forms with a wide variety of expectations. In most cases, the challenge is to migrate from 240-pel-based documents to documents formatted to exploit the benefits of higher resolution printers. If expectations include exact page fidelity with exactly the same typefaces and no change to the document, the migration path can be perplexing. However, if a certain amount of flexibility can be tolerated in typeface selection, expected page fidelity, and document reformatting, excellent results can be achieved.

The best way to handle migration issues is to begin using outline-based fonts such as the Expanded Core fonts found in AFP Font Collection as soon as possible. Documents formatted with these fonts, particularly with those using relative metrics (300-pel and outlines) will be useful well into the future. A document formatted with an IBM-supplied (or Type Transformer created) 300-pel font can be printed on either a 300-pel or a high resolution AFP outline font printer with the same results.

Of course in some market segments documents simply must print exactly the same across multiple resolutions, and many of these documents were created years ago using 240-pel fonts. In these cases, 240-pel is, essentially, the *de facto* standard print resolution.

Where to start?

Where you start depends on where you are and where you want to go. Basically, migration scenarios are of four kinds:

- Compatibility fonts to Expanded Core
- 240-pel font licensed products to Expanded Core
- 240-pel to 300-pel

- 240-pel to outline

Each will be discussed, but first a word of warning. It must be understood that the origins of many of the older fonts were not based on standards of convention. In many cases, the fonts contain odd collections of characters and many times the code pages used with them were intended for purposes other than for AFP printing. In the discussions that follow, “mapping” means that an equivalent character set and code page is available, but it does not imply that every character/code point in the old will be available in the new. It does imply, however, that the look of the font will be very similar and the code pages will be close, if not exact matches.

Migrating from Compatibility Fonts to Expanded Core

In this scenario you alter your documents to use Expanded Core fonts instead of Compatibility fonts. This is covered in some detail in **IBM-Supplied Compatibility Fonts** in the **Legacy AFP Font Products** chapter and in the Compatibility font migration tables in **Appendix A**.

Migrating from 240-pel Licensed Products to Expanded Core

Many of the legacy 240-pel font licensed products have equivalent Expanded Core fonts that can be used in place of the older fonts. Each product will be examined on an individual basis.

Sonoran Sans Serif and Sonoran Serif (5771-ABB and 5771-ABA):
If you are migrating from the Sonoran fonts to Expanded Core you will be changing your documents to use Helvetica instead of Sonoran Sans Serif and Times New Roman instead of Sonoran Serif. There are some fairly straightforward relationships here.

Sonoran Sans Serif and Sonoran Serif character sets and coded fonts can be mapped to Helvetica and Times New Roman as shown below. Understand that the Expanded Core coded fonts use a later level of the International #5 code page. T1V10500 is used in the Expanded Core, T1GI0361 is used in the Sonorans. In the following table, “p” = point size.

- C0A055p0 maps to C0H200p0 and CZH200
- C0A155p0 maps to C0H300p0 and CZH300
- C0A075p0 maps to C0H400p0 and CZH400
- C0A175p0 maps to C0H500p0 and CZH500
- C0T055p0 maps to C0N200p0 and CZN200
- C0T155p0 maps to C0N300p0 and CZN300
- C0T075p0 maps to C0N400p0 and CZN400
- C0T175p0 maps to C0N500p0 and CZN500

- X0A055pC maps to X0H210pC and XZH210pC
- X0A155pC maps to X0H310pC and XZH310pC

- X0A075pC maps to X0H410pC and XZH410pC
- X0A175pC maps to X0H510pC and XZH510pC
- X0T055pC maps to X0N210pC and XZN210pC
- X0T155pC maps to X0N310pC and XZN310pC
- X0T075pC maps to X0N410pC and XZN410pC
- X0T175pC maps to X0N510pC and XZN510pC

This is a small sampling of the coded fonts. For others, see the **Understanding Naming Conventions** section in this document and use the referenced publications.

If you are converting from one of the 240-pel font licensed products to Expanded Core, it will depend on the product whether or not a migration path exists. Let's consider each possibility.

APL2 (5771-ADB)
APL2 roman medium and roman bold 10-pitch fonts are provided in the Expanded Core fonts. Italic as well as 12-pitch, 15-pitch, and 20-pitch roman medium versions are not available. However, when using AFP outlines, 12-pitch, 15-pitch, and 20-pitch can be achieved by selecting 10-point, 8-point and 6-point. For all 10-pitch fonts, the equivalent character sets from the Expanded Core fonts are C0420PB0 and CZ420P and the coded fonts are Xn427PB2 and Xn480B where "n" = 0 or Z.

DATA1 (5771-ADJ)
DATA1 is basically Gothic Text 13.3-pitch, so 13.3-pitch fonts from the Expanded Core Gothic Text Latin1 can be used. Use character sets C0620090 and CZ6200 from the Expanded Core fonts for C0S0D224 and C0S0D225. Use coded fonts Xn62109C and Xn60D9 for X0D224 and X0D225. There are no Gothic Text Latin1 fonts available for DATA1 roman bold (C0S0D226 and X0D226) or for DATA1 italic medium (C0S0D227 and X0D227).

OCR-A and OCR-B (Compatibility fonts and 5688-021)
There are many OCR fonts available. Some are from the Compatibility fonts, some from the Bar Code and OCR product, 5688-021, and some are found in the Expanded Core fonts.

OCR-A: C0920AB0 and CZ920A from the Expanded Core fonts can be used for C0L00AOA, C0L01AOA, C0L00AON, and C0L01AON from the Compatibility fonts and for C0OCRA10 from 5688-021. Coded fonts Xn927AB4 and Xn9B0B can be used for X0AOA, X0OAA, X01AOA, X0AOD, X0AON, X0ONA, X0ODA, X01AOD, X01AON, and X01ODA from the Compatibility fonts and for X0OC0A from 5688-021.

OCR-B: C0920BB0 and CZ920B from the Expanded Core fonts can be used for C0L00BOA, C0L00OAB, and C0L00BON from the Compatibility fonts and for C0OCRB10 from 5688-021. Coded fonts Xn927BB5 and Xn9B1B can be used for X0BOA, X0OAB, X0BON, and X0ONB from the Compatibility fonts and for X0OC0B from 5688-021.

Pi and Specials (5771-ABC)
The Pi and Specials product contains symbols fonts, a version of "Old English", and a 4-point font. There is no Expanded Core equivalent of "Old English", nor is there a direct replacement for the 4-point font, Sonoran Petite. Helvetica Symbols can be used for the Pi Sans Serif fonts and Times New Roman Symbols can be used for Pi Serif. A close approximation of Sonoran Petite can be created with Type Transformer by making a 4-point Helvetica font.

Pi Sans Serif Roman Medium: C0H201p0 and CZH201 from the Expanded Core fonts can be used for C0P055p0 where "p" = 6, 8, 0, and B. Use coded fonts XnH271p1 and XnH12p for X0P055pP.

Pi Sans Serif Roman Bold: C0H401p0 and CZH401 from the Expanded Core fonts can be used for C0P075p0 where "p" = 6, 8, 0, and B. Use coded fonts XnH471p1 and XnH13p for X0P075pP.

Pi Serif Roman Medium: C0N201p0 and CZN201 from the Expanded Core fonts can be used for C0Q055p0 where "p" = 6, 8, 0, and B. Use coded fonts XnN271p1 and XnN12p for X0Q055pP.

Pi Serif Roman Bold: C0N401p0 and CZN401 from the Expanded Core fonts can be used for C0Q075p0 where "p" = 6, 8, 0, and B. Use coded fonts XnN471p1 and XnN13p for X0Q075pP.

Sonoran Petite: If using AFP outlines, use Helvetica Latin1 roman medium and specify 4-point. Type Transformer can also be used to create Helvetica Latin1 roman medium 4-point raster fonts.

Mathematics and Science (5771-ADT)
The Mathematics and Science font product provides math symbols that are used by the DCF Math Formatter. Most, if not all of the characters found in these fonts are also found in the Expanded Core Symbols fonts; however, many of the large point sizes provided by 5771-ADT are not found as raster fonts in the Expanded Core fonts.

Math Format: Because of a special code page that has both roman and bold characters, directly mapping the Math Format fonts to Expanded Core can be difficult. All the characters are there, but roman and bold characters are in different fonts. With this understood, C0N201p0 and CZN201 (roman medium) and C0N401p0 and CZN401 (roman bold) from the Expanded Core fonts can be used for C0MO55pp where "pp" = 60, 70, 80, 90, 00, A0, B0, D0, F0, H0, J0, N0, T0, and Z0. Note that "pp" = L0, R0, V0, 41, 81, B1, H1, N1, and Z1 are not provided. These point sizes can, however, be created by using AFP outlines or by creating the raster fonts with Type Transformer. Coded fonts XnN271p1 and Xn12p can be used for X0MO55p0.

Math Symbols Sans Serif Roman Medium: C0H201p0 and CZH201 from the Expanded Core fonts can be used for C0MQ55p0 where "p" = 6, 7, 8, 9, 0, A, B, D, F, H, J, N, T, and Z. Coded fonts XnH201p0 and XnH12p can be used for X0MQ55p0.

Math Symbols Sans Serif Roman Bold: C0H401p0 and CZH401 from the Expanded Core fonts can be used for C0MQ75p0 where “p” = 6, 7, 8, 9, 0, A, B, D, F, H, J, N, T, and Z. Coded fonts XnH401p0 and XnH13p can be used for X0MQ75p0.
Math Symbols Serif Roman Medium: C0N201p0 and CZN201 from the Expanded Core fonts can be used for C0MP55p0 where “p” = 6, 7, 8, 9, 0, A, B, D, F, H, J, N, T, and Z. Coded fonts XnN201p0 and XnN12p can be used for X0MP55p0.

Math Symbols Serif Roman Bold: C0N401p0 and CZN401 from the Expanded Core fonts can be used for C0MP75p0 where “p” = 6, 7, 8, 9, 0, A, B, D, F, H, J, N, T, and Z. Coded fonts XnN401p0 and XnN13p can be used for X0MP75p0.

Sonoran Expanded and Condensed (5771-AFN and 5771-AFL)

No Expanded Core fonts exist that can be directly mapped to these fonts. Type1 outlines for Helvetica Condensed can be purchased from font vendors and used with Type Transformer to create fonts equivalent to Sonoran Condensed.

Sonoran Sans Serif Headliner (5771-ADX)

Helvetica roman medium, roman bold, italic medium, and italic bold AFP outlines at 48pt, 60-pt, and 72pt can be used for the Sonoran Sans Serif Headliner fonts. Or, Type Transformer can be used to create raster fonts in these sizes.

Sonoran Serif Headliner (5771-AD)

Times New Roman medium, roman bold, italic medium, and italic bold AFP outlines at 48pt, 60-pt, and 72pt can be used for the Sonoran Serif Headliner fonts. Or, Type Transformer can be used to create raster fonts in these sizes.

Other Font Licensed Products

In order to create outline-based equivalents of the remainder of the AFP font licensed products, it will be necessary to purchase Type1 outlines from a font vendor and create AFP resources with Type Transformer. These products include:

- Century Schoolbook (5771-ADJ)
- ITC Avant Garde Gothic (5771-ADL)
- ITC Souvenir (5771-ADQ)
- Monotype Garamond (5771-AFK)

Is there any hope for those who need to use legacy 240-pel bitmap fonts on new high resolution printers? Yes, there is, because some IBM printers can take the 240-pel font and rescale it to printer resolution at print time, thus maintaining the character shapes and metrics of the 240-pel font. Printer information can be found on the following IBM Printing Systems web site: http://www.printers.ibm.com/R5PSC.NSF/web/manuals .

Migrating 240-pel DBCS Applications to DBCS Core Fonts

More than any other application environment, utilizing outline font technologies for DBCS printing provides the most advantages over using 240-pel raster fonts. This is simply because outline fonts are more efficient with regards to storage and download time. They also provide the print quality benefits gained by high resolution printing.

As was discussed in the DBCS Core font section, there is a difference in character baseline positioning between the 240-pel DBCS font products and the DBCS Core outlines provided in AFP Font Collection and as printer resident fonts. This creates a problem when migrating to the DBCS Core fonts because lines of text will not be positioned as they were when the 240-pel fonts were used.

Special “simulation” coded fonts are provided in AFP Font Collection V2.1 to handle this problem. By providing baseline positioning information, the simulation coded fonts cause the printer to adjust the baselines of each character so that the resulting character placements are exactly the same as that of the old 240-pel fonts. In this way, high resolution outline font printing is achieved with characters placed exactly as they were with the older fonts.

Please refer to DBCS Simulation Fonts in *Font Summary for AFP Font Collection* (S544-5633-01) for more information.

Migrating Applications from 240-pel to 300-pel

In order to begin the discussion of migrating documents from 240-pel to 300-pel it is first necessary to understand why the two resolutions are so different.

It seems reasonable to assume that formatting a document at one resolution and printing it at another resolution will cause problems because the base numbering systems used to position text are totally different. This is actually not as big a problem as it appears because many text applications convert to a common internal numbering system. The real problem is the difference between the 240-pel and 300-pel font and printer technologies.

In order to understand the difference, it is first necessary to understand *relative metrics*.

Relative Metrics

Outline fonts offer the capability of being able to print virtually any point size/resolution combination from a single collection of mathematically defined character shapes. This is accomplished by expressing character positioning parameters as "relative metrics" and calculating exact pel values based on the desired point size and the resolution of the output device. What are the metrics "relative" to? Actual pel values can only be determined if the point size and resolution are known, so the metrics are "relative" to point size and resolution.

The relative metric concept was architected by Adobe Systems and is based on the premise that there are 1000 relative units per em-square. The term "em" is equivalent to point size. "square" means that the font is scaled the same horizontally and vertically.

The easiest way to visualize the relative metric concept is to imagine each character being designed to occupy space in a 72pt by 72pt (1" x 1") design box at 1000 dpi resolution. In this case, each relative unit will equal one pel. The actual character will not necessarily fill the box, but will occupy a percentage of the box based on the shape of the character. For example, let’s consider a hypothetical uppercase “A” character. We want the character increment of our hypothetical “A” to be 77.2% of the 1000 x 1000 design box. In this case our “A” will be assigned a character increment value of 772 relative units. Let’s say we also have a hypothetical uppercase “I” in our font. We want the “I” to occupy 20% of the design box, so its character increment will be 200 relative units.

By using units based on 1000 units/em, pel values are determined by simply changing the point size and resolution. For example, the “A” and "I" we just discussed would have character increments of 772 and 200 pels if the resolution was 1000 dpi and the point size 72. If the point size/resolution combination is changed to 36pt/1000 dpi, the character increments will be half what they were at 72pt for the same resolution, or 386 and 100 pels. If the resolution is lowered to 500 dpi, the pel values will be 193 and 50. *The point size and resolution applied to the relative metric determine the actual pel value.*

You can probably see from the following example that documents formatted with relative metrics can be printed on printers of any resolution with the same page fidelity. For example, the “A” and “I” at 36pt/1000dpi had character increments of 386 and 100 pels. At 36pt/500dpi the character increments were 193 and 50. At 1000dpi, 386 pels = .386 inch and 100 pels = .100 inch. At 500 dpi, 193 pels = .386 inch and 50 pels = .100 inch. As you can see, the characters will occupy the same print space in both cases. Of course, more pels means smoother character shapes, but in both cases, the characters will occupy the same space.

In these examples the results were always whole pel numbers. It must be understood that the result of the pel calculation can correctly result in a fractional pel. *The fact that fractional pels occur and the fact that the fractional pels are accommodated by formatters and relative metric printers is the reason for the difference between 240-pel and 300-pel printing.*

How fractional pels are handled

Let’s consider using our hypothetical “A” character at 11pt and 300-pel resolution. The computed character increment value will be 35.4 pels, with the “.4” pel being the fractional pel value. When the printer sees this character it positions the character and increments by 35 pels, the whole pel value of the character increment. It then adds the .4 pel to an accumulator. If the accumulator is equal to or greater than 1.0, the printer inserts a white pel and resets the accumulator. It repeats this process for each character in the text line and the result is a line of text that is within one pel of perfection. All AFP formatters, viewers, and printers are capable of handling relative metrics.

240-pel vs. relative metrics (cross resolution print fidelity)
Now that relative metrics are understood, it’s fairly easy to see why 240-pel printing and relative metric printing yield different results.

240-pel fonts are described using whole-pel metrics and each character increment is expressed as a whole-pel value. The fractional pels that are so conscientiously maintained by the relative metric devices are simply rounded up or down into the character increments when the 240-pel characters are made. This means that 240-pel characters can vary from the designed character increment by nearly one-half pel in either direction.

If you consider that each 240-pel character increment has a fractional pel added or truncated, you can see that the accumulation of these differences from the designed character increment can result in significant differences in output between 240-pel and relative metric devices. In mixed text it usually isn't noticeable because the rounding tends to be averaged out over the variety of characters used. However, in cases where a single character is repeated, the effect can be quite pronounced. Each time the character is used a portion of a pel is either added or lost due to rounding that occurred when the character was created. Depending on the character, the accumulated loss or gain across a page can be significant.

As an example, consider a character for which the computed character increment at 240-pel is 20.4 pels. When rounded down, the character increment of this character in the font will be 20. A repeated string of this character will "lose" .4 pel each time the character is printed.

At 300-pel the intended setwidth is for this character is 25.5 pels. Since the printer will be accumulating the fractional pel (.5) a white pel will be inserted after every other character. At 240-pel a string of 60 characters will equal 1200 pels or 5.0". At 300-pel the same string will equal 1530 pels or 5.1" for a difference of one-tenth of an inch.

Now that we’ve discussed the differences, how does one actually get from 240-pel to 300-pel? There are several approaches depending of the amount of print applications that are involved and the amount of output flexibility that can be tolerated.

Making a 300-pel Font Library
Before going much further with this, one thing is clear. To print at 300-pel, you have to have 300-pel fonts. There are several ways to go about building a 300-pel font library and the ways vary by the fonts involved and by the operating system. Here are some alternatives.

1. If you use an MVS, OS/390, VSE, of VM operating system, you can convert any 240-pel font to a 300-pel font with the 240-to-300-pel font conversion utility provided with PSF. Use this tool **only** on 240-pel fonts for which no 300-pel equivalents exist, such as OEM fonts and some of the older

IBM 240-pel font licensed products. **Do not** use this tool to create 300-pel versions of 240-pel fonts provided with AFP Font Collection. You will not like the quality and 300-pel versions of all fonts in the product are already provided.

2. If you must use the Sonoran Serif and Sonoran Sans Serif fonts, consider purchasing the Sonoran 300-pel Equivalent Fonts PRPQ 8A5061, 5799-FLK. This product provides high quality 300-pel Sonoran fonts for MVS, OS/390, VSE, VM, and AS/400 and will produce higher quality output than fonts converted with the font conversion utility.
3. If you need 300-pel versions of some of the old 240-pel font products, consider purchasing Type1 outline fonts from a font vendor and using Type Transformer to create 300-pel fonts.
4. If you are using fonts from one of the AFP Font Collection products, you're in luck because you already have 300-pel fonts!

Now that you have 300-pel equivalents of your 240-pel fonts, you will have to consider how much page fidelity is required. Basically, there are two choices:

1. Simply print with the 300-pel fonts and accept the output. The character shape quality will generally be better; however, the page may not look exactly the same as it did when printed at 240-pel. If the differences are acceptable, then print away!
2. If a higher degree of page fidelity is required you will have to reformat the jobs. This can be extremely tedious and time consuming; in some cases, if the source no longer exists, impossible. The thing to keep in mind when going through this is that once you format with relative metrics, you will have documents that can be used well into the future on high resolution printers and you will not have to go through this again!

Migrating Applications from 240-pel to AFP Outlines

Migration from 240-pel fonts to AFP outlines is quite similar to migration from 240-pel to 300-pel because in both cases the migration is from fixed metrics to relative metrics. It is highly recommended that prior to beginning a migration effort from 240-pel to AFP outlines, you first migrate your applications to the 240-pel Expanded Core fonts. Once you have changed over to the Expanded Core fonts you have opened the door to consistency because all font data formats are linked together through the base outline fonts. As with 300-pel, AFP Font Collection provides all the character sets and coded fonts needed to go directly from 240-pel to AFP outlines.

There is simply no easy way to get from 240-pel fonts that are not part of the Expanded Core fonts to AFP outlines. For example:

1. There is no conversion utility that converts 240-pel AFP fonts to outlines.
2. There are no outline font equivalents for the Sonorans.
3. The only outlines available for the old 240-pel font licensed products are Type1 outlines available from font vendors that must be transformed into AFP font resources.

Converting 240-pel raster fonts to outlines

Let's look at #1 for a moment. We get asked from time to time if there is a way to convert 240-pel raster fonts directly to outlines. There are tools available that will wrap an outline around bitmap characters and can be used to create Type1 outline fonts. However, the act of creating an outline font from a bitmap font presents a significant problem. Unless the bitmap font is very large (even 36pt at 240-pel is not really enough), the tool that wraps the outline around the bitmap tends to follow individual pels. The resulting outline will most always require hand editing to smooth out the curves. This tends to be expensive and time consuming.

The other problem with creating outlines from bitmap fonts concerns the sizes of characters as they increase or decrease with point size. Every character in the old 240-pel fonts has been hand tuned specifically for 240-pel printing. This means that as point size increases or decreases, the characters do not necessarily increase or decrease in a linear fashion. Since the outline font will generate all point sizes linearly, it would never be able to duplicate the 240-pel raster fonts. The only way to accurately duplicate the 240-pel fonts would be to create unique outline fonts for each point size which defeats the purpose of using outline font technology.

Migrating from 240-pel to AFP outlines within AFP Font Collection

Since coded fonts and character sets within AFP Font Collection follow consistent naming conventions, it is fairly easy to determine which character sets and coded fonts to use. Here are some key points to remember:

1. The second character of a character set or coded font name determines the font data type. If the character is "0" (C**0**H200B0 and X**0**H210BC) the resource is 240-pel or 300-pel. If the second character is "Z" (C**Z**H200 and X**Z**H210BC) the resource is an AFP outline.
2. Since outline fonts are used to create all point sizes within a typeface, there is no point size identifier carried with the character set name. In the previous example, C0H200**B0** is Helvetica Latin1 Roman Medium 12-point and the "B0" indicates 12-point. CZH200 is Helvetica Latin Roman Medium and since it is an outline font, can be used to create any point size.
3. You might be wondering at this point how the printer determines which point size to create when given an AFP outline. The key is in the coded font. AFP outline coded fonts use the same naming convention as their raster font counterparts, the only difference being the "Z" in the name. Inside the outline coded font, however, is a point size value corresponding to the point size identifier in the coded font name. In our previous example, XZH210**B**C, the "B" indicates this is a 12-point coded font and inside the coded font is a size parameter that will be used by the printers to create 12-point characters.

Document Formatting and Print Scenarios

When text is formatted it is critical to consider the output devices involved. Clearly, formatting at 240-pel and printing at 300-pel can present some problems if absolute page layout fidelity is desired.

The following table shows what can be expected from various formatter/printer combinations. Some things to notice:

- Formatting and printing with relative metric fonts (300-pel and AFP outlines) will result in optimal page layout fidelity when printed on any non-240-pel printer. This is the best argument for conversion to relative metric fonts!
- To ensure that documents formatted at 240-pel print correctly, they must be printed on either a 240-pel printer or a printer capable of rescaling 240-pel to printer resolution on-the-fly.
- Formatting with relative metric fonts and printing at 240-pel will not be perfect, but it does tend to be better than formatting at 240-pel and printing to a relative metric printer.

	Print at 240-pel	**Print at 300-pel**	**Print with Outlines**
Format with 240-pel fonts	Optimal	Possible poor page layout fidelity	Possible poor page layout fidelity. On printers capable of rescaling to print resolution, page layout fidelity will be maintained.
Format with 300-pel fonts	Possible poor page layout fidelity, but better than formatting at 240-pel and printing at 300-pel.	Optimal	Optimal
Format with Outline fonts	Possible poor page layout fidelity, but better than formatting at 240-pel and printing to an outline font printer.	Optimal	Optimal

Understanding Font Naming Conventions

What's in a name? When you look at the character sets and coded fonts provided by IBM you might wonder what demented soul thought up all these things. It wasn't easy. We only had 8 characters to work with and the first two were lost to distinguishing between character sets and coded fonts (Cn and Xn). That left just 6 characters to name thousands and thousands of existing and potential font resources. Just to make things worse, we were asked to provide 4-character coded font resources for each of our 6-character coded fonts!

Several naming conventions have evolved over the years. Today, there are six character set/coded font naming conventions in use:

1. Compatibility fonts
2. 240-pel SBCS font products
3. 240-pel DBCS font products
4. AFP Font Collection Expanded Core fonts
5. AFP Font Collection Expanded Core 4-char coded fonts
6. AFP Font Collection DBCS Core fonts

There are two documents available that describe the naming conventions:

- *Font Summary for AFP Font Collection*, S544-5633-01 describes:
  - AFP Font Collection Expanded Core fonts (p.23-25)
  - AFP Font Collection DBCS Core fonts (p.27-33)
  - Compatibility fonts (p.26)

- *About Type: IBM's Technical Reference for 240-pel Digitized Type*, S544-3516-05 describes:
  - Compatibility fonts (B1-B8)
  - 240-pel SBCS font products (B9-B19)

The 4-character coded font naming convention is described in the program directories, but it is also be provided here in Appendix B.

Determining the Font Product from a Coded Font Name

This discussion will be limited to the single-byte font product environment. The reasons for this are twofold. First, the vast majority of questions we've received regarding the lineage of coded fonts are related to single-byte products. Second, since the double-byte products tend to be installed in separate font libraries, they are less likely to become intermingled with other font products.

The first thing to remember when trying to determine the source of a coded font is that there is nothing to prevent a user from naming a coded font anything they choose. The following rules-of-thumb can be used to located IBM products as long as the coded font came from IBM, but keep in mind that even though the coded font may fit some of the tests listed below, there is always the potential that the coded font is from another source (OEM, custom, or created by the customer) and is not from IBM.

Here are some tricks to help you determine the source of a coded font. It is assumed that the first 2 characters are Xn or XZ (otherwise it wouldn't be a coded font). We will be looking at the 3rd and 4th characters.

- If there are **6 characters** following the Xn or XZ, the coded font is likely from either a 240-pel font product, from AFP Font Collection, or is a Proprinter Emulation font from the Compatibility fonts.
    - If the 3rd character is B, H, I, N, 4, 5, 6, 7, 8, or 9, the font is from an AFP Font Collection product: 5688-113 (discontinued), 5688-B33, or 5688-B45.
    - If the 3rd character is A, C, G, J, M, O, P, Q, S, T, V, or Z, the font is from a 240-pel font product.
    - If the 3rd character is 2, the font is a Proprinter Emulation font from the Compatibility fonts.
- If there are **4 characters** following the Xn or XZ, it is very difficult to pinpoint the source product.
    - If the 3rd character is B, H, I, N, 4, 5, 6, 7, 8, or 9 **and** the next 2 characters are numeric, it is a 4-character coded font from an AFP Font Collection product: 5688-113 (discontinued), 5688-B33, or 5688-B45.
    - If the 3rd and 4th characters are BC, the coded font is from the Bar Code and OCR product, 5688-021.
    - If the 3rd and 4th characters are AC, AE, AT, the coded font is a MICR coded font from the MICR Font RPQ, 8A8083.
    - If the 3rd and 4th characters are BP, the coded font is from the Postal Bar Code Font RPQ, 8A5043.
    - For all others, it is most likely a Compatibility font.

Using the *Font Summary for AFP Font Collection* publication

The *Font Summary for AFP Font Collection* is a useful book that can be help you determine which fonts to use and also help you understand the font resources provided in AFP Font Collection. The book is an entitlement publication that is provided with the AFP Font Collection products and is organized as follows:

- *IBM Font Concepts* describes basic font structure, font characteristics, distribution methods, language support, and most importantly, the **naming conventions** used for character sets, code pages and coded fonts.
- *Font Summary Tables* identify Expanded Core, Compatibility, and DBCS font resources.
- The *Code Pages* section identifies code page resources, languages supported, and the font groups for which they are used.

Coded Fonts and the Font Summary Tables

Let’s spend a moment on the Font Summary Tables. In these tables all character sets are identified along with the Type1 font name, GRID information, size information, and a representative code page/coded font relationship. *Not all coded fonts provided in AFP Font Collection are identified in these tables*. There are simply too many of them. Instead of identifying each of the thousands of coded fonts, the most popular code page for each language complement was chosen and the coded fonts for that code page were identified.

In cases where a coded font cannot be located in the Font Summary Tables and in cases where a code page is required that is also not identified, you will have to go to the naming convention pages. If you have a coded font you want to identify, first determine if it is even provided in AFP Font Collection by using the hints mentioned previously. Assuming it fits the AFP Font Collection model, refer to the Expanded Core Fonts section under IBM Font Naming Conventions to decode the characters in the coded font name (**A F R S T C P X**). This will help identify the code page and character set used in the coded font.

If you have a code page and wish to know which coded fonts are provided for it, locate the code page in the coded font naming convention tables. Use the table in which the code page is found to provide **T, C**, and **X** for the coded font name. **A** and **F** will be X0 or XZ and **P** will be a point size. **R** and **S** represent the typeface, so you’ll have to at least make a guess at which typeface you would like to use.

Hint: Coded fonts are created for all character set sizes and typefaces for only a select few code pages, usually only one per language complement. Coded fonts for the remaining code pages are only created for roman medium 10pt typefaces for each font family. When trying to determine if a coded font exists, start with **R** = 4, H, or N and **S** = 2 (Courier, Helvetica, or Times New Roman 10pt).

Point Size vs. Pitch

The Font Summary book also provides a point size/pitch table (Table 10 on p.36). Here you can see how point size relates to pitch. Pitch is an old typewriter term that describes the size of a font by how many characters can fit in one inch of text. Today, font size is specified in points and points are used in every instance where size is described. This includes character set identification and font size specified in outline coded fonts. Point size is also used for pel value calculation when using relative metrics. Since point size is all that is known regarding size, the table is provided to show which point sizes to use to achieve the various pitches.

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OGL	
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PPFA	
PPFA/370	
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PSF	Print Services Facility
PSF/400	
PSF/6000	
PSF/AIX	
PSF/MVS	
PSF/VM	
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Selectric	
VM	
VSE	
OS/2	

Appendix A. Compatibility Font Migration Tables

The following tables are provided to assist in migrating applications from the Compatibility fonts to Expanded Core fonts.

Compatibility Font Coded Font Migration Table (Compats to Expanded Core)

```
Create Date: 31May94
Modified:    06Sep96 - changed "modify document..." to "use Expanded Core..."
Modified:    26Sep96 - added "closest equivalent" fonts and clean-up

This table identifies each of the 1271 Compatibility Font coded fonts
and if possible, indicates a migration path to the Expanded Core
Fonts. Expanded Core coded fonts are shown as Xnxxxxxx where “n” is”0” for
bitmaps (X0xxxxxx) and “Z” for outlines (Xzxxxxx).

 302 can be replaced by existing Expanded Core coded fonts.
 193 can be replaced by creating new coded fonts using Expanded Core
     character sets and code pages.
 270 can be approximated by using existing Expanded Core coded fonts and
     format fidelity can be maintained
 150 can be approximated by using existing Expanded Core coded fonts, but
     format fidelity cannot be maintained
 356 have no reasonable equivalent Expanded Core character equivalent.
     Note that 180 of these are Proprinter Emulation fonts.  The rest
     include: Underscore, Overstrike, Format, Script, Gothic Bold, Gothic
     Italic, and Proprinter Emulation fonts.

X0AE10   Create new coded font for T1S0AE10 and C0420PB0.
X0AE20   Create new coded font for T1S0AE10 and C0420P60 <- also create.
X0AN     Create new coded font for T1L0PCAN and C06200B0.
X0AOA    Create new coded font for T1L0OCR1 and C0920AB0.
X0AOD    Create new coded font for T1L0OCR1 and C0920AB0.
X0AON    Create new coded font for T1L0OCR2 and C0920AB0.
X0A11    Use Expanded Core coded font Xn6210B1.
X0BIRA   For the closest equivalent try XnN310B2.  Format fidelity = NO.
X0BIRB   For the closest equivalent try XnN310B3.  Format fidelity = NO.
X0BIRD   For the closest equivalent try XnN310B5.  Format fidelity = NO.
X0BIRE   For the closest equivalent try XnN310B6.  Format fidelity = NO.
X0BIRF   For the closest equivalent try XnN310BB.  Format fidelity = NO.
X0BIRI   For the closest equivalent try XnN310B7.  Format fidelity = NO.
X0BIRJ   For the closest equivalent try XnN310B3.  Format fidelity = NO.
X0BIRK   For the closest equivalent try XnN310B4.  Format fidelity = NO.
X0BIRL   For the closest equivalent try XnN310B8.  Format fidelity = NO.
X0BIRM   For the closest equivalent try XnN310B9.  Format fidelity = NO.
X0BIRN   For the closest equivalent try XnN310B9.  Format fidelity = NO.
X0BIRS   For the closest equivalent try XnN310B0.  Format fidelity = NO.
X0BIRU   For the closest equivalent try XnN310BA.  Format fidelity = NO.
X0BIRZ   For the closest equivalent try XnN340B3.  Format fidelity = NO.
X0BIR0   For the closest equivalent try XnN310BD.  Format fidelity = NO.
X0BIR1   For the closest equivalent try XnN310B1.  Format fidelity = NO.
X0BIR2   For the closest equivalent try XnN310B2.  Format fidelity = NO.
X0BIR3   For the closest equivalent try XnN310B5.  Format fidelity = NO.
X0BIR4   For the closest equivalent try XnN310B6.  Format fidelity = NO.
```

X0BIR5 For the closest equivalent try XnN310B7. Format fidelity = NO.
X0BIR6 For the closest equivalent try XnN310B0. Format fidelity = NO.
X0BIR7 For the closest equivalent try XnN310BA. Format fidelity = NO.
X0BIR8 For the closest equivalent try XnN310BB. Format fidelity = NO.
X0BIR9 For the closest equivalent try XnN310BC. Format fidelity = NO.
X0BITR For the closest equivalent try new cfont for T1001002 and C0N300B0. Format fidelity NO.
X0BOA Create new coded font for T1L0OCRB and C0920BB0.
X0BON Create new coded font for T1L0OCRB and C0920BB0.
X0BRRA Use Expanded Core coded font Xn8410B2.
X0BRRB Use Expanded Core coded font Xn8410B3.
X0BRRD Use Expanded Core coded font Xn8410B5.
X0BRRE Use Expanded Core coded font Xn8410B6.
X0BRRF Use Expanded Core coded font Xn8410BB.
X0BRRI Use Expanded Core coded font Xn8410B7.
X0BRRJ Use Expanded Core coded font Xn8410B3.
X0BRRK Use Expanded Core coded font Xn8410B4.
X0BRRL Use Expanded Core coded font Xn8410B8.
X0BRRM Use Expanded Core coded font Xn8410B9.
X0BRRN Use Expanded Core coded font Xn8410B9.
X0BRRS Use Expanded Core coded font Xn8410B0.
X0BRRU Use Expanded Core coded font Xn8410BA.
X0BRRZ Use Expanded Core coded font Xn8440B3.
X0BRR0 Use Expanded Core coded font Xn8410BD.
X0BRR1 Use Expanded Core coded font Xn8410B1.
X0BRR2 Use Expanded Core coded font Xn8410B2.
X0BRR3 Use Expanded Core coded font Xn8410B5.
X0BRR4 Use Expanded Core coded font Xn8410B6.
X0BRR5 Use Expanded Core coded font Xn8410B7.
X0BRR6 Use Expanded Core coded font Xn8410B0.
X0BRR7 Use Expanded Core coded font Xn8410BA.
X0BRR8 Use Expanded Core coded font Xn8410BB.
X0BRR9 Use Expanded Core coded font Xn8410BC.
X0BRTR Create new coded font for T1001002 and C08400B0.
X0CBEJ Create new coded font for T1V10274 and C0440000.
X0CBEK Create new coded font for T1V10275 and C0440000.
X0CBEL Create new coded font for T1V10281 and C0440000.
X0CBEM Create new coded font for T1V10282 and C0440000.
X0CBE0 Create new coded font for T1V10871 and C0440000.
X0CBE1 Create new coded font for T1V10037 and C0440000.
X0CBE2 Create new coded font for T1V10273 and C0440000.
X0CBE3 Create new coded font for T1V10277 and C0440000.
X0CBE4 Create new coded font for T1V10278 and C0440000.
X0CBE5 Create new coded font for T1V10280 and C0440000.
X0CBE6 Create new coded font for T1V10284 and C0440000.
X0CBE7 Create new coded font for T1V10285 and C0440000.
X0CBE8 Create new coded font for T1V10297 and C0440000.
X0CBE9 Use Expanded Core coded font Xn44100C.
X0CB0J Create new coded font for T1V10274 and C04400B0.
X0CB0K Create new coded font for T1V10275 and C04400B0.
X0CB0L Create new coded font for T1V10281 and C04400B0.
X0CB0M Create new coded font for T1V10282 and C04400B0.
X0CB0Z Use Expanded Core coded font Xn4440B3.
X0CB00 Create new coded font for T1V10871 and C04400B0.
X0CB01 Create new coded font for T1V10037 and C04400B0.
X0CB02 Create new coded font for T1V10273 and C04400B0.
X0CB03 Create new coded font for T1V10277 and C04400B0.
X0CB04 Create new coded font for T1V10278 and C04400B0.
X0CB05 Create new coded font for T1V10280 and C04400B0.
X0CB06 Create new coded font for T1V10284 and C04400B0.
X0CB07 Create new coded font for T1V10285 and C04400B0.

X0CB08	Create new coded font for T1V10297 and C04400B0.
X0CB09	Use Expanded Core coded font Xn4410BC.
X0CB10	Create new coded font for T1001002 and C04400B0.
X0CB12	Create new coded font for T1001002 and C0440000.
X0CB15	Create new coded font for T1001002 and C0440080.
X0CB2Z	Use Expanded Core coded font Xn444003.
X0CB5J	Create new coded font for T1V10274 and C0440080.
X0CB5K	Create new coded font for T1V10275 and C0440080.
X0CB5L	Create new coded font for T1V10281 and C0440080.
X0CB5M	Create new coded font for T1V10282 and C0440080.
X0CB5Z	Use Expanded Core coded font Xn444083.
X0CB50	Create new coded font for T1V10871 and C0440080.
X0CB51	Create new coded font for T1V10037 and C0440080.
X0CB52	Create new coded font for T1V10273 and C0440080.
X0CB53	Create new coded font for T1V10277 and C0440080.
X0CB54	Create new coded font for T1V10278 and C0440080.
X0CB55	Create new coded font for T1V10280 and C0440080.
X0CB56	Create new coded font for T1V10284 and C0440080.
X0CB57	Create new coded font for T1V10285 and C0440080.
X0CB58	Create new coded font for T1V10297 and C0440080.
X0CB59	Use Expanded Core coded font Xn44108C.
X0CD15	No comparable character set.
X0CD5J	No comparable character set.
X0CD5K	No comparable character set.
X0CD5L	No comparable character set.
X0CD5M	No comparable character set.
X0CD5Z	No comparable character set.
X0CD50	No comparable character set.
X0CD51	No comparable character set.
X0CD52	No comparable character set.
X0CD53	No comparable character set.
X0CD54	No comparable character set.
X0CD55	No comparable character set.
X0CD56	No comparable character set.
X0CD57	No comparable character set.
X0CD58	No comparable character set.
X0CD59	No comparable character set.
X0CE10	Create new coded font for T1001002 and C04200B0.
X0CE12	Use Expanded Core coded font Xn424001.
X0CH10	No comparable character set.
X0CIEJ	Create new coded font for T1V10274 and C0430000.
X0CIEK	Create new coded font for T1V10275 and C0430000.
X0CIEL	Create new coded font for T1V10281 and C0430000.
X0CIEM	Create new coded font for T1V10282 and C0430000.
X0CIE0	Create new coded font for T1V10871 and C0430000.
X0CIE1	Create new coded font for T1V10037 and C0430000.
X0CIE2	Create new coded font for T1V10273 and C0430000.
X0CIE3	Create new coded font for T1V10277 and C0430000.
X0CIE4	Create new coded font for T1V10278 and C0430000.
X0CIE5	Create new coded font for T1V10280 and C0430000.
X0CIE6	Create new coded font for T1V10284 and C0430000.
X0CIE7	Create new coded font for T1V10285 and C0430000.
X0CIE8	Create new coded font for T1V10297 and C0430000.
X0CIE9	Use Expanded Core coded font Xn43100C.
X0CI0J	Create new coded font for T1V10274 and C04300B0.
X0CI0K	Create new coded font for T1V10275 and C04300B0.
X0CI0L	Create new coded font for T1V10281 and C04300B0.
X0CI0M	Create new coded font for T1V10282 and C04300B0.
X0CI0Z	Use Expanded Core coded font Xn4340B3.
X0CI00	Create new coded font for T1V10871 and C04300B0.
X0CI01	Create new coded font for T1V10037 and C04300B0.

X0CI02	Create new coded font for T1V10273 and C04300B0.
X0CI03	Create new coded font for T1V10277 and C04300B0.
X0CI04	Create new coded font for T1V10278 and C04300B0.
X0CI05	Create new coded font for T1V10280 and C04300B0.
X0CI06	Create new coded font for T1V10284 and C04300B0.
X0CI07	Create new coded font for T1V10285 and C04300B0.
X0CI08	Create new coded font for T1V10297 and C04300B0.
X0CI09	Use Expanded Core coded font Xn4310BC.
X0CI10	Create new coded font for T1001002 and C04300B0.
X0CI12	Create new coded font for T1001002 and C0430000.
X0CI15	Create new coded font for T1001002 and C0430080.
X0CI2Z	Use Expanded Core coded font Xn434003.
X0CI5J	Create new coded font for T1V10274 and C0430080.
X0CI5K	Create new coded font for T1V10275 and C0430080.
X0CI5L	Create new coded font for T1V10281 and C0430080.
X0CI5M	Create new coded font for T1V10282 and C0430080.
X0CI5Z	Use Expanded Core coded font Xn434083.
X0CI50	Create new coded font for T1V10871 and C0430080.
X0CI51	Create new coded font for T1V10037 and C0430080.
X0CI52	Create new coded font for T1V10273 and C0430080.
X0CI53	Create new coded font for T1V10277 and C0430080.
X0CI54	Create new coded font for T1V10278 and C0430080.
X0CI55	Create new coded font for T1V10280 and C0430080.
X0CI56	Create new coded font for T1V10284 and C0430080.
X0CI57	Create new coded font for T1V10285 and C0430080.
X0CI58	Create new coded font for T1V10297 and C0430080.
X0CI59	Use Expanded Core coded font Xn43108C.
X0CO10	No comparable character set.
X0CREJ	Use Expanded Core coded font Xn421003.
X0CREK	Use Expanded Core coded font Xn421004.
X0CREL	Use Expanded Core coded font Xn421008.
X0CREM	Use Expanded Core coded font Xn421009.
X0CRE0	Use Expanded Core coded font Xn42100D.
X0CRE1	Use Expanded Core coded font Xn421001.
X0CRE2	Use Expanded Core coded font Xn421002.
X0CRE3	Use Expanded Core coded font Xn421005.
X0CRE4	Use Expanded Core coded font Xn421006.
X0CRE5	Use Expanded Core coded font Xn421007.
X0CRE6	Use Expanded Core coded font Xn421000.
X0CRE7	Use Expanded Core coded font Xn42100A.
X0CRE8	Use Expanded Core coded font Xn42100B.
X0CRE9	Use Expanded Core coded font Xn42100C.
X0CR0A	Create new coded font for T1V01273 and C04200B0.
X0CR0B	Create new coded font for T1V10274 and C04200B0.
X0CR0D	Create new coded font for T1V10277 and C04200B0.
X0CR0E	Create new coded font for T1V10278 and C04200B0.
X0CR0F	Create new coded font for T1V10297 and C04200B0.
X0CR0I	Create new coded font for T1V10280 and C04200B0.
X0CR0J	Create new coded font for T1V10274 and C04200B0.
X0CR0K	Create new coded font for T1V10275 and C04200B0.
X0CR0L	Create new coded font for T1V10281 and C04200B0.
X0CR0M	Create new coded font for T1V10282 and C04200B0.
X0CR0N	Create new coded font for T1V10282 and C04200B0.
X0CR0S	Create new coded font for T1V10284 and C04200B0.
X0CR0U	Create new coded font for T1V10285 and C04200B0.
X0CR0Z	Use Expanded Core coded font Xn4240B3.
X0CR00	Create new coded font for T1V10871 and C04200B0.
X0CR01	Create new coded font for T1V10037 and C04200B0.
X0CR02	Create new coded font for T1V10273 and C04200B0.
X0CR03	Create new coded font for T1V10277 and C04200B0.
X0CR04	Create new coded font for T1V10278 and C04200B0.

X0CR05	Create new coded font for T1V10280 and C04200B0.
X0CR06	Create new coded font for T1V10284 and C04200B0.
X0CR07	Create new coded font for T1V10285 and C04200B0.
X0CR08	Create new coded font for T1V10297 and C04200B0.
X0CR09	Use Expanded Core coded font Xn4210BC.
X0CR10	Create new coded font for T1001002 and C04200B0.
X0CR12	Use Expanded Core coded font Xn424001.
X0CR15	Create new coded font for T1001002 and C0420080.
X0CR2Z	Use Expanded Core coded font Xn424003.
X0CR5J	Create new coded font for T1V10274 and C0420080.
X0CR5K	Create new coded font for T1V10275 and C0420080.
X0CR5L	Create new coded font for T1V10281 and C0420080.
X0CR5M	Create new coded font for T1V10282 and C0420080.
X0CR5Z	Use Expanded Core coded font Xn424083.
X0CR50	Create new coded font for T1V10871 and C0420080.
X0CR51	Create new coded font for T1V10037 and C0420080.
X0CR52	Create new coded font for T1V10273 and C0420080.
X0CR53	Create new coded font for T1V10277 and C0420080.
X0CR54	Create new coded font for T1V10278 and C0420080.
X0CR55	Create new coded font for T1V10280 and C0420080.
X0CR56	Create new coded font for T1V10284 and C0420080.
X0CR57	Create new coded font for T1V10285 and C0420080.
X0CR58	Create new coded font for T1V10297 and C0420080.
X0CR59	Use Expanded Core coded font Xn42108C.
X0CW15	No comparable character set.
X0CW5J	No comparable character set.
X0CW5K	No comparable character set.
X0CW5L	No comparable character set.
X0CW5M	No comparable character set.
X0CW5Z	No comparable character set.
X0CW50	No comparable character set.
X0CW51	No comparable character set.
X0CW52	No comparable character set.
X0CW53	No comparable character set.
X0CW54	No comparable character set.
X0CW55	No comparable character set.
X0CW56	No comparable character set.
X0CW57	No comparable character set.
X0CW58	No comparable character set.
X0CW59	No comparable character set.
X0DORA	For the closest equivalent try Xn8410B2. Format fidelity = YES.
X0DORB	For the closest equivalent try Xn8410B3. Format fidelity = YES.
X0DORD	For the closest equivalent try Xn8410B5. Format fidelity = YES.
X0DORE	For the closest equivalent try Xn8410B6. Format fidelity = YES.
X0DORF	For the closest equivalent try Xn8410BB. Format fidelity = YES.
X0DORI	For the closest equivalent try Xn8410B7. Format fidelity = YES.
X0DORJ	For the closest equivalent try Xn8410B3. Format fidelity = YES.
X0DORK	For the closest equivalent try Xn8410B4. Format fidelity = YES.
X0DORL	For the closest equivalent try Xn8410B8. Format fidelity = YES.
X0DORM	For the closest equivalent try Xn8410B9. Format fidelity = YES.
X0DORN	For the closest equivalent try Xn8410B9. Format fidelity = YES.
X0DORS	For the closest equivalent try Xn8410B0. Format fidelity = YES.
X0DORU	For the closest equivalent try Xn8410BA. Format fidelity = YES.
X0DORZ	For the closest equivalent try Xn8440B3. Format fidelity = YES.
X0DOR0	For the closest equivalent try Xn8410BD. Format fidelity = YES.
X0DOR1	For the closest equivalent try Xn8410B1. Format fidelity = YES.
X0DOR2	For the closest equivalent try Xn8410B2. Format fidelity = YES.
X0DOR3	For the closest equivalent try Xn8410B5. Format fidelity = YES.
X0DOR4	For the closest equivalent try Xn8410B6. Format fidelity = YES.
X0DOR5	For the closest equivalent try Xn8410B7. Format fidelity = YES.
X0DOR6	For the closest equivalent try Xn8410B0. Format fidelity = YES.

X0DOR7 For the closest equivalent try Xn8410BA. Format fidelity = YES.
X0DOR8 For the closest equivalent try Xn8410BB. Format fidelity = YES.
X0DOR9 For the closest equivalent try Xn8410BC. Format fidelity = YES.
X0DOTR For the closest equivalent try new cfont for T1001002 and C08400B0. Format fidelity YES.
X0DUMP No comparable character set.
X0EBRA For the closest equivalent try XnH410B2. Format fidelity = NO.
X0EBRB For the closest equivalent try XnH410B3. Format fidelity = NO.
X0EBRD For the closest equivalent try XnH410B5. Format fidelity = NO.
X0EBRE For the closest equivalent try XnH410B6. Format fidelity = NO.
X0EBRF For the closest equivalent try XnH410BB. Format fidelity = NO.
X0EBRI For the closest equivalent try XnH410B7. Format fidelity = NO.
X0EBRJ For the closest equivalent try XnH410B3. Format fidelity = NO.
X0EBRK For the closest equivalent try XnH410B4. Format fidelity = NO.
X0EBRL For the closest equivalent try XnH410B8. Format fidelity = NO.
X0EBRM For the closest equivalent try XnH410B9. Format fidelity = NO.
X0EBRN For the closest equivalent try XnH410B9. Format fidelity = NO.
X0EBRS For the closest equivalent try XnH410B0. Format fidelity = NO.
X0EBRU For the closest equivalent try XnH410BA. Format fidelity = NO.
X0EBRZ For the closest equivalent try XnH440B3. Format fidelity = NO.
X0EBR0 For the closest equivalent try XnH410BD. Format fidelity = NO.
X0EBR1 For the closest equivalent try XnH410B1. Format fidelity = NO.
X0EBR2 For the closest equivalent try XnH410B2. Format fidelity = NO.
X0EBR3 For the closest equivalent try XnH410B5. Format fidelity = NO.
X0EBR4 For the closest equivalent try XnH410B6. Format fidelity = NO.
X0EBR5 For the closest equivalent try XnH410B7. Format fidelity = NO.
X0EBR6 For the closest equivalent try XnH410B0. Format fidelity = NO.
X0EBR7 For the closest equivalent try XnH410BA. Format fidelity = NO.
X0EBR8 For the closest equivalent try XnH410BB. Format fidelity = NO.
X0EBR9 For the closest equivalent try XnH410BC. Format fidelity = NO.
X0EBTR For the closest equivalent try new cfont for T1001002 and C0H400B0. Format fidelity NO.
X0EIRA For the closest equivalent try XnH310B2. Format fidelity = NO.
X0EIRB For the closest equivalent try XnH310B3. Format fidelity = NO.
X0EIRD For the closest equivalent try XnH310B5. Format fidelity = NO.
X0EIRE For the closest equivalent try XnH310B6. Format fidelity = NO.
X0EIRF For the closest equivalent try XnH310BB. Format fidelity = NO.
X0EIRI For the closest equivalent try XnH310B7. Format fidelity = NO.
X0EIRJ For the closest equivalent try XnH310B3. Format fidelity = NO.
X0EIRK For the closest equivalent try XnH310B4. Format fidelity = NO.
X0EIRL For the closest equivalent try XnH310B8. Format fidelity = NO.
X0EIRM For the closest equivalent try XnH310B9. Format fidelity = NO.
X0EIRN For the closest equivalent try XnH310B9. Format fidelity = NO.
X0EIRS For the closest equivalent try XnH310B0. Format fidelity = NO.
X0EIRU For the closest equivalent try XnH310BA. Format fidelity = NO.
X0EIRZ For the closest equivalent try XnH340B3. Format fidelity = NO.
X0EIR0 For the closest equivalent try XnH310BD. Format fidelity = NO.
X0EIR1 For the closest equivalent try XnH310B1. Format fidelity = NO.
X0EIR2 For the closest equivalent try XnH310B2. Format fidelity = NO.
X0EIR3 For the closest equivalent try XnH310B5. Format fidelity = NO.
X0EIR4 For the closest equivalent try XnH310B6. Format fidelity = NO.
X0EIR5 For the closest equivalent try XnH310B7. Format fidelity = NO.
X0EIR6 For the closest equivalent try XnH310B0. Format fidelity = NO.
X0EIR7 For the closest equivalent try XnH310BA. Format fidelity = NO.
X0EIR8 For the closest equivalent try XnH310BB. Format fidelity = NO.
X0EIR9 For the closest equivalent try XnH310BC. Format fidelity = NO.
X0EITR For the closest equivalent try new cfont for T1001002 and C0H300B0. Format fidelity NO.
X0ELRA For the closest equivalent try XnH210B2. Format fidelity = NO.
X0ELRB For the closest equivalent try XnH210B3. Format fidelity = NO.
X0ELRD For the closest equivalent try XnH210B5. Format fidelity = NO.

X0ELRE For the closest equivalent try XnH210B6. Format fidelity = NO.
X0ELRF For the closest equivalent try XnH210BB. Format fidelity = NO.
X0ELRI For the closest equivalent try XnH210B7. Format fidelity = NO.
X0ELRJ For the closest equivalent try XnH210B3. Format fidelity = NO.
X0ELRK For the closest equivalent try XnH210B4. Format fidelity = NO.
X0ELRL For the closest equivalent try XnH210B8. Format fidelity = NO.
X0ELRM For the closest equivalent try XnH210B9. Format fidelity = NO.
X0ELRN For the closest equivalent try XnH210B9. Format fidelity = NO.
X0ELRS For the closest equivalent try XnH210B0. Format fidelity = NO.
X0ELRU For the closest equivalent try XnH210BA. Format fidelity = NO.
X0ELRZ For the closest equivalent try XnH240B3. Format fidelity = NO.
X0ELR0 For the closest equivalent try XnH210BD. Format fidelity = NO.
X0ELR1 For the closest equivalent try XnH210B1. Format fidelity = NO.
X0ELR2 For the closest equivalent try XnH210B2. Format fidelity = NO.
X0ELR3 For the closest equivalent try XnH210B5. Format fidelity = NO.
X0ELR4 For the closest equivalent try XnH210B6. Format fidelity = NO.
X0ELR5 For the closest equivalent try XnH210B7. Format fidelity = NO.
X0ELR6 For the closest equivalent try XnH210B0. Format fidelity = NO.
X0ELR7 For the closest equivalent try XnH210BA. Format fidelity = NO.
X0ELR8 For the closest equivalent try XnH210BB. Format fidelity = NO.
X0ELR9 For the closest equivalent try XnH210BC. Format fidelity = NO.
X0ELTR For the closest equivalent try new cfont for T1001002 and C0H200B0. Format fidelity NO.
X0EOTR No comparable character set.
X0ESRA For the closest equivalent try XnH210B2. Format fidelity = NO.
X0ESRB For the closest equivalent try XnH210B3. Format fidelity = NO.
X0ESRD For the closest equivalent try XnH210B5. Format fidelity = NO.
X0ESRE For the closest equivalent try XnH210B6. Format fidelity = NO.
X0ESRF For the closest equivalent try XnH210BB. Format fidelity = NO.
X0ESRI For the closest equivalent try XnH210B7. Format fidelity = NO.
X0ESRJ For the closest equivalent try XnH210B3. Format fidelity = NO.
X0ESRK For the closest equivalent try XnH210B4. Format fidelity = NO.
X0ESRL For the closest equivalent try XnH210B8. Format fidelity = NO.
X0ESRM For the closest equivalent try XnH210B9. Format fidelity = NO.
X0ESRN For the closest equivalent try XnH210B9. Format fidelity = NO.
X0ESRS For the closest equivalent try XnH210B0. Format fidelity = NO.
X0ESRU For the closest equivalent try XnH210BA. Format fidelity = NO.
X0ESRZ For the closest equivalent try XnH240B3. Format fidelity = NO.
X0ESR0 For the closest equivalent try XnH210BD. Format fidelity = NO.
X0ESR1 For the closest equivalent try XnH210B1. Format fidelity = NO.
X0ESR2 For the closest equivalent try XnH210B2. Format fidelity = NO.
X0ESR3 For the closest equivalent try XnH210B5. Format fidelity = NO.
X0ESR4 For the closest equivalent try XnH210B6. Format fidelity = NO.
X0ESR5 For the closest equivalent try XnH210B7. Format fidelity = NO.
X0ESR6 For the closest equivalent try XnH210B0. Format fidelity = NO.
X0ESR7 For the closest equivalent try XnH210BA. Format fidelity = NO.
X0ESR8 For the closest equivalent try XnH210BB. Format fidelity = NO.
X0ESR9 For the closest equivalent try XnH210BC. Format fidelity = NO.
X0ESTR For the closest equivalent try new cfont for T1001002 and C0H200B0. Format fidelity NO.
X0FM10 No comparable character set.
X0FM12 No comparable character set.
X0FM15 No comparable character set.
X0GBEJ No comparable character set.
X0GBEK No comparable character set.
X0GBEL No comparable character set.
X0GBEM No comparable character set.
X0GBE0 No comparable character set.
X0GBE1 No comparable character set.
X0GBE2 No comparable character set.
X0GBE3 No comparable character set.

X0GBE4	No comparable character set.
X0GBE5	No comparable character set.
X0GBE6	No comparable character set.
X0GBE7	No comparable character set.
X0GBE8	No comparable character set.
X0GBE9	No comparable character set.
X0GB0A	No comparable character set.
X0GB0B	No comparable character set.
X0GB0D	No comparable character set.
X0GB0E	No comparable character set.
X0GB0F	No comparable character set.
X0GB0I	No comparable character set.
X0GB0J	No comparable character set.
X0GB0K	No comparable character set.
X0GB0L	No comparable character set.
X0GB0M	No comparable character set.
X0GB0N	No comparable character set.
X0GB0S	No comparable character set.
X0GB0U	No comparable character set.
X0GB0Z	No comparable character set.
X0GB00	No comparable character set.
X0GB01	No comparable character set.
X0GB02	No comparable character set.
X0GB03	No comparable character set.
X0GB04	No comparable character set.
X0GB05	No comparable character set.
X0GB06	No comparable character set.
X0GB07	No comparable character set.
X0GB08	No comparable character set.
X0GB09	No comparable character set.
X0GB10	No comparable character set.
X0GB12	No comparable character set.
X0GB2A	No comparable character set.
X0GB2B	No comparable character set.
X0GB2D	No comparable character set.
X0GB2E	No comparable character set.
X0GB2F	No comparable character set.
X0GB2I	No comparable character set.
X0GB2N	No comparable character set.
X0GB2S	No comparable character set.
X0GB2U	No comparable character set.
X0GB2Z	No comparable character set.
X0GC15	No comparable character set.
X0GC5Z	No comparable character set.
X0GFC	No comparable character set.
X0GF10	Create new coded font for T1L0FOLD and C06200B0.
X0GF12	Create new coded font for T1L0FOLD and C0620000.
X0GF15	Create new coded font for T1L0FOLD and C0620080.
X0GIEJ	No comparable character set.
X0GIEK	No comparable character set.
X0GIEL	No comparable character set.
X0GIEM	No comparable character set.
X0GIE0	No comparable character set.
X0GIE1	No comparable character set.
X0GIE2	No comparable character set.
X0GIE3	No comparable character set.
X0GIE4	No comparable character set.
X0GIE5	No comparable character set.
X0GIE6	No comparable character set.
X0GIE7	No comparable character set.
X0GIE8	No comparable character set.

X0GIE9	No comparable character set.
X0GI12	No comparable character set.
X0GI2A	No comparable character set.
X0GI2B	No comparable character set.
X0GI2D	No comparable character set.
X0GI2E	No comparable character set.
X0GI2F	No comparable character set.
X0GI2I	No comparable character set.
X0GI2N	No comparable character set.
X0GI2S	No comparable character set.
X0GI2U	No comparable character set.
X0GI2Z	No comparable character set.
X0GLEJ	For the closest equivalent try Xn621003. Format fidelity = YES.
X0GLEK	For the closest equivalent try Xn621004. Format fidelity = YES.
X0GLEL	For the closest equivalent try Xn621008. Format fidelity = YES.
X0GLEM	For the closest equivalent try Xn621009. Format fidelity = YES.
X0GLE0	For the closest equivalent try Xn62100D. Format fidelity = YES.
X0GLE1	For the closest equivalent try Xn621001. Format fidelity = YES.
X0GLE2	For the closest equivalent try Xn621002. Format fidelity = YES.
X0GLE3	For the closest equivalent try Xn621005. Format fidelity = YES.
X0GLE4	For the closest equivalent try Xn621006. Format fidelity = YES.
X0GLE5	For the closest equivalent try Xn621007. Format fidelity = YES.
X0GLE6	For the closest equivalent try Xn621000. Format fidelity = YES.
X0GLE7	For the closest equivalent try Xn62100A. Format fidelity = YES.
X0GLE8	For the closest equivalent try Xn62100B. Format fidelity = YES.
X0GLE9	For the closest equivalent try Xn62100C. Format fidelity = YES.
X0GL0J	For the closest equivalent try Xn6210B3. Format fidelity = YES.
X0GL0K	For the closest equivalent try Xn6210B4. Format fidelity = YES.
X0GL0L	For the closest equivalent try Xn6210B8. Format fidelity = YES.
X0GL0M	For the closest equivalent try Xn6210B9. Format fidelity = YES.
X0GL0Z	For the closest equivalent try Xn6240B3. Format fidelity = YES.
X0GL00	For the closest equivalent try Xn6210BD. Format fidelity = YES.
X0GL01	For the closest equivalent try Xn6210B1. Format fidelity = YES.
X0GL02	For the closest equivalent try Xn6210B2. Format fidelity = YES.
X0GL03	For the closest equivalent try Xn6210B5. Format fidelity = YES.
X0GL04	For the closest equivalent try Xn6210B6. Format fidelity = YES.
X0GL05	For the closest equivalent try Xn6210B7. Format fidelity = YES.
X0GL06	For the closest equivalent try Xn6210B0. Format fidelity = YES.
X0GL07	For the closest equivalent try Xn6210BA. Format fidelity = YES.
X0GL08	For the closest equivalent try Xn6210BB. Format fidelity = YES.
X0GL09	For the closest equivalent try Xn6210BC. Format fidelity = YES.
X0GL10	For the closest equivalent try new cfont for T1001002 and C06200B0. Format fidelity YES.
X0GL12	For the closest equivalent try new cfont for T1001002 and C0620000. Format fidelity YES.
X0GL15	For the closest equivalent try new cfont for T1001002 and C0620080. Format fidelity YES.
X0GL2Z	For the closest equivalent try Xn624003. Format fidelity = YES.
X0GL5J	For the closest equivalent try Xn621083. Format fidelity = YES.
X0GL5K	For the closest equivalent try Xn621084. Format fidelity = YES.
X0GL5L	For the closest equivalent try Xn621088. Format fidelity = YES.
X0GL5M	For the closest equivalent try Xn621089. Format fidelity = YES.
X0GL5Z	For the closest equivalent try Xn624083. Format fidelity = YES.
X0GL50	For the closest equivalent try Xn62108D. Format fidelity = YES.
X0GL51	For the closest equivalent try Xn621081. Format fidelity = YES.
X0GL52	For the closest equivalent try Xn621082. Format fidelity = YES.
X0GL53	For the closest equivalent try Xn621085. Format fidelity = YES.
X0GL54	For the closest equivalent try Xn621086. Format fidelity = YES.
X0GL55	For the closest equivalent try Xn621087. Format fidelity = YES.
X0GL56	For the closest equivalent try Xn621080. Format fidelity = YES.
X0GL57	For the closest equivalent try Xn62108A. Format fidelity = YES.

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X0GL58   For the closest equivalent try Xn62108B.  Format fidelity = YES.
X0GL59   For the closest equivalent try Xn62108C.  Format fidelity = YES.
X0GN     Create new coded font for T1L000GN and C06200B0.
X0GPEJ   For the closest equivalent try XnH21093.  Format fidelity = NO.
X0GPEK   For the closest equivalent try XnH21094.  Format fidelity = NO.
X0GPEL   For the closest equivalent try XnH21098.  Format fidelity = NO.
X0GPEM   For the closest equivalent try XnH21099.  Format fidelity = NO.
X0GPE0   For the closest equivalent try XnH2109D.  Format fidelity = NO.
X0GPE1   For the closest equivalent try XnH21091.  Format fidelity = NO.
X0GPE2   For the closest equivalent try XnH21092.  Format fidelity = NO.
X0GPE3   For the closest equivalent try XnH21095.  Format fidelity = NO.
X0GPE4   For the closest equivalent try XnH21096.  Format fidelity = NO.
X0GPE5   For the closest equivalent try XnH21097.  Format fidelity = NO.
X0GPE6   For the closest equivalent try XnH21090.  Format fidelity = NO.
X0GPE7   For the closest equivalent try XnH2109A.  Format fidelity = NO.
X0GPE8   For the closest equivalent try XnH2109B.  Format fidelity = NO.
X0GPE9   For the closest equivalent try XnH2109C.  Format fidelity = NO.
X0GP12   For the closest equivalent try new cfont for T1001002 and C0H20090. Format
fidelity NO.
X0GP2A   For the closest equivalent try XnH21092.  Format fidelity = NO.
X0GP2B   For the closest equivalent try XnH21093.  Format fidelity = NO.
X0GP2D   For the closest equivalent try XnH21095.  Format fidelity = NO.
X0GP2E   For the closest equivalent try XnH21096.  Format fidelity = NO.
X0GP2F   For the closest equivalent try XnH2109B.  Format fidelity = NO.
X0GP2I   For the closest equivalent try XnH21097.  Format fidelity = NO.
X0GP2N   For the closest equivalent try XnH21099.  Format fidelity = NO.
X0GP2S   For the closest equivalent try XnH21090.  Format fidelity = NO.
X0GP2U   For the closest equivalent try XnH2109A.  Format fidelity = NO.
X0GP2Z   For the closest equivalent try XnH24093.  Format fidelity = NO.
X0GR0A   Create new coded font for T1V10273 and C0B600B0.
X0GR0B   Create new coded font for T1V10274 and C0B600B0.
X0GR0D   Create new coded font for T1V10277 and C0B600B0.
X0GR0E   Create new coded font for T1V10278 and C0B600B0.
X0GR0F   Create new coded font for T1V10297 and C0B600B0.
X0GR0I   Create new coded font for T1V10280 and C0B600B0.
X0GR0J   Create new coded font for T1V10274 and C0B600B0.
X0GR0K   Create new coded font for T1V10275 and C0B600B0.
X0GR0L   Create new coded font for T1V10281 and C0B600B0.
X0GR0M   Create new coded font for T1V10282 and C0B600B0.
X0GR0N   Create new coded font for T1V10282 and C0B600B0.
X0GR0S   Create new coded font for T1V10284 and C0B600B0.
X0GR0U   Create new coded font for T1V10285 and C0B600B0.
X0GR0Z   Create new coded font for T1001068 and C0B600B0.
X0GR00   Create new coded font for T1V10273 and C0B600B0.
X0GR01   Create new coded font for T1V10871 and C0B600B0.
X0GR02   Create new coded font for T1V10273 and C0B600B0.
X0GR03   Create new coded font for T1V10277 and C0B600B0.
X0GR04   Create new coded font for T1V10278 and C0B600B0.
X0GR05   Create new coded font for T1V10280 and C0B600B0.
X0GR06   Create new coded font for T1V10284 and C0B600B0.
X0GR07   Create new coded font for T1V10285 and C0B600B0.
X0GR08   Create new coded font for T1V10297 and C0B600B0.
X0GR09   Create new coded font for T1V10500 and C0B600B0.
X0GR10   Create new coded font for T1001002 and C0B600B0.
X0GSC    Create new coded font for T1L038BA and C0620080.
X0GS10   Create new coded font for T1L038BA and C06200B0.
X0GS12   Create new coded font for T1L038BA and C0620000.
X0GS15   Create new coded font for T1L038BA and C0620080.
X0GTEJ   Use Expanded Core coded font Xn621003.
X0GTEK   Use Expanded Core coded font Xn621004.
X0GTEL   Use Expanded Core coded font Xn621008.
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X0GTEM	Use Expanded Core coded font Xn621009.
X0GTE0	Use Expanded Core coded font Xn62100D.
X0GTE1	Use Expanded Core coded font Xn621001.
X0GTE2	Use Expanded Core coded font Xn621002.
X0GTE3	Use Expanded Core coded font Xn621005.
X0GTE4	Use Expanded Core coded font Xn621006.
X0GTE5	Use Expanded Core coded font Xn621007.
X0GTE6	Use Expanded Core coded font Xn621000.
X0GTE7	Use Expanded Core coded font Xn62100A.
X0GTE8	Use Expanded Core coded font Xn62100B.
X0GTE9	Use Expanded Core coded font Xn62100C.
X0GTJZ	Use Expanded Core coded font Xn624063.
X0GTNZ	No comparable character set.
X0GTRI	Create new coded font for T1001002 and C0H20090.
X0GT0A	Use Expanded Core coded font Xn6210B2.
X0GT0B	Use Expanded Core coded font Xn6210B3.
X0GT0D	Use Expanded Core coded font Xn6210B5.
X0GT0E	Use Expanded Core coded font Xn6210B6.
X0GT0F	Use Expanded Core coded font Xn6210BB.
X0GT0I	Use Expanded Core coded font Xn6210B7.
X0GT0J	Use Expanded Core coded font Xn6210B3.
X0GT0K	Use Expanded Core coded font Xn6210B4.
X0GT0L	Use Expanded Core coded font Xn6210B8.
X0GT0M	Use Expanded Core coded font Xn6210B9.
X0GT0N	Use Expanded Core coded font Xn6210B9.
X0GT0S	Use Expanded Core coded font Xn6210B0.
X0GT0U	Use Expanded Core coded font Xn6210BA.
X0GT0Z	Use Expanded Core coded font Xn6240B3.
X0GT00	Use Expanded Core coded font Xn6210BD.
X0GT01	Use Expanded Core coded font Xn6210B1.
X0GT02	Use Expanded Core coded font Xn6210B2.
X0GT03	Use Expanded Core coded font Xn6210B5.
X0GT04	Use Expanded Core coded font Xn6210B6.
X0GT05	Use Expanded Core coded font Xn6210B7.
X0GT06	Use Expanded Core coded font Xn6210B0.
X0GT07	Use Expanded Core coded font Xn6210BA.
X0GT08	Use Expanded Core coded font Xn6210BB.
X0GT09	Use Expanded Core coded font Xn6210BC.
X0GT10	Create new coded font for T1001002 and C06200B0.
X0GT12	Create new coded font for T1001002 and C0620000.
X0GT13	Create new coded font for T1001002 and C0620090.
X0GT15	Create new coded font for T1001002 and C0620080.
X0GT18	No comparable character set.
X0GT2A	Use Expanded Core coded font Xn621002.
X0GT2B	Use Expanded Core coded font Xn621003.
X0GT2D	Use Expanded Core coded font Xn621005.
X0GT2E	Use Expanded Core coded font Xn621006.
X0GT2F	Use Expanded Core coded font Xn62100B.
X0GT2I	Use Expanded Core coded font Xn621007.
X0GT2N	Use Expanded Core coded font Xn621009.
X0GT2S	Use Expanded Core coded font Xn621000.
X0GT2U	Use Expanded Core coded font Xn62100A.
X0GT2Z	Use Expanded Core coded font Xn624003.
X0GT20	Create new coded font for T1001002 and C0620060.
X0GT24	No comparable character set.
X0GT3Z	Use Expanded Core coded font Xn624093.
X0GT5A	Use Expanded Core coded font Xn621082.
X0GT5B	Use Expanded Core coded font Xn621083.
X0GT5D	Use Expanded Core coded font Xn621085.
X0GT5E	Use Expanded Core coded font Xn621086.
X0GT5F	Use Expanded Core coded font Xn62108B.

X0GT5I	Use Expanded Core coded font Xn621087.
X0GT5J	Use Expanded Core coded font Xn621083.
X0GT5K	Use Expanded Core coded font Xn621084.
X0GT5L	Use Expanded Core coded font Xn621088.
X0GT5M	Use Expanded Core coded font Xn621089.
X0GT5N	Use Expanded Core coded font Xn621089.
X0GT5S	Use Expanded Core coded font Xn621080.
X0GT5U	Use Expanded Core coded font Xn62108A.
X0GT5Z	Use Expanded Core coded font Xn624083.
X0GT50	Use Expanded Core coded font Xn62108D.
X0GT51	Use Expanded Core coded font Xn621081.
X0GT52	Use Expanded Core coded font Xn621082.
X0GT53	Use Expanded Core coded font Xn621085.
X0GT54	Use Expanded Core coded font Xn621086.
X0GT55	Use Expanded Core coded font Xn621087.
X0GT56	Use Expanded Core coded font Xn621080.
X0GT57	Use Expanded Core coded font Xn62108A.
X0GT58	Use Expanded Core coded font Xn62108B.
X0GT59	Use Expanded Core coded font Xn62108C.
X0GT8A	No comparable character set.
X0GT8B	No comparable character set.
X0GT8D	No comparable character set.
X0GT8E	No comparable character set.
X0GT8F	No comparable character set.
X0GT8I	No comparable character set.
X0GT8J	No comparable character set.
X0GT8K	No comparable character set.
X0GT8L	No comparable character set.
X0GT8M	No comparable character set.
X0GT8N	No comparable character set.
X0GT8S	No comparable character set.
X0GT8U	No comparable character set.
X0GT8Z	No comparable character set.
X0GT80	No comparable character set.
X0GT81	No comparable character set.
X0GT82	No comparable character set.
X0GT83	No comparable character set.
X0GT84	No comparable character set.
X0GT85	No comparable character set.
X0GT86	No comparable character set.
X0GT87	No comparable character set.
X0GT88	No comparable character set.
X0GT89	No comparable character set.
X0GUC	No comparable character set.
X0GU10	No comparable character set.
X0GU12	No comparable character set.
X0GU15	No comparable character set.
X0G11	Create new coded font for T1L000GN and C06200B0.
X0HN	Use Expanded Core coded font Xn6210B0.
X0H11	Use Expanded Core coded font Xn6210B0.
X0KL0A	For the closest equivalent try new cfont for T1L00KN1 and C06208B0. Format fidelity YES.
X0KL0B	For the closest equivalent try Xn6268B6. Format fidelity = YES.
X0KL0C	For the closest equivalent try Xn6268B6. Format fidelity = YES.
X0KL10	For the closest equivalent try Xn6268B6. Format fidelity = YES.
X0KL12	For the closest equivalent try Xn626806. Format fidelity = YES.
X0KL15	For the closest equivalent try Xn626886. Format fidelity = YES.
X0KL2A	For the closest equivalent try new cfont for T1L00KN1 and C0620800. Format fidelity YES.
X0KL2B	Use Expanded Core coded font Xn626806.
X0KL2C	Use Expanded Core coded font Xn626806.

X0KL5A For the closest equivalent try new cfont for T1L00KN1 and C0620880. Format fidelity YES.
X0KL5B For the closest equivalent try Xn626886. Format fidelity = YES.
X0KL5C For the closest equivalent try Xn626886. Format fidelity = YES.
X0KNJA Create new coded font for T1L00KN1 and C0620860.
X0KNJB Use Expanded Core coded font Xn626866.
X0KNJC Use Expanded Core coded font Xn626866.
X0KN0A Create new coded font for T1L00KN1 and C06208B0.
X0KN0B Use Expanded Core coded font Xn6268B6.
X0KN0C Use Expanded Core coded font Xn6268B6.
X0KN1 Create new coded font for T1L00KN1 and C06208B0.
X0KN10 Use Expanded Core coded font Xn6268B6.
X0KN12 Use Expanded Core coded font Xn626806.
X0KN15 Use Expanded Core coded font Xn626886.
X0KN2A Create new coded font for T1L00KN1 and C0620800.
X0KN2B Use Expanded Core coded font Xn626806.
X0KN2C Use Expanded Core coded font Xn626806.
X0KN20 Use Expanded Core coded font Xn626866.
X0KN5A Create new coded font for T1L00KN1 and C0620880.
X0KN5B Use Expanded Core coded font Xn626886.
X0KN5C Use Expanded Core coded font Xn626886.
X0K290 Use Expanded Core coded font Xn6268B6.
X0LBEJ Use Expanded Core coded font Xn541003.
X0LBEK Use Expanded Core coded font Xn541004.
X0LBEL Use Expanded Core coded font Xn541008.
X0LBEM Use Expanded Core coded font Xn541009.
X0LBE0 Use Expanded Core coded font Xn54100D.
X0LBE1 Use Expanded Core coded font Xn541001.
X0LBE2 Use Expanded Core coded font Xn541002.
X0LBE3 Use Expanded Core coded font Xn541005.
X0LBE4 Use Expanded Core coded font Xn541006.
X0LBE5 Use Expanded Core coded font Xn541007.
X0LBE6 Use Expanded Core coded font Xn541000.
X0LBE7 Use Expanded Core coded font Xn54100A.
X0LBE8 Use Expanded Core coded font Xn54100B.
X0LBE9 Use Expanded Core coded font Xn54100C.
X0LB12 Create new coded font for T1001002 and C0540000.
X0LB2A Use Expanded Core coded font Xn541002.
X0LB2B Use Expanded Core coded font Xn541003.
X0LB2D Use Expanded Core coded font Xn541005.
X0LB2E Use Expanded Core coded font Xn541006.
X0LB2F Use Expanded Core coded font Xn54100B.
X0LB2I Use Expanded Core coded font Xn541007.
X0LB2N Use Expanded Core coded font Xn541009.
X0LB2S Use Expanded Core coded font Xn541000.
X0LB2U Use Expanded Core coded font Xn54100A.
X0LB2Z Use Expanded Core coded font Xn544003.
X0LREJ Use Expanded Core coded font Xn521003.
X0LREK Use Expanded Core coded font Xn521004.
X0LREL Use Expanded Core coded font Xn521008.
X0LREM Use Expanded Core coded font Xn521009.
X0LRE0 Use Expanded Core coded font Xn52100D.
X0LRE1 Use Expanded Core coded font Xn521001.
X0LRE2 Use Expanded Core coded font Xn521002.
X0LRE3 Use Expanded Core coded font Xn521005.
X0LRE4 Use Expanded Core coded font Xn521006.
X0LRE5 Use Expanded Core coded font Xn521007.
X0LRE6 Use Expanded Core coded font Xn521000.
X0LRE7 Use Expanded Core coded font Xn52100A.
X0LRE8 Use Expanded Core coded font Xn52100B.
X0LRE9 Use Expanded Core coded font Xn52100C.

X0LR12	Create new coded font for T1001002 and C0520000.
X0LR2A	Use Expanded Core coded font Xn521002.
X0LR2B	Use Expanded Core coded font Xn521003.
X0LR2D	Use Expanded Core coded font Xn521005.
X0LR2E	Use Expanded Core coded font Xn521006.
X0LR2F	Use Expanded Core coded font Xn52100B.
X0LR2I	Use Expanded Core coded font Xn521007.
X0LR2N	Use Expanded Core coded font Xn521009.
X0LR2S	Use Expanded Core coded font Xn521000.
X0LR2U	Use Expanded Core coded font Xn52100A.
X0LR2Z	Use Expanded Core coded font Xn524003.
X0OAA	Create new coded font for T1L0OCR1 and C0920AB0.
X0OAB	Create new coded font for T1L0OCRB and C0920BB0.
X0OB0Z	For the closest equivalent try Xn5440B3. Format fidelity = YES.
X0OB10	For the closest equivalent try new cfont for T1001002 and C05400B0. Format fidelity YES.
X0ODA	Create new coded font for T1L0OCR3 and C0920AB0.
X0ONA	Create new coded font for T1L0OCR2 and C0920AB0.
X0ONB	Create new coded font for T1L0OCRB and C0920BB0.
X0OR0Z	For the closest equivalent try Xn5240B3. Format fidelity = YES.
X0OR10	For the closest equivalent try new cfont for T1001002 and C05200B0. Format fidelity YES.
X0PBEJ	Use Expanded Core coded font Xn741003.
X0PBEK	Use Expanded Core coded font Xn741004.
X0PBEL	Use Expanded Core coded font Xn741008.
X0PBEM	Use Expanded Core coded font Xn741009.
X0PBE0	Use Expanded Core coded font Xn74100D.
X0PBE1	Use Expanded Core coded font Xn741001.
X0PBE2	Use Expanded Core coded font Xn741002.
X0PBE3	Use Expanded Core coded font Xn741005.
X0PBE4	Use Expanded Core coded font Xn741006.
X0PBE5	Use Expanded Core coded font Xn741007.
X0PBE6	Use Expanded Core coded font Xn741000.
X0PBE7	Use Expanded Core coded font Xn74100A.
X0PBE8	Use Expanded Core coded font Xn74100B.
X0PBE9	Use Expanded Core coded font Xn74100C.
X0PB12	Create new coded font for T1001002 and C0740000.
X0PB2A	Use Expanded Core coded font Xn741002.
X0PB2B	Use Expanded Core coded font Xn741003.
X0PB2D	Use Expanded Core coded font Xn741005.
X0PB2E	Use Expanded Core coded font Xn741006.
X0PB2F	Use Expanded Core coded font Xn74100B.
X0PB2I	Use Expanded Core coded font Xn741007.
X0PB2N	Use Expanded Core coded font Xn741009.
X0PB2S	Use Expanded Core coded font Xn741000.
X0PB2U	Use Expanded Core coded font Xn74100A.
X0PB2Z	Use Expanded Core coded font Xn744003.
X0PCAN	Create new coded font for T1L0PCAN and C06200B0.
X0PCHN	Use Expanded Core coded font Xn6210B0.
X0PIEJ	Use Expanded Core coded font Xn731003.
X0PIEK	Use Expanded Core coded font Xn731004.
X0PIEL	Use Expanded Core coded font Xn731008.
X0PIEM	Use Expanded Core coded font Xn731009.
X0PIE0	Use Expanded Core coded font Xn73100D.
X0PIE1	Use Expanded Core coded font Xn731001.
X0PIE2	Use Expanded Core coded font Xn731002.
X0PIE3	Use Expanded Core coded font Xn731005.
X0PIE4	Use Expanded Core coded font Xn731006.
X0PIE5	Use Expanded Core coded font Xn731007.
X0PIE6	Use Expanded Core coded font Xn731000.
X0PIE7	Use Expanded Core coded font Xn73100A.

X0PIE8	Use Expanded Core coded font Xn73100B.
X0PIE9	Use Expanded Core coded font Xn73100C.
X0PI12	Create new coded font for T1001002 and C0730000.
X0PI2A	Use Expanded Core coded font Xn731002.
X0PI2B	Use Expanded Core coded font Xn731003.
X0PI2D	Use Expanded Core coded font Xn731005.
X0PI2E	Use Expanded Core coded font Xn731006.
X0PI2F	Use Expanded Core coded font Xn73100B.
X0PI2I	Use Expanded Core coded font Xn731007.
X0PI2N	Use Expanded Core coded font Xn731009.
X0PI2S	Use Expanded Core coded font Xn731000.
X0PI2U	Use Expanded Core coded font Xn73100A.
X0PI2Z	Use Expanded Core coded font Xn734003.
X0PN	Use Expanded Core coded font Xn6210B1.
X0PREJ	Use Expanded Core coded font Xn721003.
X0PREK	Use Expanded Core coded font Xn721004.
X0PREL	Use Expanded Core coded font Xn721008.
X0PREM	Use Expanded Core coded font Xn721009.
X0PRE0	Use Expanded Core coded font Xn72100D.
X0PRE1	Use Expanded Core coded font Xn721001.
X0PRE2	Use Expanded Core coded font Xn721002.
X0PRE3	Use Expanded Core coded font Xn721005.
X0PRE4	Use Expanded Core coded font Xn721006.
X0PRE5	Use Expanded Core coded font Xn721007.
X0PRE6	Use Expanded Core coded font Xn721000.
X0PRE7	Use Expanded Core coded font Xn72100A.
X0PRE8	Use Expanded Core coded font Xn72100B.
X0PRE9	Use Expanded Core coded font Xn72100C.
X0PR0A	Use Expanded Core coded font Xn7210B2.
X0PR0B	Use Expanded Core coded font Xn7210B3.
X0PR0D	Use Expanded Core coded font Xn7210B5.
X0PR0E	Use Expanded Core coded font Xn7210B6.
X0PR0F	Use Expanded Core coded font Xn7210BB.
X0PR0I	Use Expanded Core coded font Xn7210B7.
X0PR0J	Use Expanded Core coded font Xn7210B3.
X0PR0K	Use Expanded Core coded font Xn7210B4.
X0PR0L	Use Expanded Core coded font Xn7210B8.
X0PR0M	Use Expanded Core coded font Xn7210B9.
X0PR0N	Use Expanded Core coded font Xn7210B9.
X0PR0S	Use Expanded Core coded font Xn7210B0.
X0PR0U	Use Expanded Core coded font Xn7210BA.
X0PR0Z	Use Expanded Core coded font Xn7240B3.
X0PR00	Use Expanded Core coded font Xn7210BD.
X0PR01	Use Expanded Core coded font Xn7210B1.
X0PR02	Use Expanded Core coded font Xn7210B2.
X0PR03	Use Expanded Core coded font Xn7210B5.
X0PR04	Use Expanded Core coded font Xn7210B6.
X0PR05	Use Expanded Core coded font Xn7210B7.
X0PR06	Use Expanded Core coded font Xn7210B0.
X0PR07	Use Expanded Core coded font Xn7210BA.
X0PR08	Use Expanded Core coded font Xn7210BB.
X0PR09	Use Expanded Core coded font Xn7210BC.
X0PR10	Create new coded font for T1001002 and C07200B0.
X0PR12	Create new coded font for T1001002 and C0720000.
X0PR2A	Use Expanded Core coded font Xn721002.
X0PR2B	Use Expanded Core coded font Xn721003.
X0PR2D	Use Expanded Core coded font Xn721005.
X0PR2E	Use Expanded Core coded font Xn721006.
X0PR2F	Use Expanded Core coded font Xn72100B.
X0PR2I	Use Expanded Core coded font Xn721007.
X0PR2N	Use Expanded Core coded font Xn721009.

X0PR2S	Use Expanded Core coded font Xn721000.
X0PR2U	Use Expanded Core coded font Xn72100A.
X0PR2Z	Use Expanded Core coded font Xn724003.
X0P11	Use Expanded Core coded font Xn6210B1.
X0QN	Use Expanded Core coded font Xn6210B1.
X0QNC	Use Expanded Core coded font Xn6210B1.
X0RN	Create new coded font for T1L000RN and C06200B0.
X0RT0A	For the closest equivalent try Xn7210B2. Format fidelity = YES.
X0RT0B	For the closest equivalent try Xn7210B3. Format fidelity = YES.
X0RT0D	For the closest equivalent try Xn7210B5. Format fidelity = YES.
X0RT0E	For the closest equivalent try Xn7210B6. Format fidelity = YES.
X0RT0F	For the closest equivalent try Xn7210BB. Format fidelity = YES.
X0RT0I	For the closest equivalent try Xn7210B7. Format fidelity = YES.
X0RT0J	For the closest equivalent try Xn7210B3. Format fidelity = YES.
X0RT0K	For the closest equivalent try Xn7210B4. Format fidelity = YES.
X0RT0L	For the closest equivalent try Xn7210B8. Format fidelity = YES.
X0RT0M	For the closest equivalent try Xn7210B9. Format fidelity = YES.
X0RT0N	For the closest equivalent try Xn7210B9. Format fidelity = YES.
X0RT0S	For the closest equivalent try Xn7210B0. Format fidelity = YES.
X0RT0U	For the closest equivalent try Xn7210BA. Format fidelity = YES.
X0RT0Z	For the closest equivalent try Xn7240B3. Format fidelity = YES.
X0RT00	For the closest equivalent try Xn7210BD. Format fidelity = YES.
X0RT01	For the closest equivalent try Xn7210B1. Format fidelity = YES.
X0RT02	For the closest equivalent try Xn7210B2. Format fidelity = YES.
X0RT03	For the closest equivalent try Xn7210B5. Format fidelity = YES.
X0RT04	For the closest equivalent try Xn7210B6. Format fidelity = YES.
X0RT05	For the closest equivalent try Xn7210B7. Format fidelity = YES.
X0RT06	For the closest equivalent try Xn7210B0. Format fidelity = YES.
X0RT07	For the closest equivalent try Xn7210BA. Format fidelity = YES.
X0RT08	For the closest equivalent try Xn7210BB. Format fidelity = YES.
X0RT09	For the closest equivalent try Xn7210BC. Format fidelity = YES.
X0RT10	For the closest equivalent try new cfont for T1001002 and C07200B0. Format fidelity YES.
X0SBEJ	For the closest equivalent try Xn741003. Format fidelity = YES.
X0SBEK	For the closest equivalent try Xn741004. Format fidelity = YES.
X0SBEL	For the closest equivalent try Xn741008. Format fidelity = YES.
X0SBEM	For the closest equivalent try Xn741009. Format fidelity = YES.
X0SBE0	For the closest equivalent try Xn74100D. Format fidelity = YES.
X0SBE1	For the closest equivalent try Xn741001. Format fidelity = YES.
X0SBE2	For the closest equivalent try Xn741002. Format fidelity = YES.
X0SBE3	For the closest equivalent try Xn741005. Format fidelity = YES.
X0SBE4	For the closest equivalent try Xn741006. Format fidelity = YES.
X0SBE5	For the closest equivalent try Xn741007. Format fidelity = YES.
X0SBE6	For the closest equivalent try Xn741000. Format fidelity = YES.
X0SBE7	For the closest equivalent try Xn74100A. Format fidelity = YES.
X0SBE8	For the closest equivalent try Xn74100B. Format fidelity = YES.
X0SBE9	For the closest equivalent try Xn74100C. Format fidelity = YES.
X0SB12	For the closest equivalent try new cfont for T1001002 and C0740090. Format fidelity YES.
X0SB2A	For the closest equivalent try Xn741002. Format fidelity = YES.
X0SB2B	For the closest equivalent try Xn741003. Format fidelity = YES.
X0SB2D	For the closest equivalent try Xn741005. Format fidelity = YES.
X0SB2E	For the closest equivalent try Xn741006. Format fidelity = YES.
X0SB2F	For the closest equivalent try Xn74100B. Format fidelity = YES.
X0SB2I	For the closest equivalent try Xn741007. Format fidelity = YES.
X0SB2N	For the closest equivalent try Xn741009. Format fidelity = YES.
X0SB2S	For the closest equivalent try Xn741000. Format fidelity = YES.
X0SB2U	For the closest equivalent try Xn74100A. Format fidelity = YES.
X0SB2Z	For the closest equivalent try Xn744003. Format fidelity = YES.
X0SIEJ	For the closest equivalent try Xn731003. Format fidelity = YES.
X0SIEK	For the closest equivalent try Xn731004. Format fidelity = YES.

X0SIEL For the closest equivalent try Xn731008. Format fidelity = YES.

X0SIEM For the closest equivalent try Xn731009. Format fidelity = YES.

X0SIE0 For the closest equivalent try Xn73100D. Format fidelity = YES.

X0SIE1 For the closest equivalent try Xn731001. Format fidelity = YES.

X0SIE2 For the closest equivalent try Xn731002. Format fidelity = YES.

X0SIE3 For the closest equivalent try Xn731005. Format fidelity = YES.

X0SIE4 For the closest equivalent try Xn731006. Format fidelity = YES.

X0SIE5 For the closest equivalent try Xn731007. Format fidelity = YES.

X0SIE6 For the closest equivalent try Xn731000. Format fidelity = YES.

X0SIE7 For the closest equivalent try Xn73100A. Format fidelity = YES.

X0SIE8 For the closest equivalent try Xn73100B. Format fidelity = YES.

X0SIE9 For the closest equivalent try Xn73100C. Format fidelity = YES.

X0SI0A For the closest equivalent try Xn7310B2. Format fidelity = YES.

X0SI0B For the closest equivalent try Xn7310B3. Format fidelity = YES.

X0SI0D For the closest equivalent try Xn7310B5. Format fidelity = YES.

X0SI0E For the closest equivalent try Xn7310B6. Format fidelity = YES.

X0SI0F For the closest equivalent try Xn7310BB. Format fidelity = YES.

X0SI0I For the closest equivalent try Xn7310B7. Format fidelity = YES.

X0SI0J For the closest equivalent try Xn7310B3. Format fidelity = YES.

X0SI0K For the closest equivalent try Xn7310B4. Format fidelity = YES.

X0SI0L For the closest equivalent try Xn7310B8. Format fidelity = YES.

X0SI0M For the closest equivalent try Xn7310B9. Format fidelity = YES.

X0SI0N For the closest equivalent try Xn7310B9. Format fidelity = YES.

X0SI0S For the closest equivalent try Xn7310B0. Format fidelity = YES.

X0SI0U For the closest equivalent try Xn7310BA. Format fidelity = YES.

X0SI0Z For the closest equivalent try Xn7340B3. Format fidelity = YES.

X0SI00 For the closest equivalent try Xn7310BD. Format fidelity = YES.

X0SI01 For the closest equivalent try Xn7310B1. Format fidelity = YES.

X0SI02 For the closest equivalent try Xn7310B2. Format fidelity = YES.

X0SI03 For the closest equivalent try Xn7310B5. Format fidelity = YES.

X0SI04 For the closest equivalent try Xn7310B6. Format fidelity = YES.

X0SI05 For the closest equivalent try Xn7310B7. Format fidelity = YES.

X0SI06 For the closest equivalent try Xn7310B0. Format fidelity = YES.

X0SI07 For the closest equivalent try Xn7310BA. Format fidelity = YES.

X0SI08 For the closest equivalent try Xn7310BB. Format fidelity = YES.

X0SI09 For the closest equivalent try Xn7310BC. Format fidelity = YES.

X0SI10 For the closest equivalent try new cfont for T1001002 and C07300B0. Format fidelity YES.

X0SI12 For the closest equivalent try new cfont for T1001002 and C0730000. Format fidelity YES.

X0SI2A For the closest equivalent try Xn731002. Format fidelity = YES.

X0SI2B For the closest equivalent try Xn731003. Format fidelity = YES.

X0SI2D For the closest equivalent try Xn731005. Format fidelity = YES.

X0SI2E For the closest equivalent try Xn731006. Format fidelity = YES.

X0SI2F For the closest equivalent try Xn73100B. Format fidelity = YES.

X0SI2I For the closest equivalent try Xn731007. Format fidelity = YES.

X0SI2N For the closest equivalent try Xn731009. Format fidelity = YES.

X0SI2S For the closest equivalent try Xn731000. Format fidelity = YES.

X0SI2U For the closest equivalent try Xn73100A. Format fidelity = YES.

X0SI2Z For the closest equivalent try Xn734003. Format fidelity = YES.

X0SN For the closest equivalent try new cfont for T1L000SN and C04200B0. Format fidelity YES.

X0SOEJ No comparable character set.

X0SOEK No comparable character set.

X0SOEL No comparable character set.

X0SOEM No comparable character set.

X0SOE0 No comparable character set.

X0SOE1 No comparable character set.

X0SOE2 No comparable character set.

X0SOE3 No comparable character set.

X0SOE4 No comparable character set.

X0SOE5 No comparable character set.
X0SOE6 No comparable character set.
X0SOE7 No comparable character set.
X0SOE8 No comparable character set.
X0SOE9 No comparable character set.
X0SO12 No comparable character set.
X0SO2A No comparable character set.
X0SO2B No comparable character set.
X0SO2D No comparable character set.
X0SO2E No comparable character set.
X0SO2F No comparable character set.
X0SO2I No comparable character set.
X0SO2N No comparable character set.
X0SO2S No comparable character set.
X0SO2U No comparable character set.
X0SO2Z No comparable character set.
X0SR12 No comparable character set.
X0SR2Z No comparable character set.
X0STEJ For the closest equivalent try Xn721003. Format fidelity = YES.
X0STEK For the closest equivalent try Xn721004. Format fidelity = YES.
X0STEL For the closest equivalent try Xn721008. Format fidelity = YES.
X0STEM For the closest equivalent try Xn721009. Format fidelity = YES.
X0STE0 For the closest equivalent try Xn72100D. Format fidelity = YES.
X0STE1 For the closest equivalent try Xn721001. Format fidelity = YES.
X0STE2 For the closest equivalent try Xn721002. Format fidelity = YES.
X0STE3 For the closest equivalent try Xn721005. Format fidelity = YES.
X0STE4 For the closest equivalent try Xn721006. Format fidelity = YES.
X0STE5 For the closest equivalent try Xn721007. Format fidelity = YES.
X0STE6 For the closest equivalent try Xn721000. Format fidelity = YES.
X0STE7 For the closest equivalent try Xn72100A. Format fidelity = YES.
X0STE8 For the closest equivalent try Xn72100B. Format fidelity = YES.
X0STE9 For the closest equivalent try Xn72100C. Format fidelity = YES.
X0ST0A For the closest equivalent try Xn7210B2. Format fidelity = YES.
X0ST0B For the closest equivalent try Xn7210B3. Format fidelity = YES.
X0ST0D For the closest equivalent try Xn7210B5. Format fidelity = YES.
X0ST0E For the closest equivalent try Xn7210B6. Format fidelity = YES.
X0ST0F For the closest equivalent try Xn7210BB. Format fidelity = YES.
X0ST0I For the closest equivalent try Xn7210B7. Format fidelity = YES.
X0ST0J For the closest equivalent try Xn7210B3. Format fidelity = YES.
X0ST0K For the closest equivalent try X07210B4. Format fidelity = YES.
X0ST0L For the closest equivalent try Xn7210B8. Format fidelity = YES.
X0ST0M For the closest equivalent try Xn7210B9. Format fidelity = YES.
X0ST0N For the closest equivalent try Xn7210B9. Format fidelity = YES.
X0ST0S For the closest equivalent try Xn7210B0. Format fidelity = YES.
X0ST0U For the closest equivalent try Xn7210BA. Format fidelity = YES.
X0ST0Z For the closest equivalent try Xn7240B3. Format fidelity = YES.
X0ST00 For the closest equivalent try Xn7210BD. Format fidelity = YES.
X0ST01 For the closest equivalent try Xn7210B1. Format fidelity = YES.
X0ST02 For the closest equivalent try Xn7210B2. Format fidelity = YES.
X0ST03 For the closest equivalent try Xn7210B5. Format fidelity = YES.
X0ST04 For the closest equivalent try Xn7210B6. Format fidelity = YES.
X0ST05 For the closest equivalent try Xn7210B7. Format fidelity = YES.
X0ST06 For the closest equivalent try Xn7210B0. Format fidelity = YES.
X0ST07 For the closest equivalent try Xn7210BA. Format fidelity = YES.
X0ST08 For the closest equivalent try Xn7210BB. Format fidelity = YES.
X0ST09 For the closest equivalent try Xn7210BC. Format fidelity = YES.
X0ST10 For the closest equivalent try new cfont for T1001002 and C07200B0. Format fidelity YES.
X0ST12 For the closest equivalent try new cfont for T1001002 and C0720000. Format fidelity YES.

X0ST15 For the closest equivalent try new cfont for T1001002 and C0720090. Format fidelity YES.
X0ST2A For the closest equivalent try Xn721002. Format fidelity = YES.
X0ST2B For the closest equivalent try Xn721003. Format fidelity = YES.
X0ST2D For the closest equivalent try Xn721005. Format fidelity = YES.
X0ST2E For the closest equivalent try Xn721006. Format fidelity = YES.
X0ST2F For the closest equivalent try Xn72100B. Format fidelity = YES.
X0ST2I For the closest equivalent try Xn721007. Format fidelity = YES.
X0ST2N For the closest equivalent try Xn721009. Format fidelity = YES.
X0ST2S For the closest equivalent try Xn721000. Format fidelity = YES.
X0ST2U For the closest equivalent try Xn72100A. Format fidelity = YES.
X0ST2Z For the closest equivalent try Xn724003. Format fidelity = YES.
X0ST5A For the closest equivalent try Xn721082. Format fidelity = YES.
X0ST5B For the closest equivalent try Xn721083. Format fidelity = YES.
X0ST5D For the closest equivalent try Xn721085. Format fidelity = YES.
X0ST5E For the closest equivalent try Xn721086. Format fidelity = YES.
X0ST5F For the closest equivalent try Xn72108B. Format fidelity = YES.
X0ST5I For the closest equivalent try Xn721087. Format fidelity = YES.
X0ST5J For the closest equivalent try Xn721083. Format fidelity = YES.
X0ST5K For the closest equivalent try Xn721084. Format fidelity = YES.
X0ST5L For the closest equivalent try Xn721088. Format fidelity = YES.
X0ST5M For the closest equivalent try Xn721089. Format fidelity = YES.
X0ST5N For the closest equivalent try Xn721089. Format fidelity = YES.
X0ST5S For the closest equivalent try Xn721080. Format fidelity = YES.
X0ST5U For the closest equivalent try Xn72108A. Format fidelity = YES.
X0ST5Z For the closest equivalent try Xn724083. Format fidelity = YES.
X0ST50 For the closest equivalent try Xn72108D. Format fidelity = YES.
X0ST51 For the closest equivalent try Xn721081. Format fidelity = YES.
X0ST52 For the closest equivalent try Xn721082. Format fidelity = YES.
X0ST53 For the closest equivalent try Xn721085. Format fidelity = YES.
X0ST54 For the closest equivalent try Xn721086. Format fidelity = YES.
X0ST55 For the closest equivalent try Xn721087. Format fidelity = YES.
X0ST56 For the closest equivalent try Xn721080. Format fidelity = YES.
X0ST57 For the closest equivalent try Xn72108A. Format fidelity = YES.
X0ST58 For the closest equivalent try Xn72108B. Format fidelity = YES.
X0ST59 For the closest equivalent try Xn72108C. Format fidelity = YES.
X0SYM0 For the closest equivalent try XnN271B1. Format fidelity = YES.
X0SYM2 For the closest equivalent try XnN27101. Format fidelity = YES.
X0S192 For the closest equivalent try new cfont for T1S0S192 and C0420100. Format fidelity YES.
X0S193 For the closest equivalent try new cfont for T1S0S193 and C0420100. Format fidelity YES.
X0S198 For the closest equivalent try new cfont for T1S0S198 and C04201B0. Format fidelity YES.
X0TN For the closest equivalent try new cfont for T1L038TE and C04200B0. Format fidelity YES.
X0TU10 No comparable character set.
X0T11 For the closest equivalent try new cfont for T1L038TE and C04200B0. Format fidelity YES.
X0XN Use Expanded Core coded font Xn6210B1.
X0YN Use Expanded Core coded font Xn6210B1.
X01AOA Create new coded font for T1L0OCR1 and C0920AB0.
X01AOD Create new coded font for T1L0OCR1 and C0920AB0.
X01AON Create new coded font for T1L0OCR2 and C0920AB0.
X01ODA Create new coded font for T1L0OCR3 and C0920AB0.
X02773 Use Expanded Core coded font Xn6268B6.
X02774 Use Expanded Core coded font Xn6268B6.
X02051HF No comparable character set.
X02051HG No comparable character set.
X02051HH No comparable character set.
X02051HJ No comparable character set.

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X02051HK No comparable character set.
X02051KF No comparable character set.
X02051KG No comparable character set.
X02051KH No comparable character set.
X02051KJ No comparable character set.
X02051KK No comparable character set.
X02051RF No comparable character set.
X02051RG No comparable character set.
X02051RH No comparable character set.
X02051RJ No comparable character set.
X02051RK No comparable character set.
X02054QF No comparable character set.
X02054QG No comparable character set.
X02054QH No comparable character set.
X02054QJ No comparable character set.
X02054QK No comparable character set.
X02055DF No comparable character set.
X02055DG No comparable character set.
X02055DH No comparable character set.
X02055DJ No comparable character set.
X02055DK No comparable character set.
X02055EF No comparable character set.
X02055EG No comparable character set.
X02055EH No comparable character set.
X02055EJ No comparable character set.
X02055EK No comparable character set.
X02055FF No comparable character set.
X02055FG No comparable character set.
X02055FH No comparable character set.
X02055FJ No comparable character set.
X02055FK No comparable character set.
X02055GF No comparable character set.
X02055GG No comparable character set.
X02055GH No comparable character set.
X02055GJ No comparable character set.
X02055GK No comparable character set.
X02055HF No comparable character set.
X02055HG No comparable character set.
X02055HH No comparable character set.
X02055HJ No comparable character set.
X02055HK No comparable character set.
X02055JF No comparable character set.
X02055JG No comparable character set.
X02055JH No comparable character set.
X02055JJ No comparable character set.
X02055JK No comparable character set.
X02055PF No comparable character set.
X02055PG No comparable character set.
X02055PH No comparable character set.
X02055PJ No comparable character set.
X02055PK No comparable character set.
X02055SF No comparable character set.
X02055SG No comparable character set.
X02055SH No comparable character set.
X02055SJ No comparable character set.
X02055SK No comparable character set.
X02056NF No comparable character set.
X02056NG No comparable character set.
X02056NH No comparable character set.
X02056NJ No comparable character set.
X02056NK No comparable character set.
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X02057SF No comparable character set.
X02057SG No comparable character set.
X02057SH No comparable character set.
X02057SJ No comparable character set.
X02057SK No comparable character set.
X02058MF No comparable character set.
X02058MG No comparable character set.
X02058MH No comparable character set.
X02058MJ No comparable character set.
X02058MK No comparable character set.
X02059AF No comparable character set.
X02059AG No comparable character set.
X02059AH No comparable character set.
X02059AJ No comparable character set.
X02059AK No comparable character set.
X02059BF No comparable character set.
X02059BG No comparable character set.
X02059BH No comparable character set.
X02059BJ No comparable character set.
X02059BK No comparable character set.
X02059CF No comparable character set.
X02059CG No comparable character set.
X02059CH No comparable character set.
X02059CJ No comparable character set.
X02059CK No comparable character set.
X02059GF No comparable character set.
X02059GG No comparable character set.
X02059GH No comparable character set.
X02059GJ No comparable character set.
X02059GK No comparable character set.
X02059LF No comparable character set.
X02059LG No comparable character set.
X02059LH No comparable character set.
X02059LJ No comparable character set.
X02059LK No comparable character set.
X02071HF No comparable character set.
X02071HG No comparable character set.
X02071HH No comparable character set.
X02071HJ No comparable character set.
X02071HK No comparable character set.
X02071KF No comparable character set.
X02071KG No comparable character set.
X02071KH No comparable character set.
X02071KJ No comparable character set.
X02071KK No comparable character set.
X02074QF No comparable character set.
X02074QG No comparable character set.
X02074QH No comparable character set.
X02074QJ No comparable character set.
X02074QK No comparable character set.
X02075DF No comparable character set.
X02075DG No comparable character set.
X02075DH No comparable character set.
X02075DJ No comparable character set.
X02075DK No comparable character set.
X02075EF No comparable character set.
X02075EG No comparable character set.
X02075EH No comparable character set.
X02075EJ No comparable character set.
X02075EK No comparable character set.
X02075GF No comparable character set.

X02075GG No comparable character set.
X02075GH No comparable character set.
X02075GJ No comparable character set.
X02075GK No comparable character set.
X02075HF No comparable character set.
X02075HG No comparable character set.
X02075HH No comparable character set.
X02075HJ No comparable character set.
X02075HK No comparable character set.
X02075JF No comparable character set.
X02075JG No comparable character set.
X02075JH No comparable character set.
X02075JJ No comparable character set.
X02075JK No comparable character set.
X02075PF No comparable character set.
X02075PG No comparable character set.
X02075PH No comparable character set.
X02075PJ No comparable character set.
X02075PK No comparable character set.
X02075SF No comparable character set.
X02075SG No comparable character set.
X02075SH No comparable character set.
X02075SJ No comparable character set.
X02075SK No comparable character set.
X02077SF No comparable character set.
X02077SG No comparable character set.
X02077SH No comparable character set.
X02077SJ No comparable character set.
X02077SK No comparable character set.
X02078MF No comparable character set.
X02078MG No comparable character set.
X02078MH No comparable character set.
X02078MJ No comparable character set.
X02078MK No comparable character set.
X02079AF No comparable character set.
X02079AG No comparable character set.
X02079AH No comparable character set.
X02079AJ No comparable character set.
X02079AK No comparable character set.
X02079BF No comparable character set.
X02079BG No comparable character set.
X02079BH No comparable character set.
X02079BJ No comparable character set.
X02079BK No comparable character set.
X02079GF No comparable character set.
X02079GG No comparable character set.
X02079GH No comparable character set.
X02079GJ No comparable character set.
X02079GK No comparable character set.
X02079LF No comparable character set.
X02079LG No comparable character set.
X02079LH No comparable character set.
X02079LJ No comparable character set.
X02079LK No comparable character set.

Compatibility Font Character Set Migration Table (Raster to Outline)

This table can be used as a starting point when mapping Compatibility font characters sets to outlines. It was created under the premise that the most important consideration was to preserve the typeface "look", at the expense of loss of weight contrast (medium to bold). There are no rules here, and you may chose to map with a preference to maintain weight contrast over typeface appearance or for some other consideration.

The typeface names in CAPS were taken from the typeface name field in the FND. Descriptive text such as Bold, Italic, and 10-pitch was added for clarity. The Codes identified below indicate what can be expected as a result of the mapping.

Code:

1 - Family, typestyle, and setwidth match. Format fidelity can be expected. Character weight and shape differences may be present, but minimal.
2 - Suitable outlines are not available to satisfy the weight, size, and style requirements. Another type family will be substituted. Format fidelity will be maintained, however expect character shape and weight differences.
3 - Same as #2, except format fidelity cannot be maintained.
4 - No equivalent outlines exist and no reasonable substitution is possible. Examples are: tri-pitch, overstrike, format, underscored, and all Proprinter Emulation fonts.

Compat	Typeface	Code	O/L	Typeface	Width	VFS	PtSize
C0D0GB10	GOTHIC Bold 10-pitch	2	CZ4400	COURIER LATIN1 Bold	144	240	12
C0D0GB12	GOTHIC Bold 12-pitch	2	CZ4400	COURIER LATIN1 Bold	120	200	10
C0D0GC15	GOTHIC 15-pitch 7pt	1	CZ6200	GOTHIC TEXT LATIN1	96	160	8
C0D0GI12	GOTHIC Italic 12-pitch	2	CZ4300	COURIER LATIN1 Italic	120	200	10
C0D0GL10	GOTHIC Semilight 10-pitch	1	CZ6200	GOTHIC TEXT LATIN1	144	240	12
C0D0GL12	GOTHIC Semilight 12-pitch	1	CZ6200	GOTHIC TEXT LATIN1	120	200	10
C0D0GL15	GOTHIC Semilight 15-pitch	1	CZ6200	GOTHIC TEXT LATIN1	96	160	8
C0D0GP12	GOTHIC PROPORTIONAL 9pt	3	CZH200	HELVETICA LATIN1	...	...	..
C0D0GR10	GOTHIC REVERSE 10-pitch	1	CZB600	BOOKMASTER LATIN1 Reverse	144	240	12
C0D0GT10	GOTHIC 10-pitch	1	CZ6200	GOTHIC TEXT LATIN1	144	240	12
C0D0GT12	GOTHIC 12-pitch	1	CZ6200	GOTHIC TEXT LATIN1	120	200	20
C0D0GT13	GOTHIC13 13-pitch	1	CZ6200	GOTHIC TEXT LATIN1	108	180	9
C0D0GT15	GOTHIC 15-pitch 8pt	1	CZ6200	GOTHIC TEXT LATIN1	96	160	8

C0D0GT18	GOTHIC 18-pitch	1	CZ6200 GOTHIC TEXT LATIN1	78	130	6.5
C0D0GT20	GOTHIC 20-pitch	1	CZ6200 GOTHIC TEXT LATIN1	72	120	6
C0D0GT24	GOTHIC 27-pitch	1	CZ6200 GOTHIC TEXT LATIN1	54	90	4.5
C0D0RT10	ROMAN 10-pitch	2	CZ7200 PRESTIGE LATIN1	144	240	12
C0D0SB12	SERIF 12-pitch	2	CZ7400 PRESTIGE LATIN1 Bold	120	200	10
C0D0SI10	SERIF Italic 10-pitch	2	CZ7300 PRESTIGE LATIN1 Italic	144	240	12
C0D0SI12	SERIF Italic 12-pitch	2	CZ7300 PRESTIGE LATIN1 Italic	120	200	10
C0D0SO12	SERIF Overstrike 12-pitch	4	......	...	...	
C0D0ST10	SERIF 10-pitch	2	CZ7200 PRESTIGE LATIN1	144	240	12
C0D0ST12	SERIF 12-pitch	2	CZ7200 PRESTIGE LATIN1	120	200	10
C0D0ST15	SERIF 15-pitch	2	CZ7200 PRESTIGE LATIN1	96	160	8
C0L0DUMP	DUMP Underscored 15-pitch	4	......	...	...	..
C0L0FM10	FORMAT 10-pitch	4	......	...	...	..
C0L0FM12	FORMAT 12-pitch	4	......	...	...	..
C0L0FM15	FORMAT 15-pitch	4	......	...	...	..
C0L0GU10	GOTHIC UPPERCASE Underscore 10	4	......	...	...	..
C0L0GU12	GOTHIC UPPERCASE Underscore 12	4	......	...	...	..
C0L0GU15	GOTHIC UPPERCASE Underscore 15	4	......	...	...	..
C0L0KATA	KATAKANA 10-pitch	1	CZ6208 GOTHIC KATAKANA	144	240	12
C0L0KL10	KATAKANA Semilight 10-pitch	2	CZ6208 GOTHIC KATAKANA	144	240	12
C0L0KL12	KATAKANA Semilight 12-pitch	2	CZ6208 GOTHIC KATAKANA	120	200	10
C0L0KL15	KATAKANA Semilight 15-pitch	2	CZ6208 GOTHIC KATAKANA	96	160	8
C0L0KN12	KATAKANA 12-pitch	1	CZ6208 GOTHIC KATAKANA	120	200	10
C0L0KN15	KATAKANA 15-pitch	1	CZ6208 GOTHIC KATAKANA	96	160	8
C0L0KN20	KATAKANA 20-pitch	1	CZ6208 GOTHIC KATAKANA	72	120	6
C0L0TU10	TEXT Underscored 10-pitch	4	......	...	...	..
C0L00AOA	OCRA AOA	1	CZ920A OCRA	144	240	12
C0L00AON	OCRA AON	1	CZ920A OCRA	144	240	12
C0L00BOA	OCRB BOA	1	CZ920B OCRB	144	240	12
C0L00BON	OCRB BON	1	CZ920B OCRB	144	240	12
C0L00GSC	GOTHIC UPPERCASE 15-pitch	1	CZ4200 COURIER LATIN1	96	160	8

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C0L00GUC GOTHIC UPPERCASE Underscored    4  ......                          ...   ...
  ..
C0L00OAB OCRB OAB                        1  CZ920B OCRB                     144   240
  12
C0L00T11 TEXT 10-pitch                   2  CZ4200 COURIER LATIN1           144   240
  12
C0L01AOA OCRA AOA1                       1  CZ920A OCRA                     144   240
  12
C0L01AON OCRA AON1                       1  CZ920A OCRA                     144   240
  12
C0S0AE10 APL 10-pitch                    1  CZ420P COURIER APL2             144   240
  12
C0S0AE20 APL 20-pitch                    1  CZ420P COURIER APL2              72   120
   6
C0S0BITR BOOK Italic                     3  CZN300 TNR LATIN1 Italic        120   200
  10
C0S0BRTR BOOK                            1  CZ8400 BOLDFACE LATIN1          120   200
  10
C0S0CB10 COURIER Bold 10-pitch           1  CZ4400 COURIER LATIN1 Bold      144   240
  12
C0S0CB12 COURIER Bold 12-pitch           1  CZ4400 COURIER LATIN1 Bold      120   200
  10
C0S0CB15 COURIER Bold 15-pitch           1  CZ4400 COURIER LATIN1 Bold       96   160
   8
C0S0CD15 COURIER Double-Wide 7.5-pitch   4  ......                          ...   ...
  ..
C0S0CE10 COURIER EXTENDED 10-pitch       1  CZ4200 COURIER LATIN1           144   240
  12
C0S0CE12 COURIER 12-pitch                1  CZ4200 COURIER LATIN1           120   200
  10
C0S0CH10 COURIER OVERSTRIKE 10-pitch     4  ......                          ...   ...
  ..
C0S0CI10 COURIER Italic 10-pitch         1  CZ4300 COURIER LATIN1 Italic    144   240
  12
C0S0CI12 COURIER Italic 12-pitch         1  CZ4300 COURIER LATIN1 Italic    120   200
  10
C0S0CI15 COURIER Italic 15-pitch         1  CZ4300 COURIER LATIN1 Italic     96   160
   8
C0S0CO10 COURIER Overstrike 10-pitch     4  ......                          ...   ...
  ..
C0S0CR10 COURIER 10-pitch                1  CZ4200 COURIER LATIN1           144   240
  12
C0S0CR12 COURIER12 12-pitch              1  CZ4200 COURIER LATIN1           120   200
  10
C0S0CR15 COURIER 15-pitch                1  CZ4200 COURIER LATIN1            96   160
   8
C0S0CW15 COURIER Dble-Wde Ital 7.5-pitch 4  ......                          ...   ...
  ..
C0S0DOTR BOOK                            2  CZ8400 BOLDFACE LATIN1          120   200
  10
C0S0EBTR ESSAY Bold                      3  CZH400 HELVETICA LATIN1 Bold    120   200
  10
C0S0EITR ESSAY Italic                    3  CZH300 HELVETICA LATIN1 Italic  120   200
  10
C0S0ELTR ESSAY Light                     3  CZH200 HELVETICA LATIN1         120   200
  10
C0S0EOTR ESSAY Overstrike                4  ......                          ...   ...
  ..
C0S0ESTR ESSAY                           3  CZH200 HELVETICA LATIN1         120   200
  10
```

```
C0S0LB12 LETTER GOTHIC Bold 12-pitch     1  CZ5400 LETTER GOTHIC LATIN1 Bold   120   200
  10
C0S0LR12 LETTER GOTHIC 12-pitch          1  CZ5200 LETTER GOTHIC LATIN1        120   200
  10
C0S0OB10 ORATOR Bold 10-pitch            1  CZ5400 LETTER GOTHIC LATIN1 Bold   144   240
  12
C0S0OR10 ORATOR 10-pitch                 1  CZ5200 LETTER GOTHIC LATIN1        144   240
  12
C0S0PB12 PRESTIGE Bold 12-pitch          1  CZ7400 PRESTIGE LATIN1 Bold        120   200
  10
C0S0PI12 PRESTIGE Italic 12-pitch        1  CZ7300 PRESTIGE LATIN1 Italic      120   200
  10
C0S0PR10 PRESTIGE 10-pitch               1  CZ7200 PRESTIGE LATIN1             144   240
  12
C0S0PR12 PRESTIGE 12-pitch               1  CZ7200 PRESTIGE LATIN1             120   200
  10
C0S0SR12 SCRIPT 12-pitch                 4  ......                             ...   ...
  ..
C0S0SYM0 SYMBOLS7 10pt                   3  CZN201 TIMES NEW ROMAN SYMBOLS      67   200
  10
C0S0SYM2 SYMBOLS7 12pt                   3  CZN201 TIMES NEW ROMAN SYMBOLS      80   240
  12
C0S0S192 SYMBOLS OS6 12-pitch            1  CZ4201 COURIER SYMBOLS             120   200
  10
C0S0S193 SYMBOLS 12-pitch                1  CZ4201 COURIER SYMBOLS             120   200
  10
C0S0S198 SYMBOLS 10-pitch                1  CZ4201 COURIER SYMBOLS             144   240
  12
C020nnnn PROPTR EMUL (all 36 fonts)      4  ......                             ...   ...
  ..
```

Appendix B. 4-Character Coded Font Naming

4-character Coded Font Naming Determination

Certain operating environments, such as JES, impose a 4-character limit on coded font names. For example, to select X0GT10 in JES you ask for GT10. X0N210BC could not be selected because N210BC is greater than four characters. Note that the resource names for coded fonts always begin with X0 (240-pel and 300-pel), XZ (AFP outlines), or X1, X2, and others (3800-3) but the "Xn" is not counted as part of the four characters.

The Expanded Core fonts include a collection of 4-character coded fonts for use in these environments. There is one 4-character coded font for each 6-character coded font. The 4-character coded fonts are referenced in the "Alternate Coded Font Identifier" section of the Font Summary Tables in *Font Summary for AFP Font Collection* and are prefixed with "Xn".

You can also determine the 4-character coded font name algorithmically. Use the following procedure to determine the 4-character coded font name from the standard, 6-character name.

1. Look at the standard coded font name according to the following naming convention:

```
          a f r s t c p x

      where: a = X
             f = 0 or Z
             r = type family identifier
          -> s = typeface identifier
          -> t = code page category
          -> c = language complement
             p = point size
          -> x = code page identifier
```

2. Locate **‘stcx**’ in the table below to determine the 4-character coded font name.

3. Substitute **‘r’** and **‘p’** values from the standard coded font to complete the 4-character coded font name.

To see how this works consider the following example.

Example: X06210BC pairs Gothic Text Latin1 12pt (10-pitch) roman medium with code page T1V10500. To determine the 4-character coded font name for X06210BC determine ‘**stcx**’, **‘r**’, and **‘p**’.

```
    |       |
a f r s t c p x
X 0 6 2 1 0 B C
```

```
          |  |  |     |

stcx  =  210C
r     =  6
p     =  B
```

Locating the **stcx** value of 210C in the table yields **r**0D**p**. Substituting 6 for "**r**" and B for "**p**" gives us the 4-character coded font name: 60DB. So, a CHARS parameter statement would be: CHARS 60DB. Remember, if you’re looking for this coded font in a font library, that the actual coded font resource name is Xn60DB.

The following table is used to determine the 4-character coded font name from the standard coded font name.

stcx	4-char	stcx	4-char	stcx	4-char	stcx	4-char
2100	r0Ap	2454	r6Fp	283D	r42p	4104	r89p
2101	r01p	2464	r7Fp	2846	r40p	4105	r8Ap
2102	r02p	2474	r70p	284A	r5Bp	4106	r8Bp
2103	r03p	2521	r44p	284B	r68p	4107	r8Cp
2104	r04p	2522	r4Ep	284C	r71p	4108	r8Dp
2105	r05p	2523	r60p	2850	r53p	4109	r8Ep
2106	r06p	2524	r37p	2854	r3Ap	410A	r90p
2107	r07p	2525	r38p	2855	r3Ep	410B	r91p
2108	r08p	2526	r3Bp	2868	r7Ep	410C	r0Fp
2109	r09p	2527	r4Fp	288E	r99p	410D	r92p
210A	r0Bp	2528	r54p	288F	r9Bp	4201	r16p
210B	r0Cp	252C	r50p	3100	rA5p	4301	r93p
210C	r0Dp	2570	r51p	3101	r9Cp	4302	r95p
210D	r11p	2579	r73p	3102	r9Dp	4307	r96p
210D	r11p	2579	r73p	3102	r9Dp	4307	r96p
2200	r21p	2632	r2Bp	3103	r9Ep	4308	r94p
2201	r14p	2635	r48p	3104	r9Fp	4402	r58p
2202	r19p	2637	r4Cp	3105	rA0p	4403	r97p
2203	r1Ap	2639	r5Cp	3106	rA1p	4521	r46p
2204	r1Bp	2641	r27p	3107	rA2p	4523	r62p
2205	r1Cp	2650	r64p	3108	rA3p	4579	r75p
2206	r1Dp	2653	r2Cp	3109	rA4p	4635	r4Ap
2207	r1Ep	2654	r31p	310A	rA6p	4639	r5Ep
2208	r1Fp	2668	r7Bp	310B	rA7p	4641	r29p
2209	r20p	2686	r98p	310C	r0Ep	4650	r66p
220A	r22p	268A	r9Ap	310D	rA8p	4653	r2Ep
220B	r23p	2710	r7Ap	3201	r15p	4668	r7Dp
220C	r24p	2711	r12p	3301	rA9p	4711	r13p
220D	r25p	2716	r4Dp	3302	rABp	4719	r79p
220E	r26p	2717	r77p	3307	rACp	47P2	r81p
2301	r30p	2718	r69p	3308	rAAp	47P3	r83p
2302	r35p	2719	r78p	3402	r57p	47PC	r85p
2303	r3Cp	271A	r18p	3403	rADp	510C	r10p
2304	r3Dp	271B	r34p	3521	r45p	5201	r17p
2305	r3Fp	27A4	rB0p	3523	r61p	5402	r59p

2305 - r3Fp
2306 - r41p
2307 - r5Ap
2308 - r33p
2401 - r55p
2402 - r56p
2403 - r72p
2404 - r6Ap
2414 - r6Bp
2424 - r6Cp
2434 - r6Dp
2444 - r6Ep
27A4 - rB0p
27AD - rAEp
27B5 - rB1p
27BE - rAFp
27P2 - r80p
27P3 - r82p
27PC - r84p
2831 - r32p
2832 - r36p
2833 - r39p
2837 - r43p
2839 - r52p
3523 - r61p
3579 - r74p
3635 - r49p
3639 - r5Dp
3641 - r28p
3650 - r65p
3653 - r2Dp
3668 - r7Cp
4100 - r8Fp
4101 - r86p
4102 - r87p
4103 - r88p
5402 - r59p
5403 - rB2p
5521 - r47p
5523 - r63p
5579 - r76p
5635 - r4Bp
5639 - r5Fp
5641 - r2Ap
5650 - r67p
5653 - r2Fp