Supported Languages and Code Pages in Non-Unicode Systems

NW AS Internationalization

Copyright

Typographic Conventions

Type Style	Represents
Example Text	Words or characters that appear on the screen. These include field names, screen titles, pushbuttons as well as menu names, paths and options. Cross-references to other documentation
Example text	Emphasized words or phrases in body text, titles of graphics and tables
EXAMPLE TEXT	Names of elements in the system. These include report names, program names, transaction codes, table names, and individual key words of a programming language, when surrounded by body text, for example, SELECT and INCLUDE.
`Example text`	Screen output. This includes file and directory names and their paths, messages, names of variables and parameters, source code as well as names of installation, upgrade and database tools.
`Example text`	Exact user entry. These are words or characters that you enter in the system exactly as they appear in the documentation.
`<Example text>`	Variable user entry. Pointed brackets indicate that you replace these words and characters with appropriate entries.
`EXAMPLE TEXT`	Keys on the keyboard, for example, function keys (such as **`F2`**) or the **`ENTER`** key
A	the keyboard key A
<A>	the keystroke A
/A/	the character A
[A]	the glyph A
0x41	the byte sequence in hexadecimal notation
i18n	Internationally used abbreviation of the term 'Internationalization'

Icons

Icon	Meaning
	Background
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	Function
	Note
	Recommendation
	Syntax
	Tip

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1. Code page configurations and supported languages

This document is constantly being revised. Please make sure that you always use the most current version which can be downloaded from SAP Note 73606.

This document contains information on which languages and language combinations are supported in mySAP. SAP supports more than 30 languages in non-Unicode systems, but due to the technical limitations of non-Unicode code pages, only certain combinations of languages can be used without restrictions. The following options are currently available:

1. Single standard code pages, which can support specific sets of languages. The number and combination of languages that are supported cannot be altered, but there are no restrictions on users.

2. Blended Code Pages, which are SAP proprietary code pages that contain characters from one or more standard code pages. This increases the combinations of languages that can be used. Functionally, a Blended Code Page system uses a single code page.

   Note: New installation of SAP Blended Code Page systems is not supported any longer!

3. Multi-Display / Multi-Processing (MDMP), which allows dynamic code page switching on the application server, and therefore permits any combination of standard code pages in one system. The logon language determines the code page that is active for each user. Some restrictions must be followed. MDMP configurations are only supported with R/3.

Important information for MDMP configurations!

MDMP will no longer be supported as of release SAP NetWeaver 2004s:

1. As of SAP NetWeaver 2004s SAP can only warrant for consistent data in installations with mixed languages if:
   - the whole system is based on Unicode.
   - all systems in a system landscape are based on Unicode.
2. In cases where customers want to use MDMP as of SAP NetWeaver 2004s, SAP disclaims all responsibility for any damages or losses of (productive) data and interruption of or restrictions for scenarios in mixed environments:
   - Data destruction caused by communication between Unicode systems and MDMP systems
   - Data destruction caused by communication between JAVA applications (always Unicode-based) and MDMP applications
   - Data destruction caused by locale-dependent operations

   unless such damages are attributable to SAP's willful misconduct or gross negligence.

Note that SAP NetWeaver 2004**s** is the mySAP Business Suite edition of SAP NetWeaver 2004. This means it is the platform for all 2005 solutions which are part of the mySAP Business Suite – for

example **mySAP ERP 2005**. Detailed information about SAP NetWeaver 2004s is available at SAP Service Marketplace Quick Link /netweaver.

The following SAP solutions and SAP applications do not support MDMP configurations:

- mySAP BW (SAP Note 563975)
- mySAP SRM (SAP Note 819426)
- mySAP SCM (SAP Note 452762
- mySAP CRM: See SAP Note 718324 for information about MDMP installation in CRM releases!
- JAVA-based applications: J2EE applications; Java Connector (JCo); Web Dynpro applications (e.g. Employee Self- Service); SAP Enterprise Portal 6.0; SAP xAPPS
- XML-based applications: SAP XI

1.1 Unicode

SAP strongly recommends **Unicode-based solutions** for **both** new installations and upgrades.

For detailed information see the documentation "Supported Languages in SAP Unicode Systems" which can be downloaded from SAP Note 73606.

Recent information about the availability of Unicode-based SAP solutions are listed in SAP Note 79991.

See SAP Note 379940 for information about Unicode versions of operating system/platform combinations.

SAP is completing Unicode-enabled SAP products to support virtually all languages and scripts used in the world without restriction and to ensure secure communication across the internet. With Unicode, there are no limitations on users, and all languages in the ISO639-2 standard can be used. But note that SAP provides translations only for the languages listed on SAP Service Marketplace → Quick Link /languages. As of Basis Release 6.10/6.20 (see SAP Note 79991 for more information), Unicode-based solutions and the conversion of Single Code Page systems, SAP Blended Code Page systems and MDMP systems to Unicode is fully supported. A Single Code Page system (standard or Unambiguous Blended Code Page) can be converted to Unicode using the standard upgrade method. Converting all other configurations to Unicode requires several additional upgrade steps.

The process of converting SAP systems to Unicode is described in the "Unicode Conversion Guide". This document can be downloaded from SAP Note 551344 or from SAP Service Marketplace → Quick Link /unicode@sap → Unicode Library → Unicode Conversion Library. Contact globalization@sap.com SAP for more information about Unicode pilot projects.

If Unicode-based solutions are not applicable, you can use a single standard code page for new installations and upgrades. If additional languages or language combinations are needed, the MDMP solution is still supported in existing installations. **But: Support of MDMP configurations ends with SAP NetWeaver 2004! In future releases (starting in Q4/2005 with SAP NetWeaver 2004s) Unicode is the only solution for multilingual SAP Systems.**

This document contains information about the non-Unicode solutions in order to help you select the solution that best fits your requirements, as well as installation information; if you are unfamiliar with the terms, "code page", "locale" and "language key" and how they are used in R/3, please read the appendix before continuing.

1.2 Single Code Page

SAP supports multiple languages without any restrictions as long as the characters required are in the same code page. The languages and language combinations listed below are supported in SAP systems with a single system code page (double-byte code pages are shaded).

Table 1: Standard code pages and languages

Code page	*Supported Languages*
ISO8859-1	Danish, Dutch, English, Finnish, French, German, Italian, Icelandic, Norwegian, Portuguese, Spanish, Swedish
ISO8859-2	Croatian, Czech, English, German, Hungarian, Polish, Rumanian, Slovakian, Slovene
ISO8859-5	English, Russian
ISO8859-7	English, Greek
ISO8859-8	English, Hebrew
ISO8859-9	Danish, Dutch, English, Finnish, French, German, Italian, Norwegian, Portuguese, Spanish, Swedish, Turkish
ISO8859-11	English, Thai
Shift JIS	English, Japanese
GB2312-80	English, Chinese
Big 5	English, Taiwanese
KSC5601	English, Korean
TIS620	English, Thai
EBCDIC 0697/0500	Danish, Dutch, English, Finnish, French, German, Italian, Icelandic, Norwegian, Portuguese, Spanish, Swedish
EBCDIC 0959/0870	Croatian, Czech, English, German, Hungarian, Polish, Rumanian, Slovakian, Slovene
EBCDIC 1150/1025	English, Russian
EBCDIC 0925/0875	English, Greek
EBCDIC 0941/0424	English, Hebrew
EBCDIC Thai	English, Thai

For a list of supported languages with language codes and SAP code page numbers, see the Excel file "Supported Languages and Code Pages" which is attached to SAP Note 73606. You can also download the file from SAP Service Marketplace → Quick Link /i18n → Internationalization Library. Other languages and languages combinations are not supported with a single code page using standard code pages.

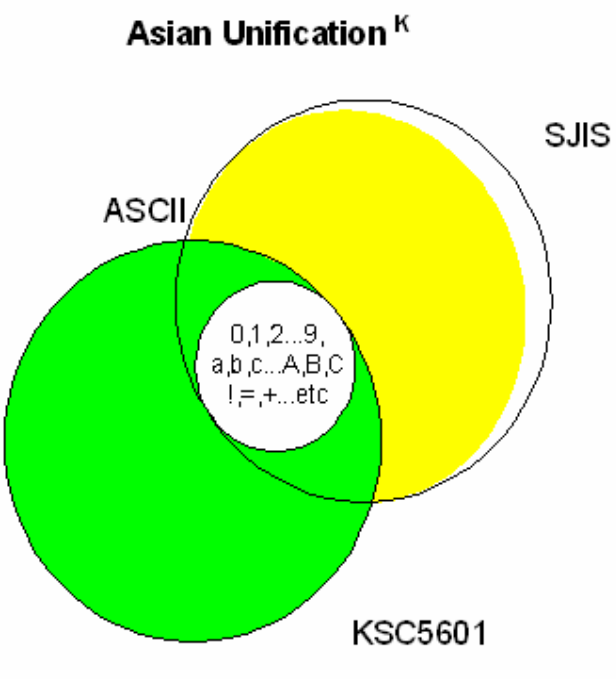
In a single code page configuration, SAP supports multiple languages via multiple locales on the application server, but all languages must use the same code page. For example, French and German can be used on a ISO8859-1 system as long as the corresponding locales for both languages are installed; French and Greek do not share a code page and therefore cannot be used together in a single code page system.

 **Customer/Correspondence Languages**

It is also possible to specify a customer-specific language; this language must use one of the code pages that SAP supports, see Note 0112065. In addition, it is possible to use a different language for correspondence only. See Note 302063 for more information about Correspondence Languages.

1.3 Blended Code Pages (≥ Release 3.0D; new installation not supported any more)

There are many code points that are unused in standard, double-byte code pages, and in order to enhance the capability of a single code-page R/3 system, SAP offers double-byte blended code pages, which contain characters from two or more standard code pages. For example the SAP blended code page Asian Unification^{K} contains all of the 7 bit ASCII characters, all of the Korean characters in KSC5601 as well as a large portion of the SJIS characters (single-byte katakana, as well as certain other characters are not included. See Appendix 3.9).



Asian Unification^{K} therefore provides all of the characters needed for English, Korean, and Japanese with a single code page.

Table 2: SAP blended code pages

SAP Code pages	*Supported Languages*
Asian Unification ^{C}	English Japanese[1] Chinese
Asian Unification ^{K}	English Japanese[1] Korean
Asian Unification ^{T}	English Japanese[1] Taiwanese
Nagamasa	Japanese[1] Thai English
Eurojapan	German English French Italian Danish Dutch Finnish Norwegian Portuguese Spanish Swedish Japanese[1]
Silk road	Japanese[1] English Greek
Trans Siberian	Japanese[1] English Russian

[1] Single Byte Katakana and some level 2 SJIS Kanji (first byte > than H'E0) are *not* supported

Technically, a Blended Code Page system is a single code page system, and users can see and enter all characters contained in the code page, regardless of their logon language. The availability of SAP blended code pages is platform-dependent, because SAP blended locales need to be created for each platform. **Table 3** lists the SAP blended locales currently available.

Table 3: Blended Locale Status (X = available -- = not available)

OS / Version / Locale	HP-UX [d]	NT 2000	Linux	Reliant Unix	IBM AIX	DEC Unix	SUN Solaris	
	10.01-11.X		[c]	4.5[b]	4.1[a]-5.2	V4.0-V5.1	2.5	2.6- 2.9
Asian Unification [C]	X	--	X	X	X	X	--	X
Asian Unification [K]	X	--	X	X	X	X	--	X
Asian Unification [T]	X	--	X	X	X	X	--	X
Nagamasa	X	X	X	--	X	X	--	X
Eurojapan	X	X	X	X	X	X	--	X
Silk road	X	--	X	X	X	X	--	X
Trans Siberian	X	--	X	--	X	X	--	X

a Make sure that you have fetched your AIX SAP blended locales after January 1998 as our initial locales do not function on AIX 4.1.
b See note 134608 for the required kernel patches and the required patch level of the operating system.
c Note that Linux does not support Shift-JIS. See SAP Note 171356.
d IA-64 has been supported since June 2003.

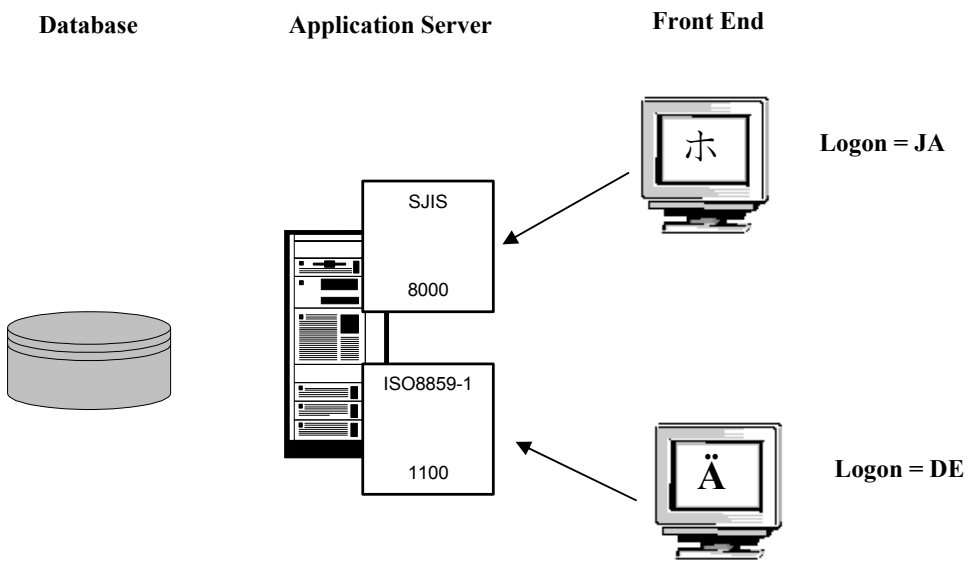
It may be necessary to replace the kernel on older releases (<3.1I); see Note 79376 or 102445.

AMBIGUOUS BLENDED CODE PAGES

SAP also supports SAP Ambiguous Blended Code Pages, but because a future migration to Unicode can be problematic, they cannot be recommended. For more details, see Appendix 3.11.

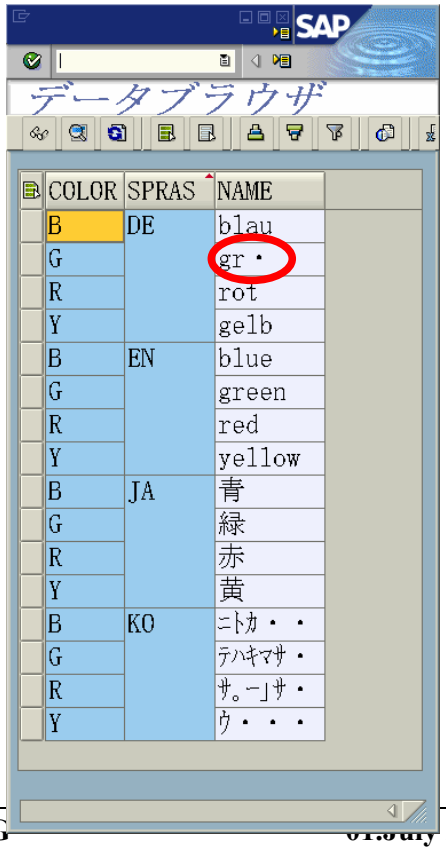
1.4 MDMP (≥ 3.1I; MDMP Support see chap. 1)

The size of a code page limits the number and combination of languages that can be supported in a single code page system. In an MDMP system, the code page used on the application server is selected dynamically, according to the user's logon language, and in ABAP application code according to the command SET LOCALE. This allows any combination of supported code pages to be used together in one installation. An MDMP installation makes it possible to use any combination of languages that SAP supports on a single application server. An MDMP system is recommended if (i) one or more additional code pages are required to add languages to your existing installation (ii) a blended code page cannot support the combination of languages you need for a new installation. For example, an MDMP system with the code pages 1100 and 8000, allows German and Japanese users to log on to the same R/3 system in their respective languages:

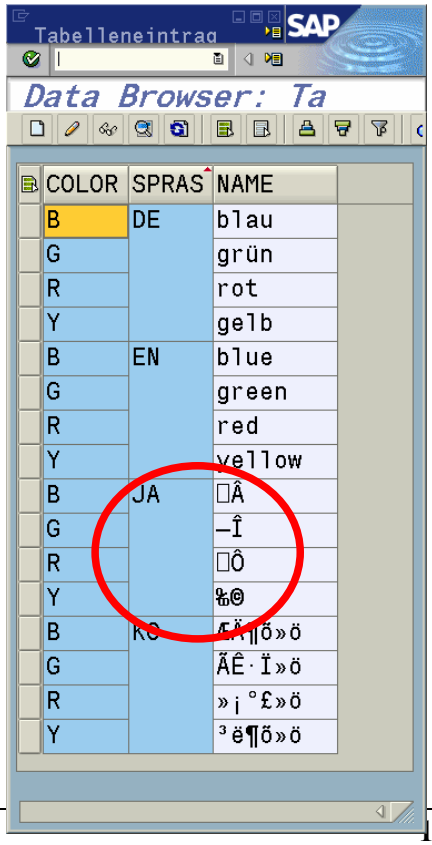


Note that each user can only access *one* code page at a time: a user who logs on as a Japanese (JA) user cannot enter German characters, and all German characters in the database will not be correctly *displayed* (language keys guarantee that they will be *processed* correctly!). Likewise, a German (DE) user cannot enter or display Japanese characters.

Log on with language JA



Log on with language DE



It is possible for a user to log on with German and then manipulate the character set and font settings so that he can enter what appear to be Japanese characters; these characters will not be correctly stored in the database and *this data will be corrupt*. A user who wants to enter Japanese must log on in Japanese. Because there is more than one code page on the application server using MDMP, several restrictions apply.

MDMP RESTRICTIONS

To insure that no data corruption occurs, the following restrictions must be followed:

- ✓ Global data (=data without a language key) must contain only 7-bit ASCII characters, which are in all code pages
- ✓ Users may use only the characters of their logon language or 7-bit ASCII
- ✓ Batch processes must be assigned with the correct user ID and language
- ✓ EBCDIC code pages are not supported

Failure to follow these restrictions can lead to data corruption!

2. Configuration

This section contains general installation information and additional information for installing a single standard code page, Blended Code Page or an MDMP system. (Note that the default installation uses the code page 1100.)

To prepare for the installation of other languages/code pages, follow these steps:

➢ Which languages are needed?

Consider all of the users who will be working in the system and determine which users need to work in their respective languages. Also consider languages that are necessary for you to conduct business.

➢ Which additional languages may be needed in the future?

For example in the default system configuration English and German use the code page ISO8859-1; but if Central European languages are to be added at a later date, then ISO8859-2 can be used.

➢ Are there locales for existing hardware?

ABAP programs are written to be language-neutral and all language-specific data is derived from the system locales, which are platform dependent. The correct locale is a prerequisite for installation, because using the incorrect locale can lead to data corruption. Therefore contact your hardware manufacturer to insure that a locale exists for the hardware and for the languages you wish to install before beginning with the installation (for Blended Code Pages, see Table 3). Also check for Notes concerning errors that have been found in certain locales.

2.1 Restrictions

Components: an MDMP installation is not possible with BW or APO (see Chapter 1.)


Transliteration

The code page 1180 offers transliteration of Eastern European Languages for BW and APO installations, see SAP Note 452762. Code page 1180 is only supported for BW and APO.

Data communication: Within SAP installations, the relationships between the language keys and code pages are well defined. But serious problems may occur if these systems are to be connected to non-SAP systems by means other than R/3 BAPI and RFC. If it is absolutely necessary for you to connect to the R/3 database directly with non-SAP tools then MDMP/ambiguous blended code pages are not supported.

Global Data: In a MDMP system or in an SAP Ambiguous Blended Code Page system, only 7 bit ASCII characters can be used for global data (= data without a language key). When this rule is violated, the behavior of the system is in general unpredictable and data corruption can occur.

Data Transfer: When data is transferred between systems ASCII characters will always be transferred correctly. When the sending and receiving systems do not have the same code page(s) characters which are only supported by one of the code pages will not be interpreted correctly.

Data Selection: In the database commands such as.

```
SELECT * FROM ZNAME INTO L_NAME_WA
  WHERE NAME LIKE '%ö%'.
```

apply for the entire table, and not line-by-line. As a result, language keys are ignored, and thus more data may be selected than expected.

Translation: The logon language determines the characters that a user can see and enter, and this is particularly important for translating texts. If the source language and the target language for translations belong to different code pages, then you cannot log on with the source language and enter characters from the target language. Instead, translators must log on with the target language. For example, to translate German into Japanese, log on with Japanese to translate the texts. Note however that the German characters öäüß will not be displayed correctly. For many language combinations, it will be necessary to translate all texts first into English and then into the target language(s), because the translator cannot see the characters of the source language correctly when logged on with the target language. For example, a translator who wants to translate from JA into ZH will not be able to see the Japanese characters correctly when logged in with ZH. In this case the translator should log on in JA, translate the texts into English and then log on with ZH and translate the texts from EN into ZH.

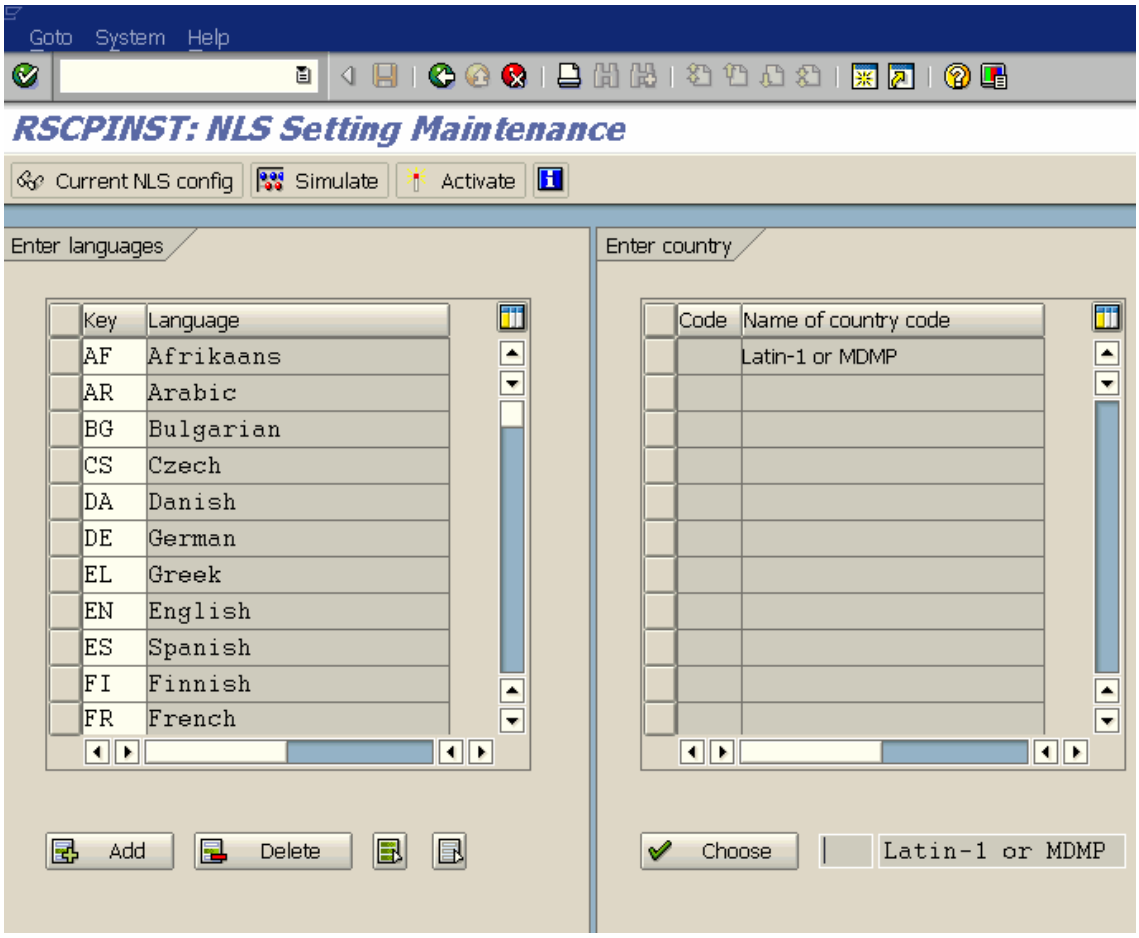
2.2 Configuration with RSCPINST

After determining which languages to install and acquiring the necessary locales, run the report RSCPINST.

RSCPINST is a setup and diagnostic tool for configuring languages in R/3. The report automatically determines the settings required for a consistent i18n configuration, based on the set of languages selected. RSCPINST checks (i) all important i18n configuration tables (ii) all important i18n application server profile parameters (iii) all necessary locales. The report also updates the necessary

database tables, but modifications to the application profile parameters have to be carried out manually. For Blended Code Pages, see Table 3.

To use RSCPINST follow the steps indicated on the screen (select in the transaction for step-by-step instructions):



Step 1 : The tool suggests the set of languages that have been derived from the profile parameter `zsca/installed_languages`. Add or delete languages as needed.

Step 2 : The country code specifies which *code page* will be used whenever more than one option is available. For example, English uses ISO8859-1 as a default, but this is not a requirement.

English and Russian

The country can be set to (i) *Latin 1 or MDMP* (English will then use the code page 1100, and Russian will use the code page 1500) or (ii) *Russian Federation* (English and Russian will both use the code page 1500). If English is used with 1500, then a user can log on as an English user and enter Cyrillic characters.


English, German, and Czech

The country can be set to (i) *Czech Republic* (ii) *Slovakia* (iii) *Poland* (iv) *Latin-1 or MDMP* (v) *SAP Unification*, which is not considered, since it is an Ambiguous Blended Code Page. Selecting *Czech Republic* or *Slovakia* sets up a single code page system using 1401 as the system code page. If you select *Poland* then English will also use 1401; in this case "Poland" in fact means "with 1401". If you select Latin-1 or MDMP then English and German will use 1100 and Czech will use 1401.


Unexpected Country Options

It is possible that the country you expect may not appear on the list or some of the possibilities may seem inappropriate. For all languages that use the code page 1401, PL is always a correct option. This reflects an earlier design concept, and is not an error.


Asian MDMP: Japanese, Simplified Chinese, and English

By selecting a country other than *Latin-1 or MDMP*, it is possible use the logon language EN without using code page 1100; instead, English will use one of the other installed code pages.

For example, English as a logon language can be used in 3 different ways: in its own "native" code page (1100), with the Japanese code page (8000), or within the Simplified Chinese code page (8400).

Country	Result
Latin-1 or MDMP	*Logon with EN = code page 1100*: you can only see and enter English characters and French or German, but you cannot see or enter Japanese or Simplified Chinese characters correctly. To enter or see Japanese or Simplified Chinese text, you must log on with the corresponding language.
Japan	*Logon with EN = code page 8000:* you can only see and enter English and Japanese characters, but you cannot see or enter German, French or Simplified Chinese characters correctly. To enter or see Simplified Chinese text, you must log on with the corresponding login language. You cannot enter or see French, German or Spanish characters.
China	*Logon with EN = code page 8400:* you can only see and enter English and Chinese characters, but you cannot see or enter German, French or Japanese characters correctly. To enter or see Japanese text, you must log on with the corresponding logon language. You cannot enter or see French, German or Spanish characters.

If you intend to set up such an MDMP system, please contact a specialized consultant!


English, German, and Japanese

The country can be set to (i) *Latin-1 or MDMP* (ii) *Eurojapan* (iii) *SAP Unification*, which is not considered, since it is an *Ambiguous Blended Code Page*. If you select *Latin-1 or MDMP* then English and German will use 1100 and Japanese will use 8000. Selecting *Eurojapan* sets up a single code page system using the Unambiguous Blended Code Page 6300 as the system code page.

MDMP or BLENDED CODE PAGE

With a Blended Code Page, users can use any logon language and can enter any characters in the Blended Code Page. With an MDMP system, users must log on with a language that belongs to the code page of the language they want to use, and only characters that are in the code page corresponding to the logon language will be displayed correctly.

Step 3: Select a country code from the list, and then click on *Choose*.

Step 4: Select one of the *profile parameter output order* options.

Step 5: Select *Enable locale check*.[1]

Step 6: Select *Simulation* from the toolbar.

During the simulation mode no database updates are carried out. Based on the set of languages and the country code, RSCPINST generates a log file, which reports missing locales or inconsistent tables that have to be repaired.

Step 7: Review the output and make the necessary changes to the profile parameters.

Step 8: Select *Activate* to complete the installation.

MANUAL CONFIGURATION

It is possible to manually mis-configure the system so that characters that are not in the system code page can be seen and entered on the front end. Users should only use those characters that are in the code page of their logon language, **otherwise data will be corrupted**. In some case it may be necessary to manually configure certain tables; contact an SAP consultant if you require assistance.

2.3 Language Import

After having finished all code page related configurations, run transaction SMLT to configure, import or supplement the translations for all required languages. Call transaction SMLT and read the documentation which is available via pushbutton *Documentation* in the toolbar.

3. Appendix

3.1 Logon Language

The logon language determines

- Language for menus, warnings, etc.
- Active System Code Page
- The characters you can enter and see

[1] Some versions of RSCPINST do not have the *Enable Locale Check option*. Read SAP Note 42305 for details.

3.2 Background: Code pages in SAP Systems

A character is an abstract written object: letters /A, B, C, ع, ภ, й , ফ/, symbols /⇨ , ₡ , ♯ , ╞ /, ideographs /众, 傜, 啐/, numbers, punctuation. But data in the database -- including characters -- are stored as a sequence of bytes, i.e. numbers. A code page defines how a byte sequence (number) is interpreted as a character. Each character has code point, which is the coordinate value for a given space in a code page matrix. In the following code page, the character /B/ has the code point 0x42 and the character /°/ has the code point 0xBA. The empty fields contain control characters.

Code page ISO8859-1 (Latin –1)

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0																
1																
2		!	"	#	$	%	&	'	(	)	*	+	,	-	.	/
3	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
4		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
5	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
6		a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
7	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	
8																
9																
A		¡	¢	£	¤	¥	¦	§	¨	©	ª	«	¬		®	¯
B	°	±	²	³	´	µ	¶	·	¸	¹	°	»	¼	½	¾	¿
C	À	Á	Â	Ã	Ä	Å	Æ	Ç	È	É	Ê	Ë	Ì	Í	Î	Ï
D	Ð	Ñ	Ò	Ó	Ô	Õ	Ö	×	Ø	Ù	Ú	Û	Ü	Ý	Þ	ß
E	à	á	â	ã	ä	å	æ	ç	è	é	ê	ë	ì	í	î	ï
F	ð	ñ	ò	ó	ô	õ	ö	÷	ø	ù	ú	û	ü	ý	þ	ÿ

1st half byte

2nd half byte

All ISO8859 code pages contain the 7 bit US-ASCII characters (shaded in the graphic above), and they all have the same code points. The rest of the code page varies from code page to code page and therefore 0xBA = /°/ is true for the code page ISO8859-1, but not for all code pages.

In order to support different front end-hardware, SAP only uses standard code pages or SAP Blended Code Pages. Using standard code pages is necessary to guarantee that proprietary standards do not lead to loss of data, for example when data is sent between different platforms via RFC.

An R/3 system requires numerous code pages:

- System code page for the Application Server and the database
- Front End code page: Microsoft, EBCDIC, Apple, etc
- Peripheral code pages: Printer code pages, RFC, etc

All of the code pages in a system should be compatible to ensure that the correct data is stored in the database and that the data is transferred correctly. For example, certain programs convert text into upper case using the ABAP command TRANSLATE TO UPPER CASE. This command converts /a/ to /A/, which means that the byte sequence is *changed* from 0x61 to 0x41. To ensure that the correct code page is used for business data, language keys were added to tables containing language-specific data.

Note that a code page is not a font: A font defines how a character is rendered as a glyph on the screen/printout. The character /A/ can have many different glyphs: [**A**] [*A*] [𝒜] [**A**], but they are all

renderings of the character /A/.[2] The difference between the system code page, the front-end code page, and the front end font (glyphs) is crucial, they are all independent of each other, but they must be correctly synchronized

3.3 7-bit ASCII

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
1																
2		!	"	#	$	%	&	'	(	)	*	+	,	-	.	/
3	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
4		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
5	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	
6		a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
7	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	

3.4 Syntactical character set

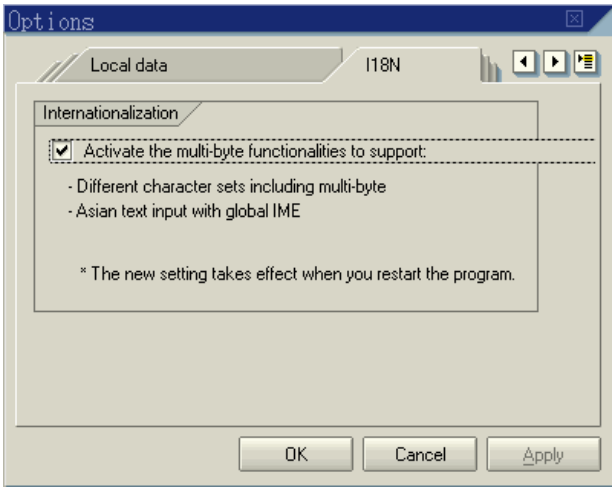
The following characters form the syntactical character set. They have the same code points in all of the ASCII code pages and they have the same code points in all of the EBCDIC code pages. They are **not** identical in ASCII *and* EBCDIC code pages: /A/ is `0x41` in ASCII and `0xC1` in EBCDIC.

```
!"%&'()*+,-./:;<=>?_
     0123456789
ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
```

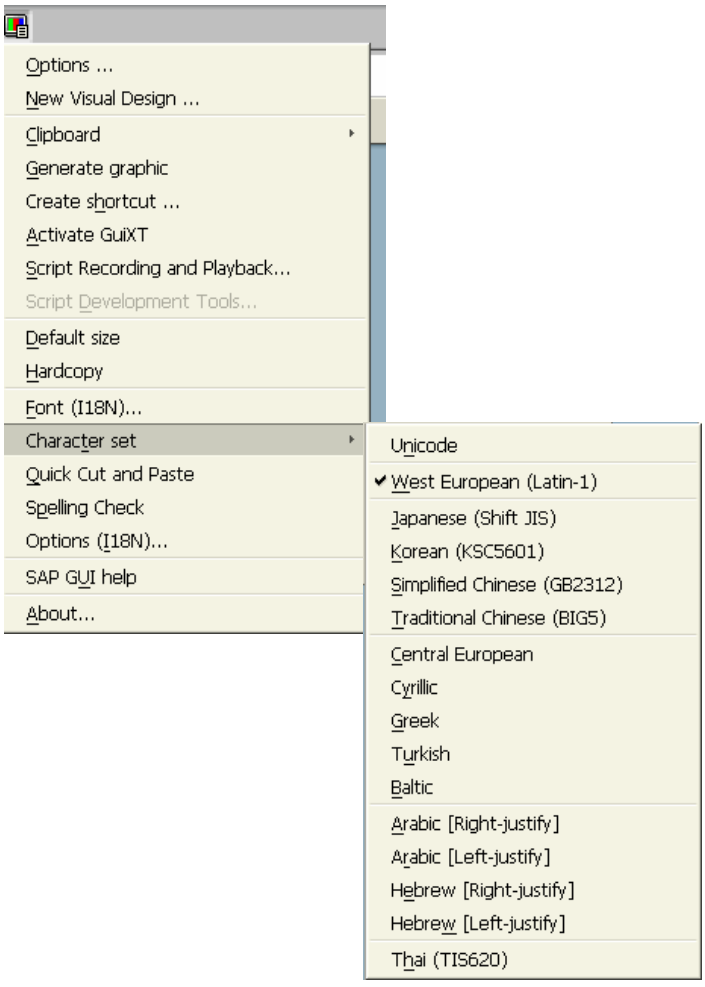
3.5 Front End Settings (WinGUI)

SAPGUI does not require a localized version of the operating system and therefore only one GUI needs to be installed. To be able to use different fonts and additional languages, select *"Customizing of local layout" (ALT F12)* → *Options* from the menu. Select the tabstrip "I18N". Then select the checkbox "*Activate the multi-byte functionalities to support*". This change will take effect only after restarting SAP Logon.

[2] Obviously there is a relationship between a code page and a font. A font such as Times Roman is designed to render the characters found in Latin alphabets, such as those in ISO8859-1. Similarly, a Greek or a Russian font renders the characters of the respective alphabets.

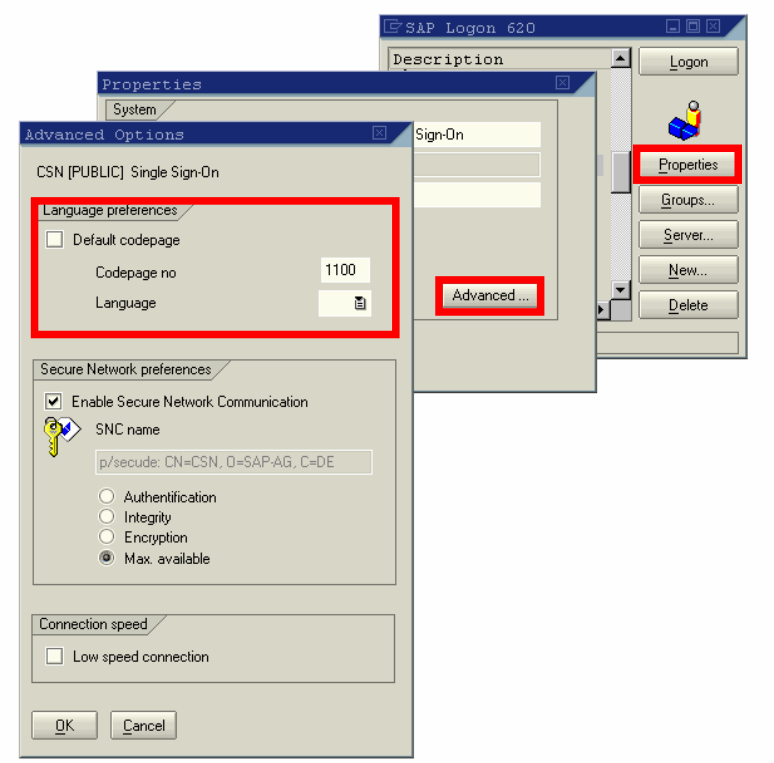


After restarting SAP Logon, select *"Customizing of local layout" (ALT F12)* You can now select a "Character Set" from the menu.



Correct Character set
Always select a Character Set that corresponds to the language you have logged onto the system with. In addition, the font you select should also correspond to the character set.

RELEASE < 4.6C
Prior to Release 4.6C, the front-end code page had to be set manually. *SAP Logon --> Properties --> Advanced.*



The correct front end code page should be selected. The correct front end code page for 1100 is 1160, **not** 1100. Selecting 1100 as the front-end code page turns off the code page conversion between the front end and application server. As a result, no conversion takes place. It is therefore possible to "see" and "enter" characters that are not in the system code page; this data will not be correctly stored in the database! See Note 195490.

The following example shows the problems that can occur if the front end code page is not selected correctly; as of 4.6C the font end code page is selected automatically, and this error can no longer occur.

Incorrect Front-End Code Page Settings Release < 4.6C

For example, a user has a MS Windows PC and a SAPUI for Windows installed. The system code page is 1100, which is based on the ISO8859-1. The character /š/ is not in the ISO8859-1 standard code page, and therefore it is not in SAP 1100. Microsoft has added /š/ to its own proprietary code pages

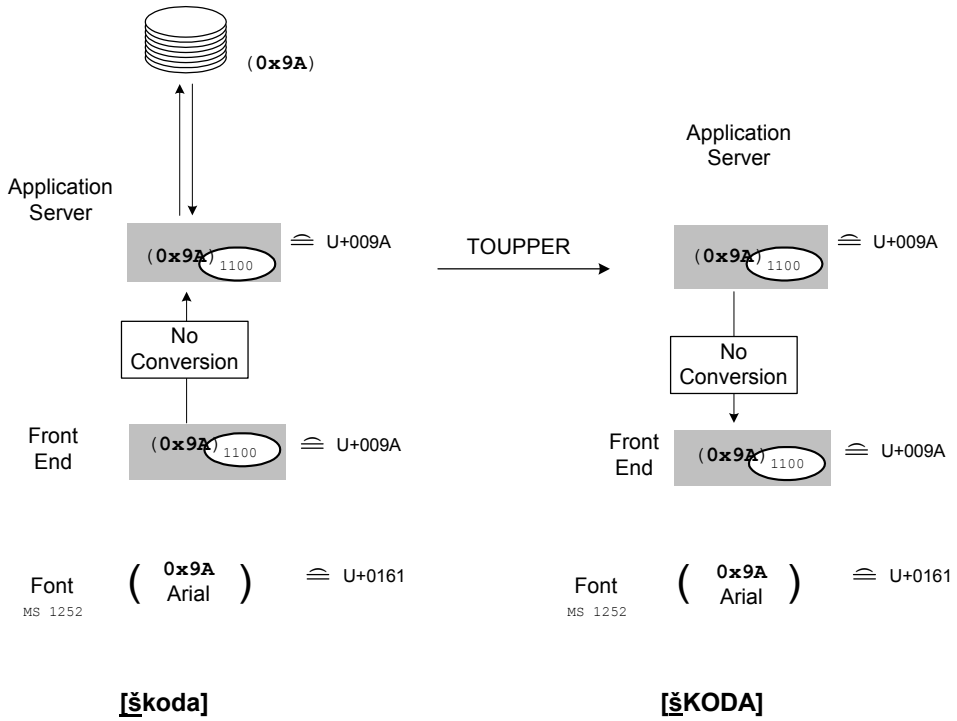
MS1252 (SAP 1160). As a result it is possible to see /š/ under Windows, but it *not* possible to save the character in an SAP system that uses 1100. In the Microsoft code page 1252, /š/ = 0x9A, but in the SAP code page 1100, the byte sequence 0x9A is a control character:

Whenever character data is sent from one code page to another, a conversion must occur. Characters that are in the code page 1160 and not in 1100 are filtered out, because they cannot be saved in the system properly. Prior to Release 4.6C, it is possible to incorrectly set the front-end code page to 1100. When the systems code page and the front end code page are identical, the byte value for each character is transferred from the front end to the application server, without any conversion; there is no reason to convert between the same code page. As a result, characters that are in the code page 1160 appear on the screen. For example, the user enters the characters <škoda> into a text field. The character /š/ is not in the code page 1100. The byte sequence 0x9A is transferred from the front end to the application server. The byte sequence 0x9A in the code page 1100 is not the character /š/ however. It is a control character. The character will appear as /š/ on the screen, but the application server will not treat 0x9A as a character. The ABAP command CONVERT...TO UPPERCASE converts the data the user just entered to uppercase. The control character does not have an uppercase letter, and the command has no affect. All other characters are converted to upper case. As a result, it appears to the user that the conversion did not occur correctly, because the character the user sees [škoda] is not converted to uppercase [šKODA].

This is shown in the following diagram. Byte values are given in Courier bold. A subscript denotes the code page, and the character that corresponds to a byte/code page pair is given as a Unicode character. In other words, the sequence

$$(0x9A)_{1160} \equiv \text{U+0161}$$

means, "in the code page 1160, the byte value 0x9A corresponds to the Unicode character U+0160".



In this case the difference does not appear all that dramatic, but because the TOUPPER failed, printouts will be incorrect, data will not sort correctly, and searches can also fail to find certain data.

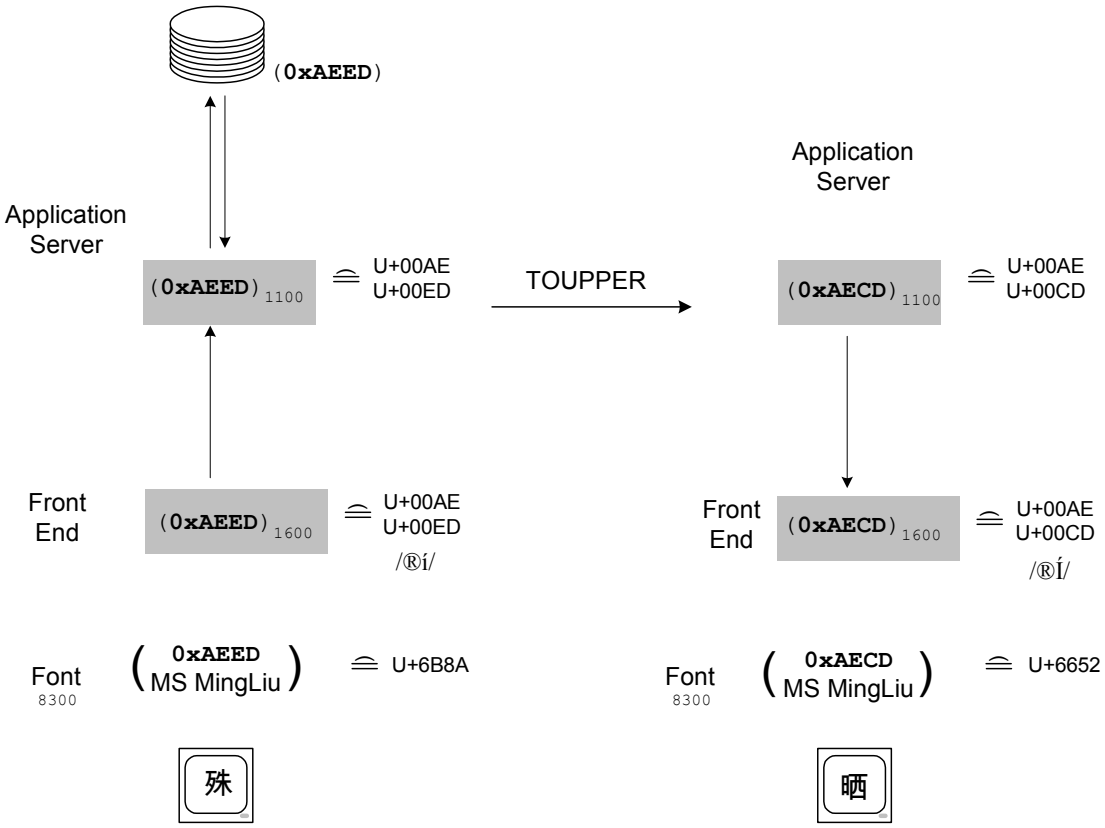
The same problem can occur with other languages as well. The Unicode character 珉 (U+73C9) is not included in the Microsoft code page for Traditional Chinese (based on Big5), although the character is in the corresponding Japanese and Korean code pages. It is possible to enter the character in the Microsoft Notepad, which supports Unicode, but if the file is saved as plain text, the character is replaced with a /?/ (see Note 176097).

Font selection

Always select a font that corresponds to the front-end code page.

Selecting an incorrect font lead to similar problems, because being able to see or enter a glyph into a field does not mean that the character can be used in the system!

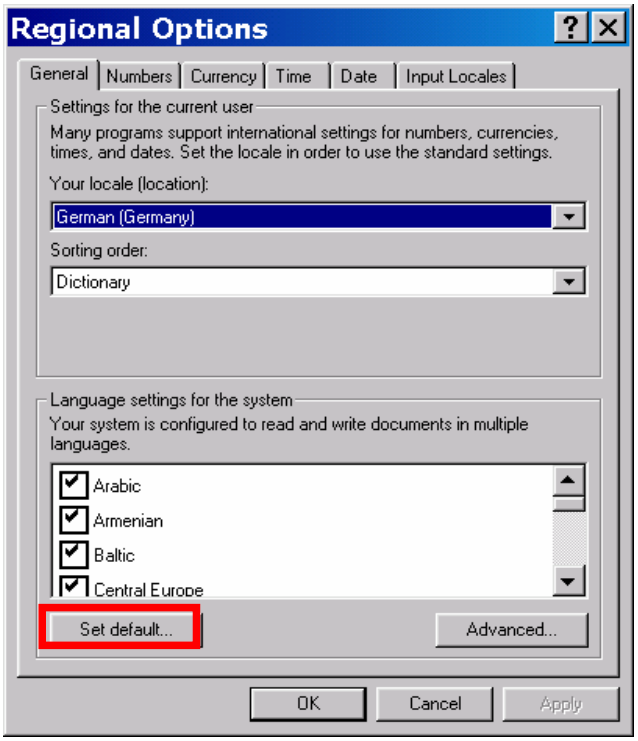
In the following example, the system code page is 1100, but a user has selected a front on the front end that is for Chinese MS MingLiu, which is designed to be used with Chinese characters. The users enters what appears to be a Chinese characters, but this is a mirage. Because the system code page is 1100, the only characters that can be entered into the system are from the code page 1100. The Chinese font shows the glyph 殊 which has the byte value `0xAEED` in the code page 8300. The front end code page in 1160 and the code page on the application server is 1100; this is the correct setting for a system with the system code page 1100 and character conversion takes place between the front end and the application server. In this example, the code points are the same in both 1100 and 1160, so the conversion here is not really visible. On the front end and the application server, the byte sequence 0x`AEED` corresponds to **two** characters (i) `0xAE` the REGISTERED SIGN (U+00AE) and (ii) 0x`ED` the SMALL LATIN LETTER I WITH ACUTE (U+00ED). The ABAP command CONVERT...TO UPPERCASE will not apply to the trademark sign, but will change the *SMALL* LATIN LETTER I WITH ACUTE (U+00ED) to *CAPITAL* LATIN LETTER I WITH ACUTE (U+00CD). The byte sequence therefore changes from `0xAEED` to `0xAECD`. The font MingLiu renders this as 哂, a completely different character.



In sum, a code page defines how a byte sequence is interpreted as a character and a font determines how the character is then rendered as glyph. It is possible that the characters visible on the front end cannot be saved in R/3. To avoid these problems, set the front-end code page correctly (before 4.6C), and in all releases, only use fonts that correspond to the system code page.

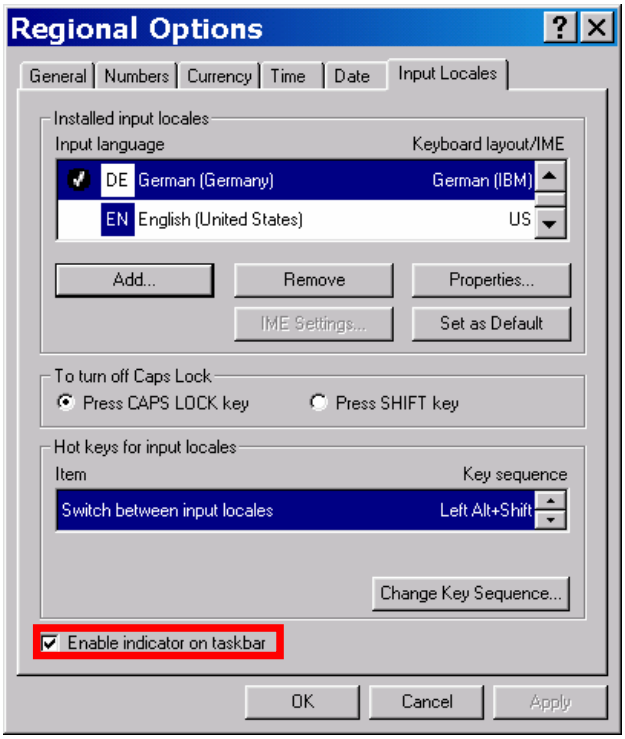
3.6 PC Settings

For Windows 2000 select Start → Settings → Control Panel → Regional Options → tabstrip "General" → select the language(s) you wish to work with



You must also set the default. For these settings to take affect a reboot is required! See note 508854 for restrictions.

In addition, you must specify the "Input Locales" you want to use. Select the tabstrip "Input Locales" and add the languages you want to use. Select the checkbox “Enable indicator on taskbar” otherwise you will have no selection possibility between the different Input Methods (IME)



3.7 Supported languages and language codes in non-Unicode systems

LANGUAGE	LANG CODE ISO 639-1	LANG CODE SAP	SAP System Code Page		Corresponding Front End Code Page (Microsoft Front End)
			ASCII	EBCDIC	
Afrikaans	AF	a	1100; 1610	0610	1160
Bulgarian	BG	W	1500	0500	1504
Catalan	CA	c	1100; 1610	0120	1160; 1614
Chinese	ZH	1	8400	--	8400
Chinese trad	ZF	M	8300	--	8300
Croatian	HR	6	1401	0410	1404
Czech	CS	C	1401	0410	1404
Danish	DA	K	1100; 1610	0120	1160; 1614
Dutch	NL	N	1100; 1610	0120	1160; 1614
English *	EN	E	1100	0120	1160
Estonian***	ET	9	1900	--	1914
Finnish	FI	U	1100; 1610,	0120	1904
French	FR	F	1100; 1610;	0120	1160; 1614
German	DE	D	1100; 1401; 1610	0120	1160; 1404; 1614
Greek	EL	G	1700	700	1704
Hebrew	HE	B	1800	0800	1804
Hungarian	HU	H	1401	0410	1404
Icelandic	IS	b	1100	0120	1160
*Indonesian***	ID	i	1100; 1610	0120	1160; 1614
Italian	IT	I	1100; 1610	0120	1160; 1614
Japanese	JA	J	8000	--	8000
Korean	KO	3	8500	--	8500
Latvian***	LV	Y	1900	--	1914
Lithuanian***	LT	X	1900	--	1914
*Malay***	MS	7	1100; 1610	0120	1160; 1614
Norwegian	NO	O	1100; 1610	0120	1160; 1614
Polish	PL	L	1401	0410	1404
Portuguese	PT	P	1100; 1610	0120	1160; 1614
Reserved- cust†.	Z1	Z			
Romanian	RO	4	1401	0410	1404
Russian	RU	R	1500	0500	1504
Serbian (Cyrillic)	SR	0	1500	0500	1504
Serbian (Latin)	SH	d	1401	0410	1404
Slovakian	SK	Q	1401	0410	1404
Slovene	SL	5	1401	0410	1404
Spanish	ES	S	1100; 1610	0120	1160; 1614
Swedish	SV	V	1100; 1610	0120	1160; 1614
Thai	TH	2	8600	0860	8600
Turkish	TR	T	1610	0610	1614
*Ukrainian***	UK	8	1500	0500	1504

* English only requires 7-bit US ASCII characters, and therefore can be used in combination with any code page.
** These languages are only partially supported.
*** Baltic Languages: See SAP Notes 198489 and 784665 for important additional information!
† See Note 112065 for more information about Customer specific languages; for correspondence languages, see Note 302063.

Note there is only one correct Front End code page for each System code page. For example, the front end code page 1160 should be used on a 1100 system and 1614 for a 1610 system, but 1160 **cannot** be used for a 1610 system.

Although these languages are technically supported, translations may not exist, or hardware manufacturers may not have locales for all languages. Note it is possible to import English if no translations exist (see Note 136649 and 0116756).

3.8 Language keys

A language key is a key field that specifies which code page is used when character data is manipulated (case conversion, for example). Language keys were added as of release 3.0F to tables that have language-dependent text data. Language keys guarantee that the data is *processed* correctly by the system, although the data may not be displayed correctly. For data without a language key, the application server uses the code page of the log on language. Character data are defined as either local or global:

1. Local data, i.e. character fields with a language key, will be processed in the language environment specified by the language key, independent of the user's language.
2. Global data, i.e. character fields without a language key, will be processed in the user's language environment (determined by the log on language).

Because global data can be processed using different code pages, it should only contain 7-bit ASCII characters. This ensures that the data is always processed correctly.

 **misuse of language keys**

Language keys should not be used for any other purposes! Using a language key to distinguish office, warehouse locations, etc. is not supported. System checks guarantee that the language configuration is the system is correct, to ensure data integrity: These checks will lead to system errors if language keys are used incorrectly.

3.9 Locales

A locale defines language-specific character properties: sort order, characters vs. non-characters, upper/lower case conversion, date/time/currency formats. A locale needs to contain both a language (code page) and a country/territory environment, because the same language may have different sort orders in different countries, and more than one language may be used in one country.

 **Installed locales**

It is crucial that the correct locales are installed at all times. Using the wrong locale can lead to data corruption, if the wrong locale used for a TO UPPERCASE conversion, similar to the errors that occur when the incorrect front end code page/font is used (described above). For more information about locale problems in general and for OS specific problems, see the corresponding note below.

0039473	locale and TCP0C
0158774	Incorrect case mappings in some locales
0188993	Linux
0038677	HP-UX
0039763	Windows/NT
0039309	Digital UNIX
0039718	AIX

0039724 OS/400
0039745 ReliantUNIX (SINIX)
0039739 Solaris (SunOS)

3.10 Multi Display / Single Processing code page (MDSP)

In an MDSP system, user interface texts, such as menus, screen texts, and online help can be displayed in languages other than the system code page (multi-display); all data entered and stored in the system will be in one code page (single processing code page). For example, a system is set up with ISO8859-1 as the system code page, and therefore only characters from this code page can be entered into the system. With MDSP it is possible for Japanese users to see the entire user interface in Japanese; in input-enable fields, the Japanese user can only enter characters that are in **both** the system code page, and the display code page. In this case, Japanese users can only enter 7-bit ASCII characters. To install an MDSP system, see Note 109975. Note that MDSP is not recommended, see Note 0496913. As of BASIS_6.10 MDSP is no longer supported.

3.11 SAP Blended Code Page installation

To install a Blended Code Page, use RSCPINST as described; this section contains some additional information that is needed to install an Unambiguous Blended Code Page.

3.11.1 Convert unsupported characters

When migrating an existing system to a blended code page system, all the characters that are not supported in the blended code pages must be converted. RSCPSRCH/RSCPUPDT is a tool for analyzing those characters; it is described in Note 85363.

3.11.2 Installing blended code page locales

When installing SAP blended code pages, the following procedures must be planned:

Install SAP blended locales. These locales can be fetched from sapserv3 (diocletian has no *.so - libraries):

/usr/SUPPORT/ftp/home/ftp/general/R3server/abap/note.0073606

HPUX 10	->	../hp/<locale>
HPUX 11	->	../hp11/<locale> and
		../hp11/lib<locale>.sl
		../hp11/pa20_64/<locale> and
		../hp11/pa20_64/lib<locale>.sl
HPUX 11 for IA64	->	../hp11_ia/<locale>.TAR
AIX 4.1, 4.2	->	../ibm/<locale> and
		../ibm/lib<locale>.so
AIX 4.3	->	../ibm43/<locale>_aix.TAR
AIX 5.1, 5.2	->	../ibm51/<locale>_aix.TAR
OSF1	->	../dec/<locale> and
		../dec/lib<locale>.so

Solaris 2.5	->	../sun25/<locale>.TAR
Solaris 2.6	->	../sun26/<locale>.TAR
Solaris 2.7	->	../sun27/<locale>.TAR
Solaris 2.8, 2.9	->	../sun28/<locale>.TAR
Solaris 10	->	../solaris10/<locale>.TAR
ReliantUNIX	->	../sinix/<locale>.TAR

where <locale> represents the locale name (e.g. eurojapan).
Please note: You need only the files cited above. The files *.cm, *.src, *.m or the *.c - files in methods.TAR are included only for informational purpose for those interested into details of the locale.

Special note for Windows NT: The association of each nls file with the SAP locale names is as follows:
c_40001.nls : Diocletian
c_40874.nls : Nagamasa
c_48591.nls : Eurojapan
On NT, the language and country combinations used in these blended code pages need to be supported by the operating system for setlocale to work properly. For example, "Japanese_Japan" needs to be supported to use Eurojapan. If this combination is not available, the standard Traditional Chinese NLS file needs to be installed. Language, country, and codepage combinations can be tested with "setlocale.exe" (see note 65878).

Set up the locales as root user:

HP: (HP UX 10.01, 10.20)

```
> mv <locale> /usr/lib/nls/loc/locales/
> cd /usr/lib/nls/loc/locales
> chmod 555 <locale>
> chown bin:bin <locale>
```

HP11: (HP UX 11.X)

```
> mv <locale> /usr/lib/nls/loc/locales.1/
> mv <locale> /usr/lib/nls/loc/locales.2/
> mv lib<locale>.sl /usr/lib/nls/loc/methods.1/
> mv lib<locale>.sl /usr/lib/nls/loc/methods.2/
> mv pa20_64/<locale> /usr/lib/nls/loc/pa20_64/locales.2/
> mv pa20_64/lib<locale>.sl
          /usr/lib/nls/loc/pa20_64/methods.2/
> chmod 555 to all copied files
> chown bin:bin to all copied files
```

HP11_IA: (HP UX 11.X for IA64)

```
> mv <locale>.TAR /usr/lib/nls/loc/
> cd /usr/lib/nls/loc/
> tar -xvf <locale>.TAR
```

IBM : (AIX 4.1, 4.2)

```
> mv <locale> /usr/lib/nls/loc/
> mv lib<locale>.so  /usr/lib/nls/loc/methods/
```

IBM : (AIX 4.3)

```
> mv  <locale>_aix.TAR /usr/lib/nls/loc/
> cd /usr/lib/nls/loc
> tar -xvf <locale>_aix.TAR
> chmod 755 <locale> <locale>__64
> chown bin:bin <locale> <locale>__64
```

```
        (For all the locales except diocletian)
      > chmod 755 ./methods/lib<locale>*
      > chown bin:bin ./methods/lib<locale>*
IBM : (AIX 5.1, 5.2)
      > mv <locale>_aix_TAR /usr/lib/nls/loc/
      > cd /usr/lib/nls/loc
      > tar -xvf <locale>_aix.TAR
      > chmod 755 <locale> <locale>__64
      > chown bin:bin <locale> <locale>__64
       (For all the locales except diocletian)
      > chmod 755 ./methods/lib<locale>.a
      > chown bin:bin ./methods/lib<locale>.a
DEC:
      > mv <locale> /usr/i18n/lib/nls/loc/
      > mv lib<locale>.so /usr/i18n/shlib/
      > cd /usr/i18n/lib/nls/loc
      > chmod 644 <locale>
      > chown bin:bin <locale>
      > cd /usr/lib/nls/loc
      > ln -s ../../../i18n/lib/nls/loc/<locale> .
      > cd /usr/i18n/shlib
      > chmod 644 lib<locale>.so
      > chown bin:bin
      > cd /usr/shlib
      > ln -s ../i18n/shlib/lib<locale>.so .

ReliantUNIX: (5.44B)
      > mv <locale>.TAR /usr/lib/locale_new/
      > cd /usr/lib/locale_new/
      > tar -xvf <locale>.TAR
      > chmod 755 <locale>
      > chown bin:bin <locale>
      > cd <locale>
      > chown bin:bin *
      > cd to all subdirectories, there
            chmod 555 * and chown bin:bin *

SUN25: (SUN Solaris 2.5)
SUN26: (SUN Solaris 2.6)
SUN27: (SUN Solaris 2.7)
SUN28: (SUN Solaris 2.8)
SUN29: (SUN Solaris 2.9)
      > mv <locale>.TAR /usr/lib/locale/
      > cd /usr/lib/locale/
      > tar -xvf <locale>.TAR


NT:
      1. Move the NLS files to the directory
            %SystemRoot%\system32\
      2. Start the registry editor (regedit.exe)
      3. Under the key
            HKEY_LOCAL_MACHINE ->
            SYSTEM ->
            ControlSet001 ->
            Control ->
            nls ->
            CodePage,
            create a new value of type string:
```

```
      Right click on "CodePage" -> Create -> String
4. Enter the five-digit number "4xxxx".
5. Set the data of the created value to the filename of
   the new NLS file:
      Right click on the new value -> Change
      -> enter data (e.g. c_40001.nls).
```

3.12 Japanese in Blended Code Pages

All Japanese code pages for R/3 databases and application servers are derived from Shift-JIS. Other Japanese code pages, for example JIS or EUC are currently supported only for printers and other output devices.

The Shift-JIS code page is built from five blocks:

1.	`20 .. 7E`	7-Bit-US-ASCII
2.	`8140 .. 9FFC`	most often used double-byte characters
3.	`A0 .. DF`	half-width/single-byte katakana
4.	`E040 .. EFFC`	seldom used kanji (from JIS level 2)
5.	`F040 .. FCFC`	user defined characters

Shift-JIS is not supported by Linux. SAP provides the Shift-JIS patch on Linux as part of the SAP Linux installation CD (available on SAP Service Marketplace). Read SAP Note 171356 for important further information and downloads.

SAP does not use the user-defined character area of Shift-JIS and nearly all available code points are occupied. Therefore a SAP Blended Code Page cannot support certain Japanese characters. Single-byte katakana are not supported for the following reasons:

1. Single byte katakana will not be supported in the future SJIS standard according to JIXX0208 from April 1997.
2. Single byte katakana is located in the area H'A0-H'DF. In the SAP blended code pages this area is needed for other characters.

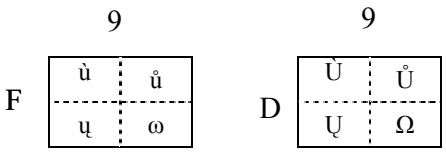
In addition, some of the level 2 Kanji are not supported. In Blended Code Pages, all level two kanji and half-width katakana are blocked from input into database fields. For half-width katakana, the system will convert the user input into double-byte katakana; level two kanji are excluded.

Half-width katakana to be used with data transfer to banks and public offices in Japan, however, because code page conversion takes place when writing or reading external data. Thus, the data can be stored as full-width katakana internally, even if external media require half-width katakana.

3.13 SAP Ambiguous Blended Code Pages

In ambiguous SAP blended code pages, some characters share the same code point. For example, French uses the character /û/ and Hungarian uses the character /ű/, but no language uses both characters simultaneously. It is therefore possible to assign /û/ and /ű/ to the same code point, `0xF9`. More than two characters can share the same code point. In the SAP blended code page SAPUnification, four

characters share the byte sequence `0xF9`; the character that is used will depend on the log in language: in all cases, the database will contain `0xF9`:



The ambiguity is resolved by the log-in language, which determines whether /û/ and /ű/ is the correct character. Should a French user inadvertently look at Hungarian texts, some of the characters will be incorrect, but this does not affect data in the database, which contains the byte sequence `0xFB`. The uppercase characters /Û/ and /Ű/ are mapped to the same code point DB, which ensures that all TOUPPER conversions function properly. A list that contains Hungarian and French texts, such as a list of international customers, will not display or print correctly, however, since /û/ and /ű/ cannot be used together. The following ambiguous code pages are supported (Diocletian is the only single-byte Ambiguous Blended Code page):

Table 3: SAP Ambiguous blended code pages

SAP Code pages	*Supported Languages*
Asian Unification	English Japanese[1] Chinese Korean Taiwanese
Diocletian[3]	German English French Italian Danish Dutch Finnish Norwegian Portuguese Spanish Swedish, Greek
SAP Unification[3]	German English French Italian Danish Dutch Finnish Norwegian Portuguese Spanish Swedish, Japanese[2], Czech Hungarian Polish Slovakian Rumanian Slovene Croatian, Turkish

[1] Single Byte Katakana is not supported
[2] Single Byte Katakana and some level 2 S-JIS Kanji (first byte > than H'E0) are *not* supported
[3] See appendix 3.11.1 for a list of unsupported characters

OS / Version / Locale	HP-UX[d] 10.01-11.X	NT 2000	Linux[c]	Reliant Unix 4.5[b]	IBM AIX 4.1[a]-5.2	DEC Unix V4.0-V5.1	SUN Solaris 2.5	SUN Solaris 2.6- 2.9
Asian Unification	X	--	X	--	X	X	--	X
Diocletian	X	X	X	--	X	X	X	X
SAP Unification	X	--	X	--	X	X	--	X

a Make sure that you have fetched your AIX SAP blended locales after January 98 as our initial locales do not function on AIX 4.1.
b See note 134608 for the required kernel patches and the required patch level of the operating system.
c Note that Linux does not support Shift-JIS. See SAP Note 171356 for details.
d IA-64 has been supported since June 2003.


English, German, Hungarian, Polish

There are four possible Country selections (i) Poland (ii) Latin-1 or MDMP (iii) SAPUnification "0EU" (iv) Sap Unification "8EU". Selecting "Poland" sets up a single code page system using 1401 as the system code page for all languages. Selecting "Latin-1 or MDMP" sets up an MDMP system with two code pages, 1100 (English, German) and 1401 (Hungarian, Polish).

There are also two possible settings for SAPUnification, which is an Ambiguous Blended Code Page (see appendix). Selecting "0EU" sets the Ambiguous Blended Code Page (6100), and all users can log in as English users and all characters are displayed correctly. Selecting "8EU" sets up an *MDMP* system that uses the locale for SAPUnification. This has some advantages and disadvantages compared to a true MDMP system. With 8EU, all users can log in as English users, and because there is only one locale, character data in tables without language keys will always be processed correctly (compare this to the MDMP restrictions given above). SAP does not recommend Ambiguous Code pages, because a future migration to Unicode is problematic.

 **UNICODE CONVERSION**
Because an upgrade to Unicode will involve a special conversion project, which is currently not supported, we do not recommend using SAP Ambiguous Code Pages; MDMP should be used.

3.13.1 Characters not supported in Ambiguous SAP Blended Code Pages

The following characters are not supported in ambiguous Blended Code Pages and cannot be used *at all*. Certain combinations of characters are also not supported however. For example it is impossible to use /û/ and /ű/ together, since they always share the same code point.

3.13.1.1 Characters not supported in Diocletian

To avoid any confusion, the unsupported characters are given with Unicode scalar value and name

U+00D7	MULTIPLICATION SIGN
U+00F7	DIVISION SIGN
U+02BC	MODIFIER LETTER APOSTROPHE
U+02BD	MODIFIER LETTER REVERSED COMMA
U+0384	GREEK TONOS
U+0385	GREEK DIALYTIKA TONOS
U+0386	GREEK CAPITAL LETTER ALPHA WITH TONOS
U+0388	GREEK CAPITAL LETTER EPSILON WITH TONOS
U+0389	GREEK CAPITAL LETTER ETA WITH TONOS
U+038A	GREEK CAPITAL LETTER IOTA WITH TONOS
U+038C	GREEK CAPITAL LETTER OMICRON WITH TONOS
U+038E	GREEK CAPITAL LETTER UPSILON WITH TONOS
U+038F	GREEK CAPITAL LETTER OMEGA WITH TONOS
U+0390	GREEK SMALL LETTER IOTA WITH DIALYTIKA AND TONOS
U+03AC	GREEK SMALL LETTER ALPHA WITH TONOS
U+03AD	GREEK SMALL LETTER EPSILON WITH TONOS
U+03AE	GREEK SMALL LETTER ETA WITH TONOS
U+03AF	GREEK SMALL LETTER IOTA WITH TONOS
U+03B0	GREEK SMALL LETTER UPSILON WITH DIALYTIKA AND TONOS
U+03C2	GREEK SMALL LETTER FINAL SIGMA
U+03CC	GREEK SMALL LETTER OMICRON WITH TONOS
U+03CD	GREEK SMALL LETTER UPSILON WITH TONOS
U+03CE	GREEK SMALL LETTER OMEGA WITH TONOS
U+2015	HORIZONTAL BAR

3.13.1.2 Characters not supported in SAP Unification

To avoid any confusion, the unsupported characters are given with Unicode scalar value and name: see www.unicode.org

U+00A1	INVERTED EXCLAMATION MARK
U+00A2	CENT SIGN
U+00A3	POUND SIGN
U+00A5	YEN SIGN
U+00A6	BROKEN BAR
U+00A9	COPYRIGHT SIGN
U+00AA	FEMININE ORDINAL INDICATOR
U+00AB	LEFT-POINTING DOUBLE ANGLE QUOTATION MARK
U+00AC	NOT SIGN
U+00AE	REGISTERED SIGN
U+00AF	MACRON
U+00B1	PLUS-MINUS SIGN
U+00B2	SUPERSCRIPT TWO
U+00B3	SUPERSCRIPT THREE
U+00B5	MICRO SIGN
U+00B6	PILCROW SIGN
U+00B7	MIDDLE DOT
U+00B9	SUPERSCRIPT ONE
U+00BA	MASCULINE ORDINAL INDICATOR
U+00BB	RIGHT-POINTING DOUBLE ANGLE QUOTATION MARK
U+00BC	VULGAR FRACTION ONE QUARTER
U+00BD	VULGAR FRACTION ONE HALF
U+00BE	VULGAR FRACTION THREE QUARTERS
U+00BF	INVERTED QUESTION MARK
U+00D7	MULTIPLICATION SIGN
U+00F7	DIVISION SIGN
U+02BC	MODIFIER LETTER APOSTROPHE
U+02BD	MODIFIER LETTER REVERSED COMMA
U+02D9	DOT ABOVE
U+0384	GREEK TONOS
U+0385	GREEK DIALYTIKA TONOS
U+0386	GREEK CAPITAL LETTER ALPHA WITH TONOS
U+0388	GREEK CAPITAL LETTER EPSILON WITH TONOS
U+0389	GREEK CAPITAL LETTER ETA WITH TONOS
U+038A	GREEK CAPITAL LETTER IOTA WITH TONOS
U+038C	GREEK CAPITAL LETTER OMICRON WITH TONOS
U+038E	GREEK CAPITAL LETTER UPSILON WITH TONOS
U+038F	GREEK CAPITAL LETTER OMEGA WITH TONOS
U+0390	GREEK SMALL LETTER IOTA WITH DIALYTIKA AND TONOS
U+03AC	GREEK SMALL LETTER ALPHA WITH TONOS
U+03AD	GREEK SMALL LETTER EPSILON WITH TONOS
U+03AE	GREEK SMALL LETTER ETA WITH TONOS
U+03AF	GREEK SMALL LETTER IOTA WITH TONOS
U+03B0	GREEK SMALL LETTER UPSILON WITH DIALYTIKA AND TONOS
U+03C2	GREEK SMALL LETTER FINAL SIGMA
U+03CC	GREEK SMALL LETTER OMICRON WITH TONOS
U+03CD	GREEK SMALL LETTER UPSILON WITH TONOS
U+03CE	GREEK SMALL LETTER OMEGA WITH TONOS
U+2015	HORIZONTAL BAR

3.13.2 SAP blended Locales

Table 1: Unambiguous code pages

Name of code page	locale name / TCPDB entry	original locale	Peripheral code pages			TCP0D
Asian Unification t)	asianuni / 6230	H'00-H'9F = Shift JIS H'A0-H'FF = Taiwanese	Japanese	SJIS (MS)	8000	0JM
			Taiwanese	MS Window 950	8300	
Asian Unification c)	asianuni / 6240	H'00-H'9F = SHIFT JIS H'A0-H'FF = Chinese	Japanese	SJIS (MS)	8000	0J1
			Chinese	MS Window 936	8400	
Asian Unification k)	asianuni / 6250	H'00-H'9F = Shift JIS H'A0-H'FF = Korean	Japanese	SJIS (MS)	8000	0J3
			Korean	MS Window 949	8500	
Euro Japan	eurojapan / 6300	H'00-H'7F & H'A0-H'FF = ISO88591 H'80-H'9F = SJIS	ISO88591	Motif ISO88591	6300	0EJ
				OS/2 Window 850	6313	
				MS Windows 1252	1160	
				HP Printer	1116	
				Postscript Printer	1117	
			Japanese	SJIS (MS)	8000	
				Canon Printer	6310	
				Generic Printer	6311	
				Kyocera Printer	6314	
				HP Printer	6316	
				Postscript Printer	6317	
				RICOH Printer	6322	
				SAPWINJP	6334	
Silk Road	silkroad / 6400	H'00-H'7F & H'A0-H'FF = ISO8859-7 H'80-H'9F = SJIS	ISO88597	Motif ISO88597	6400	0GJ
				OS/2 Window 869	6473	
				MS Window 1253	1704	
				HP Printer	6476	
				Postscript Printer	6477	
			Japanese	SJIS (MS)	8000	
Nagamasa	nagamasa / 6600	H'00-H'7F & H'A0-H'FF = TIS620 H'80-H'9F = SJIS	Thai	MS Window 874	8604	0J2
			Japanese	SJIS (MS)	8000	
Transsiberian	transsiberian / 6700	H'00-H'7F & H'A0-H'FF = ISO88595 H'80-H'9F = SJIS	Russian	MS Window 1251	1504	0JR
			Japanese	SJIS (MS)	8000	

Table 2: Ambiguous code pages

Name of code page	locale name / TCPDB entry	original locale	Peripheral code pages			TCP0D
SAP Unification	sapuni / 6100	H'00-H'7F = ISO88591 H'80-H'9F = SHIFTJIS H'A0-H'FF = ISO88592 EXCEPTIONS: H'D7 & H'F7 = ISO88597	ISO88591	Motif - ISO88591	6112	0EU
				OS/2 Window 850	6113	
				MS Window 1252	6114	
				MAC Window	6115	
				HP Printer	6116	
				Postscript Printer	6117	
			ISO88592	Motif - ISO88592	6122	
				OS/2 Window 852	6123	
				MS Window 1250	6124	
				MAC Window	6125	
				HP Printer	6126	
				Postscript Printer	6127	
			ISO88594	Motif - ISO88594	6142	
				MS Window	6144	
				HP Printer	6146	
				Postscript Printer	6147	
			ISO88597	Motif – ISO88597	6172	
				OS/2 Window 869	6173	
				MS Window 1253	6174	
				MAC Window	6175	
				HP Printer	6176	
				Postscript Printer	6177	
			ISO88599	Motif – ISO88597	6192	
				OS/2 Window 857	6193	
				MS Window 1254	6194	
				MAC Window	6195	
				HP Printer	6196	
				Postscript Printer	6197	
			Japanese	Motif - SJIS	6101	

				SJIS (MS)	8000	
				SAPWINJP Printer	6134	
				Canon Printer	6150	
				Generic Printer	6151	
				RICOH Printer	6152	
				Kyocera Printer	6154	
				HP Printer	6156	
				Postscript Printer	6157	

Name of code page	locale name / TCPDB entry	original locale	Peripheral code pages			TCP0D
Asian Unification	asianuni / 6200	H'00-H'9F = Shift JIS H'A0-H'FF = Korean or Chinese or Taiwanese	Japanese	SJIS (MS)	8000	0AU
			Korean	MS Window 949	8500	
			Chinese	MS Window 936	8400	
			Taiwanese	MS Window 950	8300	
Diocletian	diocletian / 6500	H'00-H'FF = ISO88591 Exceptions: H'D7 & H'F7 = ISO88597	ISO88591	Motif ISO88591	6512	0EG
				OS/2 Window 869	6513	
				MS Window 1250	6514	
				HP Printer	6516	
				Postscript Printer	6517	
			ISO88597	Motif ISO88591	6572	
				OS/2 Window 869	6573	
				MS Window 1253	6574	
				HP Printer	6576	
				Postscript Printer	6577	

The date format of all blended code page is: "Fri Aug 28 09:45:33 1998". (since Aug 27, 1998)