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SAS® 9.2 National Language Support (NLS) Reference Guide

SAS® Documentation

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Contents

What's New

Overview

In this release, SAS has expanded the scope and capabilities of National Language Support (NLS). NLS is a set of features that enable a software product to function properly in every global market for which the product is targeted. SAS contains NLS features to ensure that you can write SAS applications that conform to local language conventions. Typically, software that is written in the English language works well for users who use the English language and data that is formatted using the conventions that are observed in the United States. However, without NLS, these products might not work as well for users in other regions of the world. NLS in SAS enables users in regions such as Asia and Europe to process data successfully in their native languages and environments.

This topic describes the changes and enhancements that have been made to the NLS documentation and features.

- additional autocall macros
- macro functions
- additional encodings
- additional functions and a new directive for selected functions
- additional locales
- additional system options
- formats that now support Arabic and new formats
- documentation enhancements such as revising the collating sequence topic and moving the EUR language elements to another section
- informats that now support Arabic and new informats
- internationalization compatibility for SAS string functions
- language switching

Documentation Enhancements

- The title of this document was changed for SAS 9.2 NLS. The new title is *SAS National Language Support (NLS): Reference Guide*.

- The Collating Sequences section, which describes the orders in which characters are sorted, has been revised.
- SAS recommends that users use the NL language elements instead of the EUR language elements. The EUR language elements are in an appendix titled Additional Elements.

Internationalization Compatibility for SAS String Functions

The Internationalization Compatibility for SAS String Functions section specifies the level of internationalization compatibility for SAS string functions.

National Collating Sequences of Alphanumeric Characters

The National Collating Sequences of Alphanumeric Characters table has been updated to reflect current collating sequences.

Language Switching

The Language Switching section describes how you can view SAS messages in another language using a Unicode server.

Locales

The following locales have been added in SAS 9.2 NLS. Information on how locales work in SAS programming is provided in Overview of Locale Concepts for NLS:

- Afrikaans_SouthAfrica
- Albanian_Albania
- Arabic_India
- Arabic_Iraq
- Arabic_Libya
- Arabic_Sudan
- Arabic_Syria
- Arabic_Yemen
- Bengali_India
- Bosnian_BosniaHerzegovina
- Catalan_Spain
- Cornish_UnitedKingdom
- Croatian_BosniaHerzegovina
- English_Belgium
- English_Botswana
- English_Caribbean
- English_Philippines
- English_Zimbabwe

- Faroese_FaroeIslands
- Greenlandic_Greenland
- Hindi_India
- Indonesian_Indonesia
- Macedonian_Macedonia
- Malay_Malaysia
- Maltese_Malta
- ManxGaelic_UnitedKingdom
- Marathi_India
- NorwegianBokmal_Norway
- NorwegianNynorsk_Norway
- Persian_India
- Persian_Iran
- Russian_Ukraine
- Serbian_BosniaHerzegovina
- Serbian_Montenegro
- Serbian_Serbia
- SerboCroatian_Montenegro
- SerboCroatian_Serbia
- Tamil_India
- Telugu_India

Encodings

In the third maintenance release for SAS 9.2, the SBCS, DBCS, and Unicode Encoding Values Used to Transcode Data table was updated to reflect current values.

In the third maintenance release for SAS 9.2, the following encodings were removed from the Double-Byte Encodings for UNIX table:

- Traditional Chinese HP15
- Simplified Chinese PCMS
- Korean PCMS

The following encodings have been added in SAS 9.2 NLS. Information on how encodings work in SAS programming is provided in Overview of Encoding for NLS:

- e097 - Farsi Bilingual - EBCDIC
- eofa - Farsi Bilingual - EBCDIC
- e137 - Devanagari - EBCDIC
- eoin - Devanagari - EBCDIC
- e153 - EBCDIC Latin 2 Multilingual with euro
- e053 - EBCDIC Latin 2 Multilingual with euro
- e154 - EBCDIC Cyrillic Multilingual with euro
- e054 - EBCDIC Cyrillic Multilingual with euro
- e155 - EBCDIC Turkey with euro
- e055 - EBCDIC Turkey with euro
- e156 - EBCDIC Baltic Multi with euro
- e056 - EBCDIC Baltic Multi with euro

- e157 - EBCDIC Estonia with euro
- e057 - EBCDIC Estonia with euro
- e158 - EBCDIC Cyrillic Ukraine with euro
- e058 - EBCDIC Cyrillic Ukraine with euro
- e905 - Latin 3 - EBCDIC
- e013 - Latin 3 - EBCDIC
- lat8 - ISO 8859/14–latin8
- p806 - PC Indian Script Code (ISCII–91)
- p098 - Farsi - Personal Computer

Autocall Macros

The following SAS 9.2 NLS autocall macros are new:

- %KLOWCASE and %QKLOWCAS
- %KTRIM and %QKTRIM
- %KVERIFY

Macro Functions

The following SAS 9.2 NLS macro functions are new:

- %KINDEX
- %KLEFT and %QKLEFT
- %KLENGTH
- %KSCAN and %QKSCAN
- %KSUBSTR and %QKSUBSTR
- %KUPCASE and %QKUPCASE

Formats

- The following SAS 9.2 NLS formats have been enhanced and now support Arabic:
  - $BIDI
  - $LOGVS
  - $LOGVSR
  - $VSLOG
  - $VSLOGR
- In the third maintenance release for SAS 9.2, the following formats have been enhanced to support date-time values:
  - NLTIMAP
  - NLTIME
- The following numeric formats are new for SAS 9.2 NLS.

NLBEST	writes the best numerical notation, based on the locale.
NLSTRMON	writes a numeric value as a day-of-the-month in the specified locale.

NLSTRQTR writes a numeric value as the quarter-of-the-year in the specified locale

NLSTRWK writes a numeric value as the day-of-the-week in the specified locale

NLPVALUE writes p-values of the local expression in the specified locale

- The following date and time formats are new for SAS 9.2 NLS. These formats write locale-specific dates and times.

  NLDATEYQ converts the SAS date value to the date value of the specified locale, and then writes the date value as the year and the quarter.

  NLDATEYR converts the SAS date value to the date value of the specified locale, and then writes the date value as the year.

  NLDATEYW converts the SAS date value to the date value of the specified locale, and then writes the date value as the year and the week.

  NLDATMDT converts the SAS datetime value to the datetime value of the specified locale. This format writes the value as the name of the month, day of the month, and year.

  NLDATMMN converts the SAS datetime value to the datetime value of the specified locale, and then writes the value as the name of the month.

  NLDATMWN converts a SAS datetime value to the datetime value of the specified locale, and then writes the value as the day of the week.

  NLDATMYQ converts the SAS datetime value to the datetime value of the specified locale, and then writes the value as the year and the quarter of the year.

  NLDATMYR converts the SAS datetime value to the datetime value of the specified locale, and then writes the value as the year.

  NLDATMYW converts the SAS datetime value to the datetime value of the specified locale, and then writes the value as the year and the name of the week.

- The following currency formats are new for SAS 9.2 NLS. These formats write the international monetary expression.
  - NLMNIAUD - Australia
  - NLMNICADw.d - Canada
  - NLMNICHFw.d - Liechtenstein
  - NLMNICNYw.d - China
  - NLMNIDKKw.d - Denmark, Faroe Island, and Greenland
  - NLMNIEURw.d - Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Malta, the Netherlands, Portugal, Slovenia, and Spain
  - NLMNIGBPw.d -United Kingdom
  - NLMNIILSw.d - Israel
  - NLMNIJPYw.d - Japan
  - NLMNIKRWw.d - South Korea
  - NLMNIMYRw.d - Malaysia

- NLMNINOKw.d - Norway
- NLMNINZDw.d - New Zealand
- NLMNIPLNw.d - Poland
- NLMNIRUBw.d - Russia
- NLMNISEKw.d - Sweden
- NLMNISGDw.d - Singapore
- NLMNITWDw.d - Thailand
- NLMNIUSDw.d - Puerto Rico, and United States
- NLMNIZARw.d - South Africa

- The following currency formats for SAS 9.2 NLS are new. These formats write the local monetary expression.
  - NLMNLAUDw.d - Australia
  - NLMNLCADw.d - Canada
  - NLMNLCHFw.d - Liechtenstein
  - NLMNLCNYw.d - China
  - NLMNLDKKw.d - Denmark, Faroe Island, Greenland
  - NLMNLEURw.d - Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, and Spain
  - NLMNLGPBw.d - United Kingdom
  - NLMNLHKDw.d - Hong Kong
  - NLMNLILSw.d - Israel
  - NLMNLJPYw.d - Japan
  - NLMNLKRWw.d - South Korea
  - NLMNLMYRw.d - Malaysia
  - NLMNLNOKw.d - Norway
  - NLMNLNZDw.d - New Zealand
  - NLMNLPLNw.d - Poland
  - NLMNLRUBw.d - Russia
  - NLMNLSEKw.d - Sweden
  - NLMNLSGDw.d - Singapore
  - NLMNLTWDw.d - Taiwan
  - NLMNLUSDw.d - Puerto Rico and the United States
  - NLMNLZARw.d - South Africa

Informats

- The following SAS 9.2 NLS informats have been enhanced and now support Arabic:
  - $LOGVS
  - $LOGVSR
  - $VSLOG
  - $VSLOGR
- The following currency informats are new for SAS 9.2 NLS. These informats read the international monetary expression.

- NLMNIAUDw.d - Australia
- NLMNICADw.d - Canada
- NLMNICHFw.d - Liechtenstein and Switzerland
- NLMNICNYw.d - China
- NLMNIDKKw.d - Denmark, Faroe Island, and Greenland
- NLMNIEURw.d - Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Malta, the Netherlands, Portugal, Slovenia, and Spain
- NLMNIGBPw.d - United Kingdom
- NLMNIHKDw.d - Hong Kong
- NLMNIILSw.d - Israel
- NLMNIJPYw.d - Japan
- NLMNIKRWw.d - South Korea
- NLMNIMYRw.d - Malaysia
- NLMNINOKw.d - Norway
- NLMNINZDw.d - New Zealand
- NLMNIPLNw.d - Poland
- NLMNIRUBw.d - Russia
- NLMNISEKw.d - Sweden
- NLMNISGDw.d - Singapore
- NLMNITWDw.d - Taiwan
- NLMNIUSDw.d - Puerto Rico, and the United States
- NLMNIZARw.d - South Africa

- The following currency informats are new for SAS 9.2 NLS. These informats read the local monetary expression.
  - NLMNLAUDw.d - Australia
  - NLMNLCADw.d - Canada
  - NLMNLCHFw.d - Liechtenstein and Switzerland
  - NLMNLCNYw.d - China
  - NLMNLDKKw.d - Denmark, the Faroe Island, and Greenland
  - NLMNLEURw.d - Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Malta, the Netherlands, Portugal, Slovenia, and Spain
  - NLMNLGBPw.d - United Kingdom
  - NLMNLHKDw.d - Hong Kong
  - NLMNLILSw.d - Israel
  - NLMNLJPYw.d - Japan
  - NLMNLKRWw.d - South Korea
  - NLMNLMYRw.d - Malaysia
  - NLMNLNOKw.d - Norway
  - NLMNLNZDw.d - New Zealand
  - NLMNLPLNw.d - Poland
  - NLMNLRUBw.d - Russia
  - NLMNLSEKw.d - Sweden
  - NLMNLSGDw.d - Singapore

- NLMNLTWDw.d - Taiwan
- NLMNLUSDw.d - Puerto Rico and the United States
- NLMNLZARw.d - South Africa

Functions

- The following functions are new for SAS 9.2 NLS:

GETPXLANGUAGE	displays a transcoding error when illegal data is read from a remote application
GETPXLOCALE	returns the POSIX locale value for a SAS locale
GETPXREGION	returns the current, two-letter region code
KPROPCASE	converts Chinese, Japanese, Korean, Taiwanese (CJKT) characters
KPROPCHAR	converts special characters to normal characters
KPROPDATA	removes or converts unprintable characters
SORTKEY	creates a linguistic sort key
UNICODE	converts Unicode characters to the current SAS session encoding
UNICODEC	converts characters in the current SAS session encoding to Unicode characters
UNICODELEN	creates a linguistic sort key
UNICODEWIDTH	specifies the length of a display unit for the Unicode data

- A new directive, "#", was added to the following functions:
  - NLDATE
  - NLDATM
  - NLTIME

System Options

In the third maintenance release for SAS 9.2, the NLSCOMPATMODE option has been modified. A note has been added to the Details section notifying the user that a warning will be generated when NLSCOMPATMODE is set.

The following system options are new for SAS 9.2 NLS:

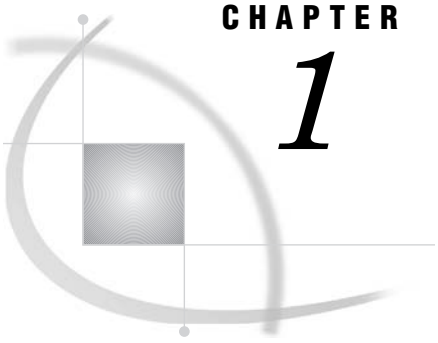
BOMFILE
specifies whether to write the Byte Order Mark (BOM) prefix on Unicode-encoded external files

LOCALELANGCHG
determines whether the language of the text of the ODS output can be changed

RSASIOTRANSERROR
displays a transcoding error when illegal data is read from a remote application

PART 1

NLS Concepts



CHAPTER

1

National Language Support (NLS)

Overview to National Language Support

National Language Support (NLS) is a set of features that enable a software product to function properly in every global market for which the product is targeted. The SAS System contains NLS features to ensure that SAS applications can be written so that they conform to local language conventions. Typically, software that is written in the English language works well for users who use the English language and use data that is formatted using the conventions that are observed in the United States. However, without NLS, these products might not work well for users in other regions of the world. NLS in SAS enables users in regions such as Asia and Europe to process data successfully in their native languages and environments.

SAS provides NLS for data as well as for code under all operating environments and hardware, from the mainframe to the personal computer. This support is especially important to international users who are running applications in a client/server environment. SAS provides NLS for mainframes while maintaining consistency with applications that were developed with previous versions of SAS.

NLS is applied to data that is moved between machines; for example, NLS ensures that the data is converted to the correct format for use on the target machine.

Text-string operations are sensitive to SAS settings for language and region. This action enables correct results for such operations as uppercasing and lowercasing characters, classifying characters, and scanning data. SAS provides features to ensure that national characters, which are characters specific to a particular nation or group of nations, display and print properly.

Software applications that incorporate NLS can avoid dependencies on language-specific or cultural-specific conventions for software features such as:

- character classifications
- character comparison rules
- code sets
- date and time formatting
- interface
- message-text language
- numeric and monetary formatting
- sort order

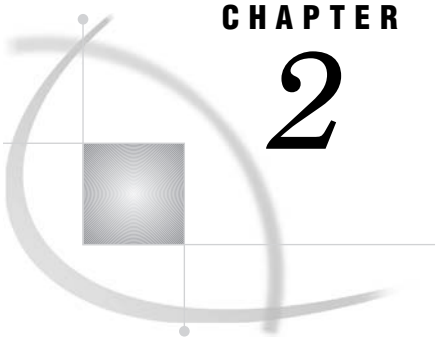
Definition of Localization and Internationalization

Localization is the process of adapting a product to meet the language, cultural, and other requirements of a specific target environment or market so that users can use their own languages and conventions when using the product. Translation of the user interface, system messages, and documentation is part of localization.

Internationalization is the process of designing a software application without making assumptions that are based on a single language or locale. One goal of internationalization is to ensure that international conventions, including rules for sorting strings and for formatting dates, times, numbers, and currencies, are supported. Another goal is to design the product to have a consistent look, feel, and functionality across different language editions.

Although the application logic might support cultural conventions (for example, the monetary and numeric formats of a particular region), only a localized version of the software presents user interfaces and system messages in the local language.

SAS NLS features are available for localizing and internationalizing your SAS applications.



CHAPTER

2

Locale for NLS

Overview of Locale Concepts for NLS

A *locale* reflects the language, local conventions such as data formatting, and culture for a geographical region. Local conventions might include specific formatting rules for dates, times, and numbers and a currency symbol for the country or region. Collating sequence, paper size, postal addresses, and telephone numbers can also be included in locale.

Dates have many representations, depending on the conventions that are accepted in a culture. The month might be represented as a number or as a name. The name might be fully spelled or abbreviated. The order of the month, day, and year might differ according to locale.

For example, "the third day of October in the year 2002" would be displayed in a different way for each of these locales:

Bulgaria	2002–X-3
Canada	02–10–03
Germany	03–10–02
Italy	3/10/02
United States	10/03/02

Time can be represented in one English-speaking country or region by using the 12-hour notation, while other English speakers expect time values to be formatted using the 24-hour notation.

Language is part of a locale, but is not unique to any one locale. For example, Portuguese is spoken in Brazil as well as in Portugal, but the cultures are different. In Brazil and in Portugal, there are similarities in the formatting of data. Numbers are formatted using a comma (,) to separate integers from fractional values and a dot (.) to separate groups of digits to the left of the radix character. However, there are important differences, such as the currency symbols that are used in the two different locales. Portugal uses the Euro and requires the Euro symbol (€), while Brazil uses the Real which is represented by the two-character currency symbol R$.

Additionally, a country might have more than one official language. Canada has two official languages: English and French; two values can be specified for the LOCALE= system option: English_Canada and French_Canada.

Numbers, including currency, can have different representations. For example, the decimal separator, or radix character, is a dot (.) in some regions and a comma (,) in others, while the thousands separator can be a dot, comma, or even a space. Monetary conventions likewise vary between locales; for example, a dollar sign or a yen sign might be attached to a monetary value.

Paper size and measurement are also locale considerations. Standard paper sizes include letter (8-1/2-by-11-inch paper) and A4 (210-by-297-millimeter paper). The letter paper size is mainly used by some English-speaking countries; A4 is used by most other locales. While most locales use centimeters, some locales use inches.

Specifying a Locale

How Locale Is Specified at SAS Invocation

You can use the LOCALE= system option to specify the locale of the SAS session at SAS invocation. LOCALE= also implicitly sets the following SAS system options:

- DATESTYLE=
- DFLANG=
- ENCODING=
- PAPERSIZE=
- TRANTAB=

Windows example:

```
sas9 -locale English_UnitedStates
```

Note: Locale can also be specified using POSIX naming standards. For example, en_US is the POSIX equivalent for the SAS value English_UnitedStates. △

Default values for the LOCALE= option are the same under each operating environment. For details, see Chapter 16, "Values for the LOCALE= System Option," on page 539.

The English_UnitedStates value for LOCALE= causes the following options to be implicitly set to the specified default values SAS invocation:

- DATESTYLE=MDY
- DFLANG=English
- ENCODING=wlatin1
- PAPERSIZE=Letter
- TRANTAB=(lat1lat1, lat1lat1,wlt1_ucs,wlt1_lcs,wlt1_ccl,,,)

At invocation, an explicitly set system option will override any implicitly set option.
Windows example:

```
sas9 - papersize=A4;
```

At invocation, the explicit setting PAPERSIZE=A4 will override an implicit setting of the PAPERSIZE= option via the LOCALE= option. For details, see "DATESTYLE= System Option" on page 453.

How Locale Is Specified During a SAS Session

You can use the LOCALE= system option to specify the locale of the SAS session during the SAS session. However, only the values for these system options will change implicitly to reflect the changed value of LOCALE=:

- DATESTYLE=
- DFLANG=
- PAPERSIZE=

The values for these system options will not change implicitly to reflect the changed value of LOCALE=:

- ENCODING=
- TRANTAB=

Note: ENCODING= cannot be reset during a SAS session. It can be set only at invocation. △

Note: For more details about the differences between the LOCALE= and ENCODING= options, see "Setting the Encoding of a SAS Session" on page 22 △

Windows example:

```
options locale=Italian_Italy;
```

The Italian_Italy value that is assigned to the LOCALE= option causes the following options to be implicitly reset during the SAS session to reflect the changed value of the LOCALE= system option:

- DATESTYLE=DMY
- DFLANG=Italian
- PAPERSIZE=A4

The values for the ENCODING= and TRANTAB= options will not be reset; their former values will be retained.

For details about these system options, see "DATESTYLE= System Option" on page 453.

Language Switching

SAS messages are displayed in the language that is specified by the settings in the SAS configuration file during startup. In the Unicode server, you can view SAS messages in another language by using the Language Switching feature. You can access the Language Switching feature with the LOCALELANGCHG system option. If LOCALELANGCHG is enabled, then the value of the LOCALE system option determines the language for procedure output, user interface elements and ODS fonts. If LOCALELANGCHG is disabled, then messages will appear in the language that is set during startup. This feature is supported in the Unicode server. For more information, see the "LOCALELANGCHG System Option" on page 464.

CHAPTER

3

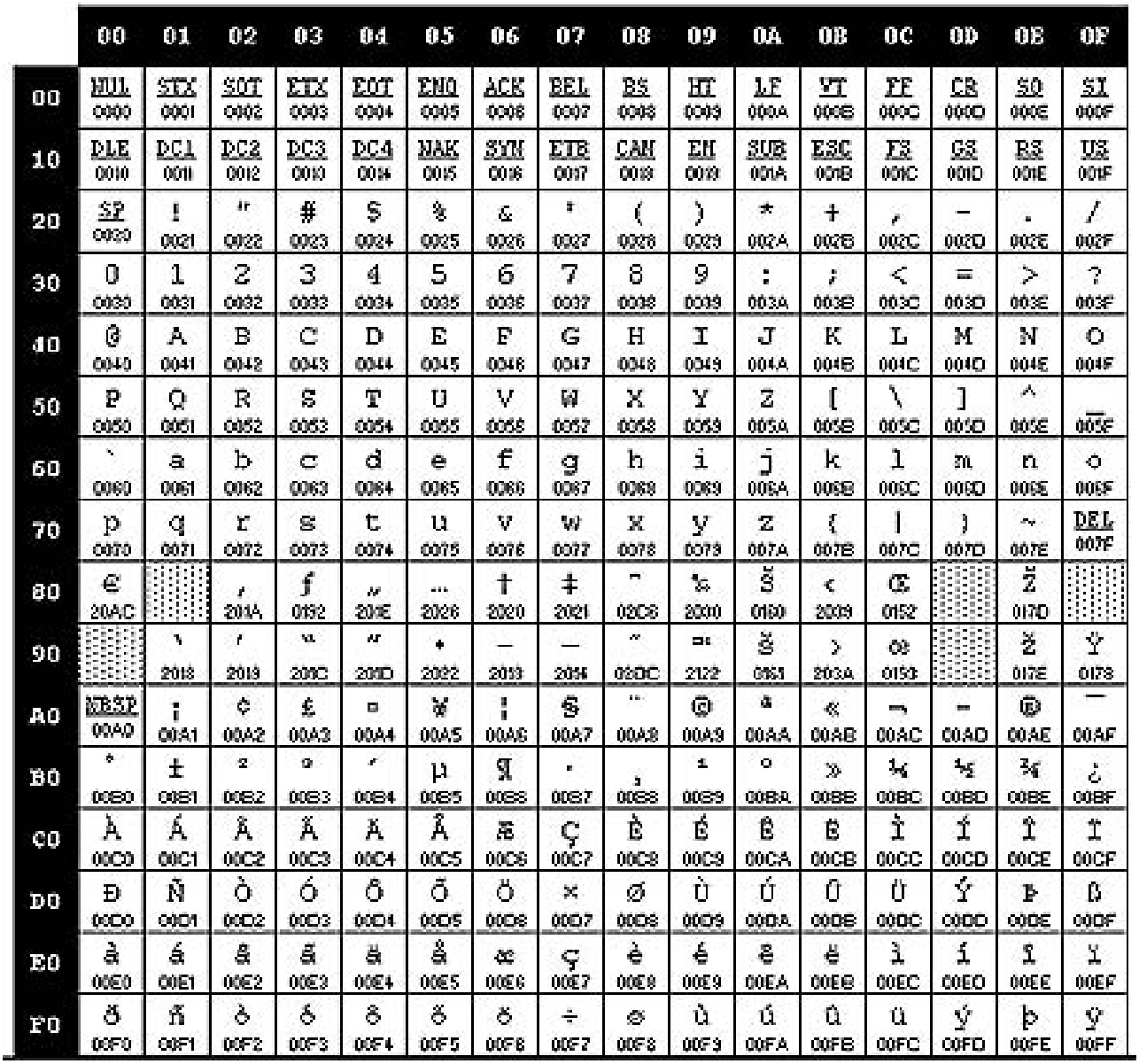
Encoding for NLS

Overview: Encoding for NLS

An encoding maps each character in a character set to a unique numeric representation, which results in a table of all code points. This table is referred to as a *code page*, which is an ordered set of characters in which a numeric index (code point value) is associated with each character. The position of a character on the code page determines its two-digit hexadecimal number.

For example, the following is the code page for the Windows Latin1 encoding. In the following example, the row determines the first digit and the column determines the second digit. The numeric representation for the uppercase A is the hexadecimal number 41, and the numeric representation for the equal sign (=) is the hexadecimal number 3D.

Figure 3.1 Windows Latin1 Code Page



A *character set* is the set of characters and symbols that are used by a language or group of languages. A character set includes national characters (which are characters specific to a particular nation or group of nations), special characters (such as punctuation marks), the unaccented Latin characters A–Z, the digits 0–9, and control characters that are needed by the computer.

An *encoding method* is a set of rules that assign the numeric representations to the set of characters. These rules govern the size of the encoding (number of bits used to store the numeric representation of the character) and the ranges in the code page where characters appear. The encoding methods result from the adherence to standards that have been developed in the computing industry. An encoding method is often specific to the computer hardware vendor.

An *encoding* results from applying an encoding method to a character set.

An individual character can occupy a different position in a code page, depending on the code page used. For example, the German uppercase letter Ä:

- is represented as the hexadecimal number C4 in the Windows Latin1 code page (1252)
- is represented as the hexadecimal number 4A in the German EBCDIC code page (1141)

In the following code page example, German is the character set and EBCDIC is the encoding method.

In the following example, the column determines the first digit and the row determines the second digit.

Figure 3.2 German EBCDIC Code Page

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	ø LC610000	Ø LC620000	¤ SM190000	µ SM170000	¢ SC040000	ä LA170000	ü LU170000	Ö LO180000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	a LA010000	j LJ010000	ß LS810000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	§ LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	{ SM110000	ë LE170000	[SM060000	Ë LE180000	c LC010000	l LL010000	t LT010000	• SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	@ SM050000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	ì LI130000	Ç LC420000	Ì LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	~ SD190000	Ñ LN200000	` SD130000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	Ä LA180000	Ü LU180000	ö LO170000	: SP130000	« SP170000	æ SM210000	¦ SP030000	¬ SM660000	(SHY) SP320000	¹ ND011000	² ND021000	³ ND031000
-B	. SP110000	$ SC030000	, SP080000	# SM010000	» SP180000	Æ SM200000	¿ SP160000	‖ SM130000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA080000	* SM040000	% SM020000	§ SM240000	ð LD630000	æ LA510000	Ð LD620000	¯ SM150000	¦ SM650000	} SM140000	\ SM070000	] SM080000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	ý LY110000	¸ SD410000	Ý LY120000	¨ SD170000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	Æ LA520000	Þ LT640000	´ SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	± SA020000	¤ SC010000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

Each SAS session is set to a default encoding, which can be specified by using various SAS language elements.

Difference between Encoding and Transcoding

Encoding establishes the default working environment for your SAS session. For example, the Windows Latin1 encoding is the default encoding for a SAS session under Windows in a Western European locale such as the de_DE locale for German in Germany. As an example, the Windows Latin1 code point for the uppercase letter Ä is C4 hexadecimal.

Note: The default encoding varies according to the operating environment and the locale. △

However, if you are working in an international environment (for example, you access SAS data that is encoded in German EBCDIC), the German EBCDIC code point for the uppercase letter Ä is 4A hexadecimal. In order for a version of SAS that normally uses Windows Latin1 to properly interpret a data set that is encoded in German EBCDIC, the data must be transcoded. *Transcoding* is the process of converting data from one encoding to another. When SAS transcodes the Windows Latin1 uppercase letter Ä to the German EBCDIC uppercase letter Ä, the hexadecimal representation for the character is converted from the value C4 to a 4A. For conceptual information, see Chapter 4, "Transcoding for NLS," on page 27.

Character Sets for Encoding in NLS

Encodings are available to address the requirements of the character set (few languages use the same 26 characters, A through Z as English). All languages are represented using either of the following classes of character sets:

SBCS (Single-Byte Character Set)
: represents each character in a single (one) byte. A single-byte character set can be either 7 bits (providing up to 128 characters) or 8 bits (providing up to 256 characters). An example of an 8-bit SBCS is the ISO 8859-5 (Cyrillic) character set (represents the Russian characters).

  For details about how SAS uses SBCS encodings, see Chapter 18, "Encoding Values in SAS Language Elements," on page 549.

DBCS (Double-Byte Character Set)
: refers to the East Asian character sets (Japanese, Korean, Simplified Chinese, and Traditional Chinese), which require a mixed-width encoding because most characters consist of more than one byte. Although the term DBCS (Double-Byte Character Set) is more commonly used than MBCS (Multi-Byte Character Set), MBCS is more accurate. Some, but not all characters in an East Asian character set do require more than one byte.

  For details about how SAS uses DBCS encodings, see Chapter 17, "SAS System Options for Processing DBCS Data," on page 547.

MBCS (Multi-Byte Character Set)
: is used as a synonym for DBCS.

Common Encoding Methods

The encoding methods result from standards developed by various computer hardware manufacturers and standards organizations. For more information, see

"Standards Organizations for NLS Encodings" on page 15. The common encoding methods are listed here:

ASCII (American Standard Code for Information Interchange)
is a 7-bit encoding for the United States that provides 128 character combinations. The encoding contains characters for uppercase and lowercase English, American English punctuation, base 10 numbers, and a few control characters. This set of 128 characters is common to most other encodings. ASCII is used by personal computers.

EBCDIC (Extended Binary Coded Decimal Interchange Code) family
is an 8-bit encoding that provides 256 character combinations. There are multiple EBCDIC-based encodings. EBCDIC is used on IBM mainframes and most IBM mid-range computers. EBCDIC follows ISO 646 conventions to facilitate translations between EBCDIC encodings and 7-bit (and 8-bit) ASCII-based encodings. The 95 EBCDIC graphical characters include 82 invariant characters (including a blank space), which occupy the same code positions across most EBCDIC single-byte code pages, and also includes 13 variant graphic characters, which occupy varying code positions across most EBCDIC single-byte code pages. For details about variant characters, see "Code Point Discrepancies among EBCDIC Encodings" on page 15.

ISO (International Organization for Standardization) 646 family
is a 7-bit encoding that is an international standard and provides 128 character combinations. The ISO 646 family of encodings is similar to ASCII except that it has 12 code points for national variants. The 12 national variants represent specific characters that are needed for a particular language.

ISO 8859 family and Windows family
is an 8-bit extension of ASCII that supports all of the ASCII code points and adds 12 more, providing 256 character combinations. Latin1, which is officially named ISO-8859-1, is the most frequently used member of the ISO 8859 family of encodings. In addition to the ASCII characters, Latin1 contains accented characters, other letters needed for languages of Western Europe, and some special characters. HTTP and HTML protocols are based on Unicode.

Unicode
provides up to 99,024 character combinations. Unicode can accommodate basically all of the world's languages.

There are three Unicode encoding forms:

UTF-8
is an MBCS encoding that contains the Latin-script languages, Greek, Cyrillic, Arabic, and Hebrew, and East Asian languages such as Japanese, Chinese and Korean. The characters in UTF-8 are of varying width, from one to four bytes. UTF-8 maintains ASCII compatibility by preserving the ASCII characters in code positions 1 through 128.

UTF-16
is a 16-bit form that contains all of the most common characters in all modern writing systems. Most of the characters are uniformly represented with two bytes, although there is extended space, called surrogate space, for additional characters that require four bytes.

UTF-32
is a 32-bit form whose characters each occupy 4 bytes.

Other encodings
The ISO 8859 family has other members that are designed for other languages. The following table describes the other encodings that are approved by ISO.

Table 3.1 Other Encodings Approved by ISO

ISO Standard	Name of Encoding	Description
ISO 8859-1	Latin 1	US and West European
ISO 8859-2	Latin 2	Central and East European
ISO 8859-3	Latin 3	South European, Maltese and Esperanto
ISO 8859-4	Baltic	North European
ISO 8859-5	Cyrillic	Slavic languages
ISO 8859-6	Arabic	Arabic
ISO 8859-7	Greek	Modern Greek
ISO 8859-8	Hebrew	Hebrew and Yiddish
ISO 8859-9	Turkish	Turkish
ISO 8859-10	Latin 6	Nordic (Inuit, Sámi, Icelandic)
ISO 8859-11	Latin/Thai	Thai
ISO 8859-13	Latin 7	Baltic Rim
ISO 8859-14	Latin 8	Celtic
ISO 8859-15	Latin 9	West European and Albanian

Additionally, a number of encoding standards have been developed for East Asian languages, some of which are listed in the following table.

Table 3.2 Some East Asian Language Encodings Approved by ISO

Standard	Name of Encoding	Description
GB 2312-80	Simplified Chinese	People's Republic of China
CNS 11643	Traditional Chinese	Taiwan
Big-5	Traditional Chinese	Taiwan
KS C 5601	Korean National Standard	Korea
JIS	Japan Industry Standard	Japan
Shift-JIS	Japan Industry Standard multibyte encoding	Japan

There are other encodings in the standards for EBCDIC and Windows that support different languages and locales.

Standards Organizations for NLS Encodings

Encodings that are supported by SAS are defined by the following standards organizations:

International Organization for Standardization (ISO)
: promotes the development of standardization and related activities to facilitate the free flow of goods and services between nations and to advocate for the exchange of intellectual, scientific, and technological information. ISO also establishes standards for encodings.

American National Standards Institute (ANSI)
: coordinates voluntary standards and conformity to those standards in the United States. ANSI works with ISO to establish global standards.

Unicode Consortium
: that develops and promotes the Unicode standard, which provides a unique number for every character.

Code Point Discrepancies among EBCDIC Encodings

Selected characters do not occupy the same code point locations in code maps for all EBCDIC encoding methods. For example, the following characters occupy different code point locations in the respective EBCDIC code maps for U.S. English and German.

Table 3.3 EBCDIC Code Point Discrepancies for Selected Languages

EBCDIC Code Points	U.S. English	Finnish	Spanish	Austrian/ German
4A	¢	§	[	Ä
4F	|	!	|	!
5A	!	¤	]	Ü
5B	$	Å	$	$
5F	¬	^	¬	^
6A	¦	ö	ñ	ö
79	‘	é	‘	‘
7B	#	Ä	Ñ	#
7C	@	Ö	@	§
A1	~	ü	¨	ß
C0	{	ä	{	ä
D0	}	å	}	ü
E0	\	É	\	Ö

These characters are known as *variant characters*. For example, if a German mainframe user entered an ä, which occupies code point C0, an American compiler would interpret code point C0 as a {.

Especially important are characters that are commonly used in programming languages, for example, { and $.

Collating Sequence

Overview to Collating Sequence

The collating sequence is the order in which characters are sorted. For example, when the SORT procedure is executed, the collating sequence determines the sort order (higher, lower, or equal to) of a particular character in relation to other characters.

The default collating sequence is *binary collation*, which sorts characters according to each character's location in the code page of the session encoding. (The session encoding is the default encoding for a SAS session. The default encoding can be specified by using various SAS language elements.) The sort order corresponds directly to the arrangement of the code points within the code page. The two single-byte character encoding methods that data processing uses most widely are ASCII and EBCDIC. The OpenVMS, UNIX, and Windows operating environments use ASCII encodings; IBM mainframe computers use EBCDIC encodings.

Binary collation is the fastest type of collation because it is the most efficient for the computer. However, locating characters within a binary-collated report might be difficult if you are not familiar with this method. For example, a binary-collated report lists words beginning with uppercase characters separately from words beginning with lowercase characters, and words beginning with accented characters after words beginning with unaccented characters. Therefore, for ASCII-based encodings, the capital letter **Z** precedes the lowercase letter **a**. Similarly, for EBCDIC-based encodings, the lowercase letter **z** precedes the capital letter **A**.

You can request an alternate collating sequence that overrides the binary collation. To request an alternate collating sequence, specify one of the following sequences:

- a translation table name
- an encoding value
- linguistic collation

Table 3.4 on page 16 illustrates the results of using different collating sequences to sort a short list of words:

Table 3.4 Results of Different Collating Sequences

Binary	Translation Table	Encoding Value	Linguistic
Aaron	aardvark	Aaron	aardvark
Aztec	azimuth	Aztec	Aaron
Zeus	Aaron	Zeus	azimuth
aardvark	Aztec	aardvark	Aztec
azimuth	cote	azimuth	cote

Binary	Translation Table	Encoding Value	Linguistic
cote	coté	cote	côte
coté	côte	coté	coté
côte	côté	côte	côté
côté	zebra	côté	zebra
zebra	zèbre	zebra	zèbre
zèbre	Zeus	zèbre	Zeus

The first column shows the results of binary collation on characters that are represented in an ASCII-based encoding. The alphabetization is not consistent because of the separate grouping of words that begin with uppercase and lowercase characters. For example, the word *Zeus* appears before *aardvark* because of the code points that are assigned to the characters within the ASCII-based encoding.

The second column shows the results of specifying a translation table that alternates the ordering of lowercase and uppercase characters. If you use the translation table, the word *aardvark* appears before *Zeus*. However, the word *azimuth* appears before *Aaron* because the translation table assigns a weight value to the lowercase character **a** that is less than the weight value of the uppercase character **A**. In addition, accents are sorted from left to right. For example, *coté* comes before *côte*.

The third column shows the results of specifying the ASCII-based, double-byte latin1 encoding.

The last column shows the results of linguistic collation for the session locale fr_FR (French_France), which uses a collation algorithm to alphabetize words. The algorithm specifies that words beginning with lowercase characters appear before words beginning with uppercase characters. In addition, this linguistic collation sorts accents from right to left because of the French locale specification.

SAS has adopted the International Components for Unicode (ICU)to implement linguistic collation. The ICU and its implementation of the Unicode Collation Algorithm (UCA) have become a standard. The collating sequence is the default provided by the ICU for the specified locale.

Request Alternate Collating Sequence

To request an alternate collating sequence, use the following SAS language elements:

- SORTSEQ= option in the PROC SORT statement. See “Collating Sequence Option” on page 475.
- SORTSEQ= system option. See “SORTSEQ= System Option: UNIX, Windows, and z/OS” on page 467.

Note that neither method supports all of the collating sequences. For example, only the SORTSEQ= option in the PROC SORT statement supports linguistic collation. However, both the SORTSEQ= option in the PROC SORT statement and the SORTSEQ= system option support translation table collating sequences.

The BASE (V9) engine and the REMOTE engine for SAS/SHARE support all alternate collating sequences. The V9TAPE sequential engine supports the use of a translation table and an encoding value to sort data, but the V9TAPE engine does not support linguistic collation.

Specifying a Translation Table

A translation table is a SAS catalog entry that transcodes data from one single-byte encoding to another single-byte encoding. A translation table also reorders characters when sorting them. A translation table can be one that SAS provides, such as a standard collating sequence like ASCII, EBCDIC, or DANISH; or it can be a user-defined translation table.

When you specify a translation table for an alternate collating sequence, the characters are reordered by mapping the code point of each character to an integer weight value in the range of 0 to 255. A binary collation is then performed.

For collating purposes, you can create translation tables that order characters so that lowercase and uppercase characters alternate. For example, you can create a translation table to correct the situation in which **z** precedes **a** in an ASCII-based encoding. (However, regardless of the weight assignments in the translation table, it is difficult to achieve a true alphabetic ordering that takes the character case into account.) You can also create a translation table that orders alphabetic characters of a particular language in their expected order.

The TRANTAB procedure creates, edits, and displays translation tables. For example, you can display a translation table to view the character-weight values. The translation tables that are supplied by SAS are stored in the SASHELP.HOST catalog. Any translation table that you create or customize is stored in your SASUSER.PROFILE catalog. Translation tables have an entry type of TRANTAB. See Chapter 15, “The TRANTAB Procedure,” on page 511 for more information about translation tables.

You can specify a translation table with the SORTSEQ= option in the PROC SORT statement or with the SORTSEQ= system option. For example, if your operating environment sorts with the ASCII-based Wlatin1 encoding by default, and you want to sort with a translation table that alternates uppercase and lowercase characters, issue the following statements to specify the SAS translation table FRSOLAT1:

```
proc sort data=myfiles.test sortseq=FRSOLAT1;
   by name;
run;
```

A SAS data set that is sorted with a translation table contains a sort indicator that displays the specified translation table name as the collating sequence in CONTENTS procedure output.

Specifying an Encoding Value

An encoding is a set of characters (letters, logograms, digits, punctuation marks, symbols, and control characters) that have been mapped to hexadecimal values, called code points, that computers use. When you specify an encoding value for an alternate collating sequence, the characters are transcoded from the SAS session encoding to the specified encoding, and then a binary collation is performed. You can specify all encoding values that are supported by the ENCODING= option, including multi-byte encodings. Note that specifying a translation table can transcode data, but translation tables are limited to single-byte encodings.

You can specify an encoding value with the SORTSEQ= option in the PROC SORT statement, but you cannot specify an encoding value in the SORTSEQ= system option. For example, you want to sort a SAS data set and then transport it to a Japanese Windows environment. If your session encoding is ASCII-based and binary collation is in effect, you can issue the following statements to specify the ASCII-based double-byte encoding SHIFT-JIS:

```
proc sort data=myfiles.test sortseq='shift-jis';
   by name;
run;
```

Note that SAS checks the encoding value for any translation tables with the same name. If a translation table name exists, SAS uses the translation table.

A SAS data set that is sorted with an encoding value contains a sort indicator that displays the specified encoding value as the collating sequence in CONTENTS procedure output.

Specifying Linguistic Collation

Linguistic collation sorts characters according to rules of language and produces results that are intuitive and culturally acceptable. The results are similar to the collation used in printed materials such as dictionaries, phone books, and book indexes. Linguistic collation is useful for generating reports or other data presentations and for achieving compatibility between systems.

SAS incorporates the International Components for Unicode (ICU), which is an open-source library that provides routines for linguistic collation that are compatible with the Unicode Collation Algorithm (UCA). The UCA is a standard by which Unicode strings can be compared and ordered.

To request linguistic collation, you must use the SORTSEQ= option in the PROC SORT statement because the SORTSEQ= system option does not support linguistic collation. For example, the following statements cause the SORT procedure to collate linguistically, in accordance with the French_France locale:

```
options locale=fr_FR;

proc sort data=myfiles.test sortseq=linguistic;
   by name;
run;
```

When linguistic collation is requested, SAS uses the default linguistic collation algorithm that is provided by the ICU for the SAS session locale. This algorithm reflects the language, local conventions such as data formatting, and culture for a geographical region. You can modify the algorithm by specifying options in parentheses following the LINGUISTIC keyword. For example, you can specify a different locale; you can specify the CASE_FIRST= option to collate lowercase characters before uppercase characters, or vice versa; and so on. Generally, it is not necessary to specify options, because the ICU associates defaults with the various languages and locales. For more information about the linguistic options, see the SORTSEQ= option in "Collating Sequence Option" on page 475 or the SORTSEQ= option in the PROC SORT statement in *Base SAS Procedures Guide*.

A SAS data set that is sorted linguistically contains a sort indicator that displays the collating sequence LINGUISTIC in CONTENTS procedure output. Along with the sort indicator, the data set also records a complete description of the linguistic collating sequence in the file's descriptor information, which is also displayed in CONTENTS procedure output.

Determining the Encoding of a SAS Session and a Data Set

Encoding of a SAS Session

To determine your current SAS session encoding, which is the value assigned to the ENCODING= system option, you can use the OPTIONS procedure or the OPTIONS window. For example, the following PROC OPTIONS statement displays the session encoding value:

```
proc options option=encoding;
run;
```

The SAS log displays the following information:

```
ENCODING=WLATIN1 Specifies default encoding for processing external data.
```

You can display the encoding of any SAS 9 data set by using the CONTENTS procedure or the Properties window in the SAS windowing environment.

An example follows of output that is reported from the CONTENT procedure in the SAS log. The encoding is Western latin1.

Output 3.1 Encoding Reported in the SAS Log

```
The SAS System       10:15 Friday, June 06, 2003   1

                                   The CONTENTS Procedure

     Data Set Name     WORK.GRADES                          Observations          1
     Member Type       DATA                                 Variables             4
     Engine            V9                                   Indexes               0
     Created           11:03 Friday, June 06 2003      Observation Length    32
     Last Modified     11:03 Friday, June 06, 2003      Deleted Observations  0
     Protection                                             Compressed            NO
     Data Set Type                                          Sorted                NO
     Label
     Data Representation  HP_UX_64, RS_6000_AIX_64, SOLARIS_64, HP_IA64
     Encoding          latin1  Western (ISO)


                            Engine/Host Dependent Information

       Data Set Page Size          4096
       Number of Data Set Pages    1
       First Data Page             1
       Max Obs per Page            126
       Obs in First Data Page      1
       Number of Data Set Repairs  0
       File Name                   C:\TEMP\SAS Temporary Files\_TD228\grades.sas7bdat
       Release Created             9.0000M0
       Host Created                WIN_NT


                        Alphabetic List of Variables and Attributes

                               #    Variable    Type    Len

                               4    final       Num        8
                               1    student     Char       8
                               2    test1       Num        8
                               3    test2       Num        8
```

Encoding of a SAS Data Set

To determine the encoding of a specific SAS data set, follow these steps:

1. Locate the data set using SAS Explorer.
2. Right-click the data set.
3. Select Properties from the menu.
4. Click the Details tab.

   The encoding of the data set is listed, along with other information.

Default SAS Session Encoding

The ENCODING= option is used to specify the SAS session encoding, which establishes the environment to process SAS syntax and SAS data sets, and to read and write external files. If neither the LOCALE= nor ENCODING= options is set, a default value is set.

Table 3.5 Default SAS Session Encoding Values

Operating Environment	Default ENCODING= Value	Description
OpenVMS for integrity servers	Latin1	Western (ISO)
z/OS	OPEN_ED-1047	OpenEdition EBCDIC cp1047-Latin1
UNIX	Latin1	Western (ISO)
Windows	WLatin1	Western (Windows)

For a complete list of supported encoding values for a SAS session, see Chapter 19, "Encoding Values for a SAS Session," on page 555.

Setting the Encoding of a SAS Session

You can set the session encoding by using the ENCODING= system option, the DBCS options, or the LOCALE= system option.

Note: Values for the ENCODING= system option depend on the operating environment. △

The priority order for setting the encoding is as follows:

1 ENCODING= system option

The SAS session encoding is determined by the ENCODING= option regardless of whether the DBCS or LOCALE= options are specified. If the ENCODING= option is specified, a set of valid DBCS options are set regardless of whether the user has specified those options. Also, if the ENCODING= option is specified, the LOCALE= option is set to an appropriate value unless a value has been specified by the user.

Note: If the ENCODING= option is specified, the TRANTAB= option is implicitly set. △

2 DBCS options

If the ENCODING= option is not specified, the SAS session encoding is determined by the DBCS options regardless of whether the LOCALE= option is specified. The LOCALE= option is set to an appropriate value unless a value has been specified by the user.

The encoding is determined by the values of the DBCSLANG and DBCSTYPE options for DBCS languages, such as Japanese, Korean, Simplified Chinese, and Traditional Chinese.

The DBCS options are valid only when the DBCS extension directory is included in the path option list. The path of the DBCS extension dynamic link library (DLLs) has to be located at the top of the pathname list of the path option for the DBCS languages when you want to invoke a DBCS SAS session. The DBCS extension DLLs are located in the directory**!SASROOT/dbcs/sasexe** by default.

Also you might have to specify the resourcesloc, msg, and sashelp options to use localized resources even if the SAS session encoding is not a DBCS language (for example, Polish, German, and French). The localized resources are located under**!SASROOT/nls/<language identifier>/<sasmsg, sashelp, sasmacro, resource>**. The values for language identifiers are: cs, de, en, es, fr, hu, it, ja, ko, pl, ru, sv, zh, and zt.

You can specify a sasv9.cfg file located in the localized directories such as **!SASROOT/nls/<language identifier>** so that you do not have to consider using the **path, resourcesloc, sasmsg**, and **sashelp**options.

If DBCS (which specifies that SAS process DBCS encodings) is specified, DBCSLANG= and DBCSTYPE= options are implicitly set. The default values for DBCSTYPE= and DBCSLANG= match those values for the Japanese environment on the host.

3 LOCALE= system option

The SAS session encoding is determined by the LOCALE= option and the platform, if the ENCODING= or DBCS options are not specified.

The following example shows that encoding is explicitly set by default for the Spanish_Spain locale:

```
sas9 -locale Spanish_Spain
```

The wlatin1 encoding is the default encoding for the Spanish_Spain locale.

The following example shows that the wlatin2 encoding is set explicitly when SAS is invoked:

```
sas9 -encoding wlatin2
```

Note: Setting DBCS encodings, DBCS options, or a CJK locale on SAS if the DBCS extensions are not available will fail to successfully invoke SAS. △

Note: Changing the encoding for a SAS session does not affect SAS keywords or SAS log output, which remain in English. △

In Table 3.6 on page 23, the following values for the CJK locales are based on locale and platform:

Table 3.6 Default Encoding Values Based on the LOCALE= Option

Locales	WIN (sas4)	MVS (sas4)	UNX (sas4)
zh_TW	MS-950 (ywin)	IBM-937 (yibm)	sax, s64: EUC-TW (yeuc)
zh_HK			
zh_MO			others: MS-950 (ywin)
zh_CN	EUC-CN (zeuc)	IBM-935 (zibm)	EUC-CN (zeuc)
zh_SG			
ja_JP	SHIFT-JIS (sjis)	IBM-939 (jibm)	h64, h6i, r64: SHIFT-JIS (sjis)
			others: EUC-JP (jeuc)
ko_KR	EUC-KR (keuc)	IBM-933 (kibm)	EUC-KR (keuc)

Encoding Behavior in a SAS Session

Encoding Support for Data Sets by SAS Release

For Base SAS files, there are three categories of encoding support, which is based on the version of SAS that created the file:

- Data sets that are created in SAS 9 automatically have an encoding attribute, which is specified in the descriptor portion of the file. In SAS 9, DBCS recognizes the DBCSTYPE value and converts it to the encoding value and specifies it in the descriptor portion of the field, by default.
- Data sets that are created in SAS 7 and SAS 8 do not have an encoding value that is specified in the file. It is assumed that SAS 7 and SAS 8 data sets were created in the SAS session encoding of the operating environment. However, the descriptor portion of the file does support an encoding value. When you replace or update a SAS 7 or SAS 8 file in a SAS 9 session, SAS specifies the current session encoding in the descriptor portion of the file, by default. In SAS 8, DBCS has the DBCSTYPE field, instead of the encoding field.
- Data sets created in SAS 6 do not have an encoding value that is associated with the file and cannot have an encoding value specified in the file.

z/OS: Ensuring Compatibility with Previous SAS Releases

Setting the NLSCOMPATMODE system option ensures compatibility with previous releases of SAS.

Note: NLSCOMPATMODE is supported under the z/OS operating environment only. △

Programs that were run in previous releases of SAS will continue to work when NLSCOMPATMODE is specified.

The NONLSCOMPATMODE system option specifies that data is to be processed in the encoding that is set by the ENCODING= option or the LOCALE= option, including reading and writing external data and processing SAS syntax and user data.

Some existing programs that ran in previous releases of SAS will no longer run when NONLSCOMPATMODE is in effect. If you have made character substitutions in SAS syntax statements, you must modify your programs to use national characters. For example, a Finnish customer who has substituted the Å character for the $ character in existing SAS syntax will have to update the program to use the $ in the Finnish environment.

For details, see “NLSCOMPATMODE System Option: z/OS” on page 466.

Output Processing

When you create a data set in SAS 9, encoding is determined as follows:

- If a new output file is created, the data is written to the file using the current session encoding.
- If a new output file is created using the OUTREP= option, which specifies a data representation that is different from the current session, the data is written to the file using the default session encoding for the operating system that is specified by the OUTREP= value.
- If a new output file replaces an existing file, the new file inherits the encoding of the existing file. For output processing that replaces an existing file that is from another operating environment or if the existing file has no encoding that is specified in it, then the current session encoding is used.

Input Processing

For input (read) processing in SAS 9, encoding behavior is as follows:

- If the session encoding and the encoding that is specified in the file are incompatible, the data is transcoded to the session encoding. For example, if the current session encoding is ASCII and the encoding that is specified in the file is EBCDIC, SAS transcodes the data from EBCDIC to ASCII.
- If a file does not have an encoding specified in it, SAS transcodes the data only if the file's data representation is different from the current session.

Reading and Writing External Files

SAS reads and writes external files using the current session encoding. SAS assumes that the external file has the same encoding as the session encoding. For example, if you are creating a new SAS data set by reading an external file, SAS assumes that the encoding of the external file and the current session are the same. If the encodings are not the same, the external data could be written incorrectly to the new SAS data set. For details about the syntax for the SAS statements that perform input and output processing, see "SAS Options That Transcode SAS Data" on page 29.

CHAPTER

4

Transcoding for NLS

Overview to Transcoding

Transcoding is the process of converting a SAS file (its data) from one encoding to another encoding. Transcoding is necessary when the session encoding and the file encoding are different. Transcoding is often necessary when you move data between operating environments that use different locales.

For example, consider a file that was created under a UNIX operating environment that uses the Latin1 encoding, then moved to an IBM mainframe that uses the German EBCDIC encoding. When the file is processed on the IBM mainframe, the data is remapped from the Latin1 encoding to the German EBCDIC encoding. If the data contains an uppercase letter Ä, the hexadecimal number is converted from C4 to 4A.

Transcoding does not translate between languages; transcoding remaps characters.

In order to dynamically transcode data between operating environments that use different encodings, an explicit encoding value must be specified. For details, see Chapter 18, “Encoding Values in SAS Language Elements,” on page 549.

Common Reasons for Transcoding

Some situations where data might commonly be transcoded are:

- when you share data between two different SAS sessions that are running in different locales or in different operating environments
- when you perform text-string operations, such as converting to uppercase or lowercase
- when you display or print characters from another language

- when you copy and paste data between SAS sessions running in different locales

Transcoding and Translation Tables

Specifying LOCALE= or ENCODING= indirectly sets the appropriate translation-table values in the TRANTAB= option. Translation tables are used for transcoding one SBCS encoding to another and back again. For example, there is a specific translation table that maps Windows Latin2 to ISO Latin2.

The following figure shows a translation table. The area of a translation table for mapping from Windows Latin 2 (wlt2) to ISO Latin 2 (lat2) is named "table 1," and the area for mapping characters from ISO Latin 2 to Windows Latin 2 is named "table 2."

Figure 4.1 SAS Windows Latin 2 to ISO Latin 2 Translation Table

```
WLT2LAT2 table 1:
          0 1 2 3 4 5 6 7 8 9 A B C D E F
     00 '000102030405060708090A0B0C0D0E0F'x
     10 '101112131415161718191A1B1C1D1E1F'x
     20 '202122232425262728292A2B2C2D2E2F'x
     30 '303132333435363738393A3B3C3D3E3F'x
     40 '404142434445464748494A4B4C4D4E4F'x
     50 '505152535455565758595A5B5C5D5E5F'x
     60 '606162636465666768696A6B6C6D6E6F'x
     70 '707172737475767778797A7B7C7D7E7F'x
     80 '808182838485868788898A98AA6ABAEAC'x
     90 '908B8C8D8E8F91929893B994B6BBBEBC'x
     A0 'A0B7A2A3A4A195A7A896AA9799AD9AAF'x
     B0 'B09BB2B3B49C9D9EB8B1BA9FA5BDB5BF'x
     C0 'C0C1C2C3C4C5C6C7C8C9CACBCCCDCECF'x
     D0 'D0D1D2D3D4D5D6D7D8D9DADBDCDDDEDF'x
     E0 'E0E1E2E3E4E5E6E7E8E9EAEBECEDEEEF'x
     F0 'F0F1F2F3F4F5F6F7F8F9FAFBFCFDFEFF'x


WLT2LAT2 table 2:
          0 1 2 3 4 5 6 7 8 9 A B C D E F
     00 '000102030405060708090A0B0C0D0E0F'x
     10 '101112131415161718191A1B1C1D1E1F'x
     20 '202122232425262728292A2B2C2D2E2F'x
     30 '303132333435363738393A3B3C3D3E3F'x
     40 '404142434445464748494A4B4C4D4E4F'x
     50 '505152535455565758595A5B5C5D5E5F'x
     60 '606162636465666768696A6B6C6D6E6F'x
     70 '707172737475767778797A7B7C7D7E7F'x
     80 '808182838485868788898B9192939495'x
     90 '909697999BA6A9AB98ACAEB1B5B6B7BB'x
     A0 'A0A5A2A3A4BC8CA7A88AAA8D8FAD8EAF'x
     B0 'B0B9B2B3B4BE9CA1B89ABA9D9FBD9EBF'x
     C0 'C0C1C2C3C4C5C6C7C8C9CACBCCCDCECF'x
     D0 'D0D1D2D3D4D5D6D7D8D9DADBDCDDDEDF'x
     E0 'E0E1E2E3E4E5E6E7E8E9EAEBECEDEEEF'x
     F0 'F0F1F2F3F4F5F6F7F8F9FAFBFCFDFEFF'x
```

The LOCALE= or ENCODING= system option and other encoding options (to statements, commands, or procedures) eliminates the need to directly create or manage translation tables.

CAUTION:
Do not change a translation table unless you are familiar with its purpose. Translation tables are used internally by the SAS supervisor to implement NLS. If you are unfamiliar with the purpose of translation tables, do not change the specifications without proper technical advice. △

The TRANTAB= option specifies the translation table to be used in the SAS session. For details, see "TRANTAB= System Option" on page 469. The TRANTAB procedure is used to create, edit, and display customized translation tables. For details, see Chapter 15, "The TRANTAB Procedure," on page 511.

SAS Options That Transcode SAS Data

The following SAS options for various language elements enable you to transcode, or to override the default encoding behavior. These elements enable you to specify a different encoding for a SAS file or a SAS application or to suppress transcoding.

Table 4.1 SAS Options That Transcode SAS Data

Option	Where Used
CHARSET=	ODS MARKUP statement
CORRECTENCODING=	MODIFY statement of the DATASETS procedure
ENCODING=	%INCLUDE, FILE, FILENAME, INFILE, ODS statements; FILE and INCLUDE commands
ENCODING=	in a DATA step
INENCODING=	LIBNAME statement
ODSCHARSET=	LIBNAME statement for XML
ODSTRANTAB=	LIBNAME statement for XML
OUTENCODING=	LIBNAME statement
XMLENCODING=	LIBNAME statement for XML

For a list of supported encoding values to use for these options, see "SBCS, DBCS, and Unicode Encoding Values for Transcoding Data" on page 549.

Transcoding between Operating Environments

Transcoding occurs automatically when SAS files are moved or accessed across operating environments. Common SAS transcoding activities include:

CPORT and CIMPORT procedures
To create a transport file, SAS automatically uses translation tables to transcode one encoding to another and back again. First, the data is converted from the source encoding to transport format, then the data is converted from the transport format to the target encoding. For details, see *Base SAS Procedures Guide*.

CEDA (cross environment data access) feature of SAS
when you process a SAS data set that has an encoding that is different from the current session encoding, SAS automatically uses CEDA software to transcode

data. (CEDA also converts a SAS file to the correct data representation when you move a file between operating environments.) For details, see *SAS Language Reference: Concepts* and *SAS Language Reference: Dictionary*.

SAS/CONNECT Data Transfer Services (UPLOAD and DOWNLOAD procedures)
For details, see *SAS/CONNECT User's Guide*.

SAS/CONNECT Compute Services (RSUBMIT statement)
identifies a block of statements that a client session submits to server session for processing. For details, see *SAS/CONNECT User's Guide*.

SAS/CONNECT and SAS/SHARE Remote Library Services (LIBNAME)
References a library on a remote machine for client access. For details, see *SAS/CONNECT User's Guide* and *SAS/SHARE User's Guide*.

Transcoding Considerations

Although transcoding usually occurs with no problems, there are situations that can affect your data and produce unsatisfactory results. For example:

- Encodings can conflict with another. That is, two encodings can use different code points for the same character, or use the same code points for two different characters.
- Characters in one encoding might not be present in another encoding. For example, a specific encoding might not have a character for the dollar sign ($). Transcoding the data to an encoding that does not support the dollar sign would result in the character not printing or displaying.
- The number of bytes for a character in one encoding can be different from the number of bytes for the same character in another encoding; for example, transcoding from a DBCS to an SBCS. Therefore, transcoding can result in character value truncation.
- If an error occurs during transcoding such that the data cannot be transcoded back to its original encoding, data can be lost. That is, if you open a data set for update processing, the observation might not be updated. However, if you open the data set for input (read) processing and no output data set is open, SAS issues a warning that can be printed. Processing proceeds and allows a PRINT procedure or other read operation to show the data that does not transcode.
- CEDA has some processing limitations. For example, CEDA does not support update processing.
- Incorrect encoding can be stamped on a SAS 7 or SAS 8 data set if it is copied or replaced in a SAS 9 session with a different session encoding from the data. The incorrect encoding stamp can be corrected with the CORRECTENCODING= option in the MODIFY statement in PROC DATASETS. If a character variable contains binary data, transcoding might corrupt the data.

Compatible and Incompatible Encodings

Overview to Compatible and Incompatible Encodings

ASCII is the foundation for most encodings, and is used by most personal computers, minicomputers, and workstations. However, the IBM mainframe uses an EBCDIC encoding. Therefore, ASCII and EBCDIC machines and data are incompatible. Transcoding is necessary if some or all characters in one encoding are different from the characters in the other encoding.

However, to avoid transcoding, you can create a data set and specify an encoding value that SAS will not transcode. For example, if you use the following values in either the ENCODING= data set option, or the INENCODING=, or the OUTENCODING= option in the LIBNAME statement, transcoding is not performed:

- ANY specifies that no transcoding is desired, even between EBCDIC and ASCII encodings.

  Note: ANY is a synonym for binary. Because the data is binary, the actual encoding is irrelevant. △
- ASCIIANY enables you to create a data set that is compatible with all ASCII-based encodings.
- EBCDICANY enables you to create a data set that is compatible with all EBCDIC-based encodings.

You might want to create a SAS data set that contains mixed encodings; for example, both Latin1 and Latin2. You do not want the data transcoded for either input or output processing. By default, data is transcoded to the current session encoding.

Data must be transcoded when the SAS file and the SAS session use *incompatible encodings*; for example, ASCII and EBCDIC.

In some cases, transcoding is not required because the SAS file and the SAS session have *compatible encodings*.

For a list of the encodings, by operating environment, see Chapter 19, “Encoding Values for a SAS Session,” on page 555.

Line-feed Characters and Transferring Data between EBCDIC and ASCII

Software that runs under ASCII operating environments requires the end of the line be specified by the line-feed character. When data is transferred from z/OS to a machine that supports ASCII encodings, formatting problems can occur, particularly in HTML output, because the EBCDIC newline character is not recognized. SAS supports two sets of EBCDIC-based encodings for z/OS:

- The encodings that have EBCDIC in their names use the traditional mapping of EBCDIC line-feed to ASCII line-feed character, which can cause data to appear as one stream.
- The encodings that have Open Edition in their names use the line-feed character as the end-of-line character. When the data is transferred to an operating environment that uses ASCII, the EBCDIC new-line character maps to an ASCII line-feed character. This mapping enables ASCII applications to interpret the end-of-line correctly, resulting in better formatting.

For a list of the encodings, by operating environment, see Chapter 19, "Encoding Values for a SAS Session," on page 555.

EBCDIC and OpenEdition Encodings Are Compatible

EBCDIC and OpenEdition are compatible encodings.

Encodings that contain EBCDIC in their names use the traditional mapping of EBCDIC line-feed (0x25) and new-line (0x15) characters.

Encodings that contain OPEN_ED in their names and OpenEdition in their descriptions switch the mapping of the new-line and line-feed characters. That is, they use the line-feed character as the end-of-line character.

If the two encodings use the same code page number but one is EBCDIC and the other is Open Edition, no transcoding is necessary.

Example:

If the data is encoded in EBCDIC1143 and the SAS session is encoded in OPEN_ED-1143, no transcoding is necessary because they use the same 1143 code page.

In order to transfer data between ASCII and EBCDIC, you can specify Open Edition encodings from the list of compatible encodings.

Note: Open Edition encodings are used by default in NONLSCOMPATMODE. △

Some East Asian MBCS Encodings Are Compatible

Some East Asian double-byte (DBCS) are compatible encodings. Each line in the list contains compatible encodings:

- SHIFT-JIS, MS-932, IBM-942, MACOS-1
- MS-949, MACOS-3, EUC-KR
- EUC-CN, MS-936, MACOS-25, DEC-CN
- EUC-TW, DEC-TW
- MS-950, MACOS-2, BIG5

If the SAS session is encoded in one of the encodings in the group and the data set is encoded in another encoding, but in the same group, then no transcoding occurs.

Example:

If the session encoding is SHIFT-JIS and the data set encoding is IBM-942, then no transcoding occurs.

Preventing Transcoding

Some encoding values enable you to create a data set that SAS does not transcode. You might not want to transcode data for input or output processing but rather you might want to create a SAS library that contains data in mixed encodings; for example, both Latin1 and Latin2.

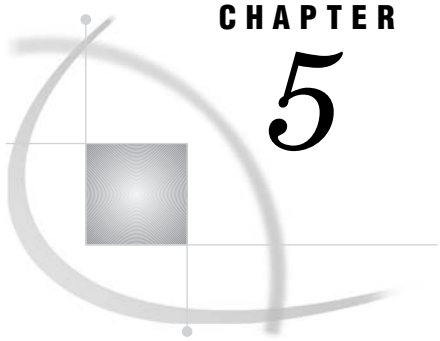
For example, you can avoid transcoding if you use the following values in either the ENCODING= data set option or the INENCODING= or OUTENCODING= options in the LIBNAME statement:

- ANY specifies that no transcoding is desired, even between EBCDIC and ASCII encodings.

  Note: ANY is a synonym for binary. Because the data is binary, the actual encoding is irrelevant. △

- ASCIIANY specifies that no transcoding is required between any ASCII-based encodings.
- EBCDICANY specifies that no transcoding is required between any EBCDIC-based encodings.

For details, see "ENCODING= Data Set Option" on page 43 and "INENCODING= and OUTENCODING= Options" on page 490.



CHAPTER

5

Double-Byte Character Sets (DBCS)

Overview to Double-Byte Character Sets (DBCS)

Because East Asian languages have thousands of characters, double (two) bytes of information are needed to represent each character.

Each East Asian language usually has more than one DBCS encoding system, due to nonstandardization among computer manufacturers. SAS processes the DBCS encoding information that is unique to each manufacturer for the major East Asian languages.

With the proper software extensions, you can use SAS for the following functions:

- display any of the major East Asian languages in the DBCS version of the SAS System
- import data from East Asian language computers and move the data from one application or operating environment to another (which might require SAS ACCESS or other SAS products)
- convert standard East Asian date and time notation to SAS date values, SAS time values, and SAS datetime values
- create data sets and various types of output (such as reports and graphs) that contain East Asian language characters.

East Asian Languages

East Asian languages include:

- Chinese, which is written in Simplified Chinese script, and is used in the People's Republic of China and Singapore
- Chinese, which is written in Traditional Chinese script, and is used in Hong Kong SAR, Macau SAR, and Taiwan
- Japanese
- Korean

Specifying DBCS

To specify DBCS, use the following SAS system options:

DBCS recognizes DBCS characters

DBCSLANG= specifies the language

DBCSTYPE= specifies the DBCS encoding method type

Example of a SAS configuration file for Windows:

```
/*basic DBCS options */

-dbms               /*Recognizes DBCS*/
-dbcstype PCMS      /*Specifies the PCMS encoding method*/

-dbcslang JAPANESE; /*specifies the Japanese language */
```

DBCSTYPE= and DBCSLANG= were introduced in Version 6.12. As an alternative, setting ENCODING= implicitly sets the DBCSTYPE= and DBCSLANG= options. For details, see "ENCODING System Option: OpenVMS, UNIX, Windows, and z/OS" on page 459.

Requirements for Displaying DBCS Character Sets

In order to display data sets that contain DBCS characters, you must have the following resources:

- system support for multiple code pages
- DBCS fonts that correspond to the language that you intend to use

If you need to create a user-defined character for use with SAS software, your computer must support DBCS. These computers have a limited availability in the U.S. and Europe. These East Asian language computer systems use various methods of creating the characters. In one popular method, the user types the phonetic pronunciation of the character, often using Latin characters. The computer presents a menu of characters whose sounds are similar to the phonetic pronunciation and prompts the user to select one of them.

When You Can Use DBCS Features

After you have set up your SAS session to recognize a specific DBCS language and operating environment, you can work with your specified language in these general areas:

- the DATA step and batch-oriented procedures
- windowing and interactive capabilities
- cross-system connectivity and compatibility
- access to databases
- graphics

In a DATA step and in batch-oriented procedures, you can use DBCS wherever a text string within quotation marks is allowed. Variable values, variable labels, and data set

labels can all be in DBCS. DBCS can also be used as input data and with range and label specifications in the FORMAT procedure. In WHERE expression processing, you can search for embedded DBCS text.

DBCS and SAS on a Mainframe

Another type of DBCS encoding exists on mainframe systems, which combine DBCS support with the 3270-style data stream. Each DBCS character string is surrounded by escape codes called *shift out*/*shift in*, or SO/SI. These codes originated from the need for the old-style printers to shift out from the EBCDIC character set, to the DBCS character set. The major manufacturers have different encodings for SO/SI; some manufacturers pad DBCS code with one byte of shift code information while others pad the DBCS code with two bytes of shift code information. These differences can cause problems in reading DBCS information about mainframes.

PCs, minicomputers, and workstations do not have SO/SI but have their own types of DBCS encodings that differ from manufacturer to manufacturer. SAS has several formats and informats that can read DBCS on SO/SI systems:

Table 5.1 SAS Formats and Informats That Support DBCS on SO/SI Systems

Keyword	Language Element	Description
$KANJI	informat	Removes SO/SI from Japanese kanji DBCS
$KANJIX	informat	Adds SO/SI to Japanese kanji DBCS
$KANJI	format	Adds SO/SI to Japanese kanji DBCS
$KANJIX	format	Removes SO/SI from Japanese kanji DBCS

SAS Data Conversion between DBCS Encodings

Normally, DBCS data that is generated on one computer system is incompatible with data generated on another computer system. SAS has features that allow conversion from one DBCS source to another, as shown in the following table.

Language Element	Type	Use	See
KCVT	function	Converts DBCS data from one operating environment to another	"KCVT Function" on page 260
CPORT	procedure	Moves files from one environment to another	*Base SAS Procedures Guide*
CIMPORT	procedure	Imports a transport file created by CPORT	*Base SAS Procedures Guide*

Avoiding Problems with Split DBCS Character Strings

- When working with DBCS characters, review your data to make sure that SAS recognizes the entire character string when data is imported or converted or used in a DATA or a PROC step.
- On mainframe systems that use shift out/shift in escape codes, DBCS character strings can become truncated during conversion across operating environments.
- There is a possibility that DBCS character strings can be split when working with the PRINT, REPORT, TABULATE, and FREQ procedures. If undesirable splitting occurs, you might have to add spaces on either side of your DBCS character string to force the split to occur in a better place. The SPLIT= option can also be used with PROC REPORT and PROC PRINT to force string splitting in a better location.

Avoiding Character Data Truncation by Using the CVP Engine

When you specify the ENCODING= data set option, the encoding for the output data set might require more space than the original data set. For example, when writing DBCS data in a Windows environment using the UTF8 encoding, each DBCS character might require three bytes. To avoid data truncation, each variable must have a width that is 1.5 times greater than the width of the original data.

When you process a SAS data file that requires transcoding, you can request that the CVP (character variable padding) engine expand character variable lengths so that character data truncation does not occur. (A variable's length is the number of bytes used to store each of the variable's values.)

Character data truncation can occur when the number of bytes for a character in one encoding is different from the number of bytes for the same character in another encoding, such as when a single-byte character set (SBCS) is transcoded to a double-byte character set (DBCS) or to a multi-byte character set (MBCS). An SBCS represents each character in one byte, and a DBCS represents each character in two bytes. An MBCS represents characters in a varying length from one to four bytes. For example, when transcoding from Wlatin2 to a Unicode encoding, such as UTF-8, the variable lengths (in bytes) might not be sufficient to hold the values, and the result is character data truncation.

Using the CVP engine, you specify an expansion amount so that variable lengths are expanded before transcoding, then the data is processed. Think of the CVP engine as an intermediate engine that is used to prepare the data for transcoding. After the lengths are increased, the primary engine, such as the default base engine, is used to do the actual file processing.

The CVP engine is a read-only engine for SAS data files only. You can request character variable expansion (for example with the LIBNAME statement) in either of the following ways:

- explicitly specify the CVP engine and using the default expansion of 1.5 times the variable lengths.
- implicitly specifying the CVP engine with the LIBNAME options CVPBYTES= or CVPMULTIPLIER=. The options specify the expansion amount. In addition, you can use the CVPENGINE= option to specify the primary engine to use for processing the SAS file; the default is the default SAS engine.

For example, the following LIBNAME statement explicitly assigns the CVP engine. Character variable lengths are increased using the default expansion, which multiples

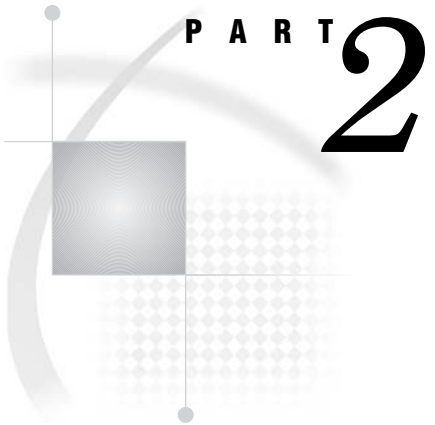
the lengths by 1.5. For example, a character variable with a length of 10 will have a new length of 15, and a character variable with a length of 100 will have a new length of 150:

```
libname expand cvp 'SAS data-library';
```

Note: The expansion amount must be large enough to accommodate any expansion; otherwise, truncation will still occur. △

Note: For processing that conditionally selects a subset of observations by using a WHERE expression, using the CVP engine might affect performance. Processing the file without using the CVP engine might be faster than processing the file using the CVP engine. For example, if the data set has indexes, the indexes will not be used in order to optimize the WHERE expression if you use the CVP engine. △

For more information and examples, see the CVP options in the LIBNAME Statement in *SAS Language Reference: Dictionary*.



PART 2

SAS Language Elements for NLS Data

CHAPTER

6

Data Set Options for NLS

Data Set Options for NLS by Category

NLS affects the data set control category of options for selected data set options. The following table provides brief descriptions of the data set options. For more detailed descriptions, see the dictionary entry for each data set option:

Table 6.1 Summary of Data Set Options for NLS

Category	Data Set Options for NLS	Description
Data Set Control	"ENCODING= Data Set Option" on page 43	Overrides the encoding to use for reading or writing a SAS data set.
	"OUTREP= Data Set Option" on page 46	Specifies the data representation for the output SAS data set.

ENCODING= Data Set Option

Overrides the encoding to use for reading or writing a SAS data set.

Valid in: DATA step and PROC steps
Category: Data Set Control

Syntax

ENCODING= ANY | ASCIIANY | EBCDICANY | *encoding-value*

Syntax Description

ANY
specifies that no transcoding occurs.

Note: ANY is a synonym for binary. Because the data is binary, the actual encoding is irrelevant. △

ASCIIANY
specifies that no transcoding occurs when the mixed encodings are ASCII encodings.

EBCDICANY
specifies that no transcoding occurs when the mixed encodings are EBCDIC encodings.

encoding-value
specifies an encoding value. For details, see Chapter 3, “Encoding for NLS,” on page 9.

Details

The value for ENCODING= indicates that the SAS data set has a different encoding from the current session encoding. When you read data from a data set, SAS transcodes the data from the specified encoding to the session encoding. When you write data to a data set, SAS transcodes the data from the session encoding to the specified encoding.

Input Processing

By default, encoding for input processing is determined as follows:

- If the session encoding and the encoding that is specified in the file are different, SAS transcodes the data to the session encoding.
- If a file has no encoding specified, but the file’s data representation is different from the encoding of the current session, then SAS transcodes the data to the current session.

Output Processing

By default, encoding for output processing is determined as follows:

- Data is written to a file using the encoding of the current session, except when a different output representation is specified using the OUTREP= data set option, the OUTENCODING= option in the LIBNAME statement, or the ENCODING= data set option.
- If a new file replaces an existing file, then the new file inherits the encoding of the existing file.
- If an existing file is replaced by a new file that was created under a different operating environment or that has no encoding specified, the new file uses the encoding of the current session.

Note: Character metadata and data output appears garbled if you specify a different encoding from where the data set was created.

In this example, the data set to be printed is internally encoded as ASCII, however the data set option specifies an EBCDIC encoding. SAS attempts to transcode the data from EBCDIC to ASCII, but the data is already in ASCII. The result is garbled data.

```
data a;
x=1;
abc='abc';
run'
proc print data=a (encoding=''ebcdic'');
run;
```

△

Note: The following values for ENCODING= are invalid:

- UCS2
  UCS4
  UTF16
  UTF32

△

Comparisons

- Session encoding is specified using the ENCODING= system option or the LOCALE= system option, with each operating environment having a default encoding.
- You can specify encoding for a SAS library by using the LIBNAME statement's INENCODING= option (for input files) and the OUTENCODING= option (for output files). If both the LIBNAME statement option and the ENCODING= data set option are specified, SAS uses the data set option.

Examples

Example 1: Creating a SAS Data Set with Mixed Encodings and with Transcoding Suppressed By specifying the data set option ENCODING=ANY, you can create a SAS data set that contains mixed encodings, and suppress transcoding for either input or output processing.

In this example, the new data set MYFILES.MIXED contains some data that uses the Latin1 encoding, and some data that uses the Latin2 encoding. When the data set is processed, no transcoding occurs. For example, the correct Latin1 characters in a Latin1 session encoding and correct Latin2 characters in a Latin2 session encoding are displayed.

```
libname myfiles 'SAS data-library';

data myfiles.mixed (encoding=any);
   set work.latin1;
   set work.latin2;
run;
```

Example 2: Creating a SAS Data Set with a Particular Encoding For output processing, you can override the current session encoding. This action might be necessary, for example, if the normal access to the file uses a different session encoding.

For example, if the current session encoding is Wlatin1, you can specify ENCODING=WLATIN2 in order to create the data set that uses the encoding Wlatin2. The following statements tell SAS to write the data to the new data set using the Wlatin2 encoding instead of the session encoding. The encoding is also specified in the descriptor portion of the file.

```
libname myfiles 'SAS data-library';
```

```
data myfiles.difencoding (encoding=wlatin2);
      .
      .
      .
run;
```

Example 3: Overriding Encoding for Input Processing For input processing, you can override the encoding that is specified in the file, and specify a different encoding.

For this example, the current session encoding is EBCDIC-870, but the file has the encoding value EBCDIC-1047 in the descriptor information. By specifying ENCODING=EBCDIC-870, SAS does not transcode the data, but instead displays the data using EBCDIC-870 encoding.

```
proc print data=myfiles.mixed (encoding=ebcdic870);
run;
```

See Also

Conceptual discussion in Chapter 3, “Encoding for NLS,” on page 9

Options in Statements and Commands:

“ENCODING= Option” on page 487

“INENCODING= and OUTENCODING= Options” on page 490

System Options:

“ENCODING System Option: OpenVMS, UNIX, Windows, and z/OS” on page 459

“LOCALE System Option” on page 463

OUTREP= Data Set Option

Specifies the data representation for the output SAS data set.

Valid in: DATA step and PROC steps

Category: Data Set Control

See: OUTREP= Data Set Option in *SAS Language Reference: Dictionary*

CHAPTER

7

Formats for NLS

International Date and Datetime Formats

SAS supports international formats that are equivalent to some of the most commonly used English-language date formats. In each case, the format works like the corresponding English-language format. Only the maximum, minimum, and default widths are different.

Table 7.1 International Date and Datetime Formats

Language	English Format	International Format	Min	Max	Default
Afrikaans (AFR)	DATE.	NLDATE.	10	200	20
	DATETIME.	NLDATM.	10	200	30
	DOWNAME.	NLDATEWN.	4	200	10
	MONNAME.	NLDATEMN.	4	200	10
	MONYY.	NLDATEYM.	6	200	10
	WEEKDATX.	NLDATEW.	10	200	20
	WEEKDAY.	NLDATEWN.	4	200	10
	WORDDATX.	NLDATE.	10	200	20
Catalan (CAT)	DATE.	NLDATE.	10	200	20
	DATETIME.	NLDATM.	10	200	30
	DOWNAME.	NLDATEWN.	4	200	10
	MONNAME.	NLDATEMN.	4	200	10
	MONYY.	NLDATEYM.	6	200	10
	WEEKDATX.	NLDATEW.	10	200	20
	WEEKDAY.	NLDATEWN.	4	200	10

Language	English Format	International Format	Min	Max	Default
	WORDDATX.	NLDATE.	10	200	20
Croatian (CRO)	DATE.	NLDATE.	10	200	20
	DATETIME.	NLDATM.	10	200	30
	DOWNAME.	NLDATEWN.	4	200	10
	MONNAME.	NLDATEMN.	4	200	10
	MONYY.	NLDATEYM.	6	200	10
	WEEKDATX.	NLDATEWX.	3	40	27
	WEEKDAY.	NLDATEWN.	4	200	10
	WORDDATX.	NLDATE.	10	200	20
Czech (CSY)	DATE.	NLDATE.	10	200	20
	DATETIME.	NLDATM.	10	200	30
	DOWNAME.	NLDATEWN.	4	200	10
	MONNAME.	NLDATEMN.	4	200	10
	MONYY.	NLDATEYM.	6	200	10
	WEEKDATX.	NLDATEWX.	2	40	25
	WEEKDAY.	NLDATEWN.	4	200	10
	WORDDATX.	NLDATE.	10	200	20
Danish (DAN)	DATE.	NLDATE.	10	200	20
	DATETIME.	NLDATM.	10	200	30
	DOWNAME.	NLDATEWN.	4	200	10
	MONNAME.	NLDATEMN.	4	200	10
	MONYY.	NLDATEYM.	6	200	10
	WEEKDATX.	NLDATEWX.	2	31	31
	WEEKDAY.	NLDATEWN.	4	200	10
	WORDDATX.	NLDATE.	10	200	20
Dutch (NLD)	DATE.	NLDATE.	10	200	20
	DATETIME.	NLDATM.	10	200	30
	DOWNAME.	NLDATEWN.	4	200	10
	MONNAME.	NLDATEMN.	4	200	10
	MONYY.	NLDATEYM.	6	200	10
	WEEKDATX.	NLDATEWX.	2	38	28
	WORDDATX.	NLDATE.	10	200	20
	WEEKDAY.	NLDATEWN.	4	200	10
Finnish (FIN)	DATE.	NLDATE.	10	200	20
	DATETIME.	NLDATM.	10	200	30
	DOWNAME.	NLDATEWN.	4	200	10

Language	English Format	International Format	Min	Max	Default
	MONNAME.	NLDATEMN.	4	200	10
	MONYY.	NLDATEYM.	6	200	10
	WEEKDATX.	NLDATEWX.	2	37	37
	WEEKDAY.	NLDATEWN.	4	200	10
	WORDDATX.	NLDATE.	10	200	20
French (FRA)	DATE.	NLDATE.	10	200	20
	DATETIME.	NLDATM.	10	200	30
	DOWNAME.	NLDATEWN.	4	200	10
	MONNAME.	NLDATEMN.	4	200	10
	MONYY.	NLDATEYM.	6	200	10
	WEEKDATX.	NLDATEWX.	3	27	27
	WEEKDAY.	NLDATEWN.	4	200	10
	WORDDATX.	NLDATE.	10	200	20
German (DEU)	DATE.	NLDATE.	105	200	20
	DATETIME.	NLDATM.	10	200	30
	DOWNAME.	NLDATEWN.	4	200	10
	MONNAME.	NLDATEMN.	4	200	10
	MONYY.	NLDATEYM.	6	200	10
	WEEKDATX.	NLDATEWX.	3	30	30
	WEEKDAY.	NLDATEWN.	4	200	10
	WORDDATX.	NLDATE.	10	200	20
Hungarian (HUN)	DATE.	NLDATE.	10	200	20
	DATETIME.	NLDATM.	10	200	30
	DOWNAME.	NLDATEWN.	4	200	10
	MONNAME.	NLDATEMN.	4	200	10
	MONYY.	NLDATEYM.	6	200	10
	WEEKDATX.	NLDATEWX.	3	40	28
	WEEKDAY.	NLDATEWN.	4	200	10
	WORDDATX.	NLDATE.	10	200	20
Italian (ITA)	DATE.	NLDATE.	10	200	20
	DATETIME.	NLDATM.	10	200	30
	DOWNAME.	NLDATEWN.	4	200	10
	MONNAME.	NLDATEMN.	4	200	10
	MONYY.	NLDATEYM.	6	200	10
	WEEKDATX.	NLDATEWX.	3	28	28
	WEEKDAY.	NLDATEWN.	4	200	10

Language	English Format	International Format	Min	Max	Default
	WORDDATX.	NLDATE.	10	200	20
Macedonian (MAC)	DATE.	NLDATE.	10	200	20
	DATETIME.	NLDATM.	10	200	30
	DOWNAME.	NLDATEWN.	4	200	10
	MONNAME.	NLDATEMN.	4	200	10
	MONYY.	NLDATEYM.	6	200	10
	WEEKDATX.	NLDATEWX.	3	40	29
	WEEKDDATX.	EURDFWDX.	1	32	1
	WORDDATX.	NLDATEWN.	4	200	10
Norwegian (NOR)	DATE.	NLDATE.	10	200	20
	DATETIME.	NLDATM.	10	200	30
	DOWNAME.	NLDATEWN.	4	200	10
	MONNAME.	NLDATEMN.	4	200	10
	MONYY.	NLDATEYM.	6	200	10
	WEEKDATX.	NLDATEWX.	3	26	26
	WEEKDAY.	NLDATEWN.	4	200	10
	WORDDATX.	NLDATE.	10	200	20
Polish (POL)	DATE.	NLDATE.	10	200	20
	DATETIME.	NLDATM.	10	20	30
	DOWNAME.	NLDATEWN.	4	200	10
	MONNAME.	NLDATEMN.	4	200	10
	MONYY.	NLDATEYM.	6	200	10
	WEEKDATX.	NLDATEWX.	2	40	34
	WEEKDAY.	NLDATEWN.	4	200	10
	WORDDATX.	NLDATE.	10	200	20
Portuguese (PTG)	DATE.	NLDATE.	10	200	20
	DATETIME.	NLDATM.	10	200	30
	DOWNAME.	NLDATEWN.	4	200	10
	MONNAME.	NLDATEMN.	4	200	10
	MONYY.	NLDATEYM.	6	200	10
	WEEKDATX.	NLDATEWX.	3	38	38
	WEEKDAY.	NLDATEWN.	4	200	10
	WORDDATX.	NLDATE.	10	200	20
Russian (RUS)	DATE.	NLDATE.	10	200	20
	DATETIME.	NLDATM.	10	200	30
	DOWNAME.	NLDATEWN.	4	200	10

Language	English Format	International Format	Min	Max	Default
	MONNAME.	NLDATEMN.	4	200	10
	MONYY.	NLDATEYM.	6	200	10
	WEEKDATX.	NLDATEWX.	2	40	29
	WEEKDAY.	NLDATEWN.	4	200	10
	WORDDATX.	NLDATE.	10	200	20
Spanish (ESP)	DATE.	NLDATE.	10	200	20
	DATETIME.	NLDATM.	10	200	30
	DOWNAME.	NLDATEWN.	4	200	10
	MONNAME.	NLDATEMN.	4	200	10
	MONYY.	NLDATEYM.	6	200	10
	WEEKDATX.	NLDATEWX.	1	35	35
	WEEKDAY.	NLDATEWN.	4	200	10
	WORDDATX.	NLDATE.	10	200	20
Slovenian (SLO)	DATE.	NLDATE.	10	200	20
	DATETIME.	NLDATM.	10	200	30
	DOWNAME.	NLDATEWN.	4	200	10
	MONNAME.	NLDATEMN.	4	200	10
	MONYY.	NLDATEYM.	6	200	10
	WEEKDATX.	NLDATEWX.	3	40	29
	WEEKDAY.	NLDATEWN.	4	200	10
	WORDDATX.	NLDATE.	10	200	20
Swedish (SVE)	DATE.	NLDATE.	10	200	20
	DATETIME.	NLDATM.	10	200	30
	DOWNAME.	NLDATEWN.	4	200	10
	MONNAME.	NLDATEMN.	4	200	10
	MONYY.	NLDATEYM.	6	200	10
	WEEKDATX.	NLDATEWX.	3	26	26
	WEEKDAY.	NLDATEWN.	4	200	10
	WORDDATX.	NLDATE.	10	200	20
Swiss_French (FRS)	DATE.	NLDATE.	10	200	20
	DATETIME.	NLDATM.	10	200	30
	DOWNAME.	NLDATEWN.	4	200	10
	MONNAME.	NLDATEMN.	4	200	10
	MONYY.	NLDATEYM.	6	200	10
	WEEKDATX.	NLDATEWX.	3	26	26
	WEEKDAY.	NLDATEWN.	4	200	10

Language	English Format	International Format	Min	Max	Default
	WORDDATX.	NLDATE.	10	200	20
Swiss_German (DES)	DATE.	NLDATE.	10	200	20
	DATETIME.	NLDATM.	10	200	30
	DOWNAME.	NLDATEWN.	4	200	10
	MONNAME.	NLDATEMN.	4	200	10
	MONYY.	NLDATEYM.	6	200	10
	WEEKDATX.	NLDATEWX.	3	30	30
	WEEKDAY.	NLDATEWN.	4	200	10
	WORDDATX.	NLDATE.	10	200	20

Currency Representation

Overview to Currency

Currency is the medium of exchange, which is specific to a country. SAS provides formats and informats for reading and writing currency.

U.S. Dollars

The DOLLARw.d formats and informats were first introduced to read and write American currency. DOLLARw.d

- uses the dollar sign ($) currency symbol to precede U.S. currency
- uses a comma (,) as the thousands separator and a dot (.) as the decimal separator

Example:

```
$12,345.00
```

DOLLARXw.d also writes currency with a leading dollar sign ($), but uses a dot (.) as the thousands separator and a comma (,) as the decimal separator. The reversal of the dot and comma for currency formatting is a convention used in many European countries.

Example:

```
$12.345,00
```

Because the dollar sign and some currency symbols used by other countries occupy the same code point location in a code page ('5B'x on EBCDIC systems and '24'x on ASCII systems), DOLLARXw.d will produce the correct currency symbol for the specified encoding.

Limitations of the DOLLAR formats and informats are:

- the lack of support for all currency symbols
- the reversal of the dot and comma for currency formatting is not used by all European countries

Localized Euros

The EUROw.d formats and informats were introduced to support the euro currency that was established by the European Monetary Union (EMU), which was formed in 1999. EUROw.d

- uses the euro (e) currency symbol to precede Euro currency data
- uses a comma (,) as the thousands separator and a dot (.) s the decimal separator

Example:

```
options locale=English_UnitedKingdom;
x=12345;
put x euro10.2;
run;
```

Output:

```
 e12.345,00
```

Limitations of the EURO formats and informats are:

- the reversal of the dot and comma for currency formatting is not used by all European countries
- euros are limited only to members of the EMU
- the specific value of the locale is required

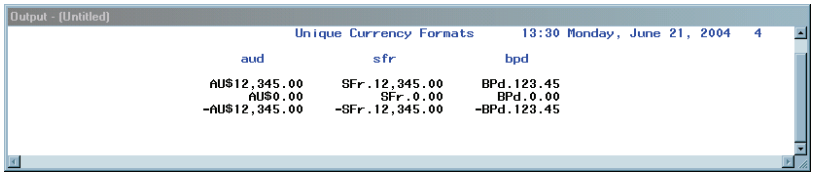
Customized Currency Representations

To create a customized currency representation, you can use the FORMAT procedure. The following example shows the creation of unique formats for the Australian dollar, the Swiss franc, and the British pound. For details about the FORMAT procedure, see *Base SAS Procedures Guide*.

Example Code 7.1 SAS Code That Customizes Currency Representations

```
proc format;

   picture aud low-<0='0,000,000,009.00'
               (prefix='-AU$' mult=100)
               0--high='0,000,00,009.00 '
               (prefix='AU$' mult=100);

   picture sfr low-<0='0,000,000,009.00'
               (prefix='-SFr.' mult=100)
               0--high='0,000,00,009.00 '
               (prefix='-SFr.' mult=100);

   picture bpd low-<0='0,000,000,009.00'
               (prefix='-BPd.' mult=100)
               0--high='0,000,00,009.00 '
               (prefix='BPd.' mult=100);

run;
data currency;
input aud sfr bpd 12.2;
datalines;
```

```
12345 12345 12345
0 0 0
-12345 -12345 -12345
;

proc print data=curr noobs;
   var aud sfr ukp;
   format aud aud. sfr sfr. bpd bpd.;
   title 'Unique Currency Formats'
run;
```



Customizing currency representations offers flexibility, but requires a programming solution.

Localized National and International Currency Representations

The NLMNYw.d and NLMNYIw.d formats and informats were introduced to represent localized currency in two forms:

Localized national currency representation
reflects the customs and conventions of the locale. National formats are specified using the NLMNYw.d formats and informats. You must also use the LOCALE= option to specify the locale when using the NLMNYw.d formats and informats.

Example:

```
options locale=english_UnitedStates;
data _null_;
x=12345;
put x nlmny15.2;
run;
```

Output:

```
$12,345.00
```

Selected national currency representations follow:

Table 7.2 Localized National Currency Representations

LOCALE=	Currency	National Representation
English_UnitedStates	U.S. dollars	$12,345.00
French_Canada	Canadian dollars	12 345,00 $
French_France	French euros	12 345,00 e

LOCALE=	Currency	National Representation
French_Switzerland	Swiss francs	SFr. 12'345.00
German_Germany	German euros	12.345,00 e
German_Luxembourg	Luxembourg euros	12.345 e
Spanish_Spain	Spanish pesetas	12.345,00 e
Spanish_Venezuela	Venezuelan bolivars	Bs12.345,00

The localized renderings show the native customs for representing currency. For example, although these selected EMU countries might use the same euro currency, their depiction of the currency varies. Whereas French_France uses no thousands separator but uses a comma as a decimal separator, German_Germany and Spanish_Spain use a dot as a thousands separator and a comma as a decimal separator.

Localized International currency representation
conforms to ISO standard 4217. International forms are specified using the NLMNYIw.d formats and informats. International forms are commonly used to show a comparison of world currencies; for example, for airline ticket, trade, and stock market pricing. You must also use the LOCALE= option to specify the locale when using the NLMNYIw.d formats and informats. The letter "I," which signifies "International," is appended to the format and informat names.

Example:

```
options locale=english_UnitedStates;
data _null_;
x=12345;
put x nlmnyi15.2;
run;
```

Output:

```
USD12,345.00
```

Selected international currency representations follow:

Table 7.3 International Currency Representations by Locale (ISO standard 4217)

LOCALE=	Currency	International Representation
English_UnitedStates	U.S. dollars	USD12,345.00
French_Canada	Canadian dollars	12,345.00 CAD
French_France	French euros	12,345.00 EUR
French_Luxembourg	Luxembourg euros	12,345.00 EUR
German_Germany	German euros	12,345.00 EUR
German_Switzerland	Swiss francs	CHF 12,345.00
Spanish_Spain	Spanish pesetas	12,345.00 EUR
Spanish_Venezuela	Venezuelan bolivars	VEB12,345.00

The international renderings also reflect native customs for representing currency. For example, although all locales use a comma as the thousands

separator and a dot as the decimal separator, they vary the placement of the ISO currency code. Whereas the EMU countries put the currency code after the currency, English_UnitedStates, German_Switzerland, and Spanish_Venezuela precede the currency with the ISO code.

For a complete list of the ISO standard 4217 currency codes, see www.bsi-global.com/Technical%2BInformation/Publications/_Publications/tig90x.doc.

A primary limitation of using localized national and international currency representations is their dependence on a value for the LOCALE= system option.

Unique National and International Monetary Representations

The NLMNL*ISO*w.d and NLMNI*ISO*w.d formats and informats were introduced to uniquely represent each currency without having to also use the LOCALE= option to specify the locale. Each currency is specified by a unique ISO standard 4217 currency code.

Unique national monetary representation
is specified by the unique ISO currency code. National formats are specified using the NLMNL*ISO*w.d formats and informats. In the following example, USD is the ISO currency code for American dollars.

Note: When using the NLMNL*ISO*w.d formats and informats, you do not use the LOCALE= option to specify the locale. △

Example:

```
data _null_;
x=12345;
put x nlmnlusd15.2;
run;
```

Output:

```
US$12,345.00
```

Selected unique national currency representations follow:

Table 7.4 Unique Currency Representations by ISO Currency Code

ISO Currency Code	Currency	National Representation
USD	U.S. dollars	USD$12,345.00
CAD	Canadian dollars	CA$12,345.00
EUR	French euros	e12,345.00
CHF	Swiss francs	SFr.12,345.00
EUR	German euros	e12,345.00
EUR	Luxembourg euros	e12,345.00
EUR	Spanish euros	e12,345.00
VEB	Venezuelan bolivars	Not found

A currency symbol or a currency code precedes most currencies. Also used are a comma as the thousands separator and a dot as the decimal separator.

Unique international monetary representation
is specified by the unique ISO currency code. International formats are specified using the NLMNI*ISO*w.d formats and informats. International forms are commonly used to show a comparison of world currencies; for example, for airline ticket, trade, and stock market pricing. The letter "I", which signifies "International", is appended to the format and informat names. In the following example, USD is the ISO currency code for American dollars.

Note: When using the NLMNI*ISO*w.d formats and informats, you do not use the LOCALE= option to specify the locale. △

Example:

```
data _null_;
x=12345;
put x nlmni15.2;
run;
```

Output:

```
USD12,345.00
```

Selected international currency representations follow:

Table 7.5 International Currency Representations by ISO Currency Code

ISO Currency Code	Currency	International Representation
USD	U.S. dollars	USD12,345.00
CAD	Canadian dollars	CAD12,345.00
EUR	French euros	EUR12,345.00
CHF	Swiss francs	CHF12,234.00
EUR	German euros	EUR12,345.00
EUR	Luxembourg euros	EUR12,345.00
EUR	Spanish euros	EUR12,345.00
VEB	Venezuelan bolivars	Not found

The international renderings precede the currency with the appropriate ISO code. Also used are a comma as the thousands separator and a dot as the decimal separator.

Example: Representing Currency in National and International Formats

This SAS program uses the exchange rates for selected Asia-Pacific countries against the U.S. dollar. In the output, each country's currency is represented using a national and an international format.

Example Code 7.2 SAS Code That Formats National and International Currency Formats

```
data curr;
input ex_date mmddyy. usd aud hkd jpy sgd 12.2;
datalines;
061704 1.00000 1.45349 7.79930 110.110 1.71900  ❶
```

```
;
proc print data=curr noobs label;
        var ex_date usd aud hkd jpy sgd;
        format ex_date mmddyy. usd nlmnlusd15.2 aud nlmnlaud15.2 hkd nlmnlhkd15.2
                               jpy nlmnljpy15.2 sgd nlmnlsgd15.2;  ❷
        label ex_date='Date' usd="US" aud='Australia' hkd='Hong Kong'
                               jpy='Japan' sgd='Singapore';
        title 'Exchange Rates for Selected Asian-Pacific Countries
          (Localized Currency Codes)';

proc print data=curr noobs label;
        var ex_date usd aud hkd jpy sgd;
        format ex_date mmddyy. usd nlmniusd15.2 aud nlmniaud15.2 hkd nlmnihkd15.2
                               jpy nlmnijpy15.2 sgd nlmnisgd15.2;  ❸
        label ex_date='Date' usd="US" aud='Australia' hkd='Hong Kong'
                               jpy='Japan' sgd='Singapore';
        title 'Exchange Rates for Selected Asian-Pacific Countries
          (International Currency Codes)';
run;
```

1 These exchange rates, which were effective June 17, 2004, are specified as data in the SAS program.

2 These NLMNL*ISO* formats are applied to each of the numeric data items that are specified in the INPUT statement. These formats show currencies in the appropriate national formats.

3 These NLMNI*ISO* formats are applied to each of the numeric data items that are specified in the INPUT statement. These formats show currencies in the appropriate international formats.

Display 7.1 National and International Format Output

European Currency Conversion

Overview to European Currency Conversion

SAS enables you to convert European currency from one country's currency to an equivalent amount in another country's currency. You can also convert a country's currency to euros, and you can convert euros to a specific country's currency.

SAS provides a group of formats, informats, and a function to use for currency conversion. The set of formats EURFR*ISO* can be used to convert specific European currencies to an amount in euros. *ISO* represents an ISO standard 4214 currency code. For a complete list of the ISO standard 4217 currency codes, see www.bsi-global.com/Technical%2BInformation/Publications/_Publications/tig90x.doc.

Fixed Rates for Euro Conversion

Twenty-five European countries comprise the EMU (European Monetary Union). The conversion rates for 12 countries are fixed, and are incorporated into the EURFR*ISO* and EURTO*ISO* formats and into the EUROCURR function. The following table lists the currency codes and conversion rates for the specific currencies whose rates are fixed.

Table 7.6 Fixed Rates for Euro Conversion

ISO Currency Code	Conversion Rate	Currency
ATS	13.7603	Austrian schilling
BEF	40.3399	Belgian franc
DEM	1.95583	Deutsche mark
ESP	166.386	Spanish peseta
EUR	1	Euro
FIM	5.94573	Finnish markka
FRF	6.55957	French franc
GRD	340.750	Greek drachma
IEP	0.787564	Irish pound
ITL	1936.27	Italian lira
LUF	40.3399	Luxembourg franc
NLG	2.20371	Dutch guilder
PTE	200.482	Portuguese escudo

Variable Rates for Euro Conversion

For 13 countries in the EMU, currency conversion rates can fluctuate. The conversion rates for these countries are stored in an ASCII text file that you reference with the EURFRTBL fileref.

The following table lists the currency codes and conversion rates for the currencies of the EMU countries whose rates fluctuate.

Table 7.7 Variable Rates for Euro Conversion

ISO Currency Code	Conversion Rate	Currency
CHF	1.60430	Swiss franc
CZK	34.8563	Czech koruna
DKK	7.49009	Danish krone
GBP	0.700132	British pound
HUF	260.325	Hungarian forint
NOK	9.19770	Norwegian krone
PLZ	4.2	Polish zloty
ROL	13.71	Romanian leu

ISO Currency Code	Conversion Rate	Currency
RUR	19.7680	Russian ruble
SEK	9.36591	Swedish krona
SIT	191	Slovenian tolar
TRL	336.912	Turkish lira
YUD	13.0644	Yugoslavian dinar

Example: Converting between a European Currency and Euros

The following example shows the conversion from Belgian francs to euros. The EURFRBEF format divides the country's currency amount by the exchange rate:

```
CurrencyAmount / ExchangeRate
12345 / 40.3399
```

Example Code 7.3 Example Code: Conversion from Belgian Francs to Euros

```
data _null_
x=12345 /*convert from Belgian francs to euros*/
put x eurfrbef15.2;
run;
```

Output:

```
e306,02
```

The following example shows the conversion of euros to Belgian francs. The EURTOBEF format multiplies euros by the target currency's exchange rate:

```
EurosAmount * ExchangeRate
12345 * 40.3399
```

Example Code 7.4 Example Code: Conversion from Euros to Belgian Francs

```
data _null_
x=12345; /*convert from euros to Belgian francs*/
put x eurtobef15.2;
run;
```

Output:

```
497996.07
```

Direct Conversion between European Currencies

The EUROCURR function uses the conversion rate tables to convert between currencies. For conversion between the currencies of two countries,

1. SAS converts the amount to euros.

   Note: SAS stores the intermediate value as precisely as the operating environment allows, and does not round the value. △

2. SAS converts the amount in euros to an amount in the target currency.

SourceCurrencyAmount → EurosAmount → TargetCurrencyAmount

BelgianFrancs → euros

```
12345 / 40.3399 = 306.02456 euros
```

Euros → FrenchFrancs

```
306.02456 * 6.55957 = 2007.3895 French francs
```

Example Code 7.5 Example Code: Conversion from Belgian Francs to French Francs

```
data _null_;
x=eurocurr(12345,'bef','frf'); /*convert from Belgian francs to French francs*/
put x=;
run;
```

Output:

```
x=2007.389499
```

SAS converts Belgian francs to euros, and then euros to French francs.

Formats for NLS by Category

The following categories relate to NLS issues:

Table 7.8 Categories of NLS Formats

Category	Description
BIDI text handling	Instructs SAS to write bidirectional data values from data variables.
Character	Instructs SAS to write character data values from character variables.
Currency Conversion	Instructs SAS to convert an amount from one currency to another currency.
DBCS	Instructs SAS to translate double–byte-character sets that are used in Asian languages.
Hebrew text handling	Instructs SAS to read Hebrew data from data variables.
International Date and Time	Instructs SAS to write data values from variables that represent dates, times, and datetimes.
Numeric	Instructs SAS to write numeric data values from numeric variables.

The following table provides brief descriptions of the SAS formats that are related to NLS. For more detailed descriptions, see the NLS entry for each format.

Table 7.9 Summary of NLS Formats by Category

Category	Formats for NLS	Description
BIDI text handling	"$BIDI*w*. Format" on page 73	Converts between a logically ordered string and a visually ordered string, by reversing the order of Hebrew and Arabic characters while preserving the order of Latin words and numbers.
	"$LOGVS*w*. Format" on page 83	Processes a character string that is in left-to-right-logical order, and then writes the character string in visual order.
	"$LOGVSR*w*. Format" on page 84	Processes a character string that is in right-to-left-logical order, and then writes the character string in visual order.
	"$VSLOG*w*. Format" on page 221	Processes a character string that is in visual order, and then writes the character string in left-to-right logical order.
	"$VSLOGR*w*. Format" on page 222	Processes a character string that is in visual order, and then writes the character string in right-to-left logical order.
Character	"$UCS2B*w*. Format" on page 199	Processes a character string that is in the encoding of the current SAS session, and then writes the character string in big-endian, 16-bit, UCS2, Unicode encoding.
	"$UCS2BE*w*. Format" on page 200	Processes a character string that is in big-endian, 16-bit, UCS2, Unicode encoding, and then writes the character string in the encoding of the current SAS session.
	"$UCS2L*w*. Format" on page 201	Processes a character string that is in the encoding of the current SAS session, and then writes the character string in little-endian, 16-bit, UCS2, Unicode encoding.
	"$UCS2LE*w*. Format" on page 203	Processes a character string that is in little-endian, 16-bit, UCS2, Unicode encoding, and then writes the character string in the encoding of the current SAS session.
	"$UCS2X*w*. Format" on page 204	Processes a character string that is in the encoding of the current SAS session, and then writes the character string in native-endian, 16-bit, UCS2, Unicode encoding.
	"$UCS2XE*w*. Format" on page 205	Processes a character string that is in native-endian, 16-bit, UCS2, Unicode encoding, and then writes the character string in the encoding of the current SAS session.
	"$UCS4B*w*. Format" on page 206	Processes a character string that is in the encoding of the current SAS session, and then writes the character string in big-endian, 32-bit, UCS4, Unicode encoding.
	"$UCS4BE*w*. Format" on page 207	Processes a character string that is in big-endian, 32-bit, UCS4, Unicode encoding, and then writes the character string in the encoding of the current SAS session.
	"$UCS4L*w*. Format" on page 208	Processes a character string that is in the encoding of the current SAS session, and then writes the character string in little-endian, 32-bit, UCS4, Unicode encoding.

Category	Formats for NLS	Description
	"$UCS4LE*w*. Format" on page 210	Processes a character string that is in little-endian, 32-bit, UCS4, Unicode encoding, and then writes the character string in the encoding of the current SAS session.
	"$UCS4X*w*. Format" on page 211	Processes a character string that is in the encoding of the current SAS session, and then writes the character string in native-endian, 32-bit, UCS4, Unicode encoding.
	"$UCS4XE*w*. Format" on page 212	Processes a character string that is in native-endian, 32-bit, UCS4, Unicode encoding, and then writes the character string in the encoding of the current SAS session.
	"$UESC*w*. Format" on page 213	Processes a character string that is encoded in the current SAS session, and then writes the character string in Unicode escape (UESC) representation.
	"$UESCE*w*. Format" on page 214	Processes a character string that is in Unicode escape (UESC) representation, and then writes the character string in the encoding of the current SAS session.
	"$UNCR*w*. Format" on page 215	Processes a character string that is encoded in the current SAS session, and then writes the character string in numeric character representation (NCR).
	"$UNCRE*w*. Format" on page 217	Processes a character string that is in numeric character representation (NCR), and then writes the character string in the encoding of the current SAS session.
	"$UPAREN*w*. Format" on page 218	Processes a character string that is encoded in the current SAS session, and then writes the character string in Unicode parenthesis (UPAREN) representation.
	"$UPARENE*w*. Format" on page 219	Processes a character string that is in Unicode parenthesis (UPAREN), and then writes the character string in the encoding of the current SAS session.
	"$UTF8X*w*. Format" on page 220	Processes a character string that is in the encoding of the current SAS session, and then writes the character string in universal transformation format (UTF-8) encoding.
DBCS	"$KANJI*w*. Format" on page 81	Adds shift-code data to DBCS data.
	"$KANJIX*w*. Format" on page 82	Removes shift-code data from DBCS data.
Date and Time	"HDATE*w*. Format" on page 79	Writes date values in the form *yyyy mmmmm dd* where *dd* is the day-of-the-month, *mmmmm* represents the month's name in Hebrew, and *yyyy* is the year.
	"HEBDATE*w*. Format" on page 80	Writes date values according to the Jewish calendar.
	"MINGUO*w*. Format" on page 85	Writes date values as Taiwanese dates in the form *yyyymmdd* .
	"NENGO*w*. Format" on page 86	Writes date values as Japanese dates in the form *e.yymmdd* .

Category	Formats for NLS	Description
	"NLDATE*w*. Format" on page 89	Converts a SAS date value to the date value of the specified locale, and then writes the date value as a date.
	"NLDATEMD*w*. Format" on page 90	Converts the SAS date value to the date value of the specified locale, and then writes the value as the name of the month and the day of the month.
	"NLDATEMN*w*. Format" on page 91	Converts a SAS date value to the date value of the specified locale, and then writes the value as the name of the month.
	"NLDATEW*w*. Format" on page 92	Converts a SAS date value to the date value of the specified locale, and then writes the value as the date and the day of the week.
	"NLDATEWN*w*. Format" on page 93	Converts the SAS date value to the date value of the specified locale, and then writes the date value as the day of the week.
	"NLDATEYM*w*. Format" on page 94	Converts the SAS date value to the date value of the specified locale, and then writes the date value as the year and the name of the month.
	"NLDATEYQ*w*. Format" on page 95	Converts the SAS date value to the date value of the specified locale, and then writes the date value as the year and the quarter.
	"NLDATEYR*w*. Format" on page 96	Converts the SAS date value to the date value of the specified locale, and then writes the date value as the year.
	"NLDATEYW*w*. Format" on page 97	Converts the SAS date value to the date value of the specified locale, and then writes the date value as the year and the week.
	"NLDATM*w*. Format" on page 98	Converts a SAS datetime value to the datetime value of the specified locale, and then writes the value as a datetime.
	"NLDATMAP*w*. Format" on page 99	Converts a SAS datetime value to the datetime value of the specified locale, and then writes the value as a datetime with a.m. or p.m.
	"NLDATMDT*w*. Format" on page 100	Converts the SAS datetime value to the datetime value of the specified locale, and then writes the value as the name of the month, day of the month and year.
	"NLDATMMD*w*. Format" on page 101	Converts the SAS datetime value to the datetime value of the specified locale, and then writes the value as the name of the month and the day of the month.
	"NLDATMMN*w*. Format" on page 101	Converts the SAS datetime value to the datetime value of the specified locale, and then writes the value as the name of the month.
	"NLDATMTM*w*. Format" on page 102	Converts the time portion of a SAS datetime value to the time-of-day value of the specified locale, and then writes the value as a time of day.

Category	Formats for NLS	Description
	"NLDATMWN*w*. Format" on page 103	Converts a SAS datetime value to the datetime value of the specified locale, and then writes the value as the day of the week.
	"NLDATMW*w*. Format" on page 104	Converts SAS datetime values to the locale sensitive datetime string as the day of the week and the datetime.
	"NLDATMYM*w*. Format" on page 105	Converts the SAS datetime value to the datetime value of the specified locale, and then writes the value as the year and the name of the month.
	"NLDATMYQ*w*. Format" on page 106	Converts the SAS datetime value to the datetime value of the specified locale, and then writes the value as the year and the quarter of the year.
	"NLDATMYR*w*. Format" on page 107	Converts the SAS datetime value to the datetime value of the specified locale, and then writes the value as the year.
	"NLDATMYW*w*. Format" on page 107	Converts the SAS datetime value to the datetime value of the specified locale, and then writes the value as the year and the name of the week.
	"NLTIME*w*. Format" on page 197	Converts a SAS time value to the time value of the specified locale, and then writes the value as a time value.
	"NLTIMAP*w*. Format" on page 198	Converts a SAS time value to the time value of a specified locale, and then writes the value as a time value with a.m. or p.m.
	"WEEKU*w*. Format" on page 223	Writes a week number in decimal format by using the U algorithm.
	"WEEKV*w*. Format" on page 225	Writes a week number in decimal format by using the V algorithm.
	"WEEKW*w*. Format" on page 227	Writes a week number in decimal format by using the W algorithm.
	"YYWEEKU*w*. Format" on page 228	Writes a week number in decimal format by using the U algorithm, excluding day-of-the-week information.
	"YYWEEKV*w*. Format" on page 230	Writes a week number in decimal format by using the V algorithm, excluding day-of-the-week information.
	"YYWEEKW*w*. Format" on page 231	Writes a week number in decimal format by using the W algorithm, excluding the day-of-week information.
Hebrew text handling	"$CPTDW*w*. Format" on page 74	Processes a character string that is in Hebrew text, encoded in IBM-PC (cp862), and then writes the character string in Windows Hebrew encoding (cp 1255).
	"$CPTWD*w*. Format" on page 75	Processes a character string that is encoded in Windows (cp1255), and then writes the character string in Hebrew DOS (cp862) encoding.
Numeric	"EURO*w.d* Format" on page 76	Writes numeric values with a leading euro symbol (E), a comma that separates every three digits, and a period that separates the decimal fraction.

Category	Formats for NLS	Description
	"EUROX*w*.*d* Format" on page 77	Writes numeric values with a leading euro symbol (E), a period that separates every three digits, and a comma that separates the decimal fraction.
	"NLBEST*w*. Format" on page 88	Writes the best numerical notation based on the locale.
	"NLMNIAED*w*.*d* Format" on page 108	Writes the monetary format of the international expression for the United Arab Emirates.
	"NLMNIAUD*w*.*d* Format" on page 109	Writes the monetary format of the international expression for Australia.
	"NLMNIBGN*w*.*d* Format" on page 110	Writes the monetary format of the international expression for Bulgaria.
	"NLMNIBRL*w*.*d* Format" on page 111	Writes the monetary format of the international expression for Brazil.
	"NLMNICAD*w*.*d* Format" on page 112	Writes the monetary format of the international expression for Canada.
	"NLMNICHF*w*.*d* Format" on page 113	Writes the monetary format of the international expression for Liechtenstein and Switzerland.
	"NLMNICNY*w*.*d* Format" on page 114	Writes the monetary format of the international expression for China.
	"NLMNICZK*w*.*d* Format" on page 115	Writes the monetary format of the international expression for the Czech Republic.
	"NLMNIDKK*w*.*d* Format" on page 116	Writes the monetary format of the local expression for Denmark, Faroe Island, and Greenland.
	"NLMNIEEK*w*.*d* Format" on page 117	Writes the monetary format of the international expression for Estonia.
	"NLMNIEGP*w*.*d* Format" on page 118	Writes the monetary format of the international expression for Egypt.
	"NLMNIEUR*w*.*d* Format" on page 119	Writes the monetary format of the international expression for Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Malta, the Netherlands, Portugal, Slovenia, and Spain.
	"NLMNIGBP*w*.*d* Format" on page 120	Writes the monetary format of the international expression for the United Kingdom.
	"NLMNIHKD*w*.*d* Format" on page 121	Writes the monetary format of the international expression for Hong Kong.
	"NLMNIHRK*w*.*d* Format" on page 122	Writes the monetary format of the international expression for Croatia.
	"NLMNIHUF*w*.*d* Format" on page 123	Writes the monetary format of the international expression for Hungary.
	"NLMNIIDR*w*.*d* Format" on page 124	Writes the monetary format of the international expression for Indonesia.
	"NLMNIILS*w*.*d* Format" on page 125	Writes the monetary format of the international expression for Israel.

Category	Formats for NLS	Description
	"NLMNIINR*w*.*d* Format" on page 126	Writes the monetary format of the international expression for India.
	"NLMNIJPY*w*.*d* Format" on page 127	Writes the monetary format of the international expression for Japan.
	"NLMNIKRW*w*.*d* Format" on page 128	Writes the monetary format of the international expression for South Korea.
	"NLMNILTL*w*.*d* Format" on page 129	Writes the monetary format of the international expression for Lithuania.
	"NLMNILVL*w*.*d* Format" on page 130	Writes the monetary format of the international expression for Latvia.
	"NLMNIMOP*w*.*d* Format" on page 131	Writes the monetary format of the international expression for Macau.
	"NLMNIMXN*w*.*d* Format" on page 132	Writes the monetary format of the international expression for Mexico.
	"NLMNIMYR*w*.*d* Format" on page 133	Writes the monetary format of the international expression for Malaysia.
	"NLMNINOK*w*.*d* Format" on page 134	Writes the monetary format of the international expression for Norway.
	"NLMNINZD*w*.*d* Format" on page 135	Writes the monetary format of the international expression for New Zealand.
	"NLMNIPLN*w*.*d* Format" on page 136	Writes the monetary format of the international expression for Poland.
	"NLMNIRUB*w*.*d* Format" on page 137	Writes the monetary format of the international expression for Russia.
	"NLMNISEK*w*.*d* Format" on page 138	Writes the monetary format of the international expression for Sweden.
	"NLMNISGD*w*.*d* Format" on page 139	Writes the monetary format of the international expression for Singapore.
	"NLMNITHB*w*.*d* Format" on page 140	Writes the monetary format of the international expression for Thailand.
	"NLMNITRY*w*.*d* Format" on page 141	Writes the monetary format of the international expression for Turkey.
	"NLMNITWD*w*.*d* Format" on page 142	Writes the monetary format of the international expression for Taiwan.
	"NLMNIUSD*w*.*d* Format" on page 143	Writes the monetary format of the international expression for Puerto Rico and the United States.
	"NLMNIZAR*w*.*d* Format" on page 144	Writes the monetary format of the international expression for South Africa.
	"NLMNLAED*w*.*d* Format" on page 145	Writes the monetary format of the local expression for the United Arab Emirates.
	"NLMNLAUD*w*.*d* Format" on page 146	Writes the monetary format of the local expression for Australia.
	"NLMNLBGN*w*.*d* Format" on page 147	Writes the monetary format of the local expression for Bulgaria.

Category	Formats for NLS	Description
	"NLMNLBRL*w*.*d* Format" on page 148	Writes the monetary format of the local expression for Brazil.
	"NLMNLCAD*w*.*d* Format" on page 149	Writes the monetary format of the local expression for Canada.
	"NLMNLCHF*w*.*d* Format" on page 150	Writes the monetary format of the local expression for Liechtenstein and Switzerland.
	"NLMNLCNY*w*.*d* Format" on page 151	Writes the monetary format of the local expression for China.
	"NLMNLCZK*w*.*d* Format" on page 152	Writes the monetary format of the local expression for the Czech Republic.
	"NLMNLDKK*w*.*d* Format" on page 153	Writes the monetary format of the local expression for Denmark, Faroe Island, and Greenland.
	"NLMNLEEK*w*.*d* Format" on page 154	Writes the monetary format of the local expression for Estonia.
	"NLMNLEGP*w*.*d* Format" on page 155	Writes the monetary format of the local expression for Egypt.
	"NLMNLEUR*w*.*d* Format" on page 156	Writes the monetary format of the local expression for Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Malta, the Netherlands, Portugal, Slovenia, and Spain.
	"NLMNLGBP*w*.*d* Format" on page 157	Writes the monetary format of the local expression for the United Kingdom.
	"NLMNLHKD*w*.*d* Format" on page 158	Writes the monetary format of the local expression for Hong Kong.
	"NLMNLHRK*w*.*d* Format" on page 159	Writes the monetary format of the local expression for Croatia.
	"NLMNLHUF*w*.*d* Format" on page 160	Writes the monetary format of the local expression for Hungary.
	"NLMNLIDR*w*.*d* Format" on page 161	Writes the monetary format of the local expression for Indonesia.
	"NLMNLILS*w*.*d* Format" on page 162	Writes the monetary format of the local expression for Israel.
	"NLMNLINR*w*.*d* Format" on page 163	Writes the monetary format of the local expression for India.
	"NLMNLJPY*w*.*d* Format" on page 164	Writes the monetary format of the local expression for Japan.
	"NLMNLKRW*w*.*d* Format" on page 165	Writes the monetary format of the local expression for South Korea.
	"NLMNLLTL*w*.*d* Format" on page 166	Writes the monetary format of the local expression for Lithuania.
	"NLMNLLVL*w*.*d* Format" on page 167	Writes the monetary format of the local expression for Latvia.
	"NLMNLMOP*w*.*d* Format" on page 168	Writes the monetary format of the local expression for Macau.

Category	Formats for NLS	Description
	"NLMNLMXN*w*.*d* Format" on page 169	Writes the monetary format of the local expression for Mexico.
	"NLMNLMYR*w*.*d* Format" on page 170	Writes the monetary format of the local expression for Malaysia.
	"NLMNLNOK*w*.*d* Format" on page 171	Writes the monetary format of the local expression for Norway.
	"NLMNLNZD*w*.*d* Format" on page 172	Writes the monetary format of the local expression for New Zealand.
	"NLMNLPLN*w*.*d* Format" on page 173	Writes the monetary format of the local expression for Poland.
	"NLMNLRUB*w*.*d* Format" on page 174	Writes the monetary format of the local expression for Russia.
	"NLMNLSEK*w*.*d* Format" on page 175	Writes the monetary format of the local expression for Sweden.
	"NLMNLSGD*w*.*d* Format" on page 176	Writes the monetary format of the local expression for Singapore.
	"NLMNLTHB*w*.*d* Format" on page 177	Writes the monetary format of the local expression for Thailand.
	"NLMNLTRY*w*.*d* Format" on page 178	Writes the monetary format of the local expression for Turkey.
	"NLMNLTWD*w*.*d* Format" on page 179	Writes the monetary format of the local expression for Taiwan.
	"NLMNLUSD*w*.*d* Format" on page 180	Writes the monetary format of the local expression for Puerto Rico and the United States.
	"NLMNLZAR*w*.*d* Format" on page 181	Writes the monetary format of the local expression for South Africa.
	"NLMNY*w*.*d* Format" on page 182	Writes the monetary format of the local expression in the specified locale using local currency.
	"NLMNYI*w*.*d* Format" on page 184	Writes the monetary format of the international expression in the specified locale.
	"NLNUM*w*.*d* Format" on page 185	Writes the numeric format of the local expression in the specified locale.
	"NLNUMI*w*.*d* Format" on page 186	Writes the numeric format of the international expression in the specified locale.
	"NLPCT*w*.*d* Format" on page 188	Writes percentage data of the local expression in the specified locale.
	"NLPCTI*w*.*d* Format" on page 189	Writes percentage data of the international expression in the specified locale.
	"NLPCTN*w*.*d* Format" on page 190	Produces percentages, using a minus sign for negative values.
	"NLPCTP*w*.*d* Format" on page 191	Writes locale-specific numeric values as percentages.
	"NLPVALUE*w*.*d* Format" on page 192	Writes p-values of the local expression in the specified locale.

Category	Formats for NLS	Description
	"NLSTRMON*w.d* Format" on page 193	Writes a numeric value as a day-of-the-month in the specified locale.
	"NLSTRQTR*w.d* Format" on page 195	Writes a numeric value as the quarter-of-the-year in the specified locale.
	"NLSTRWK*w.d* Format" on page 196	Writes a numeric value as the day-of-the-week in the specified locale.
	"YEN*w.d* Format" on page 233	Writes numeric values with yen signs, commas, and decimal points.

$BIDI*w*. Format

Converts between a logically ordered string and a visually ordered string, by reversing the order of Hebrew and Arabic characters while preserving the order of Latin words and numbers.

Category: BIDI text handling

Alignment: left

Syntax

$BIDI*w.*

Syntax Description

w

specifies the width of the output field.

Default: 1 if *w* is not specified

Range: 1–32767

Details

In the Windows operating environment, Hebrew and Arabic text is stored in logical order. The text is stored in the order that it is written and not necessarily as it is displayed. However, in other operating environments, Hebrew text is stored in the same order it is displayed. SAS users can encounter Hebrew and Arabic text that is reversed. Such situations can occur when you use SAS/CONNECT or other software to transfer SAS data sets or reports with Hebrew and Arabic text from a visual operating environment to a logical one. The $BIDI format is a format that reverses Hebrew and Arabic text while maintaining the order of numbers and Latin-1 words.

Operating Environment Information: In mainframe operating environments, this format is designed to work with NewCode Hebrew and Arabic. Some mainframe operating environments might experience unsatisfactory results, because they use the OldCode Hebrew or Arabic encoding. There is a hotfix for this encoding on SAS Institute's Web site: **`http://support.sas.com/`**. △

Comparisons

The $BIDI*w*. format performs a reversing function similar to the $REVERJ*w*. format, which writes character data in reverse order and preserves blanks. $BIDI*w*. behaves in the following way:

- $BIDI*w*. reverses the order of words and numbers in a specified string, preserving blanks. Latin-1 words and numbers themselves are not reversed, only their order in the string.
- When $BIDI encounters a word consisting of Hebrew or Arabic characters in the text string, the characters in the Hebrew or Arabic word are reversed and the position of the Hebrew or Arabic word is reversed in the string.

Examples

This example demonstrates how $BIDI*w.* reverses Hebrew characters. The Hebrew is reversed in the string. The Hebrew characters in the words are also reversed.

```
data;
   a='שלום כיתה א abc 123';
   b1 = put (a,$bidi20.);
   put b=;
   b2 = put (b,$bidi20.);
   put b=;
run;
```

The following lines are written to the SAS log:

```
b1=123 abc א הכיתה שלום
b2=א הכיתה שלום abc 123
```

$CPTDW*w*. Format

Processes a character string that is in Hebrew text, encoded in IBM-PC (cp862), and then writes the character string in Windows Hebrew encoding (cp 1255).

Category: Hebrew text handling

Alignment: left

Syntax

$CPTDW*w*.

Syntax Description

w

specifies the width of the output field.

Default: 200

Range: 1–32000

Comparisons

The $CPTDW*w*. format performs processing that is the opposite of the $CPTWD*w*. format.

Examples

The following example uses the input value of "808182x."

Statement	Result
	`----+----1----+`
`put text $cptdw3.;`	אבג

See Also

Formats:

"$CPTWD*w*. Format" on page 75

Informats:

"$CPTDW*w*. Informat" on page 310
"$CPTWD*w*. Informat" on page 311

$CPTWD*w*. Format

Processes a character string that is encoded in Windows (cp1255), and then writes the character string in Hebrew DOS (cp862) encoding.

Category: Hebrew text handling
Alignment: left

Syntax

$CPTWD*w*.

Syntax Description

w
specifies the width of the output field.
Default: 200
Range: 1–32000

Comparisons

The $CPTWD*w*. format performs processing that is the opposite of the $CPTDW*w*. format.

Examples

The following example uses the input value of "אבג".

Statement	Result
	`----+----1----+----2----+`
`put text $cptwd3.;`	€□,

See Also

Formats:

"$CPTDW*w*. Format" on page 74

Informats:

"$CPTDW*w*. Informat" on page 310
"$CPTWD*w*. Informat" on page 311

EURO*w.d* Format

Writes numeric values with a leading euro symbol (E), a comma that separates every three digits, and a period that separates the decimal fraction.

Category: Numeric
Alignment: right

Syntax

EURO*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 6

Range: 1-32

Tip: If you want the euro symbol to be part of the output, be sure to choose an adequate width. See "Examples" on page 77.

d

specifies the number of digits to the right of the decimal point in the numeric value.

Default: 0

Range: 0-31

Requirement: must be less than *w*

Comparisons

- The EURO*w.d* format is similar to the EUROX*w.d* format, but EUROX*w.d* format reverses the roles of the decimal point and the comma. This convention is common in European countries.
- The EURO*w.d* format is similar to the DOLLAR*w.d* format, except that DOLLAR*w.d* format writes a leading dollar sign instead of the euro symbol.

Examples

These examples use 1254.71 as the value of amount.

Statements	Results
	`----+----1----+----2----+----3`
`put amount euro10.2;`	`E1,254.71`
`put amount euro5.;`	`1,255`
`put amount euro9.2;`	`E1,254.71`
`put amount euro15.3;`	`E1,254.710`

See Also

Formats:

"EUROX*w.d* Format" on page 77

Informats:

"EURO*w.d* Informat" on page 312

"EUROX*w.d* Informat" on page 313

EUROX*w.d* Format

Writes numeric values with a leading euro symbol (E), a period that separates every three digits, and a comma that separates the decimal fraction.

Category: Numeric

Alignment: right

Syntax

EUROX*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 6

Range: 1-32

Tip: If you want the euro symbol to be part of the output, be sure to choose an adequate width. See "Examples" on page 78.

d

specifies the number of digits to the right of the decimal point in the numeric value.

Default: 0

Range: 0-31

Requirement: must be less than *w*

Comparisons

- The EUROX*w.d* format is similar to the EURO*w.d* format, but EURO*w.d* format reverses the roles of the comma and the decimal point. This convention is common in English–speaking countries.
- The EUROX*w.d* format is similar to the DOLLARX*w.d* format, except that DOLLARX*w.d* format writes a leading dollar sign instead of the euro symbol.

Examples

These examples use 1254.71 as the value of amount.

Statements	Results
	`----+----1----+----2----+----3`
`put amount eurox10.2;`	` E1.254,71`
`put amount eurox5.;`	`1.255`
`put amount eurox9.2;`	`E1.254,71`
`put amount eurox15.3;`	`E1.254,710`

See Also

Formats:

"EURO*w.d* Format" on page 76

Informats:

"EURO*w.d* Informat" on page 312

"EUROX*w.d* Informat" on page 313

HDATE*w*. Format

Writes date values in the form *yyyy mmmmm dd* where *dd* is the day-of-the-month, *mmmmm* represents the month's name in Hebrew, and *yyyy* is the year.

Category: Date and Time

Alignment: right

Syntax

HDATE*w*.

Syntax Description

w
specifies the width of the output field.

Note: Use widths 9, 11, 15, or 17 for the best view. △

Default: 17

Range: 9–17

Details

The HDATE*w*. format writes the SAS date value in the form *yyyy mmmmm dd*:

yyyy
is the year

mmmmm
is the Hebrew name of the month

dd
is the day-of-the-month

Examples

The following example uses the input value of 15780, which is the SAS date of March 16, 2003.

Statements	Results
	`----+----1----+----2----+`
`put day hdate9.;`	`03 מרץ 16`
`put day hdate11.;`	`2003 מרץ 16`
`put day hdate17.;`	`2003 מרץ 16`

See Also

Formats:

"HEBDATE*w*. Format" on page 80

HEBDATE*w*. Format

Writes date values according to the Jewish calendar.

Category: Date and Time

Alignment: right

Syntax

HEBDATE*w*.

Syntax Description

w

specifies the width of the output field.

Default: 16

Range: 7–24

Details

The Jewish calendar is a combined solar and lunar calendar. Years are counted from the creation of the world, which according to Jewish history, occurred 3760 years and three months before the commencement of the Christiar. You must add 3761, beginning in the autumn of a specified year in the Gregorian calendar to calculate the Hebrew year.

The HEBDATE*w*. format writes the SAS date value according to the Jewish calendar. The date is written in one of the following formats:

long	ראשון י' אדר ה'תשס"ג
default	י' אדר תשס"ג
short	י'/ו'/תשס"ג

Examples

The following example uses the input value of 15780, which is the SAS date of March 16, 2003.

Statements	Results
	`----+----1----+`
`put day hebdate13.;`	י"ב/ו2'/תשס"ג
`put day hebdate16.;`	י"ב אדר-ב' תשס"ג
`put day hebdate24.;`	ראשון י"ב אדר-ב' ה'תשס"ג

See Also

Informats:

"HDATE*w*. Format" on page 79

$KANJI*w*. Format

Adds shift-code data to DBCS data.

Category: DBCS

Alignment: left

Syntax

$KANJI*w*.

Syntax Description

w

specifies the width of the output field.

Restriction: The width must be an even number. If it is an odd number, it is truncated. The width must be equal to or greater than the length of the shift-code data.

Range: The minimum width of the format is **`2 + (length of shift code used on the current DBCSTYPE= setting)*2.`**

Details

The $KANJI format adds shift-code data to DBCS data that does not have shift-code data. If the input data is blank, shift-code data is not added.

The $KANJI format processes host-mainframe data, but $KANJI can be used on other platforms. If you use the $KANJI format on non-EBCDIC (non-modal encoding) hosts, the data does not change.

See Also

Formats:

"$KANJIX*w*. Format" on page 82

Informats:

"$KANJI*w*. Informat" on page 317

"$KANJIX*w*. Informat" on page 318

System Options:

"DBCSTYPE System Option: UNIX, Windows, and z/OS" on page 456

$KANJIX*w*. Format

Removes shift-code data from DBCS data.

Category: DBCS

Alignment: left

Syntax

$KANJIX*w*.

Syntax Description

w

specifies the width of the output field.

Restriction: The width must be an even number. If it is an odd number, it is truncated. The width must be equal to or greater than the length of the shift-code data.

Range: The minimum width of the format is 2.

Details

The $KANJIX format removes shift-code data from DBCS data. The input data length must be **`2 + (SO/SI length)*2`**. The data must start with SO and end with SI, unless single-byte data is returned.

The $KANJIX format processes host mainframe data, but $KANJIX can be used on other platforms. If you use the $KANJIX format on non-EBCDIC (non-modal encoding) hosts, the data does not change.

See Also

Formats:

"$KANJI*w*. Format" on page 81

Informats:

"$KANJI*w*. Informat" on page 317

"$KANJIX*w*. Informat" on page 318

System Options:

"DBCSTYPE System Option: UNIX, Windows, and z/OS" on page 456

$LOGVS*w*. Format

Processes a character string that is in left-to-right-logical order, and then writes the character string in visual order.

Category: BIDI text handling

Alignment: left

Syntax

$LOGVS*w*.

Syntax Description

w

specifies the width of the output field.

Default: 200

Range: 1–32000

Details

The $LOGVS*w*. format is used when you store logical-ordered text on a visual server.

Note: If the $LOGVS*w*. format is not accessible, then the Hebrew or Arabic portion of the data will be reversed. △

Comparisons

The $LOGVS*w*. format performs processing that is the opposite of the $LOGVSR*w*. format.

Examples

The following example uses the Hebrew input value of "טיסה flight".

Statements	Results
	`----+----1----+----2----+`
`put text $logvs12.;`	הסיט **flight**

The following example uses the Arabic input value of “ ذاتك ” computer.

Statements	Results
	`----+----1----+----2----+`
`put text $logvs12.;`	ذاتك computer

See Also

Formats:

“$LOGVSR*w*. Format” on page 84

Informats:

“$LOGVSR*w*. Informat” on page 320
“$LOGVS*w*. Informat” on page 319

$LOGVSR*w*. Format

Processes a character string that is in right-to-left-logical order, and then writes the character string in visual order.

Category: BIDI text handling
Alignment: left

Syntax

$LOGVSR*w*.

Syntax Description

w
specifies the width of the output field.
Default: 200
Range: 1–32000

Details

The $LOGVSR*w*. format is used when you store logical-ordered text on a visual server. The Hebrew or Arabic portion of the text is reversed if the $LOGVS*w*. format is not on the server.

Comparisons

The $LOGVSR*w*. format performs processing that is opposite of the $LOGVS*w*. format.

Examples

The following example uses the Hebrew input value of "טיסה flight".

Statements	Results
	`----+----1----+`
`put text $logvsr12.;`	**flight** חסיט

The following example uses the Arabic input value of " ذات " computer.

Statements	Results
	`----+----1----+`
`put text $logvsr12.;`	ذات computer

See Also

Formats:

"$LOGVS*w*. Format" on page 83

Informats:

"$LOGVS*w*. Informat" on page 319
"$LOGVSR*w*. Informat" on page 320

MINGUO*w*. Format

Writes date values as Taiwanese dates in the form *yyyymmdd*.

Category: Date and Time
Alignment: left

Syntax

MINGUO*w*.

Syntax Description

w
specifies the width of the output field.

Default: 8

Range: 1–10

Details

The MINGUO*w*. format writes SAS date values in the form *yyyymmdd*, where

yyyy
is an integer that represents the year.

mm
is an integer that represents the month.

dd
is an integer that represents the day of the month.

The Taiwanese calendar uses 1912 as the base year (01/01/01 is January 1, 1912). Dates before 1912 appear as a series of asterisks. Year values do not roll around after 100 years; instead, they continue to increase.

Examples

The example table uses the following input values:

1. 12054 is the SAS date value that corresponds to January 1, 1993.
2. 18993 is the SAS date value that corresponds to January 1, 2012.
3. -20088 is the SAS date value that corresponds to January 1, 1905.

Statements	Results
	`----+----1`
`put date minguo10.;`	`0082/01/01`
	`0101/01/01`
	`**********`

See Also

Informats:

"MINGUO*w*. Informat" on page 321

NENGO*w*. Format

Writes date values as Japanese dates in the form *e.yymmdd*.

Category: Date and Time

Alignment: left

Syntax

NENGO*w*.

Syntax Description

w
specifies the width of the output field.

Default: 10

Range: 2–10

Details

The NENGO*w*. format writes SAS date values in the form *e.yymmdd*, where

e
is the first letter of the name of the emperor (Meiji, Taisho, Showa, or Heisei).

yy
is an integer that represents the year.

mm
is an integer that represents the month.

dd
is an integer that represents the day of the month.

If the width is too small, SAS omits the period.

Examples

The example table uses the input value of 15342, which is the SAS date value that corresponds to January 2, 2002.

Statements	Results
	`----+----1`
`put date nengo3.;`	`H14`
`put date nengo6.;`	`H14/01`
`put date nengo8.;`	`H.140102`
`put date nengo9.;`	`H14/01/02`
`put date nengo10.;`	`H.14/01/02`

See Also

Informats:

"NENGO*w*. Informat" on page 323

NLBEST*w*. Format

Writes the best numerical notation based on the locale.

Category: Numeric
Alignment: right

Syntax

NLBEST*w*.

Syntax Description

w
specifies the width of the output field.

Default: 12

Tip: If you print numbers between 0 and .01 exclusively, then use a field width of at least 7 to avoid excessive rounding. If you print numbers between 0 and -.01 exclusively, then use a field width of at least 8.

Range: 1–32

Details

The NLBEST format writes the best numerical value based on the locale's decimal point and the sign mark's location. NLBEST is similar to the BEST format. For more information, see the BEST format in the *SAS Language Reference: Dictionary*.

Examples

The following code produces results based on the locale:

```
x=-1257000
 put x nlbest6.;
 put x nlbest3.;
 put "=====";
x=-0.1
 put x nlbest6.;
 put x nlbest3.;
 put "=====";
x=0.1
 put x nlbest6.;
 put x nlbest3.;
 put "=====";
x=1257000
 put x nlbest6.;
 put x nlbest3.;
```

Locales	Results
locale=English_UnitedStates	-126E4 *** ===== -0.1 -.1 ===== 0.1 0.1 ===== 1.26E6 1E6
locale=German_Germany	-126E4 *** ===== -0,1 -,1 ===== 0,1 0,1 ===== 1,26E6 1E6
locale=ar_BH	126E4- *** ===== 0.1- .1- ===== 0.1 0.1 ===== 1.26E6 1E6

NLDATE*w*. Format

Converts a SAS date value to the date value of the specified locale, and then writes the date value as a date.

Category: Date and Time

Alignment: left

Syntax

NLDATE*w*.

Syntax Description

w
specifies the width of the output field. If necessary, SAS abbreviates the date to fit the format width.
Default: 20
Range: 10–200

Comparisons

NLDATE*w*. is similar to DATE*w*. and WORDDATE*w*. except that NLDATE*w*. is locale-specific.

Examples

These examples use the input value of 15760, which is the SAS date value that corresponds to February 24, 2003.

Statements	Results
	`----+----1----+----2`
`options locale=English_UnitedStates;`	
`put day nldate.;`	`February 24, 2003`
`options locale=German_Germany;`	
`put day nldate.;`	`24. Februar 2003`

See Also

Formats:
"NLDATEMN*w*. Format" on page 91
"NLDATEW*w*. Format" on page 92
"NLDATEWN*w*. Format" on page 93

NLDATEMD*w*. Format

Converts the SAS date value to the date value of the specified locale, and then writes the value as the name of the month and the day of the month.

Category: Date and Time

Alignment: left

Syntax

NLDATEMD*w*.

Syntax Description

w
specifies the width of the output field.

Default: 16

Range: 6-200

Examples

This example uses the en_US locale option.

Statement	Result
`put 1 nldatemd.;`	`January 02`

See Also

Formats:

"NLDATEYM*w*. Format" on page 94

NLDATEMN*w*. Format

Converts a SAS date value to the date value of the specified locale, and then writes the value as the name of the month.

Category: Date and Time

Alignment: left

Syntax

NLDATEMN*w*.

Syntax Description

w
specifies the width of the output field. If necessary, SAS abbreviates the name of the month to fit the format width.

Default: 10

Range: 4–200

Comparisons

NLDATEMN*w*. is similar to MONNAME*w*. except that NLDATEMN*w*. is locale-specific.

Examples

These examples use the input value of 15760, which is the SAS date value that corresponds to February 24, 2003.

Statements	Results
	`----+----1`
`options locale=English_UnitedStates;`	
`put month nldatemn.;`	`February`
`options locale=German_Germany;`	
`put month nldatemn.;`	`Februar`

See Also

Formats:

"NLDATE*w*. Format" on page 89
"NLDATEW*w*. Format" on page 92
"NLDATEWN*w*. Format" on page 93

NLDATEW*w*. Format

Converts a SAS date value to the date value of the specified locale, and then writes the value as the date and the day of the week.

Category: Date and Time

Alignment: left

Syntax

NLDATEW*w*.

Syntax Description

w
specifies the width of the output field. If necessary, SAS abbreviates the date and the day of the week to fit the format width.

Default: 20

Range: 10–200

Comparisons

NLDATEW*w*. is similar to WEEKDATE*w*. except that NLDATEW*w*. is locale specific.

Examples

These examples use the input value of 15760, which is the SAS date value that corresponds to February 24, 2003.

Statements	Results
	`----+----1----+----2`
`options locale=English_UnitedStates;`	
`put date nldatew.;`	`Sun, Feb 24, 03`
`options locale=German_Germany;`	
`put date nldatew.;`	`So, 24. Feb 03`

See Also

Formats:

"NLDATE*w*. Format" on page 89
"NLDATEMN*w*. Format" on page 91
"NLDATEWN*w*. Format" on page 93

NLDATEWN*w*. Format

Converts the SAS date value to the date value of the specified locale, and then writes the date value as the day of the week.

Category: Date and Time

Alignment: left

Syntax

NLDATEWN*w*.

Syntax Description

w
specifies the width of the output field. If necessary, SAS abbreviates the day of the week to fit the format width.
Default: 10
Range: 4–200

Comparisons

NLDATEWN*w*. is similar to DOWNAME*w*. except that NLDATEWN*w*. is locale-specific.

Examples

These examples use the input value of 15760, which is the SAS date value that corresponds to February 24, 2003.

Statements	Results
	`----+----1`
`options locale=English_UnitedStates;`	
`put date nldatewn.;`	`Sunday`
`options locale=German_Germany;`	
`put date nldatewn.;`	`Sonntag`

See Also

Formats:
"NLDATE*w*. Format" on page 89
"NLDATEMN*w*. Format" on page 91
"NLDATEW*w*. Format" on page 92

NLDATEYM*w*. Format

Converts the SAS date value to the date value of the specified locale, and then writes the date value as the year and the name of the month.

Category: Date and Time

Alignment: left

Syntax

NLDATEYM*w*.

Syntax Description

w
specifies the width of the output field.

Default: 16

Range: 6–200

Examples

This example uses the en_US locale option.

Statement	Result
`put 1 nldateym.;`	`January 1960`

See Also

Formats:

"NLDATEMD*w*. Format" on page 90

NLDATEYQ*w*. Format

Converts the SAS date value to the date value of the specified locale, and then writes the date value as the year and the quarter.

Category: Date and Time

Alignment: left

Syntax

NLDATEYQ*w*.

Syntax Description

w
specifies the width of the output field.
Default: 16
Range: 4–200

Examples

This example uses the fr_FR locale option.

Statements	Results
options locale=fr_FR;	
data _null_;	
dy=today();	
dt=datetime();	
put "+— NLDATEYQ min=4 default=16 max=200 —+";	+— NLDATEYQ min=4 default=16 max=200 —+
put '16' +5 dy nldateyq.;	16 T3 08
put '4' +5 dy nldateyq4.;	4 ****
put '14' +5 dy nldateyq14.;	14 T3 08
put '32' +5 dy nldateyq32.;	32 3e trimestre 2008
put '200' +5 dy nldateyq200.;	200
run;	3e trimestre 2008

NLDATEYR*w*. Format

Converts the SAS date value to the date value of the specified locale, and then writes the date value as the year.

Category: Date and Time
Alignment: left

Syntax

NLDATEYR*w*.

Syntax Description

w
specifies the width of the output field.

Default: 16
Range: 2–200

Examples

This example uses the fr_FR locale option.

Statements	Results
options locale=fr_FR;	
data _null_;	
dy=today();	
dt=datetime();	
put "+— NLDATEYR min=2 default=16 max=200 —+";	+— NLDATEYR min=2 default=16 max=200 —+
put dy nldateyr.;	2008
put dy nldateyr2.;	08
put dy nldateyr8.;	2008
put dy nldateyr200.;	2008
run;	

NLDATEYW*w*. Format

Converts the SAS date value to the date value of the specified locale, and then writes the date value as the year and the week.

Category: Date and Time
Alignment: left

Syntax

NLDATEYW*w*.

Syntax Description

w
specifies the width of the output field.
Default: 16
Range: 5–200

Examples

This example uses the fr_FR locale option.

Statements	Results
options locale=fr_FR;	
data _null_;	
dy=today();	
dt=datetime();	
put "+— NLDATEYW min=5 default=16 max=200 —+";	16 Week 33 2008
put '16' +5 dy nldateyw.;	5 *****
put '5' +5 dy nldateyw5.;	8 W33 08
put '8' +5 dy nldateyw8.;	32 Week 33 2008
put '32' +5 dy nldateyw32.;	200
put '200' +5 dy nldateyw200.;	Week 33 2008
run;	

NLDATM*w*. Format

Converts a SAS datetime value to the datetime value of the specified locale, and then writes the value as a datetime.

Category: Date and Time
Alignment: left

Syntax

NLDATM*w*.

Syntax Description

w
specifies the width of the output field. If necessary, SAS abbreviates the datetime value to fit the format width.

Default: 30

Range: 10–200

Comparisons

The NLDATM*w*. format is similar to the DATETIME*w*. format except that the NLDATM*w*. format is locale-specific.

Examples

These examples use the input value of 1361709583, which is the SAS datetime value that corresponds to 12:39:43 p.m. on February 24, 2003.

Statements	Results
	`----+----1----+----2----+----3`
`options locale=English_UnitedStates;` `put day nldatm.;`	`24Feb03:12:39:43`
`options locale=German_Germany;` `put day nldatm.;`	`24. Februar 2003 12.39 Uhr`

See Also

Formats:

"NLDATMAP*w*. Format" on page 99
"NLDATMTM*w*. Format" on page 102
"NLDATMW*w*. Format" on page 104

NLDATMAP*w*. Format

Converts a SAS datetime value to the datetime value of the specified locale, and then writes the value as a datetime with a.m. or p.m.

Category: Date and Time

Alignment: left

Syntax

NLDATMAP*w*.

Syntax Description

w

specifies the width of the output field. If necessary, SAS abbreviates the date-time value to fit the format width.

Default: 32

Range: 16–200

Comparisons

The NLDATMAP*w*. format is similar to DATEAMPM*w*. except that the NLDATMAP*w*. format is locale-specific.

Examples

These examples use the input value of 1361709583, which is the SAS date-time value that corresponds to 12:39:43 p.m. on February 24, 2003.

Statements	Results
	`----+----1----+----2----+----3`
`options locale=English_UnitedStates;`	
`put event nldatmap.;`	`February 24, 2003 12:39:43 PM`
`options locale=Spanish_Mexico;`	
`put event nldatmap.;`	`24 de febrero de 2003 12:39:43 PM`

See Also

Formats:

"NLDATM*w*. Format" on page 98
"NLDATMTM*w*. Format" on page 102
"NLDATMW*w*. Format" on page 104

NLDATMDT*w*. Format

Converts the SAS datetime value to the datetime value of the specified locale, and then writes the value as the name of the month, day of the month and year.

Category: Date and Time
Alignment: left

Syntax

NLDATMDT*w*.

Syntax Description

w
specifies the width of the output field
Default: 20
Range: 10–200

Examples

This example uses the en_US locale option.

Statements	Results
`put $6400,nldatmdt.;` `put$6400,dtdate.;`	`January 02, 1960` `02JAN60`

NLDATMMD*w*. Format

Converts the SAS datetime value to the datetime value of the specified locale, and then writes the value as the name of the month and the day of the month.

Category: Date and Time
Alignment: left

Syntax

NLDATMMD*w*.

Syntax Description

w
specifies the width of the output field.
Default: 16
Range: 6–200

Examples

This example uses the en_US locale option.

Statement	Result
`put 86400 nldatmmd.;`	`January 02`

See Also

Formats:
"NLDATMYM*w*. Format" on page 105

NLDATMMN*w*. Format

Converts the SAS datetime value to the datetime value of the specified locale, and then writes the value as the name of the month.

Category: Date and Time
Alignment: left

Syntax

NLDATMMN*w*.

Syntax Description

w
specifies the width of the output field.
Default: 10
Range: 4–200

Examples

This example uses the en_US locale option.

Statements	Results
data _null_;	
dt = datetime();	
dy = date();	
put "+— NLDATEMN min=4 default=10 max=200 —+";	+— NLDATMMN min=4 default=10 max=200 —+
put dt nldatmmn.;	October
put dt nldatmmn4.;	Oct
put dt nldatmmn10.;	October
put dt nldatmmn200.;	October
run;	

NLDATMTM*w*. Format

Converts the time portion of a SAS datetime value to the time-of-day value of the specified locale, and then writes the value as a time of day.

Category: Date and Time
Alignment: left

Syntax

NLDATMTM*w*.

Syntax Description

w
specifies the width of the output field.
Default: 16
Range: 16–200

Comparisons

The NLDATMTM*w*. format is similar to the TOD*w*. format except that the NLDATMTM*w*. format is locale-specific.

Examples

These examples use the input value of 1361709583, which is the SAS datetime value that corresponds to 12:39:43 p.m. on February 24, 2003.

Statements	Results
	`----+----1`
`options locale=English_UnitedStates;`	
`put event nldatmtm.;`	`12:39:43`
`options locale=German_Germany;`	
`put event nldatmtm.;`	`12.39 Uhr`

See Also

Formats:
"NLDATM*w*. Format" on page 98
"NLDATMAP*w*. Format" on page 99
"NLDATMW*w*. Format" on page 104

NLDATMWN*w*. Format

Converts a SAS datetime value to the datetime value of the specified locale, and then writes the value as the day of the week.

Category: Date and Time
Alignment: left

Syntax

NLDATMWN*w*.

Syntax Description

w
specifies the width of the output field.

Default: 30

Range: 16–200

Examples

This example writes the SAS datetime value as a day of the week.

```
now = datetime() ;
put now nldatmwn. ;
```

NLDATMW*w*. Format

Converts SAS datetime values to the locale sensitive datetime string as the day of the week and the datetime.

Category: Date and Time

Alignment: left

Syntax

NLDATMW*w*.

Syntax Description

w
specifies the width of the output field. If necessary, SAS abbreviates the day of week and datetime to fit the format width.

Default: 30

Range: 16–200

Comparisons

The NLDATMW*w*. format is similar to the TWMDY*w*. format except that the NLDATMW*w*. format is locale-specific.

Examples

These examples use the input value of 1361709583, which is the SAS datetime value that corresponds to 12:39:43 p.m. on February 24, 2003.

Statements	Results
	`----+----1----+----2----+----3`
`options locale=English_UnitedStates;`	
`put event nldatmw.;`	`Sun, Feb 24, 2003 12:39:43`
`options locale=German_Germany;`	
`put event nldatmw.;`	`So, 24. Feb 2003 12.39 Uhr`

See Also

Formats:

"NLDATM*w*. Format" on page 98
"NLDATMAP*w*. Format" on page 99
"NLDATMTM*w*. Format" on page 102

NLDATMYM*w*. Format

Converts the SAS datetime value to the datetime value of the specified locale, and then writes the value as the year and the name of the month.

Category: Date and Time
Alignment: left

Syntax

NLDATMYM*w*.

Syntax Description

w
specifies the width of the output field.
Default: 16
Range: 6–200

Examples

This example uses the en_US locale option.

Statement	Result
`put 86400 nldatmym.;`	`January 1960`

See Also

Formats:

"NLDATMMD*w*. Format" on page 101

NLDATMYQ*w*. Format

Converts the SAS datetime value to the datetime value of the specified locale, and then writes the value as the year and the quarter of the year.

Category: Date and Time

Alignment: left

Syntax

NLDATMYQ*w*.

Syntax Description

w

specifies the width of the output field.

Default: 16

Range: 4–200

Examples

This example uses the fr_FR locale option.

Statements	Results
options locale=fr_FR;	
data _null_;	
dy=today();	
dt=datetime();	
put "+— NLDATMYQ min=4 default=16 max=200 —+";	+— NLDATMYQ min=4 default=16 max=200 —+
put '16' +5 dt nldatmyq.;	16 T3 08
put '4' +5 dt nldatmyq4.;	4 ****
put '14' +5 dt nldatmyq14.;	14 T3 08
put '32' +5 dt nldatmyq32.;	32 3e trimestre 2008
put '200' +5 dt nldatmyq200.;	200 3e trimestre 2008
run;	

NLDATMYR*w*. Format

Converts the SAS datetime value to the datetime value of the specified locale, and then writes the value as the year.

Category: Date and Time
Alignment: left

Syntax

NLDATMYR*w*.

Syntax Description

w
specifies the width of the output field.
Default: 16
Range: 2–200

Examples

This example uses the en_US locale option.

Statements	Results
options locale=fr_FR;	
data _null_;	
dy=today();	
dt=datetime();	
put "+— NLDATMYR min=2 default=16 max=200 —+";	+— NLDATMYR min=2 default=16 max=200 —+
put dt nldatmyr.;	2008
put dt nldatmyr2.;	08
put dt nldatmyr32.;	2008
put dt nldatmyr200.;	2008
run;	

NLDATMYW*w*. Format

Converts the SAS datetime value to the datetime value of the specified locale, and then writes the value as the year and the name of the week.

Category: Date and Time

Alignment: left

Syntax

NLDATMYW*w*.

Syntax Description

w
specifies the width of the output field.
Default: 16
Range: 5–200

Examples

This example uses the fr_FR locale option.

Statements	Results
options locale=fr_FR;	
data _null_;	
dy=today();	
dt=datetime();	
put "+— NLDATMYW min=5 default=16 max=200 —+";	+— NLDATMYW min=5 default=16 max=200 —+
put '16' +5 dt nldatmyw.;	16 Week 33 2008
put '5' +5 dt nldatmyw5.;	5 *****
put '8' +5 dt nldatmyw8.;	8 W33 08
put '32' +5 dt nldatmyw32.;	32 Week 33 2008
put '200' +5 dt nldatmyw200.;	200
run;	Week 33 2008

NLMNIAED*w.d* Format

Writes the monetary format of the international expression for the United Arab Emirates.

Category: Numeric
Alignment: left

Syntax

NLMNIAED*w*.*d*

Syntax Description

w
specifies the width of the output field.

Default: 12

Range: 8–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 3

Range: 0–328

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmniaed32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(AED1,234,57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNLAED*w.d* Format" on page 145

NLMNIAUD*w.d* Format

Writes the monetary format of the international expression for Australia.

Category: Numeric
Alignment: left

Syntax

NLMNIAUD*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmniaud32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(AUD1,234,57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNLAUD*w.d* Format" on page 146

NLMNIBGN*w.d* Format

Writes the monetary format of the international expression for Bulgaria.

Category: Numeric
Alignment: left

Syntax

NLMNIBGN*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmnibgn32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(BGN1,234.57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNLBGN*w.d* Format" on page 147

NLMNIBRL*w.d* Format

Writes the monetary format of the international expression for Brazil.

Category: Numeric
Alignment: left

Syntax

NLMNIBRL*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmnibrl32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(BRL1,234.57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNLBRL*w.d* Format" on page 148

NLMNICAD*w.d* Format

Writes the monetary format of the international expression for Canada.

Category: Numeric

Alignment: left

Syntax

NLMNICAD*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmnicad32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(CAD1,234,57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNLCAD*w.d* Format" on page 149

NLMNICHF*w.d* Format

Writes the monetary format of the international expression for Liechtenstein and Switzerland.

Category: Numeric

Alignment: left

Syntax

NLMNICHF*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmnichf32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(CHF1,234.57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNLCHF*w.d* Format" on page 150

NLMNICNY*w.d* Format

Writes the monetary format of the international expression for China.

Category: Numeric

Alignment: left

Syntax

NLMNICNY*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmnicny32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(CNY1,234.57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNLCNY*w.d* Format" on page 151

NLMNICZK*w.d* Format

Writes the monetary format of the international expression for the Czech Republic.

Category: Numeric
Alignment: left

Syntax

NLMNICZK*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmniczk32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(CZK1,234.57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNLCZK*w.d* Format" on page 152

NLMNIDKK*w.d* Format

Writes the monetary format of the local expression for Denmark, Faroe Island, and Greenland.

Category: Numeric
Alignment: left

Syntax

NLMNIDKK*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmnidkk32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(DKK1,234.57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNLDKK*w.d* Format" on page 153

NLMNIEEK*w.d* Format

Writes the monetary format of the international expression for Estonia.

Category: Numeric
Alignment: left

Syntax

NLMNIEEK*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmnieek32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(EEK1,234.57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNLEEK*w.d* Format" on page 154

NLMNIEGP*w.d* Format

Writes the monetary format of the international expression for Egypt.

Category: Numeric

Alignment: left

Syntax

NLMNIEGP*w.d*

Syntax Description

w
specifies the width of the output field.
Default: 9
Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.
Default: 0
Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmniegp32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(EGP1,234.57)`
`put y=;`	`$-1,234.57`

See Also

Formats:
"NLMNLEGP*w.d* Format" on page 155

NLMNIEUR*w.d* Format

Writes the monetary format of the international expression for Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Malta, the Netherlands, Portugal, Slovakia, Slovenia, and Spain.

Category: Numeric
Alignment: left

Syntax

NLMNIEUR*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to Locale=German_Germany.

```
x=put(-1234.56789,nlmnieur32.2);
y=put(-1234.56789,nlmnleur32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-EUR1.234,57`
`put y=;`	-€ 1.234,57

See Also

Formats:

"NLMNLEUR*w.d* Format" on page 156

NLMNIGBP*w.d* Format

Writes the monetary format of the international expression for the United Kingdom.

Category: Numeric

Alignment: left

Syntax

NLMNIGBP*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmnigbp32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(GBP1,234.57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNLGBP*w.d* Format" on page 157

NLMNIHKD*w.d* Format

Writes the monetary format of the international expression for Hong Kong.

Category: Numeric
Alignment: left

Syntax

NLMNIHKD*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmnihkd32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(HKD1,234.57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNLHKD*w.d* Format" on page 158

NLMNIHRK*w.d* Format

Writes the monetary format of the international expression for Croatia.

Category: Numeric
Alignment: left

Syntax

NLMNIHRK*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmnihrk32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(HRK1,234.57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNLHRK*w.d* Format" on page 159

NLMNIHUF*w.d* Format

Writes the monetary format of the international expression for Hungary.

Category: Numeric
Alignment: left

Syntax

NLMNIHUF*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmnihuf32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(HUF1,234.57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNLHUF*w.d* Format" on page 160

NLMNIIDR*w.d* Format

Writes the monetary format of the international expression for Indonesia.

Category: Numeric
Alignment: left

Syntax

NLMNIIDR*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmniidr32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(IDR1,234.57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNLIDR*w.d* Format" on page 161

NLMNIILS*w.d* Format

Writes the monetary format of the international expression for Israel.

Category: Numeric

Alignment: left

Syntax

NLMNIILS*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmniils32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(ILS1,234.57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNLILS*w.d* Format" on page 162

NLMNIINR*w.d* Format

Writes the monetary format of the international expression for India.

Category: Numeric
Alignment: left

Syntax

NLMNIINR*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmniinr32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(INR1,234.57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNLINR*w.d* Format" on page 163

NLMNIJPY*w.d* Format

Writes the monetary format of the international expression for Japan.

Category: Numeric
Alignment: left

Syntax

NLMNIJPY*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmnijpy32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(JPY1,234.57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNLJPY*w.d* Format" on page 164

NLMNIKRW*w.d* Format

Writes the monetary format of the international expression for South Korea.

Category: Numeric
Alignment: left

Syntax

NLMNIKRW*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmnikrw32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(KRW1,234.57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNLKRW*w.d* Format" on page 165

NLMNILTL*w.d* Format

Writes the monetary format of the international expression for Lithuania.

Category: Numeric
Alignment: left

Syntax

NLMNILTL*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmniltl32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(LTL1,234.57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNLLTL*w.d* Format" on page 166

NLMNILVL*w.d* Format

Writes the monetary format of the international expression for Latvia.

Category: Numeric
Alignment: left

Syntax

NLMNILVL*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmnilvl32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(LVL1,234.57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNLLVL*w.d* Format" on page 167

NLMNIMOP*w.d* Format

Writes the monetary format of the international expression for Macau.

Category: Numeric

Alignment: left

Syntax

NLMNIMOP*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmnimop32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(MOP1,234.57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNLMOP*w.d* Format" on page 168

NLMNIMXN*w.d* Format

Writes the monetary format of the international expression for Mexico.

Category: Numeric

Alignment: left

Syntax

NLMNIMXN*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmnimxn32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(MXN1,234,57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNLMXN*w.d* Format" on page 169

NLMNIMYR*w.d* Format

Writes the monetary format of the international expression for Malaysia.

Category: Numeric
Alignment: left

Syntax

NLMNIMYR*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmnimyr32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(MYR1,234.57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNLMYR*w.d* Format" on page 170

NLMNINOK*w.d* Format

Writes the monetary format of the international expression for Norway.

Category: Numeric
Alignment: left

Syntax

NLMNINOK*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmninok32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(NOK1,234.57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNLNOK*w.d* Format" on page 171

NLMNINZD*w.d* Format

Writes the monetary format of the international expression for New Zealand.

Category: Numeric
Alignment: left

Syntax

NLMNINZD*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmninzd32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(NZD1,234.57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNLNZD*w.d* Format" on page 172

NLMNIPLN*w.d* Format

Writes the monetary format of the international expression for Poland.

Category: Numeric
Alignment: left

Syntax

NLMNIPLN*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmnipln32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(PLN1,234.57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNLPLN*w.d* Format" on page 173

NLMNIRUB*w.d* Format

Writes the monetary format of the international expression for Russia.

Category: Numeric

Alignment: left

Syntax

NLMNIRUB*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmnirub32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(RUB1,234.57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNLRUB*w.d* Format" on page 174

NLMNISEK*w.d* Format

Writes the monetary format of the international expression for Sweden.

Category: Numeric

Alignment: left

Syntax

NLMNISEK*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmnisek32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(SEK1,234.57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNLSEK*w.d* Format" on page 175

NLMNISGD*w.d* Format

Writes the monetary format of the international expression for Singapore.

Category: Numeric

Alignment: left

Syntax

NLMNISGD*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmnisgd32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(SGD1,234.57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNLSGD*w.d* Format" on page 176

NLMNITHB*w.d* Format

Writes the monetary format of the international expression for Thailand.

Category: Numeric
Alignment: left

Syntax

NLMNITHB*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmnithb32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(THB1,234.57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNLTHB*w.d* Format" on page 177

NLMNITRY*w.d* Format

Writes the monetary format of the international expression for Turkey.

Category: Numeric

Alignment: left

Syntax

NLMNITRY*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmnlitry32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(TRY1,234,57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNLTRY*w.d* Format" on page 178

NLMNITWD*w.d* Format

Writes the monetary format of the international expression for Taiwan.

Category: Numeric
Alignment: left

Syntax

NLMNITWD*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmnitwd32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(TWD1,234.57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNLTWD*w.d* Format" on page 179

NLMNIUSD*w.d* Format

Writes the monetary format of the international expression for Puerto Rico and the United States.

Category: Numeric

Alignment: left

Syntax

NLMNIUSD*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmniusd32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(USD1,234.57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNLUSD*w.d* Format" on page 180

NLMNIZAR*w.d* Format

Writes the monetary format of the international expression for South Africa.

Category: Numeric
Alignment: left

Syntax

NLMNIZAR*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmnizar32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(ZAR1,234.57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNLZAR*w.d* Format" on page 181

NLMNLAED*w.d* Format

Writes the monetary format of the local expression for the United Arab Emirates.

Category: Numeric

Alignment: left

Syntax

NLMNLAED*w.d*

Syntax Description

w
specifies the width of the output field.
Default: 9
Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.
Default: 0
Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmnlaed32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(AED1,234.57)`
`put y=;`	`$-1,234.57`

See Also

Formats:
"NLMNIAED*w.d* Format" on page 108

NLMNLAUD*w.d* Format

Writes the monetary format of the local expression for Australia.

Category: Numeric
Alignment: left

Syntax

NLMNLAUD*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmnlaud32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(AU$1,234.57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNIAUD*w.d* Format" on page 109

NLMNLBGN*w.d* Format

Writes the monetary format of the local expression for Bulgaria.

Category: Numeric

Alignment: left

Syntax

NLMNLBGN*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmnlbgn32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(BGN1,234.57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNIBGN*w.d* Format" on page 110

NLMNLBRL*w.d* Format

Writes the monetary format of the local expression for Brazil.

Category: Numeric

Alignment: left

Syntax

NLMNLBRL*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
optionally specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmnlbrl32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(BRL1,234.57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNIBRL*w.d* Format" on page 111

NLMNLCAD*w.d* Format

Writes the monetary format of the local expression for Canada.

Category: Numeric

Alignment: left

Syntax

NLMNLCAD*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmnlcad32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(CA$1,234.57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNICAD*w.d* Format" on page 112

NLMNLCHF*w.d* Format

Writes the monetary format of the local expression for Liechtenstein and Switzerland.

Category: Numeric
Alignment: left

Syntax

NLMNLCHF*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmnlchf32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`SFr.1,234.57`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNICHF*w.d* Format" on page 113

NLMNLCNY*w.d* Format

Writes the monetary format of the local expression for China.

Category: Numeric

Alignment: left

Syntax

NLMNLCNY*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmnlcny32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(RMB1,234.57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNICNY*w.d* Format" on page 114

NLMNLCZK*w.d* Format

Writes the monetary format of the local expression for the Czech Republic.

Category: Numeric
Alignment: left

Syntax

NLMNLCZK*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmnlczk32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(CZK1,234.57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNICZK*w.d* Format" on page 115

NLMNLDKK*w.d* Format

Writes the monetary format of the local expression for Denmark, Faroe Island, and Greenland.

Category: Numeric
Alignment: left

Syntax

NLMNLDKK*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmnldkk32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(kr1,234.57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNIDKK*w.d* Format" on page 116

NLMNLEEK*w.d* Format

Writes the monetary format of the local expression for Estonia.

Category: Numeric
Alignment: left

Syntax

NLMNLEEK*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmnleek32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(EEK1,234.57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNIEEK*w.d* Format" on page 117

NLMNLEGP*w.d* Format

Writes the monetary format of the local expression for Egypt.

Category: Numeric

Alignment: left

Syntax

NLMNLEGP*w.d*

Syntax Description

w
specifies the width of the output field.
Default: 9
Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.
Default: 0
Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmnlegp32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(EGP1,234.57)`
`put y=;`	`$-1,234.57`

See Also

Formats:
"NLMNIEGP*w.d* Format" on page 118

NLMNLEUR*w.d* Format

Writes the monetary format of the local expression for Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Malta, the Netherlands, Portugal, Slovakia, Slovenia, and Spain.

Category: Numeric
Alignment: left

Syntax

NLMNLEUR*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^{d}. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to German_Germany.

```
x=put(-1234.56789,nlmnieur32.2);
y=put(-1234.56789,nlmnleur32.2);
```

Statements	Results
	—-+—-1—-+—-2—-+
put x=;	-EUR1.234,57
put y=;	-€ 1.234,57

See Also

Formats:

"NLMNIEUR*w.d* Format" on page 119

NLMNLGBP*w.d* Format

Writes the monetary format of the local expression for the United Kingdom.

Category: Numeric

Alignment: left

Syntax

NLMNLGBP*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmnlgbp32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(£1,234.57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNIGBP*w.d* Format" on page 120

NLMNLHKD*w.d* Format

Writes the monetary format of the local expression for Hong Kong.

Category: Numeric
Alignment: left

Syntax

NLMNLHKD*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmnlhkd32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(HK$1,234.57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNIHKD*w.d* Format" on page 121

NLMNLHRK*w.d* Format

Writes the monetary format of the local expression for Croatia.

Category: Numeric
Alignment: left

Syntax

NLMNLHRK*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmnlhrk32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(HRK1,234.57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNIHRK*w.d* Format" on page 122

NLMNLHUF*w.d* Format

Writes the monetary format of the local expression for Hungary.

Category: Numeric
Alignment: left

Syntax

NLMNLHUF*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmnlhuf32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(HUF1,234.57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNIHUF*w.d* Format" on page 123

NLMNLIDR*w.d* Format

Writes the monetary format of the local expression for Indonesia.

Category: Numeric

Alignment: left

Syntax

NLMNLIDR*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmnlidr32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(IDR1,234.57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNIIDR*w.d* Format" on page 124

NLMNLILS*w.d* Format

Writes the monetary format of the local expression for Israel.

Category: Numeric
Alignment: left

Syntax

NLMNLILS*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmnlils32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(ILS1,234.57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNIILS*w.d* Format" on page 125

NLMNLINR*w.d* Format

Writes the monetary format of the local expression for India.

Category: Numeric
Alignment: left

Syntax

NLMNLINR*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmnlinr32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(INR1,234.57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNIINR*w.d* Format" on page 126

NLMNLJPY*w.d* Format

Writes the monetary format of the local expression for Japan.

Category: Numeric
Alignment: left

Syntax

NLMNLJPY*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmnljpy32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(JPY1,234.57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNIJPY*w.d* Format" on page 127

NLMNLKRW*w.d* Format

Writes the monetary format of the local expression for South Korea.

Category: Numeric
Alignment: left

Syntax

NLMNLKRW*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmnlkrw32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(KRW1,234.57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNIKRW*w.d* Format" on page 128

NLMNLLTL*w.d* Format

Writes the monetary format of the local expression for Lithuania.

Category: Numeric
Alignment: left

Syntax

NLMNLLTL*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmnlltl32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(LTL1,234.57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNILTL*w*.*d* Format" on page 129

NLMNLLVL*w.d* Format

Writes the monetary format of the local expression for Latvia.

Category: Numeric
Alignment: left

Syntax

NLMNLLVL*w*.*d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmnllvl32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(LVL1,234.57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNILVL*w.d* Format" on page 130

NLMNLMOP*w.d* Format

Writes the monetary format of the local expression for Macau.

Category: Numeric

Alignment: left

Syntax

NLMNLMOP*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmnlmop32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(MOP1,234.57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNIMOP*w.d* Format" on page 131

NLMNLMXN*w.d* Format

Writes the monetary format of the local expression for Mexico.

Category: Numeric

Alignment: left

Syntax

NLMNLMXN*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmnlmxn32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(MXN1,234,57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNIMXN*w.d* Format" on page 132

NLMNLMYR*w.d* Format

Writes the monetary format of the local expression for Malaysia.

Category: Numeric
Alignment: left

Syntax

NLMNLMYR*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmnlmyr32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(R1,234.57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNIMYR*w.d* Format" on page 133

NLMNLNOK*w.d* Format

Writes the monetary format of the local expression for Norway.

Category: Numeric

Alignment: left

Syntax

NLMNLNOK*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmnlnok32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(kr1,234.57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNINOK*w.d* Format" on page 134

NLMNLNZD*w.d* Format

Writes the monetary format of the local expression for New Zealand.

Category: Numeric
Alignment: left

Syntax

NLMNLNZD*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmnlnzd32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(NZ$1,234.57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNINZD*w.d* Format" on page 135

NLMNLPLN*w.d* Format

Writes the monetary format of the local expression for Poland.

Category: Numeric
Alignment: left

Syntax

NLMNLPLN*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmnlpln32.2);
y=put(-1234.56789,dollar32.2)
```

Statements	Results
	`----+----1----+`
`put x=;`	`(PLN1,234.57`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNIPLN*w.d* Format" on page 136

NLMNLRUB*w.d* Format

Writes the monetary format of the local expression for Russia.

Category: Numeric
Alignment: left

Syntax

NLMNLRUB*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmnlrub32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(RUB1,234.57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNIRUB*w.d* Format" on page 137

NLMNLSEK*w.d* Format

Writes the monetary format of the local expression for Sweden.

Category: Numeric

Alignment: left

Syntax

NLMNLSEK*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmnlsek32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(kr1,234.57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNISEK*w.d* Format" on page 138

NLMNLSGD*w.d* Format

Writes the monetary format of the local expression for Singapore.

Category: Numeric
Alignment: left

Syntax

NLMNLSGD*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmnlsgd32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(SG$1,234.57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNISGD*w.d* Format" on page 139

NLMNLTHB*w.d* Format

Writes the monetary format of the local expression for Thailand.

Category: Numeric

Alignment: left

Syntax

NLMNLTHB*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmnlthb32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(THB1,234.57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNITHB*w*.*d* Format" on page 140

NLMNLTRY*w.d* Format

Writes the monetary format of the local expression for Turkey.

Category: Numeric

Alignment: left

Syntax

NLMNLTRY*w*.*d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmnltry32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(TRY1,234,57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNITRY*w.d* Format" on page 141

NLMNLTWD*w.d* Format

Writes the monetary format of the local expression for Taiwan.

Category: Numeric

Alignment: left

Syntax

NLMNLTWD*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmnltwd32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(NT$1,234.57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNITWD*w.d* Format" on page 142

NLMNLUSD*w.d* Format

Writes the monetary format of the local expression for Puerto Rico and the United States.

Category: Numeric

Alignment: left

Syntax

NLMNLUSD*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmnlusd32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(US$1,234.57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNIUSD*w.d* Format" on page 143

NLMNLZAR*w.d* Format

Writes the monetary format of the local expression for South Africa.

Category: Numeric
Alignment: left

Syntax

NLMNLZAR*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmnlzar32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(R1,234.57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNIZAR*w.d* Format" on page 144

NLMNY*w.d* Format

Writes the monetary format of the local expression in the specified locale using local currency.

Category: Numeric
Alignment: left

Syntax

NLMNY*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies the number of digits to the right of the decimal point in the numeric value.

Default: 0

Range: 0–31

Details

The NLMNY*w.d* format reads integer binary (fixed-point) values, including negative values that are represented in two's-complement notation. The NLMNY*w.d* format writes numeric values by using the currency symbol, the thousands separator, and the decimal separator that is used by the locale.

Note: The NLMNY*w.d* format does not convert currency format, therefore, the value of the formatted number should equal the currency of the current locale value. △

Comparisons

The NLMNY*w.d* and NLMNYI*w.d* formats write the monetary format with locale-dependent thousands and decimal separators. However, the NLMNYI*w.d* format uses three-letter international currency codes, such as USD, while NLMNY*w.d* format uses local currency symbols, such as $.

The NLMNY*w.d* format is similar to the DOLLAR*w.d* format except that the NLMNY*w.d* format is locale-specific.

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmny32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`($1,234.57)`
`put y=;`	`$-1,234.57`

See Also

Formats:

"NLMNYI*w.d* Format" on page 184

Informats:

"NLMNY*w.d* Informat" on page 400
"NLMNYI*w.d* Informat" on page 401

NLMNYI*w.d* Format

Writes the monetary format of the international expression in the specified locale.

Category: Numeric
Alignment: left

Syntax

NLMNYI*w.d*

Syntax Description

w
specifies the width of the output field.
Default: 9
Range: 1–32

d
specifies the number of digits to the right of the decimal point in the numeric value.
Default: 0
Range: 0–31

Details

The NLMNYI*w.d* format reads integer binary (fixed-point) values, including negative values that are represented in two's-complement notation. The NLMNYI*w.d* format writes numeric values by using the international currency code, and locale-dependent thousands and decimal separators. The position of international currency code is also locale dependent.

Note: The NLMNYI*w.d* format does not convert currency format, therefore, the value of the formatted number should equal the currency of the current locale value. △

Comparisons

The NLMNY*w.d* and NLMNYI*w.d* formats write the monetary format with locale-dependent thousands and decimal separators. However, the NLMNYI*w.d* format uses three-letter international currency codes, such as USD, while NLMNY*w.d* format uses local currency symbols, such as $.

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmnyi32.2);
y=put(-1234.56789,nlmny32.2);
z=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`(USD1,234.57)`
`put y=;`	`($1,234.57)`
`put z=;`	`$-1,234.57`

See Also

Formats:

"NLMNY*w.d* Format" on page 182

Informats:

"NLMNY*w.d* Informat" on page 400

"NLMNYI*w.d* Informat" on page 401

NLNUM*w.d* Format

Writes the numeric format of the local expression in the specified locale.

Category: Numeric

Alignment: left

Syntax

NLNUM*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 6

Range: 1–32

d

specifies to divide the number by 10^d. If the data contains decimal separators, the *d* value is ignored.

Default: 0
Range: 0–31

Details

The NLMUM*w.d* format reads integer binary (fixed-point) values, including negative values that are represented in two's-complement notation. The NLNUM*w.d* format writes numeric values by using the thousands separator and the decimal separator that is used by the locale.

Comparisons

The NLNUM*w.d* format writes the numeric value with locale-dependent thousand and decimal separators. The NLNUMI*w.d* format writes the numeric value with a comma (,) as thousand separator and a period (.) as a decimal separator

If the *w* or *d* values are not large enough to generate a formatted number, the NLNUM*w.d* format uses an algorithm that prints the thousands-separator characters whenever possible, even if some decimal precision is lost.

Examples

```
x=put(-1234356.7891,nlnum32.2);
```

Statements	Results
	`----+----1----+`
`options LOCALE=English_UnitedStates;`	
`put x=;`	`-1,234,356.79`
`options LOCALE=German_Germany;`	
`put x=;`	`-1.234.356,79`

See Also

Formats:
"NLNUMI*w.d* Format" on page 186
Informats:
"NLNUM*w.d* Informat" on page 402
"NLNUMI*w.d* Informat" on page 403

NLNUMI*w.d* Format

Writes the numeric format of the international expression in the specified locale.

Category: Numeric
Alignment: left

Syntax

NLNUMI*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 6

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Details

The NLMUMI*w.d* format reads integer binary (fixed-point) values, including negative values that are represented in two's-complement notation. The NLNUMI*w.d* format writes numeric values by using a comma (,) as thousands separator and a period (.) as a decimal separator for all locales.

Comparisons

The NLNUMI*w.d* format writes the numeric data of the international expression in the specified locale. The NLNUMI*w.d* format writes the numeric value with a comma (,) as thousand separator and a period (.) as a decimal separator.

If the *w* or *d* values are not large enough to generate a formatted number, the NLNUM*w.d* format uses an algorithm that prints the thousands-separator characters whenever possible, even if some decimal precision is lost.

Examples

```
x=put(-1234356.7891,nlnumi32.2);
```

Statements	Results
	`----+----1----+`
`options LOCALE=English_UnitedStates;`	
`put x=;`	`-1,234,356.79`
`options LOCALE=German_Germany;`	
`put x=;`	`-1,234,356.79`

See Also

Formats:

"NLNUM*w.d* Format" on page 185

Informats:

"NLNUM*w.d* Informat" on page 402
"NLNUMI*w.d* Informat" on page 403

NLPCT*w.d* Format

Writes percentage data of the local expression in the specified locale.

Category: Numeric
Alignment: left

Syntax

NLPCT*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 6

Range: 4–32

d

specifies to divide the number by 10^d. If the data contains decimal separators, the *d* value is ignored.

Default: 0

Range: 0–31

Comparisons

The NLPCT*w.d* format writes percentage data of the local expression in the specified locale. The NLPCT*w.d* format writes the percentage value with locale-dependent thousand and decimal separators. The NLPCTI*w.d* format writes the percentage value with a comma (,) as thousand separator and a period (.) as a decimal separator.

The NLPCT*w.d* format is similar to the PERCENT*w.d* format except the NLPCT*w.d* format is locale-specific.

Examples

```
x=put(-12.3456789,nlpct32.2);
y=put(-12.3456789,nlpcti32.2);
z=put(-12.3456789,percent32.2);
```

Statements	Results
	`----+----------1`
`options LOCALE=English_UnitedStates;`	
`put x=;`	`-1,234.57%`
`put y=;`	`-1,234.57%`
`put z=;`	`(  1234.57%)`
`options LOCALE=German_Germany;`	
`put x=;`	`-1.234,57%`
`put y=;`	`-1,234.57%`
`put z=;`	`(  1234.57%)`

See Also

Formats:

"NLPCTI*w.d* Format" on page 189

Informats:

"NLPCT*w.d* Informat" on page 405
"NLPCTI*w.d* Informat" on page 406

NLPCTI*w.d* Format

Writes percentage data of the international expression in the specified locale.

Category: Numeric
Alignment: left

Syntax

NLPCTI*w.d*

Syntax Description

w
specifies the width of the output field.
Default: 6
Range: 4–32

d
specifies to divide the number by 10^{d}. If the data contains decimal separators, the *d* value is ignored.
Default: 0
Range: 0–31

Comparisons

The NLPCTI*w.d* format writes percentage data of the international expression in the specified locale. The NLPCT*w.d* format writes the percentage value with locale-dependent thousand and decimal separators. The NLPCTI*w.d* format writes the percentage value with a comma (,) as thousand separator and a period (.) as a decimal separator.

The NLPCT*w.d* format is similar to the PERCENT*w.d* format except the NLPCT*w.d* format is locale-specific.

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-12.3456789,nlpcti32.2);
y=put(-12.3456789,percent32.2);
```

Statements	Results
	`----+--------1`
`put x=;`	`-1,234.57%`
`put y=;`	`(                         1234.57)`

See Also

Formats:

"NLPCT*w.d* Format" on page 188

Informats:

"NLPCT*w.d* Informat" on page 405

"NLPCTI*w.d* Informat" on page 406

NLPCTN*w.d* Format

Produces percentages, using a minus sign for negative values.

Category: Numeric

Alignment: right

Syntax

NLPCTN*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 6

Range: 4–32

Tip: The width of the output field must account for the minus sign (–), the percent sign (%), and a trailing blank, whether the number is negative or positive.

d
specifies the number of digits to the right of the decimal point in the numeric value. This argument is optional.

Range: 0–31

Requirement: must be less than *w*

Details

The NLPCTN*w.d* format multiplies negative values by 100, adds a minus sign to the beginning of the value, and adds a percent sign (%) to the end of the formatted value.

Examples

```
x=-0.02;
```

Statements	Results
put x nlpctn6.;	x=-2%
put x percentn6.;	x=-2%

NLPCTP*w.d* Format

Writes locale-specific numeric values as percentages.

Category: Numeric

Alignment: right

Syntax

NLPCTP*w.d*

Syntax Description

w
specifies the width of the output field.

Default 6

Range 4–32

Tip: The width of the output field must account for the percent sign (%).

d

specifies the number of digits to the right of the decimal point in the numeric value. This argument is optional. The thousand separator and decimal symbol for the NLPCTP format is locale-specific.

Range: 0–31

Requirement: must be less than *w*

Details

The NLPCTP*w.d* format multiplies values by 100, formats them, and adds a percent sign (%) to the end of the formatted value. The NLPCTP*w.d* format is similar to the The PERCENT*w.d* format except that the thousand separator and decimal symbol for the NLPCTP*w.d* format is locale-specific.

Examples

```
x=-0.02;
```

Statements	Results
put x nlpctp6.;	–2%
put x percent6.;	(2%)

NLPVALUE*w.d* Format

Writes p-values of the local expression in the specified locale.

Category: Numeric

Alignment: left

Syntax

NLPVALUE*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 6

Range: 3–32

d
specifies to divide the number by 10^d. If the data contains decimal separators, the *d* value is ignored.

Default: 4

Range: 1–30

Examples

This example uses the german_Germany locale option.

Statements:

```
options locale=german_germany;
data _null_;
   put "+--- nlpvalue min=3 default=6 max=32 ---+";
   x=0.1248;
   put x= +5 x pvalue.    +5 x nlpvalue.;
   put x= +5 x pvalue3.1  +5 x nlpvalue3.1;
   put x= +5 x pvalue20.2 +5 x nlpvalue20.2;
   put x= +5 x pvalue32.3 +5 x nlpvalue32.3;
run;
```

Results:

```
+--- nlpvalue min=3 default=6 max=32 ---+
x=0.1248   0.1248     0,1248
x=0.1248   0.1     0,1
x=0.1248                  0.12                    0,12
x=0.1248                               0.125                          0,125
```

See Also

Format:

PVALUEw.d in *SAS Language Reference: Dictionary*

NLSTRMON*w.d* Format

Writes a numeric value as a day-of-the-month in the specified locale.

Category: Numeric

Alignment: left

Syntax

NLSTRMON*w.d*

Syntax Description

w

specifies the width of the output field

Default: 20

Range: 200-1

d

specifies the following:

00000001: write abbreviated form.

00000010: write capitalized form.

Default: 0

Range: 0-3

Details

The NLSTRMONw.d format writes a SAS value, 1–12 as the name-of-the-month in the specified locale. The following examples use the English_UnitedStates locale.

1 = the first month (January)

2 = the second month (February)

3 = the third month (March)

4 = the fourth month (April)

5 = the fifth month (May)

6 = the sixth month (June)

7 = the seventh month (July)

8 = the eight month (August)

9 = the ninth month (September)

10 = the tenth month (October)

11 = the eleventh month (November)

12 = the twelfth month (December)

Examples

This example uses the English_UnitedStates session encoding.

Statements	Results
Data _null_ ;	
monnum = 1 ; /* January=1, December=12 */	
put monnum NLSTRMON20. ;	January
put monnum NLSTRMON20.1; /* decimal .1 specified use abbreviation. */	Jan
put monnum NLSTRMON20.2;	January
put monnum NLSTRMON20.3;	Jan
run;	

NLSTRQTR*w.d* Format

Writes a numeric value as the quarter-of-the-year in the specified locale.

Category: Numeric
Alignment: left

Syntax

NLSTRQTR*w.d*

Syntax Description

w
specifies the width of the output field
Default: 20
Range: 1–200

d
specifies the following:
00000001: write abbreviated form.
00000010: write capitalized form.
Default: 3
Range: 0–3

Details

The NLSTRQTRw.d format writes a SAS value, 1–4 as the name-of-the-quarter for the year in the specified locale. The following examples use the English_UnitedStates locale.

1 = 1st quarter
2 = 2nd quarter
3 = 3rd quarter
4 = 4th quarter

Examples

This example uses the English_UnitedStates session encoding.

Statements	Results
Data _null_ ;	
qtrnum = 1 ; /* January=1, December=12 */	
put qtrnum NLSTRQTR20. ;	1st quarter
put qtrnum NLSTRQTR20.1; /* decimal .1 specified use abbreviation. */	1st quarter
put qtrnum NLSTRQTR20.2;	1ST QUARTER
put qtrnum NLSTRQTR20.3; run;	1ST QUARTER

NLSTRWK*w.d* Format

Writes a numeric value as the day-of-the-week in the specified locale.

Category: Numeric
Alignment: left

Syntax

NLSTRWK*w.d*

Syntax Description

w
specifies the width of the output field
Default: 20
Range: 1–200

d
specifies the following:
00000001: write abbreviated form.
00000010: write capitalized form.
Default: 0
Range: 0–3

Details

The NLSTRQTRw.d format writes a SAS value, 1–7 as the name-of-the-week in the specified locale. The following examples use the English_UnitedStates locale.

1 = First day-of-week (Monday)
2 = Second day-of-week (Tuesday)
3 = Third day-of-week (Wednesday)
4 = Fourth day-of-week (Thursday)
5 = Fifth day-of-week (Friday)
6 = Sixth day-of-week (Saturday)
7 = Seventh day-of-week (Sunday)

Examples

This example uses the English_UnitedStates session encoding.

Statements	Results
Data _null_ ;	
wknum = 1 ; /* Sunday=1, Saturday=7 */	
put wknum NLSTRWK20. ;	Sunday
put wknum NLSTRWK20.1; /* decimal .1 specified use abbreviation. */	Sun
put wknum NLSTRWK20.2;	SUNDAY
put wknum NLSTRWK20.3;	SUN
run;	

NLTIME*w*. Format

Converts a SAS time value to the time value of the specified locale and then writes the value as a time value. NLTIME also converts SAS date-time values.

Category: Date and Time

Alignment: left

Syntax

NLTIME*w*.

Syntax Description

w
specifies the width of the input field.

Default: 20

Range: 10–200

Comparisons

The NLTIME*w*. format is similar to the TIME*w*. format except that the NLTIME*w*. format is locale-specific.

Examples

These examples use the input value of 59083, which is the SAS date-time value that corresponds to 4:24:43 p.m.

Statements	Results
	`----+----1----+`
`options locale=English_UnitedStates;`	
`put time nltime.;`	`4:24:43`
`options locale=German_Germany;`	
`put time nltime.;`	`16.24`

See Also

Formats:

"NLTIMAP*w*. Format" on page 198

NLTIMAP*w*. Format

Converts a SAS time value to the time value of a specified locale and then writes the value as a time value with am or pm. NLTIMAP also converts SAS date-time values.

Category: Date and Time

Alignment: left

Syntax

NLTIMAP*w*.

Syntax Description

w

specifies the width of the output field.

Default: 10

Range: 4–200

Comparisons

The NLTIMAP*w*. format is similar to the TIMEAMPM*w*. format except that the NLTIMAP*w*. format is locale-specific.

Examples

These examples use the input value of 59083, which is the SAS date-time value that corresponds to 4:24:43 p.m.

Statements	Results
	`----+----1----+`
`options locale=English_UnitedStates;`	
`put time nltimap.;`	`4:24:43 PM`
`options locale=German_Germany;`	
`put time nltimap.;`	`16.24 Uhr`

See Also

Formats:

"NLTIME*w*. Format" on page 197

$UCS2B*w*. Format

Processes a character string that is in the encoding of the current SAS session, and then writes the character string in big-endian, 16-bit, UCS2, Unicode encoding.

Category: Character

Alignment: left

Syntax

$UCS2B*w*.

Syntax Description

w

specifies the width of the output field. Specify enough width to accommodate the 16-bit size of the Unicode characters.

Default: 8

Range: 2–32767

Details

The $UCS2B*w*. format writes a character string in big-endian, 16-bit, UCS2 (universal character set code in two octets), Unicode encoding. It processes character strings that are in the encoding of the current SAS session.

Comparison

The $UCS2B*w*. format performs processing that is the opposite of the $UCS2BE*w*. format.

Examples

This example uses the Japanese Shift_JIS encoding, which is supported under the UNIX operating environment.

Statements	Results
	`----+----1`
x = '大';	
`put x $ucs2b2.;`	`'5927'x (binary)`

See Also

Formats:

"$UCS2L*w*. Format" on page 201
"$UCS2X*w*. Format" on page 204
"$UTF8X*w*. Format" on page 220
"$UCS2BE*w*. Format" on page 200

Informats:

"$UCS2B*w*. Informat" on page 411
"$UCS2BE*w*. Informat" on page 412
"$UCS2L*w*. Informat" on page 413
"$UCS2X*w*. Informat" on page 415
"$UTF8X*w*. Informat" on page 429

$UCS2BE*w*. Format

Processes a character string that is in big-endian, 16-bit, UCS2, Unicode encoding, and then writes the character string in the encoding of the current SAS session.

Category: Character
Alignment: left

Syntax

$UCS2BE*w*.

Syntax Description

w
specifies the width of the output field. Specify enough width to accommodate the 16-bit size of the Unicode characters.

Default: 8

Range: 1–32000

Details

The $UCS2BE*w*. format writes a character string in the encoding of the current SAS session. It processes character strings that are in big-endian, 16-bit, UCS2 (universal character set code in two octets), Unicode encoding.

Comparison

The $UCS2BE*w*. format performs processing that is the opposite of the $UCS2B*w*. format.

Example

This example uses the Japanese Shift_JIS encoding, which is supported under the UNIX operating environment.

Statements	Results
	`----+----1`
`x ='592700410042'x;`	
`put x $ucs2be4.;`	大AB

See Also

Formats:

"$UCS2B*w*. Format" on page 199

Informats:

"$UCS2B*w*. Informat" on page 411

"$UCS2BE*w*. Informat" on page 412

$UCS2L*w*. Format

Processes a character string that is in the encoding of the current SAS session, and then writes the character string in little-endian, 16-bit, UCS2, Unicode encoding.

Category: Character

Alignment: left

Syntax

$UCS2L*w*.

Syntax Description

w
specifies the width of the output field. Specify enough width to accommodate the 16-bit size of the Unicode characters.

Default: 8

Range: 2–32767

Details

The $UCS2L*w*. format writes a character string in little-endian, 16-bit, UCS2 (universal character set code in two octets), Unicode encoding. It processes character strings that are in the encoding of the current SAS session.

Comparison

The $UCS2L*w*. format performs processing that is the opposite of the $UCS2LE*w*. format.

Example

This example uses the Japanese Shift_JIS encoding, which is supported under the UNIX operating environment.

Statements	Result
	`----+----1`
`x = '大';`	
`put x $ucs2l2.;`	`'2759'x (binary)`

See Also

Formats:

"$UCS2B*w*. Format" on page 199
"$UCS2LE*w*. Format" on page 203
"$UCS2X*w*. Format" on page 204
"$UTF8X*w*. Format" on page 220

Informats:

"$UCS2B*w*. Informat" on page 411
"$UCS2L*w*. Informat" on page 413
"$UCS2LE*w*. Informat" on page 414
"$UCS2X*w*. Informat" on page 415
"$UTF8X*w*. Informat" on page 429

$UCS2LE*w*. Format

Processes a character string that is in little-endian, 16-bit, UCS2, Unicode encoding, and then writes the character string in the encoding of the current SAS session.

Category: Character

Alignment: left

Syntax

$UCS2LE*w*.

Syntax Description

w

specifies the width of the output field. Specify enough width to accommodate the 16-bit size of the Unicode characters.

Default: 8

Range: 1–32000

Details

The $UCS2LE*w*. format writes a character string in the encoding of the current SAS session. It processes character strings that are in little-endian, 16-bit, UCS2 (universal character set code in two octets), Unicode encoding.

Comparison

The $UCS2LE*w*. format performs processing that is the opposite of the $UCS2L*w*. format.

Example

This example uses the Japanese Shift_JIS encoding, which is supported under the UNIX operating environment.

Statements	Result
	`----+----1`
`x ='275941004200'x;`	
`put x $ucs2le4.;`	大**AB**

See Also

Formats:

"$UCS2L*w*. Format" on page 201

Informats:

"$UCS2L*w*. Informat" on page 413
"$UCS2LE*w*. Informat" on page 414

$UCS2X*w*. Format

Processes a character string that is in the encoding of the current SAS session, and then writes the character string in native-endian, 16-bit, UCS2, Unicode encoding.

Category: Character
Alignment: left

Syntax

$UCS2X*w*.

Syntax Description

w
specifies the width of the output field. Specify enough width to accommodate the 16-bit size of the Unicode characters.

Default: 8

Range: 2–32767

Details

The $UCS2X*w*. format writes a character string in 16-bit, UCS2 (universal character set code in two octets), Unicode encoding, by using byte order that is native to the operating environment.

Comparison

The $UCS2X*w*. format performs processing that is the opposite of the $UCS2XE*w*. format. If you are exchanging data within the same operating environment, use the $UCS2X*w*. format. If you are exchanging data with a different operating environment, use the $UCS2B*w*. format or $UCS2L*w*. format.

Example

This example uses the Japanese Shift_JIS session encoding, which is supported under the UNIX operating environment.

Statements	Result
	`----+----1`
`x = '大';`	
`put x $ucs2x2.;`	`'5927'x (binary) or '2759'x (little endian)`

See Also

Formats:

"$UCS2B*w*. Format" on page 199
"$UCS2XE*w*. Format" on page 205
"$UCS2L*w*. Format" on page 201
"$UTF8X*w*. Format" on page 220

Informats:

"$UCS2B*w*. Informat" on page 411
"$UCS2L*w*. Informat" on page 413
"$UCS2X*w*. Informat" on page 415
"$UCS2XE*w*. Informat" on page 416
"$UTF8X*w*. Informat" on page 429

$UCS2XE*w*. Format

Processes a character string that is in native-endian, 16-bit, UCS2, Unicode encoding, and then writes the character string in the encoding of the current SAS session.

Category: Character

Alignment: left

Syntax

$UCS2XE*w*.

Syntax Description

w

specifies the width of the output field. Specify enough width to accommodate the 16-bit size of the Unicode characters.

Default: 8

Range: 1–32000

Details

The $UCS2XE*w*. format writes a character string in the encoding of the current SAS session. It processes character strings that are in native-endian, 16-bit, UCS2 (universal character set code in two octets), Unicode encoding.

Comparison

The $UCS2XE*w*. format performs processing that is the opposite of the $UCS2X*w*. format.

Example

This example uses the Japanese Shift_JIS encoding, which is supported under the UNIX operating environment.

Statements	Result
	`----+----1`
`x ='e5a4a7'x; /* Japanese '大' in UTF8 */;`	
`put x $utf8xe10.;`	大

See Also

Formats:

"$UCS2Xw. Format" on page 204

Informats:

"$UCS2Xw. Informat" on page 415
"$UCS2XEw. Informat" on page 416

$UCS4Bw. Format

Processes a character string that is in the encoding of the current SAS session, and then writes the character string in big-endian, 32-bit, UCS4, Unicode encoding.

Category: Character
Alignment: left

Syntax

$UCS4B*w*.

Syntax Description

w

specifies the width of the output field. Specify enough width to accommodate the 32-bit size of the Unicode characters.

Default: 4

Range: 4–32767

Details

The $UCS4Bw. format writes a character string in big-endian, 32-bit, UCS4 (universal character set code in four octets), Unicode encoding. It processes character strings that are in the encoding of the current SAS session.

Comparison

The $UCS4B*w*. format performs processing that is the opposite of the $UCS4BE*w*. format.

Examples

This example uses the Japanese Shift_JIS encoding, which is supported under the UNIX operating environment.

Statements	Result
	`----+----1`
`x = '大';`	
`put x $ucs4b4.;`	`'00005927'x (binary)`

See Also

Formats:

"$UCS2L*w*. Format" on page 201
"$UCS2X*w*. Format" on page 204
"$UCS4BE*w*. Format" on page 207
"$UCS4L*w*. Format" on page 208
"$UCS4X*w*. Format" on page 211
"$UTF8X*w*. Format" on page 220

Informats:

"$UCS2B*w*. Informat" on page 411
"$UCS2L*w*. Informat" on page 413
"$UCS2X*w*. Informat" on page 415
"$UCS4B*w*. Informat" on page 417
"$UCS4L*w*. Informat" on page 418
"$UCS4X*w*. Informat" on page 419
"$UTF8X*w*. Informat" on page 429

$UCS4BE*w*. Format

Processes a character string that is in big-endian, 32-bit, UCS4, Unicode encoding, and then writes the character string in the encoding of the current SAS session.

Category: Character
Alignment: left

Syntax

$UCS4BE*w*.

Syntax Description

w
specifies the width of the output field. Specify enough width to accommodate the 32-bit size of the Unicode characters.

Default: 8

Range: 1–32000

Details

The $UCS4BE*w*. format writes a character string in the encoding of the current SAS session. It processes character strings that are in big-endian, 32-bit, UCS4 (universal character set code in four octets), Unicode encoding.

Comparison

The $UCS4BE*w*. format performs processing that is the opposite of the $UCS4B*w*. format.

Example

This example uses the Japanese Shift_JIS encoding, which is supported under the UNIX operating environment.

Statements	Result
	`----+----1`
`x ='00005927000000041000000042'x;` `put x $ucs4be4.;`	大AB

See Also

Formats:

"$UCS4B*w*. Format" on page 206

Informats:

"$UCS4B*w*. Informat" on page 417

$UCS4L*w*. Format

Processes a character string that is in the encoding of the current SAS session, and then writes the character string in little-endian, 32-bit, UCS4, Unicode encoding.

Category: Character

Alignment: left

Syntax

$UCS4L*w*.

Syntax Description

w
specifies the width of the output field. Specify enough width to accommodate the 32-bit size of the Unicode characters.

Default: 4

Range: 4–32767

Details

The $UCS4L*w*. format writes a character string in little-endian, 32-bit, UCS4 (universal character set code in four octets), Unicode encoding. It processes character strings that are in the encoding of the current SAS session.

Comparisons

The $UCS4L*w*. format performs processing that is the opposite of the $UCS4LE*w*. format.

Examples

This example uses the Japanese Shift_JIS encoding, which is supported under the UNIX operating environment.

Statements	Result
	`----+----1`
`x = '大';`	
`put x $ucs414.;`	`'27590000'x (binary)`

See Also

Formats:

"$UCS2B*w*. Format" on page 199
"$UCS2X*w*. Format" on page 204
"$UCS4B*w*. Format" on page 206
"$UCS4LE*w*. Format" on page 210
"$UCS4X*w*. Format" on page 211
"$UTF8X*w*. Format" on page 220

Informats:

"$UCS2B*w*. Informat" on page 411
"$UCS2L*w*. Informat" on page 413
"$UCS2X*w*. Informat" on page 415

"$UCS4B*w*. Informat" on page 417
"$UCS4L*w*. Informat" on page 418
"$UCS4X*w*. Informat" on page 419
"$UTF8X*w*. Informat" on page 429

$UCS4LE*w*. Format

Processes a character string that is in little-endian, 32-bit, UCS4, Unicode encoding, and then writes the character string in the encoding of the current SAS session.

Category: Character
Alignment: left

Syntax

$UCS4LE*w*.

Syntax Description

w
specifies the width of the output field. Specify enough width to accommodate the 32-bit size of the Unicode characters.

Default: 8

Range: 1–32000

Details

The $UCS4LE*w*. format writes a character string in the encoding of the current SAS session. It processes character strings that are in little-endian, 32-bit, UCS4 (universal character set code in four octets), Unicode encoding.

Comparison

The $UCS4LE*w*. format performs processing that is the opposite of the $UCS4L*w*. format.

Example

This example uses the Japanese Shift_JIS encoding, which is supported under the UNIX operating environment.

Statements	Result
	`----+----1`
`x ='275900004100000042000000'x;`	
`put x $ucs4le4.;`	大**AB**

See Also

Formats:

"$UCS4L*w*. Format" on page 208

Informats:

"$UCS4L*w*. Informat" on page 418

$UCS4X*w*. Format

Processes a character string that is in the encoding of the current SAS session, and then writes the character string in native-endian, 32-bit, UCS4, Unicode encoding.

Category: Character

Alignment: left

Syntax

$UCS4X*w*.

Syntax Description

w

specifies the width of the output field. Specify enough width to accommodate the 32-bit size of the Unicode characters.

Default: 4

Range: 4–32767

Details

The $UCS4X*w*. format writes a character string in 32-bit, UCS4 (universal character set code in two octets), Unicode encoding, by using byte order that is native to the operating environment.

Comparisons

The $UCS4X*w*. format performs processing that is the opposite of the $UCS4XE*w*. format. If you are exchanging data within the same operating environment, use the $UCS4X*w*. format. If you are exchanging data with a different operating environment, use the $UCS4B*w*. format or $UCS4L*w*. format.

Example

This example uses the Japanese Shift_JIS session encoding, which is supported under the UNIX operating environment.

Statements	Results
	`----+----1`
`x = '木';`	
`put x $ucs4x4.;`	`'00005927'x (binary) or '27590000'x (little endian)`

See Also

Formats:

"$UCS2L*w*. Format" on page 201
"$UCS4XE*w*. Format" on page 212
"$UCS2X*w*. Format" on page 204
"$UCS4B*w*. Format" on page 206
"$UCS4L*w*. Format" on page 208
"$UTF8X*w*. Format" on page 220

Informats:

"$UCS2B*w*. Informat" on page 411
"$UCS2L*w*. Informat" on page 413
"$UCS2X*w*. Informat" on page 415
"$UCS4B*w*. Informat" on page 417
"$UCS4B*w*. Format" on page 206
"$UCS4L*w*. Informat" on page 418
"$UCS4X*w*. Informat" on page 419
"$UTF8X*w*. Informat" on page 429

$UCS4XE*w*. Format

Processes a character string that is in native-endian, 32-bit, UCS4, Unicode encoding, and then writes the character string in the encoding of the current SAS session.

Category: Character
Alignment: left

Syntax

$UCS4XE*w*.

Syntax Description

w
specifies the width of the output field. Specify enough width to accommodate the 32-bit size of the Unicode characters.

Default: 8

Range: 1–32000

Details

The $UCS4XE*w*. format writes a character string in the encoding of the current SAS session. It processes character strings that are in native-endian, 32-bit, UCS4 (universal character set code in four octets), Unicode encoding.

Comparison

The $UCS4XE*w*. format performs processing that is the opposite of the $UCS4X*w*. format.

Example

This example uses the Japanese Shift_JIS encoding, which is supported under the UNIX operating environment.

Statements	Result
	`----+----1`
`x ='27590000410000042000000'x;`	
`put x $ucs4be4.;`	`AB (little endian)`

See Also

Formats:

"$UCS4X*w*. Format" on page 211

Informats:

"$UCS4X*w*. Informat" on page 419

$UESC*w*. Format

Processes a character string that is encoded in the current SAS session, and then writes the character string in Unicode escape (UESC) representation.

Category: Character

Alignment: left

Syntax

$UESC*w*.

Syntax Description

w
specifies the width of the input field.

Default: 8

Range: 1–32000

Details

If the characters are not available on all operating environments, for example, 0–9, a–z, A–Z, they must be represented in UESC. $UESC*w*. can be nested.

Comparisons

The $UESC*w*. format performs processing that is opposite of the $UESCE*w*. format.

Examples

This example uses the Japanese Shift_JIS encoding, which is supported under the UNIX operating system.

Statements	Results
	`----+----1----+----2`
`x='犬' ;`	
`y='u5927'`	
`z='uu5927';`	
`put x = $uesc10. ;`	`¥u5927`
`put y = $uesc10. ;`	`¥uu5927`
`put z = $uesc10. ;`	`¥uuu5927`

See Also

Formats:

"$UESCE*w*. Format" on page 214

Informats:

"$UESC*w*. Informat" on page 421

"$UESCE*w*. Informat" on page 423

$UESCE*w*. Format

Processes a character string that is in Unicode escape (UESC) representation, and then writes the character string in the encoding of the current SAS session.

Category: Character

Alignment: left

Syntax

$UESCE*w*.

Syntax Description

w
specifies the width of the output field.
Default: 8
Range: 1–32000

Details

If the data is not supported by the encoding of the current SAS session, the data remains in UESC.

Comparisons

The $UESCE*w*. format performs processing that is the opposite of the $UESC*w*. format.

Examples

This example uses the Japanese Shift_JIS session encoding, which is supported under the UNIX operating system.

Statements	Results
	`----+----1----+----2`
`x=put('¥u5927',$uesce10.) ;`	x=大
`x=put('¥uu5927',$uesce10.) ;`	`x=¥u5927`
`x=put('¥uuu5927',$uesce10.) ;`	`x=¥uu5927`

See Also

Formats:
"$UESC*w*. Format" on page 213
Informats:
"$UESC*w*. Informat" on page 421
"$UESCE*w*. Informat" on page 423

$UNCR*w*. Format

Processes a character string that is encoded in the current SAS session, and then writes the character string in numeric character representation (NCR).

Category: Character

Alignment: left

Syntax

$UNCR*w*.

Syntax Description

w
specifies the width of the output field.

Default: 8

Range: 1–32000

Comparison

The $UNCR*w*. format performs processing that is the opposite of the $UNCRE*w*. format.

Examples

This example uses the Japanese Shift_JIS session encoding, which is supported under the UNIX operating system.

Statements	Results
	`----+----1----+----2`
`x='91E5'x ; /* Japanese '夫' in Shift-JIS */`	
`y='abc';`	
`put x $uncr10.;`	`&#22823`
`put y $uncr10.;`	`abc`

See Also

Formats:

"$UNCRE*w*. Format" on page 217

Informats:

"$UNCR*w*. Informat" on page 424

"$UNCRE*w*. Informat" on page 425

$UNCRE*w*. Format

Processes a character string that is in numeric character representation (NCR), and then writes the character string in the encoding of the current SAS session.

Category: Character
Alignment: left

Syntax

$UNCRE*w*.

Syntax Description

w
specifies the width of the output field.
Default: 8
Range: 1–32000

Details

National characters should be represented in NCR.

Comparison

The $UNCRE*w*. format performs processing that is the opposite of the $UNCR*w*. format.

Examples

This example uses the Japanese Shift_JIS session encoding, which is supported under the UNIX operating system.

Statements	Results
	`----+----1`
`x='&#22823;abc';` `put x $uncr10.;`	大abc

See Also

Formats:
"$UNCR*w*. Format" on page 215
Informats:
"$UNCR*w*. Informat" on page 424

"$UNCREw. Informat" on page 425

$UPARENw. Format

Processes a character string that is encoded in the current SAS session, and then writes the character string in Unicode parenthesis (UPAREN) representation.

Category: Character

Alignment: left

Syntax

$UPARENw.

Syntax Description

w
specifies the width of the output field.

Default: 8

Range: 27–32000

Details

The character string is encoded with parentheses and Unicode hexadecimal representation.

Comparisons

The $UPARENw. format performs processing that is the opposite of the $UPARENEw. format.

Examples

This example uses the Japanese Shift_JIS session encoding, which is supported under the UNIX operating system.

Statements	Results
	`----+----1----+----2----+----3----+`
`x='太';`	
`y='abc3';`	
`put x $uparen7.;`	`<u5927>`
`put y $uparen28.;`	`<u0061> <u0062> <u0063> <u0033>`

See Also

Formats:

"$UPARENE*w*. Format" on page 219

Informats:

"$UPAREN*w*. Informat" on page 426

"$UPARENE*w*. Informat" on page 427

$UPARENE*w*. Format

Processes a character string that is in Unicode parenthesis (UPAREN), and then writes the character string in the encoding of the current SAS session.

Category: Character

Alignment: left

Syntax

$UPARENE*w*.

Syntax Description

w

specifies the width of the output field.

Default: 8

Range: 1–32000

Comparisons

The $UPARENE*w*. format performs processing that is the opposite of the $UPAREN*w*. format.

Examples

This example uses the Japanese Shift_JIS encoding, which is supported under the UNIX operating system.

Statements	Results
	`----+`
`x='<u0061><u0062><u0063><u0033>';`	
`put x $uparene4.;`	`abc3`

See Also

Formats:

"$UPAREN*w*. Format" on page 218

Informats:

"$UPAREN*w*. Informat" on page 426

"$UPARENE*w*. Informat" on page 427

$UTF8X*w*. Format

Processes a character string that is in the encoding of the current SAS session, and then writes the character string in universal transformation format (UTF-8) encoding.

Category: Character

Alignment: left

Syntax

$UTF8X*w*.

Syntax Description

w
specifies the width of the output field. Specify enough width to include all of the characters in the variable. The width of the characters are dependent on the code point value of the individual characters.

Default: 8

Range: 2–32767

Examples

This example uses the Japanese Shift_JIS session encoding, which is supported under the UNIX operating environment.

Statements	Results
	`----+----1`
`x ='91E5'x; ; /* Japanese '大' in Shift-JIS */`	
`put x $utf8x10.;`	`x='e5a4a7'x`

See Also

Formats:

"$UCS2B*w*. Format" on page 199
"$UCS2L*w*. Format" on page 201
"$UCS2X*w*. Format" on page 204

Informats:

"$UCS2B*w*. Informat" on page 411
"$UCS2L*w*. Informat" on page 413
"$UCS2X*w*. Informat" on page 415

$VSLOG*w*. Format

Processes a character string that is in visual order, and then writes the character string in left-to-right logical order.

Category: BIDI text handling

Alignment: left

Syntax

$VSLOG*w*.

Syntax Description

w

specifies the width of the output field.

Default: 200

Range: 1–32000

Details

The $VSLOG*w*. format is used when transferring data that is stored in visual order. An example is transferring data from a UNIX server to a Windows client.

Note: The $VSLOG*w*. format does not correctly process all combinations of data strings. △

Comparisons

The $VSLOG*w*. format performs processing that is opposite to the $VSLOGR*w*. format.

Examples

The following example uses the Hebrew input value of "טיסה flight".

Statements	Results
	`----+----1----+----2----+`
`put text $vslog12.;`	טיסה **flight**

The following example uses the Arabic input value of " ذ|ت " computer.

Statements	Results
	`----+----1----+----2----+`
`put text $vslog12.;`	ذ|ت computer

See Also

Formats:

"$VSLOGR*w*. Format" on page 222

Informats:

"$VSLOG*w*. Informat" on page 430

"$VSLOGR*w*. Informat" on page 431

$VSLOGR*w*. Format

Processes a character string that is in visual order, and then writes the character string in right-to-left logical order.

Category: BIDI text handling

Alignment: left

Syntax

$VSLOGR*w*.

Syntax Description

w

specifies the width of the output field.

Default: 200

Range: 1–32000

Details

The $VSLOGR*w*. format is used when transferring data that is stored in visual order. An example is transferring data from a UNIX server to a Windows client.

Note: The $VSLOGR*w*. format does not correctly process all combinations of data strings. △

Comparisons

The $VSLOGR*w*. format performs processing that is opposite to the $VSLOG*w*. format.

Examples

The following example uses the Hebrew input value of "טיסה flight."

Statements	Results
	`----+----1----+`
`put text $logvs12;`	`flight` טיסה

The following example uses the Arabic input value of " ذات " computer.

Statements	Results
	`----+----1----+`
`put text $logvs12;`	ذات computer

See Also

Formats:

$VSLOGw.

Informats:

"$VSLOG*w*. Informat" on page 430

"$VSLOGR*w*. Informat" on page 431

WEEKU*w*. Format

Writes a week number in decimal format by using the U algorithm.

Category: Date and Time

Alignment: left

Syntax

WEEKU*w*.

Syntax Description

w
specifies the width of the output field.

Default: 11

Range: 3–200

Details

The WEEKU*w*. format writes a week-number format. The WEEKU*w*. format writes the various formats depending on the specified width. Algorithm U calculates the SAS date value by using the number of the week within the year (Sunday is considered the first day of the week). The number-of-the-week value is represented as a decimal number in the range 0–53, with a leading zero and maximum value of 53. For example, the fifth week of the year would be represented as 05.

Refer to the following table for widths, formats, and examples:

Widths	Formats	Examples
3-4	Www	w01
5-6	yyWww	03W01
7-8	yyWwwdd	03W0101
9-10	yyyyWwwdd	2003W0101
11-200	yyyy-Www-dd	2003-W01-01

Comparisons

The WEEKV*w*. format writes the week number as a decimal number in the range 01–53, with weeks beginning on a Monday and week 1 of the year including both January 4th and the first Thursday of the year. If the first Monday of January is the 2nd, 3rd, or 4th, the preceding days are part of the last week of the preceding year. The WEEKW*w*. format writes the week number of the year as a decimal number in the range 00–53, with Monday as the first day of week 1. The WEEKU*w*. format writes the week number of the year (Sunday as the first day of the week) as a decimal number in the range 0–53, with a leading zero.

Examples

```
sasdate = '01JAN2003'd;
```

Statements	Results
	`----+----1----+`
`v=put(sasdate,weeku3.);`	
`w=put(sasdate,weeku5.);`	
`x=put(sasdate,weeku7.);`	
`y=put(sasdate,weeku9.);`	
`z=put(sasdate,weeku11.);`	
`put v;`	`W00`
`put w;`	`03W00`
`put x;`	`03W0004`
`put y;`	`2003W0004`
`put z;`	`2003-W00-04`

See Also

Formats:

"WEEKV*w*. Format" on page 225
"WEEKW*w*. Format" on page 227

WEEKV*w*. Format

Writes a week number in decimal format by using the V algorithm.

Category: Date and Time
Alignment: left

Syntax

WEEKV*w*.

Syntax Description

w
specifies the width of the output field.
Default: 11
Range: 3–200

Details

The WEEKV*w*. format writes the various formats depending on the specified width. Algorithm V calculates the SAS date value, with the number-of-the-week value represented as a decimal number in the range 01–53, with a leading zero and maximum value of 53. Weeks begin on a Monday and week 1 of the year is the week that includes both January 4th and the first Thursday of the year. If the first Monday

of January is the 2nd, 3rd, or 4th, the preceding days are part of the last week of the preceding year. For example, the fifth week of the year would be represented as 06.

Refer to the following table for widths, formats, and examples:

Widths	Formats	Examples
3-4	Www	w01
5-6	yyWww	03W01
7-8	yyWwwdd	03W0101
9-10	yyyyWwwdd	2003W0101
11-200	yyyy-Www-dd	2003-W01-01

Comparisons

The WEEKV*w*. format writes the week number as a decimal number in the range 01–53, with weeks beginning on a Monday and week 1 of the year including both January 4th and the first Thursday of the year. If the first Monday of January is the 2nd, 3rd, or 4th, the preceding days are part of the last week of the preceding year. The WEEKW*w*. format writes the week number of the year as a decimal number in the range 00–53, with Monday as the first day of week 1. The WEEKU*w*. format writes the week number of the year (Sunday as the first day of the week) as a decimal number in the range 0–53, with a leading zero.

Examples

```
sasdate='01JAN2003'd;
```

Statements	Results
	`----+----1----+`
`v=put(sasdate,weekv3.);`	
`w=put(sasdate,weekv5.);`	
`x=put(sasdate,weekv7.);`	
`y=put(sasdate,weekv9.);`	
`z=put(sasdate,weekv11.);`	
`put v;`	`W01`
`put w;`	`03W01`
`put x;`	`03W0103`
`put y;`	`2003W0103`
`put z;`	`2003-W01-03`

See Also

Formats:

"WEEKU*w*. Format" on page 223

"WEEKW*w*. Format" on page 227

WEEKW*w*. Format

Writes a week number in decimal format by using the W algorithm.

Category: Date and Time
Alignment: left

Syntax

WEEKW*w*.

Syntax Description

w
specifies the width of the output field.
Default: 11
Range: 3–200

Details

The WEEKW*w*. format writes the various formats depending on the specified width. Algorithm W calculates the SAS date value using the number of the week within the year (Monday is considered the first day of the week). The number-of-the-week value is represented as a decimal number in the range 0–53, with a leading zero and maximum value of 53. For example, the fifth week of the year would be represented as 05.

Refer to the following table for widths, formats, and examples:

Widths	Formats	Examples
3-4	Www	w01
5-6	yyWww	03W01
7-8	yyWwwdd	03W0101
9-10	yyyyWwwdd	2003W0101
11-200	yyyy-Www-dd	2003-W01-01

Comparisons

The WEEKV*w*. format writes the week number as a decimal number in the range 01–53. Weeks beginning on a Monday and on week 1 of the year include both January 4th and the first Thursday of the year. If the first Monday of January is the 2nd, 3rd, or 4th, the preceding days are part of the last week of the preceding year. The WEEKW*w*. format writes the week number of the year as a decimal number in the range 00–53, with Monday as the first day of week 1. The WEEKU*w*. format writes the week number of the year (Sunday as the first day of the week) as a decimal number in the range 0–53, with a leading zero.

Examples

```
sasdate = '01JAN2003'd;
```

Statements	Results
	----+----1----+
v=put(sasdate,weekw3.);	
w=put(sasdate,weekw5.);	
x=put(sasdate,weekw7.);	
y=put(sasdate,weekw9.);	
z=put(sasdate,weekw11.);	
put v;	W03
put w;	03W03
put x;	03W0003
put y;	2003W0003
put z;	2003-W00-03

See Also

Formats:

"WEEKU*w*. Format" on page 223

"WEEKV*w*. Format" on page 225

YYWEEKU*w*. Format

Writes a week number in decimal format by using the U algorithm, excluding day-of-the-week information.

Category: Date and Time

Alignment: left

Syntax

YYWEEKU*w*.

Syntax Description

w

specifies the width of the output field.

Default: 7

Range: 3-8

Details

The YYWEEKU*w*. format writes a week-number format. The YYWEEKU*w*. format writes the various formats depending on the specified width. Algorithm U calculates the SAS date value by using the number of the week within the year (Sunday is considered the first day of the week).

Refer to the following table for widths, formats, and examples:

Widths	Formats	Examples
3-4	Www	W01
5-6	yyWww	07W01
7	yyyyWww	2007W01
8	yyyy-Www	2007-W01
9-above	invalid	invalid

Comparisons

The YYWEEKU*w*. format is similar to the WEEKU*w*. format except that the YYWEEKU*w*. format does not specify the day-of-week information. Also, the YYWEEKU*w*. format does not accept any width that is greater than 8.

Examples

```
sasdate = '01JAN2007'd;
```

Statements	Results
	`----+----1----+`
`u=put(sasdate,yyweeku3.);`	
`v=put(sasdate,yyweeku4.);`	
`w=put(sasdate,yyweeku5.);`	
`x=put(sasdate,yyweeku6.);`	
`y=put(sasdate,yyweeku7.);`	
`z=put(sasdate,yyweeku8.);`	
`put u;`	`W00`
`put v;`	`W00`
`put w;`	`07W00`
`put x;`	`07W00`
`put y;`	`2007W00`
`put z;`	`2007-W00`

See Also

Formats:

"WEEKU*w*. Format" on page 223

YYWEEKV*w*. Format

Writes a week number in decimal format by using the V algorithm, excluding day-of-the-week information.

Category: Date and Time

Alignment: left

Syntax

YYWEEKV*w*.

Syntax Description

w
specifies the width of the output field.

Default: 7

Range: 3–8

Details

The YYWEEKV*w*. format writes the various formats depending on the specified width. Algorithm V calculates the SAS date value, with the number-of-the-week value represented as a decimal number in the range 01–53, with a leading zero and maximum value of 53. Weeks begin on a Monday and week 1 of the year is the week that includes both January 4th and the first Thursday of the year. If the first Monday of January is the 2nd, 3rd, or 4th, the preceding days are part of the last week of the preceding year. For example, the fifth week of the year would be represented as 06.

Refer to the following table for widths, formats, and examples:

Widths	Formats	Examples
3-4	Www	w01
5-6	yyWww	07W01
7	yyyyWww	2007W01
8	yyyy-Www	2007-W01
9-above	invalid	invalid

Comparisons

The YYWEEKV*w*. format is similar to the WEEKV*w*. format except that the YYWEEKV*w*. format does not specify the day-of-week information. Also, the YYWEEKV*w*. format does not accept a width that is greater than 8.

Examples

```
sasdate = '01JAN2007'd;
```

Statements	Results
	`----+----1----+`
`u=put(sasdate,yyweekv3.);`	
`v=put(sasdate,yyweekv4.);`	
`w=put(sasdate,yyweekv5.);`	
`x=put(sasdate,yyweekv6.);`	
`y=put(sasdate,yyweekv7.);`	
`z=put(sasdate,yyweekv8.);`	
`put u;`	`W01`
`put v;`	`W01`
`put w;`	`07W01`
`put x;`	`07W01`
`put y;`	`2007W01`
`put z;`	`2007-W01`

See Also

Formats:

"WEEKV*w*. Format" on page 225

YYWEEKW*w*. Format

Writes a week number in decimal format by using the W algorithm, excluding the day-of-week information.

Category: Date and Time

Alignment: left

Syntax

YYWEEKW*w*.

Syntax Description

w

specifies the width of the output field.

Default: 7

Range: 3–8

Details

The YYWEEKW*w*. format writes the various formats depending on the specified width. Algorithm W calculates the SAS date value using the number of the week within the year.

Refer to the following table for widths, formats, and examples:

Widths	Formats	Examples
3-4	Www	W01
5-6	yyWww	07W01
7	yyyyWww	2007W01
8	yyyy-Www	2007-W01
9-above	invalid	invalid

Comparisons

The YYWEEKW*w*. format is similar to the WEEKW*w*. format except that the YYWEEKW*w*. format does not specify the day-of-week information. Also, the YYWEEKW*w*. format does not accept any width that is greater than 8.

Examples

```
sasdate = '01JAN2007'd
```

Statements	Results
	`----+----1----+`
`u=put(sasdate,yyweekw3.);`	
`v=put(sasdate,yyweekw4.);`	
`w=put(sasdate,yyweekw5.);`	
`x=put(sasdate,yyweekw6.);`	
`y=put(sasdate,yyweekw7.);`	
`z=put(sasdate,yyweekw8.);`	
`put u;`	`W01`
`put v;`	`W01`
`put w;`	`07W01`
`put x;`	`07W01`
`put y;`	`2007W01`
`put z;`	`2007-W01`

See Also

Formats:

"WEEKW*w*. Format" on page 227

YEN*w.d* Format

Writes numeric values with yen signs, commas, and decimal points.

Category: Numeric
Alignment: right

Syntax

YEN*w.d*

Syntax Description

w
specifies the width of the output field.
Default: 1
Range: 1–32

d
specifies the number of digits to the right of the decimal point in the numeric value.
Restriction: must be either 0 or 2.
Tip: If *d* is 2, then YEN*w.d* writes a decimal point and two decimal digits. If *d* is 0, then YEN*w.d* does not write a decimal point or decimal digits.

Details

The YEN*w.d* format writes numeric values with a leading yen sign and with a comma that separates every three digits of each value.

The hexadecimal representation of the code for the yen sign character is 5B on EBCDIC systems and 5C on ASCII systems. The monetary character these codes represent might be different in other countries.

Examples

```
put cost yen10.2;
```

Cost	Result
	`----+----1`
`1254.71`	`¥1,254.71`

See Also

Informats:
"YEN*w.d* Informat" on page 433

CHAPTER

8

Functions for NLS

Internationalization Compatibility for SAS String Functions

SAS provides string functions and CALL routines that allow you to easily manipulate your character data. Many of the original SAS string functions assume that the size of one character is always one byte. This process works well for data in a single-byte character set (SBCS). However, when some of these functions and CALL routines are used with data in a double-byte character set (DBCS) or multi-byte character set (MBCS), the data is often handled improperly and produce incorrect results.

DBCS encodings require a varying number of bytes to represent each character. MBCS is sometimes used as a synonym for DBCS.

To solve this problem SAS introduced a set of string functions and CALL routines, called K functions, for those string manipulations where DBCS and MBCS data must be handled carefully. This page shows the level of I18N compatibility for each SAS string function. *I18N* is the abbreviation for internationalization. Compatibility indicates whether a program using a particular string function can be adapted to different languages and locales without program changes.

The user needs to understand the difference between byte-based offset-length and character-based offset-length in order to use the K functions properly. Most K functions require the character-based offset or length. Under SBCS environments, the byte-based unit is identical to character-based unit; however, under DBCS or MBCS environment, there are significant differences, and programmers need to distinguish them. The users might need to change the programming logic in order to use the K functions. Most K functions require strings encoded in current SAS session encoding.

String functions are assigned I18N levels depending on whether the functions can process DBCS, MBCS, or SBCS. Here are descriptions of the levels:

I18N Level 0	This function is designed for SBCS data. Do not use this function to process DBCS or MBCS data.
I18N Level 1	This function should be avoided, if possible, if you are using a non-English language. The I18N Level 1 functions might not work correctly with DBCS or MBCS encodings under certain circumstances.
I18N Level 2	This function can be used for SBCS, DBCS, and MBCS (UTF-8) data.

Table 8.1 SAS String Functions

Function	Description	I18N Level 0	I18N Level 1	I18N Level 2
ANYALNUM	Searches a character string for an alphanumeric character, and returns the first position at which the character is found.			X
ANYALPHA	Searches a character string for an alphabetic character, and returns the first position at which the character is found.			X
ANYCNTRL	Searches a character string for a control character, and returns the first position at which that character is found.			X
ANYDIGIT	Searches a character string for a digit, and returns the first position at which the digit is found.			X
ANYFIRST	Searches a character string for a character that is valid as the first character in a SAS variable name under VALIDVARNAME=V7, and returns the first position at which that character is found.			X

Function	Description	I18N Level 0	I18N Level 1	I18N Level 2
ANYGRAPH	Searches a character string for a graphical character, and returns the first position at which that character is found.			X
ANYLOWER	Searches a character string for a lowercase letter, and returns the first position at which the letter is found.			X
ANYNAME	Searches a character string for a character that is valid in a SAS variable name under VALIDVARNAME=V7, and returns the first position at which that character is found.			X
ANYPRINT	Searches a character string for a printable character, and returns the first position at which that character is found.			X
ANYPUNCT	searches a character string for a punctuation character, and returns the first position at which that character is found.			X

Function	Description	I18N Level 0	I18N Level 1	I18N Level 2
ANYSPACE	Searches a character string for a white-space character (blank, horizontal and vertical tab, carriage return, line feed, and form feed). Returns the first position at which that character is found.			X
ANYUPPER	Searches a character string for an uppercase letter, and returns the first position at which the letter is found.			X
ANYXDIGIT	Searches a character string for a hexadecimal character that represents a digit, and returns the first position at which that character is found.			X
BYTE	Returns one character in the ASCII or the EBCDIC collating sequence.	X		
CAT	Does not remove leading or trailing blanks, and returns a concatenated character string.			X
CATS	Removes leading and trailing blanks, and returns a concatenated character string.	X		

Function	Description	I18N Level 0	I18N Level 1	I18N Level 2
CATT	Removes trailing blanks, and returns a concatenated character string.	X		
CATX	Removes leading and trailing blanks, inserts delimiters, and returns a character string.	X		
CHOOSEC	Returns a character value that represents the results of choosing from a list of arguments.			X
CHOOSEN	Returns a numeric value that represents the results of choosing from a list of arguments.			X
COALESCEC	Returns the first non-missing value from a list of numeric arguments.			X
COLLATE	Returns a character string in ASCII or EBCDIC collating sequence.	X		
COMPARE	Returns the position of the leftmost character by which two strings differ, or returns 0 if there is no difference.	X		
COMPBL	Removes multiple blanks from a character string.	X		

Function	Description	I18N Level 0	I18N Level 1	I18N Level 2
COMPGED	Returns the generalized edit distance between two strings.	X		
COMPLEV	Returns the Levenshtein edit distance between two strings.	X		
COMPRESS	Returns a character string with specified characters removed from the original string.	X		
COUNT	Counts the number of times that a specified substring appears within a character string.		X	
COUNTC	Counts the number of characters in a string that appear or do not appear in a list of characters.		X	
DEQUOTE	Removes matching quotation marks from a character string that begins with a quotation mark, and deletes all characters to the right of the closing quotation mark.			X
FIND	Searches for a specific substring of characters within a character string.		X	
FINDC	Searches a string for any character in a list of characters.		X	

Function	Description	I18N Level 0	I18N Level 1	I18N Level 2
HTMLDECODE	Decodes a string that contains HTML numeric character references or HTML character entity references, and returns the decoded string.			X
HTMLENCODE	Encodes characters using HTML character entity references, and returns the encoded string.			X
IFC	Returns a character value based on whether an expression is true, false, or missing.			X
IFN	Returns a numeric value based on whether an expression is true, false, or missing.			X
INDEX	Searches a character expression for a string of characters, and returns the position of the string's first character for the first occurrence of the string.	X		
INDEXC	Searches a character expression for any of the specified characters, and returns the position of that character.	X		

Function	Description	I18N Level 0	I18N Level 1	I18N Level 2
INDEXW	Searches a character expression for a string that is specified as a word, and returns the position of the first character in the word.	X		
"KCOMPARE Function" on page 258	Returns the result of a comparison of character expressions.			X
"KCOMPRESS Function" on page 259	Removes specified characters from a character expression.			X
"KCOUNT Function" on page 260	Returns the number of double-byte characters in an expression.			X
"KCVT Function" on page 260	Converts data from one type of encoding data to another encoding data.			X
"KINDEX Function" on page 262	Searches a character expression for a string of characters.			X
"KINDEXC Function" on page 262	Searches a character expression for specified characters.			X
"KLEFT Function" on page 263	Left-aligns a character expression by removing unnecessary leading DBCS blanks and SO-SI.			X

Function	Description	I18N Level 0	I18N Level 1	I18N Level 2
"KLENGTH Function" on page 264	Returns the length of an argument.			X
"KLOWCASE Function" on page 264	Converts all letters in an argument to lowercase.			X
"KREVERSE Function" on page 270	Reverses a character expression.			X
"KRIGHT Function" on page 271	Right-aligns a character expression by trimming trailing DBCS blanks and SO-SI.			X
"KSCAN Function" on page 271	Selects a specified word from a character expression.			X
"KSTRCAT Function" on page 272	Concatenates two or more character expressions.			X
"KSUBSTR Function" on page 273	Extracts a substring from an argument.			X
"KSUBSTRB Function" on page 274	Extracts a substring from an argument according to the byte position of the substring in the argument.			X
"KTRANSLATE Function" on page 274	Replaces specific characters in a character expression.			X
"KTRIM Function" on page 275	Removes trailing DBCS blanks and SO-SI from character expressions.			X
"KTRUNCATE Function" on page 276	Truncates a numeric value to a specified length.			X

Function	Description	I18N Level 0	I18N Level 1	I18N Level 2
"KUPCASE Function" on page 277	Converts all letters in an argument to uppercase.			X
"KUPDATE Function" on page 277	Inserts, deletes, and replaces character value contents.			X
"KUPDATEB Function" on page 279	Inserts, deletes, and replaces the contents of the character value according to the byte position of the character value in the argument.			X
"KVERIFY Function" on page 280	Returns the position of the first character that is unique to an expression.			X
LEFT	Left-aligns a character string.	X		
LENGTH	Returns the length of a non-blank character string, excluding trailing blanks, and returns 1 for a blank character string.	X		
LENGTHC	Returns the length of a character string, including trailing blanks.			X
LENGTHM	Returns the amount of memory (in bytes) that is allocated for a character string.			X
LENGTHN	Returns the length of a character string, excluding trailing blanks.	X		

Function	Description	I18N Level 0	I18N Level 1	I18N Level 2
LOWCASE	Converts all letters in an argument to lowercase.			X
MISSING	Returns a numeric result that indicates whether the argument contains a missing value.			X
NLITERAL	Converts a character string that you specify to a SAS name literal.			X
NOTALNUM	Searches a character string for a non-alphanumeric character, and returns the first position at which the character is found.			X
NOTALPHA	Searches a character string for a nonalphabetic character, and returns the first position at which the character is found.			X
NOTCNTRL	Searches a character string for a character that is not a control character, and returns the first position at which that character is found.			X

Function	Description	I18N Level 0	I18N Level 1	I18N Level 2
NOTDIGIT	Searches a character string for any character that is not a digit, and returns the first position at which that character is found.			X
NOTFIRST	Searches a character string for an invalid first character in a SAS variable name under VALIDVARNAME=V7, and returns the first position at which that character is found.			X
NOTGRAPH	Searches a character string for a non-graphical character, and returns the first position at which that character is found.			X
NOTLOWER	Searches a character string for a character that is not a lowercase letter, and returns the first position at which that character is found.			X

Function	Description	I18N Level 0	I18N Level 1	I18N Level 2
NOTNAME	Searches a character string for an invalid character in a SAS variable name under VALIDVARNAME=V7, and returns the first position at which that character is found.			X
NOTPRINT	Searches a character string for a nonprintable character, and returns the first position at which that character is found.	X		
NOTPUNCT	Searches a character string for a character that is not a punctuation character, and returns the first position at which that character is found.	X		
NOTSPACE	Searches a character string for a character that is not a white-space character (blank, horizontal and vertical tab, carriage return, line feed, and form feed), and returns the first position at which that character is found.	X		

Function	Description	I18N Level 0	I18N Level 1	I18N Level 2
NOTUPPER	Searches a character string for a character that is not an uppercase letter, and returns the first position at which that character is found.			X
NOTXDIGIT	Searches a character string for a character that is not a hexadecimal character, and returns the first position at which that character is found.			X
NVALID	Checks the validity of a character string for use as a SAS variable name.	X		
PROPCASE	Converts all words in an argument to proper case.			X
QUOTE	Adds double quotation marks to a character value.			X
RANK	Returns the position of a character in the ASCII or EBCDIC collating sequence.	X		
REPEAT	Returns a character value that consists of the first argument repeated n+1 times.		X	
REVERSE	Reverses a character string.	X		

Function	Description	I18N Level 0	I18N Level 1	I18N Level 2
RIGHT	Right-aligns a character expression.	X		
SCAN	Returns the nth word from a character string.	X		
SOUNDEX	Encodes a string to facilitate searching.	X		
SPEDIS	Determines the likelihood of two words matching, expressed as the asymmetric spelling distance between the two words.	X		
STRIP	Returns a character string with all leading and trailing blanks removed.	X		
SUBPAD	Returns a substring that has a length you specify, using blank padding if necessary.		X	
SUBSTR	Extracts a substring from an argument.	X		
SUBSTRN	Returns a substring, allowing a result with a length of zero.		X	
TRANSLATE	Replaces specific characters in a character string.	X		
"TRANTAB Function" on page 290	Transcodes data by using the specified translation table.	X		
TRANWRD	Replaces or removes all occurrences of a substring in a character string.			X

Function	Description	I18N Level 0	I18N Level 1	I18N Level 2
TRIM	Removes trailing blanks from a character string, and returns one blank if the string is missing.	X		
TRIMN	Removes trailing blanks from character expressions, and returns a string with a length of zero if the expression is missing.	X		
UPCASE	Converts all letters in an argument to uppercase.			X
URLDECODE	Returns a string that was decoded using the URL escape syntax.			X
URLENCODE	Returns a string that was encoded using the URL escape syntax.			X
VERIFY	Returns the position of the first character in a string that is not in any of several other strings.	X		

Functions for NLS by Category

The following categories relate to NLS issues:

Table 8.2 Categories of NLS Formats

Category	Description
Character	processes character data
Currency Conversion	converts one currency to another currency
DBCS	processes double-byte character set.
Date and Time	processes data and time data.
Locale	processes data based on the specified locale.
Variable Information	processes variable information.

The following table provides brief descriptions of the SAS functions. For more detailed descriptions, see the NLS entry for each function.

Table 8.3 Summary of NLS Functions by Category

Category	Functions for NLS	Description
Character	"KCVT Function" on page 260	Converts data from one type of encoding data to another encoding data.
	"TRANTAB Function" on page 290	Transcodes data by using the specified translation table.
	"UNICODE Function" on page 295	converts Unicode characters to the current SAS session encoding.
	"UNICODEC Function" on page 297	converts characters in the current SAS session encoding to Unicode characters.
	"UNICODELEN Function" on page 299	specifies the length of the character unit for the Unicode data.
	"UNICODEWIDTH Function" on page 300	specifies the length of a display unit for the Unicode data.
DBCS	"KCOMPARE Function" on page 258	Returns the result of a comparison of character expressions.
	"KCOMPRESS Function" on page 259	Removes specified characters from a character expression.

Category	Functions for NLS	Description
	"KCOUNT Function" on page 260	Returns the number of double-byte characters in an expression.
	"KINDEX Function" on page 262	Searches a character expression for a string of characters.
	"KINDEXC Function" on page 262	Searches a character expression for specified characters.
	"KLEFT Function" on page 263	Left-aligns a character expression by removing unnecessary leading DBCS blanks and SO/SI.
	"KLENGTH Function" on page 264	Returns the length of an argument.
	"KLOWCASE Function" on page 264	Converts all letters in an argument to lowercase.
	"KPROPCASE Function" on page 265	Converts Chinese, Japanese, Korean, Taiwanese (CJKT) characters.
	"KPROPCHAR Function" on page 268	Converts special characters to normal characters.
	"KPROPDATA Function" on page 268	Removes or converts unprintable characters.
	"KREVERSE Function" on page 270	Reverses a character expression.
	"KRIGHT Function" on page 271	Right-aligns a character expression by trimming trailing DBCS blanks and SO/SI.
	"KSCAN Function" on page 271	Selects a specified word from a character expression.
	"KSTRCAT Function" on page 272	Concatenates two or more character expressions.
	"KSUBSTR Function" on page 273	Extracts a substring from an argument.
	"KSUBSTRB Function" on page 274	Extracts a substring from an argument according to the byte position of the substring in the argument.
	"KTRANSLATE Function" on page 274	Replaces specific characters in a character expression.
	"KTRIM Function" on page 275	Removes trailing DBCS blanks and SO/SI from character expressions.
	"KTRUNCATE Function" on page 276	Truncates a numeric value to a specified length.
	"KUPCASE Function" on page 277	Converts all letters in an argument to uppercase.
	"KUPDATE Function" on page 277	Inserts, deletes, and replaces character value contents.
	"KUPDATEB Function" on page 279	Inserts, deletes, and replaces the contents of the character value according to the byte position of the character value in the argument.

Category	Functions for NLS	Description
	"KVERIFY Function" on page 280	Returns the position of the first character that is unique to an expression.
Date and Time	"NLDATE Function" on page 280	Converts the SAS date value to the date value of the specified locale by using the date format descriptors.
	"NLDATM Function" on page 283	Converts the SAS datetime value to the time value of the specified locale by using the datetime- format descriptors.
	"NLTIME Function" on page 286	Converts the SAS time or the datetime value to the time value of the specified locale by using the NLTIME descriptors.
Locale	"GETLOCENV Function" on page 254	Returns the current locale/language environment.
	"GETPXLANGUAGE Function" on page 255	Returns the current two-letter language code.
	"GETPXLOCALE Function" on page 256	Returns the POSIX locale value for a SAS locale.
	"GETPXREGION Function" on page 257	Returns the current two-letter region code.
	"SORTKEY Function" on page 287	creates a linguistic sort key.
Variable Information	"VARTRANSCODE Function" on page 291	Returns the transcode attribute of a SAS data set variable.
	"VTRANSCODE Function" on page 293	Returns a value that indicates whether transcoding is enabled for the specified character variable.
	"VTRANSCODEX Function" on page 294	Returns a value that indicates whether transcoding is enabled for the specified argument.

GETLOCENV Function

Returns the current locale/language environment.

Category: Locale

Syntax

GETLOCENV( )

Details

The GETLOCENV function returns the locale/language environment value for a valid SAS locale. The following environment values are possible:

SBCS — The SAS session encoding is SBCS (Single-Byte Character Set). SASWZSD is loaded for string manipulation.

DBCS — The SAS session encoding is DBCS (Double-Byte Character Set). SASWZSD is loaded for string manipulation.

MBCS	The SAS session encoding is Unicode(UTF8). SASWZSU is loaded for string manipulation.

If you receive a blank value, then the WZSS subsystem is not available. This action suggests a configuration or installation error.

Examples

In the following example, the LOCALE= system option is set to French_France.

Statements	Results
option locale=french_france;	
environ=getlocenv();	
put environ;	SBCS

GETPXLANGUAGE Function

Returns the current two-letter language code.

Category: Locale

Syntax

GETPXLANGUAGE()

Details

The GETPXLANGUAGE function returns the two-letter language code based on the current value of the LOCALE= SAS system option. The length of the language name is two characters. If the size of the variable that receives the value is less than two characters, the value is truncated.

Examples

In the first example, the LOCALE= system option is set to French_France. The second example is set to German. The third example is set to English_United States.

Statements	Results

option locale=french_france;
lang=getpxLanguage();
put lang;
	fr

option locale=German;
lang=getpxLanguage();
put lang;
	de

option locale=en_US;
lang=getpxLanguage();
put lang;
	en

See Also

System Options:

"LOCALE System Option" on page 463

Functions:

"GETPXREGION Function" on page 257
"GETPXLOCALE Function" on page 256

GETPXLOCALE Function

Returns the POSIX locale value for a SAS locale.

Category: Locale

Syntax

GETPXLOCALE(<*source*>)

<source>
is an optional argument that specifies a locale name.

Details

The GETPXLOCALE function returns the POSIX locale value for a valid SAS locale name. If you specify an invalid locale name, then a null string is returned. If you do not specify a value for the <*source*> argument, then the function returns the POSIX name for the current SAS session. The length of the POSIX locale name is five characters. If the size of the variable that receives the value is less than five characters, the value is truncated.

Examples

In the first example, the LOCALE= system option is set to French_France. In the second example, the <*source*> argument is set to German_Germany. In the third example, the <*source*> argument is set to English_United States.

Statements	Results

option locale=french_france;
locale=getpxLocale();
put locale;
	fr_FR

locale=getpxLocale("german_germany"); put locale;	de_DE
locale=getpxLocale("english_unitedstates"); put locale;	en_US

See Also

System Options:

"LOCALE System Option" on page 463

Functions:

"GETPXLANGUAGE Function" on page 255
"GETPXREGION Function" on page 257

GETPXREGION Function

Returns the current two-letter region code.

Category: Locale

Syntax

GETPXREGION()

Details

The GETPXREGION function returns the two-letter region code based on the current LOCALE= SAS system option. The length of the region name is two characters. If the size of the variable that receives the value is less than two characters, the value is truncated.

Examples

In the first example the LOCALE= system option is set to French_France. The second example is set to German. The third example is set to English_United States.

Statements	Results

option locale=french_france;
region=getpxRegion();
put region;
	FR

option locale=German;
region=getpxRegion();
put region;
	DE

option locale=en_US;
region=getpxRegion();
put region;
	US

See Also

System Options:

"LOCALE System Option" on page 463

Functions:

"GETPXLOCALE Function" on page 256
"GETPXLANGUAGE Function" on page 255

KCOMPARE Function

Returns the result of a comparison of character expressions.

Category: DBCS

Restriction: "Internationalization Compatibility for SAS String Functions" on page 236

Tip: Non-DBCS equivalent function is COMPARE in *SAS Language Reference: Dictionary*

Syntax

KCOMPARE(*source*,<*pos*, <*count*,>>*findstr*)

Arguments

source
specifies the character expression to be compared.

pos
specifies the starting position in *source* to begin the comparison. If *pos* is omitted, the entire *source* is compared. If *pos* is less than 0, *source* is assumed as extended DBCS data that does not contain any SO/SI characters.

count
specifies the number of bytes to compare. If *count* is omitted, all of *source* that follows *pos* is compared, except for any trailing blanks.

findstr
specifies the character expression to compare to *source*.

Details

KCOMPARE returns values as follows:

- a negative value if *source* is less than *findstr*
- 0 if *source* is equal to *findstr*
- a positive value if *source* is greater than *findstr*

KCOMPRESS Function

Removes specified characters from a character expression.

Category: DBCS

Restriction: Chapter 8, "Functions for NLS," on page 235

Tip: Non-DBCS equivalent function is COMPARE in *SAS Language Reference: Dictionary*.

Syntax

KCOMPRESS(*source*,<*characters-to-remove*>)

Arguments

source
specifies a character expression that contains the characters to be removed. When only *source* is specified, KCOMPRESS returns this expression with all of the single and double-byte blanks removed.

characters-to-remove
specifies the character or characters that KCOMPRESS removes from the character expression.

Note: If characters-to-remove is omitted, KCOMPRESS removes all blanks. △

Tip: Enclose a literal string of characters in quotation marks.

See Also

Functions:

"KLEFT Function" on page 263

"KTRIM Function" on page 275

KCOUNT Function

Returns the number of double-byte characters in an expression.

Category: DBCS

Restrictions: Chapter 8, "Functions for NLS," on page 235

Syntax

KCOUNT(*source*)

Arguments

source
specifies the character expression to count.

KCVT Function

Converts data from one type of encoding data to another encoding data.

Category: Character

Restriction: "Internationalization Compatibility for SAS String Functions" on page 236

Syntax

KCVT(*text, intype, outtype*, <*options*,...>)

Arguments

text
specifies the character variable to be converted.

intype
specifies the encoding of the data. The encoding of the text must match the input data's encoding. For valid values, see "SBCS, DBCS, and Unicode Encoding Values for Transcoding Data" on page 549.

Note: ASCIIANY and EBCIDICANY are invalid encoding values. △

outtype
specifies the encoding to be converted into character data. For valid values see"SBCS, DBCS, and Unicode Encoding Values for Transcoding Data" on page 549.

Note: ASCIIANY and EBCIDICANY are invalid encoding values. △

options
specifies character data options. Here are the available options:

NOSOSI | NOSHIFT	No shift code or Hankaku characters.
INPLACE	Replaces character data by conversion. The INPLACE option is specified to secure the same location between different hosts whose lengths of character data are not identical. For example, the INPLACE option converts data from the host which requires Shift-Codes, into the other host, which does not require shift codes. Truncation occurs when the length of the character data that is converted into *outtype* for Shift-Codes is longer than the length that is specified in *intype*.
KANA	Includes Hankaku katakana characters in columns of character data.
UPCASE	Converts 2-byte alphabet to uppercase characters.
LOWCASE	Converts 2-byte alphabet to lowercase characters.
KATA2HIRA	Converts katakana data to Hiragana.
HIRA2KATA	Converts Hiragana data to katakana.

Details

The KCVT function converts SBCS, DBCS, and MBCS character strings into encoding data. For example, the KCVT function can convert: ASCII code data to UCS2 encoding data, Greek code data to UTF-8, and Japanese SJIS code data to another Japanese code data. You can specify the following types for Intype and Outtype options: UCS2, UCS2L, UCS2B, and UTF8. To enable the DBCS mode, specify the following SAS options in the configuration file or in the command line.

- DBCS
- DBCSLANG Japanese or Korean or Chinese or Taiwanese
- DBCSTYPE dbcstype value

Example

The following code converts IBM PC codes into DEC codes for the external text file specified as *my-input-file*, and writes in OUTDD.

```
data _null_;
   infile 'my-input-file';
   file outdd noprint;
   input @1 text $char80.;
   text = kcvt(text, 'pcibm', 'dec');
   put @1 text $char80.;
run;
```

See Also

System options:

"DBCS System Option: UNIX, Windows, and z/OS" on page 454
"DBCSLANG System Option: UNIX, Windows, and z/OS" on page 455
"DBCSTYPE System Option: UNIX, Windows, and z/OS" on page 456

Procedure:

Chapter 14, "The DBCSTAB Procedure," on page 505

KINDEX Function

Searches a character expression for a string of characters.

Category: DBCS

Restriction: Chapter 8, "Functions for NLS," on page 235

Tip: Non-DBCS equivalent function is INDEX in *SAS Language Reference: Dictionary*

Syntax

KINDEX(*source, excerpt*)

Arguments

source
specifies the character expression to search.

excerpt
specifies the string of characters to search for in the character expression.

Tip: Enclose a literal string of characters in quotation marks.

Details

The KINDEX function searches *source*, from left to right, for the first occurrence of the string that is specified in *excerpt*, and returns the position in *source* of the string's first character. If the string is not found in *source*, KINDEX returns a value of 0. If there are multiple occurrences of the string, KINDEX returns only the position of the first occurrence.

See Also

Functions:

"KINDEXC Function" on page 262

KINDEXC Function

Searches a character expression for specified characters.

Category: DBCS

Restriction: "Internationalization Compatibility for SAS String Functions" on page 236

Tip: Non-DBCS equivalent function is INDEXC *SAS Language Reference: Dictionary*

Syntax

KINDEXC(*source,excerpt-1*<,... *excerpt-n*>)

Arguments

source
specifies the character expression to search.

excerpt
specifies the characters to search for in the character expression.

Tip: If you specify more than one excerpt, separate them with a comma.

Details

The KINDEXC function searches *source*, from left to right, for the first occurrence of any character present in the excerpts and returns the position in *source* of that character. If none of the characters in *excerpt-1* through *excerpt-n* in *source* are found, KINDEXC returns a value of 0.

Comparisons

The KINDEXC function searches for the first occurrence of any individual character that is present within the character string, whereas the KINDEX function searches for the first occurrence of the character string as a pattern.

See Also

Function:
"KINDEX Function" on page 262

KLEFT Function

Left-aligns a character expression by removing unnecessary leading DBCS blanks and SO/SI.

Category: DBCS
Restriction: "Internationalization Compatibility for SAS String Functions" on page 236
Tip: Non-DBCS equivalent function is LEFT in *SAS Language Reference: Dictionary*.

Syntax

KLEFT(*argument*)

Arguments

argument
specifies any SAS character expression.

Details

KLEFT returns an argument and removes the leading blanks.

See Also

Functions:

"KCOMPRESS Function" on page 259
"KRIGHT Function" on page 271
"KTRIM Function" on page 275

KLENGTH Function

Returns the length of an argument.

Category: DBCS

Restriction: "Internationalization Compatibility for SAS String Functions" on page 236

Tip: Non-DBCS equivalent function is LENGTH in *SAS Language Reference: Dictionary*.

Syntax

KLENGTH(*argument*)

Arguments

argument
specifies any SAS expression.

Details

The KLENGTH function returns an integer that represents the position of the rightmost non-blank character in the argument. If the value of the argument is missing, KLENGTH returns a value of 1. If the argument is an uninitialized numeric variable, KLENGTH returns a value of 12 and prints a note in the SAS log that the numeric values have been converted to character values.

KLOWCASE Function

Converts all letters in an argument to lowercase.

Category: DBCS

Restriction: "Internationalization Compatibility for SAS String Functions" on page 236

Tip: Non-DBCS equivalent function is LOWCASE in *SAS Language Reference: Dictionary*.

Syntax

KLOWCASE(*argument*)

Arguments

argument
specifies any SAS character expression.

Details

The KLOWCASE function copies a character argument, converts all uppercase letters to lowercase letters, and returns the altered value as a result.

KPROPCASE Function

Converts Chinese, Japanese, Korean, Taiwanese (CJKT) characters.

Category: DBCS

Restriction: Chapter 8, "Functions for NLS," on page 235

Syntax

str=**KPROPCASE**(<*instr*>, (<options>))

Arguments

str
data string that has been converted and is in the current SAS session encoding.

instr
input data string.

options
converts Japanese, Chinese, Korean, and Taiwanese characters based on specified options.

HALF-KATAKANA, FULL-KATAKANA
This option converts half-width Katakana to full-width Katakana and is used only with Japanese encoding.

Restriction: This option cannot be used at the same time with the full-Katakana, half-Katakana option.

FULL-KATAKANA, HALF-KATAKANA
This option converts full-width Katakana to half-width Katakana and is used only with Japanese encoding.

Restriction: This option cannot be used at the same time with the half-Katakana, full-Katakana option.

KATAKANA, ROMAJI
This option converts the Katakana character string to a Romaji character string and is used only with Japanese encoding.

Restriction: This option cannot be used at the same time with the Romaji, Katakana option.

ROMAJI, KATAKANA
This option converts the Romaji character string to a Katakana character string and is used only with Japanese encoding.

Restriction: This option cannot be used at the same time with the Katakana, Romaji option.

FULL-ALPHABET, HALF-ALPHABET
This option converts the Full-Alphabet characters to Half-Alphabet characters and is used only with Japanese, Chinese, Korean, and Taiwanese encoding.

Restriction: This option cannot be used at the same time with the Half-Alphabet, Full-Alphabet option.

HALF-ALPHABET, FULL-ALPHABET
This option converts the Half-Alphabet characters to Full-Alphabet characters and is used only with Japanese, Chinese, Korean, and Taiwanese encoding.

Restriction: This option cannot be used at the same time with the Full-Alphabet, Half-Alphabet option.

LOWERCASE, UPPERCASE
This option converts lowercase alphabet characters to uppercase alphabet characters.

Restriction: This option cannot be used at the same time with the Uppercase, Lowercase option.

UPPERCASE, LOWERCASE
This option converts uppercase alphabet characters to lowercase alphabet characters.

Restriction: This option cannot be used at the same time with the Lowercase, Uppercase option.

PROPER
This option specifies the following default options based on the encoding:

Japanese encoding:

- Half-Katakana,Full-Katakana
- Full-alphabet, Half-alphabet
- Lowercase, Uppercase

Korean encoding:

- Full-alphabet, Half-alphabet

Chinese encoding:

- Full-alphabet, Half-alphabet

Taiwanese encoding:

- Full-alphabet, Half-alphabet

Details

This function converts the input string based on the specified options and default options. The KPROPCASE function supports the Chinese, Japanese, Korean, Taiwanese (CJKT) environment.

Example

The following example demonstrates the functionality of the KPROPCASE function:

```
length fullkana halfkana upper lower fullalpha $ 200;
length str1 str2 str3 str4 str5 str7 str8 $ 30 str6 $44;

lower = 'do-naxtutsu';  /* Doughnuts in Japanese Roman word. */
upper = 'DO-NAXTUTSU';  /* Doughnuts in Japanese Roman word. */
fullkana = unicode('\u30C9\u30FC\u30CA\u30C3\u30C4');
halfkana = unicode('\uFF84\uFF9E\uFF70\uFF85\uFF6F\uFF82');
fullalpha = unicode('\uFF24\uFF2F\uFF0D\uFF2E\uFF21\uFF38\uFF34
   \uFF35\uFF34\uFF33\uFF35');

str1 = kpropcase(fullkana, 'full-katakana,half-katakana');
if (halfkana EQ trim(str1)) then
  put str1= $hex14.;
str2 = kpropcase(halfkana, 'half-katakana, full-katakana');
if (fullkana EQ trim(str2)) then
  put str2= $hex22.;

str3 = kpropcase(fullkana, 'katakana,romaji');
if (trim(str3) EQ upper) then
  put str3=  ;

str4 = kpropcase(upper, 'romaji,katakana');
if (trim(str4) EQ fullkana) then
  put str4= $hex22.;

str5 = kpropcase(fullalpha, 'full-alphabet, half-alphabet');
if (trim(upper) EQ str5) then
  put str5=;

str6 = kpropcase(upper, 'half-alphabet, full-alphabet');
if (trim(str6) EQ fullalpha) then
  put str6= $hex46.;

str7 = kpropcase(lower, 'lowercase, uppercase');
if (trim(str7) EQ upper) then
  put str7=;

str8 = kpropcase(upper, 'uppercase, lowercase');
if (trim(str8) EQ lower) then
 put str8=;

RESULTS:
str1=C4DEB0C5AFC220
str2=8368815B83698362836320
str3=DO-NAXTUTSU
str4=8368815B83698362836320
str5=DO-NAXTUTSU
str6=8263826E817C826D8260827782738274827382728274 20
str7=DO-NAXTUTSU
str8=do-naxtutsu
```

KPROPCHAR Function

Converts special characters to normal characters.

Category: DBCS

Syntax

str=**KPROPCHAR**(<*instr*>)

Arguments

str
result string. Special characters are converted to normal characters.

instr
input data string.

Details

This function converts special characters to normal characters. The KPROPCHAR function converts the characters from the following ranges:

Enclosed alphanumeric values: \u2460 to \u24FF. See **http://www.unicode.org/charts/PDF/U2460.pdf**.

Dingbats: \u2776 to \u2793. See **http://www.unicode.org/charts/PDF/U2700.pdf**.

Enclosed CJK letters and months: \u3200 to \u32FF. See **http://www.unicode.org/charts/PDF/U3200.pdf**.

Example

The following example demonstrates the functionality of the KPROPCHAR function:

```
length in1 out1 $30 ;
  in1=unicode('\u2460\u2473\u277F\u325F');
  out1=KPROPCHAR(in1);
  put out1;

RESULTS:
(1)(20)(-10)(35)
```

KPROPDATA Function

Removes or converts unprintable characters.

Category: DBCS

Syntax

str=**KPROPDATA**(<*instr*>(<option, input encode name, output encode name>))

Arguments

str
data string that has been converted and is in session encoding.

instr
input data string.

options
specifies instructions on processing unprintable characters:

UESC
Converts unprintable characters using a Unicode escaped string (for example, \u0000\u1234).

TRIM
Removes unprintable characters. No replacement character is used.

BLANK or ”
Replaces each unprintable character with a single-byte blank.

QUESTION or ’?’
Replaces unprintable characters with a single-byte ’?’.

HEX
Replaces unprintable characters with a hexadecimal representation (for example, 0x810x82).

TRUNCATE or TRUNC
Truncates the data string when the first unprintable character is encountered.

REMOVE
Removes the data string if any unprintable characters are found.

NCR
Encodes the unprintable characters using NCR representation if the code is available in Unicode.

input encode name
specifies the input data’s encoding name if necessary. If the input encode name is not specified, then the KPROPDATA function processes the data as the current SAS session encoded string. For information on SAS encoding names, see “SBCS, DBCS, and Unicode Encoding Values for Transcoding Data” on page 549.

output encode name
specifies the output data’s encoding name. If the encoding name is not specified, the KPROPDATA function recognizes the output as the current SAS session encoding. For information on SAS encoding names, see “SBCS, DBCS, and Unicode Encoding Values for Transcoding Data” on page 549.

Details

This function converts the input data string to the current SAS session encoding and removes or replaces unprintable characters based on the options.

Example

The following example demonstrates the functionality of the KPROPDATA function:

```
length instr $12;
  length str1 str2 str3 str4 str5 str6 str7 str8 str9 str10$ 50;

  instr = "534153"x||"ae"x || " System";
  put instr;

  str1 = kpropdata(instr);
  put str1= +2 str1= $hex26.;
  str2 = kpropdata(instr,'UESC');
  put str2= +2 str2= $hex26.;;
  str3 = kpropdata(instr, 'UESC','wlatin1');
  put str3= +2 str3= $hex34.;
  str4 = kpropdata(instr,'TRIM','wlatin1');
  put str4= +2 str4= $hex26.;
  str5 = kpropdata(instr,'BLANK', 'wlatin1');
  put str5= +2 str5= $hex26.;
  str6 = kpropdata(instr,'?', 'wlatin1');
  put str6= +2 str6= $hex26.;
  str7 = kpropdata(instr,'hex', 'wlatin1');
  put str7= +2 str7= $hex26.;
  str8 = kpropdata(instr,'TRUNC', 'wlatin1');
  put str8= +2 str8= $hex26.;
  str9 = kpropdata(instr,'REMOVE', 'wlatin1');
  put str9= +2 str9= $hex26.;
  str10 = kpropdata(instr,'NCR', 'wlatin1');
  put str10= +2 str10= $hex26.;

RESULTS:
SAS? System
str1=SAS? System   str1=534153AE2053797374656D2020
str2=SAS? System   str2=534153AE2053797374656D2020
str3=SAS\uff6e System   str3=5341535C756666366520537973746 56D20
str4=SAS System   str4=5341532053797374656D202020
str5=SAS  System   str5=53415320205379737 4656D2020
str6=SAS? System   str6=5341533F2053797374656D2020
str7=SAS\xAE System   str7=5341535C784145205379737465
str8=SAS   str8=534153202020202020202020
str9=    str9=20202020202020202020202020
str10=SAS® System   str10=53415326233137343B20537973
```

KREVERSE Function

Reverses a character expression.

Category: DBCS

Restriction: “Internationalization Compatibility for SAS String Functions” on page 236

Tip: Non-DBCS equivalent function is REVERSE in *SAS Language Reference: Dictionary*.

Syntax

KREVERSE(*argument*)

Arguments

argument
specifies any SAS character expression.

KRIGHT Function

Right-aligns a character expression by trimming trailing DBCS blanks and SO/SI.

Category: DBCS
Restriction: "Internationalization Compatibility for SAS String Functions" on page 236
Tip: RIGHT in *SAS Language Reference: Dictionary*.

Syntax

KRIGHT(*argument*)

Arguments

argument
specifies any SAS character expression.

Details

The KRIGHT function returns an argument with trailing blanks moved to the start of the value. The argument's length does not change.

See Also

Functions:
"KCOMPRESS Function" on page 259
"KLEFT Function" on page 263
"KTRIM Function" on page 275

KSCAN Function

Selects a specified word from a character expression.

Category: DBCS

Restriction: "Internationalization Compatibility for SAS String Functions" on page 236

Tip: Non-DBCS equivalent function is SCAN in *SAS Language Reference: Dictionary*.

Syntax

KSCAN(*argument,n*<, *delimiters*>)

Arguments

argument
specifies any character expression.

n
specifies a numeric expression that produces the number of the word in the character expression you want KSCAN to select.

Tip: If *n* is negative, KSCAN selects the word in the character expression starting from the end of the string. If |*n*| is greater than the number of words in the character expression, KSCAN returns a blank value.

delimiters
specifies a character variable that produces characters that you want KSCAN to use as word separators in the character expression.

Default: If you omit *delimiters* in an ASCII environment, SAS uses the following characters:

blank . < (+ & ! $ *); ^ – / , % |

In ASCII environments without the ^ character, KSCAN uses the ~ character instead.

If you omit *delimiters* on an EBCDIC environment, SAS uses the following characters:

blank . < (+ | & ! $ *); ¬ – / , % | ¢

Tip: If you represent *delimiters* as a constant, enclose *delimiters* in quotation marks.

Details

Leading delimiters before the first word in the character string do not effect KSCAN. If there are two or more contiguous delimiters, KSCAN treats them as one.

KSTRCAT Function

Concatenates two or more character expressions.

Category: DBCS

Restriction: "Internationalization Compatibility for SAS String Functions" on page 236

Tip: Non-DBCS equivalent function is CAT in *SAS Language Reference: Dictionary*.

Syntax

KSTRCAT(*argument-1*, *argument-2*<, … *argument-n*>)

Arguments

argument
specifies any single-byte or double-byte character expression.

Details

KSTRCAT concatenates two or more single-byte or double-byte character expressions. It also removes unnecessary SO/SI pairs between the expressions.

KSUBSTR Function

Extracts a substring from an argument.

Category: DBCS

Restriction: "Internationalization Compatibility for SAS String Functions" on page 236

Tip: SUBSTR in *SAS Language Reference: Dictionary*.

Syntax

KSUBSTR(*argument,position*<,*n*>)

Arguments

argument
specifies any SAS character expression.

position
specifies a numeric expression that is the beginning character position.

n
specifies a numeric expression that is the length of the substring to extract.

Interaction: If *n* is larger than the length of the expression that remains in *argument* after *position*, SAS extracts the remainder of the expression.

Tip: If you omit *n*, SAS extracts the remainder of the expression.

Details

The KSUBSTR function returns a portion of an expression that you specify in *argument*. The portion begins with the character specified by *position* and is the number of characters specified by *n*.

A variable that is created by KSUBSTR obtains its length from the length of *argument*.

See Also

Functions:
"KSUBSTRB Function" on page 274

KSUBSTRB Function

Extracts a substring from an argument according to the byte position of the substring in the argument.

Category: DBCS
Restriction: Chapter 8, "Functions for NLS," on page 235

Syntax

KSUBSTRB(*argument,position*<,*n*>)

Arguments

argument
specifies any SAS character expression.

position
specifies the beginning character position in byte units.

n
specifies the length of the substring to extract in byte units.
Interaction: If *n* is larger than the length (in byte units) of the expression that remains in *argument* after *position*, SAS extracts the remainder of the expression.
Tip: If you omit *n*, SAS extracts the remainder of the expression.

Details

The KSUBSTRB function returns a portion of an expression that you specify in *argument*. The portion begins with the byte unit specified by *position* and is the number of byte units specified by *n*.

A variable that is created by KSUBSTRB obtains its length from the length of *argument*.

See Also

Functions:
"KSUBSTR Function" on page 273

KTRANSLATE Function

Replaces specific characters in a character expression.

Category: DBCS

Restriction: "Internationalization Compatibility for SAS String Functions" on page 236

Tip: Non-DBCS equivalent function is TRANSLATE in *SAS Language Reference: Dictionary*.

See: KTRANSLATE Function in the documentation for your operating environment.

Syntax

KTRANSLATE(*source,to-1,from-1*<,*…to-n,from-n*>)

Arguments

source
specifies the SAS expression that contains the original character value.

to
specifies the characters that you want KTRANSLATE to use as substitutes.

from
specifies the characters that you want KTRANSLATE to replace.

Interaction: Values of *to* and *from* correspond on a character-by-character basis; KTRANSLATE changes character one of *from* to character one of *to*, and so on. If *to* has fewer characters than *from*, KTRANSLATE changes the extra *from* characters to blanks. If *to* has more characters than *from*, KTRANSLATE ignores the extra *to* characters.

Operating Environment Information: You must have pairs of *to* and *from* arguments on some operating environments. On other operating environments, a segment of the collating sequence replaces null *from* arguments. See the SAS documentation for your operating environment for more information. △

Details

You can use KTRANSLATE to translate a single-byte character expression to a double-byte character expression, or translate a double-byte character expression to a single-byte character expression.

The maximum number of pairs of *to* and *from* arguments that KTRANSLATE accepts depends on the operating environment you use to run SAS. There is no functional difference between using several pairs of short arguments, or fewer pairs of longer arguments.

KTRIM Function

Removes trailing DBCS blanks and SO/SI from character expressions.

Category: DBCS

Restriction: Chapter 8, "Functions for NLS," on page 235

Tip: Non-DBCS equivalent function is TRIM in *SAS Language Reference: Dictionary*.

Syntax

KTRIM(*argument*)

Arguments

argument
specifies any SAS character expression.

Details

KTRIM copies a character argument, removes all trailing blanks, and returns the trimmed argument as a result. If the argument is blank, KTRIM returns one blank. KTRIM is useful for concatenating because concatenation does not remove trailing blanks.

Assigning the results of KTRIM to a variable does not affect the length of the receiving variable. If the trimmed value is shorter than the length of the receiving variable, SAS pads the value with new blanks as it assigns it to the variable.

See Also

Functions:

"KCOMPRESS Function" on page 259
"KLEFT Function" on page 263
"KRIGHT Function" on page 271

KTRUNCATE Function

Truncates a numeric value to a specified length.

Category: DBCS
Restriction: "Internationalization Compatibility for SAS String Functions" on page 236

Syntax

KTRUNCATE(*argument*, *number*, *length*)

Arguments

argument
specifies any SAS character expression.

number
is numeric.

length
is an integer.

Details

The KTRUNCATE function truncates a full-length *number* (stored as a double) to a smaller number of bytes, as specified in *length* and pads the truncated bytes with 0s. The truncation and subsequent expansion duplicate the effect of storing numbers in less than full length and then reading them.

KUPCASE Function

Converts all letters in an argument to uppercase.

Category: DBCS

Restriction: "Internationalization Compatibility for SAS String Functions" on page 236

Tip: UPCASE in *SAS Language Reference: Dictionary*.

Syntax

KUPCASE(*argument*)

Arguments

argument
specifies any SAS character expression.

Details

The KUPCASE function copies a character argument, converts all lowercase letters to uppercase letters, and returns the altered value as a result.

KUPDATE Function

Inserts, deletes, and replaces character value contents.

Category: DBCS

Restriction: "Internationalization Compatibility for SAS String Functions" on page 236

Syntax

KUPDATE(*argument,position,n*<, *characters-to-replace*>)

KUPDATE(*argument,position*<,*n*>, *characters-to-replace*)

Arguments

argument
specifies a character variable.

position
specifies a numeric expression that is the beginning character position.

n
specifies a numeric expression that is the length of the substring to be replaced.

Restriction: *n* cannot be larger than the length of the expression that remains in *argument* after *position*.

Restriction: *n* is optional, but you cannot omit both *n* and *characters-to-replace* from the function.

Tip: If you omit *n*, SAS uses all of the characters in *characters-to-replace* to replace the values of *argument*.

characters-to-replace
specifies a character expression that replaces the contents of *argument*.

Restriction: *characters-to-replace* is optional, but you cannot omit both *characters-to-replace* and *n* from the function.

Tip: Enclose a literal string of characters in quotation marks.

Details

The KUPDATE function replaces the value of *argument* with the expression in *characters-to-replace*. KUPDATE replaces *n* characters starting at the character you specify in *position*.

Note: If you set the NLSCOMPATMODE system option to on, parameter, *characters-to-replace*, processes the data based on previous SAS releases. If NLSCOMPATMODE is off, then *characters-to-replace* uses the 9.2 functionality. See the following table for examples.
△

Statements	Results
NLSCOMPATEMODE **kkupdate("123456", 2,3);**	**156**
NLSCOMPATEMODE **kupdate("123456", 2,3,"abcd");**	**1abcd56**
NONLSCOMPATEMODE **kupdate("123456", 2,3);**	**1 56**
NONLSCOMPATEMODE **kupdate("123456", 2,3,"abcd");**	**1abc56**

See Also

Functions:

"KUPDATEB Function" on page 279

System Options:

"NLSCOMPATMODE System Option: z/OS" on page 466

KUPDATEB Function

Inserts, deletes, and replaces the contents of the character value according to the byte position of the character value in the argument.

Category: DBCS

Restriction: "Internationalization Compatibility for SAS String Functions" on page 236

Syntax

KUPDATEB(*argument,position,n<,characters-to-replace>*)

KUPDATEB(*argument,position* <, *n*>, *characters-to-replace*)

Arguments

argument
specifies a character variable.

position
specifies the beginning character position in byte units.

n
specifies the length of the substring to be replaced in byte units.

Restriction: *n* cannot be larger than the length (in bytes) of the expression that remains in *argument* after *position*.

Restriction: *n* is optional, but you cannot omit both *n* and *characters-to-replace* from the function.

Tip: If you omit *n*, SAS uses all of the characters in *characters-to-replace* to replace the values of *argument*.

characters-to-replace
specifies a character expression to replace the contents of *argument*.

Restriction: *characters-to-replace* is optional, but you cannot omit both *characters-to-replace* and *n* from the function.

Tip: Enclose a literal string of characters in quotation marks.

Details

The KUPDATEB function replaces the value of *argument* with the expression in *characters-to-replace*. KUPDATEB replaces *n* byte units starting at the byte unit that you specify in *position*.

See Also

Functions:

"KUPDATE Function" on page 277

KVERIFY Function

Returns the position of the first character that is unique to an expression.

Category: DBCS

Restriction: "Internationalization Compatibility for SAS String Functions" on page 236

Tip: VERIFY in *SAS Language Reference: Dictionary*

Syntax

KVERIFY(*source,excerpt-1*<,*…excerpt-n*>)

Arguments

source
specifies any SAS character expression.

excerpt
specifies any SAS character expression. If you specify more than one excerpt, separate them with a comma.

Details

The KVERIFY function returns the position of the first character in *source* that is not present in any *excerpt*. If KVERIFY finds every character in *source* in at least one *excerpt*, it returns a 0.

NLDATE Function

Converts the SAS date value to the date value of the specified locale by using the date format descriptors.

Category: Date and Time

Syntax

NLDATE(*date,descriptor*)

Arguments

date
specifies a SAS date value.

descriptor
is a variable or expression that specifies how dates and times are formatted in output. The following descriptors are case sensitive:

#
removes the leading zero from the result.

%%
specifies the % character.

%a
specifies the short-weekday descriptor. The range for the day descriptor is Mon–Sun.

%A
specifies the long-weekday descriptor. The range for the long-weekday descriptor is Monday–Sunday.

%b
specifies the short-month descriptor. The range for the short-month descriptor is Jan–Dec.

%B
specifies the long-month descriptor. The range for the long-month descriptor is January–December.

%C
specifies the long-month descriptor and uses blank padding. The range for the long-month descriptor is January–December.

%d
specifies the day descriptor and uses 0 padding. The range for the day modifier is 01–31.

%e
specifies the day descriptor and uses blank padding. The range for the day descriptor is 01–31.

%F
specifies the long-weekday descriptor and uses blank padding. The range for the day descriptor is Monday–Sunday.

%j
specifies the day-of-year descriptor as a decimal number and uses a leading zero. The range for the day-of-year descriptor is 1–366.

%m
specifies the month descriptor and uses 0 padding. The range for the month descriptor is 01–12.

%o
specifies the month descriptor. The range for the month descriptor is 1–12 with blank padding.

%u
specifies the weekday descriptor as a number in the range 1–7 that represents Monday–Sunday.

%U
specifies the week-number-of-year descriptor by calculating the descriptor value as the SAS date value using the number of week within the year (Sunday is considered the first day of the week). The number-of-the-week value is represented as a decimal number in the range 0–53 and uses a leading zero and a maximum value of 53.

%V
specifies the week-number-of-year descriptor by calculating the descriptor value as the SAS date value. The number-of-week value is represented as a decimal number in the range 01–53 and uses a leading zero and a maximum value of 53. Weeks begin on a Monday and week 1 of the year is the week that includes both January 4th and the first Thursday of the year. If the first Monday of January is the 2nd, 3rd, or 4th, the preceding days are part of the last week of the preceding year.

%w
specifies the weekday descriptor as a number in the range 0–6 that represents Sunday–Saturday.

%W
specifies the week-number-of-year descriptor by calculating the descriptor value as SAS date value by using the number of week within the year (Monday is considered the first day of the week). The number-of-week value is represented as a decimal number in the range 0–53 and uses a leading zero and a maximum value of 53.

%y
specifies the year (2-digit) modifier. The range for the year descriptor is 00–99.

%Y
specifies the year (4-digit) descriptor. The range for the year descriptor is 1970–2069.

Details

The NLDATE function converts the SAS date value to the date value of the specified locale by using the date descriptors.

Examples

The following example shows a log filename that is created from a SAS date value.

Statements	Results
`options locale=English_Unitedstates;`	
`logfile=nldate('24Feb2003'd,'%B-%d.log');`	
`put logfile;`	`February-24.log`
`options locale=German_Germany;`	
`logfile=nldate('24Feb2003'd,'%B-%d.log');`	
`put logfile;`	`Februar-24.log`

The following example shows a weekday name that is created from a SAS date value.

Statements	Results
	`----+----1----+`

`options locale=English_unitedstates;`
`weekname=nldate('24Feb2003'd,'%A');`
`put weekname;`
	`Monday`

`options locale=German_Germany;`
`weekname=nldate('24Feb2003'd,'%A');`
`put weekname;`
	`Montag`

See Also

Format:

"NLDATE*w*. Format" on page 89

NLDATM Function

Converts the SAS datetime value to the time value of the specified locale by using the datetime-format descriptors.

Category: Date and Time

Syntax

NLDATM(*datetime,descriptor*)

Arguments

datetime
specifies a SAS datetime value.

descriptor
is a variable or expression that specifies how dates and times are formatted in output. The following descriptors are case sensitive:

#
removes the leading zero from the result.

%%
specifies the % character.

%a
specifies the short-weekday descriptor. The range for the day descriptor is Mon–Sun.

%A
specifies the long-weekday descriptor. The range for the long-weekday descriptor is Monday–Sunday.

%b
specifies the short-month descriptor. The range for the short-month descriptor is Jan–Dec.

%B
specifies the long-month descriptor. The range for the long-month descriptor is January–December.

%c
specifies the long-month descriptor and uses blank padding. The range for the long-month descriptor is January–December.

%d
specifies the day descriptor and uses 0 padding. The range for the day descriptor is 01–31.

%e
specifies the day descriptor and uses blank padding. The range for the day descriptor is 01–31.

%F
specifies the long-weekday descriptor and uses blank padding. The range for the day descriptor is Monday–Sunday.

%H
specifies the hour descriptor that is based on a 24-hour clock. The range for the hour descriptor is 00–23.

%I
specifies the hour descriptor that is based on a 12-hour clock. The range for the hour descriptor is 01–12.

%j
specifies the day-of-year descriptor as a decimal number and uses a leading zero. The range for the day-of-year descriptor is 1–366.

%m
specifies the month descriptor and uses 0 padding. The range for the month descriptor is 01–12.

%M
specifies the minute descriptor. The range for the minute descriptor is 00–59.

%o
specifies the month descriptor and uses blank padding. The range for the month descriptor is 1–12.

%p
specifies a.m. or p.m. descriptor.

%S
specifies the second descriptor. The range for the second descriptor is 00–59.

%u
specifies the weekday descriptor as a number in the range of 1–7 that represents Monday–Sunday.

%U
specifies the week-number-of-year descriptor by calculating the descriptor value as the SAS date value and uses the number-of-week value within the year (Sunday is considered the first day of the week). The number-of-week value is represented as a decimal number in the range 0–53. A leading zero and a maximum value of 53 is used.

%V
specifies the week-number-of-year descriptor by calculating the descriptor value as the SAS date value. The number-of-week value is represented as a decimal number in the range 01–53. A leading zero and a maximum value of 53 is used. Weeks begin on a Monday and week 1 of the year is the week that includes both January 4th and the first Thursday of the year. If the first Monday of January is the 2nd, 3rd, or 4th, the preceding days are part of the last week of the preceding year.

%w
specifies the weekday descriptor as a number in the range of 0–6 that represents Sunday–Saturday.

%W
specifies the week-number-of-year descriptor by calculating the descriptor value as SAS date value using the number of week within the year (Monday is considered the first day of the week). The number-of-week value is represented as a decimal number in the range of 0–53. A leading zero and a maximum value of 53 are used.

%y
specifies the year (2-digit) descriptor. The range for the year descriptor is 00–99.

%Y
specifies the year (4-digit) descriptor. The range for the year descriptor is 1970–2069.

Details

The NLDATM function converts the SAS datetime value to the datetime value of the specified locale by using the datetime descriptors.

Examples

The following example shows a time (a.m or p.m.) that is created from a SAS datetime value.

Statements	Results
	`----+----1----+`
`options locale=English;`	
`time_ampm=nldatm('24Feb2003:12:39:43'dt,'%I%p');`	
`put time_ampm;`	`00 PM`
`options locale=German;`	
`time_ampm=nldatm(''24Feb2003:12:39:43'dt,'%I%p');`	
`put time_ampm;`	`00 nachm`

See Also

Format:

"NLDATM*w*. Format" on page 98

NLTIME Function

Converts the SAS time or the datetime value to the time value of the specified locale by using the NLTIME descriptors.

Category: Date and Time

Syntax

NLTIME(*time*|*datetime,descriptor,startpos*)

Arguments

time
specifies a SAS time value.

datetime
specifies a SAS datetime value.

descriptor
is a variable, or expression, that specifies the value of a descriptor. You can enter the following descriptors in uppercase or lowercase:

#
removes the leading zero from the result.

%%
specifies the % character.

%H
specifies the hour descriptor that is based on a 24-hour clock. The range for the hour descriptor is 00–23.

%I
specifies the hour descriptor that is based on a 12-hour clock. The range for the hour descriptor is 01–12.

%M
specifies the minute modifier. The range for the minute descriptor is 00–59.

%P
specifies the a.m. or p.m. descriptor.

%S
specifies the second descriptor. The range for the second descriptor is 00–59.

startpos
is an integer that specifies the position at which the search should start and that specifies the direction of the search.

Details

The NLTIME function converts a SAS time or datetime value to the time value of the specified locale by using the time descriptors.

Examples

The following example shows an a.m. or p.m. time that is created from a SAS time.

Statements	Results
	`----+----1----+`
`options locale=English;`	
`time_ampm=nltime('12:39:43't,'%i%p');`	
`put time_ampm;`	`00 PM`
`options locale=German;`	
`time_ampm=nltime('12:39:43't,'%i%p');`	
`put time_ampm;`	`00 nachm`

See Also

Formats:

"NLTIME*w*. Format" on page 197

SORTKEY Function

creates a linguistic sort key.

Category: Locale

Syntax

sortKey(string, <locale, strength, case, numeric, order>)

Arguments

string
character expression

locale
specifies the locale name in the form of a POSIX name (ja_JP). See Table 16.1 on page 539 for a list of locale names and Posix values.

strength

The value of strength is related to the collation level. There are five collation-level values. The following table provides information regarding the five levels. The default value for strength is related to the locale.

Value	Type of Collation	Description
PRIMARY or P	PRIMARY specifies differences between base characters (for example, "a" < "b").	It is the strongest difference. For example, dictionaries are divided into different sections by base character.
SECONDARY or S	Accents in the characters are considered secondary differences (for example, "as" < "às" < "at").	Other differences between letters can also be considered secondary differences, depending on the language. A secondary difference is ignored when there is a primary difference anywhere in the strings.
TERTIARY or T	Upper and lower case differences in characters are distinguished at the tertiary level (for example, "ao" < "Ao" < "aò").	An example is the difference between large and small Kana. A tertiary difference is ignored when there is a primary or secondary difference anywhere in the strings.
QUATERNARY or Q	When punctuation is ignored at level 1-3, an additional level can be used to distinguish words with and without punctuation (for example, "ab" < "a-b" < "aB").	This difference is ignored when there is a primary, secondary, or tertiary difference. The quaternary level should be used if ignoring punctuation is required or when processing Japanese text.
IDENTICAL or I	When all other levels are equal, the identical level is used as a tiebreaker. The Unicode code point values of the NFD form of each string are compared at this level, just in case there is no difference at levels 1-4.	For example, only Hebrew cantillation marks are distinguished at this level. This level should be used sparingly, as only code point values differences between two strings is an extremely rare occurrence.

case order

sorts uppercase and lowercase letters. This argument is valid for only TERTIARY, QUATERNARY, or IDENTICAL. The following table provides the values and information for the case order argument.

Value	Description
UPPER or U	Sorts upper case letters first, then the lower case letters.
LOWER or L	Sorts lower case letters first, then the upper case letters.

numeric collation
orders numbers by the numeric value instead of the number's characters.

Table 8.4

Value	Description
NUMERIC or N	Order numbers (integers) by the numeric value. For example, "8 Main St." would sort before "45 Main St.".

collation order
There are two types of collation values: Phonebook and Traditional. If you do not select a collation value, then the user's locale-default collation is selected. The following table provides more information.

Value	Description
PHONEBOOK or P	specifies a phonebook style ordering of characters. Select PHONEBOOK only with the German language.
TRADITIONAL or T	specifies a traditional style ordering of characters. Select TRADITIONAL only with the Spanish language.

Details

The SORTKEY function creates a linguistic sort key for data. You must enter at least one argument. If the length of the variable that receives the key is not large enough, the data truncates, and a warning is displayed.

locale — Locale values use the POSIX name (ll_RR). LL represents the two-letter language code, and RR represents the two-letter region code. For example, en_US is the POSIX name for English, United States. en represents the English language, and US represents the United States. If a locale value is not specified, then the session locale is used.

strength — The strength argument determines whether accents or case affect collating or matching text. If no value is specified for strength, then the locale determines the value. The following values can be specified for strength.

- PRIMARY — This value includes base letters, for example, the letters, A, a, and Å are all processed the same.
- SECONDARY — This value processes data the same as PRIMARY, and accents are processed. The letters A and a are processed equally, and Å is processed as an accented character.

TERTIARY	This value processes data the same as SECONDARY, and the character's case is processed. For example, A, a, and Å are all processed differently.
QUATERNARY	This value processes data the same as TERTIARY, and punctuation is processed.
IDENTICAL	This value process data the same as QUATERNARY, and code point is processed.

case order specifies to sort data using upper case or lower case letter. The following table shows examples of specifying the UPPER value or the LOWER value.

UPPER	LOWER
Aztec	aztec
aztec	Aztec
Mars	mars
mars	Mars

collation order The collation order value PHONEBOOK is ignored unless the locale is a German language.

The collation order value TRADITIONAL is ignored unless the locale is a Spanish language.

A warning message displays for other locales.

TRANTAB Function

Transcodes data by using the specified translation table.

Category: Character

Syntax

TRANTAB(*string,trantab_name*)

Note: Translation tables were introduced in SAS 6 to support the requirements of national languages. SAS 8.2 introduced the LOCALE= system option as an improvement on direct use of translation tables. SAS 9.2 supports the TRANTAB function for backward compatibility. However, using the LOCALE= system option is preferred in later SAS releases. △

Arguments

string
input data that is transcoded.

trantab_name
translation table.

Details

The TRANTAB function transcodes a data string by using a translation table to remap the characters from one internal representation to another. The encoding of the data in the input string must match the encoding of table 1 in the translation table. The TRANTAB function remaps the data from the encoding using table 1.

CAUTION:
Only experienced SAS users should use the TRANTAB function. △

Examples

The following example uses a translation table that transcodes data that is encoded in Latin2 to an uppercase Latin2 encoding:

Statements	Result
`teststrg=trantab('testing','lat2_ucs');` `put teststrg;`	TESTING

See Also

Procedures:

Chapter 15, "The TRANTAB Procedure," on page 511

VARTRANSCODE Function

Returns the transcode attribute of a SAS data set variable.

Category: Variable Information

Syntax

VARTRANSCODE(*data-set-id*, *var-num*)

Arguments

data-set-id
specifies the data set identifier that the OPEN function returns.

var-num
specifies the position of the variable in the SAS data set.

Tip: The VARNUM function returns this value.

Details

Transcoding is the process of converting data from one encoding to another. The VARTRANSCODE function returns 0 if the *var-num* variable does not transcode its value, or 1 if the *var-num* variable transcodes its value.

For more information about transcoding variables, see "Transcoding" in *SAS National Language Support (NLS): Reference Guide*. For information about encoding values and transcoding data, see "SBCS, DBCS, and Unicode Encoding Values When Transcoding SAS Data" in *SAS National Language Support (NLS): Reference Guide*.

Examples

The following example shows how to determine whether a character variable is transcoded:

```
data a;
   attrib x length=$3. transcode=no;
   attrib y length=$3. transcode=yes;
   x='abc';
   y='xyz';
run;

data _null_;
   dsid=open('work.a','i');
   nobs=attrn(dsid,"nobs");
   nvars=attrn(dsid,"nvars");
   do i=1 to nobs;
      xrc=fetch(dsid,1);
      do j=1 to nvars;
         transcode = vartranscode(dsid,j);
         put transcode=;
      end;
   end;
run;
```

SAS writes the following output to the log:

```
transcode=0
transcode=1
```

See Also

Functions:

ATTRN in *SAS Language Reference: Dictionary*

OPEN in *SAS Language Reference: Dictionary*
VARNUM in *SAS Language Reference: Dictionary*
"VTRANSCODE Function" on page 293
"VTRANSCODEX Function" on page 294

VTRANSCODE Function

Returns a value that indicates whether transcoding is enabled for the specified character variable.

Category: Variable Information

Syntax

VTRANSCODE (*var*)

Arguments

var
specifies a character variable that is expressed as a scalar or as an array reference.

Restriction: You cannot use an expression as an argument.

Details

The VTRANSCODE function returns 0 if transcoding is off, and 1 if transcoding is on.

By default, all character variables in the DATA step are transcoded. You can use the TRANSCODE= attribute of the ATTRIB statement to turn transcoding off.

Comparisons

- The VTRANSCODE function returns a value that indicates whether transcoding is enabled for the specified variable. The VTRANSCODEX function, however, evaluates the argument to determine the variable name. The function then returns the transcoding status (on or off) that is associated with that variable name.
- The VTRANSCODE function does not accept an expression as an argument. The VTRANSCODEX function accepts expressions, but the value of the specified expression cannot denote an array reference.
- Related functions return the value of other variable attributes, such as the variable name, type, format, and length. For a list of the variable attributes, see the "Variable Information" functions in *SAS Language Reference: Dictionary*.

Example

Statements	Result
	`----+----1----+`

`attrib x transcode = yes;`
`attrib y transcode = no;`
`rc1 = vtranscode(y);`
`put rc1=;`
	`rc1=0`

See Also

Functions:

"VTRANSCODEX Function" on page 294

Statements:

ATTRIB in *SAS Language Reference: Dictionary*

VTRANSCODEX Function

Returns a value that indicates whether transcoding is enabled for the specified argument.

Category: Variable Information

Syntax

VTRANSCODEX (*var*)

Arguments

var

specifies any SAS character expression that evaluates to a character variable name.

Restriction: The value of the specified expression cannot denote an array reference.

Details

The VTRANSCODEX function returns 0 if transcoding is off, and 1 if transcoding is on.

By default, all character variables in the DATA step are transcoded. You can use the TRANSCODE= attribute of the ATTRIB statement to turn transcoding off.

Comparisons

- The VTRANSCODE function returns a value that indicates whether transcoding is enabled for the specified variable. The VTRANSCODEX function, however,

evaluates the argument to determine the variable name. The function then returns the transcoding status (on or off) that is associated with that variable name.

- The VTRANSCODE function does not accept an expression as an argument. The VTRANSCODEX function accepts expressions, but the value of the specified expression cannot denote an array reference.
- Related functions return the value of other variable attributes, such as the variable name, type, format, and length. For a list of the variable attributes, see the "Variable Information" functions in *SAS Language Reference: Dictionary*.

Examples

Statements	Result
	`----+----1----+`

`attrib x transcode = yes;`
`attrib y transcode = no;`
`rc1 = vtranscodex('y');`	

`put rc1=;`	`rc1=0`

See Also

Functions:

"VTRANSCODE Function" on page 293

Statements:

ATTRIB in *SAS Language Reference: Dictionary*

UNICODE Function

converts Unicode characters to the current SAS session encoding.

Category: Character

Syntax

STR=**UNICODE**(<*instr*>(,<Unicode type>))

Arguments

str
Data string that has been converted to the current SAS session encoding.

instr
input data string.

Unicode type

Unicode character formats

ESC	Unicode Escape (for example, \u0042). ESC is the default format.
NCR	Numeric Character Representation (for example, &#22823 or &#177 ;)
PAREN	Unicode Parenthesis Escape (for example, <u0061>)
UCS2	UCS2 encoding with native endian.
UCS2B	UCS2 encoding with big endian.
UCS2L	UCS2 encoding with little endian.
UCS4	UCS4 encoding with native endian.
UCS4B	UCS4 encoding with big endian.
UCS4L	UCS4 encoding with little endian.
UTF16	UTF16 encoding with big endian.
UTF16B	UTF16 encoding with big endian.
UTF16L	UTF16 encoding with little endian.
UTF8	UTF8 encoding.

Details

This function reads Unicode characters and converts them to the current SAS session encoding.

Examples

The following example demonstrates the functionality of the UNICODE function:

```
Examples: (Submitted under Little endian system.)
str1=unicode('\u0041\u0042\u0043');
str2=unicode('\0041\u0042\uu43','esc');
str3=unicode('&# 177;', 'ncr');
str4=unicode('&# 22823;', 'ncr');
str5=unicode('<u0061><u0062>','paren');
str6=unicode('2759'x,'ucs2');
str7=unicode('5927'x,'ucs2b');
str8=unicode('2759'x,'ucs21');
str9=unicode('27590000'x,'ucs4');
str10=unicode('00005927'x,'ucs4b');
str11=unicode('27590000'x,'ucs41') ;
str12=unicode('E5A4A7'x,'utf8');
str13=unicode('2759'x,'utf16') ;
str14=unicode('5927'x,'utf16b') ;
str15=unicode('2759'x,'utf161') ;

Results:
str1=ABC
str1=ABC
str3=±
str4=大
str5=ab
str6=大
str7=大
str8=大
str9=大
str10=大
str11=大
str12=大
str13=大
str14=大
str15=大
```

UNICODEC Function

converts characters in the current SAS session encoding to Unicode characters.

Category: Character

Syntax

STR=**UNICODEC**(<*instr*>(,<Unicode type>))

Arguments

str
data string that has been converted to Unicode encoding.

instr
input data string.

Unicode type

Unicode character formats

ESC	Unicode Escape (for example, \u0042)ESC is the default format.
NCR	Numeric Character Representation (for example, &#22823 or &#177 ;)
PAREN	Unicode Parenthesis Escape (for example, <u0061>)
UCS2	UCS2 encoding with native endian.
UCS2B	UCS2 encoding with big endian.
UCS2L	UCS2 encoding with little endian.
UCS4	UCS4 encoding with native endian.
UCS4B	UCS4 encoding with big endian.
UCS4L	UCS4 encoding with little endian.
UTF16	UTF16 encoding with big endian.
UTF16B	UTF16 encoding with big endian.
UTF16L	UTF16 encoding with little endian.
UTF8	UTF8 encoding.

Details

This function reads characters that are in the current SAS session encoding and converts them to Unicode encoding.

Examples

The following example demonstrates the functionality of the UNICODEC function:

```
length str4 $20;
dai=unicode('\u5927');

str1=unicodec("ABC");
str2=unicodec("ABC",'esc');
str3=unicodec(dai, 'ncr');
str4=unicodec("ab",'paren');
str5=unicodec(dai, 'ucs2');
str6=unicodec(dai, 'ucs2b');
str7=unicodec(dai, 'ucs2l');
str8=unicodec(dai, 'ucs4');
str9=unicodec(dai, 'ucs4b');
str10=unicodec(dai, 'ucs4l');
str11=unicodec(dai, 'utf8');
str12=unicodec(dai, 'utf16');
str13=unicodec(dai, 'utf16b');
str14=unicodec(dai, 'utf16l');

Results:
str1=414243
str2=414243
str3=
str4=str5=2759
```

```
str6=5927
str7=2759
str8=27590000
str9=00005927
str10=27590000
str11=E5A4A7
str12=2759
str13=5927
str14=2759
```

UNICODELEN Function

specifies the length of the character unit for the Unicode data.

Category: Character

Syntax

UNICODELEN()

Details

The UNICODELEN function specifies the length of the character unit for the UNICODE data.

Examples

This example uses the Japanese Shift_JIS session encoding, which is supported under the UNIX operating system.

Statements	Results
len1=unicodelen("abc大");	len1=4
len2=unicodelen("\u0041\u0042\u0043\u5927",'esc')	len2=4
len3=unicodelen("大' ,'ncr');	len3=1
len4=unicodelen("<u0061><u0062>",'paren');	len4=2

See Also

Functions:

"UNICODEWIDTH Function" on page 300

UNICODEWIDTH Function

specifies the length of a display unit for the Unicode data.

Category: Character

Syntax

UNICODEWIDTH()

Details

The UNICODEWIDTH function specifies the length of a display unit for the Unicode data. The display unit displays the width of a character when the character is displayed with fixed width font. Characters between 0x3000 and 0x303F, 0x3400 and 0x4DFF, 0x4E00 and 0x9FFF, 0xF900 and 0xFAFF, inclusively, have the value of a display unit 2. Other characters are display unit 1

Examples

This example uses the Japanese Shift_JIS session encoding, which is supported under the UNIX operating system.

Statements	Results
len1=unicodewidth("abc人");	len1=5
len2=unicodewidth("\u0041\u0042\u0043\u5927",'esc');	len2=5
len3=unicodewidth("大 ",'ncr');	len3=2
len4=unicodewidth("<u0061><u0062>",'paren');	len4=2

See Also

Functions:

"UNICODELEN Function" on page 299

CHAPTER 9

Informats for NLS

Informats for NLS by Category

There are six categories of SAS informats that support NLS:

Table 9.1 Categories of Informats for NLS

Category	Description
BIDI text handling	Instructs SAS to read bidirectional data values from data variables.
Character	Instructs SAS to read character data values into character variables.
DBCS	Instructs SAS to manage various Asian languages.
Date and Time	Instructs SAS to read data values into variables that represent dates, times, and datetimes.
Hebrew text handling	Instructs SAS to read Hebrew data from data variables.
Numeric	Instructs SAS to read numeric data values into numeric variables.

The following table provides brief descriptions of the SAS informats. For more detailed descriptions, see the NLS entry for each informat.

Table 9.2 Summary of NLS Informats by Category

Category	Informats for NLS	Description
BIDI text handling	"$LOGVS*w*. Informat" on page 319	Reads a character string that is in left-to-right logical order, and then converts the character string to visual order.
	"$LOGVSR*w*. Informat" on page 320	Reads a character string that is in right-to-left logical order, and then converts the character string to visual order.
	"$VSLOG*w*. Informat" on page 430	Reads a character string that is in visual order, and then converts the character string to left-to-right logical order.
	"$VSLOGR*w*. Informat" on page 431	Reads a character string that is in visual order, and then converts the character string to right-to-left logical order.
Character	"$REVERJ*w*. Informat" on page 409	Reads character data from right to left and preserves blanks.
	"$REVERS*w*. Informat" on page 410	Reads character data from right to left, and then left aligns the text.
	"$UCS2B*w*. Informat" on page 411	Reads a character string that is encoded in big-endian, 16-bit, UCS2, Unicode encoding, and then converts the character string to the encoding of the current SAS session.
	"$UCS2BE*w*. Informat" on page 412	Reads a character string that is in the encoding of the current SAS session and then converts the character string to big-endian, 16-bit, UCS2, Unicode encoding.
	"$UCS2L*w*. Informat" on page 413	Reads a character string that is encoded in little-endian, 16-bit, UCS2, Unicode encoding, and then converts the character string to the encoding of the current SAS session.
	"$UCS2LE*w*. Informat" on page 414	Reads a character string that is in the encoding of the current SAS session and then converts the character string to little-endian, 16-bit, UCS2, Unicode encoding.
	"$UCS2X*w*. Informat" on page 415	Reads a character string that is encoded in 16-bit, UCS2, Unicode encoding, and then converts the character string to the encoding of the current SAS session.
	"$UCS2XE*w*. Informat" on page 416	Reads a character string that is in the encoding of the current SAS session and then converts the character string to 16-bit, UCS2, Unicode encoding.
	"$UCS4B*w*. Informat" on page 417	Reads a character string that is encoded in big-endian, 32-bit, UCS4, Unicode encoding, and then converts the character string to the encoding of the current SAS session.
	"$UCS4L*w*. Informat" on page 418	Reads a character string that is encoded in little-endian, 32-bit, UCS4, Unicode encoding, and then converts the character string to the encoding of the current SAS session.
	"$UCS4X*w*. Informat" on page 419	Reads a character string that is encoded in 32-bit, UCS4, Unicode encoding, and then converts the character string to the encoding of the current SAS session.

Category	Informats for NLS	Description
	"$UCS4XE*w*. Informat" on page 420	Reads a character string that is in the encoding of the current SAS session, and then converts the character string to 32-bit, UCS4, Unicode encoding.
	"$UESC*w*. Informat" on page 421	Reads a character string that is encoded in UESC representation, and then converts the character string to the encoding of the current SAS session.
	"$UESCE*w*. Informat" on page 423	Reads a character string that is in the encoding of the current SAS session, and then converts the character string to UESC representation.
	"$UNCR*w*. Informat" on page 424	Reads an NCR character string, and then converts the character string to the encoding of the current SAS session.
	"$UNCRE*w*. Informat" on page 425	Reads a character string in the encoding of the current SAS session, and then converts the character string to NCR.
	"$UPAREN*w*. Informat" on page 426	Reads a character string that is encoded in UPAREN representation, and then converts the character string to the encoding of the current SAS session.
	"$UPARENE*w*. Informat" on page 427	Reads a character string that is in the encoding of the current SAS session, and then converts the character string to UPAREN representation.
	"$UPARENP*w*. Informat" on page 428	Reads a character string that is encoded in UPAREN representation, and then converts the character string to the encoding of the current SAS session, with national characters remaining in the encoding of the UPAREN representation.
	"$UTF8X*w*. Informat" on page 429	Reads a character string that is encoded in UTF-8, and then converts the character string to the encoding of the current SAS session.
DBCS	"$KANJI*w*. Informat" on page 317	Removes shift code data from DBCS data.
	"$KANJIX*w*. Informat" on page 318	Adds shift-code data to DBCS data.
Date and Time	"JDATEYMD*w*. Informat" on page 315	Reads Japanese kanji date values in the format *yymmmdd* or *yyyymmmdd*.
	"JNENGO*w*. Informat" on page 316	Reads Japanese kanji date values in the form *yymmdd*.
	"MINGUO*w*. Informat" on page 321	Reads dates in Taiwanese format.
	"NENGO*w*. Informat" on page 323	Reads Japanese date values in the form *eyymmdd*.
	"NLDATE*w*. Informat" on page 324	Reads the date value in the specified locale, and then converts the date value to the local SAS date value.
	"NLDATM*w*. Informat" on page 325	Reads the datetime value of the specified locale, and then converts the datetime value to the local SAS datetime value.

Category	Informats for NLS	Description
	"NLTIMAP*w*. Informat" on page 407	Reads the time value and uses a.m. and p.m. in the specified locale, and then converts the time value to the local SAS time value.
	"NLTIME*w*. Informat" on page 408	Reads the time value in the specified locale, and then converts the time value to the local SAS time value.
Hebrew text handling	"$CPTDW*w*. Informat" on page 310	Reads a character string that is in Hebrew DOS (cp862) encoding, and then converts the character string to Windows (cp1255) encoding.
	"$CPTWD*w*. Informat" on page 311	Reads a character string that is in Windows (cp1255) encoding, and then converts the character string to Hebrew DOS (cp862) encoding.
Numeric	"EURO*w.d* Informat" on page 312	Reads numeric values, removes embedded characters in European currency, and reverses the comma and decimal point.
	"EUROX*w.d* Informat" on page 313	Reads numeric values and removes embedded characters in European currency.
	"NLMNIAED*w.d* Informat" on page 326	Reads the monetary format of the international expression for the United Arab Emirates.
	"NLMNIAUD*w.d* Informat" on page 327	Reads the monetary format of the international expression for Australia.
	"NLMNIBGN*w.d* Informat" on page 328	Reads the monetary format of the international expression for Bulgaria.
	"NLMNIBRL*w.d* Informat" on page 329	Reads the monetary format of the international expression for Brazil.
	"NLMNICAD*w.d* Informat" on page 330	Reads the monetary format of the international expression for Canada.
	"NLMNICHF*w.d* Informat" on page 331	Reads the monetary format of the international expression for Liechtenstein and Switzerland.
	"NLMNICNY*w.d* Informat" on page 332	Reads the monetary format of the international expression for China.
	"NLMNICZK*w.d* Informat" on page 333	Reads the monetary format of the international expression for the Czech Republic.
	"NLMNIDKK*w.d* Informat" on page 334	Reads the monetary format of the international expression for Denmark, Faroe Island, and Greenland.
	"NLMNIEEK*w.d* Informat" on page 335	Reads the monetary format of the international expression for Estonia.
	"NLMNIEGP*w.d* Informat" on page 336	Reads the monetary format of the international expression for Egypt.
	"NLMNIEUR*w.d* Informat" on page 337	Reads the monetary format of the international expression for Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Malta, the Netherlands, Portugal, Slovenia, and Spain.
	"NLMNIGBP*w.d* Informat" on page 338	Reads the monetary format of the international expression for the United Kingdom.

Category	Informats for NLS	Description
	"NLMNIHKD*w.d* Informat" on page 339	Reads the monetary format of the international expression for Hong Kong.
	"NLMNIHRK*w.d* Informat" on page 340	Reads the monetary format of the international expression for Croatia.
	"NLMNIHUF*w.d* Informat" on page 341	Reads the monetary format of the international expression for Hungary.
	"NLMNIIDR*w.d* Informat" on page 342	Reads the monetary format of the international expression for Indonesia.
	"NLMNIILS*w.d* Informat" on page 343	Reads the monetary format of the international expression for Israel.
	"NLMNIINR*w.d* Informat" on page 344	Reads the monetary format of the international expression for India.
	"NLMNIJPY*w.d* Informat" on page 345	Reads the monetary format of the international expression for Japan.
	"NLMNIKRW*w.d* Informat" on page 346	Reads the monetary format of the international expression for South Korea.
	"NLMNILTL*w.d* Informat" on page 347	Reads the monetary format of the international expression for Lithuania.
	"NLMNILVL*w.d* Informat" on page 348	Reads the monetary format of the international expression for Latvia.
	"NLMNIMOP*w.d* Informat" on page 349	Reads the monetary format of the international expression for Macau.
	"NLMNIMXN*w.d* Informat" on page 350	Reads the monetary format of the international expression for Mexico.
	"NLMNIMYR*w.d* Informat" on page 351	Reads the monetary format of the international expression for Malaysia.
	"NLMNINOK*w.d* Informat" on page 352	Reads the monetary format of the international expression for Norway.
	"NLMNINZD*w.d* Informat" on page 353	Reads the monetary format of the international expression for New Zealand.
	"NLMNIPLN*w.d* Informat" on page 354	Reads the monetary format of the international expression for Poland.
	"NLMNIRUB*w.d* Informat" on page 355	Reads the monetary format of the international expression for Russia.
	"NLMNISEK*w.d* Informat" on page 356	Reads the monetary format of the international expression for Sweden.
	"NLMNISGD*w.d* Informat" on page 357	Reads the monetary format of the international expression for Singapore.
	"NLMNITHB*w.d* Informat" on page 358	Reads the monetary format of the international expression for Thailand.
	"NLMNITRY*w.d* Informat" on page 359	Reads the monetary format of the international expression for Turkey.
	"NLMNITWD*w.d* Informat" on page 360	Reads the monetary format of the international expression for Taiwan.

Category	Informats for NLS	Description
	"NLMNIUSD*w*.*d* Informat" on page 361	Reads the monetary format of the international expression for Puerto Rico and the United States.
	"NLMNIZAR*w*.*d* Informat" on page 362	Reads the monetary format of the international expression for South Africa.
	"NLMNLAED*w*.*d* Informat" on page 363	Reads the monetary format of the local expression for the United Arab Emirates.
	"NLMNLAUD*w*.*d* Informat" on page 364	Reads the monetary format of the local expression for Australia.
	"NLMNLBGN*w*.*d* Informat" on page 365	Reads the monetary format of the local expression for Bulgaria.
	"NLMNLBRL*w*.*d* Informat" on page 366	Reads the monetary format of the local expression for Brazil.
	"NLMNLCAD*w*.*d* Informat" on page 367	Reads the monetary format of the local expression for Canada.
	"NLMNLCHF*w*.*d* Informat" on page 368	Reads the monetary format of the local expression for Liechtenstein and Switzerland.
	"NLMNLCNY*w*.*d* Informat" on page 369	Reads the monetary format of the local expression for China.
	"NLMNLCZK*w*.*d* Informat" on page 370	Reads the monetary format of the local expression for the Czech Republic.
	"NLMNLDKK*w*.*d* Informat" on page 371	Reads the monetary format of the local expression for Denmark, the Faroe Island, and Greenland.
	"NLMNLEEK*w*.*d* Informat" on page 372	Reads the monetary format of the local expression for Estonia.
	"NLMNLEGP*w*.*d* Informat" on page 373	Reads the monetary format of the local expression for Egypt.
	"NLMNLEUR*w*.*d* Informat" on page 374	Reads the monetary format of the local expression for Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Malta, the Netherlands, Portugal, Slovenia, and Spain.
	"NLMNLGBP*w*.*d* Informat" on page 375	Reads the monetary format of the local expression for the United Kingdom.
	"NLMNLHKD*w*.*d* Informat" on page 376	Reads the monetary format of the local expression for Hong Kong.
	"NLMNLHRK*w*.*d* Informat" on page 377	Reads the monetary format of the local expression for Croatia.
	"NLMNLHUF*w*.*d* Informat" on page 378	Reads the monetary format of the local expression for Hungary.
	"NLMNLIDR*w*.*d* Informat" on page 379	Reads the monetary format of the local expression for Indonesia.
	"NLMNLILS*w*.*d* Informat" on page 380	Reads the monetary format of the local expression for Israel.
	"NLMNLINR*w*.*d* Informat" on page 381	Reads the monetary format of the local expression for India.

Category	Informats for NLS	Description
	"NLMNLJPY*w.d* Informat" on page 382	Reads the monetary format of the local expression for Japan.
	"NLMNLKRW*w.d* Informat" on page 383	Reads the monetary format of the local expression for South Korea.
	"NLMNLLTL*w.d* Informat" on page 384	Reads the monetary format of the local expression for Lithuania.
	"NLMNLLVL*w.d* Informat" on page 385	Reads the monetary format of the local expression for Latvia.
	"NLMNLMOP*w.d* Informat" on page 386	Reads the monetary format of the local expression for Macau.
	"NLMNLMXN*w.d* Informat" on page 387	Reads the monetary format of the local expression for Mexico.
	"NLMNLMYR*w.d* Informat" on page 388	Reads the monetary format of the local expression for Malaysia.
	"NLMNLNOK*w.d* Informat" on page 389	Reads the monetary format of the local expression for Norway.
	"NLMNLNZD*w.d* Informat" on page 390	Reads the monetary format of the local expression for New Zealand.
	"NLMNLPLN*w.d* Informat" on page 391	Reads the monetary format of the local expression for Poland.
	"NLMNLRUB*w.d* Informat" on page 392	Reads the monetary format of the local expression for Russia.
	"NLMNLSEK*w.d* Informat" on page 393	Reads the monetary format of the local expression for Sweden.
	"NLMNLSGD*w.d* Informat" on page 394	Reads the monetary format of the local expression for Singapore.
	"NLMNLTHB*w.d* Informat" on page 395	Reads the monetary format of the local expression for Thailand.
	"NLMNLTRY*w.d* Informat" on page 396	Reads the monetary format of the local expression for Turkey.
	"NLMNLTWD*w.d* Informat" on page 397	Reads the monetary format of the local expression for Taiwan.
	"NLMNLUSD*w.d* Informat" on page 398	Reads the monetary format of the local expression for Puerto Rico, and the United States.
	"NLMNLZAR*w.d* Informat" on page 399	Reads the monetary format of the local expression for South Africa.
	"NLMNY*w.d* Informat" on page 400	Reads monetary data in the specified locale for the local expression, and then converts the data to a numeric value.
	"NLMNYI*w.d* Informat" on page 401	Reads monetary data in the specified locale for the international expression, and then converts the data to a numeric value.

Category	Informats for NLS	Description
	"NLNUM*w*.*d* Informat" on page 402	Reads numeric data in the specified locale for local expressions, and then converts the data to a numeric value.
	"NLNUMI*w*.*d* Informat" on page 403	Reads numeric data in the specified locale for international expressions, and then converts the data to a numeric value.
	"NLPCT*w*.*d* Informat" on page 405	Reads percentage data in the specified locale for local expressions, and then converts the data to a numeric value.
	"NLPCTI*w*.*d* Informat" on page 406	Reads percentage data in the specified locale for international expressions, and then converts the data to a numeric value.
	"YEN*w*.*d* Informat" on page 433	Removes embedded yen signs, commas, and decimal points.

$CPTDW*w*. Informat

Reads a character string that is in Hebrew DOS (cp862) encoding, and then converts the character string to Windows (cp1255) encoding.

Category: Hebrew text handling

Syntax

$CPTDW*w*.

Syntax Description

w
specifies the width of the input field.

Default: 200

Range: 1–32000

Comparisons

The $CPTDW*w*. informat performs processing that is opposite of the $CPTWD*w*. informat.

Examples

The following example uses the input value of 808182.

Statements	Result
	`----+----1----+`
`x=input('808182',$cptdw6.);` `put x;`	אבג

See Also

Formats:

"$CPTDW*w*. Format" on page 74

"$CPTWD*w*. Format" on page 75

Informats:

"$CPTWD*w*. Informat" on page 311

$CPTWD*w*. Informat

Reads a character string that is in Windows (cp1255) encoding, and then converts the character string to Hebrew DOS (cp862) encoding.

Category: Hebrew text handling

Syntax

$CPTWD*w*.

Syntax Description

w

specifies the width of the input field.

Default: 200

Range: 1–32000

Comparisons

The $CPTWD*w*. informat performs processing that is opposite of the $CPTDW*w*. informat.

Examples

The following example uses the input value of אבג.

Statements	Result
	`----+----1----+`
`x=input ('אבג',$cptwd6.);` `put x;`	
	€□,

See Also

Formats:

"$CPTWD*w*. Format" on page 75
"$CPTDW*w*. Format" on page 74

Informats:

"$CPTDW*w*. Informat" on page 310

EURO*w.d* Informat

Reads numeric values, removes embedded characters in European currency, and reverses the comma and decimal point.

Category: Numeric

Syntax

EURO*w.d*

Syntax Description

w
specifies the width of the input field.
Default: 6
Range: 1–32

d
specifies the power of 10 by which to divide the value. If the data contains decimal points, the *d* value is ignored.
Default: 0
Range: 0–31

Details

The EURO*w.d* informat reads numeric values and removes embedded euro symbols (E), commas, blanks, percent signs, dashes, and close parentheses from the input data. A

decimal point is assumed to be a separator between the whole number and the decimal portion. The EURO*w.d* informat converts an open parenthesis at the beginning of a field to a minus sign.

Comparisons

- The EURO*w.d* informat is similar to the EUROX*w.d* informat, but EUROX*w.d* reverses the roles of the decimal point and the comma. This convention is common in European countries.
- If no commas or periods appear in the input, then the EURO*w.d* and the EUROX*w.d* informats are interchangeable.

Examples

The following table shows input values for currency in euros, the SAS statements that are applied, and the results.

Values	Statements	Results
		`----+----1----2`
`E1`	`input x euro10.;` `put x;`	`1`
`E1.23`	`input x euro10.;` `put x;`	`1.23`
`1.23`	`input x euro10.;` `put x;`	`1.23`
`1,234.56`	`input x euro10.;` `put x;`	`1234.56`

See Also

Formats:

"EURO*w.d* Format" on page 76
"EUROX*w.d* Format" on page 77

Informats:

"EUROX*w.d* Informat" on page 313

EUROX*w.d* Informat

Reads numeric values and removes embedded characters in European currency.

Category: Numeric

Syntax

EUROX*w.d*

Syntax Description

w
specifies the width of the input field.

Default: 6

Range: 1–32

d
specifies the power of 10 by which to divide the value. If the data contains a comma, which represents a decimal point, the *d* value is ignored.

Default: 0

Range: 0–31

Details

The EUROX*w.d* informat reads numeric values and removes embedded euro symbols (E), periods, blanks, percent signs, dashes, and close parentheses from the input data. A comma is assumed to be a separator between the whole number and the decimal portion. The EUROX*w.d* informat converts an open parenthesis at the beginning of a field to a minus sign.

Comparisons

- The EUROX*w.d* informat is similar to the EURO*w.d* informat, but EURO*w.d* reverses the roles of the comma and the decimal point. This convention is common in English-speaking countries.
- If no commas or periods appear in the input, the EUROX*w.d* and the EURO*w.d* informats are interchangeable.

Examples

The following table shows input values for currency in euros, the SAS statements that are applied, and the results.

Values	Statements	Results
		`----+----1----2`
`E1`	`input x eurox10.;` `put x;`	`1`
`E1.23`	`input x eurox10.;` `put x;`	`123`
`1.23`	`input x eurox10.;` `put x;`	`123`
`1,234.56`	`input x eurox10.;` `put x;`	`1.23456`

See Also

Formats:

"EURO*w*.*d* Format" on page 76
"EUROX*w*.*d* Format" on page 77

Informats:

"EURO*w*.*d* Informat" on page 312

JDATEYMD*w*. Informat

Reads Japanese kanji date values in the format *yymmmdd* or *yyyymmmdd*.

Category: Date and Time

Syntax

JDATEYMD*w*.

Syntax Description

w
specifies the width of the input field.
Default: 12
Range: 12–32

Details

The date values must be in the form *yymmmdd* or *yyyymmmdd*.

You can separate the year, month, and day values by blanks or by special characters. Note that in the example, the date values in the data lines are separated by special characters.

When you use this informat, ensure that the width of the input field includes space for blanks and special characters.

Note: SAS interprets a two-digit year as belonging to the 100-year span that is defined by the YEARCUTOFF= system option. △

Examples

The following examples show how to use the JDATEYMD informat to convert kanji values to SAS date values.

```
data _null_;
   input x jdateymd14.;
   put x=;
   put x= jdateymd14.;
   datalines;
1582年1月1日
1980年12月31日
2000年 1月 1日
2100年11月30日
;
data _null_;
  input x jdateymd.;
  put x=;
  put x= jdateymd14.;
  datalines;
1年1月1日
12年12月31日
99年 1月 1日
;
```

See Also

Informats:

"JNENGO*w*. Informat" on page 316

System Options:

YEARCUTOFF= in *SAS Language Reference: Dictionary*

JNENGO*w*. Informat

Reads Japanese kanji date values in the form *yymmdd*.

Category: Date and Time

Alignment: left

Syntax

JNENGO*w*.

Syntax Description

w

specifies the width of the output field.

Default: 16

Range: 16–32

Details

The JNENGO*w*. informat reads Japanese kanji values in the form *yymmdd*.

You can separate the year, month, and day values by blanks or by special characters. Note that in the example, the date values in the data lines are separated by special characters.

When you use this informat, ensure that the width of the input field includes space for blanks and special characters.

Note: SAS interprets a two-digit year as belonging to the 100-year span that is defined by the YEARCUTOFF= system option. △

Examples

The following examples show how to use the JNENGO informat to convert kanji values to SAS date values.

```
data _null_;
   input x jnengo.;
   datalines;
明治1年4月6日
明治45年7月29日
大正1年7月30日
大正15年12月24日
昭和1年12月25日
昭和64年 1月 7日
平成1年1月8日
平成10年12月 8日
;
```

See Also

Informats:

"JDATEYMD*w*. Informat" on page 315

System Options:

YEARCUTOFF= in *SAS Language Reference: Dictionary*

$KANJI*w*. Informat

Removes shift code data from DBCS data.

Category: DBCS

Syntax

$KANJI*w*.

Syntax Description

w
specifies the width of the input field.

Restriction: The width must be an even number. If it is an odd number, it is truncated. The width must be equal to or greater than the length of the shift-code data.

Range: The minimum width for the informat is 2.

Details

The $KANJI informat removes shift-code data from DBCS data. The $KANJI informat processes host-mainframe data. $KANJI can be used on other platforms. If you use the $KANJI informat on non-EBCDIC (non-modal encoding) hosts, the data does not change.

The data must start with SO and end with SI, unless single-byte blank data are returned. The input data length must be **`2 + (SO/SI length)*2`**.

See Also

Formats:

"$KANJI*w*. Format" on page 81
"$KANJIX*w*. Format" on page 82

Informats:

"$KANJIX*w*. Informat" on page 318

$KANJIX*w*. Informat

Adds shift-code data to DBCS data.

Category: DBCS

Syntax

$KANJIX*w*.

Syntax Description

w
specifies the width of the input field.

Restriction: The width must be an even number. If it is an odd number, it is truncated. The width must be equal to or greater than the length of the shift-code data.

Range: The minimum width for the informat is **`2 + (length of shift code used on the current DBCSTYPE= setting)*2.`**

Details

The $KANJIX informat adds shift-code data to DBCS data that does not have shift-code data. If the input data is blank, shift-code data is not added. The $KANJIX informat processes host-mainframe data, but $KANJIX can be used on other platforms. If you use the $KANJIX informat on non-EBCDIC (non-modal encoding) hosts, the data does not change.

See Also

Formats:

"$KANJI*w*. Format" on page 81

"$KANJIX*w*. Format" on page 82

Informats:

"$KANJI*w*. Informat" on page 317

$LOGVS*w*. Informat

Reads a character string that is in left-to-right logical order, and then converts the character string to visual order.

Category: BIDI text handling

Syntax

$LOGVS*w*.

Syntax Description

w
specifies the width of the input field.

Default: 200

Range: 1–32000

Comparisons

The $LOGVS*w*. informat performs processing that is opposite to the LOGVSR*w*. informat.

Examples

The following example uses the Hebrew input value of "טיסה flight."

Statements	Result
	`----+----1----+`
x=input (' טיסה flight',$logvs12.); **put x;**	טיסה flight

The following example uses the Arabic input value of " كمبيوتر computer."

Statements	Result
	`----+----1----+`
x=input (' كمبيوتر computer',$logvs12.); **put x;**	كمبيوتر computer

See Also

Formats:

"$LOGVSR*w*. Format" on page 84

"$LOGVS*w*. Format" on page 83

Informats:

"$LOGVSR*w*. Informat" on page 320

$LOGVSR*w*. Informat

Reads a character string that is in right-to-left logical order, and then converts the character string to visual order.

Category: BIDI text handling

Syntax

$LOGVSR*w*.

Syntax Description

w

specifies the width of the input field.

Default: 200

Range: 1–32000

Comparisons

The $LOGVSR*w*. informat performs processing that is opposite to the $LOGVS*w*. informat.

Examples

The following example uses the Hebrew input value of "טיסה flight."

Statements	Results
	`----+----1----+`
x=input ('טיסה flight',$logvsr12.);	
`put x;`	flight טיסה

The following example uses the Arabic input value of "تذاكر computer."

Statements	Results
	`----+----1----+`
x=input ('تذاكر computer',$logvsr12.);	
`put x;`	تذاكر computer

See Also

Formats:

"$LOGVS*w*. Format" on page 83

"$LOGVSR*w*. Format" on page 84

Informats:

"$LOGVS*w*. Informat" on page 319

MINGUO*w*. Informat

Reads dates in Taiwanese format.

Category: Date and Time

Syntax

MINGUO*w*.

Syntax Description

w
specifies the width of the input field.

Default: 6

Range: 6–10

Details

The general form of a Taiwanese date is *yyyymmdd*:

yyyy
is an integer that represents the year.

mm
is an integer from 01 through 12 that represents the month.

dd
is an integer from 01 through 31 that represents the day of the month.

The Taiwanese calendar uses 1912 as the base year (01/01/01 is January 1, 1912). Dates before 1912 are not valid. Year values do not roll over after 100 years; instead, they continue to increase.

You can separate the year, month, and day values with any delimiters, such as blanks, slashes, or dashes, that are permitted by the YYMMDD*w*. informat. If delimiters are used, place them between all the values. If you omit delimiters, be sure to use a leading zero for days or months that have a value less than 10.

Examples

The following examples use different dates for input values.

```
input date minguo10.;
put date date9.;
```

Values	Results
	`----+----1----+`
`49/01/01`	`01JAN1960`
`891215`	`15DEC2000`
`103-01-01`	`01JAN2014`

See Also

Formats:

"MINGUO*w*. Format" on page 85

Informats:

YYMMDDw. in *SAS Language Reference: Dictionary*

NENGO*w*. Informat

Reads Japanese date values in the form *eyymmdd*.

Category: Date and Time

Syntax

NENGO*w*.

Syntax Description

w
specifies the width of the input field.
Default: 10
Range: 7–32

Details

The general form of a Japanese date is *eyymmdd*:

e
is the first letter of the name of the imperial era(Meiji, Taisho, Showa, or Heisei).

yy
is an integer that represents the year.

mm
is an integer from 01 through 12 that represents the month.

dd
is an integer from 01 through 31 that represents the day of the month.

The *e* value can be separated from the integers by a period. If you omit *e*, SAS uses the current imperial era. You can separate the year, month, and day values by blanks or any nonnumeric character. However; if delimiters are used, place them between all the values. If you omit delimiters, be sure to use a leading zero for days or months that are values less than 10.

Examples

The following examples use different input values.

```
input nengo_date nengo8.;
put nengo_date date9.;
```

Values	Results
	`----+----1----+`
`h11108`	`08OCT1999`
`h.11108`	`08OCT1999`
`11/10/08`	`08OCT1999`

See Also

Formats:

"NENGO*w*. Format" on page 86

NLDATE*w*. Informat

Reads the date value in the specified locale, and then converts the date value to the local SAS date value.

Category: Date and Time

Syntax

NLDATE*w*.

Syntax Description

w

specifies the width of the input field.

Default: 20

Range: 10–200

Examples

The following examples use the input February 24, 2003.

Statements	Results
	`----+----1----+`

`options locale=English_UnitedStates;`
`y=input('February 24, 2003,nldate17.);`
`put y=nldate.;`
	`y=February 24, 2003`

`options locale=German_Germany;`
`y=input('24. Februar 2003',nldate16.);`
`put y=nldate;`
	`y=24. Februar 2003`

See Also

Formats:

"NLDATE*w*. Format" on page 89

NLDATM*w*. Informat

Reads the datetime value of the specified locale, and then converts the datetime value to the local SAS datetime value.

Category: Date and Time

Syntax

NLDATM*w*.

Syntax Description

w

specifies the width of the input field.

Default: 30

Range: 10–200

Examples

The following examples use the input value of February 24, 2003 12:39:43.

Statements	Results
	`----+----1----+`

`options locale=English_UnitedStates;`
`y=input('24.Feb03:12:39:43', nldatm.);`
`put y=;`
	`1361709583`

`options locale=German_Germany;`
`y=input('24.Februar 2003 12.39 Uhr', nldatm.);`
`put y=;`
	`1330171200`

See Also

Formats:

"NLDATM*w*. Format" on page 98

NLMNIAED*w.d* Informat

Reads the monetary format of the international expression for the United Arab Emirates.

Category: Numeric

Alignment: left

Syntax

NLMNIAED*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 9

Range: 1–32

d

specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input('($12,345.67)',nlmniaed32.2);
y=input('($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Informat:

"NLMNLAED*w.d* Informat" on page 363

NLMNIAUD*w.d* Informat

Reads the monetary format of the international expression for Australia.

Category: Numeric

Alignment: left

Syntax

NLMNIAUD*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
optionally specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input('($12,345.67)',nlmniaud32.2);
y=input('($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Informats:

"NLMNLAUD*w.d* Informat" on page 364

NLMNIBGN*w.d* Informat

Reads the monetary format of the international expression for Bulgaria.

Category: Numeric

Alignment: left

Syntax

NLMNIBGN*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 9

Range: 1–32

d

specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmnibgn32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Informats:

"NLMNLBGN*w.d* Informat" on page 365

NLMNIBRL*w.d* Informat

Reads the monetary format of the international expression for Brazil.

Category: Numeric

Alignment: left

Syntax

NLMNIBRL*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input('($12,345.67)',nlmnibrl32.2);
y=input('($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Informats:

"NLMNLBRL*w.d* Informat" on page 366

NLMNICAD*w.d* Informat

Reads the monetary format of the international expression for Canada.

Category: Numeric

Alignment: left

Syntax

NLMNICAD*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 9

Range: 1–32

d

specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input'($12,345.67)',nlmniaud32.2);
y=input'($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Formats:

"NLMNICAD*w.d* Format" on page 112

NLMNICHF*w.d* Informat

Reads the monetary format of the international expression for Liechtenstein and Switzerland.

Category: Numeric

Alignment: left

Syntax

NLMNICHF*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 9

Range: 1–32

d

specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input'($12,345.67)',nlmnichf32.2);
y=input'($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Formats:

"NLMNICHF*w.d* Format" on page 113

NLMNICNY*w.d* Informat

Reads the monetary format of the international expression for China.

Category: Numeric

Alignment: left

Syntax

NLMNICNY*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 9

Range: 1–32

d

specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input'($12,345.67)',nlmnicny32.2);
y=input'($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Formats:

"NLMNICNY*w.d* Format" on page 114

NLMNICZK*w.d* Informat

Reads the monetary format of the international expression for the Czech Republic.

Category: Numeric
Alignment: left

Syntax

NLMNICZK*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input('($12,345.67)',nlmniczk32.2);
y=input('($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Informats:

"NLMNLCZK*w.d* Informat" on page 370

NLMNIDKK*w.d* Informat

Reads the monetary format of the international expression for Denmark, Faroe Island, and Greenland.

Category: Numeric

Alignment: left

Syntax

NLMNIDKK*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 9

Range: 1–32

d

specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input'($12,345.67)',nlmniaud32.2);
y=input'($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Formats:

"NLMNIDKK*w.d* Format" on page 116

NLMNIEEK*w.d* Informat

Reads the monetary format of the international expression for Estonia.

Category: Numeric

Alignment: left

Syntax

NLMNIEEK*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input('($12,345.67)',nlmnieek32.2);
y=input('($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Informats:

"NLMNLEEK*w.d* Informat" on page 372

NLMNIEGP*w.d* Informat

Reads the monetary format of the international expression for Egypt.

Category: Numeric

Alignment: left

Syntax

NLMNIEGP*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 9

Range: 1–32

d

specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input('($12,345.67)',nlmniegp32.2);
y=input('($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Informats:

"NLMNLEGP*w.d* Informat" on page 373

NLMNIEUR*w.d* Informat

Reads the monetary format of the international expression for Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Malta, the Netherlands, Portugal, Slovakia, Slovenia, and Spain.

Category: Numeric

Alignment: left

Syntax

NLMNIEUR*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 9

Range: 1–32

d

specifies to divide the number by 10^{d}. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input'($12,345.67)',nlmnieur32.2);
y=input'($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Formats:

"NLMNIEUR*w.d* Format" on page 119

NLMNIGBP*w.d* Informat

Reads the monetary format of the international expression for the United Kingdom.

Category: Numeric

Alignment: left

Syntax

NLMNIGBP*w*.*d*

Syntax Description

w

specifies the width of the output field.

Default: 9

Range: 1–32

d

specifies to divide the number by 10^{d}. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input'($12,345.67)',nlmnigbp32.2);
y=input'($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Formats:

"NLMNIGBP*w*.*d* Format" on page 120

NLMNIHKD*w.d* Informat

Reads the monetary format of the international expression for Hong Kong.

Category: Numeric

Alignment: left

Syntax

NLMNIHKD*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 9

Range: 1–32

d

specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input'($12,345.67)',nlmnihkd32.2);
y=input'($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Formats:

"NLMNIHKD*w.d* Format" on page 121

NLMNIHRK*w.d* Informat

Reads the monetary format of the international expression for Croatia.

Category: Numeric

Alignment: left

Syntax

NLMNIHRK*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 9

Range: 1–32

d

specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input('($12,345.67)',nlmnihrk32.2);
y=input('($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Informats:

"NLMNLHRK*w.d* Informat" on page 377

NLMNIHUF*w.d* Informat

Reads the monetary format of the international expression for Hungary.

Category: Numeric

Alignment: left

Syntax

NLMNIHUF*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input('($12,345.67)',nlmnihuf32.2);
y=input('($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Informats:

"NLMNLHUF*w.d* Informat" on page 378

NLMNIIDR*w.d* Informat

Reads the monetary format of the international expression for Indonesia.

Category: Numeric

Alignment: left

Syntax

NLMNIIDR*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 9

Range: 1–32

d

specifies to divide the number by 10^{d}. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input('($12,345.67)',nlmniidr32.2);
y=input('($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Informats:

"NLMNLIDR*w.d* Informat" on page 379

NLMNIILS*w.d* Informat

Reads the monetary format of the international expression for Israel.

Category: Numeric

Alignment: left

Syntax

NLMNIILS*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 9

Range: 1–32

d

specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input'($12,345.67)',nlmniils32.2);
y=input'($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Formats:

"NLMNIILS*w.d* Format" on page 125

NLMNIINR*w.d* Informat

Reads the monetary format of the international expression for India.

Category: Numeric

Alignment: left

Syntax

NLMNIINR*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 9

Range: 1–32

d

specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input('($12,345.67)',nlmniinr32.2);
y=input('($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Informats:

"NLMNLINR*w.d* Informat" on page 381

NLMNIJPY*w.d* Informat

Reads the monetary format of the international expression for Japan.

Category: Numeric

Alignment: left

Syntax

NLMNIJPY*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input'($12,345.67)',nlmnijpy32.2);
y=input'($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Formats:

"NLMNIJPY*w.d* Format" on page 127

NLMNIKRW*w.d* Informat

Reads the monetary format of the international expression for South Korea.

Category: Numeric

Alignment: left

Syntax

NLMNIKRW*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 9

Range: 1–32

d

specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input'($12,345.67)',nlmnikrw32.2);
y=input'($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Informats:

"NLMNLKRW*w.d* Informat" on page 383

NLMNILTL*w.d* Informat

Reads the monetary format of the international expression for Lithuania.

Category: Numeric

Alignment: left

Syntax

NLMNILTL*w*.*d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input('($12,345.67)',nlmniltl32.2);
y=input('($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Informats:

"NLMNLLTL*w*.*d* Informat" on page 384

NLMNILVL*w.d* Informat

Reads the monetary format of the international expression for Latvia.

Category: Numeric

Alignment: left

Syntax

NLMNILVL*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 9

Range: 1–32

d

specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input('($12,345.67)',nlmnilvl32.2);
y=input('($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Informats:

"NLMNLLVL*w.d* Informat" on page 385

NLMNIMOP*w.d* Informat

Reads the monetary format of the international expression for Macau.

Category: Numeric

Alignment: left

Syntax

NLMNIMOP*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input('($12,345.67)',nlmnimop32.2);
y=input('($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Informats:

"NLMNLMOP*w.d* Informat" on page 386

NLMNIMXN*w.d* Informat

Reads the monetary format of the international expression for Mexico.

Category: Numeric

Alignment: left

Syntax

NLMNIMXN*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 9

Range: 1–32

d

specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input('($12,345.67)',nlmnimxn32.2);
y=input('($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Informats:

"NLMNLMXN*w.d* Informat" on page 387

NLMNIMYR*w.d* Informat

Reads the monetary format of the international expression for Malaysia.

Category: Numeric

Alignment: left

Syntax

NLMNIMYR*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input'($12,345.67)',nlmniaud32.2);
y=input'($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Formats:

"NLMNIMYR*w.d* Format" on page 133

NLMNINOK*w.d* Informat

Reads the monetary format of the international expression for Norway.

Category: Numeric

Alignment: left

Syntax

NLMNINOK*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 9

Range: 1–32

d

specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input'($12,345.67)',nlmninok32.2);
y=input'($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Formats:

"NLMNINOK*w.d* Format" on page 134

NLMNINZD*w.d* Informat

Reads the monetary format of the international expression for New Zealand.

Category: Numeric

Alignment: left

Syntax

NLMNINZD*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 9

Range: 1–32

d

specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input'($12,345.67)',nlmniaud32.2);
y=input'($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Formats:

"NLMNINZD*w.d* Format" on page 135

NLMNIPLN*w.d* Informat

Reads the monetary format of the international expression for Poland.

Category: Numeric

Alignment: left

Syntax

NLMNIPLN*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 9

Range: 1–32

d

specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input'($12,345.67)',nlmnipln32.2);
y=input'($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Formats:

"NLMNIPLN*w.d* Format" on page 136

NLMNIRUB*w.d* Informat

Reads the monetary format of the international expression for Russia.

Category: Numeric

Alignment: left

Syntax

NLMNIRUB*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
optionally specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input'($12,345.67)',nlmnirub32.2);
y=input'($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Formats:

"NLMNIRUB*w.d* Format" on page 137

NLMNISEK*w.d* Informat

Reads the monetary format of the international expression for Sweden.

Category: Numeric

Alignment: left

Syntax

NLMNISEK*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 9

Range: 1–32

d

optionally specifies to divide the number by 10^{d}. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input'($12,345.67)',nlmnisek32.2);
y=input'($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Formats:

"NLMNISEK*w.d* Format" on page 138

NLMNISGD*w.d* Informat

Reads the monetary format of the international expression for Singapore.

Category: Numeric

Alignment: left

Syntax

NLMNISGD*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 9

Range: 1–32

d

optionally specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input'($12,345.67)',nlmnisgd32.2);
y=input'($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Formats:

"NLMNISGD*w.d* Format" on page 139

NLMNITHB*w.d* Informat

Reads the monetary format of the international expression for Thailand.

Category: Numeric

Alignment: left

Syntax

NLMNITHB*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 9

Range: 1–32

d

optionally specifies to divide the number by 10^{d}. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input('($12,345.67)',nlmnithb2);
y=input('($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Informats:

"NLMNLTHB*w.d* Informat" on page 395

NLMNITRY*w.d* Informat

Reads the monetary format of the international expression for Turkey.

Category: Numeric

Alignment: left

Syntax

NLMNITRY*w*.*d*

Syntax Description

w

specifies the width of the output field.

Default: 9

Range: 1–32

d

optionally specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input('($12,345.67)',nlmnitry32.2);
y=input('($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Informats:

"NLMNLTRY*w*.*d* Informat" on page 396

NLMNITWD*w.d* Informat

Reads the monetary format of the international expression for Taiwan.

Category: Numeric

Alignment: left

Syntax

NLMNITWD*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 9

Range: 1–32

d

optionally specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input'($12,345.67)',nlmnitwd32.2);
y=input'($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Formats:

"NLMNITWD*w.d* Format" on page 142

NLMNIUSD*w.d* Informat

Reads the monetary format of the international expression for Puerto Rico and the United States.

Category: Numeric

Alignment: left

Syntax

NLMNIUSD*w*.*d*

Syntax Description

w

specifies the width of the output field.

Default: 9

Range: 1–32

d

optionally specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input'($12,345.67)',nlmniusd32.2);
y=input'($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Formats:

"NLMNIUSD*w*.*d* Format" on page 143

NLMNIZAR*w.d* Informat

Reads the monetary format of the international expression for South Africa.

Category: Numeric

Alignment: left

Syntax

NLMNIZAR*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 9

Range: 1–32

d

optionally specifies to divide the number by 10^{d}. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input'($12,345.67)',nlmnizar32.2);
y=input'($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Formats:

"NLMNIZAR*w.d* Format" on page 144

NLMNLAED*w.d* Informat

Reads the monetary format of the local expression for the United Arab Emirates.

Category: Numeric

Alignment: left

Syntax

NLMNLAED*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
optionally specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input('($12,345.67)',nlmnlaed32.2);
y=input('($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Informats:

"NLMNIAED*w.d* Informat" on page 326

NLMNLAUD*w.d* Informat

Reads the monetary format of the local expression for Australia.

Category: Numeric

Alignment: left

Syntax

NLMNLAUD*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 9

Range: 1–32

d

optionally specifies to divide the number by 10^{d}. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input'($12,345.67)',nlmnlaud32.2);
y=input'($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Formats:

"NLMNLAUD*w.d* Format" on page 146

NLMNLBGN*w.d* Informat

Reads the monetary format of the local expression for Bulgaria.

Category: Numeric

Alignment: left

Syntax

NLMNLBGN*w*.*d*

Syntax Description

w

specifies the width of the output field.

Default: 9

Range: 1–32

d

optionally specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=put(-1234.56789,nlmnlbgn32.2);
y=put(-1234.56789,dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Informats:

"NLMNIBGN*w.d* Informat" on page 328

NLMNLBRL*w.d* Informat

Reads the monetary format of the local expression for Brazil.

Category: Numeric

Alignment: left

Syntax

NLMNLBRL*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 9

Range: 1–32

d

optionally specifies to divide the number by 10^{d}. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input('($12,345.67)',nlmnlbrl32.2);
y=input('($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Informats:

"NLMNIBRL*w.d* Informat" on page 329

NLMNLCAD*w.d* Informat

Reads the monetary format of the local expression for Canada.

Category: Numeric

Alignment: left

Syntax

NLMNLCAD*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 9

Range: 1–32

d

optionally specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input'($12,345.67)',nlmnlcad32.2);
y=input'($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Formats:

"NLMNLCAD*w.d* Format" on page 149

NLMNLCHF*w.d* Informat

Reads the monetary format of the local expression for Liechtenstein and Switzerland.

Category: Numeric

Alignment: left

Syntax

NLMNLCHF*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 9

Range: 1–32

d

optionally specifies to divide the number by 10^{d}. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input'($12,345.67)',nlmnlchf32.2);
y=input'($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Formats:

"NLMNLCHF*w.d* Format" on page 150

NLMNLCNY*w.d* Informat

Reads the monetary format of the local expression for China.

Category: Numeric

Alignment: left

Syntax

NLMNLCNY*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 9

Range: 1–32

d

optionally specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input'($12,345.67)',nlmnlcny32.2);
y=input'($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Formats:

"NLMNLCNY*w.d* Format" on page 151

NLMNLCZK*w.d* Informat

Reads the monetary format of the local expression for the Czech Republic.

Category: Numeric

Alignment: left

Syntax

NLMNLCZK*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 9

Range: 1–32

d

optionally specifies to divide the number by 10^{d}. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input('($12,345.67)',nlmnlczk32.2);
y=input('($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Informats:

"NLMNICZK*w.d* Informat" on page 333

NLMNLDKK*w.d* Informat

Reads the monetary format of the local expression for Denmark, the Faroe Island, and Greenland.

Category: Numeric

Alignment: left

Syntax

NLMNLDKK*w*.*d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
optionally specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input'($12,345.67)',nlmnldkk32.2);
y=input'($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Formats:

"NLMNLDKK*w.d* Format" on page 153

NLMNLEEK*w.d* Informat

Reads the monetary format of the local expression for Estonia.

Category: Numeric

Alignment: left

Syntax

NLMNLEEK*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 9

Range: 1–32

d

optionally specifies to divide the number by 10^{d}. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input('($12,345.67)',nlmnleek32.2);
y=input('($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Informats:

"NLMNIEEK*w.d* Informat" on page 335

NLMNLEGP*w.d* Informat

Reads the monetary format of the local expression for Egypt.

Category: Numeric

Alignment: left

Syntax

NLMNLEGP*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
optionally specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input('($12,345.67)',nlmnlegp32.2);
y=input('($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Informats:

"NLMNIEGP*w.d* Informat" on page 336

NLMNLEUR*w.d* Informat

Reads the monetary format of the local expression for Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Malta, the Netherlands, Portugal, Slovakia, Slovenia, and Spain.

Category: Numeric

Alignment: left

Syntax

NLMNLEUR*w*.*d*

Syntax Description

w

specifies the width of the output field.

Default: 9

Range: 1–32

d

optionally specifies to divide the number by 10^{d}. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input'($12,345.67)',nlmnleur32.2);
y=input'($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Formats:

"NLMNLEUR*w*.*d* Format" on page 156

NLMNLGBP*w.d* Informat

Reads the monetary format of the local expression for the United Kingdom.

Category: Numeric

Alignment: left

Syntax

NLMNLGBP*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 9

Range: 1–32

d

optionally specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input'($12,345.67)',nlmnlgbp32.2);
y=input'($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Formats:

"NLMNLGBP*w.d* Format" on page 157

NLMNLHKD*w.d* Informat

Reads the monetary format of the local expression for Hong Kong.

Category: Numeric

Alignment: left

Syntax

NLMNLHKD*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 9

Range: 1–32

d

optionally specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input'($12,345.67)',nlmnlhkd32.2);
y=input'($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Formats:

"NLMNLHKD*w.d* Format" on page 158

NLMNLHRK*w.d* Informat

Reads the monetary format of the local expression for Croatia.

Category: Numeric

Alignment: left

Syntax

NLMNLHRK*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
optionally specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input('($12,345.67)',nlmnlhrk32.2);
y=input('($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-1,234.57`

See Also

Informats:

"NLMNIHRK*w.d* Informat" on page 340

NLMNLHUF*w.d* Informat

Reads the monetary format of the local expression for Hungary.

Category: Numeric

Alignment: left

Syntax

NLMNLHUF*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 9

Range: 1–32

d

optionally specifies to divide the number by 10^{d}. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input('($12,345.67)',nlmnlhuf32.2);
y=input('($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Informats:

"NLMNIHUF*w.d* Informat" on page 341

NLMNLIDR*w.d* Informat

Reads the monetary format of the local expression for Indonesia.

Category: Numeric

Alignment: left

Syntax

NLMNLIDR*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 9

Range: 1–32

d

optionally specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input('($12,345.67)',nlmnlidr32.2);
y=input('($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Informats:

"NLMNIIDR*w.d* Informat" on page 342

NLMNLILS*w.d* Informat

Reads the monetary format of the local expression for Israel.

Category: Numeric

Alignment: left

Syntax

NLMNLILS*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 9

Range: 1–32

d

optionally specifies to divide the number by 10^{d}. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input'($12,345.67)',nlmnlils32.2);
y=input'($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Formats:

"NLMNLILS*w.d* Format" on page 162

NLMNLINR*w.d* Informat

Reads the monetary format of the local expression for India.

Category: Numeric

Alignment: left

Syntax

NLMNLINR*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
optionally specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input('($12,345.67)',nlmnlinr32.2);
y=input('($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Informats:

"NLMNIINR*w.d* Informat" on page 344

NLMNLJPY*w.d* Informat

Reads the monetary format of the local expression for Japan.

Category: Numeric

Alignment: left

Syntax

NLMNLJPY*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 9

Range: 1–32

d

optionally specifies to divide the number by 10^{d}. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input'($12,345.67)',nlmnljpy32.2);
y=input'($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Formats:

"NLMNLJPY*w.d* Format" on page 164

NLMNLKRW*w.d* Informat

Reads the monetary format of the local expression for South Korea.

Category: Numeric

Alignment: left

Syntax

NLMNLKRW*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
optionally specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input'($12,345.67)',nlmnlkrw32.2);
y=input'($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Informats:

"NLMNIKRW*w.d* Informat" on page 346

NLMNLLTL*w.d* Informat

Reads the monetary format of the local expression for Lithuania.

Category: Numeric

Alignment: left

Syntax

NLMNLLTL*w*.*d*

Syntax Description

w

specifies the width of the output field.

Default: 9

Range: 1–32

d

optionally specifies to divide the number by 10^{d}. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input('($12,345.67)',nlmnlltl32.2);
y=input('($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Informats:

"NLMNILTL*w*.*d* Informat" on page 347

NLMNLLVL*w.d* Informat

Reads the monetary format of the local expression for Latvia.

Category: Numeric

Alignment: left

Syntax

NLMNLLVL*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
optionally specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input('($12,345.67)',nlmnllvl32.2);
y=input('($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Informats:

"NLMNILVL*w.d* Informat" on page 348

NLMNLMOP*w.d* Informat

Reads the monetary format of the local expression for Macau.

Category: Numeric

Alignment: left

Syntax

NLMNLMOP*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 9

Range: 1–32

d

optionally specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input('($12,345.67)',nlmnlmop32.2);
y=input('($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Informats:

"NLMNIMOP*w.d* Informat" on page 349

NLMNLMXN*w.d* Informat

Reads the monetary format of the local expression for Mexico.

Category: Numeric

Alignment: left

Syntax

NLMNLMXN*w*.*d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
optionally specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input('($12,345.67)',nlmnlmxn32.2);
y=input('($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Informats:

"NLMNIMXN*w*.*d* Informat" on page 350

NLMNLMYR*w.d* Informat

Reads the monetary format of the local expression for Malaysia.

Category: Numeric

Alignment: left

Syntax

NLMNLMYR*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 9

Range: 1–32

d

optionally specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input'($12,345.67)',nlmnlmyr32.2);
y=input'($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Formats:

"NLMNLMYR*w.d* Format" on page 170

NLMNLNOK*w.d* Informat

Reads the monetary format of the local expression for Norway.

Category: Numeric

Alignment: left

Syntax

NLMNLNOK*w*.*d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
optionally specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input'($12,345.67)',nlmnlnok32.2);
y=input'($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Formats:

"NLMNLNOK*w.d* Format" on page 171

NLMNLNZD*w.d* Informat

Reads the monetary format of the local expression for New Zealand.

Category: Numeric

Alignment: left

Syntax

NLMNLNZD*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 9

Range: 1–32

d

optionally specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input'($12,345.67)',nlmnlnzd32.2);
y=input'($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Formats:

"NLMNLNZD*w.d* Format" on page 172

NLMNLPLN*w.d* Informat

Reads the monetary format of the local expression for Poland.

Category: Numeric

Alignment: left

Syntax

NLMNLPLN*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 9

Range: 1–32

d

optionally specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input'($12,345.67)',nlmnlpln32.2);
y=input'($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Formats:

"NLMNLPLN*w.d* Format" on page 173

NLMNLRUB*w.d* Informat

Reads the monetary format of the local expression for Russia.

Category: Numeric

Alignment: left

Syntax

NLMNLRUB*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 9

Range: 1–32

d

optionally specifies to divide the number by 10^{d}. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input'($12,345.67)',nlmnlrub32.2);
y=input'($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Formats:

"NLMNLRUB*w.d* Format" on page 174

NLMNLSEK*w.d* Informat

Reads the monetary format of the local expression for Sweden.

Category: Numeric

Alignment: left

Syntax

NLMNLSEK*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 9

Range: 1–32

d

optionally specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input'($12,345.67)',nlmnlsek32.2);
y=input'($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Formats:

"NLMNLSEK*w.d* Format" on page 175

NLMNLSGD*w.d* Informat

Reads the monetary format of the local expression for Singapore.

Category: Numeric

Alignment: left

Syntax

NLMNLSGD*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 9

Range: 1–32

d

optionally specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input'($12,345.67)',nlmnlsgd32.2);
y=input'($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Formats:

"NLMNLSGD*w.d* Format" on page 176

NLMNLTHB*w.d* Informat

Reads the monetary format of the local expression for Thailand.

Category: Numeric

Alignment: left

Syntax

NLMNLTHB*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
optionally specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input('($12,345.67)',nlmnlthb32.2);
y=input('($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Informats:

"NLMNITHB*w.d* Informat" on page 358

NLMNLTRY*w.d* Informat

Reads the monetary format of the local expression for Turkey.

Category: Numeric

Alignment: left

Syntax

NLMNLTRY*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 9

Range: 1–32

d

optionally specifies to divide the number by 10^{d}. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input('($12,345.67)',nlmnltry32.2);
y=input('($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Informats:

"NLMNITRY*w.d* Informat" on page 359

NLMNLTWD*w.d* Informat

Reads the monetary format of the local expression for Taiwan.

Category: Numeric

Alignment: left

Syntax

NLMNLTWD*w*.*d*

Syntax Description

w

specifies the width of the output field.

Default: 9

Range: 1–32

d

optionally specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input'($12,345.67)',nlmnltwd32.2);
y=input'($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Formats:

"NLMNLTWD*w*.*d* Format" on page 179

NLMNLUSD*w.d* Informat

Reads the monetary format of the local expression for Puerto Rico, and the United States.

Category: Numeric

Alignment: left

Syntax

NLMNLUSD*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 9

Range: 1–32

d

optionally specifies to divide the number by 10^{d}. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input'($12,345.67)',nlmnlusd32.2);
y=input'($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Formats:

"NLMNLUSD*w.d* Format" on page 180

NLMNLZAR*w.d* Informat

Reads the monetary format of the local expression for South Africa.

Category: Numeric

Alignment: left

Syntax

NLMNLZAR*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 9

Range: 1–32

d
optionally specifies to divide the number by 10^d. If the data contains decimal points, the *d* value is ignored.

Default: 0

Range: 0–31

Examples

In the following example, the LOCALE= system option is set to English_UnitedStates.

```
x=input'($12,345.67)',nlmnlzar32.2);
y=input'($12,345.67)'dollar32.2);
```

Statements	Results
	`----+----1----+`
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Formats:

"NLMNLZAR*w.d* Format" on page 181

NLMNY*w.d* Informat

Reads monetary data in the specified locale for the local expression, and then converts the data to a numeric value.

Category: Numeric

Syntax

NLMNY*w.d*

Syntax Description

w
specifies the width of the input field.

Default: 9

Range: 1–32

d
optionally specifies whether to divide the number by 10^{d}. If the data contains decimal separators, the *d* value is ignored.

Default: 0

Range: 0–31

Details

The NLMNY*w.d* informat reads monetary data in the specified locale for the local expression, and then converts the data to a numeric value. It removes any thousands separators, decimal separators, blanks, the currency symbol, and the close parenthesis from the input data.

Comparisons

The NLMNY*w.d* informat performs processing that is the opposite of the NLMNYI*w.d* informat.

The NLMNY*w.d* informat is similar to the DOLLAR*w.d* informat except that the NLMNY*w.d* informat is locale-specific.

Examples

The following examples use the input value of $12,345.67.

Statements	Results
	`----+----1----+`
`options LOCALE=English_UnitedStates;`	
`x=input('($12,345.67)',nlmny32.2);`	
`y=input('($12,345.67)',dollar32.2);`	
`put x=;`	
	`-12345.67`
`put y=;`	`-12345.67`

See Also

Formats:

"NLMNY*w.d* Format" on page 182

"NLMNYI*w.d* Format" on page 184

Informats:

"NLMNYI*w.d* Informat" on page 401

NLMNYI*w.d* Informat

Reads monetary data in the specified locale for the international expression, and then converts the data to a numeric value.

Category: Numeric

Syntax

NLMNYI*w.d*

Syntax Description

w

specifies the width of the input field.

Default: 9

Range: 1–32

d

optionally specifies whether to divide the number by 10^{d}. If the data contains decimal separators, the *d* value is ignored.

Default: 0

Range: 0–31

Details

The NLMNYI*w.d* informat reads monetary data in the specified locale for the international expression, and then converts the data to a numeric value. It removes any thousands separators, decimal separators, blanks, the currency symbol, and the close parenthesis from the input data.

Comparisons

The NLMNYI*w.d* informat performs processing that is the opposite of the NLMNY*w.d* informat.

Examples

The following examples use the input value of 12,345.67.

Statements	Results
	`----+----1----+`
`options LOCALE=English_UnitedStates;`	
`x=input('(USD12,345.67)',nlmnyi32.2);`	
`y=input('$-12,345.67)',dollar32.2);`	
`put x=;`	`-12345.67`
`put y=;`	`-12345.67`

See Also

Formats:

"NLMNY*w.d* Format" on page 182

"NLMNYI*w.d* Format" on page 184

Informats:

"NLMNY*w.d* Informat" on page 400

NLNUM*w.d* Informat

Reads numeric data in the specified locale for local expressions, and then converts the data to a numeric value.

Category: Numeric

Syntax

NLNUM*w.d*

Syntax Description

w
specifies the width of the input field.
Default: 6
Range: 1–32

d
optionally specifies whether to divide the number by 10^d. If the data contains decimal separators, the *d* value is ignored.
Default: 0
Range: 0–31

Details

The NLNUM*w.d*) informat reads numeric data in the specified locale for local expressions, and then converts the data to a numeric value. It removes any thousands separators, decimal separators, blanks, the currency symbol, and the close parenthesis from the input data.

Comparisons

The NLNUM*w.d* informat performs processing that is opposite to the NLNUMI*w.d* informat.

Examples

The following example uses –1234356.78 as the input value.

Statements	Results
	`----+----1----+`
`options locale=English_UnitedStates;`	
`x=input('-1,234,356.78',nlnum32.2);`	
`put x=;`	`-1234356.78`

See Also

Formats:
"NLNUM*w.d* Format" on page 185
"NLMNYI*w.d* Format" on page 184
Informats:
"NLNUMI*w.d* Informat" on page 403

NLNUMI*w.d* Informat

Reads numeric data in the specified locale for international expressions, and then converts the data to a numeric value.

Category: Numeric

Syntax

NLNUMI*w.d*

Syntax Description

w
specifies the width of the input field.

Default: 6

Range: 1–32

d
optionally specifies to divide the number by 10^d. If the data contains decimal separators, the *d* value is ignored.

Default: 0

Range: 0–31

Details

The NLNUMI*w.d* informat reads numeric data in the specified locale for international expressions, and then converts the data to a numeric value. It removes any thousands separators, decimal separators, blanks, the currency symbol, and the close parenthesis from the input data.

Comparisons

The NLNUMI*w.d* informat performs processing that is opposite to the NLNUM*w.d* informat.

Examples

The following example uses –1,234,356.78 as the input value.

Statements	Results
	`----+----1----+`
`options locale=English_UnitedStates;`	
`x=input('-1,234,356.78', nlnumi32.2);`	
`put x=;`	`-1234356.78`

See Also

Formats:

"NLNUM*w.d* Format" on page 185
"NLNUMI*w.d* Format" on page 186

Informats:

"NLNUM*w.d* Informat" on page 402

NLPCT*w.d* Informat

Reads percentage data in the specified locale for local expressions, and then converts the data to a numeric value.

Category: Numeric

Syntax

NLPCT*w.d*

Syntax Description

w
specifies the width of the input field.

Default: 6

Range: 1–32

d
optionally specifies whether to divide the number by 10^d. If the data contains decimal separators, the *d* value is ignored.

Default: 0

Range: 0–31

Details

The NLPCT*w.d* informat reads percentage data in the specified locale for local expressions, and then converts the data to a numeric value. It divides the value by 100 and removes any thousands separators, decimal separators, blanks, the percent sign, and the close parenthesis from the input data.

Comparisons

The NLPCT*w.d* informat performs processing that is opposite of the NLPCTI*w.d* informat. The NLPCT*w.d* informat is similar to the PERCENT*w.d* informat except that the NLPCT*w.d* informat is locale-specific.

Examples

The following example uses –12,345.67% as the input value.

Statements	Result
	`----+----1----+`
`options LOCALE=English_UnitedStates;`	
`x=input('-12,345.67%',nlpct32.2);`	
`y=input('(12,345.67%)',percent32.2);`	
`put x=;`	`-123.4567`
`put y=;`	`-123.4567`

See Also

Formats:

"NLPCT*w.d* Format" on page 188
"NLPCTI*w.d* Format" on page 189

Informats:

"NLPCTI*w.d* Informat" on page 406

NLPCTI*w.d* Informat

Reads percentage data in the specified locale for international expressions, and then converts the data to a numeric value.

Category: Numeric

Syntax

NLPCTI*w.d*

Syntax Description

w
specifies the width of the input field.
Default: 6
Range: 1–32

d
optionally specifies whether to divide the number by 10^d. If the data contains decimal separators, the *d* value is ignored.
Default: 0
Range: 0–31

Details

The NLPCTI*w.d* informat reads percentage data in the specified locale for international expressions, and then converts the data to a numeric value. It divides the value by 100

and removes any thousands separators, decimal separators, blanks, the percent sign, and the close parentheses from the input data.

Comparisons

The NLPCTI*w*.*d* informat performs processing that is opposite of the NLPCT*w*.*d* informat.

Examples

The following example uses -12,345.67% as the input value.

Statements	Results
	`----+----1----+`
`options LOCALE=English_UnitedStates;`	
`x=input('-12,345.67%',nlpct32.2);`	
`y=input('(12,345.67%)',percent32.2);`	
`put x=;`	`-123.4567`
`put y=;`	`-123.4567`

See Also

Formats:

"NLPCT*w*.*d* Format" on page 188
"NLPCTI*w*.*d* Format" on page 189

Informats:

"NLPCT*w*.*d* Informat" on page 405

NLTIMAP*w*. Informat

Reads the time value and uses a.m. and p.m. in the specified locale, and then converts the time value to the local SAS time value.

Category: Date and Time

Syntax

NLTIMAP*w*.

Syntax Description

w
specifies the width of the input field.

Default: 10
Range: 4–200

Examples

The following example uses 04:24:43 p.m. as the input value.

Statements	Results
	`----+----1----+`

`options locale=English_UnitedStates;`
`y=input('04:24:43 PM',nltimap11.);`
`put y time.;`
	`16:24:43`

`options locale=German_Germany;`
`y=input('16.24 Uhr',nltimap11.);`
`put y time.;`
	`16:24:43`

See Also

Formats:
"NLTIMAP*w*. Format" on page 198

NLTIME*w*. Informat

Reads the time value in the specified locale, and then converts the time value to the local SAS time value.

Category: Date and Time

Syntax

NLTIME*w*.

Syntax Description

w
specifies the width of the input field.
Default: 20
Range: 10–200

Examples

The following example uses 16:24:43 as the input value.

Statements	Results
	`----+----1----+`

`options locale=English_UnitedStates;`
`y=input('16:24:43',nltime.);`
`put y time.;`
	`16:24:43`

`options locale=German_Germany;`
`y=input('16.24 Uhr',nltime.);`
`put y time;`
	`16:24:00`

See Also

Formats:

"NLTIME*w*. Format" on page 197

$REVERJ*w*. Informat

Reads character data from right to left and preserves blanks.

Category: Character

Syntax

$REVERJ*w*.

Syntax Description

w

specifies the width of the input field.

Default: 1 if *w* is not specified

Range: 1–32767

Comparisons

The $REVERJ*w*. informat is similar to the $REVERS*w*. informat except that $REVERS*w*. informat left aligns the result by removing all leading blanks.

Examples

The following example uses ABCD as the input value.

```
input @1 name $reverj7.;
```

Values	Results
	----+----1
ABCD	**###DCBA**
ABCD	**DCBA###**

* The character # represents a blank space.

See Also

Informats:

"$REVERS*w*. Informat" on page 410

$REVERS*w*. Informat

Reads character data from right to left, and then left aligns the text.

Category: Character

Syntax

$REVERS*w*.

Syntax Description

w

specifies the width of the input field.

Default: 1 if *w* is not specified

Range: 1–32767

Comparisons

The $REVERS*w*. informat is similar to the $REVERJ*w*. informat except that $REVERJ*w*. informat preserves all leading and trailing blanks.

Examples

The following example uses ABCD as the input value.

```
input @1 name $revers7.;
```

Values	Results
	`----+----1`
`ABCD`	`DCBA###`
`ABCD`	`DCBA###`

* The # character represents a blank space.

See Also

Informats:

"$REVERJ*w*. Informat" on page 409

$UCS2B*w*. Informat

Reads a character string that is encoded in big-endian, 16-bit, UCS2, Unicode encoding, and then converts the character string to the encoding of the current SAS session.

Category: Character

Syntax

$UCS2B*w*.

Syntax Description

w

specifies the width of the input field. Specify enough width to accommodate the 16-bit size of the Unicode characters.

Default: 8

Range: 2–32000

Comparisons

The $UCS2B*w*. informat performs processing that is opposite of the $UCS2BE*w*. informat. If you are processing data within the same operating environment, then use the $UCS2X*w*. informat. If you are processing data from different operating environments, then use the $UCS2B*w*. and $UCS2L*w*. informats.

Examples

This example uses the Japanese Shift_JIS encoding, which is supported under the UNIX operating environment.

Statements	Result
	`----+----1----+`
`x=input('5927'x,$ucs2b.);`	
`put x=$hex4.;`	`x=91e5`

See Also

Formats:

"$UCS2B*w*. Format" on page 199
"$UCS2L*w*. Format" on page 201
"$UCS2X*w*. Format" on page 204
"$UTF8X*w*. Format" on page 220

Informats:

"$UCS2L*w*. Informat" on page 413
"$UCS2X*w*. Informat" on page 415
"$UTF8X*w*. Informat" on page 429

$UCS2BE*w*. Informat

Reads a character string that is in the encoding of the current SAS session and then converts the character string to big-endian, 16-bit, UCS2, Unicode encoding.

Category: Character

Syntax

$UCS2BE*w*.

Syntax Description

w

specifies the width of the input field. Specify enough width to accommodate the 16-bit size of the Unicode characters.

Default: 8

Range: 1–32000

Comparisons

The $UCS2BE*w*. informat performs processing that is opposite of the $UCS2B*w*. informat.

Examples

This example uses the Japanese Shift_JIS encoding, which is supported under the UNIX operating environment.

Statements	Result
	`----+----1----+`
`ucs2str=input (' 大', $ucs2be2.);`	
`put ucs2str=$hex4;`	`ucs2str=5927`

See Also

Formats:

"$UCS2B*w*. Format" on page 199

"$UCS2BE*w*. Format" on page 200

Informats:

"$UCS2B*w*. Informat" on page 411

$UCS2L*w*. Informat

Reads a character string that is encoded in little-endian, 16-bit, UCS2, Unicode encoding, and then converts the character string to the encoding of the current SAS session.

Category: Character

Syntax

$UCS2L*w*.

Syntax Description

w

specifies the width of the input field. Specify enough width to accommodate the 16-bit size of the Unicode characters.

Default: 8

Range: 2–32000

Comparisons

The $UCS2L*w*. informat performs processing that is opposite of the $UCS2LE*w*. informat. If you are processing data within the same operating environment, then use

the $UCS2X*w*.informat. If you are processing data from different operating environments, then use the $UCS2B*w*. and $UCS2L*w*. informats.

Examples

This example uses the Japanese Shift_JIS encoding, which is supported under the UNIX operating environment.

Statements	Result
	`----+----1----+`
`x=input('2759'x,$ucs2l.);`	
`put x=$hex4.;`	`x=91e5`

See Also

Formats:

"$UCS2B*w*. Format" on page 199
"$UCS2L*w*. Format" on page 201
"$UCS2X*w*. Format" on page 204
"$UTF8X*w*. Format" on page 220

Informats:

"$UCS2B*w*. Informat" on page 411
"$UCS2X*w*. Informat" on page 415
"$UTF8X*w*. Informat" on page 429

$UCS2LE*w*. Informat

Reads a character string that is in the encoding of the current SAS session and then converts the character string to little-endian, 16-bit, UCS2, Unicode encoding.

Category: Character

Syntax

$UCS2LE*w*.

Syntax Description

w

specifies the width of the input field. Specify enough width to accommodate the 16-bit size of the Unicode characters.

Default: 8

Range: 1–32000

Comparisons

The $UCS2LE*w*. informat performs processing that is opposite of the $UCS2L*w*. informat.

Examples

This example uses the Japanese Shift_JIS encoding, which is supported under the UNIX operating environment.

Statements	Result
	`----+----1----+`
`ucs2str=input ('木', $ ucs2le2.);`	
`put ucs2str=$hex4;`	`ucs2str=2759`

See Also

Formats:

"$UCS2L*w*. Format" on page 201

"$UCS2LE*w*. Format" on page 203

Informats:

"$UCS2L*w*. Informat" on page 413

$UCS2X*w*. Informat

Reads a character string that is encoded in 16-bit, UCS2, Unicode encoding, and then converts the character string to the encoding of the current SAS session.

Category: Character

Syntax

$UCS2X*w.*

Syntax Description

w

specifies the width of the output field. Specify enough width to accommodate the 16-bit size of the Unicode characters.

Default: 8

Range: 2–32000

Comparisons

The $UCS2X*w*. informat performs processing that is the opposite of the $UCS2XE*w*. informat. If you are processing data within the same operating environment, then use the $UCS2X*w*. informat. If you are processing data from different operating environments, then use the $UCS2B*w*. and $UCS2L*w*. informats.

Examples

This example uses the Japanese Shift_JIS encoding, which is supported under the UNIX operating environment. This example uses little-endian formatting.

Statements	Result
	`----+----1----+`
`x=input('5927'x,$ucs2x.);`	
`put x=$hex4.;`	`x=91e5`

See Also

Formats:

"$UCS2B*w*. Format" on page 199
"$UCS2L*w*. Format" on page 201
"$UCS2X*w*. Format" on page 204
"$UTF8X*w*. Format" on page 220

Informats:

"$UCS2B*w*. Informat" on page 411
"$UCS2L*w*. Informat" on page 413
"$UTF8X*w*. Informat" on page 429

$UCS2XE*w*. Informat

Reads a character string that is in the encoding of the current SAS session and then converts the character string to 16-bit, UCS2, Unicode encoding.

Category: Character

Syntax

$UCS2XE*w*.

Syntax Description

w
specifies the width of the input field. Specify enough width to accommodate the 16-bit size of the Unicode characters.

Default: 8

Range: 1-32000

Comparisons

The $UCS2XE*w*. informat performs processing that is opposite of the $UCS2X*w*. informat.

Examples

This example uses the Japanese Shift_JIS encoding, which is supported under the UNIX operating environment.

Statements	Result
	`----+----1----+`
`ucs2str=input (' 大', $ ucs2xe2.);`	
`put ucs2str=$hex6;`	`ucs2str=5927`

See Also

Formats:

"$UCS2X*w*. Format" on page 204

"$UCS2XE*w*. Format" on page 205

Informats:

"$UCS2X*w*. Informat" on page 415

$UCS4B*w*. Informat

Reads a character string that is encoded in big-endian, 32-bit, UCS4, Unicode encoding, and then converts the character string to the encoding of the current SAS session.

Category: Character

Syntax

$UCS4B*w*.

Syntax Description

w
specifies the width of the input field. Specify enough width to accommodate the 32-bit size of the Unicode characters.

Default: 4

Range: 4–32000

Comparison

If you are processing data within the same operating environment, then use the $UCS4X*w*. informat. If you are processing data from different operating environments, then use the $UCS4B*w*. and $UCS4L*w*. informats.

Examples

These examples use the Japanese Shift_JIS encoding, which is supported under the UNIX operating environment.

Statements	Result
	`----+----1----+`
`z=put('Zero1',$UCS4B20.);`	
`x=input(z,$UCS4B20.);`	
`put x;`	`Zero1`

See Also

Formats:

"$UCS4Bw. Format" on page 206

Informats:

"$UCS4Lw. Informat" on page 418
"$UCS4Xw. Informat" on page 419

$UCS4Lw. Informat

Reads a character string that is encoded in little-endian, 32-bit, UCS4, Unicode encoding, and then converts the character string to the encoding of the current SAS session.

Category: Character

Syntax

$UCS4L*w*.

Syntax Description

w
specifies the width of the input field. Specify enough width to accommodate the 32-bit size of the Unicode characters.

Default: 4

Range: 4–32000

Comparison

If you are processing data within the same operating environment, then use the $UCS4X*w*. informat. If you are processing data from different operating environments, then use the $UCS4B*w*. and $UCS4L*w*. informats.

Examples

These examples use the Japanese Shift_JIS encoding, which is supported under the UNIX operating environment.

Statements	Result
	`----+----1----+----2----+----3----+`
`z=put('.com',$UCS4L16.);`	
`put z $hex32.;`	`2E000000630000006F0000006D000000`

See Also

Formats:

"$UCS4L*w*. Format" on page 208

Informats:

"$UCS4B*w*. Informat" on page 417
"$UCS4X*w*. Informat" on page 419

$UCS4X*w*. Informat

Reads a character string that is encoded in 32-bit, UCS4, Unicode encoding, and then converts the character string to the encoding of the current SAS session.

Category: Character

Syntax

$UCS4X*w*.

Syntax Description

w
specifies the width of the input field. Specify enough width to accommodate the 32-bit size of the Unicode characters.

Default: 4

Range: 4–32000

Comparisons

The $UCS4X*w*. informat performs processing that is the opposite of the $UCS4XE*w*. informat. Use the $UCS4X*w*. informat when you are processing data within the same operating environment. Use the $UCS4B*w*. and $UCS4L*w*. informats when you are processing data from different operating environments.

Examples

These examples use the Japanese Shift_JIS encoding, which is supported under the UNIX operating environment. This example uses little-endian formatting.

Statements	Results
	`----+----1----+`

`ucs4=put('91e5'x,$ucs4x.);`
`sjis=input(ucs4,$ucs4x.);`
`put ucs4=$hex8. sjis=$hex8.;`
`run;`
	`ucs4=27590000`
	`sjis=91E52020`

See Also

Formats:

"$UCS2X*w*. Format" on page 204
"$UCS2B*w*. Format" on page 199
"$UCS2L*w*. Format" on page 201
"$UCS4X*w*. Format" on page 211
"$UTF8X*w*. Format" on page 220

Informats:

"$UCS2B*w*. Informat" on page 411
"$UCS2L*w*. Informat" on page 413
"$UTF8X*w*. Informat" on page 429

$UCS4XE*w*. Informat

Reads a character string that is in the encoding of the current SAS session, and then converts the character string to 32-bit, UCS4, Unicode encoding.

Category: Character

Syntax

$UCS4XE*w*.

Syntax Description

w
specifies the width of the input field. Specify enough width to accommodate the 32-bit size of the Unicode characters.

Default: 8

Range: 1–32000

Comparisons

The $UCS4XE*w*. informat performs processing that is the opposite of the $UCS4X*w*. informat.

Examples

This example uses the Japanese Shift_JIS encoding, which is supported under the UNIX operating environment.

Statements	Result
	`----+----1----+`
`ucs4str=input (' 大', $ ucs4xe2.);`	
`put ucs4str=$hex8;`	`ucs4str=00005927`

See Also

Formats:

"$UCS4X*w*. Format" on page 211

"$UCS4XE*w*. Format" on page 212

Informats:

"$UCS4X*w*. Informat" on page 419

$UESC*w*. Informat

Reads a character string that is encoded in UESC representation, and then converts the character string to the encoding of the current SAS session.

Category: Character

Syntax

$UESC*w*.

Syntax Description

w
specifies the width of the output field.

Default: 8

Range: 1–32000

Details

If the characters are not available on all operating environments, for example, 0–9, a–z, A–Z, they must be represented in UESC representation. The $UESC*w*. informat can be nested.

Comparisons

The $UESC*w*. informat performs processing that is the opposite of the $UESCE*w*. informat.

Examples

These examples use the Japanese Shift_JIS encoding, which is supported under the UNIX operating system.

Statements	Results
	`----+----1----+`

`x=input('¥u5927', $uesc10.);`
`y=input('¥uu5927', $uesc10.);`
`z=input('¥uuu5927', $uesc10.);`	

`put x;`	大
`put y;`	`¥u5927`
`put z;`	`¥uu5927`

See Also

Formats:

"$UESC*w*. Format" on page 213

"$UESCE*w*. Format" on page 214

Informats:

"$UESCE*w*. Informat" on page 423

$UESCE*w*. Informat

Reads a character string that is in the encoding of the current SAS session, and then converts the character string to UESC representation.

Category: Character

Syntax

$UESCE*w*.

Syntax Description

w
specifies the width of the input field.

Default: 8

Range: 1–32000

Details

The $UESCE*w*. informat can be nested.

Comparisons

The $UESCE*w*. informat performs processing that is opposite of the $UESC*w*. informat.

Examples

These examples use the Japanese Shift_JIS encoding, which is supported under the UNIX operating system.

Statements	Results
	`----+----1----+`
`x=input('太', $uesc10.);`	
`y=input('¥u5927',$uesc10.);`	`¥u5927`
`z=input('¥uu5927',$uesc10.);`	`¥uu5927`
`put x y z;`	`¥uuu5927`

See Also

Formats:

"$UESC*w*. Format" on page 213

"$UESCE*w*. Format" on page 214

Informat:

"$UESC*w*. Informat" on page 421

$UNCR*w*. Informat

Reads an NCR character string, and then converts the character string to the encoding of the current SAS session.

Category: Character

Syntax

$UNCR*w*.

Syntax Description

w
specifies the width of the input field.

Default: 8

Range: 1–32000

Details

The input string must contain only characters and NCR. Any national characters must be represented in NCR.

Comparison

The $UNCR*w*. informat performs processing that is opposite of the $UNCRE*w*. informat.

Examples

These examples use the Japanese Shift_JIS encoding, which is supported under the UNIX operating system.

Statements	Result
	`----+----1----+`
`x=input ('&#22823;', $uncr10.);`	
`y=input('abc', $uncr10);`	
`put X;`	大
`put Y;`	abc

See Also

Formats:

"$UNCR*w*. Format" on page 215
"$UNCRE*w*. Format" on page 217

Informats:

"$UNCRE*w*. Informat" on page 425

$UNCRE*w*. Informat

Reads a character string in the encoding of the current SAS session, and then converts the character string to NCR.

Category: Character

Syntax

$UNCRE*w*.

Syntax Description

w
specifies the width of the input field.
Default: 8
Range: 1–32000

Details

The output string will be converted to plain characters and NCR. Any national characters will be converted to NCR.

Comparison

The $UNCRE*w*. informat performs processing that is the opposite of the $UNCR*w*. informat.

Examples

These examples use the Japanese Shift_JIS encoding, which is supported under the UNIX operating system.

Statements	Result
	`----+----1----+`
`x=input ('丈abc', $uncre12.);`	
`put x;`	`&#22823;abc`

See Also

Formats:

"$UNCRw. Format" on page 215
"$UNCREw. Format" on page 217

Informats:

"$UNCRw. Informat" on page 424

$UPARENw. Informat

Reads a character string that is encoded in UPAREN representation, and then converts the character string to the encoding of the current SAS session.

Category: Character

Syntax

$UPAREN*w*.

Syntax Description

w
specifies the width of the input field.
Default: 8
Range: 1–32000

Details

If the SAS session encoding does not have a corresponding Unicode expression, the expression will remain in encoding of the current SAS session.

Comparisons

The $UPARENw. informat performs processing that is opposite of the $UPARENEw. informat.

Examples

These examples use the Japanese Shift_JIS encoding, which is supported under the UNIX operating system.

Statements	Results

`v=input('<u0061>',$uparen10.);`
`w=input('<u0062>',$uparen10.);`
`x=input('<u0063>',$uparen10.);`
`y=input('<u0033>',$uparen10.);`
`z=input('<u5927>',$uparen10.);`
`put v;`
`put w;`
`put x;`
`put y;`
`put z;`
	`a`
	`b`
	`c`
	`3`
	大

See Also

Formats:

"$UPAREN*w*. Format" on page 218
"$UPARENE*w*. Format" on page 219

Informats:

"$UPARENE*w*. Informat" on page 427
"$UPARENP*w*. Informat" on page 428

$UPARENE*w*. Informat

Reads a character string that is in the encoding of the current SAS session, and then converts the character string to UPAREN representation.

Category: Character

Syntax

$UPARENE*w*.

Syntax Description

w
specifies the width of the input field.

Default: 8

Range: 1–32000

Comparisons

The $UPARENE*w*. informat performs processing that is opposite of the $UPAREN*w*. informat.

Examples

These examples use the Japanese Shift_JIS encoding, which is supported under the UNIX operating system.

Statements	Results
	`----+----1----+`
`v=input('a',$uparen10.);`	
`w=input('b',$uparen10.);`	
`x=input('c',$uparen10.);`	
`y=input('3',$uparen10.);`	
`z=input('木',$uparen10.);`	
`put v;`	`<u0061>`
`put w;`	`<u0062>`
`put x;`	`<u0063>`
`put y;`	`<u0033>`
`put z;`	`<u5927>`

See Also

Formats:

"$UPAREN*w*. Format" on page 218
"$UPARENE*w*. Format" on page 219

Informats:

"$UPAREN*w*. Informat" on page 426
"$UPARENP*w*. Informat" on page 428

$UPARENP*w*. Informat

Reads a character string that is encoded in UPAREN representation, and then converts the character string to the encoding of the current SAS session, with national characters remaining in the encoding of the UPAREN representation.

Category: Character

Syntax

$UPARENP*w*.

Syntax Description

w

specifies the width of the input field.

Default: 8

Range: 1–32000

Details

If the UPAREN expression contains a national character, whose value is greater than Unicode 0x00ff, the expression will remain as a UPAREN expression.

Examples

These examples use the Japanese Shift_JIS encoding, which is supported under the UNIX operating system.

Statements	Results
	`----+----1----+`
`v=input('<u0061>',$uparen10.);`	
`w=input('<u0062>',$uparen10.);`	
`x=input('<u0063>',$uparen10.);`	
`y=input('<u0033>',$uparen10.);`	
`z=input('<u5927>',$uparen10.);`	
`put v;`	`a`
`put w;`	`b`
`put x;`	`c`
`put y;`	`3`
`put z;`	`<u5927>`

See Also

Formats:

"$UPAREN*w*. Format" on page 218

"$UPARENE*w*. Format" on page 219

Informats:

"$UPAREN*w*. Informat" on page 426

"$UPARENE*w*. Informat" on page 427

$UTF8X*w*. Informat

Reads a character string that is encoded in UTF-8, and then converts the character string to the encoding of the current SAS session.

Category: Character

Syntax

$UTF8X*w*.

Syntax Description

w
specifies the width of the input field.

Default: 8

Range: 1–32000

Examples

This example uses the Japanese Shift_JIS encoding, which is supported under the UNIX operating environment.

Statements	Result
	`----+----1----+`
`x=input (' e5a4a7' x,$ utf8x3.);` `put x;`	大

See Also

Formats:

"$UCS2B*w*. Format" on page 199
"$UCS2L*w*. Format" on page 201
"$UCS2X*w*. Format" on page 204
"$UTF8X*w*. Format" on page 220

Informats:

"$UCS2B*w*. Informat" on page 411
"$UCS2L*w*. Informat" on page 413
"$UCS2X*w*. Informat" on page 415

$VSLOG*w*. Informat

Reads a character string that is in visual order, and then converts the character string to left-to-right logical order.

Category: BIDI text handling

Syntax

$VSLOG*w*.

Syntax Description

w
specifies the width of the input field.
Default: 200
Range: 1–32000

Comparisons

The $VSLOG*w*. informat performs processing that is opposite of the $VSLOGR*w*. informat.

Examples

The following example uses the Hebrew input value of "טיסה flight".

Statements	Result
	`----+----1----+`
x=input ('טיסה',$vslog12.);	
`put x;`	טיסה`flight`

The following example uses the Arabic input value of " ذات computer."

Statements	Result
	`----+----1----+`
x=input (' ذات computer',$vslog12.);	ذات computer
`put x;`	

See Also

Formats:
"$VSLOGR*w*. Format" on page 222
"$VSLOG*w*. Format" on page 221
Informats:
"$VSLOGR*w*. Informat" on page 431

$VSLOGR*w*. Informat

Reads a character string that is in visual order, and then converts the character string to right-to-left logical order.

Category: BIDI text handling

Syntax

$VSLOGR*w*.

Syntax Description

w
specifies the width of the input field.

Default: 200

Range: 1–32000

Comparisons

The $VSLOGR*w*. informat performs processing that is opposite of the $VSLOG*w*. informat.

Examples

The following example uses the Hebrew input value of "טיסה flight."

Statements	Result
	`----+----1----+`
x=input ('טיסה',$vslogr12.);	
`put x;`	`flight` טיסה

The following example uses the Arabic input value of " تذاكر computer."

Statements	Result
	`----+----1----+`
x=input (' تذاكر computer',$vslogr12.);	تذاكر computer
`put x;`	

See Also

Formats:

"$VSLOG*w*. Format" on page 221

"$VSLOGR*w*. Format" on page 222

Informats:

"$VSLOG*w*. Informat" on page 430

YEN*w.d* Informat

Removes embedded yen signs, commas, and decimal points.

Category: Numeric

Syntax

YEN*w.d*

Syntax Description

w

specifies the width of the input field.

Default: 1

Range: 1–32

d

specifies the power of 10 by which to divide the value.

Requirement: *d* must be 0 or 2

Tip: If the *d* is 2, then YEN*w.d* reads a decimal point and two decimal digits. If *d* is 0, YEN*w.d* reads the value without a decimal point.

Details

The hexadecimal representation of the code for the yen sign character is 5B on EBCDIC systems and 5C on ASCII systems. The monetary character that these codes represent might be different in other countries.

Examples

The following example uses yen as the input.

```
input value yen10.2;
```

Value	Result
	`----+----1----+`
`¥1254.71`	`1254.71`

See Also

Formats:

"YEN*w.d* Format" on page 233

CHAPTER
10

Autocall Macros for NLS

Autocall Macros for NLS by Category

The following table provides brief descriptions of the SAS NLS autocall macros. For more detailed descriptions, see the NLS entry for each macro.

Table 10.1 Autocall Macros for NLS by Category

Category	Autocall Macros for NLS	Description
DBCS	"%KLOWCASE and %QKLOWCAS Autocall Macros" on page 435	Change uppercase characters to lowercase.
	"%KTRIM and %QKTRIM Autocall Macros" on page 436	Trim trailing blanks.
	"%KVERIFY Autocall Macro" on page 436	Returns the position of the first character unique to an expression.

%KLOWCASE and %QKLOWCAS Autocall Macros

Change uppercase characters to lowercase.

Category: DBCS

Requirement: MAUTOSOURCE system option

Syntax

%KLOWCASE (text | text expression)

%QKLOWCAS (text | text expression)

Note: Autocall macros are included in a SAS library. This library might not be installed at your site or might be a site-specific version. If you cannot access this macro

or if you want to find out if the library is a site-specific version, see your on-site SAS support personnel. △

Details

The %KLOWCASE and %QKLOWCAS macros change uppercase alphabetic characters to their lowercase equivalents. If the argument might contain a special character or mnemonic operator, listed below, use %QKLOWCAS.

%KLOWCASE returns a result without quotation marks, even if the argument has quotation marks. %QKLOWCAS produces a result with the following special characters and mnemonic operators masked so the macro processor interprets them as text instead of as elements of the macro language:

& % ' " ( )+ - * / < > = ¬ ^ ~ ; , blank AND OR NOT EQ NE LE LT GE GT IN

%KTRIM and %QKTRIM Autocall Macros

Trim trailing blanks.

Category: DBCS

Requirement: MAUTOSOURCE system option

Syntax

%KTRIM (text | text expression)

%QKTRIM (text | text expression)

Note: Autocall macros are included in a SAS library. This library might not be installed at your site or might be a site-specific version. If you cannot access this macro or if you want to find out if the library is a site-specific version, see your on-site SAS support personnel. △

Details

The KTRIM macro and the QKTRIM macro trim trailing blanks. If the argument contains a special character or mnemonic operator, listed below, use %QKTRIM.

QKTRIM produces a result with the following special characters and mnemonic operators masked so the macro processor interprets them as text instead of as elements of the macro language:

& % ' " ( )+ - * / < > = ¬ ? ~ ; , # blank AND OR NOT EQ NE LE LT GE GT IN

%KVERIFY Autocall Macro

Returns the position of the first character unique to an expression.

Category: DBCS

Requirement: MAUTOSOURCE system option

Syntax

%KVERIFY (source, excerpt)

Syntax

source
is text or a text expression that you want to examine for characters that do not exist in excerpt.

excerpt
is text or a text expression that defines the set of characters that %KVERIFY uses to examine source.

Note: Autocall macros are included in a SAS library. This library might not be installed at your site or might be a site-specific version. If you cannot access this macro or if you want to find out if the library is a site-specific version, see your on-site SAS support personnel. △

Details

%KVERIFY returns the position of the first character in source that is not also present in excerpt. If all characters in source are present in excerpt, %KVERIFY returns 0.

CHAPTER
11

Macro Functions for NLS

Macro Functions for NLS by Category

The following table provides brief descriptions of the SAS NLS macro functions. For more information, see the NLS entry for each macro function.

Table 11.1 Macro Functions for NLS by Category

Category	Macro Functions for NLS	Description
DBCS	"%KINDEX Macro Function" on page 439	Returns the position of the first character of a string.
	"%KLEFT and %QKLEFT Macro Functions" on page 440	Left-aligns an argument by removing leading blanks.
	"%KLENGTH Macro Function" on page 441	Returns the length of a string.
	"%KSCAN and %QKSCAN Functions" on page 441	Searches for a word that is specified by its position in a string.
	"%KSUBSTR and %QKSUBSTR Macro Functions" on page 445	Produces a substring of a character string.
	"%KUPCASE and %QKUPCASE Macro Functions" on page 447	Converts values to uppercase.

%KINDEX Macro Function

Returns the position of the first character of a string.

Category: DBCS
Type: NLS macro function

Syntax

%KINDEX (*source*, *string*)

source
is a character string or text expression.

string
is a character string or text expression.

Details

The %KINDEX function searches *source* for the first occurrence of *string* and returns the position of its first character. If *string* is not found, the function returns 0.

Example

Example 1: Locating a Character The following statements find the first character **v** in a string:

```
%let a=a very long value;
%let b=%kindex(&a,v);
%put V appears at position &b..;
```

When these statements execute, the following line is written to the SAS log:

```
V appears at position 3.
```

%KLEFT and %QKLEFT Macro Functions

Left-aligns an argument by removing leading blanks.

Category: DBCS

Requirement: MAUTOSOURCE system option

Syntax

%KLEFT (*text* | *text expression*)

%QKLEFT (*text* | *text expression*)

Details

The %KLEFT and %KQLEFT macro functions left-align arguments by removing leading blanks. If the argument contains a special character or mnemonic operator, listed here, use %KQLEFT.

%KLEFT returns an unquoted result, even if the argument is quoted. %KQLEFT produces a result with the following special characters and mnemonic operators masked so that the macro processor interprets them as text instead of as elements of the macro language:

```
& % ' " ( ) + - * / < > = ¬ ^ ~ ; , # blank
AND OR NOT EQ NE LE LT GE GT IN
```

%KLENGTH Macro Function

Returns the length of a string.

Category: DBCS

Type: NLS macro function

Syntax

%KLENGTH (*character string* | *text expression*)

Details

If the argument is a character string, %KLENGTH returns the length of the string. If the argument is a text expression, %KLENGTH returns the length of the resolved value. If the argument has a null value, %KLENGTH returns 0.

Example

Example 1: Returning String Lengths The following statements find the lengths of character strings and text expressions:

```
%let a=Happy;
%let b=Birthday;

%put The length of &a is %klength(&a).;
%put The length of &b is %klength(&b).;
%put The length of &a &b To You is %klength(&a &b to you).;
```

When these statements execute, the following is written to the SAS log:

```
The length of Happy is 5.
The length of Birthday is 8.
The length of Happy Birthday To You is 21.
```

%KSCAN and %QKSCAN Functions

Search for a word that is specified by its position in a string.

Category: DBCS

Type: NLS macro function

Syntax

%KSCAN (*argument*, *n*<,*charlist* <,*modifiers*>>)

%QKSCAN (*argument*, *n*<,*charlist* <,*modifiers*>>)

argument
is a character string or a text expression. If *argument* might contain a special character or mnemonic operator, listed here, use %QKSCAN.

n
is an integer or a text expression that yields an integer, which specifies the position of the word to return. If *n* is greater than the number of words in *argument*, the functions return a null string.

Note: If *n* is negative, %KSCAN examines the character string and selects the word that starts at the end of the string and searches backward. △

charlist
specifies an optional character expression that initializes a list of characters. This list determines which characters are used as the delimiters that separate words. The following rules apply:

- By default, all characters in *charlist* are used as delimiters.
- If you specify the K modifier in the *modifier* argument, then all characters that are *not* in *charlist* are used as delimiters.

Tip: You can add more characters to *charlist* by using other modifiers.

modifier
specifies a character constant, a variable, or an expression in which each non-blank character modifies the action of the %KSCAN function. Blanks are ignored. You can use the following characters as modifiers:

a or A	adds alphabetic characters to the list of characters.
b or B	scans backward from right to left instead of from left to right, regardless of the sign of the *count* argument.
c or C	adds control characters to the list of characters.
d or D	adds digits to the list of characters.
f or F	adds an underscore and English letters (that is, valid first characters in a SAS variable name using **VALIDVARNAME=V7**) to the list of characters.
g or G	adds graphic characters to the list of characters. Graphic characters are characters that, when printed, produce an image on paper.
h or H	adds a horizontal tab to the list of characters.
i or I	ignores the case of the characters.
k or K	treats all characters that are not in the list of characters as delimiters. That is, if K is specified, then characters that are in the list of characters are kept in the returned value rather than being omitted because they are delimiters. If K is not specified, then all characters that are in the list of characters are treated as delimiters.

l or L — adds lowercase letters to the list of characters.

m or M — specifies that multiple consecutive delimiters, and delimiters at the beginning or end of the *string* argument, refer to words that have a length of zero. If the M modifier is not specified, then multiple consecutive delimiters are treated as one delimiter, and delimiters at the beginning or end of the *string* argument are ignored.

n or N — adds digits, an underscore, and English letters (that is, the characters that can appear in a SAS variable name using **`VALIDVARNAME=V7`**) to the list of characters.

o or O — processes the *charlist* and *modifier* arguments only once, rather than every time the %KSCAN function is called.

Tip: Using the O modifier in the DATA step (excluding WHERE clauses) or in the SQL procedure can make %KSCAN run faster when you call it in a loop where the *charlist* and *modifier* arguments do not change. The O modifier applies separately to each instance of the %KSCAN function in your SAS code. It does not cause all instances of the %KSCAN function to use the same delimiters and modifiers.

p or P — adds punctuation marks to the list of characters.

q or Q — ignores delimiters that are inside of substrings that are enclosed in quotation marks. If the value of the *string* argument contains unmatched quotation marks, then scanning from left to right produces different words than scanning from right to left.

r or R — removes leading and trailing blanks from the word that %KSCAN returns.

Tip: If you specify both the Q and R modifiers, then the %KSCAN function first removes leading and trailing blanks from the word. Then, if the word begins with a quotation mark, %KSCAN also removes one layer of quotation marks from the word.

s or S — adds space characters to the list of characters (blank, horizontal tab, vertical tab, carriage return, line feed, and form feed).

t or T — trims trailing blanks from the *string* and *charlist* arguments.

Tip: If you want to remove trailing blanks from only one character argument instead of both character arguments, then use the TRIM function instead of the %KSCAN function with the T modifier.

u or U — adds uppercase letters to the list of characters.

w or W — adds printable (writable) characters to the list of characters.

x or X — adds hexadecimal characters to the list of characters.

Tip: If the *modifier* argument is a character constant, then enclose it in quotation marks. Specify multiple modifiers in a single set of quotation marks. A *modifier* argument can also be expressed as a character variable or expression.

Details

The %KSCAN and %QKSCAN functions search *argument* and return the *n*th word. A word is one or more characters separated by one or more delimiters.

%KSCAN does not mask special characters or mnemonic operators in its results, even when the argument was previously masked by a macro quoting function. %QKSCAN masks the following special characters and mnemonic operators in its results:

```
& % ' " ( ) + – * / < > = ¬ ^ ~ ; , # blank
AND OR NOT EQ NE LE LT GE GT IN
```

Definition of *Delimiter* and *Word*

A *delimiter* is any of several characters that are used to separate words. You can specify the delimiters in the *charlist* and *modifier* arguments.

If you specify the Q modifier, then delimiters inside of substrings that are enclosed in quotation marks are ignored.

In the %KSCAN function, *word* refers to a substring that has all of the following characteristics:

- is bounded on the left by a delimiter or the beginning of the string
- is bounded on the right by a delimiter or the end of the string
- contains no delimiters

A word can have a length of zero if there are delimiters at the beginning or end of the string or if the string contains two or more consecutive delimiters. However, the %KSCAN function ignores words that have a length of zero unless you specify the M modifier.

Using Default Delimiters in ASCII and EBCDIC Environments

If you use the %KSCAN function with only two arguments, then the default delimiters depend on whether your computer uses ASCII or EBCDIC characters:

- If your computer uses ASCII characters, then the default delimiters are as follows:

  blank ! $ % & ( )* + , - . / ; < ^ ¦

  In ASCII environments that do not contain the ^ character, the %KSCAN function uses the ~ character instead.
- If your computer uses EBCDIC characters, then the default delimiters are as follows:

  blank ! $ % & ( )* + , - . / ; < ¬ | ¢ ¦

If you use the *modifier* argument without specifying any characters as delimiters, then the only delimiters that will be used are delimiters that are defined by the *modifier* argument. In this case, the lists of default delimiters for ASCII and EBCDIC environments are not used. In other words, modifiers add to the list of delimiters that are specified by the *charlist* argument. Modifiers do not add to the list of default modifiers.

Using the %KSCAN Function with the M Modifier

If you specify the M modifier, then the number of words in a string is defined as one plus the number of delimiters in the string. However, if you specify the Q modifier, delimiters that are inside quotation marks are ignored.

If you specify the M modifier, then the %KSCAN function returns a word with a length of zero if one of the following conditions is true:

- The string begins with a delimiter and you request the first word.
- The string ends with a delimiter and you request the last word.
- The string contains two consecutive delimiters and you request the word that is between the two delimiters.

Using the %KSCAN Function without the M Modifier

If you do not specify the M modifier, then the number of words in a string is defined as the number of maximal substrings of consecutive nondelimiters. However, if you specify the Q modifier, delimiters that are inside quotation marks are ignored.

If you do not specify the M modifier, then the %KSCAN function does the following:

- ignores delimiters at the beginning or end of the string
- treats two or more consecutive delimiters as if they were a single delimiter

If the string contains no characters other than delimiters or if you specify a count that is greater in absolute value than the number of words in the string, then the %KSCAN function returns one of the following:

- a single blank when you call the %KSCAN function from a DATA step
- a string with a length of zero when you call the %KSCAN function from the macro processor

Using Null Arguments

The %KSCAN function allows character arguments to be null. Null arguments are treated as character strings with a length of zero. Numeric arguments cannot be null.

Example

Example 1: Comparing the Actions of %KSCAN and %QKSCAN This example illustrates the actions of %KSCAN and %QKSCAN:

```
%macro a;
   aaaaaa
%mend a;
%macro b;
   bbbbbb
%mend b;
%macro c;
   cccccc
%mend c;

%let x=%nrstr(%a*%b*%c);
%put X: &x;
%put The third word in X, with KSCAN: %kscan(&x,3,*);
%put The third word in X, with QKSCAN: %qkscan(&x,3,*);
```

The %PUT statement writes these lines to the log:

```
X: %a*%b*%c
The third word in X, with KSCAN: cccccc
The third word in X, with QKSCAN: %c
```

%KSUBSTR and %QKSUBSTR Macro Functions

Produce a substring of a character string.

Category: DBCS

Type: NLS macro function

Syntax

%KSUBSTR (*argument*, *position*<, *length*>)

%QKSUBSTR (*argument*, *position*<, *length*>)

argument
is a character string or a text expression. If *argument* might contain a special character or mnemonic operator, listed here, use %QKSUBSTR.

position
is an integer or an expression (text, logical, or arithmetic) that yields an integer that specifies the position of the first character in the substring. If *position* is greater than the number of characters in the string, %KSUBSTR and %QKSUBSTR issue a warning message and return a null value.

length
is an optional integer or an expression (text, logical, or arithmetic) that yields an integer that specifies the number of characters in the substring. If *length* is greater than the number of characters following *position* in *argument*, %KSUBSTR and %QKSUBSTR issue a warning message and return a substring containing the characters from *position* to the end of the string. By default, %KSUBSTR and %QKSUBSTR produce a string containing the characters from *position* to the end of the character string.

Details

The %KSUBSTR and %QKSUBSTR functions produce a substring of *argument*, which begins at *position* and continues for the number of characters in *length*.

%KSUBSTR does not mask special characters or mnemonic operators in its result. %QKSUBSTR masks the following special characters and mnemonic operators:

```
& % ' " ( ) + – * / < > = ¬ ^ ~ ; , #  blank
AND OR NOT EQ NE LE LT GE GT IN
```

Examples

Example 1: Limiting a Fileref to Eight Characters The macro MAKEFREF uses %KSUBSTR to assign the first eight characters of a parameter as a fileref, in case a user assigns one that is longer:

```
%macro makefref(fileref,file);
   %if %klength(&fileref) gt 8 %then
       %let fileref = %ksubstr(&fileref,1,8);
   filename &fileref "&file";
%mend makefref;

%makefref(humanresource,/dept/humanresource/report96)
```

SAS reads the following statement:

```
FILENAME HUMANRES "/dept/humanresource/report96";
```

Example 2: Storing a Long Macro Variable Value in Segments The macro SEPMSG separates the value of the macro variable MSG into 40-character units and stores each unit in a separate variable:

```
%macro sepmsg(msg);
   %let i=1;
   %let start=1;
   %if %length(&msg)>40 %then
      %do;
          %do %until(%klength(&&msg&i)<40);
             %let msg&i=%qksubstr(&msg,&start,40);
             %put Message &i is: &&msg&i;
             %let i=%eval(&i+1);
             %let start=%eval(&start+40);
             %let msg&i=%qksubstr(&msg,&start);
          %end;
          %put Message &i is: &&msg&i;
      %end;
   %else %put No subdivision was needed.;
%mend sepmsg;

%sepmsg(%nrstr(A character operand was found in the %EVAL function
or %IF condition where a numeric operand is required.  A character
operand was found in the %EVAL function or %IF condition where a
numeric operand is required.));
```

When this program executes, these lines are written to the SAS log:

```
Message 1 is: A character operand was found in the %EV
Message 2 is: AL function or  %IF condition where a nu
Message 3 is: meric operand is required.  A character
Message 4 is: operand was  found in the %EVAL function
Message 5 is: or %IF condition where a numeric operan
Message 6 is: d is required.
```

Example 3: Comparing the Actions of %KSUBSTR and %QKSUBSTR %KSUBSTR produces a resolved result because it does not mask special characters and mnemonic operators in the C language before processing it:

```
%let a=one;
%let b=two;
%let c=%nrstr(&a &b);

%put C: &c;
%put With KSUBSTR: %ksubstr(&c,1,2);
%put With QKSUBSTR: %qKsubstr(&c,1,2);
```

When these statements execute, these lines are written to the SAS log:

```
C: &a &b
With KSUBSTR: one
With QKSUBSTR: &a
```

%KUPCASE and %QKUPCASE Macro Functions

Convert values to uppercase.

Category: DBCS

Type: NLS macro function

Syntax

%KUPCASE (*character string* | *text expression*)

%QKUPCASE (*character string* | *text expression*)

Details

The %KUPCASE and %QKUPCASE functions convert lowercase characters in the argument to uppercase. %KUPCASE does not mask special characters or mnemonic operators in its results.

If the argument contains a special character or mnemonic operator, listed here, use %QKUPCASE. %QKUPCASE masks the following special characters and mnemonic operators in its results:

```
& % ' " ( ) + – * / < > = ¬ ^ ~ ; , # blank
AND OR NOT EQ NE LE LT GE GT IN
```

%KUPCASE and %QKUPCASE are useful in comparing values because the macro facility does not automatically convert lowercase characters to uppercase before comparing them.

Examples

Example 1: Capitalizing a Value to be Compared In this example, the macro RUNREPT compares a value input for the macro variable MONTH to the string DEC. If the uppercase value of the response is DEC, then PROC FSVIEW runs on the data set REPORTS.ENDYEAR. Otherwise, PROC FSVIEW runs on the data set with the name of the month in the REPORTS data library.

```
%macro runrept(month);
   %if %kupcase(&month)=DEC %then
       %str(proc fsview data=reports.endyear; run;);
   %else %str(proc fsview data=reports.&month; run;);
%mend runrept;
```

You can invoke the macro in any of these ways to satisfy the %IF condition:

```
%runrept(DEC)
%runrept(Dec)
%runrept(dec)
```

Example 2: Comparing %KUPCASE and %QKUPCASE These statements show the results produced by %KUPCASE and %QKUPCASE:

```
%let a=begin;
%let b=%nrstr(&a);

%put KUPCASE produces: %kupcase(&b);
%put QKUPCASE produces: %qkupcase(&b);
```

When these statements execute, the following is written to the SAS log:

```
KUPCASE produces: begin
QKUPCASE produces: &A
```

CHAPTER

12

System Options for NLS

System Options for NLS by Category

The language control category of SAS system options are affected by NLS. The following table provides brief descriptions of the SAS system options. For more detailed descriptions, see the dictionary entry for each SAS system option:

Table 12.1 Summary of NLS System Options Category

Category	System Options for NLS	Description
Environment control: Language control	"DATESTYLE= System Option" on page 453	Identifies the sequence of month, day, and year when the ANYDTDTM, ANYDTDTE, or ANYDTTME informats encounter input where the year, month, and day determination is ambiguous.
	"DBCS System Option: UNIX, Windows, and z/OS" on page 454	Recognizes double-byte character sets (DBCS).

Category	System Options for NLS	Description
	"DBCSLANG System Option: UNIX, Windows, and z/OS" on page 455	Specifies a double-byte character set (DBCS) language.
	"DBCSTYPE System Option: UNIX, Windows, and z/OS" on page 456	Specifies the encoding method to use for a double-byte character set (DBCS).
	"DFLANG= System Option: OpenVMS, UNIX, Windows, and z/OS" on page 457	Specifies the language for international date informats and formats.
	"ENCODING System Option: OpenVMS, UNIX, Windows, and z/OS" on page 459	Specifies the default character-set encoding for the SAS session.
	"FSDBTYPE System Option: UNIX" on page 460	Specifies a full-screen double-byte character set (DBCS) encoding method.
	"FSIMM System Option: UNIX" on page 461	Specifies input method modules (IMMs) for full-screen double-byte character set (DBCS).
	"FSIMMOPT System Option: UNIX" on page 462	Specifies options for input method modules (IMMs) that are used with a full-screen double-byte character set (DBCS).
	"LOCALE System Option" on page 463	Specifies a set of attributes in a SAS session that reflect the language, local conventions, and culture for a geographical region.
	"LOCALELANGCHG System Option" on page 464	Determines whether the language of the text of the ODS output can be changed
	"NLSCOMPATMODE System Option: z/OS" on page 466	Provides national language compatibility with previous releases of SAS.
	"PAPERSIZE= System Option" on page 467	Specifies the paper size for the printer to use.
	"TRANTAB= System Option" on page 469	Specifies the translation tables that are used by various parts of SAS.
Files: External files	"BOMFILE System Option" on page 453	Specifies whether to write the byte order mark (BOM) prefix on Unicode-encoded external files.

Category	System Options for NLS	Description
Files: SAS files	"RSASIOTRANSERROR System Option" on page 467	Displays a transcoding error when illegal data is read from a remote application.
Sort: Procedure options	Specifies a language-specific collating sequence for the SORT and SQL procedures to use in the current SAS session.	

BOMFILE System Option

Specifies whether to write the byte order mark (BOM) prefix on Unicode-encoded external files.

Valid in: configuration file, SAS invocation, OPTIONS statement, SAS System Options window

Category: Files: External files

PROC OPTIONS GROUP: EXTFILES

Syntax

BOMFILE | NOBOMFILE

Syntax Description

BOMFILE
Specifies to write a byte order mark (BOM) prefix when a Unicode-encoded file is written to an external file.

NOBOMFILE
Specifies not to write a BOM prefix when a Unicode-encoded file is written to an external file.

Details

The BOMFILE system option does not apply when a Unicode-encoded external file is read.

A BOM is a signature at the beginning of a Unicode data stream. The size of the BOM varies depending on the encoding.

DATESTYLE= System Option

Identifies the sequence of month, day, and year when the ANYDTDTM, ANYDTDTE, or ANYDTTME informats encounter input where the year, month, and day determination is ambiguous.

Valid in: configuration file, SAS invocation, OPTIONS statement, SAS System Options window

Category: Environment control: Language control

Input control: Data processing

PROC OPTIONS GROUP= INPUTCONTROL, LANGUAGECONTROL

See: DATESTYLE= system option in *SAS Language Reference: Dictionary*

DBCS System Option: UNIX, Windows, and z/OS

Recognizes double-byte character sets (DBCS).

Default: NODBCS

Valid in: configuration file, SAS invocation

UNIX specifics: Also valid in SASV9_OPTIONS environment variable

Category: Environment control: Language control

PROC OPTIONS GROUP= LANGUAGECONTROL

Syntax

-DBCS | -NODBCS (UNIX and Windows)

DBCS | NODBCS (z/OS)

DBCS
recognizes double-byte character sets (DBCS) for encoding values. DBCS encodings are used to support East Asian languages.

NODBCS
does not recognize a DBCS for encoding values. Instead, a single-byte character set (SBCS) is used for encoding values. A single byte is used to represent each character in the character set.

Details

The DBCS system option is used for supporting languages from East Asian countries such as Chinese, Japanese, Korean, and Taiwanese.

See Also

Conceptual Information:

Chapter 5, “Double-Byte Character Sets (DBCS),” on page 35

“DBCS Values for a SAS Session” on page 547

Chapter 18, “Encoding Values in SAS Language Elements,” on page 549

System Options:

“DBCSLANG System Option: UNIX, Windows, and z/OS” on page 455

"DBCSTYPE System Option: UNIX, Windows, and z/OS" on page 456

DBCSLANG System Option: UNIX, Windows, and z/OS

Specifies a double-byte character set (DBCS) language.

Default: none

Valid in: configuration file, SAS invocation

Category: Environment control: Language control

UNIX specifics: Also valid in SASV9_OPTIONS environment variable

PROC OPTIONS GROUP: LANGUAGECONTROL

Syntax

-DBCSLANG *language* (UNIX and Windows)

DBCSLANG = *language* (z/OS)

language
depends on the operating environment. The following table contains valid language values:

Table 12.2 Supported DBCS Languages According to Operating Environment

Language	z/OS	UNIX	Windows
CHINESE (simplified)	yes*	yes	yes
JAPANESE	yes	yes	yes
KOREAN	yes	yes	yes
TAIWANESE (traditional)	yes	yes	yes
NONE	yes	no	yes
UNKNOWN	yes	no	no

* For z/OS only, HANGUL and HANZI are valid aliases for CHINESE.

Details

The proper setting for the DBCSLANG system option depends on which setting is used for the DBCSTYPE system option. Some of the settings of DBCSTYPE support all of the DBCSLANG languages, while other settings of DBCSTYPE support only Japanese.

CHINESE specifies the language used in the People's Republic of China, which is known as simplified Chinese. TAIWANESE specifies the Chinese language used in Taiwan, which is known as traditional Chinese.

See Also

Conceptual discussion

Chapter 5, "Double-Byte Character Sets (DBCS)," on page 35

"DBCS Values for a SAS Session" on page 547

Chapter 18, "Encoding Values in SAS Language Elements," on page 549

System Options:

"DBCS System Option: UNIX, Windows, and z/OS" on page 454

"DBCSTYPE System Option: UNIX, Windows, and z/OS" on page 456

DBCSTYPE System Option: UNIX, Windows, and z/OS

Specifies the encoding method to use for a double-byte character set (DBCS).

z/OS Default: IBM

UNIX Default: Depends on the specific machine

Windows Default: PCMS

Valid in: configuration file, SAS invocation

Category: Environment control: Language control

UNIX specifics: Also valid in SASV9_OPTIONS environment variable

PROC OPTIONS GROUP: LANGUAGECONTROL

Syntax

-DBCSTYPE *encoding-method* (UNIX and Windows)

DBCSTYPE = *encoding-method* (z/OS)

encoding-method

specifies the method that is used to encode a double-byte character set (DBCS). Valid values for *encoding-method* depend on the standard that the computer hardware manufacturer applies to the operating environment.

Details

DBCS encoding methods vary according to the computer hardware manufacturer and the standards organization.

The DBCSLANG= system option specifies the language that the encoding method is applied to. You should specify DBCSTYPE= only if you also specify the DBCS and DBCSLANG= system options.

z/OS DBCSTYPE= supports the DBCSTYPE= value of IBM.

Operating Environment-Specific DBCSTYPE= Values

Table 12.3 DBCS Encoding Methods for z/OS

DBCSTYPE= Value	Description
IBM	IBM PC encoding method

Table 12.4 DBCS Encoding Methods for UNIX

DBCSTYPE= Value	Description
DEC	DEC encoding method
EUC	Extended UNIX Code encoding method
HP15	Hewlett Packard encoding method
PCIBM	IBM PC encoding method
PCMS	Microsoft PC encoding method
SJIS	Shift-JIS encoding method for the Japanese language only
NONE	Disables DBCS processing

Table 12.5 DBCS Encoding Methods for Windows

DBCSTYPE= Value	Description
PCMS	Microsoft PC encoding method
WINDOWS	Alias for PCMS
SJIS	Shift-JIS encoding method for the Japanese language only

See Also

Conceptual Information:

Chapter 5, “Double-Byte Character Sets (DBCS),” on page 35
“DBCS Values for a SAS Session” on page 547
Chapter 18, “Encoding Values in SAS Language Elements,” on page 549

System Options:

“DBCS System Option: UNIX, Windows, and z/OS” on page 454
“DBCSLANG System Option: UNIX, Windows, and z/OS” on page 455

DFLANG= System Option: OpenVMS, UNIX, Windows, and z/OS

Specifies the language for international date informats and formats.

Default: English

Valid in: configuration file, SAS invocation, OPTIONS statement, SAS System Options window

Category: Environment control: Language control

PROC OPTIONS GROUP: LANGUAGECONTROL

Syntax

DFLANG='*language*'

Syntax Description

'language'

specifies the language that is used for international date informats and formats. These languages are valid values for *language*:

Table 12.6 Prefix Values for *language*

Language	Prefix
Afrikaans	AFR
Catalan	CAT
Croatian	CRO
Czech	CSY
Danish	DAN
Dutch	NLD
English	ENG
Finnish	FIN
French	FRA
German	DEU
Hungarian	HUN
Italian	ITA
Macedonian	MAC
Norwegian	NOR
Polish	POL
Portuguese	PTG
Russian	RUS
Slovenian	SLO
Spanish	ESP
Swedish	SVE

Language	Prefix
Swiss_French	FRS
Swiss_German	DES

Details

You can change the value during a SAS session, but you can use only one language at a time. The values for *language* are not case-sensitive.

ENCODING System Option: OpenVMS, UNIX, Windows, and z/OS

Specifies the default character-set encoding for the SAS session.

OpenVMS and UNIX Default: latin1

z/OS Default: OPEN_ED-1047

Windows Default: wlatin1

Valid in: configuration file, SAS invocation

Category: Environment control: Language control

PROC OPTIONS GROUP: LANGUAGECONTROL

Syntax

-ENCODING= ASCIIANY | EBCDICANY | *encoding-value* (UNIX and Windows)

ENCODING= *encoding-value* (OpenVMS, UNIX, Windows, and z/OS)

ASCIIANY
Transcoding normally occurs when SAS detects that the session encoding and data set encoding are different. ASCIIANY enables you to create a data set that SAS will not transcode if the SAS session that accesses the data set has a session that encoding value of ASCII. If you transfer the data set to a machine that uses EBCDIC encoding, transcoding occurs.

Note: ANY is a synonym for binary. Because the data is binary, the actual encoding is irrelevant. △

EBCDICANY
is valid only for z/OS. Transcoding normally occurs when SAS detects that the session encoding and the data set encoding are different. EBCDICANY enables you to create a data set that SAS will not transcode if the SAS session accessing the data set has a session encoding value of EBCDIC. If you transfer the data set to a machine that uses ASCII encoding, transcoding occurs.

encoding-value
For valid values for all operating environments, see Chapter 19, "Encoding Values for a SAS Session," on page 555.

Details

A character-set encoding is a set of characters that have been mapped to numeric values called *code points*.

The ENCODING= system option is valid only when the NONLSCOMPATMODE system option is set.

The encoding for a SAS session is determined by the values of the ENCODING=, LOCALE=, DBCSTYPE=, and DBCSLANG= system options as follows:

- If the ENCODING= and LOCALE= system options are not specified, the default value is ENCODING=. For OpenVMS and UNIX, the default value is **latin1**; for Windows, the default value is wlatin1; for z/OS, the default is OPEN_ED-1047.
- If both LOCALE= and ENCODING= are specified, the session encoding is the value that is specified by the ENCODING= option.
- If LOCALE= is specified and ENCODING= is not specified, SAS infers the appropriate encoding value from the LOCALE= value.
- If the DBCS option is set, the values for the DBCSLANG= and DBCSTYPE= system options determine the ENCODING= and LOCALE= values.

See Also

Conceptual Information:

"Overview of Locale Concepts for NLS" on page 5
Conceptual discussion about "Overview: Encoding for NLS" on page 9
Conceptual discussion about "Overview to Transcoding" on page 27
Chapter 16, "Values for the LOCALE= System Option," on page 539
Chapter 17, "SAS System Options for Processing DBCS Data," on page 547
Chapter 18, "Encoding Values in SAS Language Elements," on page 549

FSDBTYPE System Option: UNIX

Specifies a full-screen double-byte character set (DBCS) encoding method.

Default: DEFAULT
Valid in: configuration file, SAS invocation, SASV9_OPTIONS environment variable
Category: Environment control: Language control
PROC OPTIONS GROUP: LANGUAGECONTROL
UNIX specifics: all

Syntax

-FSDBTYPE *encoding-method*

Details

The FSDBTYPE= system option specifies the encoding method that is appropriate for a full-screen DBCS enabling method. Full-screen DBCS encoding methods vary according to the computer hardware manufacturer and the standards organization.

Table 12.7 Full-Screen DBCS Encoding Methods

FSDBTYPE= Encoding Method	Description
dec	Digital Equipment Corporation encoding method
euc	Extended UNIX encoding method
hp15	HP-UX encoding method
jis7	7-bit Shift-JIS encoding method used in an X windows environment for the Japanese language only
pcibm	IBM PC encoding method
sjis	Shift-JIS encoding method for the Japanese language only
default	default method that is used by the specific host

See Also

Conceptual Information:

Chapter 5, "Double-Byte Character Sets (DBCS)," on page 35
"DBCS Values for a SAS Session" on page 547
Chapter 18, "Encoding Values in SAS Language Elements," on page 549

FSIMM System Option: UNIX

Specifies input method modules (IMMs) for full-screen double-byte character set (DBCS).

Default: none
Valid in: configuration file, SAS invocation, SASV9_OPTIONS environment variable
Category: Environment control: Language control
PROC OPTIONS GROUP: LANGUAGECONTROL
UNIX specifics: all

Syntax

-FSIMM *fsdevice_name=IMM-name1*<, *fsdevice_name=IMM-name2*>...

Details

You can specify the following values for *IMM-name*:

TTY | SASWUJT
provides an interface for **`/dev/tty`**. This IMM enables you to enter DBCS strings through a terminal emulator that has DBCS input capability.

PIPE | SASWUJP
provides a pipe interface. This interface forks the DBCS input server process. The default server name is **saswujms**, which uses the vendor-supplied MOTIF toolkit.

For example, to use the PIPE input method module for X11 drivers, you would specify:

```
-FSIMM X11=PIPE
```

Note: The server is specified by using the FSIMMOPT option. △

See Also

Conceptual Information:

Chapter 5, “Double-Byte Character Sets (DBCS),” on page 35

System Option:

“FSIMMOPT System Option: UNIX” on page 462

FSIMMOPT System Option: UNIX

Specifies options for input method modules (IMMs) that are used with a full-screen double-byte character set (DBCS).

Default: none

Valid in: configuration file, SAS invocation, SASV9_OPTIONS environment variable

Category: Environment control: Language control

PROC OPTIONS GROUP: LANGUAGECONTROL

UNIX specifics: all

Syntax

-FSIMMOPT *fullscreen-IMM*:*IMM-option*

Details

The FSIMMOPT system option specifies an option for each full-screen IMM (input method module). You can specify only one FSIMMOPT option for each IMM. If you specify multiple FSIMMOPT options for the same IMM, only the last specification is used.

For option values for each IMM, see SAS Technical Report J-121, *DBCS Support Usage Guide* (in Japanese).

For example, you can use the FSIMMOPT option to specify the name of the server, MOTIF, to be used for the PIPE IMM:

```
-fsimmopt PIPE:MOTIF
```

See Also

Conceptual Information:

Chapter 5, "Double-Byte Character Sets (DBCS)," on page 35

System Option:

"FSIMM System Option: UNIX" on page 461

LOCALE System Option

Specifies a set of attributes in a SAS session that reflect the language, local conventions, and culture for a geographical region.

Default: English_UnitedStates

Valid in: configuration file, SAS invocation, OPTIONS statement, SAS System Options window

Category: Environment control: Language control

UNIX specifics: Also valid in SASV9_OPTIONS environment variable

PROC OPTIONS GROUP: LANGUAGECONTROL

Syntax

-LOCALE *locale-name* (UNIX and Windows)

LOCALE=*locale-name* (UNIX, Windows, and z/OS)

locale-name

For a complete list of locale values (SAS names and POSIX names), see Chapter 16, "Values for the LOCALE= System Option," on page 539.

Details

The LOCALE= system option is used to specify the locale, which reflects the local conventions, language, and culture a geographical region.

If the value of the LOCALE= system option is not compatible with the value of the ENCODING= system option, the character-set encoding is determined by the value of the ENCODING= system option.

If the DBCS= system option is active, the values of the DBCSTYPE= and DBCSLANG= system options determine the locale and character-set encoding.

When you set a value for LOCALE=, the value of the following system options are modified unless explicit values have been specified:

ENCODING=

The locale that you set has a common encoding value that is used most often in the operating environment where SAS runs. If you start SAS with the LOCALE= system option and you do not specify the ENCODING= system option, SAS compares the default value for ENCODING= and the most common locale encoding value. If the two encoding values are not the same, the ENCODING= system option is set to the LOCALE= encoding value. When the ENCODING= system option is set, the TRANTAB= system option is also set.

DATESTYLE=
When LOCALE= is set, the DATESTYLE= system option uses the value that corresponds to the chosen locale.

DFLANG=
When LOCALE= is set, the DFLANG= system option is set to a value that corresponds to the chosen locale.

PAPERSIZE=
When LOCALE= is set, the PAPERSIZE= system option is set to a value that corresponds to the chosen locale and the ODS printer is set to the preferred unit of measurement, inches or centimeters, for that locale.

CAUTION:
Under the Windows operating systems only: The LOCALE= option can be used to specify PAPERSIZE= only if the UNIVERSALPRINT and UPRINTMENUSWITCH system options are also specified. For details about the UNIVERSALPRINT system option, see *SAS Language Reference: Dictionary*. For details about the UPRINTMENUSWITCH system option, see *SAS Companion for Windows*. △

See Also

Conceptual Information:

Chapter 2, "Locale for NLS," on page 5
Chapter 16, "Values for the LOCALE= System Option," on page 539

System Options:

"ENCODING System Option: OpenVMS, UNIX, Windows, and z/OS" on page 459
DATESTYLE in *SAS Language Reference: Dictionary*
"DFLANG= System Option: OpenVMS, UNIX, Windows, and z/OS" on page 457
PAPERSIZE in *SAS Language Reference: Dictionary*
"TRANTAB= System Option" on page 469

LOCALELANGCHG System Option

Determines whether the language of the text of the ODS output can be changed

Default: LOCALELANGCHG is set to off in all servers except for the UNICODE server

Valid in: configuration file, SAS invocation

Category: Environment control: Language control

PROC OPTIONS GROUP= LANGUAGECONTROL

Tip: The Language Switching feature, which uses the LOCALELANGCHG option, is supported in a Unicode server (a SAS server with a session encoding of UTF-8, ENCODING=utf8).

Syntax

LOCALELANGCHG | NOLOCALELANGCHG

Syntax Description

LOCALELANGCHG
Specifies that the language of the SAS message text in ODS output can change when the LOCALE option is set after startup.

NOLOCALELANGCHG
Specifies that the language of the SAS message text in ODS output cannot change when the LOCALE option is set after startup.

Details

The Language Switching feature allows you to change the language of SAS messages after startup. You must enable LOCALELANGCHG to use this feature.

During startup, the configuration file and LOCALE option determine the language for SAS messages. After startup, if the LOCALE option and LOCALELANGCHG option are set, then the language for messages and ODS templates can change to reflect the LOCALE setting when the localizations are available.

You can enable LOCALELANGCHG but not translate into the language of the locale. For example, if you enable LOCALELANGCHG, then start a SAS session in French and set the locale to Greek, NLDATE displays in Greek. The output displays in French. The output displays in French because SAS does not translate into Greek.

Comparisons

If LOCALELANGCHG is enabled at startup and LOCALE is changed during the session, the ODS PATH is updated to include the translated template item store if it exists for the language of the new locale. Messages that do not appear in the SAS log appear in the language of the new locale. Also log messages appear in the original language of the session locale.

If LOCALELANGCHG is not enabled at startup and LOCALE is changed during the session, ODS output appears in the language that was set at startup.

Examples

Example 1 is a French server with LOCALELANGCHG not enabled (NOLOCALELANGCHG).

If a French-client application connects to the server, the output appears in French, and dates, formatted by using the NLDATE format, appear in French. If a German-client application connects to the French server, and the locale is set to German on the executive session, then output messages appear in French, and dates formatted with NLDATE appear in German.

Example 2 is a French server with LOCALELANGCHG enabled (LOCALELANGCHG).

If a French-client application connects to the server, the output appears in French, and dates, formatted by using the NLDATE format, appear in French. If a German-client application connects to the French server, and the locale is set to German on the executive session, then output messages appear in German, and dates formatted with NLDATE appear in German.

NLSCOMPATMODE System Option: z/OS

Provides national language compatibility with previous releases of SAS.

Default: NONLSCOMPATMODE

Valid in: configuration file, SAS invocation

Category: Environment control: Language control

PROC OPTIONS GROUP: LANGUAGECONTROL

Syntax

NLSCOMPATMODE | NONLSCOMPATMODE

Syntax Description

NLSCOMPATMODE
provides compatibility with previous releases of SAS in order to process data in languages other than English, which is the default language. Programs that ran in previous releases of SAS will continue to work when NLSCOMPATMODE is set.

Note: NLSCOMPATMODE might affect the format of outputs that are produced using ODS. If you are using ODS, set the option value to NONLSCOMPATMODE. △

NONLSCOMPATMODE
provides support for data processing using native characters for languages other than English. When NONLSCOMPATMODE is set, character data is processed using the encoding that is specified for the SAS session.

When NONLSCOMPATMODE is in effect, SAS does not support substitution characters in SAS syntax. If you run SAS with NONLSCOMPATMODE, you must update existing programs to use national characters instead of substitution characters. For example, Danish customers who have substituted the 'Å' for the '$' character in existing SAS programs will have to update the SAS syntax to use the '$' in their environments.

Details

The NONLSCOMPATMODE system option is provided for international customers who use non-English encodings and who want to take advantage of emerging industry standards when they are coding new applications.

The NLSCOMPATMODE or NONLSCOMPATMODE settings do not change the value of the LOCALE or ENCODING system options. When NONLSCOMPATMODE is in effect, the encoding that SAS uses to process character data is the encoding that is set by the ENCODING or LOCATE options. Compiler and Session encoding characters remain separate.

Note: In preperation for deprecating the NLSCOMPATMODE option, the following warning will be displayed in the SAS log when NLSCOMPATMODE is set: SAS has been started in NLS compatibility mode with the NLSCOMPATMODE option.

```
This option will be deprecated in a future release of SAS and NLS compatibility
mode will no longer be supported. For more information, contact a SAS
representative or Technical Support.
```

△

PAPERSIZE= System Option

Specifies the paper size for the printer to use.

Valid in: configuration file, SAS invocation, OPTIONS statement, SAS System Options window

Category: Environment control: Language control

PROC OPTIONS GROUP: LANGUAGECONTROL

See: PAPERSIZE= System Option in *SAS Language Reference: Dictionary*

RSASIOTRANSERROR System Option

Displays a transcoding error when illegal data is read from a remote application.

Default: RSASIOTRANSERROR

Valid in: configuration file, SAS invocation, OPTIONS statement, SAS System Options window

Category: Files: SAS files

PROC OPTIONS GROUP: SASFILES

Syntax

RSASIOTRANSERROR | NOSASIOTRANSERROR

Syntax Description

RSASIOTRANSERROR
specifies to display a transcoding error when illegal values are read from a remote application.

NOSASIOTRANSERROR
specifies not to display a transcoding error when illegal values are read from a remote application.

Details

The RSASIOTRANSERROR system option enables remote users of SASIO, for example SAS Enterprise Guide and SAS Enterprise Miner, to ignore illegal data values. An

illegal data value typically will cause a transcoding error when the data is read by a remote application.

SORTSEQ= System Option: UNIX, Windows, and z/OS

Specifies a language-specific collating sequence for the SORT and SQL procedures to use in the current SAS session.

Valid in: configuration file, SAS invocation, OPTIONS statement, SAS System Options window

Category: Sort: Procedure options

PROC OPTIONS GROUP: SORT

Syntax

SORTSEQ=*collating-sequence*

Syntax Description

collating-sequence
specifies the collating sequence that the SORT procedure is to use in the current SAS session. Valid values can be user-supplied, or they can be one of the following:

- ASCII
- DANISH (alias NORWEGIAN)
- EBCDIC
- FINNISH
- ITALIAN
- NATIONAL
- POLISH
- REVERSE
- SPANISH
- SWEDISH

Details

To create or change a collating sequence, use the TRANTAB procedure to create or modify translation tables. When you create your own translation tables, they are stored in your PROFILE catalog, and they override any translation tables with the same name that are stored in the HOST catalog.

Note: System managers can modify the HOST catalog by copying newly created tables from the PROFILE catalog to the HOST catalog. All users can access the new or modified translation tables. △

If you are in a windowing environment, use the Explorer window to display the SASHELP HOST catalog. In the HOST catalog, entries of type TRANTAB contain collating sequences that are identified by the entry name.

If you are not in a windowing environment, issue the following statements to generate a list of the contents of the HOST catalog. Collating sequences are entries of the type TRANTAB.

```
proc catalog catalog=sashelp.host;
   contents;
run;
```

To see the contents of a particular translation table, use these statements:

```
proc trantab table=translation-table-name;
   list;
run;
```

The contents of collating sequences are displayed in the SAS log.

Example

This example demonstrates the functionality of SORTSEQ with PROC SORT and PROC SQL:

```
options sortseq=reverse;
proc sort data=sashelp.class out=foo1;
by name;
run;

proc sql;
create table foo2 as select * from sashelp.class order by name;
quit;
run;
```

See Also

"Collating Sequence" on page 16

System Options:
"TRANTAB= System Option" on page 469

TRANTAB= System Option

Specifies the translation tables that are used by various parts of SAS.

Valid in: configuration file, SAS invocation, OPTIONS statement, SAS System Options window

Category: Environment control: Language control

PROC OPTIONS GROUP: LANGUAGECONTROL

Interaction: The TRANTAB= system option specifies a translation table to use for the SAS session, including file transfers. The TRANTAB statement specifies a customized translation table (for example, to map an EBCDIC character to an ASCII character) to apply to the character set in the SAS file that is being exported or transferred.

Syntax

TRANTAB=(*catalog-entries*)

Note: TRANTAB= was introduced in SAS 6 to support the requirements of national languages. SAS 8.2 introduced the LOCALE= system option as an improvement on the features of TRANTAB=. SAS 9.2 supports TRANTAB= for backward compatibility. However, using the LOCALE= system option is preferred in later SAS releases. △

Syntax Description

catalog-entries
specifies SAS catalog entries that contain translation tables. If you specify *entry-name.type*, SAS searches SASUSER.PROFILE first and then SASUSER.HOST.

Details

Translation tables are specified in a list that is enclosed in parentheses and has ten positions. The position in which a table appears in the list determines the type of translation table that is specified. Individual entries in the list are separated by commas. See the list of positions and types that follows:

Position	Type of Translation Table
1st	local-to-transport-format
2nd	transport-to-local-format
3rd	lowercase-to-uppercase
4th	uppercase-to-lowercase
5th	character classification
6th	scanner translation
7th	delta characters
8th	scanner character classification
9th	not used
10th	DBCS user table

CAUTION:
Do not change a translation table unless you are familiar with its purpose. Translation tables are used internally by the SAS supervisor to implement NLS. If you are unfamiliar with the purpose of translation tables, do *not* change the specifications without proper technical advice. △

To change one table, specify null entries for the other tables. For example, to change the lowercase-to-uppercase table, which is third in the list, specify uppercase as follows:

```
options trantab = ( , , new-uppercase-table);
```

The other tables remain unchanged. The output from the OPTIONS procedure reflects the last specification for the TRANTAB= option and not the composite specification. Here is an example:

```
options trantab = ( , , new-uppercase-table);
options trantab = ( , , , new-lowercase-table);
```

PROC OPTIONS shows that the value for TRANTAB= is
(, , , *new-lowercase-table*), but both the *new-uppercase* and *new-lowercase* tables are in effect.

See Also

Chapter 15, “The TRANTAB Procedure,” on page 511

CHAPTER

13 Options for Commands, Statements, and Procedures for NLS

Commands, Statements, and Procedures for NLS by Category

The data set control and data access categories of options for selected SAS statements are affected by NLS. The following table provides brief descriptions of the statement options. For more detailed descriptions, see the dictionary entry for each statement option:

Table 13.1 Summary of NLS Statements by Category

Category	Commands, Statements, and Procedures for NLS by Category	Description
Data Access	"CVPBYTES=, CVPENGINE=, and CVPMULTIPLIER= Options" on page 482	Specifies attributes for character variables that are needed in order to transcode a SAS file.
	"ENCODING= Option" on page 487	Overrides and transcodes the encoding for input or output processing of external files.
	"INENCODING= and OUTENCODING= Options" on page 490	Overrides and changes the encoding when reading or writing SAS data sets in the SAS library.

Category	Commands, Statements, and Procedures for NLS by Category	Description
	"ODSCHARSET= Option" on page 492	Specifies the character set to be generated in the META declaration for the output.
	"ODSTRANTAB= Option" on page 493	Specifies the translation table to use when transcoding an XML document for an output file.
	"RENCODING= Option" on page 494	Specifies the ASCII-based or EBCDIC-based encoding to use for transcoding data for a SAS/SHARE server session that is using an EBCDICANY or ASCIIANY session encoding.
	"XMLENCODING= Option" on page 499	Overrides the encoding of an XML document to import or export an external document.
Information	"TRANSCODE= Option" on page 496	Specifies an attribute in the ATTRIB statement (which associates a format, informat, label, and length with one or more variables) that indicates whether character variables are to be transcoded.
ODS: Third-Party Formatted	"CHARSET= Option" on page 474	Specifies the character set to be generated in the META declaration for the output.
	"TRANTAB= Option" on page 498	Specifies the translation table to use when you are transcoding character data in a SAS file for the appropriate output file.

CHARSET= Option

Specifies the character set to be generated in the META declaration for the output.

Valid in: LIBNAME statement for the ODS MARKUP and ODS HTML statements

Category: ODS: Third-Party Formatted

Syntax

CHARSET=*character-set* ;

Arguments

character-set

Specifies the character set to use in the META tag for HTML output.

An example of an encoding is ISO-8859-1. Official character sets for use on the Internet are registered by IANA (Internet Assigned Numbers Authority). IANA is the central registry for various Internet protocol parameters, such as port, protocol and enterprise numbers, and options, codes and types. For a complete list of character-set values, visit **`www.unicode.org/reports/tr22/index.html`** and **`www.iana.org/assignments/character-sets`**.

Note: A *character set* is like an *encoding-value* in this context. However, *character set* is the term that is used to identify an encoding that is suitable for use on the Internet. △

Examples

Example 1: Generated Output in a META Declaration for an ODS MARKUP Statement

```
<META http-equiv="Content-Type" content="text/html; charset=iso-8858-1">
```

See Also

Conceptual Information:

Chapter 3, "Encoding for NLS," on page 9

Statements:

ODS MARKUP in *SAS Output Delivery System: User's Guide*

ODS HTML in *SAS Output Delivery System: User's Guide*

Collating Sequence Option

Specifies the collating sequence for PROC SORT.

Valid in: PROC SORT statement

PROC SORT statement: Sorts observations in a SAS data set by one or more characters or numeric variables

Syntax

PROC SORT *collating-sequence-option <other option(s)>*;

Options

Task	Option
Specify the collating sequence	
Specify ASCII	ASCII
Specify EBCDIC	EBCDIC
Specify Danish	DANISH
Specify Finnish	FINNISH
Specify Norwegian	NORWEGIAN
Specify Polish	POLISH
Specify Swedish	SWEDISH

Task	Option
Specify a customized sequence	NATIONAL
Specify any of the collating sequences listed above (ASCII, EBCDIC, DANISH, FINNISH, ITALIAN, NORWEGIAN, POLISH, SPANISH, SWEDISH, or NATIONAL), the name of any other system provided translation table (POLISH, SPANISH), and the name of a user-created translation table. You can specify an encoding. You can also specify either the keyword LINGUISTIC or UCA to achieve a locale-appropriate collating sequence.	SORTSEQ=

Options can include one *collating-sequence-option* and multiple *other options*. The order of the two types of options does not matter and both types are not necessary in the same PROC SORT step. Only the explanations for the PROC SORT collating-sequence-options follow.

Operating Environment Information: For information about behavior specific to your operating environment for the DANISH, FINNISH, NORWEGIAN, or SWEDISH *collating-sequence-option*, see the SAS documentation for your operating environment. △

ASCII
: sorts character variables using the ASCII collating sequence. You need this option only when you want to achieve an ASCII ordering on a system where EBCDIC is the native collating sequence.

DANISH
NORWEGIAN
: sorts characters according to the Danish and Norwegian convention.
  The Danish and Norwegian collating sequence is shown in Figure 13.1 on page 477.

EBCDIC
: sorts character variables using the EBCDIC collating sequence. You need this option only when you want to achieve an EBCDIC ordering on a system where ASCII is the native collating sequence.

POLISH
: sorts characters according to the Polish convention.

FINNISH
SWEDISH
: sorts characters according to the Finnish and Swedish convention. The Finnish and Swedish collating sequence is shown in Figure 13.1 on page 477.

NATIONAL
: sorts character variables using an alternate collating sequence, as defined by your installation, to reflect a country's National Use Differences. To use this option, your site must have a customized national sort sequence defined. Check with the SAS Installation Representative at your site to determine whether a customized national sort sequence is available.

NORWEGIAN
: See DANISH.

SWEDISH
See FINNISH.

SORTSEQ=*collating-sequence*
specifies the collating sequence. The *collating-sequence* can be a collating-sequence-option, a translation table, an encoding, or the keyword LINGUISTIC. Only one collating sequence can be specified. For detailed information, refer to "Collating Sequence" on page 16.

Here are descriptions of the collating sequences:

collating—sequence—option | translation_table
specifies either a translation table, which can be one that SAS provides or any user-defined translation table, or one of the PROC SORT statement Collating-Sequence-Options. For an example of using PROC TRANTAB and PROC SORT with SORTSEQ=, see Using Different Translation Tables for Sorting.

The available translation tables are

ASCII

DANISH

EBCDIC

FINNISH

ITALIAN

NORWEGIAN

POLISH

REVERSE

SPANISH

SWEDISH

The following figure shows how the alphanumeric characters in each language will sort.

Figure 13.1 National Collating Sequences of Alphanumeric Characters

```
Danish:     0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZÆØÅabcdefghijklmnopqrstuvwxyzæøå
Finnish:    0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZÅÄÖabcdefghijklmnopqrstuvwxyzåäö
Italian:    0123456789AÀBCÇDEÉÈFGHIÌJKLMNOÒPQRSTUÙVWXYZaàbcçdeéèfghiìjklmnoòpqrstuùvwxyz
Norwegian:  0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZÆØÅabcdefghijklmnopqrstuvwxyzæøå
Spanish:    0123456789AÁaáBbCcDdEÉeéFfGgHhIÍiíJjKkLlMmNnÑñOÓoóPpQqRrSsTtUÚuúÜüVvWwXxYyZz
Swedish:    0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZÅÄÖabcdefghijklmnopqrstuvwxyzåäö
```

Restriction: You can specify only one *collating-sequence-option* in a PROC SORT step.

Tip: The SORTSEQ= collating sequence options are specified without parenthesis and have no arguments associated with them. An example of how to specify a collating sequence follows:

```
proc sort data=mydata SORTSEQ=ASCII;
```

encoding-value
specifies an encoding value. The result is the same as a binary collation of the character data represented in the specified encoding. See the supported encoding values in "SBCS, DBCS, and Unicode Encoding Values for Transcoding Data" on page 549.

Restriction: PROC SORT is the only procedure or part of the SAS system that recognizes an encoding specified for the SORTSEQ= option.

Tip: When the encoding value contains a character other than an alphanumeric character or underscore, the value needs to be enclosed in quotation marks.

See: The list of the encodings that can be specified in "SBCS, DBCS, and Unicode Encoding Values for Transcoding Data" on page 549.

LINGUISTIC<*(collating—rules)*>
specifies linguistic collation, which sorts characters according to rules of the specified language. The rules and default collating sequence options are based on the language specified in the current locale setting. The implementation is provided by the International Components for Unicode (ICU) library and produces results that are largely compatible with the Unicode Collation Algorithms (UCA).

Alias: UCA

Restriction: The SORTSEQ=LINGUISTIC option is available only on the PROC SORT SORTSEQ= option and is not available for the SAS System SORTSEQ= option.

Restriction Note that linguistic collation is not supported on platforms VMS on Itanium (VMI) or 64-bit Windows on Itanium (W64).

Tip: LINGUISTIC sorting requires more memory with the z/OS mainframe. You might need to set your REGION to 50M or higher. This action must be done in JCL, if you are running in batch mode, or in the VERIFY screen if you are running interactively. This action allows the ICU libraries to load properly and does not affect the memory that is used for sorting.

Tip: The *collating-rules* must be enclosed in parentheses. More than one collating rule can be specified.

Tip: When BY processing is performed on data sets that are sorted with linguistic collation, the NOBYSORTED system option might need to be specified in order for the data set to be treated properly. BY processing is performed differently than collating sequence processing.

See: The ICU License agreement in the *Base SAS Procedures Guide*.

See: The "Collating Sequence" on page 16 for detailed information on linguistic collation.

See Also: Refer to *http://www.unicode.org* Web site for the Unicode Collation Algorithm (UCA) specification.

The following are the *collation-rules* that can be specified for the LINGUISTIC option. These rules modify the linguistic collating sequence:

ALTERNATE_HANDLING=SHIFTED
controls the handling of variable characters like spaces, punctuation, and symbols. When this option is not specified (using the default value Non-Ignorable), differences among these variable characters are of the same importance as differences among letters. If the ALTERNATE_HANDLING option is specified, these variable characters are of minor importance.

Default: NON_IGNORABLE

Tip: The SHIFTED value is often used in combination with STRENGTH= set to Quaternary. In such a case, whitespace, punctuation, and symbols are considered when comparing strings, but only if all other aspects of the strings (base letters, accents, and case) are identical.

CASE_FIRST=

specify order of uppercase and lowercase letters. This argument is valid for only TERTIARY, QUATERNARY, or IDENTICAL levels. The following table provides the values and information for the CASE_FIRST argument:

Value	Description
UPPER	Sorts uppercase letters first, then the lowercase letters.
LOWER	Sorts lowercase letters first, then the uppercase letters.

COLLATION=

The following table lists the available COLLATION= values: If you do not select a collation value, then the user's locale-default collation is selected.

Value	Description
BIG5HAN	specifies Pinyin ordering for Latin and specifies big5 charset ordering for Chinese, Japanese, and Korean characters.
DIRECT	specifies a Hindi variant.
GB2312HAN	specifies Pinyin ordering for Latin and specifies gb2312han charset ordering for Chinese, Japanese, and Korean characters.
PHONEBOOK	specifies a telephone-book style for ordering of characters. Select PHONEBOOK only with the German language.
PINYIN	specifies an ordering for Chinese, Japanese, and Korean characters based on character-by-character transliteration into Pinyin.This ordering is typically used with simplified Chinese.
POSIX	is the Portable Operating System Interface. This option specifies a "C" locale ordering of characters.
STROKE	specifies a nonalphabetic writing style ordering of characters. Select STROKE with Chinese, Japanese, Korean, or Vietnamese languages. This ordering is typically used with Traditional Chinese.
TRADITIONAL	specifies a traditional style for ordering of characters. For example, select TRADITIONAL with the Spanish language.

LOCALE=*locale_name*
specifies the locale name in the form of a POSIX name. For example, ja_JP. See the Table 16.1 on page 539 for a list of locale and POSIX values supported by PROC SORT.

Restriction: The following locales are not supported by PROC SORT:

Afrikaans_SouthAfrica, af_ZA

Cornish_UnitedKingdom, kw_GB

ManxGaelic_UnitedKingdom, gv_GB

NUMERIC_COLLATION=
orders integer values within the text by the numeric value instead of characters used to represent the numbers.

Value	Description
ON	Order numbers by the numeric value. For example, "8 Main St." would sort before "45 Main St.".
OFF	Order numbers by the character value. For example, "45 Main St." would sort before "8 Main St.".

Default: OFF

STRENGTH=
The value of strength is related to the collation level. There are five collation-level values. The following table provides information about the five levels. The default value for strength is related to the locale.

Value	Type of Collation	Description
PRIMARY or 1	PRIMARY specifies differences between base characters (for example, "a" < "b").	It is the strongest difference. For example, dictionaries are divided into different sections by base character.
SECONDARY or 2	Accents in the characters are considered secondary differences (for example, "as" < "às" < "at").	A secondary difference is ignored when there is a primary difference anywhere in the strings. Other differences between letters can also be considered secondary differences, depending on the language.
TERTIARY or 3	Upper and lowercase differences in characters are distinguished at the tertiary level (for example, "ao" < "Ao" < "aò").	A tertiary difference is ignored when there is a primary or secondary difference anywhere in the strings. Another example is the difference between large and small Kana.

Value	Type of Collation	Description
QUATERNARY or 4	When punctuation is ignored at level 1-3, an additional level can be used to distinguish words with and without punctuation (for example, "ab" < "a-b" < "aB").	The quaternary level should be used if ignoring punctuation is required or when processing Japanese text. This difference is ignored when there is a primary, secondary or tertiary difference.
IDENTICAL or 5	When all other levels are equal, the identical level is used as a tiebreaker. The Unicode code point values of the Normalization Form D (NFD) form of each string are compared at this level, just in case there is no difference at levels 1-4.	This level should be used sparingly, as only code point values differences between two strings is an extremely rare occurrence. For example, only Hebrew cantillation marks are distinguished at this level.

Alias: LEVEL=

CAUTION:
If you use a host sort utility to sort your data, then specifying a translation table based collating sequence with the SORTSEQ= option might corrupt the character BY variables. For more information, see the PROC SORT documentation for your operating environment. △

See Also

"Collating Sequence" on page 16
Procedures
The SORT Procedure in *Base SAS Procedures Guide*.
System Options:
"SORTSEQ= System Option: UNIX, Windows, and z/OS" on page 467
"TRANTAB= System Option" on page 469

CORRECTENCODING= Option

Explicitly changes the encoding attribute of a SAS file to match the encoding of the data in the SAS file.

Valid in: MODIFY statement of the DATASETS procedure

Syntax

MODIFY *SAS file* </<CORRECTENCODING=*encoding-value*>> ;

Options

</ <CORRECTENCODING=*encoding-value*> >
enables you to change the encoding indicator, which is recorded in the file's descriptor information, in order to match the actual encoding of the file's data. You cannot use this option in parenthesis after the name of each SAS file; you must specify CORRECTENCODING= after the forward slash. For example:

```
modify mydata / correctencoding=latin2;
```

For a list of valid encoding values for transcoding, see "SBCS, DBCS, and Unicode Encoding Values for Transcoding Data" on page 549.

Restriction: CORRECTENCODING= can be used only when the SAS file uses the default base engine, which is V9 in SAS 9.

Example

Example 1: Using the CORRECTENCODING= Option to Resolve a SAS Session Encoding and a SAS File Encoding A file's encoding indicator can be different from the data's encoding. For example, a SAS file that was created before SAS 9 has no encoding indicator stored on the file. If such a SAS file that has no recorded encoding is opened in a SAS 9 session, SAS assigns the encoding of the current session. For example, if the encoding of the data is Danish EBCDIC, but the encoding for the current session is Western Wlatin1, then the actual encoding of the file's data and the encoding indicator that is stored in the file's descriptor information do not match. When this action occurs, the data does not transcode correctly and could result in unreadable output. The following MODIFY statement would resolve the problem by explicitly assigning an EDCDIC encoding:

Note: CEDA creates a read-only copy. You need to copy the data with PROC COPY or a DATA step to transcode the data permanently. △

```
proc datasets library=myfiles;
   modify olddata / correctencoding=ebcdic1142;
quit;
```

CVPBYTES=, CVPENGINE=, and CVPMULTIPLIER= Options

Specifies attributes for character variables that are needed in order to transcode a SAS file.

Valid in: LIBNAME statement

Category: Data Access

PROC OPTIONS GROUP: LIBNAME statement in the documentation for your operating environment

See Also: LIBNAME, SAS/ACCESS

Syntax

LIBNAME *libref* <CVPBYTES=*bytes*> <CVPENGINE=*engine*>
<CVPMULTIPLIER=*multiplier*> '*SAS data-library*';

Options

CVPBYTES=*bytes*
specifies the number of bytes by which to expand character variable lengths when processing a SAS data file that requires transcoding. The CVP engine expands the lengths so that character data truncation does not occur. The lengths for character variables are increased by adding the specified value to the current length. You can specify a value from 0 to 32766.

For example, the following LIBNAME statement implicitly assigns the CVP engine by specifying the CVPBYTES= option.

```
libname expand 'SAS data-library' cvpbytes=5;
```

Character variable lengths are increased by adding 5 bytes. A character variable with a length of 10 is increased to 15, and a character variable with a length of 100 is increased to 105.

Default: If you specify CVPBYTES=, SAS automatically uses the CVP engine in order to expand the character variable lengths according to your specification. If you explicitly assign the CVP engine but do not specify either CVPBYTES= or CVPMULTIPLIER=, then SAS uses CVPMULTIPLIER=1.5 to increase the lengths of the character variables.

Requirement: The number of bytes that you specify must be large enough to accommodate any expansion; otherwise, truncation will still occur, which results in an error message in the SAS log.

Restriction: The CVP engine supports SAS data files only; that is, no SAS views, catalogs, item stores, and so on.

Restriction: The CVP engine is available for input (read) processing only.

Limitation: For library concatenation with mixed engines that include the CVP engine, only SAS data files are processed. For example, if you execute the COPY procedure, only SAS data files are copied.

Interaction: You cannot specify both CVPBYTES= and CVPMULTIPLIER=. Specify one of these options.

Featured in: Example 1 on page 484

See also: “Avoiding Character Data Truncation by Using the CVP Engine” on page 38

CVPENGINE=*engine*
specifies the engine to use in order to process a SAS data file that requires transcoding. The CVP engine expands the character variable lengths to transcoding so that character data truncation does not occur. Then the specified engine does the actual file processing.

Alias: CVPENG

Default: SAS uses the default SAS engine.

See also: “Avoiding Character Data Truncation by Using the CVP Engine” on page 38

CVPMULTIPLIER=*multiplier*
specifies a multiplier value in order to expand character variable lengths when you are processing a SAS data file that requires transcoding. The CVP engine expands the lengths so that character data truncation does not occur. The lengths for character variables are increased by multiplying the current length by the specified value. You can specify a multiplier value from 1 to 5.

For example, the following LIBNAME statement implicitly assigns the CVP engine by specifying the CVPMULTIPLIER= option.

```
libname expand 'SAS data-library' cvpmultiplier=2.5;
```

Character variable lengths are increased by multiplying the lengths by 2.5. A character variable with a length of 10 is increased to 25, and a character variable with a length of 100 is increased to 250.

Alias: CVPMULT

Default: If you specify CVPMULTIPLIER=, SAS automatically uses the CVP engine in order to expand the character variable lengths according to your specification. If you explicitly specify the CVP engine but do not specify either CVPMULTIPLIER= or CVPBYTES=, then SAS uses CVPMULTIPLIER=1.5 to increase the lengths.

Requirement: The number of bytes that you specify must be large enough to accommodate any expansion; otherwise, truncation will still occur, which results in an error in the SAS log.

Restriction: The CVP engine supports SAS data files only; that is, no SAS views, catalogs, item stores, and so on.

Restriction: The CVP engine is available for input (read) processing only.

Limitation: For library concatenation with mixed engines that include the CVP engine, only SAS data files are processed. For example, if you execute the COPY procedure, only SAS data files are copied.

Interaction: You cannot specify both CVPMULTIPLIER= and CVPBYTES=. Specify one of these options.

See also: "Avoiding Character Data Truncation by Using the CVP Engine" on page 38

Example

Example 1: Using the CVP (Character Variable Padding) Engine The following example illustrates how to avoid character data truncation by using the CVP engine. The example uses a SAS data set named MYFILES.WLATIN2, which contains some national characters in Wlatin2 encoding.

The SAS System

Obs	var1	var2	var3	var4
1	A	Š	œ	³

Here is PROC CONTENTS output for MYFILES.WLATIN2, which shows that the encoding is Wlatin2 and that the length for each character variable is 1 byte:

Output 13.1 PROC CONTENTS Output for MYFILES.WLATIN2

```
                              The SAS System                                    1

                            The CONTENTS Procedure

Data Set Name        MYFILES.WLATIN2                          Observations          1
Member Type          DATA                                     Variables             4
Engine               V9                                       Indexes               0
Created              Thursday, November 07, 2003 02:02:36     Observation Length    4
Last Modified        Thursday, November 07, 2003 02:02:36     Deleted Observations  0
Protection                                                    Compressed            NO
Data Set Type                                                 Sorted                NO
Label
Data Representation  WINDOWS_32
Encoding             wlatin2  Central Europe (Windows)


                       Engine/Host Dependent Information

Data Set Page Size          4096
Number of Data Set Pages    1
First Data Page             1
Max Obs per Page            987
Obs in First Data Page      1
Number of Data Set Repairs  0
File Name                   C:\Documents and Settings\xxxxxx\My
                            Documents\myfiles\wlatin2.sas7bdat
Release Created             9.0100A0
Host Created                XP_PRO


                  Alphabetic List of Variables and Attributes

                           #    Variable    Type    Len

                           1    Var1        Char      1
                           2    Var2        Char      1
                           3    Var3        Char      1
                           4    Var4        Char      1
```

The following code is executed with the session encoding Wlatin2.

```
options msglevel=i;
libname myfiles 'SAS data-library';

data myfiles.utf8 (encoding="utf-8");
   set myfiles.wlatin2;
run;
```

The DATA step requests a new data set named MYFILES.UTF8, and requests that the data be read into the new data set in UTF-8 encoding, which means that the data must be transcoded from Wlatin2 to UTF-8. The request results in errors due to character data truncation that occurs from the transcoding. The new data set MYFILES.UTF8 is created but does not contain any data.

Output 13.2 SAS Log with Transcoding Error

```
   1    options msglevel=i;
   2    libname myfiles 'C:\Documents and Settings\xxxxxx\My Documents\myfiles';
   NOTE: Libref MYFILES was successfully assigned as follows:
         Engine:        V9
         Physical Name: C:\Documents and Settings\xxxxxx\My Documents\myfiles
   3    data myfiles.utf8 (encoding="utf-8");
   4       set myfiles.wlatin2;
   5    run;

INFO: Data file MYFILES.UTF8.DATA is in a format native to another
host or the file encoding does not match the session encoding.
Cross Environment Data Access will be used, which may require additional
CPU resources and reduce performance.
   ERROR: Some character data was lost during transcoding in the data set MYFILES.UTF8.
   NOTE: The data step has been abnormally terminated.
   NOTE: The SAS System stopped processing this step because of errors.
   NOTE: There were 1 observations read from the data set MYFILES.WLATIN2.
   WARNING: The data set MYFILES.UTF8 may be incomplete.  When this step was stopped there were 0
            observations and 4 variables.
```

The following code is executed again with the session encoding Wlatin2.

```
options msglevel=i;
libname myfiles 'SAS data-library';

libname expand cvp 'SAS data-library' cvpbytes=2;

data myfiles.utf8 (encoding="utf-8");
   set expand.wlatin2;
run;
```

In this example, the CVP engine is used to expand character variable lengths by adding two bytes to each length. The data is read into the new file in UTF-8 encoding by transcoding from Wlatin2 to UTF-8. There is no data truncation due to the expanded character variable lengths, and the new data set is successfully created:

Output 13.3 SAS Log Output for MYFILES.UTF8

```
   12   options msglevel=i;
   13   libname myfiles 'C:\Documents and Settings\xxxxxx\My Documents\myfiles';
   NOTE: Directory for library MYFILES contains files of mixed engine types.
   NOTE: Libref MYFILES was successfully assigned as follows:
         Engine:        V9
         Physical Name: C:\Documents and Settings\xxxxxx\My Documents\myfiles
   14   libname expand cvp 'C:\Documents and Settings\xxxxxx\My Documents\myfiles' cvpbytes=2;
   WARNING: Libname EXPAND refers to the same physical library as MYFILES.
   NOTE: Libref EXPAND was successfully assigned as follows:
         Engine:        CVP
         Physical Name: C:\Documents and Settings\xxxxxx\My Documents\myfiles
   15   data myfiles.utf8 (encoding="utf-8");
   16      set expand.wlatin2;
   17   run;

INFO: Data file MYFILES.UTF8.DATA is in a format native to another
host or the file encoding does not match the session encoding.
Cross Environment Data Access will be used, which may require additional
CPU resources and reduce performance.
   NOTE: There were 1 observations read from the data set EXPAND.WLATIN2.
   NOTE: The data set MYFILES.UTF8 has 1 observations and 4 variables.
```

Finally, here is PROC CONTENTS output for MYFILES.UTF8 showing that it is in UTF-8 encoding and that the length of each character variable is 3:

Output 13.4 PROC CONTENTS Output for MYFILES.UTF8

```
                                The SAS System                                1

                            The CONTENTS Procedure

Data Set Name        MYFILES.UTF8                          Observations          1
Member Type          DATA                                  Variables             4
Engine               V9                                    Indexes               0
Created              Thursday, November 07, 2003 02:40:34  Observation Length    12
Last Modified        Thursday, November 07, 2003 02:40:34  Deleted Observations  0
Protection                                                 Compressed            NO
Data Set Type                                              Sorted                NO
Label
Data Representation  WINDOWS_32
Encoding             utf-8  Unicode (UTF-8)


                          Engine/Host Dependent Information

Data Set Page Size          4096
Number of Data Set Pages    1
First Data Page             1
Max Obs per Page            335
Obs in First Data Page      1
Number of Data Set Repairs  0
File Name                   C:\Documents and Settings\xxxxxx\My Documents\myfiles\utf8.sas7bdat
Release Created             9.0100A0
Host Created                XP_PRO


                       Alphabetic List of Variables and Attributes

                        #    Variable    Type    Len

                        1    Var1        Char      3
                        2    Var2        Char      3
                        3    Var3        Char      3
                        4    Var4        Char      3
```

ENCODING= Option

Overrides and transcodes the encoding for input or output processing of external files.

Valid in: %INCLUDE statement; FILE statement; FILENAME statement; FILENAME statement, EMAIL (SMTP) Access Method; INFILE statement; ODS statements; FILE command; INCLUDE command

%INCLUDE statement: Reads SAS statements and data lines from the specified source file

Category: Data Access

%INCLUDE statement-specific: Is not supported under z/OS

FILE statement: Writes to an external file

FILENAME statement: Reads from or writes to an external file

FILENAME statement, EMAIL (SMTP) Access Method: Sends electronic mail programmatically from SAS using the SMTP (Simple Mail Transfer Protocol)

INFILE statement: Reads from an external file

ODS statements: Controls features of the Output Delivery System that are used to generate, store, or reproduce SAS procedure and DATA step output
FILE command: Saves the contents of a window to an external file
INCLUDE command: Copies an external file into the current window

Syntax

ENCODING= '*encoding-value*'

Options

ENCODING= '*encoding-value*'
specifies the encoding to use for reading, writing, copying, or saving an external file. The value for ENCODING= indicates that the external file has a different encoding from the current session encoding.

When you read, write, copy, or save data using an external file, SAS transcodes the data from the session encoding to the specified encoding.

For details, see "SBCS, DBCS, and Unicode Encoding Values for Transcoding Data" on page 549.

Default: SAS uses the current session encoding.

Examples

Example 1: Using the FILE Statement to Specify an Encoding for Writing to an External File This example creates an external file from a SAS data set. The current session encoding is Wlatin1, but the external file's encoding needs to be UTF-8. By default, SAS writes the external file using the current session encoding.

To specify what encoding to use for writing data to the external file, specify the ENCODING= option:

```
libname myfiles 'SAS data-library';

filename outfile 'external-file';

data _null_;
   set myfiles.cars;
   file outfile encoding="utf-8";
   put Make Model Year;
run;
```

When you tell SAS that the external file is to be in UTF-8 encoding, SAS then transcodes the data from Wlatin1 to the specified UTF-8 encoding.

Example 2: Using the FILENAME Statement to Specify an Encoding for Reading an External File This example creates a SAS data set from an external file. The external file is in UTF-8 character-set encoding, and the current SAS session is in the Wlatin1 encoding. By default, SAS assumes that an external file is in the same encoding as the session encoding, which causes the character data to be written to the new SAS data set incorrectly.

To specify which encoding to use when reading the external file, specify the ENCODING= option:

```
libname myfiles  'SAS data-library';
```

```
filename extfile 'external-file' encoding="utf-8";

data myfiles.unicode;
   infile extfile;
   input Make $ Model $ Year;
run;
```

When you specify that the external file is in UTF-8, SAS then transcodes the external file from UTF-8 to the current session encoding when writing to the new SAS data set. Therefore, the data is written to the new data set correctly in Wlatin1.

Example 3: Using the FILENAME Statement to Specify an Encoding for Writing to an External File This example creates an external file from a SAS data set. By default, SAS writes the external file using the current session encoding. The current session encoding is Wlatin1, but the external file's encoding needs to be UTF-8.

To specify which encoding to use when writing data to the external file, specify the ENCODING= option:

```
libname myfiles  'SAS data-library';

filename outfile 'external-file' encoding="utf-8";

data _null_;
   set myfiles.cars;
   file outfile;
   put Make Model Year;
run;
```

When you specify that the external file is to be in UTF-8 encoding, SAS then transcodes the data from Wlatin1 to the specified UTF-8 encoding when writing to the external file.

Example 4: Changing Encoding for Message Body and Attachment This example illustrates how to change text encoding for the message body as well as for the attachment.

```
filename mymail email 'Joe.Developer@sas.com';

data _null_;
   file mymail
      subject='Text Encoding'
      encoding=greek ❶
      attach=('C:\My Files\Test.out' ❷
         content_type='text/plain'
         encoding='ebcdic1047'
         outencoding='latin1'); ❸
run;
```

In the program, the following occurs:

1. The ENCODING= e-mail option specifies that the message body will be encoded to Greek (ISO) before being sent.
2. For the ATTACH= e-mail option, the attachment option ENCODING= specifies the encoding of the attachment that is read into SAS, which is Western (EBCDIC).
3. Because SMTP and other e-mail interfaces do not support EBCDIC, the attachment option OUTENCODING= converts the attachment to Western (ISO) before sending it.

Example 5: Using the INFILE= Statement to Specify an Encoding for Reading from an External File This example creates a SAS data set from an external file. The external file's encoding is in UTF-8, and the current SAS session encoding is Wlatin1. By default, SAS assumes that the external file is in the same encoding as the session encoding, which causes the character data to be written to the new SAS data set incorrectly.

To specify which encoding to use when reading the external file, specify the ENCODING= option:

```
libname myfiles 'SAS data-library';

filename extfile 'external-file';

data myfiles.unicode;
   infile extfile encoding="utf-8";
   input Make $ Model $ Year;
run;
```

When you specify that the external file is in UTF-8, SAS then transcodes the external file from UTF-8 to the current session encoding when writing to the new SAS data set. Therefore, the data is written to the new data set correctly in Wlatin1.

See Also

Statements:

%INCLUDE in *SAS Companion for OpenVMS on HP Integrity Servers*

%INCLUDE in *SAS Companion for UNIX Environments*

%INCLUDE in *SAS Companion for Windows*

FILE in *SAS Language Reference: Dictionary*

FILENAME in *SAS Language Reference: Dictionary*

INFILE in *SAS Language Reference: Dictionary*

ODS statements that use encoding options in *SAS Output Delivery System: User's Guide*

Commands:

FILE in *SAS Companion for OpenVMS on HP Integrity Servers*

FILE in *SAS Companion for z/OS*

FILE in *SAS Companion for UNIX Environments*

FILE in *SAS Companion for Windows*

INCLUDE in *SAS Companion for OpenVMS on HP Integrity Servers*

INCLUDE in *SAS Companion for z/OS*

INCLUDE in *SAS Companion for UNIX Environments*

INCLUDE in *SAS Companion for Windows*

INENCODING= and OUTENCODING= Options

Overrides and changes the encoding when reading or writing SAS data sets in the SAS library.

Valid in: LIBNAME statement

Category: Data Access

Syntax

INENCODING=

INENCODING= ANY | ASCIIANY | EBCDICANY | *encoding-value*
OUTENCODING=

OUTENCODING= ANY | ASCIIANY | EBCDICANY | *encoding-value*

Syntax Description

ANY
specifies no transcoding between ASCII and EBCDIC encodings.

Note: ANY is a synonym for binary. Because the data is binary, the actual encoding is irrelevant. △

ASCIIANY
specifies that no transcoding occurs, assuming that the mixed encodings are ASCII encodings.

EBCDICANY
specifies that no transcoding occurs, assuming that the mixed encodings are EBCDIC encodings.

encoding-value
specifies an encoding value. For a list of encoding values, see Chapter 19, "Encoding Values for a SAS Session," on page 555.

Details

The INENCODING= option is used to read SAS data sets in the SAS library. The OUTENCODING= option is used to write SAS data sets in the SAS library.

The INENCODING= or the OUTENCODING= value is written to the SAS log when you use the LIST argument.

INENCODING= and OUTENCODING= are most appropriate when using an existing library that contains mixed encodings. To read a library that contains mixed encodings, you can set INENCODING= to ASCIIANY or EBCDICANY. To write a separate data set, you can use OUTENCODING= to specify a specific encoding, which is applied to the data set when it is created.

Comparisons

- Session encoding is specified using the ENCODING= system option or the LOCALE= system option. Each operating environment has a default encoding.
- You can specify the encoding for reading data sets in a SAS library by using the LIBNAME statement INENCODING= option for input files. If both the LIBNAME statement option and the ENCODING= data set option are specified, SAS uses the data set option.
- You can specify the encoding for writing data sets to a SAS library by using the LIBNAME statement OUTENCODING= option for output files. If both the LIBNAME statement option and the ENCODING= data set option are specified, SAS uses the data set option.

□ For the COPY procedure, the default CLONE option uses the encoding attribute of the input data set instead of the encoding value specified on the OUTENCODING= option. For more information on CLONE and NOCLONE, see COPY Statement.

Note: This interaction does not apply when using SAS/CONNECT or SAS/SHARE. △

See Also

"Overview: Encoding for NLS" on page 9

Statements:

LIBNAME in *SAS Language Reference: Dictionary*

System Options:

"ENCODING System Option: OpenVMS, UNIX, Windows, and z/OS" on page 459

"LOCALE System Option" on page 463

Data Set Options:

"ENCODING= Data Set Option" on page 43

ODSCHARSET= Option

Specifies the character set to be generated in the META declaration for the output.

Valid in: LIBNAME statement for the XML engine

Category: Data Access

LIBNAME statement for the XML engine: Specifies the character set to use for generating an output XML document

Syntax

ODSCHARSET=*character-set*;

Arguments

character-set

For the LIBNAME statement for the XML engine, specifies the character set to use in the ENCODING= attribute.

An example of an encoding is ISO-8859-1. Official character sets for use on the Internet are registered by IANA (Internet Assigned Numbers Authority). IANA is the central registry for various Internet protocol parameters, such as port, protocol and enterprise numbers, options, codes and types. For a complete list of character-set values, visit **`www.unicode.org/reports/tr22/index.html`** and **`www.iana.org/assignments/character-sets`**.

Note: A *character set* is like an *encoding-value* in this context. However, *character set* is the term that is used to identify an encoding that is suitable for use on the Internet. △

Details

An XML declaration is not required in all XML documents. Such a declaration is required only when the character encoding of the document is other than the default UTF-8 or UTF-16 and no encoding was determined by a higher-level protocol.

See Also

Conceptual Information:

Chapter 3, "Encoding for NLS," on page 9

Statements:

LIBNAME XML in *SAS XML LIBNAME Engine: User's Guide*

ODSTRANTAB= Option

Specifies the translation table to use when transcoding an XML document for an output file.

Valid in: the LIBNAME statement for the XML engine

Category: Data Access

Syntax

TRANTAB ='*translation-table*'

Options

translation-table

specifies the translation table to use for the output file. The translation table is an encoding method that maps characters (letters, logograms, digits, punctuation, symbols, control characters, and so on) in the character set to numeric values. An example of a translation table is one that converts characters from EBCDIC to ASCII-ISO. The *table-name* can be any translation table that SAS provides, or any user-defined translation table. The value must be the name of a SAS catalog entry in either the SASUSER.PROFILE catalog or the SASHELP.HOST catalog.

Details

For SAS 9.2, using the ODSTRANTAB= option in the LIBNAME statement for the XML Engine is supported for backward compatibility. The preferred method for specifying an encoding is to use the LOCALE= system option.

See Also

Conceptual Information:

"Transcoding and Translation Tables" on page 28

Conceptual discussion of Chapter 2, "Locale for NLS," on page 5

System Options:

"TRANTAB= System Option" on page 469

"LOCALE System Option" on page 463

Procedures:

Chapter 15, "The TRANTAB Procedure," on page 511

Statements:

LIBNAME XML in *SAS XML LIBNAME Engine: User's Guide*

TRANSCODE= Column Modifier on PROC SQL

Specifies whether values can be transcoded for character columns.

Valid in: Column modifier component in the SQL Procedure

Syntax

TRANSCODE=YES|NO

Arguments

TRANSCODE=YES|NO

for character columns, specifies whether values can be transcoded. Use TRANSCODE=NO to suppress transcoding. Note that when you create a table using the CREATE TABLE AS statement, the transcoding attribute for a particular character column in the created table is the same as it is in the source table unless you change it with the TRANSCODE= column modifier.

Default: YES

Restriction: Suppression of transcoding is not supported for the V6TAPE engine.

See Also

Conceptual Information:

Chapter 4, "Transcoding for NLS," on page 27

The SQL Procedure in *Base SAS Procedures Guide*

RENCODING= Option

Specifies the ASCII-based or EBCDIC-based encoding to use for transcoding data for a SAS/SHARE server session that is using an EBCDICANY or ASCIIANY session encoding.

Valid in: LIBNAME statement for SAS/SHARE only

Category: Data Access

Important: The RENCODING= option in the LIBNAME statement is relevant only if using a SAS/SHARE server that has a session encoding set to EBCDICANY or ASCIIANY to preserve a mixed-encoding computing environment, which was more common before SAS 9.

See Also: LIBNAME statement in *SAS/SHARE User's Guide*

Syntax

RENCODING=*ASCII-encoding-value* | *EBCDIC-encoding-value*

Syntax Description

ASCII-encoding-value
For a list of valid values for ASCII encodings for UNIX and Windows, see Chapter 19, "Encoding Values for a SAS Session," on page 555.

EBCDIC-encoding-value
For a list of valid values for EBCDIC encodings for z/OS, see Chapter 19, "Encoding Values for a SAS Session," on page 555.

Details

If you use SAS/SHARE in a mixed-encoding environment (for example, SAS/SHARE client sessions using incompatible encodings such as Latin1 and Latin2), you can set the following options:

- in the SAS/SHARE server session, set the SAS system option ENCODING=EBCDICANY or ENCODING=ASCIIANY
- in the SAS/SHARE client session, set the RENCODING= option in the LIBNAME statement(s) under these conditions:
  - a client session that uses an ASCII-based encoding accesses an EBCDICANY server
  - a client session that uses an EBCDIC- based encoding accesses an ASCIIANY server.

  The RENCODING= option enables SAS/SHARE clients to specify which encoding to assume the server's data is in when transcoding to or from the client session encoding.

For SAS 9 and 9.2, if you are processing data in a SAS/SHARE client/server session from more than one SBCS or DBCS encoding, you are advised to use the UTF8 encoding. For more information about Unicode servers that run the UTF8 session encoding, go to **`http://rnd.sas.com/sites/i18n/i18ndocs/i18nsupport/Pages/SAS%20Technical%20Papers.aspx`** and search for *SAS 9.1.3 Service Pack 4 in a Unicode Environment* and *Processing Multilingual Data with the SAS® 9.2 Unicode Server*.

Background

In SAS 9 and 9.2, you can maintain multilingual data that contains characters from more than one traditional SBCS or DBCS encoding in a SAS data set by using a UTF8 encoding. To share update access to that data using SAS/SHARE, you must also run

the SAS/SHARE server using a session encoding of UTF8. SAS will transcode the data to the client encoding if necessary.

Before SAS 9, if a SAS/SHARE client and a SAS/SHARE server ran on common architectures (for example, the client and server ran on UNIX machines), there was no automatic transcoding of character data. It was possible to build applications that accessed data sets in different EBCDIC or ASCII encodings within a single SAS/SHARE server, or that accessed data sets in mixed different encodings within a single data set. This method was very uncommon and required careful programming to set up transcoding tables from clients that ran in different operating environments.

The following steps describe how you can maintain mixed encoding in SAS 9, if necessary.

- The SAS/SHARE server must run by using a session encoding of EBCDICANY for mixed-EBCDIC encodings or ASCIIANY for mixed-ASCII encodings.

  This will restore the behavior of Version 8 and earlier releases and prevent the automatic character transcoding between different client and server encodings in the same EBCDIC or ASCII family. That is, no transcoding will occur under these circumstances:

  - if the client session encoding is an EBCDIC encoding and the server session encoding is EBCDICANY
  - if the client session encoding is an ASCII encoding and the server session encoding is ASCIIANY.

- A SAS/SHARE client that does not share the same encoding family as an ASCIIANY or EBCDICANY server can control the necessary transcoding by using an RENCODING= option on the first LIBNAME statement that accesses the server.

  For example, an ASCII client that runs in a Polish locale could access a z/OS EBCDICANY server and specify RENCODING=EBCDIC870 to access data that the client knows contains Polish-encoded data. Another ASCII client that runs in a German locale could access the same z/OS EBCDICANY server and specify RENCODING=EBCDIC1141 to access data that the client knows contains German data. Similarly, EBCDIC clients that access an ASCIIANY server can specify the precise ASCII encoding of the data they are accessing by using the RENCODING= option in the LIBNAME statement.

See Also

Conceptual Information:

Chapter 4, “Transcoding for NLS,” on page 27

Statements:

LIBNAME in *SAS/SHARE User’s Guide*

TRANSCODE= Option

Specifies an attribute in the ATTRIB statement (which associates a format, informat, label, and length with one or more variables) that indicates whether character variables are to be transcoded.

Valid in: the ATTRIB statement in a DATA step

Category: Information

Type: Declarative

See: ATTRIB Statement in the documentation for your operating environment.

Syntax

ATTRIB *variable-list(s) attribute-list(s)* ;

Arguments

variable-list
names the variables that you want to associate with the attributes.

Tip: List the variables in any form that SAS allows.

attribute-list
specifies one or more attributes to assign to *variable-list*. Multiple attributes can be specified in the ATTRIB statement. For a complete list of attributes, see the ATTRIB Statement in *SAS Language Reference: Dictionary*.

TRANSCODE= YES | NO
Specifies whether to transcode character variables. Use TRANSCODE=NO to suppress transcoding. For more information, see "Overview to Transcoding" on page 27.

Default: YES

Restriction: The TRANSCODE=NO attribute is not supported by some SAS Workspace Server clients. Variables with TRANSCODE=NO are not returned in SAS 9.2. Before SAS 9.2, variables with TRANSCODE=NO are transcoded. Prior releases of SAS cannot access a SAS 9.2 data set that contains a variable with a TRANSCODE=NO attribute.

Interaction: You can use the VTRANSCODE and VTRANSCODEX functions to return whether transcoding is on or off for a character variable.

Interaction: If the TRANSCODE= attribute is set to NO for any character variable in a data set, PROC CONTENTS prints a transcode column that contains the TRANSCODE= value for each variable in the data set. If all variables in the data set are set to the default TRANSCODE= value (YES), no transcode column is printed.

Examples

Example 1: Using the TRANSCODE= Option With the SET Statement When you use the SET statement to create a data set from several data sets, SAS makes the TRANSCODE= attribute of the variable in the output data set equal to the TRANSCODE= value of the variable in the first data set. In this example, the variable Z's TRANSCODE= attribute in data set A is NO because B is the first data set and Z's TRANSCODE= attribute in data set B is NO.

```
data b;
   length z $4;
   z = 'ice';
   attrib z transcode = NO;
data c;
   length z $4;
   z = 'snow';
   attrib z transcode = YES;
```

```
data a;
   set b;
   set c;
   /* Check transcode setting for variable Z */
   rc1 = vtranscode(z);
   put rc1=;
run;
```

Example 2: Using the TRANSCODE= Option With the MERGE Statement When you use the MERGE statement to create a data set from several data sets, SAS makes the TRANSCODE= attribute of the variable in the output data set equal to the TRANSCODE= value of the variable in the first data set. In this example, the variable Z's TRANSCODE= attribute in data set A is YES because C is the first data set and Z's TRANSCODE= attribute in data set C is YES.

```
data b;
   length z $4;
   z = 'ice';
   attrib z transcode = NO;
data c;
   length z $4;
   z = 'snow';
   attrib z transcode = YES;
data a;
   merge c b;
   /* Check transcode setting for variable Z */
   rc1 = vtranscode(z);
   put rc1=;
run;
```

Note: The TRANSCODE= attribute is set when the variable is first seen on an input data set or in an ATTRIB TRANSCODE= statement. If a SET or MERGE statement comes before an ATTRIB TRANSCODE= statement and the TRANSCODE= attribute contradicts the SET statement, an error message will occur. △

See Also

Functions:

"VTRANSCODE Function" on page 293

"VTRANSCODEX Function" on page 294

TRANTAB= Option

Specifies the translation table to use when you are transcoding character data in a SAS file for the appropriate output file.

Valid in: ODS MARKUP statement and ODS RTF statement

Category: ODS: Third-Party Formatted

Syntax

TRANTAB = (*translation-table*)

Note: Translation tables were introduced in SAS 6 to support the requirements of national languages. SAS 8.2 introduced the LOCALE= system option as an improvement on direct use of translation tables. SAS 9.1 supports the TRANTAB= option for backward compatibility. However, using the LOCALE= system option is preferred in later SAS releases. △

Options

translation-table
specifies the translation table to use for the output file. The translation table is an encoding method that maps characters (letters, logograms, digits, punctuation, symbols, control characters, and so on) in the character set to numeric values. An example of a translation table is one that converts characters from EBCDIC to ASCII-ISO. The *table-name* can be any translation table that SAS provides, or any user-defined translation table. The value must be the name of a SAS catalog entry in either the SASUSER.PROFILE catalog or the SASHELP.HOST catalog.

Details

Note: For SAS 9.1, using the TRANTAB = option in the ODS MARKUP is supported for backward compatibility. For specifying encoding, the LOCALE= system option is preferred. △

See Also

Conceptual Information:
"Transcoding and Translation Tables" on page 28
Chapter 2, "Locale for NLS," on page 5
System Options:
"TRANTAB= System Option" on page 469
"LOCALE System Option" on page 463
Procedures:
Chapter 15, "The TRANTAB Procedure," on page 511
Statements:
ODS MARKUP in *SAS Output Delivery System: User's Guide*
ODS RTF in *SAS Output Delivery System: User's Guide*

XMLENCODING= Option

Overrides the encoding of an XML document to import or export an external document.

Valid in: LIBNAME statement for the XML engine
Category: Data Access

LIBNAME statement for the XML engine: Associates a SAS libref with an XML document to import or export an external document

Syntax

XMLENCODING= '*encoding-value*'

Options

encoding-value
specifies the encoding to use when you read, write, copy, or save an external file. The value for XMLENCODING= indicates that the external file has a different encoding from the current session encoding.

For details, see "SBCS, DBCS, and Unicode Encoding Values for Transcoding Data" on page 549.

Default: SAS uses the current session encoding.

See Also

Statements:
LIBNAME XML in *SAS XML LIBNAME Engine: User's Guide*

TRANTAB Statement

Specifies the translation table to use when you transcode character data in order to export or transfer a SAS file.

Valid in: CPORT Procedure, UPLOAD procedure, DOWNLOAD procedure

PROC CPORT: Used when you export a SAS file across a network

PROC UPLOAD and PROC DOWNLOAD: Used when you transfer a SAS file across a network

Requirements for UPLOAD and DOWNLOAD: To use the TRANTAB statement, you must specify the INCAT= and OUTCAT= options in the PROC UPLOAD or PROC DOWNLOAD statement.

Restrictions: You can specify only one translation table per TRANTAB statement. To specify additional translation tables, use additional TRANTAB statements.

Interaction: The TRANTAB statement specifies a customized translation table (for example, to map an EBCDIC character to an ASCII character) to apply to the character set in the SAS file that is being exported or transferred. The TRANTAB= system option specifies a translation table to use for the SAS session, including file transfers.

Syntax

TRANTAB NAME=*translation-table-name* <TYPE=(*etype-list)* <OPT=DISP | SRC | (DISP SRC)>>;

Note: Translation tables were introduced in SAS 6 to support the requirements of national languages. SAS 8.2 introduced the LOCALE= system option as an

improvement on direct use of translation tables. SAS 9.2 supports the TRANTAB statement for backward compatibility. However, using the LOCALE= system option is preferred in later SAS releases.

For more information, see TS-639, Data Conversion Issues in V6–V8. This technical support note provides information for customers using non-English languages **`http://support.sas.com/techsup/technote/ts639.pdf`**. △

Arguments

NAME=*translation-table-name*
specifies the name of the translation table to apply to the SAS catalog that you want to export (PROC CPORT) or transfer (PROC UPLOAD or PROC DOWNLOAD). The *translation-table-name* that you specify as the name of a catalog entry in either your SASUSER.PROFILE catalog or the SASHELP.HOST catalog. The SASUSER.PROFILE catalog is searched first, and then the SASHELP.HOST catalog is searched.

In most cases, the default translation table is the correct one to use, but you might need to apply additional translation tables if, for example, your application requires different national language characters.

You can specify a translation table other than the default in two ways:

- To specify a translation table for an invocation of the procedure, use the TRANTAB statement in the procedure, as appropriate.
- To specify a translation table for your entire SAS session or job (including all file exports or transfers), use the TRANTAB= system option.

Options

TYPE=(*etype-list*)
applies the translation table only to the entries with the type or types that you specify. The *etype-list* can be one or more entry types. Examples of catalog entry types include DATA and FORMAT. If *etype-list* is a simple entry type, omit the parentheses.

By default, the UPLOAD, DOWNLOAD, and CPORT procedures apply the translation table to all specified catalog entries.

OPT=DISP | SRC | (DISP SRC)

OPT=DISP	applies the translation table only to the specified catalog entries, which produce window displays.
OPT=SRC	applies the translation table only to the specified catalog entries that are of the type SOURCE.
OPT=(DISP SRC)	applies the translation table only to the specified catalog entries that either produce window displays or are of type SOURCE.

If you do not specify the OPT= option, the UPLOAD or DOWNLOAD procedure applies the translation table to all of the entries in the catalog that you specify.

Default: PROC CPORT, PROC UPLOAD, and PROC DOWNLOAD apply the translation table to all entries and data sets in the specified catalog.

Examples

Procedure features:

PROC CPORT statement option: FILE=

TRANTAB statement option: TYPE=

This example shows how to apply a customized translation table to the transport file before PROC CPORT exports it. For this example, assume that you have already created a customized translation table called TTABLE1.

Example 1: Program

Assign library references. The LIBNAME and FILENAME statements assign a libref for the source library and a fileref for the transport file, respectively.

```
libname source 'SAS data-library';
filename tranfile 'transport-file'
                  host-option(s)-for-file-characteristics;
```

Apply the translation specifics. The TRANTAB statement applies the translation that you specify with the customized translation table TTABLE1. TYPE= limits the translation to FORMAT entries.

```
proc cport catalog=source.formats file=tranfile;
   trantab name=ttable1 type=(format);
run;
```

Example 2: SAS Log

```
NOTE: Proc CPORT begins to transport catalog SOURCE.FORMATS
NOTE: The catalog has 2 entries and its maximum logical record length is 104.
NOTE: Entry REVENUE.FORMAT has been transported.
NOTE: Entry DEPT.FORMATC has been transported.
```

See Also

Conceptual Information:

Chapter 4, “Transcoding for NLS,” on page 27

System Options:

“TRANTAB= System Option” on page 469

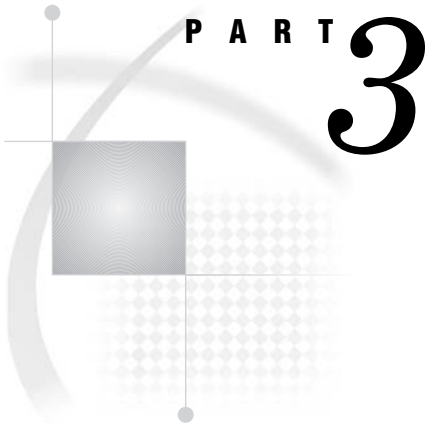
Procedures:

Chapter 15, “The TRANTAB Procedure,” on page 511

CPORT in *Base SAS Procedures Guide*

UPLOAD in *SAS/CONNECT User’s Guide*

DOWNLOAD in *SAS/CONNECT User’s Guide*



PART 3

Procedures for NLS

CHAPTER

14

The DBCSTAB Procedure

Overview: DBCSTAB Procedure

The DBCSTAB procedure produces conversion tables for the double-byte character sets that SAS supports.

Use the DBCSTAB procedure to modify an existing DBCS table when

- the DBCS encoding system that you are using is not supported by SAS
- the DBCS encoding system that you are using has a nonstandard translation table.

A situation where you would be likely to use the DBCSTAB procedure is when a valid DBCSTYPE= value is not available. These values are operating environment dependent. In such cases, you can use the DBCSTAB procedure to modify a similar translation table, and then you can specify the use of the new table with the TRANTAB option.

Syntax: DBCSTAB Procedure

PROC DBCSTAB TABLE=*table-name*
<BASETYPE=*base-type*> <CATALOG=<*libref.*>*catalog-name*>
<DATA=<*libref.*>*table-name* > <DBCSLANG=*language*>
<DESC='*description*'> <FORCE> <VERIFY> <VERBOSE>;

PROC DBCSTAB Statement

PROC DBCSTAB TABLE=*table-name*
<*option(s)*>;

Required Arguments

TABLE=*table-name*
specifies the name of the double-byte code table to produce. This table name becomes an entry of type DBCSTAB in the catalog that is specified with the CATALOG= option. By default, the catalog name is SASUSER.DBCS.

Alias: NAME=, N=

Options

BASETYPE=*base-type*
specifies a base type for the double-byte code table conversion. If you use this option, you reduce the number of tables that are produced.

If you specify BASETYPE=, then all double-byte codes are first converted to the base code, and then converted to the required code. If you have n codes, then there are $n(n\text{-}1)$ conversions that must be made.

Alias: BTYPE=

CATALOG=*<libref.>catalog-name*
specifies the name of the catalog in which the table is to be stored. If the catalog does not exist, it is created.

Default: SASUSER.DBCS

DATA=*<libref.>table-name*
specifies the data for producing the double-byte code table. Several double-byte character variables are required to produce the table. Use variable names that are equivalent to the value of the DBCSTYPE system option and are recognized by the KCVT function.

DBCSLANG=*language*
specifies the language that the double-byte code table uses. The value of this option should match the value of the DBCSLANG system option.

Alias: DBLANG

DESC='*description*'
specifies a text string to put in the DESCRIPTION field for the entry.

FORCE
produces the conversion tables even if errors are present.

VERIFY
checks the data range of the input table per code. This option is used to check for invalid double-byte code.

VERBOSE
causes the statistics detail to be printed when building DBCS tables.

Examples: DBCSTAB Procedure

Example 1: Creating a Conversion Table with the DBCSTAB Procedure

Procedure features:

PROC DBCSTAB statement options:

CATALOG=
DBLANG=
BASETYPE=
VERIFY

The following example creates a Japanese translation table called CUSTAB and demonstrates how the TRANTAB option can be used to specify this new translation table.

Note: The DBCS, DBCSLANG, and DBCSTYPE options are specified at startup. △

The TRANTAB data set is created as follows:

```
data trantab;
      pcms='8342'x; dec='b9b3'x;
run;

proc dbcstab
      /* name of the new translate table */
          name=custtab
      /* based on pcibm encoding */
          basetype=pcms
      /* data to create the new table */
          data=trantab
      /* japanese language */
          dbcslang=japanese
      /* catalog descriptor */
          desc='Modified Japanese Trantab'
      /* where the table is stored */
          catalog=sasuser.dbcs
      /* checks for invalid DBCS in the new data */
          verify;
run;
```

To specify the translate table, use the TRANTAB option:

```
options trantab=(,,,,,,,,,custtab);
```

Translate tables are generally used for DBCS conversion with SAS/CONNECT software, PROC CPORT and PROC CIMPORT, and the DATA step function, KCVT.

The TRANTAB= option might be used to specify DBCS translate tables. For SAS release 8.2 and earlier versions, the ninth argument was formerly used to specify the DBCS system table. However, for SAS 9 and later versions, instead of using the ninth argument, the SAS system uses a system table that is contained in a loadable module.

```
options trantab=(,,,,,,,,systab); /* ninth argument */
```

Japanese, Korean, Chinese, and Taiwanese are acceptable for the systab name.
The tenth argument specifies the DBCS user table:

```
options trantab=(,,,,,,,,,usrtab); /* tenth argument */
```

Example 2: Producing Japanese Conversion Tables with the DBCSTAB Procedure

Procedure features:

PROC DBCSTAB statement options:

TABLE=
DATA=
DBLANG=
BASETYPE=
VERIFY

Program

```
data ja_jpn;
   length ibm jis euc pcibm $2.;
   ibm='4040'x;
   jis='2121'x;
   euc='a1a1'x;
   pcibm='8140'x;
run;

proc dbcstab
   table=japanese
   data=ja_jpn
   dblang=japanese
   basetype=jis
   verify;
run;
```

Log

```
1   proc dbcstab
2   table=ja_jpn
3   data=work.ja_jpn
4   dblang=japanese
5   basetype=jis
6   verify;
7   run;

NOTE: Base table for JIS created.
NOTE: IBM table for JIS created.
NOTE: PCIBM table for JIS created.
NOTE: EUC table for JIS created.
NOTE: Base table for IBM created.
NOTE: JIS table for IBM created.
NOTE: Base table for PCIBM created.
NOTE: JIS table for PCIBM created.
NOTE: Base table for EUC created.
NOTE: JIS table for EUC created.
NOTE: 10 DBCS tables are generated. Each table has 1 DBCS characters.
NOTE: Each table is 2 bytes in size.
NOTE: Required table memory size is 612.
NOTE: There were 1 observations read from the data set WORK.JA_JPN.
```

See Also

Functions:

"KCVT Function" on page 260

Procedures:

Chapter 15, "The TRANTAB Procedure," on page 511

System Options:

"TRANTAB= System Option" on page 469

"DBCS System Option: UNIX, Windows, and z/OS" on page 454

"DBCSLANG System Option: UNIX, Windows, and z/OS" on page 455

"DBCSTYPE System Option: UNIX, Windows, and z/OS" on page 456

CHAPTER
15

The TRANTAB Procedure

Overview: TRANTAB Procedure

The TRANTAB procedure creates, edits, and displays customized translation tables. In addition, you can use PROC TRANTAB to view and modify translation tables that are supplied by SAS. These SAS supplied tables are stored in the SASHELP.HOST catalog. Any translation table that you create or customize is stored in your SASUSER.PROFILE catalog. Translation tables have an entry type of TRANTAB.

Translation tables are operating environment-specific SAS catalog entries that are used to translate the values of one (coded) character set to another. A translation table has two halves: table one provides a translation, such as ASCII to EBCDIC; table two provides the inverse (or reverse) translation, such as EBCDIC to ASCII. Each half of a

translation table is an array of 256 two-digit *positions*, each of which contains a one-byte unsigned number that corresponds to a coded character.

The SAS System uses translation tables for the following purposes:

- determining the collating sequence in the SORT procedure
- performing transport-format translations when you transfer files with the CPORT and CIMPORT procedures
- performing translations between operating environments when you access remote data in SAS/CONNECT or SAS/SHARE software
- facilitating data communications between the operating environment and a graphics device when you run SAS/GRAPH software in an IBM environment
- accommodating national language character sets other than U.S. English.

PROC TRANTAB produces no output. It can display translation tables and notes in the SAS log.

Concepts: TRANTAB Procedure

Understanding Translation Tables and Character Sets for PROC TRANTAB

The *k*th element in a translation table corresponds to the *k*th element of an ordered character set. For example, position 00 (which is byte 1) in a translation table contains a coded value that corresponds to the first element of the ordered character set. To determine the position of a character in your operating environment's character set, use the SAS function RANK. The following example shows how to use RANK:

```
data _null_;
   x=rank('a');
   put "The position of a is " x ".";
```

The SAS log prints the following message: **The position of a is 97 .**

Each position in a translation table contains a hexadecimal number that is within the range of 0 ('00'x) to 255 ('FF'x). Hexadecimal values always end with an x. You can represent one or more consecutive hexadecimal values within quotation marks followed by a single x. For example, a string of three consecutive hexadecimal values can be written as '08090A'x. The SAS log displays each row of a translation table as 16 hexadecimal values enclosed in quotes followed by an x. The SAS log also lists reference numbers in the vertical and horizontal margins that correspond to the positions in the table. Example 1 on page 521 shows how the SAS log displays a translation table.

Storing Translation Tables with PROC TRANTAB

When you use PROC TRANTAB to create a customized translation table, the procedure automatically stores the table in your SASUSER.PROFILE catalog. This enables you to use customized translation tables without affecting other users. When you specify the translation table in the SORT procedure or in a GOPTIONS statement, the software first looks in your SASUSER.PROFILE catalog to find the table. If the specified translation table is not in your SASUSER.PROFILE catalog, the software looks in the SASHELP.HOST catalog.

If you want the translation table you create to be globally accessed, have your SAS Installation Representative copy the table from your SASUSER.PROFILE catalog (using the CATALOG procedure) to the SASHELP.HOST catalog. If the table is not found there, the software will continue to search in SASHELP.LOCALE for the table.

Modifying SAS Translation Tables with PROC TRANTAB

If a translation table that is provided by SAS does not meet your needs, you can use PROC TRANTAB to edit it and create a new table. That is, you can issue the PROC TRANTAB statement that specifies the SAS table, edit the table, and then save the table using the SAVE statement. The modified translation table is saved in your SASUSER.PROFILE catalog. If you are a SAS Installation Representative, you can modify a translation table with PROC TRANTAB and then use the CATALOG procedure to copy the modified table from your SASUSER.PROFILE catalog to the SASHELP.HOST catalog, as shown in the following example:

```
proc catalog c=sasuser.profile;
   copy out=sashelp.host entrytype=trantab;
run;
```

You can use PROC TRANTAB to modify translation tables stored in the SASHELP.HOST catalog only if you have update (or write) access to that data library and catalog.

Using Translation Tables Outside PROC TRANTAB

Using Translation Tables in the SORT Procedure

PROC SORT uses translation tables to determine the collating sequence to be used by the sort. You can specify an alternative translation table with the SORTSEQ= option of PROC SORT. For example, if your operating environment sorts with the EBCDIC sequence by default, and you want to sort with the ASCII sequence, you can issue the following statement to specify the ASCII translation table:

```
proc sort sortseq=ascii;
```

You can also create a customized translation table with PROC TRANTAB and specify the new table with PROC SORT. This table is useful when you want to specify sorting sequences for languages other than U.S. English.

See Example 6 on page 531 for an example that uses translation tables to sort data in different ways. For information on the tables available for sorting and the SORTSEQ= option, see “SORTSEQ= System Option: UNIX, Windows, and z/OS” on page 467.

Using Translation Tables with the CPORT and CIMPORT Procedures

The CPORT and CIMPORT procedures use translation tables to translate characters in catalog entries that you export from one operating environment and import on another operating environment. You might specify the name of a supplied translation table or a customized translation table in the TRANTAB statement of PROC CPORT. See “TRANTAB Statement” on page 500 in the CPORT Procedure for more information.

Using Translation Tables with Remote Library Services

Remote Library Services (RLS) uses translation tables to translate characters when you access SAS 8 remote data. SAS/CONNECT and SAS/SHARE software use translation tables to translate characters when you transfer or share files between two operating environments that use different encoding standards.

Note: For more information, see TS-706: How to use the %lswbatch macro **http://support.sas.com/techsup/technote/ts706.pdf**. △

Using Translation Tables in SAS/GRAPH Software

In SAS/GRAPH software, translation tables are most commonly used on an IBM operating environment where tables are necessary because graphics commands must leave IBM operating environments in EBCDIC representation but must reach asynchronous graphics devices in ASCII representation. Specifically, SAS/GRAPH software builds the command stream for these devices internally in ASCII representation but must convert the commands to EBCDIC representation before they can be given to the communications software for transmission to the device. SAS/GRAPH software uses a translation table internally to make the initial conversion from ASCII to EBCDIC. The communications software then translates the command stream back to ASCII representation before it reaches the graphics device.

Translation tables are operating environment-specific. In most cases, you can simply use the default translation table, SASGTAB0, or one of the SAS supplied graphics translation tables. However, if these tables are not able to do all of the translation correctly, you can create your own translation table with PROC TRANTAB. The SASGTAB0 table might fail to do the translation correctly when it encounters characters from languages other than U.S. English.

To specify an alternative translation table for SAS/GRAPH software, you can either use the TRANTAB= option in a GOPTIONS statement or modify the TRANTAB device parameter in the device entry. For example, the following GOPTIONS statement specifies the GTABTCAM graphics translation table:

```
goptions trantab=gtabtcam;
```

Translation tables used in SAS/GRAPH software perform both *device-to-operating environment* translation and *operating environment-to-device* translation. Therefore, a translation table consists of 512 bytes, with the first 256 bytes used to perform device-to-operating environment translation (ASCII to EBCDIC on IBM mainframes) and the second 256 bytes used to perform operating environment-to-device translation (EBCDIC to ASCII on IBM mainframes). For PROC TRANTAB, the area of a translation table for device-to-operating environment translation is considered to be *table one*, and the area for operating environment-to-device translation is considered to be *table two*. See Example 1 on page 521 for a listing of the ASCII translation table (a SAS provided translation table), which shows both areas of the table.

On operating environments other than IBM mainframes, translation tables can be used to translate specific characters in the data stream that are created by the driver. For example, if the driver normally generates a vertical bar in the data stream, but you want another character to be generated in place of the vertical bar, you can create a translation table that translates the vertical bar to an alternate character.

For details on how to specify translation tables with the TRANTAB= option in SAS/GRAPH software, see *SAS/GRAPH Software: Reference, Version 6, First Edition, Volume 1* and *Volume 2*.

SAS/GRAPH software also uses key maps and device maps to map codes generated by the keyboard to specified characters and to map character codes to codes required by the graphics output device. These maps are specific to SAS/GRAPH software and are discussed in "The GKEYMAP Procedure" in *SAS/GRAPH Software: Reference*.

Syntax: TRANTAB Procedure

Tip: Supports RUN-group processing

PROC TRANTAB TABLE=*table-name* <NLS>;
CLEAR <ONE|TWO|BOTH>;
INVERSE;
LIST <ONE|TWO|BOTH>;
LOAD TABLE=*table-name* <NLS>;
REPLACE *position value-1*<*…value-n*>;
SAVE <TABLE=*table-name*> <ONE|TWO|BOTH>;
SWAP;

Task	Statement
Set all positions in the translation table to zero	"CLEAR Statement" on page 517
Create an inverse of table 1	"INVERSE Statement" on page 517
Display a translation table in hexadecimal representation	"LIST Statement" on page 517
Load a translation table into memory for editing	"LOAD Statement" on page 518
Replace the characters in a translation table with specified values	"REPLACE Statement" on page 519
Save the translation table in your SASUSER.PROFILE catalog	"SAVE Statement" on page 520
Exchange table 1 with table 2	"SWAP Statement" on page 520

Note: Translation tables were introduced in SAS 6 to support the requirements of national languages. SAS 8.2 introduced the LOCALE= system option as an improvement on direct use of translation tables. SAS 9.2 supports the TRANTAB procedure for backward compatibility. However, using the LOCALE= system option is preferred in later SAS releases.

PROC TRANTAB is an interactive procedure. Once you submit a PROC TRANTAB statement, you can continue to enter and execute statements without repeating the PROC TRANTAB statement. To terminate the procedure, submit a QUIT statement or submit another DATA or PROC statement. △

PROC TRANTAB Statement

Tip: If there is an incorrect table name in the PROC TRANTAB statement, use the LOAD statement to load the correct table. You do not need to reinvoke PROC TRANTAB. New tables are not stored in the catalog until you issue the SAVE statement, so you will not have unwanted tables in your catalog.

PROC TRANTAB TABLE=*table-name* <NLS>;

Required Arguments

TABLE=*table-name*
specifies the translation table to create, edit, or display. The specified table name must be a valid one-level SAS name with no more than eight characters.

Options

NLS
specifies that the table you listed in the TABLE= argument is one of five special internal translation tables provided with every copy of the SAS System. You must use the NLS option when you specify one of the five special tables in the TABLE= argument:

SASXPT
the local-to-transport format translation table (used by the CPORT procedure)

SASLCL
the transport-to-local format translation table (used by the CIMPORT procedure)

SASUCS
the lowercase-to-uppercase translation table (used by the UPCASE function)

SASLCS
the uppercase-to-lowercase translation table (used by the LOWCASE macro)

SASCCL
the character classification table (used internally), which contains flag bytes that correspond to each character position that indicate the class or classes to which each character belongs.

NLS stands for National Language Support. This option and the associated translation tables provide a method to translate characters that exist in languages other than English. To make SAS use the modified NLS table, specify its name in the SAS system option TRANTAB= .

Note: When you load one of these special translation tables, the SAS log displays a note that states that table 2 is uninitialized. That is, table 2 is an empty table that contains all zeros. PROC TRANTAB does not use table 2 at all for translation in these special cases, so you do not need to be concerned about this note. △

CLEAR Statement

Sets all positions in the translation table to zero; used when you create a new table.

CLEAR <ONE|TWO|BOTH>;

Options

ONE | TWO | BOTH

ONE
clears table 1.

TWO
clears table 2.

BOTH
clears both table 1 and table 2.

Default: ONE

INVERSE Statement

Creates an inverse of table 1 in a translation table; that is, it creates table 2.

Featured in: Example 5 on page 529

INVERSE;

Details

INVERSE does not preserve multiple translations. Suppose table 1 has two (or more) different characters translated to the same value; for example, "A" and "B" are both translated to "1". For table 2, INVERSE uses the last translated character for the value; that is, "1" is always translated to "B" and not "A", assuming that "A" appears before "B" in the first table.

Sort programs in SAS require an inverse table for proper operation.

LIST Statement

Displays in the SAS log a translation table in hexadecimal representation.

Featured in: All examples

LIST <ONE|TWO|BOTH>;

Options

ONE | TWO | BOTH

ONE
displays table 1.

TWO
displays table 2.

BOTH
displays both table 1 and table 2.

Default: ONE

LOAD Statement

Loads a translation table into memory for editing.

Tip: Use LOAD when you specify an incorrect table name in the PROC TRANTAB statement. You can specify the correct name without reinvoking the procedure.

Tip: Use LOAD to edit multiple translation tables in a single PROC TRANTAB step. (Be sure to save the first table before you load another one.)

Featured in: Example 4 on page 527

LOAD TABLE=*table-name* <NLS>;

Required Arguments

TABLE=*table-name*
specifies the name of an existing translation table to be edited. The specified table name must be a valid one-level SAS name.

Option

NLS
specifies that the table you listed in the TABLE= argument is one of five special internal translation tables that are provided with SAS. You must use the NLS option when you specify one of the five special tables in the TABLE= argument:

SASXPT
is the local-to-transport format translation table

SASLCL
is the transport-to-local format translation table

SASUCS
is the lowercase-to-uppercase translation table

SASLCS
is the uppercase-to-lowercase translation table

SASCCL
is the character classification table, which contains flag bytes that correspond to each character position, these positions indicate the class or classes to which each character belongs.

NLS stands for National Language Support. This option and the associated translation tables provide a method to map characters from languages other than English to programs, displays, and files.

Note: When you load one of these special translation tables, the SAS log displays a note that states that table 2 is uninitialized. That is, table 2 is an empty table that contains all zeros. PROC TRANTAB does not use table 2 for translation in these special cases. △

REPLACE Statement

Replaces characters in a translation table with the specified values, starting at the specified position.

Alias: REP

Tip: To save edits, you must issue the SAVE statement.

Featured in: Example 2 on page 522, Example 3 on page 524, and Example 4 on page 527

REPLACE *position value-1*<*…value-n*>;

Required Arguments

position
specifies the position in a translation table where the replacement is to begin. The editable positions in a translation table begin at position decimal 0 and end at decimal 255. To specify the position, you can do either of the following:

- Use a decimal or hexadecimal value to specify an actual location. If you specify a decimal value, for example, 20, PROC TRANTAB locates position 20 in the table, which is byte 21. If you specify a hexadecimal value, for example, '14'x, PROC TRANTAB locates the decimal position that is equivalent to the specified hexadecimal value, which in this case is position 20 (or byte 21) in the table.
- Use a quoted character. PROC TRANTAB locates the quoted character in the table (that is, the quoted character's hexadecimal value) and uses that character's position as the starting position. For example, if you specify the following REPLACE statement, the statement replaces the first occurrence of the hexadecimal value for "a" and the next two hexadecimal values with the hexadecimal equivalent of "ABC":

```
replace 'a' 'ABC';
```

This action is useful when you want to locate alphabetic and numerical characters but you do not know their actual location. If the quoted character is

not found, PROC TRANTAB displays an error message and ignores the statement.

To edit positions 256 through 511 (table two), follow this procedure:

1. Issue the SWAP statement.
2. Issue the appropriate REPLACE statement.
3. Issue the SWAP statement again to reposition the table.

value-1 <...value-n>
is one or more decimal, hexadecimal, or character constants that give the actual value to be put into the table, starting at *position*. You can also use a mixture of the types of values. That is, you can specify a decimal, a hexadecimal, and a character value in one REPLACE statement. Example 3 on page 524 shows a mixture of all three types of values in the REPLACE statement.

SAVE Statement

Saves the translation table in your SASUSER.PROFILE catalog.

Featured in: Example 2 on page 522 and Example 4 on page 527

SAVE <TABLE=*table-name*> <ONE|TWO|BOTH>;

Options

TABLE=*table-name*
specifies the name under which the current table is to be saved. The name must be a valid one-level SAS name.

Default: If you omit the TABLE= option, the current table is saved under the name you specify in the PROC TRANTAB statement or the LOAD statement.

ONE | TWO | BOTH

ONE
saves table one.

TWO
saves table two.

BOTH
saves both table one and table two.

Default: BOTH

SWAP Statement

Exchanges table 1 with table 2 to enable you to edit positions 256 through 511.

Tip: After you edit the table, you must the issue SWAP statement again to reposition the table.

Featured in: Example 7 on page 533

SWAP;

Examples: TRANTAB Procedure

Note: All examples were produced in the UNIX environment. △

Example 1: Viewing a Translation Table

Procedure features:
LIST statement

This example uses PROC TRANTAB to display the ASCII translation table supplied by SAS.

Program

Set the options and specify a translation table.

```
options nodate pageno=1 linesize=80 pagesize=60;
proc trantab table=ascii;
```

Display both halves of the translation table. The LIST BOTH statement displays both the table that provides the translation and the table that provides the inverse translation.

```
    list both;
```

SAS Log

```
NOTE: Table specified is ASCII.
ASCII table 1:
          0 1 2 3 4 5 6 7 8 9 A B C D E F
     00 '000102030405060708090A0B0C0D0E0F'x
     10 '101112131415161718191A1B1C1D1E1F'x
     20 '202122232425262728292A2B2C2D2E2F'x
     30 '303132333435363738393A3B3C3D3E3F'x
     40 '404142434445464748494A4B4C4D4E4F'x
     50 '505152535455565758595A5B5C5D5E5F'x
     60 '606162636465666768696A6B6C6D6E6F'x
     70 '707172737475767778797A7B7C7D7E7F'x
     80 '808182838485868788898A8B8C8D8E8F'x
     90 '909192939495969798999A9B9C9D9E9F'x
     A0 'A0A1A2A3A4A5A6A7A8A9AAABACADAEAF'x
     B0 'B0B1B2B3B4B5B6B7B8B9BABBBCBDBEBF'x
     C0 'C0C1C2C3C4C5C6C7C8C9CACBCCCDCECF'x
     D0 'D0D1D2D3D4D5D6D7D8D9DADBDCDDDEDF'x
     E0 'E0E1E2E3E4E5E6E7E8E9EAEBECEDEEEF'x
     F0 'F0F1F2F3F4F5F6F7F8F9FAFBFCFDFEFF'x


ASCII table 2:
          0 1 2 3 4 5 6 7 8 9 A B C D E F
     00 '000102030405060708090A0B0C0D0E0F'x
     10 '101112131415161718191A1B1C1D1E1F'x
     20 '202122232425262728292A2B2C2D2E2F'x
     30 '303132333435363738393A3B3C3D3E3F'x
     40 '404142434445464748494A4B4C4D4E4F'x
     50 '505152535455565758595A5B5C5D5E5F'x
     60 '606162636465666768696A6B6C6D6E6F'x
     70 '707172737475767778797A7B7C7D7E7F'x
     80 '808182838485868788898A8B8C8D8E8F'x
     90 '909192939495969798999A9B9C9D9E9F'x
     A0 'A0A1A2A3A4A5A6A7A8A9AAABACADAEAF'x
     B0 'B0B1B2B3B4B5B6B7B8B9BABBBCBDBEBF'x
     C0 'C0C1C2C3C4C5C6C7C8C9CACBCCCDCECF'x
     D0 'D0D1D2D3D4D5D6D7D8D9DADBDCDDDEDF'x
     E0 'E0E1E2E3E4E5E6E7E8E9EAEBECEDEEEF'x
     F0 'F0F1F2F3F4F5F6F7F8F9FAFBFCFDFEFF'x
```

Example 2: Creating a Translation Table

Procedures features:

LIST statement
REPLACE statement
SAVE statement

This example uses PROC TRANTAB to create a customized translation table.

Program

Set the system options and specify the translation table to edit.

```
options nodate pageno=1 linesize=80 pagesize=60;
proc trantab table=newtable;
```

Replace characters in the translation table starting at a specified position. The REPLACE statement places the values in the table starting at position 0. You can use hexadecimal strings of any length in the REPLACE statement. This example uses strings of length 16 to match the way that translation tables appear in the SAS log.

```
replace 0
'00010203a309e57ff9ecc40b0c0d0e0f'x
'10111213a5e008e71819c6c51c1d1e1f'x
'c7fce9e2e40a171beaebe8efee050607'x
'c9e616f4f6f2fb04ffd6dca2b6a7501a'x
'20e1edf3faf1d1aababfa22e3c282b7c'x
'265facbdbca1abbb5f5f21242a293bac'x
'2d2f5fa6a6a6a62b2ba6a62c255f3e3f'x
'a62b2b2b2b2b2b2d2d603a2340273d22'x
'2b6162636465666768692d2ba6a62b2b'x
'2d6a6b6c6d6e6f7071722da62d2b2d2d'x
'2d7e737475767778787a2d2b2b2b2b2b'x
'2b2b2b5f5fa65f5f5fdf5fb65f5fb55f'x
'7b41424344454647484 95f5f5f5f5f5f'x
'7d4a4b4c4d4e4f5051525f5f5fb15f5f'x
'5c83535455565758595a5f5ff75f5fb0'x
'3031323334353637383 9b75f6eb25f5f'x
;
```

Save the table. The SAVE statement saves the table under the name that is specified in the PROC TRANTAB statement. By default, the table is saved in your SASUSER.PROFILE catalog.

```
save;
```

Display both halves of the translation table in the SAS log. The LIST BOTH statement displays both the table that provides the translation and the table that provides the inverse translation.

```
list both;
```

SAS Log

Create and edit table 2. Table 2 is empty; that is, it consists entirely of 0s. To create table 2, you can use the INVERSE statement. (See Example 5 on page 529 .) To edit table 2, you can use the SWAP statement with the REPLACE statement. (See Example 7 on page 533.)

```
   NOTE: Table specified is NEWTABLE.
WARNING: Table NEWTABLE not found! New table is assumed.
NOTE: NEWTABLE table 1 is uninitialized.
NOTE: NEWTABLE table 2 is uninitialized.

NOTE: Saving table NEWTABLE.
NOTE: NEWTABLE table 2 will not be saved because it is uninitialized.
NEWTABLE table 1:
          0 1 2 3 4 5 6 7 8 9 A B C D E F
     00 '00010203A309E57FF9ECC40B0C0D0E0F'x
     10 '10111213A5E008E71819C6C51C1D1E1F'x
     20 'C7FCE9E2E40A171BEAEBE8EFEE050607'x
     30 'C9E616F4F6F2FB04FFD6DCA2B6A7501A'x
     40 '20E1EDF3FAF1D1AABABFA22E3C282B7C'x
     50 '265FACBDBCA1ABBB5F5F21242A293BAC'x
     60 '2D2F5FA6A6A6A62B2BA6A62C255F3E3F'x
     70 'A62B2B2B2B2B2B2D2D603A2340273D22'x
     80 '2B6162636465666768692D2BA6A62B2B'x
     90 '2D6A6B6C6D6E6F7071722DA62D2B2D2D'x
     A0 '2D7E737475767778787A2D2B2B2B2B2B'x
     B0 '2B2B2B5F5FA65F5F5FDF5FB65F5FB55F'x
     C0 '7B41424344454647484955F5F5F5F5F5F'x
     D0 '7D4A4B4C4D4E4F5051525F5F5FB15F5F'x
     E0 '5C83535455565758595A5F5FF75F5FB0'x
     F0 '303132333435363738397B75F6EB25F5F'x



NOTE: NEWTABLE table 2 is uninitialized.
NEWTABLE table 2:
          0 1 2 3 4 5 6 7 8 9 A B C D E F
     00 '00000000000000000000000000000000'x
     10 '00000000000000000000000000000000'x
     20 '00000000000000000000000000000000'x
     30 '00000000000000000000000000000000'x
     40 '00000000000000000000000000000000'x
     50 '00000000000000000000000000000000'x
     60 '00000000000000000000000000000000'x
     70 '00000000000000000000000000000000'x
     80 '00000000000000000000000000000000'x
     90 '00000000000000000000000000000000'x
     A0 '00000000000000000000000000000000'x
     B0 '00000000000000000000000000000000'x
     C0 '00000000000000000000000000000000'x
     D0 '00000000000000000000000000000000'x
     E0 '00000000000000000000000000000000'x
     F0 '00000000000000000000000000000000'x
```

Example 3: Editing by Specifying a Decimal Value for Starting Position

Procedure features:

LIST statement

REPLACE statement

SAVE statement

This example edits the translation table that was created in Example 2 on page 522. The decimal value specified in the REPLACE statement marks the starting position for the changes to the table.

The vertical arrow in both SAS logs marks the point at which the changes begin.

Program 1: Display the Original Table

Set the system options and specify the translation table to edit.

```
options nodate pageno=1 linesize=80 pagesize=60;
proc trantab table=newtable;
```

Display the original table. This LIST statement displays the original NEWTABLE translation table.

```
    list one;
```

SAS Log

The Original NEWTABLE Translation Table

```
NOTE: Table specified is NEWTABLE.
NOTE: NEWTABLE table 2 is uninitialized.
NEWTABLE table 1:
                           ↓
          0 1 2 3 4 5 6 7 8 9 A B C D E F
     00 '00010203A309E57FF9ECC40B0C0D0E0F'x
     10 '10111213A5E008E71819C6C51C1D1E1F'x
     20 'C7FCE9E2E40A171BEAEBE8EFEE050607'x
     30 'C9E616F4F6F2FB04FFD6DCA2B6A7501A'x
     40 '20E1EDF3FAF1D1AABABFA22E3C282B7C'x
     50 '265FACBDBCA1ABBB5F5F21242A293BAC'x
     60 '2D2F5FA6A6A6A62B2BA6A62C255F3E3F'x
     70 'A62B2B2B2B2B2B2D2D603A2340273D22'x
     80 '2B6162636465666768692D2BA6A62B2B'x
     90 '2D6A6B6C6D6E6F7071722DA62D2B2D2D'x
     A0 '2D7E737475767778787A2D2B2B2B2B2B'x
     B0 '2B2B2B5F5FA65F5F5FDF5FB65F5FB55F'x
     C0 '7B41424344454647484 95F5F5F5F5F5F'x
     D0 '7D4A4B4C4D4E4F5051525F5F5FB15F5F'x
     E0 '5C83535455565758595A5F5FF75F5FB0'x
     F0 '30313233343536373839B75F6EB25F5F'x
```

Program 2: Edit the Table

Replace characters in the translation table, starting at a specified position. The REPLACE statement starts at position decimal 10, which is byte 11 in the original table, and performs a byte-to-byte replacement with the given values.

```
replace 10
20 10 200 'x' 'ux' '092040'x;
```

Save the changes. The SAVE statement saves the changes that you made to the NEWTABLE translation table.

```
save;
```

Display the new table. The second LIST statement displays the edited NEWTABLE translation table.

```
list one;
```

SAS Log

The Edited NEWTABLE Translation Table

```
NOTE: Saving table NEWTABLE.
NOTE: NEWTABLE table 2 will not be saved because it is uninitialized.
NEWTABLE table 1:
                              ↓
          0 1 2 3 4 5 6 7 8 9 A B C D E F
     00 '00010203A309E57FF9EC140AC8787578'x
     10 '09204013A5E008E71819C6C51C1D1E1F'x
     20 'C7FCE9E2E40A171BEAEBE8EFEE050607'x
     30 'C9E616F4F6F2FB04FFD6DCA2B6A7501A'x
     40 '20E1EDF3FAF1D1AABABFA22E3C282B7C'x
     50 '265FACBDBCA1ABBB5F5F21242A293BAC'x
     60 '2D2F5FA6A6A6A62B2BA6A62C255F3E3F'x
     70 'A62B2B2B2B2B2B2D2D603A2340273D22'x
     80 '2B6162636465666768692D2BA6A62B2B'x
     90 '2D6A6B6C6D6E6F7071722DA62D2B2D2D'x
     A0 '2D7E737475767778787A2D2B2B2B2B2B'x
     B0 '2B2B2B5F5FA65F5F5FDF5FB65F5FB55F'x
     C0 '7B41424344454647484 95F5F5F5F5F5F'x
     D0 '7D4A4B4C4D4E4F5051525F5F5FB15F5F'x
     E0 '5C83535455565758595A5F5FF75F5FB0'x
     F0 '30313233343536373839B75F6EB25F5F'x
```

At position 10 (which is byte 11), a vertical arrow denotes the starting point for the changes to the translation table.

- At byte 11, decimal 20 (which is hexadecimal 14) replaces hexadecimal C4.

- At byte 12, decimal 10 (which is hexadecimal 0A) replaces hexadecimal 0B.
- At byte 13, decimal 200 (which is hexadecimal C8) replaces hexadecimal 0C.
- At byte 14, character 'x' (which is hexadecimal 78) replaces hexadecimal 0D.
- At bytes 15 and 16, characters 'ux' (which are hexadecimal 75 and 78, respectively) replace hexadecimal 0E and 0F.
- At bytes 17, 18, and 19, hexadecimal 092040 replaces hexadecimal 101112.

Example 4: Editing by Using a Quoted Character for Starting Position

Procedure features:

LIST statement
LOAD statement
REPLACE statement
SAVE statement

This example creates a new translation table by editing the already fixed ASCII translation table. The first occurrence of the hexadecimal equivalent of the quoted character that was specified in the REPLACE statement is the starting position for the changes to the table. This method differs from Example 3 on page 524 in that you do not need to know the exact position at which to start the changes to the table. PROC TRANTAB finds the correct position for you.

The edited table is saved under a new name. Horizontal arrows in both SAS logs denote the edited rows in the translation table.

Program 1: Display the Original Table

Set the system options and specify which translation table to edit.

```
options nodate pageno=1 linesize=80 pagesize=60;
proc trantab table=ascii;
```

Display the translation table. The LIST statement displays the original translation table in the SAS log.

```
    list one;
```

SAS Log

```
NOTE: Table specified is ASCII.
ASCII table 1:
          0 1 2 3 4 5 6 7 8 9 A B C D E F
     00 '000102030405060708090A0B0C0D0E0F'x
     10 '101112131415161718191A1B1C1D1E1F'x
     20 '202122232425262728292A2B2C2D2E2F'x
     30 '303132333435363738393A3B3C3D3E3F'x
     40 '404142434445464748494A4B4C4D4E4F'x
     50 '505152535455565758595A5B5C5D5E5F'x
     60 '606162636465666768696A6B6C6D6E6F'x   ←
     70 '707172737475767778797A7B7C7D7E7F'x   ←
     80 '808182838485868788898A8B8C8D8E8F'x
     90 '909192939495969798999A9B9C9D9E9F'x
     A0 'A0A1A2A3A4A5A6A7A8A9AAABACADAEAF'x
     B0 'B0B1B2B3B4B5B6B7B8B9BABBBCBDBEBF'x
     C0 'C0C1C2C3C4C5C6C7C8C9CACBCCCDCECF'x
     D0 'D0D1D2D3D4D5D6D7D8D9DADBDCDDDEDF'x
     E0 'E0E1E2E3E4E5E6E7E8E9EAEBECEDEEEF'x
     F0 'F0F1F2F3F4F5F6F7F8F9FAFBFCFDFEFF'x
```

Program 2: Edit the Table

Replace characters in the translation table, starting at a specified position. The REPLACE statement finds the first occurrence of the hexadecimal "a" (which is 61) and replaces it, and the next 25 hexadecimal values, with the hexadecimal values for uppercase "A" through "Z."

```
replace 'a' 'ABCDEFGHIJKLMNOPQRSTUVWXYZ';
```

Save your changes. The SAVE statement saves the changes made to the ASCII translation table under the new table name UPPER. The stored contents of the ASCII translation table remain unchanged.

```
save table=upper;
```

Load and display the translation table. The LOAD statement loads the edited translation table UPPER. The LIST statement displays the translation table UPPER in the SAS log.

```
load table=upper;
list one;
```

SAS Log

The UPPER Translation Table
The horizontal arrows in the SAS log denote the rows in which the changes are made.

```
NOTE: Table UPPER being loaded.
UPPER table 1:
          0 1 2 3 4 5 6 7 8 9 A B C D E F
     00 '000102030405060708090A0B0C0D0E0F'x
     10 '101112131415161718191A1B1C1D1E1F'x
     20 '202122232425262728292A2B2C2D2E2F'x
     30 '303132333435363738393A3B3C3D3E3F'x
     40 '404142434445464748494A4B4C4D4E4F'x
     50 '505152535455565758595A5B5C5D5E5F'x
     60 '604142434445464748494A4B4C4D4E4F'x   ←
     70 '505152535455565758595A7B7C7D7E7F'x   ←
     80 '808182838485868788898A8B8C8D8E8F'x
     90 '909192939495969798999A9B9C9D9E9F'x
     A0 'A0A1A2A3A4A5A6A7A8A9AAABACADAEAF'x
     B0 'B0B1B2B3B4B5B6B7B8B9BABBBCBDBEBF'x
     C0 'C0C1C2C3C4C5C6C7C8C9CACBCCCDCECF'x
     D0 'D0D1D2D3D4D5D6D7D8D9DADBDCDDDEDF'x
     E0 'E0E1E2E3E4E5E6E7E8E9EAEBECEDEEEF'x
     F0 'F0F1F2F3F4F5F6F7F8F9FAFBFCFDFEFF'x
```

Example 5: Creating the Inverse of a Table

Procedure features:

INVERSE statement
LIST statement
SAVE statement

This example creates the inverse of the translation table that was created in Example 4 on page 527. The new translation table that is created in this example is the operating environment-to-device translation for use in data communications.

Program

```
options nodate pageno=1 linesize=80 pagesize=60;
proc trantab table=upper;
```

Create the inverse translation table, save the tables, and display the tables. The INVERSE statement creates table 2 by inverting the original table 1 (called UPPER). The SAVE statement saves the translation tables. The LIST BOTH statement displays both the original translation table and its inverse.

```
    inverse;
    save;
```

```
    list both;
```

SAS Log

The UPPER Translation Table and Its Inverse

The SAS log lists all the duplicate values that it encounters as it creates the inverse of table one. To conserve space, most of these messages are deleted in this example.

```
NOTE: Table specified is UPPER.
NOTE: This table cannot be mapped one to one.
 duplicate of '41'x found at '61'x in table one.
 duplicate of '42'x found at '62'x in table one.
 duplicate of '43'x found at '63'x in table one.
   .
   .
   .
 duplicate of '58'x found at '78'x in table one.
 duplicate of '59'x found at '79'x in table one.
 duplicate of '5A'x found at '7A'x in table one.
NOTE: Saving table UPPER.
UPPER table 1:
          0 1 2 3 4 5 6 7 8 9 A B C D E F
     00 '000102030405060708090A0B0C0D0E0F'x
     10 '101112131415161718191A1B1C1D1E1F'x
     20 '202122232425262728292A2B2C2D2E2F'x
     30 '303132333435363738393A3B3C3D3E3F'x
     40 '404142434445464748494A4B4C4D4E4F'x
     50 '505152535455565758595A5B5C5D5E5F'x
     60 '604142434445464748494A4B4C4D4E4F'x
     70 '505152535455565758595A7B7C7D7E7F'x
     80 '808182838485868788898A8B8C8D8E8F'x
     90 '909192939495969798999A9B9C9D9E9F'x
     A0 'A0A1A2A3A4A5A6A7A8A9AAABACADAEAF'x
     B0 'B0B1B2B3B4B5B6B7B8B9BABBBCBDBEBF'x
     C0 'C0C1C2C3C4C5C6C7C8C9CACBCCCDCECF'x
     D0 'D0D1D2D3D4D5D6D7D8D9DADBDCDDDEDF'x
     E0 'E0E1E2E3E4E5E6E7E8E9EAEBECEDEEEF'x
     F0 'F0F1F2F3F4F5F6F7F8F9FAFBFCFDFEFF'x


UPPER table 2:
          0 1 2 3 4 5 6 7 8 9 A B C D E F
     00 '000102030405060708090A0B0C0D0E0F'x
     10 '101112131415161718191A1B1C1D1E1F'x
     20 '202122232425262728292A2B2C2D2E2F'x
     30 '303132333435363738393A3B3C3D3E3F'x
     40 '404142434445464748494A4B4C4D4E4F'x
     50 '505152535455565758595A5B5C5D5E5F'x
     60 '600000000000000000000000000000000'x
     70 '000000000000000000000007B7C7D7E7F'x
     80 '808182838485868788898A8B8C8D8E8F'x
     90 '909192939495969798999A9B9C9D9E9F'x
     A0 'A0A1A2A3A4A5A6A7A8A9AAABACADAEAF'x
     B0 'B0B1B2B3B4B5B6B7B8B9BABBBCBDBEBF'x
     C0 'C0C1C2C3C4C5C6C7C8C9CACBCCCDCECF'x
     D0 'D0D1D2D3D4D5D6D7D8D9DADBDCDDDEDF'x
     E0 'E0E1E2E3E4E5E6E7E8E9EAEBECEDEEEF'x
     F0 'F0F1F2F3F4F5F6F7F8F9FAFBFCFDFEFF'x
```

The INVERSE statement lists in the SAS log all of the multiple translations that it encounters as it inverts the translation table. In Example 4 on page 527, all the lowercase letters were converted to uppercase in the translation table UPPER, which means that there are two sets of uppercase letters in UPPER. When INVERSE cannot make a translation, PROC TRANTAB fills the value with 00. Note that the inverse of the translation table UPPER has numerous 00 values.

Example 6: Using Different Translation Tables for Sorting

Procedure features:

PROC SORT statement option:

SORTSEQ=

Other features:

PRINT procedure

This example shows how to specify a different translation table to sort data in an order that is different from the default sort order. Characters that are written in a language other than U.S. English might require a sort order that is different from the default order.

Note: You can use the TRABASE program in the SAS Sample Library to create translation tables for several languages. △

Program

Set the SAS system options.

```
options nodate pageno=1 linesize=80 pagesize=60;
```

Create the TESTSORT data set. The DATA step creates a SAS data set with four pairs of words, each pair differing only in the case of the first letter.

```
data testsort;
   input Values $10.;
   datalines;
Always
always
Forever
forever
Later
later
Yesterday
yesterday
;
```

Sort the data in an order that is different from the default sort order. PROC SORT sorts the data by using the default translation table, which sorts all lowercase words first, then all uppercase words.

```
proc sort;
   by values;
run;
```

Print the data set. PROC PRINT prints the sorted data set.

```
proc print noobs;
   title 'Default Sort Sequence';
run;
```

SAS Output

Output from Sorting Values with Default Translation Table

The default sort sequence sorts all the capitalized words in alphabetical order before it sorts any lowercase words.

```
                          Default Sort Sequence                          1

                                Values

                                Always
                                Forever
                                Later
                                Yesterday
                                always
                                forever
                                later
                                yesterday
```

Sort the data according to the translation table UPPER and print the new data set. The SORTSEQ= option specifies that PROC SORT sort the data according to the customized translation table UPPER, which treats lowercase and uppercase letters alike. This method is useful for sorting without regard for case. PROC PRINT prints the sorted data set.

```
proc sort sortseq=upper;
   by values;
run;
proc print noobs;
   title 'Customized Sort Sequence';
run;
```

SAS Output

Output from Sorting Values with Customized Translation Table
The customized sort sequence sorts all the words in alphabetical order, without regard for the case of the first letters.

```
                          Customized Sort Sequence                          2

                                 Values

                                 Always
                                 always
                                 Forever
                                 forever
                                 Later
                                 later
                                 Yesterday
                                 yesterday
```

Example 7: Editing Table 1 and Table 2

Procedure features:
LIST statement
REPLACE statement
SAVE statement
SWAP statement

This example shows how to edit both areas of a translation table. To edit positions 256 through 511 (table 2), you must

1. Issue the SWAP statement to have table 2 change places with table 1.
2. Issue an appropriate REPLACE statement to make changes to table two.
3. Issue the SWAP statement again to reposition the table.

Arrows in the SAS logs mark the rows and columns that are changed.

Program

Set the SAS system options and specify the translation table.

```
options nodate pageno=1 linesize=80 pagesize=60;
proc trantab table=upper;
```

Display the original translation table. The LIST statement displays the original UPPER translation table.

```
    list both;
```

SAS Log

The Original UPPER Translation Table

```
NOTE: Table specified is UPPER.
UPPER table 1:
           ↓
          0 1 2 3 4 5 6 7 8 9 A B C D E F
     00 '000102030405060708090A0B0C0D0E0F'x   ←
     10 '101112131415161718191A1B1C1D1E1F'x
     20 '202122232425262728292A2B2C2D2E2F'x
     30 '303132333435363738393A3B3C3D3E3F'x
     40 '404142434445464748494A4B4C4D4E4F'x
     50 '505152535455565758595A5B5C5D5E5F'x
     60 '606142434445464748494A4B4C4D4E4F'x
     70 '505152535455565758595A7B7C7D7E7F'x
     80 '808182838485868788898A8B8C8D8E8F'x
     90 '909192939495969798999A9B9C9D9E9F'x
     A0 'A0A1A2A3A4A5A6A7A8A9AAABACADAEAF'x
     B0 'B0B1B2B3B4B5B6B7B8B9BABBBCBDBEBF'x
     C0 'C0C1C2C3C4C5C6C7C8C9CACBCCCDCECF'x
     D0 'D0D1D2D3D4D5D6D7D8D9DADBDCDDDEDF'x
     E0 'E0E1E2E3E4E5E6E7E8E9EAEBECEDEEEF'x
     F0 'F0F1F2F3F4F5F6F7F8F9FAFBFCFDFEFF'x

UPPER table 2:
           ↓
          0 1 2 3 4 5 6 7 8 9 A B C D E F
     00 '000102030405060708090A0B0C0D0E0F'x   ←
     10 '101112131415161718191A1B1C1D1E1F'x
     20 '202122232425262728292A2B2C2D2E2F'x
     30 '303132333435363738393A3B3C3D3E3F'x
     40 '404142434445464748494A4B4C4D4E4F'x
     50 '505152535455565758595A5B5C5D5E5F'x
     60 '600000000000000000000000000000000'x
     70 '000000000000000000000007B7C7D7E7F'x
     80 '808182838485868788898A8B8C8D8E8F'x
     90 '909192939495969798999A9B9C9D9E9F'x
     A0 'A0A1A2A3A4A5A6A7A8A9AAABACADAEAF'x
     B0 'B0B1B2B3B4B5B6B7B8B9BABBBCBDBEBF'x
     C0 'C0C1C2C3C4C5C6C7C8C9CACBCCCDCECF'x
     D0 'D0D1D2D3D4D5D6D7D8D9DADBDCDDDEDF'x
     E0 'E0E1E2E3E4E5E6E7E8E9EAEBECEDEEEF'x
     F0 'F0F1F2F3F4F5F6F7F8F9FAFBFCFDFEFF'x
```

Replace characters in the translation table starting at a specified position. The REPLACE statement starts at position 1 and replaces the current value of 01 with '0A'.

```
replace 1 '0A'x;
```

Prepare table 2 to be edited. The first SWAP statement positions table 2 so that it can be edited. The second REPLACE statement makes the same change in table 2 that was made in table 1.

```
swap;
replace 1 '0A'x;
```

Save and display the tables in their original positions. The second SWAP statement restores tables 1 and table 2 to their original positions. The SAVE statement saves both areas of the translation table by default. The LIST statement displays both areas of the table.

```
swap;
save;
list both;
```

SAS Log

The Edited UPPER Translation Table In byte 2, in both areas of the translation table, hexadecimal value '0A' replaces hexadecimal value 01. Arrows mark the rows and columns of the table in which this change is made.

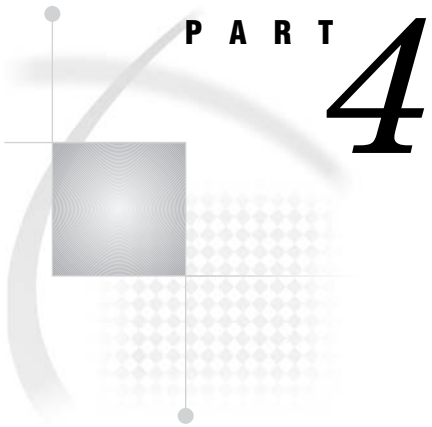
```
NOTE: Table specified is UPPER.
UPPER table 1:
            ↓
          0 1 2 3 4 5 6 7 8 9 A B C D E F
     00 '000A02030405060708090A0B0C0D0E0F'x   ←
     10 '101112131415161718191A1B1C1D1E1F'x
     20 '202122232425262728292A2B2C2D2E2F'x
     30 '303132333435363738393A3B3C3D3E3F'x
     40 '404142434445464748494A4B4C4D4E4F'x
     50 '505152535455565758595A5B5C5D5E5F'x
     60 '606142434445464748494A4B4C4D4E4F'x
     70 '505152535455565758595A7B7C7D7E7F'x
     80 '808182838485868788898A8B8C8D8E8F'x
     90 '909192939495969798999A9B9C9D9E9F'x
     A0 'A0A1A2A3A4A5A6A7A8A9AAABACADAEAF'x
     B0 'B0B1B2B3B4B5B6B7B8B9BABBBCBDBEBF'x
     C0 'C0C1C2C3C4C5C6C7C8C9CACBCCCDCECF'x
     D0 'D0D1D2D3D4D5D6D7D8D9DADBDCDDDEDF'x
     E0 'E0E1E2E3E4E5E6E7E8E9EAEBECEDEEEF'x
     F0 'F0F1F2F3F4F5F6F7F8F9FAFBFCFDFEFF'x

UPPER table 2:
            ↓
          0 1 2 3 4 5 6 7 8 9 A B C D E F
     00 '000A02030405060708090A0B0C0D0E0F'x   ←
     10 '101112131415161718191A1B1C1D1E1F'x
     20 '202122232425262728292A2B2C2D2E2F'x
     30 '303132333435363738393A3B3C3D3E3F'x
     40 '404142434445464748494A4B4C4D4E4F'x
     50 '505152535455565758595A5B5C5D5E5F'x
     60 '600000000000000000000000000000000'x
     70 '000000000000000000000007B7C7D7E7F'x
     80 '808182838485868788898A8B8C8D8E8F'x
     90 '909192939495969798999A9B9C9D9E9F'x
     A0 'A0A1A2A3A4A5A6A7A8A9AAABACADAEAF'x
     B0 'B0B1B2B3B4B5B6B7B8B9BABBBCBDBEBF'x
     C0 'C0C1C2C3C4C5C6C7C8C9CACBCCCDCECF'x
     D0 'D0D1D2D3D4D5D6D7D8D9DADBDCDDDEDF'x
     E0 'E0E1E2E3E4E5E6E7E8E9EAEBECEDEEEF'x
     F0 'F0F1F2F3F4F5F6F7F8F9FAFBFCFDFEFF'x
```

See Also

Conceptual discussion about "Transcoding and Translation Tables" on page 28

System Options:

"TRANTAB= System Option" on page 469



PART 4

Values for Locale, Encoding, and Transcoding

CHAPTER

16

Values for the LOCALE= System Option

LOCALE= Values and Default Settings for ENCODING, PAPERSIZE, DFLANG, and DATESTYLE options

Table 15.1 lists the valid LOCALE= values, specified by using the SAS name or the Posix name. The alias name is also listed. Some locales do not have an alias.

Table 16.1 Values for the LOCALE= System Option

SAS Name	Posix Locale	Alias
Afrikaans_SouthAfrica	af_ZA	Afrikaans
Albanian_Albania	sq_AL	Albanian
Arabic_Algeria	ar_DZ	
Arabic_Bahrain	ar_BH	
Arabic_Egypt	ar_EG	
Arabic_India	ar_IN	
Arabic_Iraq	ar_IQ	
Arabic_Jordan	ar_JO	
Arabic_Kuwait	ar_KW	
Arabic_Lebanon	ar_LB	
Arabic_Libya	ar_LY	
Arabic_Morocco	ar_MA	
Arabic_Oman	ar_OM	
Arabic_Qatar	ar_QA	
Arabic_SaudiArabia	ar_SA	
Arabic_Sudan	ar_SD	
Arabic_Syria	ar_SY	
Arabic_Tunisia	ar_TN	
Arabic_UnitedArabEmirates	ar_AE	Arabic

SAS Name	Posix Locale	Alias
Arabic_Yemen	ar_YE	
Bengali_India	bn_IN	Bengali
Bosnian_BosniaHerzegovina	bs_BA	
Bulgarian_Bulgaria	bg_BG	Bulgarian
Byelorussian_Belarus	be_BY	Byelorussian
Catalan_Spain	ca_ES	Catalan
Chinese_China	zh_CN	Chinese
Chinese_HongKong	zh_HK	
Chinese_Macau	zh_MO	
Chinese_Singapore	zh_SG	
Chinese_Taiwan	zh_TW	
Cornish_UnitedKingdom	kw_GB	Cornish
Croatian_BosniaHerzegovina	hr_BA	
Croatian_Croatia	hr_HR	Croatian
Czech_CzechRepublic	cs_CZ	Czech
Danish_Denmark	da_DK	Danish
Dutch_Belgium	nl_BE	
Dutch_Netherlands	nl_NL	Dutch
English_Australia	en_AU	
English_Belgium	en_BE	
English_Botswana	en_BW	
English_Canada	en_CA	
English_Caribbean	en_CB	
English_HongKong	en_HK	
English_India	en_IN	
English_Ireland	en_IE	
English_Jamaica	en_JM	
English_NewZealand	en_NZ	
English_Philippines	en_PH	
English_Singapore	en_SG	
English_SouthAfrica	en_ZA	
English_UnitedKingdom	en_GB	
English_UnitedStates	en_US	English
English_Zimbabwe	en_ZW	
Estonian_Estonia	et_EE	Estonian
Faroese_FaroeIslands	fo_FO	Faroese
Finnish_Finland	fi_FI	Finnish

SAS Name	Posix Locale	Alias
French_Belgium	fr_BE	
French_Canada	fr_CA	
French_France	fr_FR	French
French_Luxembourg	fr_LU	
French_Switzerland	fr_CH	
German_Austria	de_AT	
German_Germany	de_DE	German
German_Liechtenstein	de_LI	
German_Luxembourg	de_LU	
German_Switzerland	de_CH	
Greek_Greece	el_GR	Greek
Greenlandic_Greenland	kl_GL	Greenlandic
Hebrew_Israel	he_IL	Hebrew
Hindi_India	hi_IN	Hindi
Hungarian_Hungary	hu_HU	Hungarian
Icelandic_Iceland	is_IS	Icelandic
Indonesian_Indonesia	id_ID	Indonesian
Italian_Italy	it_IT	Italian
Italian_Switzerland	it_CH	
Japanese_Japan	ja_JP	Japanese
Korean_Korea	ko_KR	Korean
Latvian_Latvia	lv_LV	Latvian
Lithuanian_Lithuania	lt_LT	Lithuanian
Macedonian_Macedonia	mk_MK	Macedonian
Malay_Malaysia	ms_MY	Malay
Maltese_Malta	mt_MT	Maltese
ManxGaelic_UnitedKingdom	gv_GB	ManxGaelic
Marathi_India	mr_IN	Marathi
NorwegianBokmal_Norway	nb_NO	NorwegianBokmal
NorwegianNynorsk_Norway	nn_NO	NorwegianNynorsk
Norwegian_Norway	no_NO	Norwegian
Persian_India	fa_IN	
Persian_Iran	fa_IR	Persian
Polish_Poland	pl_PL	Polish
Portuguese_Brazil	pt_BR	
Portuguese_Portugal	pt_PT	Portuguese
Romanian_Romania	ro_RO	Romanian

SAS Name	Posix Locale	Alias
Russian_Russia	ru_RU	Russian
Russian_Ukraine	ru_UA	
Serbian_BosniaHerzegovina	sr_BA	
Serbian_Montenegro	sr_ME	
Serbian_Serbia	sr_RS	
Serbian_Yugoslavia	sr_YU	Serbian
SerboCroatian_BosniaHerzegovina	sh_BA	
SerboCroatian_Montenegro	sh_ME	
SerboCroatian_Serbia	sh_RS	
Slovak_Slovakia	sk_SK	Slovak
Slovenian_Slovenia	sl_SI	Slovenian
Spanish_Argentina	es_AR	
Spanish_Bolivia	es_BO	
Spanish_Chile	es_CL	
Spanish_Colombia	es_CO	
Spanish_CostaRica	es_CR	
Spanish_DominicanRepublic	es_DO	
Spanish_Ecuador	es_EC	
Spanish_ElSalvador	es_SV	
Spanish_Guatemala	es_GT	
Spanish_Honduras	es_HN	
Spanish_Mexico	es_MX	
Spanish_Nicaragua	es_NI	
Spanish_Panama	es_PA	
Spanish_Paraguay	es_PY	
Spanish_Peru	es_PE	
Spanish_PuertoRico	es_PR	
Spanish_Spain	es_ES	Spanish
Spanish_UnitedStates	es_US	
Spanish_Uruguay	es_UY	
Spanish_Venezuela	es_VE	
Swedish_Sweden	sv_SE	Swedish
Tamil_India	ta_IN	Tamil
Telugu_India	te_IN	Telugu
Thai_Thailand	th_TH	Thai
Turkish_Turkey	tr_TR	Turkish

SAS Name	Posix Locale	Alias
Ukrainian_Ukraine	uk_UA	Ukrainian
Vietnamese_Vietnam	vi_VN	Vietnamese

Table 15.2 lists the valid Posix values and the default settings for the ENCODING= option, by operating environment. The settings for DFLANG, DATESTYLE, and PAPERSIZE system options are set automatically.

Here is an example:

```
sas9 -locale arabic_algeria
```

When the Arabic_Algeria LOCALE= value is specified, corresponding default settings for the system options are as follows:

```
DFLANG=English
DATESTYLE=DMY
PAPERSIZE=A4
```

Table 16.2 Default Values for the ENCODING, DFLANG, DATESTYLE, and PAPERSIZE System Options Based on the LOCALE= System Option

Posix Locale	Windows Encoding	UNIX Encoding	z/OS Encoding	DFLANG=	DATESTYLE=	PAPERSIZE=
af_ZA	wlatin1	latin1	open_ed-1047	English	YMD	A4
ar_AE	warabic	arabic	open_ed-425	English	DMY	A4
ar_BH	warabic	arabic	open_ed-425	English	DMY	A4
ar_DZ	warabic	arabic	open_ed-425	English	DMY	A4
ar_EG	warabic	arabic	open_ed-425	English	DMY	A4
ar_IN	warabic	arabic	open_ed-425	English	DMY	A4
ar_IQ	warabic	arabic	open_ed-425	English	DMY	A4
ar_JO	warabic	arabic	open_ed-425	English	DMY	A4
ar_KW	warabic	arabic	open_ed-425	English	DMY	A4
ar_LB	warabic	arabic	open_ed-425	English	DMY	A4
ar_LY	warabic	arabic	open_ed-425	English	DMY	A4
ar_MA	warabic	arabic	open_ed-425	English	DMY	A4
ar_OM	warabic	arabic	open_ed-425	English	DMY	A4
ar_QA	warabic	arabic	open_ed-425	English	DMY	A4
ar_SA	warabic	arabic	open_ed-425	English	DMY	A4
ar_SD	warabic	arabic	open_ed-425	English	DMY	A4
ar_SY	warabic	arabic	open_ed-425	English	DMY	A4
ar_TN	warabic	arabic	open_ed-425	English	DMY	A4
ar_YE	warabic	arabic	open_ed-425	English	DMY	A4
be_BY	wcyrillic	cyrillic	open_ed-1025	English	DMY	A4
bg_BG	wcyrillic	cyrillic	open_ed-1025	English	YMD	A4
bn_IN	wlatin1	latin1	open_ed-1047	English	DMY	A4

Posix Locale	Windows Encoding	UNIX Encoding	z/OS Encoding	DFLANG=	DATESTYLE=	PAPERSIZE=
ca_ES	wlatin1	latin1	open_ed-1148	English	DMY	A4
cs_CZ	wlatin2	latin2	open_ed-870	Czech	DMY	A4
da_DK	wlatin1	latin9	open_ed-1142	Danish	DMY	A4
de_AT	wlatin1	latin9	open_ed-1141	German	DMY	A4
de_CH	wlatin1	latin9	open_ed-1148	Swiss_ German	DMY	A4
de_DE	wlatin1	latin9	open_ed-1141	German	DMY	A4
de_LI	wlatin1	latin9	open_ed-1141	German	DMY	A4
de_LU	wlatin1	latin9	open_ed-1141	German	DMY	A4
el_GR	wgreek	greek	open_ed-875	English	DMY	A4
en_AU	wlatin1	latin1	open_ed-1047	English	DMY	A4
en_BE	wlatin1	latin9	open_ed-1148	English	DMY	A4
en_BW	wlatin1	latin1	open_ed-1047	English	DMY	A4
en_CA	wlatin1	latin1	open_ed-1047	English	DMY	letter
en_CB	wlatin	latin1	open_ed-1047	English	MDY	letter
en_GB	wlatin1	latin9	open_ed-1146	English	DMY	A4
en_HK	wlatin1	latin9	open_ed-1146	English	DMY	A4
en_IE	wlatin1	latin9	open_ed-1146	English	DMY	A4
en_IN	wlatin1	latin9	open_ed-1146	English	DMY	A4
en_JM	wlatin1	latin1	open_ed-1047	English	DMY	letter
en_NZ	wlatin1	latin1	open_ed-1047	English	DMY	A4
en_PH	wlatin1	latin1	open_ed-1047	English	MDY	A4
en_SG	wlatin1	latin9	open_ed-1146	English	DMY	A4
en_US	wlatin1	latin1	open_ed-1047	English	MDY	A4
en_ZA	wlatin1	latin1	open_ed-1047	English	DMY	A4
en_ZW	wlatin1	latin1	open_ed-1047	English	DMY	A4
es_AR	wlatin1	latin1	open_ed-1047	Spanish	DMY	letter
es_BO	wlatin1	latin1	open_ed-1047	Spanish	DMY	letter
es_CL	wlatin1	latin1	open_ed-1047	Spanish	DMY	letter
es_CO	wlatin1	latin1	open_ed-1047	Spanish	DMY	letter
es_CR	wlatin1	latin1	open_ed-1047	Spanish	DMY	letter
es_DO	wlatin1	latin1	open_ed-1047	Spanish	DMY	letter
es_EC	wlatin1	latin1	open_ed-1047	Spanish	DMY	letter
es_ES	wlatin1	latin9	open_ed-1145	Spanish	DMY	A4
es_GT	wlatin1	latin1	open_ed-1047	Spanish	DMY	letter
es_HN	wlatin1	latin1	open_ed-1047	Spanish	MDY	letter

Posix Locale	Windows Encoding	UNIX Encoding	z/OS Encoding	DFLANG=	DATESTYLE=	PAPERSIZE=
es_MX	wlatin1	latin1	open_ed-1047	Spanish	DMY	letter
es_NI	wlatin1	latin1	open_ed-1047	Spanish	MDY	letter
es_PA	wlatin1	latin1	open_ed-1047	Spanish	MDY	letter
es_PE	wlatin1	latin1	open_ed-1047	Spanish	DMY	letter
es_PR	wlatin1	latin1	open_ed-1047	Spanish	MDY	letter
es_PY	wlatin1	latin1	open_ed-1047	Spanish	DMY	letter
es_SV	wlatin1	latin1	open_ed-1047	Spanish	MDY	letter
es_US	wlatin1	latin1	open_ed-1047	Spanish	DMY	letter
es_UY	wlatin1	latin1	open_ed-1047	Spanish	DMY	A4
es_VE	wlatin1	latin1	open_ed-1047	Spanish	DMY	letter
et_EE	wbaltic	latin6	open_ed-1122	English	DMY	A4
fa_IN	warabic	arabic	open_ed-1097	English	YMD	A4
fa_IR	warabic	arabic	open_ed-1097	English	YMD	A4
fi_FI	wlatin1	latin9	open_ed-1143	Finnish	DMY	A4
fo_FO	wlatin1	latin1	open_ed-1047	English	DMY	A4
fr_BE	wlatin1	latin9	open_ed-1148	French	DMY	A4
fr_CA	wlatin1	latin1	open_ed-1047	French	DMY	letter
fr_CH	wlatin1	latin9	open_ed-1148	Swiss_French	DMY	A4
fr_FR	wlatin1	latin9	open_ed-1147	French	DMY	A4
fr-LU	wlatin1	latin9	open_ed-1147	French	DMY	A4
gv_GB	wlatin1	latin8	open_ed-1148	English	DMY	A4
he_IL	whebrew	hebrew	open_ed-424	English	DMY	A4
hi_IN	PCISCII806	latin1	open_ed-1137	English	DMY	A4
hr_HR	wlatin2	latin2	open_ed-870	Croatian	YMD	A4
hu_HU	wlatin2	latin2	open_ed-870	Hungarian	YMD	A4
is_IS	wlatin1	latin1	open_ed-1047	English	DMY	A4
id_ID	wlatin1	latin1	open_ed-1047	English	DMY	A4
it_CH	wlatin1	latin9	open_ed-1148	Italian	DMY	A4
it_IT	wlatin1	latin9	open_ed-1144	Italian	DMY	A4
ja_JP	not applicable	not applicable	not applicable	Japanese	YMD	A4
kl_GL	wlatin1	latin1	open_ed-1047	English	DMY	A4
ko_KR	not applicable	not applicable	not applicable	Locale	YMD	A4
kw_GB	wlatin1	latin1	open_ed-1148	English	DMY	A4
lt_LT	wbaltic	latin6	open_ed-1112	English	YMD	A4
lv_LV	wbaltic	latin6	open_ed-1112	English	YMD	A4
mk_MK	wcyrillic	cyrillic	open_ed-1154	English	DMY	A4

Posix Locale	Windows Encoding	UNIX Encoding	z/OS Encoding	DFLANG=	DATESTYLE=	PAPERSIZE=
mr_IN	PCISCII806	latin1	open_ed-1137	English	DMY	A4
ms_MY	wlatin1	latin1	open_ed-1047	English	DMY	A4
mt_MT	wlatin1	latin3	open_ed-905	English	DMY	A4
nb_NO	wlatin1	latin9	open_ed-1142	Norwegian	DMY	A4
nl_BE	wlatin1	latin1	open_ed-1148	Dutch	DMY	A4
nl_NL	wlatin1	latin1	open_ed-1140	Dutch	DMY	A4
nn_NO	wlatin1	latin9	open_ed-1142	Norwegian	DMY	A4
no_NO	wlatin1	latin9	open_ed-1142	Norwegian	DMY	A4
pl_PL	wlatin2	latin2	open_ed-870	Polish	YMD	A4
pt_BR	wlatin1	latin1	open_ed-275	Portuguese	DMY	letter
pt_PT	wlatin1	latin1	open_ed-1140	Portuguese	DMY	A4
ro_RO	wlatin2	latin2	open_ed-870	English	DMY	A4
ru_RU	wcyrillic	cyrillic	open_ed-1025	Russian	DMY	A4
ru_UA	wcyrillic	cyrillic	open_ed-1154	Russian	DMY	A4
sh_YU	wlatin2	latin2	open_ed-870	English	DMY	A4
sk_SK	wlatin2	latin2	open_ed-870	English	DMY	A4
sl_SL	wlatin2	latin2	open_ed-870	Slovenian	YMD	A4
sr_YU	wcyrillic	cyrillic	open_ed-1025	English	DMY	A4
sq_AL	wlatin2	latin2	open_ed-1153	English	YMD	A4
sv_SE	wlatin1	latin9	open_ed-1143	Swedish	YMD	A4
ta_IN	wlatin1	latin1	open_ed-1047	English	DMY	A4
te_IN	wlatin1	latin1	open_ed-1047	English	DMY	A4
th_TH	pcoem874	thai	open_ed-838	English	DMY	A4
tr_TR	wturkish	latin5	open_ed-1026	English	DMY	A4
uk_UA	wcyrillic	cyrillic	open_ed-1025	English	DMY	A4
vi_VN	wvietnamese	latin1	open_ed-1130	English	DMY	A4
zh_CN	not applicable	not applicable	not applicable	Locale	YMD	A4
zh_HK	not applicable	not applicable	not applicable	Locale	YMD	A4
zh_MO	not applicable	not applicable	not applicable	Locale	YMD	A4
zh_SG	not applicable	not applicable	not applicable	Locale	DMY	A4
zh_TW	not applicable	not applicable	not applicable	Locale	YMD	A4

CHAPTER
17

SAS System Options for Processing DBCS Data

Overview to System Options Used in a SAS Session for DBCS

You use the DBCSLANG= and DBCSTYPE= system options to specify the DBCS encoding values for a SAS session. You do not directly use the ENCODING= system option when you are using DBCS.

DBCS Values for a SAS Session

Operating Environment Information: The following table shows the supported values for the DBCSLANG= and DBCSTYPE= system options under the z/OS, UNIX, and Windows operating environments. △

Note: If an encoding value contains a hyphen (-), enclose the encoding value in quotation marks. △

Table 17.1 DBCS Supported Values for the DBCSLANG= and DBCSTYPE= System Options

DBCSLANG=	z/OS DBCSTYPE=	UNIX DBCSTYPE=	Windows DBCSTYPE=
Chinese	ibm	dec	pcms
Chinese	not applicable	hp15	not applicable
Chinese	not applicable	euc	not applicable
Chinese	not applicable	pcms	not applicable
Japanese	ibm	dec	pcms
Japanese	pcibm	euc	sjis
Japanese	not applicable	hp15	not applicable
Japanese	not applicable	sjis	not applicable
Korean	ibm	pcibm	pcms

DBCSLANG=	z/OS DBCSTYPE=	UNIX DBCSTYPE=	Windows DBCSTYPE=
Korean	not applicable	pcms	not applicable
Korean	not applicable	dec	not applicable
Korean	not applicable	euc	not applicable
Korean	not applicable	hp15	not applicable
Taiwanese	ibm	dec	pcms
Taiwanese	pcibm	euc	not applicable
Taiwanese	not applicable	hp15	not applicable
Taiwanese	not applicable	pcms	not applicable

CHAPTER

18 Encoding Values in SAS Language Elements

Overview to SAS Language Elements That Use Encoding Values

When the encoding of the SAS session is different from the encoding of the SAS file or from the data that resides in the SAS file, transcoding must occur. Consider a SAS file that was created in the Western Latin1 encoding, then moved to an IBM mainframe that uses the German EBCDIC encoding. In order for the IBM mainframe to successfully access the file, the SAS data file must be transcoded from the Western Latin1 encoding to the German EBCDIC encoding. For information about transcoding concepts, including SAS language elements that contain options for transcoding, see Chapter 4, "Transcoding for NLS," on page 27.

SBCS, DBCS, and Unicode Encoding Values for Transcoding Data

Table 17.1 presents a list of SBCS, DBCS, and Unicode encoding values for transcoding data for all operating environments. The encoding values in Table 16.1 are valid for SAS language elements that contain options for transcoding.

Note: If an encoding value contains a hyphen (-), enclose the encoding value in quotation marks. △

Table 18.1 SBCS, DBCS, and Unicode Encoding Values Used to Transcode Data

Encoding Name	Short Name	Description
aarabic	aara	Arabic Macintosh
agreek	agrk	Greek Macintosh
ahebrew	aheb	Hebrew Macintosh
aiceland	aice	Icelandic Macintosh
any	anye	no transcoding is specified
arabic	arab	Arabic ISO
aroman	arom	Roman Macintosh

Encoding Name	Short Name	Description
aturkish	atur	Turkish Macintosh
aukrainian	aukr	Ukrainian Macintosh
big5	big5	Traditional Chinese Big5
cyrillic	cyrl	Cyrillic ISO
dec-cn	jums	Simplified Chinese DEC
dec-jp	jvms	Japanese DEC
dec-tw	yvms	Traditional Chinese DEC
ebcdic037	e037	North American EBCDIC
ebcdic275	e275	Brazil EBCDIC
ebcdic424	e424	Hebrew EBCDIC
ebcdic425	e425	Arabic EBCDIC
ebcdic500	e500	International EBCDIC
ebcdic838	e838	Thai EBCDIC
ebcdic870	e870	Central European EBCDIC
ebcdic875	e875	Greek EBCDIC
ebcdic924	e924	European EBCDIC
ebcdic1025	ecyr	Cyrillic EBCDIC
ebcdic1026	etur	Turkish EBCDIC
ebcdic1047	elat	Western EBCDIC
ebcdic1112	ebal	Baltic EBCDIC
ebcdic1122	eest	Estonian EBCDIC
ebcdic1130	evie	Vietnamese EBCDIC
ebcdic1140	e140	North American EBCDIC
ebcdic1141	e141	Austria/Germany EBCDIC
ebcdic1142	e142	Denmark/Norway EBCDIC
ebcdic1143	e143	Finland/Sweden EBCDIC
ebcdic1144	e144	Italy EBCDIC
ebcdic1145	e145	Spain EBCDIC
ebcdic1146	e146	United Kingdom EBCDIC
ebcdic1147	e147	France EBCDIC
ebcdic1148	e148	International EBCDIC
ebcdicany	eany	enables you to create a data set that is compatible with all EBCDIC encodings
euc-cn	zeuc	Simplified Chinese EUC
euc-jp	jeuc	Japanese EUC
euc-kr	keuc	Korean EUC
euc-tw	yeuc	Traditional Chinese EUC

Encoding Name	Short Name	Description
fujitsu-cn	zfuj	Simplified Chinese FACOM
fujitsu-jp	jfug	Japanese FACOM
fujitsu-ko	kfuj	Korean FACOM
fujitsu-tw	yfuj	Traditional Chinese FACOM
greek	grek	Greek ISO
hebrew	hebr	Hebrew ISO
hitachi-cn	zhit	Simplified Chinese HITAC
hitachi-jp	jhit	Japanese HITAC
hitachi-ko	khit	Korean HITAC
hitachi-tw	yhit	Traditional Chinese HITAC
hitsas-jp	jhts	Japanese XHITAC
hitsas-ko	khts	Korean XHITAC
hitsas-tw	yhts	Traditional Chinese XHITAC
hp15-tw	yhpx	Traditional Chinese HP15
ibm-1381	zpce	Simplified Chinese PCIBM
ibm-930	j930	Japanese Katakana - 930
ibm-933	kibm	Korean IBM
ibm-935	zibm	Simplified Chinese IBM
ibm-937	yibm	Traditional Chinese IBM
ibm-939	jibm	Japanese IBM
ibm-942	j942	Japanese PCIBM
ibm-949	kpce	Korean PCIBM
latin1	lat1	Western ISO
latin2	lat2	Central European ISO
latin5	lat5	Turkish ISO
latin6	lat6	Baltic ISO
latin9	lat9	European ISO
macos-1	jmac	Japanese PCMAC
macos-2	ymac	Traditional Chinese PCMAC
macos-3	kmac	Korean PCMAC
macos-25	zmac	Simplified Chinese PCMAC
ms-932	j932	Japanese PCMS
ms-936	zwin	Simplified Chinese PCMS
ms-949	kwin	Korean PCMS
ms-950	ywin	Traditional Chinese PCMS
msdos720	p720	Arabic MS-DOS
msdos737	p737	Greek MS-DOS

Encoding Name	Short Name	Description
msdos775	p775	Baltic MS-DOS
open_ed-275	eobr	Brazil OpenEdition
open_ed-424	eoiw	Hebrew OpenEdition
open_ed-425	eoa2	Arabic OpenEdition
open_ed-838	eoth	Thai OpenEdition
open_ed-870	eolz	Central European OpenEdition
open_ed-875	eoel	Greek OpenEdition
open_ed-924	eolt	European OpenEdition
open_ed-1025	eocy	Cyrillic OpenEdition
open_ed-1026	eotr	Turkish OpenEdition
open_ed-1047	eol1	Western OpenEdition
open_ed-1112	eobl	Baltic OpenEdition
open_ed-1122	eoet	Estonian OpenEdition
open_ed-1130	eovi	Vietnamese OpenEdition
open_ed-1140	eo40	North American OpenEdition
open_ed-1141	e041	Austria/Germany OpenEdition
open_ed-1142	e042	Denmark/Norway OpenEdition
open_ed-1143	e043	Finland/Sweden OpenEdition
open_ed-1144	e044	Italy OpenEdition
open_ed-1145	e045	Spain OpenEdition
open_ed-1146	e046	United Kingdom OpenEdition
open_ed-1147	e047	France OpenEdition
open_ed-1148	e048	International OpenEdition
pcoem437	p437	USA IBM-PC
pcoem850	p850	Western IBM-PC
pcoem852	p852	Central European IBM-PC
pcoem857	p857	Turkish IBM-PC
pcoem858	p858	European IBM-PC
pcoem860	p860	Portuguese MS-DOS
pcoem862	p862	Hebrew IBM-PC
pcoem863	p863	French Canadian IBM-PC
pcoem864	p864	Arabic IBM-PC
pcoem865	p865	Nordic IBM-PC
pcoem866	p866	Cyrillic IBM-PC
pcoem869	p869	Greek IBM-PC
pcoem874	p874	Thai IBM-PC

Encoding Name	Short Name	Description
pcoem921	p921	Baltic IBM-PC
pcoem922	p922	Estonia IBM-PC
pcoem1129	pvie	Vietnamese IBM-PC
shift-jis	sjis	Japanese SJIS
thai	thai	Thai ISO
utf-8	utf8	Unicode (UTF-8)
utf-16be	u16b	Unicode (UTF-16BE)
utf-16le	u16l	Unicode (UTF-16LE)
utf-32be	u32b	Unicode (UTF-32BE)
utf-32le	u32l	Unicode (UTF-32LE)
us-ascii	ansi	enables you to create a data set that is compatible with all ASCII encodings
warabic	wara	Arabic Windows
wbaltic	wbal	Baltic Windows
wcyrillic	wcyr	Cyrillic Windows
wgreek	wgrk	Greek Windows
whebrew	wheb	Hebrew Windows
wlatin1	wlt1	Western Windows
wlatin2	wlt2	Central European Windows
wturkish	wtur	Turkish Windows
wvietnamese	wvie	Vietnamese Windows

CHAPTER 19

Encoding Values for a SAS Session

OpenVMS Encoding Values

The encodings in the following tables are valid in the OpenVMS operating environment.

Note: If an encoding value contains a hyphen (-), enclose the encoding value in quotation marks. △

Table 19.1 Single-Byte Encodings for OpenVMS

ENCODING= Value	Description
arabic	Arabic (ISO)
cyrillic	Cyrillic (ISO)
greek	Greek (ISO)
hebrew	Hebrew (ISO)
latin1	Western (ISO)
latin2	Central Europe (ISO)
latin5	Turkish (ISO)
latin6	Baltic (ISO)
latin9	European (ISO)
thai	Thai (ISO)

UNIX Encoding Values

The encodings in the following tables are valid in UNIX environments.

Note: If an encoding value contains a hyphen (-), enclose the encoding value in quotation marks. △

Table 19.2 Single-Byte Encodings for UNIX

ENCODING= Value	Description
arabic	Arabic (ISO 8859-6)
cyrillic	Cyrillic (ISO 8859-5)
greek	Greek (ISO 8859-7)
hebrew	Hebrew (ISO 8859-8)
latin1	Western (ISO 8859-1)
latin2	Central Europe (ISO 8859-2)
latin5	Turkish (ISO 8859-9)
latin6	Baltic (ISO 8859-4)
latin8	Celtic (ISO 8859-14)
latin9	European (ISO 8859-15)
thai	Thai (ISO 8859-11)

Table 19.3 Double-Byte Encodings for UNIX

ENCODING= Value	Description
big5	Traditional Chinese (Big5)
euc-cn	Simplified Chinese (EUC)
euc-jp	Japanese (EUC)
euc-kr	Korean (EUC)
euc-tw	Traditional Chinese (EUC)
shift-jis	Japanese (SJIS)

UNIX also supports the UTF-8 Unicode encoding.

Windows Encoding Values

The encodings in the following tables are valid in the Windows operating environment.

Note: If an encoding-value contains a hyphen (-), enclose the encoding value in quotation marks. △

Table 19.4 Single-Byte Encodings for Windows

Description	Windows ENCODING= Value	MS-DOS ENCODING= Value	IBM-PC ENCODING= Value
Arabic	warabic	msdos720	pcoem864
Baltic	wbaltic	msdos775	pcoem921

Description	Windows ENCODING= Value	MS-DOS ENCODING= Value	IBM-PC ENCODING= Value
Central Europe	wlatin2	not applicable	pcoem852
Cyrillic	wcyrillic	not applicable	pcoem866 pcoem855
Central Europe	not applicable	not applicable	pcoem852
Estonia	not applicable	not applicable	pcoem922
European	not applicable	not applicable	pcoem858
Farsi	not applicable	not applicable	pc1098
French Canadian	not applicable	not applicable	pcoem863
Greek	wgreek	msdos737	not applicable
Hebrew	whebrew	not applicable	pcoem862
Indian Script Code	not applicable	not applicable	pciscii806
Nordic	not applicable	not applicable	pcoem865
Portuguese	not applicable	pcoem860	not applicable
Thai	not applicable	not applicable	pcoem874
Turkish	wturkish	not applicable	pcoem857
USA	not applicable	not applicable	pcoem437
Vietnamese	wvietnamese	not applicable	not applicable
Western	wlatin1	not applicable	pcoem850

Table 19.5 Windows Double-Byte Encodings

Description	PCMS ENCODING= Value	No Vendor ENCODING= Value
Traditional Chinese	ms-950	big5
Simplified Chinese	ms-936	not applicable

Description	PCMS ENCODING= Value	No Vendor ENCODING= Value
Japanese	ms-932	shift-jis
Korean	ms-949	not applicable

Note: Windows also supports the utf-8 Unicode encoding. △

z/OS Encoding Values

The encodings in the following tables are valid in the z/OS operating environment.

Note: If an encoding-value contains a hyphen (-), enclose the encoding value in quotation marks. △

Table 19.6 Single-Byte Encodings for z/OS

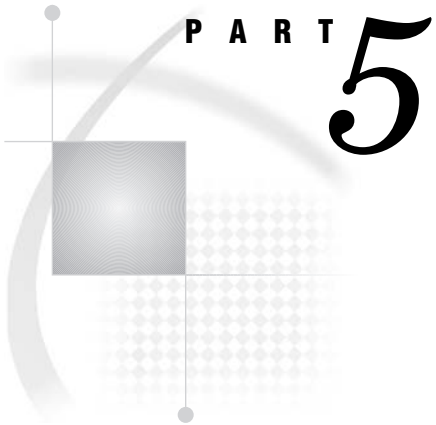
Encoding ENCODING= Value	Description
EBCDIC037	EBCDIC cp037- Old North America
EBCDIC275	EBCDIC cp275-Brazil
EBCDIC425	EBCDIC cp425-Arabic
EBCDIC838	EBCDIC cp838-Thai
EBCDIC870	EBCDIC cp870-Central Europe
EBCDIC875	EBCDIC cp875-Greek
EBCDIC905	EBCDIC cp905-Latin 3
EBCDIC924	EBCDIC cp924-Western Europe
EBCDIC1025	EBCDIC cp1025-Cyrillic
EBCDIC1026	EBCDIC cp1026-Turkish
EBCDIC1047	EBCDIC cp1047-Latin1
EBCDIC1097	EBCDIC cp1097-Farsi Bilingual
EBCDIC1112	EBCDIC cp1112-Baltic
EBCDIC1122	EBCDIC cp1122-Estonian
EBCDIC1130	EBCDIC cp1130-Vietnamese
EBCDIC1137	EBCDIC cp1137-Devanagari
EBCDIC1140	EBCDIC cp1140-North America
EBCDIC1141	EBCDIC cp1141-German/Austrian
EBCDIC1142	EBCDIC cp1142-Danish/Norwegian
EBCDIC1143	EBCDIC cp1143-Finnish/Swedish
EBCDIC1144	EBCDIC cp1144-Italian
EBCDIC1145	EBCDIC cp1145-Spanish
EBCDIC1146	EBCDIC cp1146-English (UK)

Encoding ENCODING= Value	**Description**
EBCDIC1147	EBCDIC cp1147-French
EBCDIC1148	EBCDIC cp1148-International
EBCDIC1149	EBCDIC cp1149-Iceland
EBCDIC1153	EBCDIC cp1153-Latin 2 Multilingual with euro
EBCDIC1154	EBCDIC cp1154-Cyrillic Multilingual with euro
EBCDIC1155	EBCDIC cp1155-Turkey with euro
EBCDIC1156	EBCDIC cp1156-Baltic Multilingual with euro
EBCDIC1157	EBCDIC cp1157-Estonia with euro
EBCDIC1158	EBCDIC cp1158-Cyrillic Ukraine with euro
OPEN_ED-037	OpenEdition EBCDIC cp037-Old North America
OPEN_ED-275	OpenEdition EBCDIC cp275-Brazil
OPEN_ED-425	OpenEdition EBCDIC cp425-Arabic
OPEN_ED-838	OpenEdition EBCDIC cp838-Thai
OPEN_ED-870	OpenEdition EBCDIC cp870-Central Europe
OPEN_ED-875	OpenEdition EBCDIC cp875-Greek
OPEN_ED-905	OpenEdition EBCDIC cp905-Latin 3
OPEN_ED-924	OpenEdition EBCDIC cp924-Western Europe
OPEN_ED-1025	OpenEdition EBCDIC cp1025-Cyrillic
OPEN_ED-1026	OpenEdition EBCDIC cp1026-Turkish
OPEN_ED-1047	OpenEdition EBCDIC cp1047-Latin1
OPEN_ED_1097	OpenEdition EBCDIC cp1097-Farsi Bilingual
OPEN_ED-1112	OpenEdition EBCDIC cp1112-Baltic
OPEN_ED-1122	OpenEdition EBCDIC cp1122-Estonian
OPEN_ED-1130	OpenEdition EBCDIC cp1130-Vietnamese
OPEN_ED-1137	OpenEdition EBCDIC cp1137-Devanagari
OPEN_ED-1140	OpenEdition EBCDIC cp1140-North America
OPEN_ED-1141	OpenEdition EBCDIC cp1141-German/Austrian
OPEN_ED-1142	OpenEdition EBCDIC cp1142-Danish/Norwegian
OPEN_ED-1143	OpenEdition EBCDIC cp1143-Finnish/Swedish
OPEN_ED-1144	OpenEdition EBCDIC cp1144-Italian
OPEN_ED-1145	OpenEdition EBCDIC cp1145-Spanish
OPEN_ED-1146	OpenEdition EBCDIC cp1146-English (UK)
OPEN_ED-1147	OpenEdition EBCDIC cp1147-French
OPEN_ED-1148	OpenEdition EBCDIC cp1148-International
OPEN_ED-1149	OpenEdition EBCDIC cp1149-Iceland
OPEN_ED-1153	OpenEdition EBCDIC cp1153-Latin 2 Multilingual with euro

Encoding ENCODING= Value	Description
OPEN_ED-1154	OpenEdition EBCDIC cp1154-Cyrillic Multilingual with euro
OPEN_ED-1155	OpenEdition EBCDIC cp1155-Turkey with euro
OPEN_ED-1156	OpenEdition EBCDIC cp1156-Baltic Multilingual with euro
OPEN_ED-1157	OpenEdition EBCDIC cp1157-Estonia with euro
OPEN_ED-1158	OpenEdition EBCDIC cp1158-Cyrillic Ukraine with euro

Table 19.7 Double-Byte Encodings for z/OS

Description	ENCODING= Value
Japanese	IBM-939
Korean	IBM-933
Simplified Chinese	IBM-935
Traditional Chinese	IBM-937



PART 5

Appendixes

APPENDIX

1

Additional NLS Language Elements

Additional NLS Language Elements

The following EUR language elements have been replaced with NL language elements. The EUR elements are supported in SAS 9.2, but SAS recommends that you use the NL elements.

EURDFDD*w*. Format

Writes international date values in the form *dd.mm.yy* or *dd.mm.yyyy*.

Category: Date and Time
Alignment: right

Syntax

EURDFDD*w*.

Syntax Description

w
specifies the width of the output field.
Default: 8 (except Finnish, which is 10)

Range: 2–10

Tip: When *w* is from 2 to 5, SAS prints as much of the month and day as possible. When *w* is 7, the date appears as a two-digit year without slashes, and the value is right-aligned in the output field.

Details

The EURDFDD*w*. format writes SAS date values in the form *dd.mm.yy* or *dd.mm.yyyy*, where

dd
is the two-digit integer that represents the day of the month.

mm
is the two-digit integer that represents the month.

yy or *yyyy*
is a two-digit or four-digit integer that represents the year.

You can set the language for the SAS session with the DFLANG= system option. (Because the SAS Installation Representative usually sets a default language for the site, you might be able to skip this step.) If you work with dates in multiple languages, you can replace the EUR prefix with a language prefix. See "DFLANG= System Option: OpenVMS, UNIX, Windows, and z/OS" on page 457 for the list of language prefixes. When you specify the language prefix in the format, SAS ignores the DFLANG= system option.

Examples

The example table uses the input value 15342, which is the SAS date value that corresponds to January 2, 2002. The first PUT statement assumes that the DFLANG= system option is set to Spanish.

```
options dflang=spanish;
```

The second PUT statement uses the Spanish language prefix in the format to write the international date value. The third PUT statement uses the French language prefix in the format to write the international date value. Therefore, the value of the DFLANG= option is ignored.

Statement	Result
	`----+----1`
`put date eurdfdd8.;`	`02.01.02`
`put date espdfdd8.;`	`02.01.02`
`put date fradfdd8.;`	`02/01/02`

See Also

Formats:

DATEw. in *SAS Language Reference: Dictionary*

DDMMYYw. in *SAS Language Reference: Dictionary*
MMDDYYw. in *SAS Language Reference: Dictionary*
YYMMDDw. in *SAS Language Reference: Dictionary*

Functions:

MDY in *SAS Language Reference: Dictionary*

Informats:

DATEw. in *SAS Language Reference: Dictionary*
DDMMYYw. in *SAS Language Reference: Dictionary*
MMDDYYw. in *SAS Language Reference: Dictionary*
YYMMDDw. in *SAS Language Reference: Dictionary*

System Options:

"DFLANG= System Option: OpenVMS, UNIX, Windows, and z/OS" on page 457

EURDFDE*w*. Format

Writes international date values in the form *ddmmmyy* or *ddmmmyyyy*.

Category: Date and Time
Alignment: right

Syntax

EURDFDE*w*.

Syntax Description

w

specifies the width of the output field.

Default: 7 (except Finnish)

Range: 5–9 (except Finnish)

Note: If you use the Finnish (FIN) language prefix, the *w* range is 9–10 and the default is 9. △

Details

The EURDFDE*w*. format writes SAS date values in the form *ddmmmyy* or *ddmmmyyyy*:

dd
is an integer that represents the day of the month.

mmm
is the first three letters of the month name.

yy or *yyyy*
is a two-digit or four-digit integer that represents the year.

You can set the language for the SAS session with the DFLANG= system option. (Because the SAS Installation Representative usually sets a default language for the

site, you might be able to skip this step.) If you work with dates in multiple languages, you can replace the EUR prefix with a language prefix. See "DFLANG= System Option: OpenVMS, UNIX, Windows, and z/OS" on page 457 for the list of language prefixes. When you specify the language prefix in the format, SAS ignores the DFLANG= option.

Note: The EUR-date formats require European character sets and encodings. Some formats do not work correctly using non-European encodings. When running in a DBCS environment, the default format width and max width are larger than in the single byte system to allow formats to use a double byte representation of certain characters. However, you must use a session encoding that supports the European characters set, such as UTF-8. △

Examples

The example table uses the input value 15342, which is the SAS date value that corresponds to January 2, 2002. The first PUT statement assumes that the DFLANG= system option is set to Spanish.

```
options dflang=spanish;
```

The second PUT statement uses the Spanish language prefix in the format to write the international date value in Spanish. The third PUT statement uses the French language prefix in the format to write the international date value in French. Therefore, the value of the DFLANG= option is ignored.

Statements	Results
	`----+----1`
`put date eurdfde9.;`	`02ene2002`
`put date espdfde9.;`	`02ene2002`
`put date fradfde9.;`	`02jan2002`

See Also

Formats:

DATEw. in *SAS Language Reference: Dictionary*

Functions:

DATE in *SAS Language Reference: Dictionary*

Informats:

"EURDFDE*w*. Informat" on page 639

System Options:

"DFLANG= System Option: OpenVMS, UNIX, Windows, and z/OS" on page 457

EURDFDN*w*. Format

Writes international date values as the day of the week.

Category: Date and Time

Alignment: right

Syntax

EURDFDN*w*.

Syntax Description

w
specifies the width of the output field.

Default: 1

Range: 1–32

Details

The EURDFDN*w*. format writes SAS date values in the form *day-of-the-week*:

day-of-the-week
is represented as 1=Monday, 2=Tuesday, and so forth.

You can set the language for the SAS session with the DFLANG= system option. (Because the SAS Installation Representative usually sets a default language for the site, you might be able to skip this step.) If you work with dates in multiple languages, you can replace the EUR prefix with a language prefix. See "DFLANG= System Option: OpenVMS, UNIX, Windows, and z/OS" on page 457 for the list of language prefixes. When you specify the language prefix in the format, SAS ignores the DFLANG= option.

Note: The EUR-date formats require European character sets and encodings. Some formats work correctly using non-European encodings. When running in a DBCS environment, the default format width and max width are larger than in the single byte system to allow formats to use a double byte representation of certain characters. However, you must use a session encoding that supports the European characters set like UTF-8. △

Examples

The example table uses the input value 15342, which is the SAS date value that corresponds to January 2, 2002. The first PUT statement assumes that the DFLANG= system option is set to Spanish.

```
options dflang=spanish;
```

The second PUT statement uses the Spanish language prefix in the format to write the day of the week in Spanish. The third PUT statement uses the Italian language prefix

in the format to write the day of the week in Italian. Therefore, the value of the DFLANG= option is ignored.

Statements	Results
	`----+----1`
`put day eurdfdn.;`	`3`
`put day espdfdn.;`	`3`
`put day itadfdn.;`	`3`

See Also

Formats:

DOWNAMEw. in *SAS Language Reference: Dictionary*

WEEKDAYw. in *SAS Language Reference: Dictionary*

System Options:

"DFLANG= System Option: OpenVMS, UNIX, Windows, and z/OS" on page 457

EURDFDT*w.d* Format

Writes international datetime values in the form *ddmmmyy:hh:mm:ss.ss* or *ddmmmyyyy hh:mm:ss.ss*.

Category: Date and Time

Alignment: right

Syntax

EURDFDT*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 16

Range: 7–40

Tip: If you want to write a SAS datetime value with the date, hour, and seconds, the width (*w*) must be at least 16. Add an additional two places to the width if you want to return values with optional decimal fractions of seconds.

d
specifies the number of digits to the right of the decimal point in the numeric value.

Range: 1–39

Restriction: must be less than *w*

Restriction: If $w - d < 17$, SAS truncates the decimal values.

Details

The EURDFDT*w.d* format writes SAS datetime values in the form *ddmmmyy:hh:mm:ss.ss*:

dd
is an integer that represents the day of the month.

mmm
is the first three letters of the month name.

yy or *yyyy*
is a two-digit or four-digit integer that represents the year.

hh
is the number of hours that range from 00 through 23.

mm
is the number of minutes that range from 00 through 59.

ss.ss
is the number of seconds that range from 00 through 59 with the fraction of a second following the decimal point.

You can set the language for the SAS session with the DFLANG= system option. (Because the SAS Installation Representative usually sets a default language for the site, you might be able to skip this step.) If you work with dates in multiple languages, you can replace the EUR prefix with a language prefix. See "DFLANG= System Option: OpenVMS, UNIX, Windows, and z/OS" on page 457 for the list of language prefixes. When you specify the language prefix in the format, SAS ignores the DFLANG= option.

Note: The EUR-date formats require European character sets and encodings. Some formats will not work correctly using non-European encodings. When running in a DBCS environment, the default format width and max width will be larger than in the single byte system to allow formats to use a double byte representation of certain characters. However, you must use a session encoding that supports the European characters set like UTF-8. △

Examples

The example table uses the input value of 1347453583, which is the SAS datetime value that corresponds to September 12, 2002, at 12:39:43 p.m. The first PUT statement assumes that the DFLANG= system option is set to German.

```
options dflang=german;
```

The second PUT statement uses the German language prefix in the format to write the international datetime value in German. The third PUT statement uses the Italian language prefix in the format to write the international datetime value in Italian. The value of the DFLANG= option, therefore, is ignored.

Statements	Results
	`----+----1----+----2`
`put date eurdfdt20.;`	`12Sep2002:12:39:43`
`put date deudfdt20.;`	`12Sep2002:12:39:43`
`put date itadfdt20.;`	`12Set2002:12:39:43`

See Also

Formats:

DATEw. in *SAS Language Reference: Dictionary*

DATETIMEw.d in *SAS Language Reference: Dictionary*

TIMEw.d in *SAS Language Reference: Dictionary*

Functions:

DATETIME in *SAS Language Reference: Dictionary*

Informats:

DATEw. in *SAS Language Reference: Dictionary*

DATETIMEw.d in *SAS Language Reference: Dictionary*

"EURDFDT*w*. Informat" on page 640

TIMEw.d in *SAS Language Reference: Dictionary*

System Options:

"DFLANG= System Option: OpenVMS, UNIX, Windows, and z/OS" on page 457

EURDFDWN*w*. Format

Writes international date values as the name of the day.

Category: Date and Time

Alignment: right

Syntax

EURDFDWN*w.*

Syntax Description

w

specifies the width of the output field.

Default: depends on the language prefix you use. The following table shows the default value for each language:

Language	Default
Afrikaans (AFR)	9
Catalan (CAT)	9
Croatian (CRO)	10
Czech (CSY)	7
Danish (DAN)	7
Dutch (NLD)	9
Finnish (FIN)	11
French (FRA)	8
German (DEU)	10
Hungarian (HUN)	9
Italian (ITA)	9
Macedonian (MAC)	10
Norwegian (NOR)	7
Polish (POL)	12
Portuguese (PTG)	13
Russian (RUS)	11
Slovenian (SLO)	10
Spanish (ESP)	9
Swedish (SVE)	7
Swiss-French (FRS)	8
Swiss-German (DES)	10

Range: 1–32
Tip: If you omit *w*, SAS prints the entire name of the day.

Details

If necessary, SAS truncates the name of the day to fit the format width. The EURDFDWN*w*. format writes SAS date values in the form *day-name*:

day-name
is the name of the day.

You can set the language for the SAS session with the DFLANG= system option. (Because the SAS Installation Representative usually sets a default language for the site, you might be able to skip this step.) If you work with dates in multiple languages, you can replace the EUR prefix with a language prefix. See “DFLANG= System Option: OpenVMS, UNIX, Windows, and z/OS” on page 457 for the list of language prefixes. When you specify the language prefix in the format, SAS ignores the DFLANG= option.

Note: The EUR-date formats require European character sets and encodings. Some formats do not work correctly using non-European encodings. When running in a DBCS

environment, the default format width and max width are larger than in the single-byte system to allow formats to use a double-byte representation of certain characters. However, you must use a session encoding that supports the European characters set like UTF-8. △

Examples

The following example table uses the input value 15344, which is the SAS date value that corresponds to January 4, 2002. The first PUT statement assumes that the DFLANG= system option is set to French.

```
options dflang=french;

put day eurdfdwn8.;
```

The second PUT statement uses the French language prefix in the format to write the day of the week in French. The third PUT statement uses the Spanish language prefix in the format to write the day of the week in Spanish. Therefore, the value of the DFLANG= option is ignored.

Statements	Results
	`----+----1`
`put day eurdfdwn8.;`	`Vendredi`
`put day fradfdwn8.;`	`Vendredi`
`put day espdfdwn8.;`	`viernes`

See Also

Formats:

- DOWNAMEw. in *SAS Language Reference: Dictionary*
- WEEKDAYw. in *SAS Language Reference: Dictionary*

Informats:

- DATEw. in *SAS Language Reference: Dictionary*
- DATETIMEw.d in *SAS Language Reference: Dictionary*
- "EURDFDT*w*. Informat" on page 640
- TIMEw.d in *SAS Language Reference: Dictionary*

System Options:

- "DFLANG= System Option: OpenVMS, UNIX, Windows, and z/OS" on page 457

EURDFMN*w*. Format

Writes international date values as the name of the month.

Category: Date and Time

Alignment: right

Syntax

EURDFMN*w*.

Syntax Description

w
specifies the width of the output field.

Default: 9 (except for Finnish and Spanish)

Range: 1–32

Note: If you use the Finnish (FIN) language prefix, the default value for *w* is 11. If you use the Spanish (ESP) language prefix, the default value for *w* is 10. △

Details

If necessary, SAS truncates the name of the month to fit the format width. The EURDFMN*w*. format writes SAS date values in the form *month-name*:

month-name
is the name of the month.

You can set the language for the SAS session with the DFLANG= system option. (Because the SAS Installation Representative usually sets a default language for the site, you might be able to skip this step.) If you work with dates in multiple languages, you can replace the EUR prefix with a language prefix. See "DFLANG= System Option: OpenVMS, UNIX, Windows, and z/OS" on page 457 for the list of language prefixes. When you specify the language prefix in the format, SAS ignores the DFLANG= option.

Note: The EUR-date formats require European character sets and encodings. Some formats do not work correctly using non-European encodings. When running in a DBCS environment, the default format width and max width will be larger than in the single-byte system to allow formats to use a double-byte representation of certain characters. However, you must use a session encoding that supports the European characters set like UTF-8. △

Examples

The example table uses the input value 15344, which is the SAS date value that corresponds to January 4, 2002. The first PUT statement assumes that the DFLANG= system option is set to Italian.

```
options dflang=ita;
```

The second PUT statement uses the Italian language prefix in the format to write the name of the month in Italian. The third PUT statement uses German language prefix

in the format to write the name of the month in German. Therefore, the value of the DFLANG= option is ignored.

Statements	Results
	`----+----1`
`put date eurdfmn10.;`	`janvier`
`put date itadfmn10.;`	`Gennaio`
`put date deudfmn10.;`	`Januar`

See Also

Formats:

MONNAMEw. in *SAS Language Reference: Dictionary*

Functions:

DATE in *SAS Language Reference: Dictionary*

Informats:

"EURDFDE*w*. Informat" on page 639

System Options:

"DFLANG= System Option: OpenVMS, UNIX, Windows, and z/OS" on page 457

EURDFMY*w*. Format

Writes international date values in the form *mmmyy* or *mmmyyyy*.

Category: Date and Time

Alignment: right

Syntax

EURDFMY*w*.

Syntax Description

w

specifies the width of the output field.

Default: 5 (except for Finnish)

Range: 5–7

Note: If you use the Finnish (FIN) language prefix, the value for *w* must be 8, which is the default value. △

Details

The EURDFMY*w*. format writes SAS date values in the form *mmmyy*, where

mmm
is the first three letters of the month name.

yy or *yyyy*
is a two-digit or four-digit integer that represents the year.

You can set the language for the SAS session with the DFLANG= system option. (Because the SAS Installation Representative usually sets a default language for the site, you might be able to skip this step.) If you work with dates in multiple languages, you can replace the EUR prefix with a language prefix. See "DFLANG= System Option: OpenVMS, UNIX, Windows, and z/OS" on page 457 for the list of language prefixes. When you specify the language prefix in the format, SAS ignores the DFLANG= option.

Note: The EUR-date formats require European character sets and encodings. Some formats do not work correctly using non-European encodings. When running in a DBCS environment, the default format width and max width are larger than in the single-byte system to allow formats to use a double-byte representation of certain characters. However, you must use a session encoding that supports the European characters set like UTF-8. △

Examples

The example table uses the input value 15342, which is the SAS date value that corresponds to January 2, 2002. The first PUT statement assumes that the DFLANG= system option is set to Spanish.

```
options dflang=spanish;
```

The second PUT statement uses the Spanish language prefix in the format to write the name of the month in Spanish. The third PUT statement uses the French language prefix in the format to write the name of the month in French. Therefore, the value of the DFLANG= option is ignored.

Statements	Results
	`----+----1`
`put date eurdfmy7.;`	`ene2002`
`put date espdfmy7.;`	`ene2002`
`put date fradfmy7.;`	`jan2002`

See Also

Formats:

DDMMYYw. in *SAS Language Reference: Dictionary*
MMDDYYw. in *SAS Language Reference: Dictionary*
MONYYw. in *SAS Language Reference: Dictionary*
YYMMDDw. in *SAS Language Reference: Dictionary*

Functions:

MONTH in *SAS Language Reference: Dictionary*

YEAR in *SAS Language Reference: Dictionary*

Informats:

"EURDFMY*w*. Informat" on page 642

MONYYw. in *SAS Language Reference: Dictionary*

System Options:

"DFLANG= System Option: OpenVMS, UNIX, Windows, and z/OS" on page 457

EURDFWDX*w*. Format

Writes international date values as the name of the month, the day, and the year in the form *dd month-name yy* (or *yyyy*).

Category: Date and Time

Alignment: right

Syntax

EURDFWDX*w*.

Syntax Description

w

specifies the width of the output field.

Default: depends on the language prefix you use. The following table shows the default value for each language:

Language	Maximum	Default
Afrikaans (AFR)	37	29
Catalan (CAT)	40	16
Croatian (CRO)	40	16
Czech (CSY)	40	16
Danish (DAN)	18	18
Dutch (NLD)	37	29
Finnish (FIN)	20	20
French (FRA)	18	18
German (DEU)	18	18
Hungarian (HUN)	40	18
Italian (ITA)	17	17
Macedonian (MAC)	40	17

Language	Maximum	Default
Norwegian (NOR)	17	17
Polish (POL)	40	20
Portuguese (PTG)	37	23
Russian (RUS)	40	16
Slovenian (SLO)	40	17
Spanish (ESP)	24	24
Swedish (SVE)	17	17
Swiss-French (FRS)	17	17
Swiss-German (DES)	18	18

Range: 3–(maximum width)

Tip: If the value for *w* is too small to include the complete day of the week and the month, SAS abbreviates as necessary.

Details

The EURDFWDX*w*. format writes SAS date values in the form *dd month-name yy* or *dd month-name yyyy*:

dd
is an integer that represents the day of the month.

month-name
is the name of the month.

yy or *yyyy*
is a two-digit or four-digit integer that represents the year.

You can set the language for the SAS session with the DFLANG= system option. (Because the SAS Installation Representative usually sets a default language for the site, you might be able to skip this step.) If you work with dates in multiple languages, you can replace the EUR prefix with a language prefix. See "DFLANG= System Option: OpenVMS, UNIX, Windows, and z/OS" on page 457 for the list of language prefixes. When you specify the language prefix in the format, SAS ignores the DFLANG= option.

Note: The EUR-date formats require European character sets and encodings. Some formats will not work correctly using non-European encodings. When running in a DBCS environment, the default format width and max width will be larger than in the single byte system to allow formats to use a double byte representation of certain characters. However, you must use a session encoding that supports the European characters set like UTF-8. △

Comparisons

The EURDFWKX*w*. format is the same as the EURDFWDX*w*. format except that EURDFWKX *w*. format adds the day-of-week in front of *dd*.

Examples

The example table uses the input value 15342, which is the SAS date value that corresponds to January 2, 2002. The first PUT statement assumes that the DFLANG= system option is set to Dutch.

```
options dflang=dutch;
```

The second PUT statement uses the Dutch language prefix in the format to write the name of the month in Dutch. The third PUT statement uses the Italian language prefix in the format to write the name of the month in Italian. Therefore, the value of the DFLANG= option is ignored.

Statements	Results
	`----+----1----+----2----+----3`
`put day eurdfwdx29.;`	`2 januari 2002`
`put day nlddfwdx29.;`	`2 januari 2002`
`put day itadfwdx17.;`	`02 Gennaio 1998`

See Also

Formats:

WORDDATXw. in *SAS Language Reference: Dictionary*

System Options:

"DFLANG= System Option: OpenVMS, UNIX, Windows, and z/OS" on page 457

EURDFWKX*w*. Format

Writes international date values as the name of the day and date in the form *day-of-week*, *dd month-name yy* (or *yyyy*).

Category: Date and Time

Alignment: right

Syntax

EURDFWKX*w*.

Syntax Description

w

specifies the width of the output field.

Default: depends on the language prefix you use. The following table shows the default value for each language:

Language	Minimum	Maximum	Default
Afrikaans (AFR)	2	38	28
Catalan (CAT)	2	40	27
Croatian (CRO)	3	40	27
Czech (CSY)	2	40	25
Danish (DAN)	2	31	31
Dutch (NLD)	2	38	28
Finnish (FIN)	2	37	37
French (FRA)	3	27	27
German (DEU)	3	30	30
Hungarian (HUN)	3	40	28
Italian (ITA)	3	28	28
Macedonian (MAC)	3	40	29
Norwegian (NOR)	3	26	26
Polish (POL)	2	40	34
Portuguese (PTG)	3	38	38
Russian (RUS)	2	40	29
Slovenian (SLO)	3	40	29
Spanish (ESP)	1	35	35
Swedish (SVE)	3	26	26
Swiss-French (FRS)	3	26	26
Swiss-German (DES)	3	30	30

Tip: If the value for *w* is too small to include the complete day of the week and the month, SAS abbreviates as necessary.

Details

The EURDFWKX*w*. format writes SAS date values in the form *day-of-week*, *dd month-name yy* (or *yyyy*):

day-of-week
is the name of day.

dd
is an integer that represents the day of the month.

month-name
is the name of the month.

yy or *yyyy*
is a two-digit or four-digit integer that represents the year.

You can set the language for the SAS session with the DFLANG= system option. (Because the SAS Installation Representative usually sets a default language for the site, you might be able to skip this step.) If you work with dates in multiple languages, you can replace the EUR prefix with a language prefix. See "DFLANG= System Option: OpenVMS, UNIX, Windows, and z/OS" on page 457 for the list of language prefixes. When you specify the language prefix in the format, SAS ignores the DFLANG= option.

Note: The EUR-date formats require European character sets and encodings. Some formats do not work correctly using non-European encodings. When running in a DBCS environment, the default format width and max width are larger than in the single byte system to allow formats to use a double byte representation of certain characters. However, you must use a session encoding that supports the European characters set like UTF-8. △

Comparisons

The EURDFWKX*w*. format is the same as the EURDFWDX*w*. format except that EURDFWKX*w*. format adds day-of-week in front of *dd*.

Examples

The example table uses the input value 15344, which is the SAS date value that corresponds to January 4, 2002. The first PUT statement assumes that the DFLANG= system option is set to German.

```
options dflang=German;
```

The second PUT statement uses the German language prefix in the format to write the name of the month in German. The third PUT statement uses the Italian language prefix in the format to write the name of the month in Italian. Therefore, the value of the DFLANG= option is ignored.

Statements	Results
	`----+----1----+----2----+----3`
`put date eurdfwkx30.;`	`Freitag, 4. Januar 2002`
`put date deudfwkx30.;`	`Freitag, 4. Januar 2002`
`put date itadfwkx17.;`	`Ven, 04 Gen 2002`

See Also

Formats:

DATEw. in *SAS Language Reference: Dictionary*
DDMMYYw. in *SAS Language Reference: Dictionary*
MMDDYYw. in *SAS Language Reference: Dictionary*
TODw. in *SAS Language Reference: Dictionary*

WEEKDATXw. in *SAS Language Reference: Dictionary*

YYMMDDw. in *SAS Language Reference: Dictionary*

Functions:

JULDATE in *SAS Language Reference: Dictionary*

MDY in *SAS Language Reference: Dictionary*

WEEKDAY in *SAS Language Reference: Dictionary*

Informats:

DATEw. in *SAS Language Reference: Dictionary*

DDMMYYw. in *SAS Language Reference: Dictionary*

MMDDYYw. in *SAS Language Reference: Dictionary*

YYMMDDw. in *SAS Language Reference: Dictionary*

System Options:

"DFLANG= System Option: OpenVMS, UNIX, Windows, and z/OS" on page 457

EURFRATS*w.d* Format

Converts an amount from Austrian schillings to euros.

Category: Currency Conversion

Alignment: right

Syntax

EURFRATS*w*.*d*

Syntax Description

w

specifies the width of the output field.

Default: 6

d

specifies the number of digits to the right of the decimal point in the numeric value.

Details

The EURFRATS *w*.*d* format converts an amount from Austrian schillings to an amount in euros and produces a formatted euro value. The conversion rate is a fixed rate that is incorporated into the EURFRATS*w*.*d* format and the EUROCURR function. For more information about European currency conversion and currency conversion rate tables, see "European Currency Conversion" on page 61 .

Examples

The following table shows input values in Austrian schillings, SAS statements, and the conversion results in euros.

Amounts	Statements	Results
		`----+----1----2`
`50`	`put amount eurfrats5.;`	`E4`
	`put amount eurfrats9.2;`	`E3,63`
`5234.56`	`put amount eurfrats5.;`	`E380`
	`put amount eurfrats9.2;`	`E380,41`
`52345`	`put amount eurfrats5.;`	`3.804`
	`put amount eurfrats9.2;`	`E3.804,06`

See Also

Formats:

"EURTOATS*w.d* Format" on page 610

Functions:

"EUROCURR Function" on page 644

EURFRBEF*w.d* Format

Converts an amount from Belgian francs to euros.

Category: Currency Conversion
Alignment: right

Syntax

EURFRBEF*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 6

d

specifies the number of digits to the right of the decimal point in the numeric value.

Details

The EURFRBEF*w.d* format converts an amount from Belgian francs to an amount in euros and produces a formatted euro value. The conversion rate is a fixed rate that is

incorporated into the EURFRBEF*w.d* format and the EUROCURR function. For more information about European currency conversion and currency conversion rate tables, see "European Currency Conversion" on page 61.

Examples

The following table shows input values in Belgian francs, SAS statements, and the conversion results in euros.

Amounts	Statements	Results
		`----+----1----2`
`50`	`put amount eurfrbef5.;`	`E1`
	`put amount eurfrbef9.2;`	`E1,24`
`5234.56`	`put amount eurfrbef5.;`	`E130`
	`put amount eurfrbef9.2;`	`E129,76`
`52345`	`put amount eurfrbef5.;`	`1.298`
	`put amount eurfrbef9.2;`	`E1.297,60`

See Also

Formats:

"EURTOBEF*w.d* Format" on page 612

Functions:

"EUROCURR Function" on page 644

EURFRCHF*w.d* Format

Converts an amount from Swiss francs to euros.

Category: Currency Conversion

Alignment: right

Syntax

EURFRCHF*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 6

d
specifies the number of digits to the right of the decimal point in the numeric value.

Details

The EURFRCHF*w.d* format converts an amount from Swiss francs to an amount in euros and produces a formatted euro value. The conversion rate is a changeable rate that is incorporated into the EURFRCHF*w.d* format and the EUROCURR function. For more information about European currency conversion and currency conversion rate tables, see "European Currency Conversion" on page 61.

Examples

The following table shows input values in Swiss francs, SAS statements, and the conversion results in euros.

Amounts	Statements	Results
		`----+----1----2`
`50`	`put amount eurfrchf5.;`	`E31`
	`put amount eurfrchf9.2;`	`E31,17`
`1234.56`	`put amount eurfrchf5.;`	`E770`
	`put amount eurfrchf9.2;`	`E769,53`
`12345`	`put amount eurfrchf5.;`	`7.695`
	`put amount eurfrchf9.2;`	`E7.694,94`

See Also

Formats:

"EURTOCHF*w.d* Format" on page 613

Functions:

"EUROCURR Function" on page 644

EURFRCZK*w.d* Format

Converts an amount from Czech koruny to euros.

Category: Currency Conversion

Alignment: right

Syntax

EURFRCZK*w.d*

Syntax Description

w
specifies the width of the output field.
Default: 6

d
specifies the number of digits to the right of the decimal point in the numeric value.

Details

The EURFRCZK*w.d* format converts an amount from Czech koruny to an amount in euros and produces a formatted euro value. The conversion rate is a changeable rate that is incorporated into the EURFRCZK*w.d* format and the EUROCURR function. For more information about European currency conversion and currency conversion rate tables, see "European Currency Conversion" on page 61.

Examples

The following table shows input values in Czech koruny, SAS statements, and the conversion results in euros.

Amounts	Statements	Results
		`----+----1----2`
`50`	`put amount eurfrczk5.;`	`E1`
	`put amount eurfrczk9.2;`	`E1,43`
`5234.56`	`put amount eurfrczk5.;`	`E150`
	`put amount eurfrczk9.2;`	`E150,18`
`52345`	`put amount eurfrczk5.;`	`1.502`
	`put amount eurfrczk9.2;`	`E1.501,74`

See Also

Formats:
"EURTOCZK*w.d* Format" on page 614
Functions:
"EUROCURR Function" on page 644

EURFRDEM*w.d* Format

Converts an amount from Deutsche marks to euros.

Category: Currency Conversion
Alignment: right

Syntax

EURFRDEM*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 6

d
specifies the number of digits to the right of the decimal point in the numeric value.

Details

The EURFRDEM*w.d* format converts an amount from Deutsche marks to an amount in euros and produces a formatted euro value. The conversion rate is a fixed rate that is incorporated into the EURFRDEM*w.d* format and the EUROCURR function. For more information about European currency conversion and currency conversion rate tables, see "European Currency Conversion" on page 61.

Examples

The following table shows input values in Deutsche marks, SAS statements, and the conversion results in euros.

Amounts	Statements	Results
		`----+----1----2`
`50`	`put amount eurfrdem5.;`	`E26`
	`put amount eurfrdem9.2;`	`E25,56`
`1234.56`	`put amount eurfrdem5.;`	`E631`
	`put amount eurfrdem9.2;`	`E631,22`
`12345`	`put amount eurfrdem5.;`	`6.312`
	`put amount eurfrdem9.2;`	`E6.311,90`

See Also

Formats:

"EURTODEM*w.d* Format" on page 615

Functions:

"EUROCURR Function" on page 644

EURFRDKK*w.d* Format

Converts an amount from Danish kroner to euros.

Category: Currency Conversion
Alignment: right

Syntax

EURFRDKK*w.d*

Syntax Description

w
specifies the width of the output field.
Default: 6

d
specifies the number of digits to the right of the decimal point in the numeric value.

Details

The EURFRDKK*w.d* format converts an amount from Danish kroner to an amount in euros and produces a formatted euro value. The conversion rate is a changeable rate that is incorporated into the EURFRDKK*w.d* format and the EUROCURR function. For more information about European currency conversion and currency conversion rate tables, see "European Currency Conversion" on page 61.

Examples

The following table shows input values in Danish kroner, SAS statements, and the conversion results in euros.

Amounts	Statements	Results
		`----+----1----2`
`50`	`put amount eurfrdkk5.;`	`E7`
	`put amount eurfrdkk9.2;`	`E6,68`
`1234.56`	`put amount eurfrdkk5.;`	`E165`
	`put amount eurfrdkk9.2;`	`E164,83`
`12345`	`put amount eurfrdkk5.;`	`1.648`
	`put amount eurfrdkk9.2;`	`E1.648,18`

See Also

Formats:

"EURTODKK*w.d* Format" on page 616

Functions:

"EUROCURR Function" on page 644

EURFRESP*w.d* Format

Converts an amount from Spanish pesetas to euros.

Category: Currency Conversion

Alignment: right

Syntax

EURFRESP*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 6

d

specifies the number of digits to the right of the decimal point in the numeric value.

Details

The EURFRESP*w.d* format converts an amount from Spanish pesetas to an amount in euros and produces a formatted euro value. The conversion rate is a fixed rate that is incorporated into the EURFRESP*w.d* format and the EUROCURR function. For more information about European currency conversion and currency conversion rate tables, see "European Currency Conversion" on page 61.

Examples

The following table shows input values in Spanish pesetas, SAS statements, and the conversion results in euros.

Amounts	Statements	Results
		`----+----1----2`
`200`	`put amount eurfresp5.;`	`E1`
	`put amount eurfresp9.2;`	`E1,20`

Amounts	Statements	Results
20234.56	put amount eurfresp5.;	E122
	put amount eurfresp9.2;	E121,61
202345	put amount eurfresp5.;	1.216
	put amount eurfresp9.2;	E1.216,12

See Also

Formats:

"EURTOESP*w.d* Format" on page 617

Functions:

"EUROCURR Function" on page 644

EURFRFIM*w.d* Format

Converts an amount from Finnish markkaa to euros.

Category: Currency Conversion

Alignment: right

Syntax

EURFRFIM*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 6

d

specifies the number of digits to the right of the decimal point in the numeric value.

Details

The EURFRFIM*w.d* format converts an amount from Finnish markkaa to an amount in euros and produces a formatted euro value. The conversion rate is a fixed rate that is incorporated into the EURFRFIM*w.d* format and the EUROCURR function. For more information about European currency conversion and currency conversion rate tables, see "European Currency Conversion" on page 61.

Examples

The following table shows input values in Finnish markkaa, SAS statements, and the conversion results in euros.

Amounts	Statements	Results
		`----+----1----2`
`50`	`put amount eurfrfim5.;`	`E8`
	`put amount eurfrfim9.2;`	`E8,41`
`1234.56`	`put amount eurfrfim5.;`	`E208`
	`put amount eurfrfim9.2;`	`E207,64`
`12345`	`put amount eurfrfim5.;`	`2.076`
	`put amount eurfrfim9.2;`	`E2.076,28`

See Also

Formats:

"EURTOFIM*w.d* Format" on page 618

Functions:

"EUROCURR Function" on page 644

EURFRFR*w.d* Format

Converts an amount from French francs to euros.

Category: Currency Conversion
Alignment: right

Syntax

EURFRFRF*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 6

d

specifies the number of digits to the right of the decimal point in the numeric value.

Details

The EURFRFRF*w.d* format converts an amount from French francs to an amount in euros and produces a formatted euro value. The conversion rate is a fixed rate that is

incorporated into the EURFRFRF*w.d* format and the EUROCURR function. For more information about European currency conversion and currency conversion rate tables, see "European Currency Conversion" on page 61.

Examples

The following table shows input values in French francs, SAS statements, and the conversion results in euros.

Amounts	Statements	Results
		`----+----1----2`
`50`	`put amount eurfrfrf5.;`	`E8`
	`put amount eurfrfrf9.2;`	`E7,62`
`1234.56`	`put amount eurfrfrf5.;`	`E188`
	`put amount eurfrfrf9.2;`	`E188,21`
`12345`	`put amount eurfrfrf5.;`	`1.882`
	`put amount eurfrfrf9.2;`	`E1.881,98`

See Also

Formats:

"EURTOFRF*w.d* Format" on page 619

Functions:

"EUROCURR Function" on page 644

EURFRGBP*w.d* Format

Converts an amount from British pounds to euros.

Category: Currency Conversion

Alignment: right

Syntax

EURFRGBP*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 6

d
specifies the number of digits to the right of the decimal point in the numeric value.

Details

The EURFRGBP*w.d* format converts an amount from British pounds to an amount in euros and produces a formatted euro value. The conversion rate is a changeable rate that is incorporated into the EURFRGBP*w.d* format and the EUROCURR function. For more information about European currency conversion and currency conversion rate tables, see "European Currency Conversion" on page 61.

Examples

The following table shows input values in British pounds, SAS statements, and the conversion results in euros.

Amounts	Statements	Results
		`----+----1----2`
`50`	`put amount eurfrgbp5.;`	`E71`
	`put amount eurfrgbp9.2;`	`E71.42`
`1234.56`	`put amount eurfrgbp5.;`	`1,763`
	`put amount eurfrgbp9.2;`	`E1,763.32`
`12345`	`put amount eurfrgbp5.;`	`17632`
	`put amount eurfrgbp9.2;`	`17,632.39`

See Also

Formats:

"EURTOGBP*w.d* Format" on page 621

Functions:

"EUROCURR Function" on page 644

EURFRGRD*w.d* Format

Converts an amount from Greek drachmas to euros.

Category: Currency Conversion

Alignment: right

Syntax

EURFRGRD*w.d*

Syntax Description

w
specifies the width of the output field.
Default: 6

d
specifies the number of digits to the right of the decimal point in the numeric value.

Details

The EURFRGRD*w.d* format converts an amount from Greek drachmas to an amount in euros and produces a formatted euro value. The conversion rate is a fixed rate that is incorporated into the EURFRGRD*w.d* format and the EUROCURR function. For more information about European currency conversion and currency conversion rate tables, see "European Currency Conversion" on page 61.

Examples

The following table shows input values in Greek drachmas, SAS statements, and the conversion results in euros.

Amounts	Statements	Results
		`----+----1----2`
`400`	`put amount eurfrgrd5.;`	`E1`
	`put amount eurfrgrd9.2;`	`E1,17`
`40234.56`	`put amount eurfrgrd5.;`	`E118`
	`put amount eurfrgrd9.2;`	`E118,03`
`402345`	`put amount eurfrgrd5.;`	`1.180`
	`put amount eurfrgrd9.2;`	`E1.180,30`

See Also

Formats:
"EURTOGRD*w.d* Format" on page 622
Functions:
"EUROCURR Function" on page 644

EURFRHUF*w.d* Format

Converts an amount from Hungarian forints to euros.

Category: Currency Conversion
Alignment: right

Syntax

EURFRHUF*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 6

d
specifies the number of digits to the right of the decimal point in the numeric value.

Details

The EURFRHUF*w.d* format converts an amount from Hungarian forints to an amount in euros and produces a formatted euro value. The conversion rate is a changeable rate that is incorporated into the EURFRHUF*w.d* format and the EUROCURR function. For more information about European currency conversion and currency conversion rate tables, see "European Currency Conversion" on page 61.

Examples

The following table shows input values in Hungarian forints, SAS statements, and the conversion results in euros.

Amounts	Statements	Results
		`----+----1----2`
`300`	`put amount eurfrhuf5.;`	`E1`
	`put amount eurfrhuf9.2;`	`E1,15`
`30234.56`	`put amount eurfrhuf5.;`	`E116`
	`put amount eurfrhuf9.2;`	`E116,14`
`302345`	`put amount eurfrhuf5.;`	`1.161`
	`put amount eurfrhuf9.2;`	`E1.161,41`

See Also

Formats:

"EURTOHUF*w.d* Format" on page 623

Functions:

"EUROCURR Function" on page 644

EURFRIEP*w.d* Format

Converts an amount from Irish pounds to euros.

Category: Currency Conversion
Alignment: right

Syntax

EURFRIEP*w.d*

Syntax Description

w
specifies the width of the output field.
Default: 6

d
specifies the number of digits to the right of the decimal point in the numeric value.

Details

The EURFRIEP*w.d* format converts an amount from Irish pounds to an amount in euros and produces a formatted euro value. The conversion rate is a fixed rate that is incorporated into the EURFRIEP*w.d* format and the EUROCURR function. For more information about European currency conversion and currency conversion rate tables, see "European Currency Conversion" on page 61.

Examples

The following table shows input values in Irish pounds, SAS statements, and the conversion results in euros.

Amounts	Statements	Results
		`----+----1----2`
`1`	`put amount eurfriep5.;`	`E1`
	`put amount eurfriep9.2;`	`E1.27`
`1234.56`	`put amount eurfriep5.;`	`1,568`
	`put amount eurfriep9.2;`	`E1,567.57`
`12345`	`put amount eurfriep5.;`	`15675`
	`put amount eurfriep9.2;`	`15,674.92`

See Also

Formats:

"EURTOIEP*w.d* Format" on page 624

Functions:

"EUROCURR Function" on page 644

EURFRITL*w.d* Format

Converts an amount from Italian lire to euros.

Category: Currency Conversion

Alignment: right

Syntax

EURFRITL*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 6

d

specifies the number of digits to the right of the decimal point in the numeric value.

Details

The EURFRITL*w.d* format converts an amount from Italian lire to an amount in euros and produces a formatted euro value. The conversion rate is a fixed rate that is incorporated into the EURFRITL*w.d* format and the EUROCURR function. For more information about European currency conversion and currency conversion rate tables, see "European Currency Conversion" on page 61.

Examples

The following table shows input values in Italian lire, SAS statements, and the conversion results in euros.

Amounts	Statements	Results
		`----+----1----2`
`2000`	`put amount eurfritl5.;`	`E1`
	`put amount eurfritl9.2;`	`E1,03`

Amounts	Statements	Results
7234.56	put amount eurfritl5.;	E4
	put amount eurfritl9.2;	E3,74
72345	put amount eurfritl5.;	E37
	put amount eurfritl9.2;	E37,36

See Also

Formats:

"EURTOITL*w.d* Format" on page 625

Functions:

"EUROCURR Function" on page 644

EURFRLUF*w.d* Format

Converts an amount from Luxembourg francs to euros.

Category: Currency Conversion

Alignment: right

Syntax

EURFRLUF*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 6

d

specifies the number of digits to the right of the decimal point in the numeric value.

Details

The EURFRLUF*w.d* format converts an amount from Luxembourg francs to an amount in euros and produces a formatted euro value. The conversion rate is a fixed rate that is incorporated into the EURFRLUF*w.d* format and the EUROCURR function. For more information about European currency conversion and currency conversion rate tables, see "European Currency Conversion" on page 61.

Examples

The following table shows input values in Luxembourg francs, SAS statements, and the conversion results in euros.

Amounts	Statements	Results
		`----+----1----2`
`50`	`put amount eurfrluf5.;`	`E1`
	`put amount eurfrluf9.2;`	`E1,24`
`1234.56`	`put amount eurfrluf5.;`	`E31`
	`put amount eurfrluf9.2;`	`E30,60`
`12345`	`put amount eurfrluf5.;`	`E306`
	`put amount eurfrluf9.2;`	`E306,02`

See Also

Formats:

"EURTOLUF*w.d* Format" on page 626

Functions:

"EUROCURR Function" on page 644

EURFRNLG*w.d* Format

Converts an amount from Dutch guilders to euros.

Category: Currency Conversion
Alignment: right

Syntax

EURFRNLG*w.d*

Syntax Description

w
specifies the width of the output field.
Default: 6

d
specifies the number of digits to the right of the decimal point in the numeric value.

Details

The EURFRNLG*w.d* format converts an amount from Dutch guilders to an amount in euros and produces a formatted euro value. The conversion rate is a fixed rate that is

incorporated into the EURFRNLG*w.d* format and the EUROCURR function. For more information about European currency conversion and currency conversion rate tables, see "European Currency Conversion" on page 61.

Examples

The following table shows input values in Dutch guilders, SAS statements, and the conversion results in euros.

Amounts	Statements	Results
		`----+----1----2`
`50`	`put amount eurfrnlg5.;`	`E23`
	`put amount eurfrnlg9.2;`	`E22,69`
`1234.56`	`put amount eurfrnlg5.;`	`E560`
	`put amount eurfrnlg9.2;`	`E560,22`
`12345`	`put amount eurfrnlg5.;`	`5.602`
	`put amount eurfrnlg9.2;`	`E5.601,92`

See Also

Formats:

"EURTONLG*w.d* Format" on page 627

Functions:

"EUROCURR Function" on page 644

EURFRNOK*w.d* Format

Converts an amount from Norwegian krone to euros.

Category: Currency Conversion

Alignment: right

Syntax

EURFRNOK*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 6

d
specifies the number of digits to the right of the decimal point in the numeric value.

Details

The EURFRNOK*w.d* format converts an amount from Norwegian krone to an amount in euros and produces a formatted euro value. The conversion rate is a changeable rate that is incorporated into the EURFRNOK*w.d* format and the EUROCURR function. For more information about European currency conversion and currency conversion rate tables, see "European Currency Conversion" on page 61.

Examples

The following table shows input values in Norwegian krone, SAS statements, and the conversion results in euros.

Amounts	Statements	Results
		`----+----1----2`
`50`	`put amount eurfrnok5.;`	`E5`
	`put amount eurfrnok9.2;`	`E5,44`
`1234.56`	`put amount eurfrnok5.;`	`E134`
	`put amount eurfrnok9.2;`	`E134,22`
`12345`	`put amount eurfrnok5.;`	`1.342`
	`put amount eurfrnok9.2;`	`E1.342,18`

See Also

Formats:

"EURTONOK*w.d* Format" on page 629

Functions:

"EUROCURR Function" on page 644

EURFRPLZ*w.d* Format

Converts an amount from Polish zlotys to euros.

Category: Currency Conversion

Alignment: right

Syntax

EURFRPLZ*w.d*

Syntax Description

w
specifies the width of the output field.
Default: 6

d
specifies the number of digits to the right of the decimal point in the numeric value.

Details

The EURFRPLZ*w.d* format converts an amount from Polish zlotys to an amount in euros and produces a formatted euro value. The conversion rate is a changeable rate that is incorporated into the EURFRPLZ*w.d* format and the EUROCURR function. For more information about European currency conversion and currency conversion rate tables, see "European Currency Conversion" on page 61.

Examples

The following table shows input values in Polish zlotys, SAS statements, and the conversion results in euros.

Amounts	Statements	Results
		`----+----1----2`
`50`	`put amount eurfrplz5.;`	`E12`
	`put amount eurfrplz9.2;`	`E11,90`
`1234.56`	`put amount eurfrplz5.;`	`E294`
	`put amount eurfrplz9.2;`	`E293,94`
`12345`	`put amount eurfrplz5.;`	`2.939`
	`put amount eurfrplz9.2;`	`E2.939,29`

See Also

Formats:
"EURTOPLZ*w.d* Format" on page 630
Functions:
"EUROCURR Function" on page 644

EURFRPTE*w.d* Format

Converts an amount from Portuguese escudos to euros.

Category: Currency Conversion
Alignment: right

Syntax

EURFRPTE*w*.*d*

Syntax Description

w
specifies the width of the output field.

Default: 6

d
specifies the number of digits to the right of the decimal point in the numeric value.

Details

The EURFRPTE*w*.*d* format converts an amount from Portuguese escudos to an amount in euros and produces a formatted euro value. The conversion rate is a fixed rate that is incorporated into the EURFRPTE*w*.*d* format and the EUROCURR function. For more information about European currency conversion and currency conversion rate tables, see "European Currency Conversion" on page 61.

Examples

The following table shows input values in Portuguese escudos, SAS statements, and the conversion results in euros.

Amounts	Statements	Results
		`----+----1----2`
`300`	`put amount eurfrpte5.;`	`E1`
	`put amount eurfrpte9.2;`	`E1,50`
`30234.56`	`put amount eurfrpte5.;`	`E151`
	`put amount eurfrpte9.2;`	`E150,81`
`302345`	`put amount eurfrpte5.;`	`1.508`
	`put amount eurfrpte9.2;`	`E1.508,09`

See Also

Formats:

"EURTOPTE*w*.*d* Format" on page 631

Functions:

"EUROCURR Function" on page 644

EURFRROL*w.d* Format

Converts an amount from Romanian lei to euros.

Category: Currency Conversion
Alignment: right

Syntax

EURFRROL*w.d*

Syntax Description

w
specifies the width of the output field.
Default: 6

d
specifies the number of digits to the right of the decimal point in the numeric value.

Details

The EURFRROL*w.d* format converts an amount from Romanian lei to an amount in euros and produces a formatted euro value. The conversion rate is a changeable rate that is incorporated into the EURFRROL*w.d* format and the EUROCURR function. For more information about European currency conversion and currency conversion rate tables, see "European Currency Conversion" on page 61.

Examples

The following table shows input values in Romanian lei, SAS statements, and the conversion results in euros.

Amounts	Statements	Results
		`----+----1----2`
`50`	`put amount eurfrrol5.;`	`E4`
	`put amount eurfrrol9.2;`	`E3,65`
`5234.56`	`put amount eurfrrol5.;`	`E382`
	`put amount eurfrrol9.2;`	`E381,81`
`52345`	`put amount eurfrrol5.;`	`3.818`
	`put amount eurfrrol9.2;`	`E3.818,02`

See Also

Formats:

"EURTOROL*w.d* Format" on page 632

Functions:

"EUROCURR Function" on page 644

EURFRRUR*w.d* Format

Converts an amount from Russian rubles to euros.

Category: Currency Conversion

Alignment: right

Syntax

EURFRRUR*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 6

d

specifies the number of digits to the right of the decimal point in the numeric value.

Details

The EURFRRUR*w.d* format converts an amount from Russian rubles to an amount in euros and produces a formatted euro value. The conversion rate is a changeable rate that is incorporated into the EURFRRUR*w.d* format and the EUROCURR function. For more information about European currency conversion and currency conversion rate tables, see "European Currency Conversion" on page 61.

Examples

The following table shows input values in Russian rubles, SAS statements, and the conversion results in euros.

Amounts	Statements	Results
		`----+----1----2`
`50`	`put amount eurfrrur5.;`	`E3`
	`put amount eurfrrur9.2;`	`E2,53`

Amounts	Statements	Results
5234.56	put amount eurfrrur5.;	E265
	put amount eurfrrur9.2;	E264,80
52345	put amount eurfrrur5.;	2.648
	put amount eurfrrur9.2;	E2.647,97

See Also

Formats:

"EURTORUR*w.d* Format" on page 633

Functions:

"EUROCURR Function" on page 644

EURFRSEK*w.d* Format

Converts an amount from Swedish kronor to euros.

Category: Currency Conversion

Alignment: right

Syntax

EURFRSEK*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 6

d
specifies the number of digits to the right of the decimal point in the numeric value.

Details

The EURFRSEK*w.d* format converts an amount from Swedish kronor to an amount in euros and produces a formatted euro value. The conversion rate is a changeable rate that is incorporated into the EURFRSEK*w.d* format and the EUROCURR function. For more information about European currency conversion and currency conversion rate tables, see "European Currency Conversion" on page 61.

Examples

The following table shows input values in Swedish kronor, SAS statements, and the conversion results in euros.

Amounts	Statements	Results
		`----+----1----2`
`50`	`put amount eurfrsek5.;`	`E5`
	`put amount eurfrsek9.2;`	`E5,34`
`1234.56`	`put amount eurfrsek5.;`	`E132`
	`put amount eurfrsek9.2;`	`E131,81`
`12345`	`put amount eurfrsek5.;`	`1.318`
	`put amount eurfrsek9.2;`	`E1.318,08`

See Also

Formats:

"EURTOSEK*w.d* Format" on page 634

Functions:

"EUROCURR Function" on page 644

EURFRSIT*w.d* Format

Converts an amount from Slovenian tolars to euros.

Category: Currency Conversion
Alignment: right

Syntax

EURFRSIT*w.d*

Syntax Description

w
specifies the width of the output field.
Default: 6

d
specifies the number of digits to the right of the decimal point in the numeric value.

Details

The EURFRSIT*w.d* format converts an amount from Slovenian tolars to an amount in euros and produces a formatted euro value. The conversion rate is a changeable rate

that is incorporated into the EURFRSIT*w.d* format and the EUROCURR function. For more information about European currency conversion and currency conversion rate tables, see "Overview to European Currency Conversion" on page 61.

Note: Slovenia's currency is the Euro. The information for EURFRSIT is provided for user's historical data. △

Examples

The following table shows input values in Slovenian tolars, SAS statements, and the conversion results in euros.

Amounts	Statements	Results
		`----+----1----2`
`200`	`put amount eurfrsit5.;`	`E1`
	`put amount eurfrsit9.2;`	`E1,05`
`20234.56`	`put amount eurfrsit5.;`	`E106`
	`put amount eurfrsit9.2;`	`E105,94`
`202345`	`put amount eurfrsit5.;`	`1.059`
	`put amount eurfrsit9.2;`	`E1.059,40`

See Also

Formats:

"EURTOSIT*w.d* Format" on page 635

Functions:

"EUROCURR Function" on page 644

EURFRTRL*w.d* Format

Converts an amount from Turkish liras to euros.

Category: Currency Conversion

Alignment: right

Syntax

EURFRTRL*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 6

d
specifies the number of digits to the right of the decimal point in the numeric value.

Details

The EURFRTRL*w.d* format converts an amount from Turkish liras to an amount in euros and produces a formatted euro value. The conversion rate is a changeable rate that is incorporated into the EURFRTRL*w.d* format and the EUROCURR function. For more information about European currency conversion and currency conversion rate tables, see "Overview to European Currency Conversion" on page 61.

Examples

The following table shows input values in Turkish liras, SAS statements, and the conversion results in euros.

Amounts	Statements	Results
		`----+----1----2`
`400`	`put amount eurfrtrl5.;`	`E1`
	`put amount eurfrtrl9.2;`	`E1,19`
`40234.56`	`put amount eurfrtrl5.;`	`E119`
	`put amount eurfrtrl9.2;`	`E119,42`
`402345`	`put amount eurfrtrl5.;`	`1.194`
	`put amount eurfrtrl9.2;`	`E1.194,21`

See Also

Formats:
"EURTOTRL*w.d* Format" on page 637
Functions:
"EUROCURR Function" on page 644

EURFRYUD*w.d* Format

Converts an amount from Yugoslavian dinars to euros.

Category: Currency Conversion
Alignment: right

Syntax

EURFRYUD*w.d*

Syntax Description

w
specifies the width of the output field.
Default: 6

d
specifies the number of digits to the right of the decimal point in the numeric value.

Details

The EURFRYUD*w.d* format converts an amount from Yugoslavian dinars to an amount in euros and produces a formatted euro value. The conversion rate is a changeable rate that is incorporated into the EURFRYUD*w.d* format and the EUROCURR function. For more information about European currency conversion and currency conversion rate tables, see "Overview to European Currency Conversion" on page 61.

Examples

The following table shows input values in Yugoslavian dinars, SAS statements, and the conversion results in euros.

Amounts	Statements	Results
		`----+----1----2`
`50`	`put amount eurfryud5.;`	`E4`
	`put amount eurfryud9.2;`	`E3,83`
`5234.56`	`put amount eurfryud5.;`	`E401`
	`put amount eurfryud9.2;`	`E400,67`
`52345`	`put amount eurfryud5.;`	`4.007`
	`put amount eurfryud9.2;`	`E4.006,69`

See Also

Formats:
"EURTOYUD*w.d* Format" on page 638
Functions:
"EUROCURR Function" on page 644

EURTOATS*w.d* Format

Converts an amount from euros to Austrian schillings.

Category: Currency Conversion
Alignment: right

Syntax

EURTOATS*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 6

d
specifies the number of digits to the right of the decimal point in the numeric value.

Details

The EURTOATS*w.d* format converts an amount in euros to an amount in Austrian schillings. The conversion rate is a fixed rate that is incorporated into the EURTOATS*w.d* format and the EUROCURR function. For more information about European currency conversion and currency conversion rate tables, see "Overview to European Currency Conversion" on page 61.

Examples

The following table shows input values in euros, SAS statements, and the conversion results in Austrian schillings.

Amounts	Statements	Results
		`----+----1----2`
`1`	`put amount eurtoats6.;`	`14`
	`put amount eurtoats12.2;`	`13.76`
`1234.56`	`put amount eurtoats6.;`	`16988`
	`put amount eurtoats12.2;`	`16987.92`
`12345`	`put amount eurtoats6.;`	`169871`
	`put amount eurtoats12.2;`	`169870.90`

See Also

Formats:

"EURFRATS*w.d* Format" on page 582

Functions:

"EUROCURR Function" on page 644

EURTOBEF*w.d* Format

Converts an amount from euros to Belgian francs.

Category: Currency Conversion
Alignment: right

Syntax

EURTOBEF*w.d*

Syntax Description

w
specifies the width of the output field.
Default: 6

d
specifies the number of digits to the right of the decimal point in the numeric value.

Details

The EURTOBEF*w.d* format converts an amount in euros to an amount in Belgian francs. The conversion rate is a fixed rate that is incorporated into the EURTOBEF*w.d* format and the EUROCURR function. For more information about European currency conversion and currency conversion rate tables, see "Overview to European Currency Conversion" on page 61.

Examples

The following table shows input values in euros, SAS statements, and the conversion results in Belgian francs.

Amounts	Statements	Results
		`----+----1----2`
`1`	`put amount eurtobef6.;`	`40`
	`put amount eurtobef12.2;`	`40.34`
`1234.56`	`put amount eurtobef6.;`	`49802`
	`put amount eurtobef12.2;`	`49802.03`
`12345`	`put amount eurtobef6.;`	`497996`
	`put amount eurtobef12.2;`	`497996.07`

See Also

Formats:

"EURFRBEF*w.d* Format" on page 583

Functions:

"EUROCURR Function" on page 644

EURTOCHF*w.d* Format

Converts an amount from euros to Swiss francs.

Category: Currency Conversion
Alignment: right

Syntax

EURTOCHF*w.d*

Syntax Description

w
specifies the width of the output field.
Default: 6

d
specifies the number of digits to the right of the decimal point in the numeric value.

Details

The EURTOCHF*w.d* format converts an amount in euros to an amount in Swiss francs. The conversion rate is a changeable rate that is incorporated into the EURTOCHF*w.d* format and the EUROCURR function. For more information about European currency conversion and currency conversion rate tables, see "Overview to European Currency Conversion" on page 61.

Examples

The following table shows input values in euros, SAS statements, and the conversion results in Swiss francs.

Amounts	Statements	Results
		`----+----1----2`
`1`	`put amount eurtochf6.;`	`2`
	`put amount eurtochf12.2;`	`1.60`
`1234.56`	`put amount eurtochf6.;`	`1981`
	`put amount eurtochf12.2;`	`1980.60`
`12345`	`put amount eurtochf6.;`	`19805`
	`put amount eurtochf12.2;`	`19805.08`

See Also

Formats:

"EURFRCHF*w.d* Format" on page 584

Functions:

"EUROCURR Function" on page 644

EURTOCZK*w.d* Format

Converts an amount from euros to Czech koruny.

Category: Currency Conversion

Alignment: right

Syntax

EURTOCZK*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 6

d

specifies the number of digits to the right of the decimal point in the numeric value.

Details

The EURTOCZK*w.d* format converts an amount in euros to an amount in Czech koruny. The conversion rate is a changeable rate that is incorporated into the EURTOCZK*w.d* format and the EUROCURR function. For more information about European currency conversion and currency conversion rate tables, see "Overview to European Currency Conversion" on page 61.

Examples

The following table shows input values in euros, SAS statements, and the conversion results in Czech koruny.

Amounts	Statements	Results
		`----+----1----2`
`1`	`put amount eurtoczk6.;`	`35`
	`put amount eurtoczk12.2;`	`34.86`

Amounts	Statements	Results
`1234.56`	`put amount eurtoczk6.;`	`43032`
	`put amount eurtoczk12.2;`	`43032.19`
`12345`	`put amount eurtoczk6.;`	`430301`
	`put amount eurtoczk12.2;`	`430301.02`

See Also

Formats:

"EURFRCZK*w.d* Format" on page 585

Functions:

"EUROCURR Function" on page 644

EURTODEM*w.d* Format

Converts an amount from euros to Deutsche marks.

Category: Currency Conversion

Alignment: right

Syntax

EURTODEM*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 6

d
specifies the number of digits to the right of the decimal point in the numeric value.

Details

The EURTODEM*w.d* format converts an amount in euros to an amount in Deutsche marks. The conversion rate is a fixed rate that is incorporated into the EURTODEM*w.d* format and the EUROCURR function. For more information about European currency conversion and currency conversion rate tables, see "Overview to European Currency Conversion" on page 61.

Examples

The following table shows input values in euros, SAS statements, and the conversion results in Deutsche marks.

Amounts	Statements	Results
		`----+----1----2`
`1`	`put amount eurtodem6.;`	`2`
	`put amount eurtodem12.2;`	`1.96`
`1234.56`	`put amount eurtodem6.;`	`2415`
	`put amount eurtodem12.2;`	`2414.59`
`12345`	`put amount eurtodem6.;`	`24145`
	`put amount eurtodem12.2;`	`24144.72`

See Also

Formats:
"EURFRDEM*w.d* Format" on page 586
Functions:
"EUROCURR Function" on page 644

EURTODKK*w.d* Format

Converts an amount from euros to Danish kroner.

Category: Currency Conversion
Alignment: right

Syntax

EURTODKK*w.d*

Syntax Description

w
specifies the width of the output field.
Default: 6

d
specifies the number of digits to the right of the decimal point in the numeric value.

Details

The EURTODKK*w.d* format converts an amount in euros to an amount in Danish kroner. The conversion rate is a changeable rate that is incorporated into the

EURTODKK*w.d* format and the EUROCURR function. For more information about European currency conversion and currency conversion rate tables, see "Overview to European Currency Conversion" on page 61.

Examples

The following table shows input values in euros, SAS statements, and the conversion results in Danish kroner.

Amounts	Statements	Results
		`----+----1----2`
`1`	`put amount eurtodkk6.;`	`7`
	`put amount eurtodkk12.2;`	`7.49`
`1234.56`	`put amount eurtodkk6.;`	`9247`
	`put amount eurtodkk12.2;`	`9246.97`
`12345`	`put amount eurtodkk6.;`	`92465`
	`put amount eurtodkk12.2;`	`92465.16`

See Also

Formats:

"EURFRDKK*w.d* Format" on page 588

Functions:

"EUROCURR Function" on page 644

EURTOESP*w.d* Format

Converts an amount from euros to Spanish pesetas.

Category: Currency Conversion

Alignment: right

Syntax

EURTOESP*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 6

d
specifies the number of digits to the right of the decimal point in the numeric value.

Details

The EURTOESP*w.d* format converts an amount in euros to an amount in Spanish pesetas. The conversion rate is a fixed rate that is incorporated into the EURTOESP*w.d* format and the EUROCURR function. For more information about European currency conversion and currency conversion rate tables, see "Overview to European Currency Conversion" on page 61.

Examples

The following table shows input values in euros, SAS statements, and the conversion results in Spanish pesetas.

Amounts	Statements	Results
		—-+—-1—-2
1	put amount eurtoesp8.;	166
	put amount eurtoesp12.2;	**166.39**
1234.56	put amount eurtoesp8.;	205414
	put amount eurtoesp12.2;	205413.50
12345	put amount eurtoesp8.;	2054035
	put amount eurtoesp12.2;	2054035.17

See Also

Formats:

"EURFRESP*w.d* Format" on page 589

Functions:

"EUROCURR Function" on page 644

EURTOFIM*w.d* Format

Converts an amount from euros to Finnish markkaa.

Category: Currency Conversion

Alignment: right

Syntax

EURTOFIM*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 6

d
specifies the number of digits to the right of the decimal point in the numeric value.

Details

The EURTOFIM*w.d* format converts an amount in euros to an amount in Finnish markkaa. The conversion rate is a fixed rate that is incorporated into the EURTOFIM*w.d* format and the EUROCURR function. For more information about European currency conversion and currency conversion rate tables, see "Overview to European Currency Conversion" on page 61.

Examples

The following table shows input values in euros, SAS statements, and the conversion results in Finnish markkaa.

Amounts	Statements	Results
		`----+----1----2`
`1`	`put amount eurtofim6.;`	`6`
	`put amount eurtofim12.2;`	`5.95`
`1234.56`	`put amount eurtofim6.;`	`7340`
	`put amount eurtofim12.2;`	`7340.36`
`12345`	`put amount eurtofim6.;`	`73400`
	`put amount eurtofim12.2;`	`73400.04`

See Also

Formats:
"EURFRFIM*w.d* Format" on page 590
Functions:
"EUROCURR Function" on page 644

EURTOFRF*w.d* Format

Converts an amount from euros to French francs.

Category: Currency Conversion
Alignment: right

Syntax

EURTOFRF*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 6

d
specifies the number of digits to the right of the decimal point in the numeric value.

Details

The EURTOFRF*w.d* format converts an amount in euros to an amount in French francs. The conversion rate is a fixed rate that is incorporated into the EURTOFRF*w.d* format and the EUROCURR function. For more information about European currency conversion and currency conversion rate tables, see "Overview to European Currency Conversion" on page 61.

Examples

The following table shows input values in euros, SAS statements, and the conversion results in French francs.

Amounts	Statements	Results
		`----+----1----2`
`1`	`put amount eurtofrf6.;`	`7`
	`put amount eurtofrf12.2;`	`6.56`
`1234.56`	`put amount eurtofrf6.;`	`8098`
	`put amount eurtofrf12.2;`	`8098.18`
`12345`	`put amount eurtofrf6.;`	`80978`
	`put amount eurtofrf12.2;`	`80977.89`

See Also

Formats:

"EURFRFRF*w.d* Format" on page 591

Functions:

"EUROCURR Function" on page 644

EURTOGBP*w.d* Format

Converts an amount from euros to British pounds.

Category: Currency Conversion
Alignment: right

Syntax

EURTOGBP*w.d*

Syntax Description

w
specifies the width of the output field.
Default: 6

d
specifies the number of digits to the right of the decimal point in the numeric value.

Details

The EURTOGBP*w.d* format converts an amount in euros to an amount in British pounds. The conversion rate is a changeable rate that is incorporated into the EURTOGBP*w.d* format and the EUROCURR function. For more information about European currency conversion and currency conversion rate tables, see "Overview to European Currency Conversion" on page 61.

Examples

The following table shows input values in euros, SAS statements, and the conversion results in British pounds.

Amounts	Statements	Results
		`----+----1----2`
`1`	`put amount eurtogbp6.;`	`1`
	`put amount eurtogbp12.2;`	`0.70`
`1234.56`	`put amount eurtogbp6.;`	`864`
	`put amount eurtogbp12.2;`	`864.35`
`12345`	`put amount eurtogbp6.;`	`8643`
	`put amount eurtogbp12.2;`	`8643.13`

See Also

Formats:

"EURFRGBP*w.d* Format" on page 592

Functions:

"EUROCURR Function" on page 644

EURTOGRD*w.d* Format

Converts an amount from euros to Greek drachmas.

Category: Currency Conversion

Alignment: right

Syntax

EURTOGRD*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 6

d

specifies the number of digits to the right of the decimal point in the numeric value.

Details

The EURTOGRD*w.d* format converts an amount in euros to an amount in Greek drachmas. The conversion rate is a fixed rate that is incorporated into the EURTOGRD*w.d* format and the EUROCURR function. For more information about European currency conversion and currency conversion rate tables, see "Overview to European Currency Conversion" on page 61.

Examples

The following table shows input values in euros, SAS statements, and the conversion results in Greek drachmas.

Amounts	Statements	Results
		`----+----1----2`
`1`	`put amount eurtogrd8.;`	`341`
	`put amount eurtogrd16.2;`	`340.89`

Amounts	Statements	Results
`1234.56`	`put amount eurtogrd8.;`	`420843`
	`put amount eurtogrd16.2;`	`420842.99`
`12345`	`put amount eurtogrd8.;`	`4208225`
	`put amount eurtogrd16.2;`	`4208225.33`

See Also

Formats:

"EURFRGRD*w.d* Format" on page 593

Functions:

"EUROCURR Function" on page 644

EURTOHUF*w.d* Format

Converts an amount from euros to Hungarian forints.

Category: Currency Conversion

Alignment: right

Syntax

EURTOHUF*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 6

d
specifies the number of digits to the right of the decimal point in the numeric value.

Details

The EURTOHUF*w.d* format converts an amount in euros to an amount in Hungarian forints. The conversion rate is a changeable rate that is incorporated into the EURTOHUF*w.d* format and the EUROCURR function. For more information about European currency conversion and currency conversion rate tables, see "Overview to European Currency Conversion" on page 61.

Examples

The following table shows input values in euros, SAS statements, and the conversion results in Hungarian forints.

Amounts	Statements	Results
		`----+----1----2`
`1`	`put amount eurtohuf8.;`	`260`
	`put amount eurtohuf14.2;`	`260.33`
`1234.56`	`put amount eurtohuf8.;`	`321387`
	`put amount eurtohuf14.2;`	`321386.83`
`12345`	`put amount eurtohuf8.;`	`3213712`
	`put amount eurtohuf14.2;`	`3213712.13`

See Also

Formats:
"EURFRHUF*w.d* Format" on page 594
Functions:
"EUROCURR Function" on page 644

EURTOIEP*w.d* Format

Converts an amount from euros to Irish pounds.

Category: Currency Conversion
Alignment: right

Syntax

EURTOIEP*w.d*

Syntax Description

w
specifies the width of the output field.
Default: 6

d
specifies the number of digits to the right of the decimal point in the numeric value.

Details

The EURTOIEP*w.d* format converts an amount in euros to an amount in Irish pounds. The conversion rate is a fixed rate that is incorporated into the EURTOIEP*w.d* format

and the EUROCURR function. For more information about European currency conversion and currency conversion rate tables, see "Overview to European Currency Conversion" on page 61.

Examples

The following table shows input values in euros, SAS statements, and the conversion results in Irish pounds.

Amounts	Statements	Results
		`----+----1----2`
`1`	`put amount eurtoiep6.;`	`1`
	`put amount eurtoiep12.2;`	`0.79`
`1234.56`	`put amount eurtoiep6.;`	`972`
	`put amount eurtoiep12.2;`	`972.30`
`12345`	`put amount eurtoiep6.;`	`9722`
	`put amount eurtoiep12.2;`	`9722.48`

See Also

Formats:

"EURFRIEP*w.d* Format" on page 596

Functions:

"EUROCURR Function" on page 644

EURTOITL*w.d* Format

Converts an amount from euros to Italian lire.

Category: Currency Conversion

Alignment: right

Syntax

EURTOITL*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 6

d
specifies the number of digits to the right of the decimal point in the numeric value.

Details

The EURTOITL*w.d* format converts an amount in euros to an amount in Italian lire. The conversion rate is a fixed rate that is incorporated into the EURTOITL*w.d* format and the EUROCURR function. For more information about European currency conversion and currency conversion rate tables, see "Overview to European Currency Conversion" on page 61.

Examples

The following table shows input values in euros, SAS statements, and the conversion results in Italian lire.

Amounts	Statements	Results
		`----+----1----2`
`1`	`put amount eurtoitl8.;`	`1936`
	`put amount eurtoitl12.2;`	`1936.27`
`1234.56`	`put amount eurtoitl8.;`	`2390441`
	`put amount eurtoitl12.2;`	`2390441.49`
`12345`	`put amount eurtoitl8.;`	`23903253`
	`put amount eurtoitl12.2;`	`23903253.15`

See Also

Formats:

"EURFRITL*w.d* Format" on page 597

Functions:

"EUROCURR Function" on page 644

EURTOLUF*w.d* Format

Converts an amount from euros to Luxembourg francs.

Category: Currency Conversion

Alignment: right

Syntax

EURTOLUF*w.d*

Syntax Description

w
specifies the width of the output field.
Default: 6

d
specifies the number of digits to the right of the decimal point in the numeric value.

Details

The EURTOLUF*w.d* format converts an amount in euros to an amount in Luxembourg francs. The conversion rate is a fixed rate that is incorporated into the EURTOLUF*w.d* format and the EUROCURR function. For more information about European currency conversion and currency conversion rate tables, see "Overview to European Currency Conversion" on page 61.

Examples

The following table shows input values in euros, SAS statements, and the conversion results in Luxembourg francs.

Amounts	Statements	Results
		`----+----1----2`
`1`	`put amount eurtoluf6.;`	`40`
	`put amount eurtoluf12.2;`	`40.34`
`1234.56`	`put amount eurtoluf6.;`	`49802`
	`put amount eurtoluf12.2;`	`49802.03`
`12345`	`put amount eurtoluf6.;`	`497996`
	`put amount eurtoluf12.2;`	`497996.07`

See Also

Formats:
"EURFRLUF*w.d* Format" on page 598
Functions:
"EUROCURR Function" on page 644

EURTONLG*w.d* Format

Converts an amount from euros to Dutch guilders.

Category: Currency Conversion
Alignment: right

Syntax

EURTONLG*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 6

d
specifies the number of digits to the right of the decimal point in the numeric value.

Details

The EURTONLG*w.d* format converts an amount in euros to an amount in Dutch guilders. The conversion rate is a fixed rate that is incorporated into the EURTONLG*w.d* format and the EUROCURR function. For more information about European currency conversion and currency conversion rate tables, see "Overview to European Currency Conversion" on page 61.

Examples

The following table shows input values in euros, SAS statements, and the conversion results in Dutch guilders.

Amounts	Statements	Results
		`----+----1----2`
`1`	`put amount eurtonlg6.;`	`2`
	`put amount eurtonlg12.2;`	`2.20`
`1234.56`	`put amount eurtonlg6.;`	`2721`
	`put amount eurtonlg12.2;`	`2720.61`
`12345`	`put amount eurtonlg6.;`	`27205`
	`put amount eurtonlg12.2;`	`27204.80`

See Also

Formats:

"EURFRNLG*w.d* Format" on page 599

Functions:

"EUROCURR Function" on page 644

EURTONOK*w.d* Format

Converts an amount from euros to Norwegian krone.

Category: Currency Conversion
Alignment: right

Syntax

EURTONOK*w.d*

Syntax Description

w
specifies the width of the output field.
Default: 6

d
specifies the number of digits to the right of the decimal point in the numeric value.

Details

The EURTONOK*w.d* format converts an amount in euros to an amount in Norwegian krone. The conversion rate is a changeable rate that is incorporated into the EURTONOK*w.d* format and the EUROCURR function. For more information about European currency conversion and currency conversion rate tables, see "Overview to European Currency Conversion" on page 61.

Examples

The following table shows input values in euros, SAS statements, and the conversion results in Norwegian krone.

Amounts	Statements	Results
		`----+----1----2`
`1`	`put amount eurtonok6.;`	`9`
	`put amount eurtonok12.2;`	`9.20`
`1234.56`	`put amount eurtonok6.;`	`11355`
	`put amount eurtonok12.2;`	`11355.11`
`12345`	`put amount eurtonok6.;`	`113546`
	`put amount eurtonok12.2;`	`113545.61`

See Also

Formats:

"EURFRNOK*w.d* Format" on page 600

Functions:

"EUROCURR Function" on page 644

EURTOPLZ*w.d* Format

Converts an amount from euros to Polish zlotys.

Category: Currency Conversion

Alignment: right

Syntax

EURTOPLZ*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 6

d

specifies the number of digits to the right of the decimal point in the numeric value.

Details

The EURTOPLZ*w.d* format converts an amount in euros to an amount in Polish zlotys. The conversion rate is a changeable rate that is incorporated into the EURTOPLZ*w.d* format and the EUROCURR function. For more information about European currency conversion and currency conversion rate tables, see "Overview to European Currency Conversion" on page 61.

Examples

The following table shows input values in euros, SAS statements, and the conversion results in Polish zlotys.

Amounts	Statements	Results
		`----+----1----2`
`1`	`put amount eurtoplz6.;`	`4`
	`put amount eurtoplz12.2;`	`4.20`

Amounts	Statements	Results
`1234.56`	`put amount eurtoplz6.;`	`5185`
	`put amount eurtoplz12.2;`	`5185.15`
`12345`	`put amount eurtoplz6.;`	`51849`
	`put amount eurtoplz12.2;`	`51849.00`

See Also

Formats:

"EURFRPLZ*w.d* Format" on page 601

Functions:

"EUROCURR Function" on page 644

EURTOPTE*w.d* Format

Converts an amount from euros to Portuguese escudos.

Category: Currency Conversion

Alignment: right

Syntax

EURTOPTE*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 6

d
specifies the number of digits to the right of the decimal point in the numeric value.

Details

The EURTOPTE*w.d* format converts an amount in euros to an amount in Portuguese escudos. The conversion rate is a fixed rate that is incorporated into the EURTOPTE*w.d* format and the EUROCURR function. For more information about European currency conversion and currency conversion rate tables, see "Overview to European Currency Conversion" on page 61.

Examples

The following table shows input values in euros, SAS statements, and the conversion results in Portuguese escudos.

Amounts	Statements	Results
		`----+----1----2`
`1`	`put amount eurtopte8.;`	`200`
	`put amount eurtopte12.2;`	`200.48`
`1234.56`	`put amount eurtopte8.;`	`247507`
	`put amount eurtopte12.2;`	`247507.06`
`12345`	`put amount eurtopte8.;`	`2474950`
	`put amount eurtopte12.2;`	`2474950.29`

See Also

Formats:

"EURFRPTE*w.d* Format" on page 602

Functions:

"EUROCURR Function" on page 644

EURTOROL*w.d* Format

Converts an amount from euros to Romanian lei.

Category: Currency Conversion
Alignment: right

Syntax

EURTOROL*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 6

d

specifies the number of digits to the right of the decimal point in the numeric value.

Details

The EURTOROL*w.d* format converts an amount in euros to an amount in Romanian lei. The conversion rate is a changeable rate that is incorporated into the

EURTOROL*w.d* format and the EUROCURR function. For more information about European currency conversion and currency conversion rate tables, see "Overview to European Currency Conversion" on page 61.

Examples

The following table shows input values in euros, SAS statements, and the conversion results in Romanian lei.

Amounts	Statements	Results
		`----+----1----2`
`1`	`put amount eurtorol6.;`	`14`
	`put amount eurtorol12.2;`	`13.71`
`1234.56`	`put amount eurtorol6.;`	`16926`
	`put amount eurtorol12.2;`	`16925.82`
`12345`	`put amount eurtorol6.;`	`169250`
	`put amount eurtorol12.2;`	`169249.95`

See Also

Formats:

"EURFRROL*w.d* Format" on page 604

EURTORUR*w.d* Format

Converts an amount from euros to Russian rubles.

Category: Currency Conversion

Alignment: right

Syntax

EURTORUR*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 6

d

specifies the number of digits to the right of the decimal point in the numeric value.

Details

The EURTORUR*w.d* format converts an amount in euros to an amount in Russian rubles. The conversion rate is a changeable rate that is incorporated into the EURTORUR*w.d* format and the EUROCURR function. For more information about European currency conversion and currency conversion rate tables, see "Overview to European Currency Conversion" on page 61.

Examples

The following table shows input values in euros, SAS statements, and the conversion results in Russian rubles.

Amounts	Statements	Results
		`----+----1----2`
`1`	`put amount eurtorur6.;`	`20`
	`put amount eurtorur12.2;`	`19.77`
`1234.56`	`put amount eurtorur6.;`	`24405`
	`put amount eurtorur12.2;`	`24404.78`
`12345`	`put amount eurtorur6.;`	`244036`
	`put amount eurtorur12.2;`	`244035.96`

See Also

Formats:

"EURFRRUR*w.d* Format" on page 605

Functions:

"EUROCURR Function" on page 644

EURTOSEK*w.d* Format

Converts an amount from euros to Swedish kronor.

Category: Currency Conversion

Alignment: right

Syntax

EURTOSEK*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 6

d
specifies the number of digits to the right of the decimal point in the numeric value.

Details

The EURTOSEK*w.d* format converts an amount in euros to an amount in Swedish kronor. The conversion rate is a changeable rate that is incorporated into the EURTOSEK*w.d* format and the EUROCURR function. For more information about European currency conversion and currency conversion rate tables, see "Overview to European Currency Conversion" on page 61.

Examples

The following table shows input values in euros, SAS statements, and the conversion results in Swedish kronor.

Amounts	Statements	Results
		`----+----1----2`
`1`	`put amount eurtosek6.;`	`9`
	`put amount eurtosek12.2;`	`9.37`
`1234.56`	`put amount eurtosek6.;`	`11563`
	`put amount eurtosek12.2;`	`11562.78`
`12345`	`put amount eurtosek6.;`	`115622`
	`put amount eurtosek12.2;`	`115622.16`

See Also

Formats:
"EURFRSEK*w.d* Format" on page 606
Functions:
"EUROCURR Function" on page 644

EURTOSIT*w.d* Format

Converts an amount from euros to Slovenian tolars.

Category: Currency Conversion
Alignment: right

Syntax

EURTOSIT*w.d*

Syntax Description

w
specifies the width of the output field.

Default: 6

d
specifies the number of digits to the right of the decimal point in the numeric value.

Details

The EURTOSIT*w.d* format converts an amount in euros to an amount in Slovenian tolars. The conversion rate is a changeable rate that is incorporated into the EURTOSIT*w.d* format and the EUROCURR function. For more information about European currency conversion and currency conversion rate tables, see "Overview to European Currency Conversion" on page 61.

Note: Slovenia's currency is the Euro. The information for EURTOSIT is provided for user's historical data. △

Examples

The following table shows input values in euros, SAS statements, and the conversion results in Slovenian tolars.

Amounts	Statements	Results
		`----+----1----2`
`1`	`put amount eurtosit8.;`	`191`
	`put amount eurtosit14.2;`	`191.00`
`1234.56`	`put amount eurtosit8.;`	`235801`
	`put amount eurtosit14.2;`	`235800.96`
`12345`	`put amount eurtosit8.;`	`2357895`
	`put amount eurtosit14.2;`	`2357895.00`

See Also

Formats:

"EURFRSIT*w.d* Format" on page 607

Functions:

"EUROCURR Function" on page 644

EURTOTRL*w.d* Format

Converts an amount from euros to Turkish liras.

Category: Currency Conversion
Alignment: right

Syntax

EURTOTRL*w.d*

Syntax Description

w
specifies the width of the output field.
Default: 6

d
specifies the number of digits to the right of the decimal point in the numeric value.

Details

The EURTOTRL*w.d* format converts an amount in euros to an amount in Turkish liras. The conversion rate is a changeable rate that is incorporated into the EURTOTRL*w.d* format and the EUROCURR function. For more information about European currency conversion and currency conversion rate tables, see "Overview to European Currency Conversion" on page 61.

Examples

The following table shows input values in euros, SAS statements, and the conversion results in Turkish liras.

Amounts	Statements	Results
		`----+----1----2`
`1`	`put amount eurtotrl8.;`	`337`
	`put amount eurtotrl14.2;`	`336.91`
`1234.56`	`put amount eurtotrl8.;`	`415938`
	`put amount eurtotrl14.2;`	`415938.08`
`12345`	`put amount eurtotrl8.;`	`4159179`
	`put amount eurtotrl14.2;`	`4159178.64`

See Also

Formats:

"EURFRTRL*w.d* Format" on page 608

Functions:

"EUROCURR Function" on page 644

EURTOYUD*w.d* Format

Converts an amount from euros to Yugoslavian dinars.

Category: Currency Conversion

Alignment: right

Syntax

EURTOYUD*w.d*

Syntax Description

w

specifies the width of the output field.

Default: 6

d

specifies the number of digits to the right of the decimal point in the numeric value.

Details

The EURTOYUD*w.d* format converts an amount in euros to an amount in Yugoslavian dinars. The conversion rate is a changeable rate that is incorporated into the EURTOYUD*w.d* format and the EUROCURR function. For more information about European currency conversion and currency conversion rate tables, see "Overview to European Currency Conversion" on page 61.

Examples

The following table shows input values in euros, SAS statements, and the conversion results in Yugoslavian dinars.

Amounts	Statements	Results
		`----+----1----2`
`1`	`put amount eurtoyud6.;`	`13`
	`put amount eurtoyud12.2;`	`13.06`

Amounts	Statements	Results
`1234.56`	`put amount eurtoyud6.;`	`16129`
	`put amount eurtoyud12.2;`	`16128.79`
`12345`	`put amount eurtoyud6.;`	`161280`
	`put amount eurtoyud12.2;`	`161280.02`

See Also

Formats:

"EURFRYUD*w.d* Format" on page 609

Functions:

"EUROCURR Function" on page 644

EURDFDE*w*. Informat

Reads international date values.

Category: Date and Time

Syntax

EURDFDE*w*.

w

specifies the width of the input field.

Default: 7 (except Finnish)

Range: 7–32 (except Finnish)

Note: If you use the Finnish (FIN) language prefix, the *w* range is 10–32 and the default *w* is 10. △

Details

The date values must be in the form *ddmmmyy* or *ddmmmyyyy*:

dd
is an integer from 01–31 that represents the day of the month.

mmm
is the first three letters of the month name.

yy or *yyyy*
is a two-digit or four-digit integer that represents the year.

You can place blanks and other special characters between day, month, and year values.

Note: SAS interprets a two-digit year as belonging to the 100-year span that is defined by the YEARCUTOFF= system option. △

You can set the language for the SAS session with the DFLANG= system option. (Because the SAS Installation Representative usually sets a default language for the site, you might be able to skip this step.) If you work with dates in multiple languages, you can replace the EUR prefix with a language prefix. See "DFLANG= System Option: OpenVMS, UNIX, Windows, and z/OS" on page 457 for the list of language prefixes . When you specify the language prefix in the informat, SAS ignores the DFLANG= system option.

Examples

This INPUT statement uses the value of the DFLANG= system option to read the international date values in Spanish.

```
options dflang=spanish;
input day eurdfde10.;
```

This INPUT statement uses the Spanish language prefix in the informat to read the international date values in Spanish. The value of the DFLANG= option, therefore, is ignored.

```
input day espdfde10.;
```

Values	Results
	`----+----1`
`01abr1999`	`14335`
`01-abr-99`	`14335`

See Also

Formats:

"EURDFDE*w*. Format" on page 566

Informats:

DATEw. in *SAS Language Reference: Dictionary*

"EURDFDT*w*. Informat" on page 640

"EURDFMY*w*. Informat" on page 642

System Options:

"DFLANG= System Option: OpenVMS, UNIX, Windows, and z/OS" on page 457

YEARCUTOFF= in *SAS Language Reference: Dictionary*

EURDFDT*w*. Informat

Reads international datetime values in the form *ddmmmyy hh:mm:ss.ss* or *ddmmmyyyy hh:mm:ss.ss*.

Category: Date and Time

Syntax

EURDFDT*w*.

Syntax Description

w
specifies the width of the input field.

Default: 18

Range: 13–40

Details

The date values must be in the form *ddmmmyy* or *ddmmmyyyy*, followed by a blank or special character, and then the time values as *hh:mm:ss.ss*. The syntax for the date is represented as follows:

dd
is an integer from 01–31 that represents the day of the month.

mmm
is the first three letters of the month name.

yy or *yyyy*
is a two-digit or four-digit integer that represents the year.

The syntax for time is represented as follows:

hh
is the number of hours ranging from 00–23,

mm
is the number of minutes ranging from 00–59,

ss.ss
is the number of seconds ranging from 00–59 with the fraction of a second following the decimal point.

The EURDFDT*w*. informat requires values for both the date and the time; however, the *ss.ss* portion is optional.

Note: SAS interprets a two-digit year as belonging to the 100-year span that is defined by the YEARCUTOFF= system option. △

You can set the language for the SAS session with the DFLANG= system option. (Because the SAS Installation Representative usually sets a default language for the site, you might be able to skip this step.) If you work with dates in multiple languages, you can replace the EUR prefix with a language prefix. See “DFLANG= System Option: OpenVMS, UNIX, Windows, and z/OS” on page 457 for the list of language prefixes . When you specify the language prefix in the informat, SAS ignores the DFLANG= system option.

Examples

This INPUT statement uses the value of the DFLANG= system option to read the international datetime values in German.

```
options dflang=german;
input date eurdfdt20.;
```

This INPUT statement uses the German language prefix to read the international datetime values in German. The value of the DFLANG= option, therefore, is ignored.

```
input date deudfdt20.;
```

Values	Results
	`----+----1----+----2`
`23dez99:10:03:17.2`	`1261562597.2`
`23dez1999:10:03:17.2`	`1261562597.2`

See Also

Formats:
- DATEw. in *SAS Language Reference: Dictionary*
- DATETIMEw.d in *SAS Language Reference: Dictionary*
- "EURDFDT*w*.*d* Format" on page 569
- TIMEw.d in *SAS Language Reference: Dictionary*

Functions:
- DATETIME in *SAS Language Reference: Dictionary*

Informats:
- DATETIMEw. in *SAS Language Reference: Dictionary*
- "EURDFDE*w*. Informat" on page 639
- "EURDFMY*w*. Informat" on page 642

System Options:
- "DFLANG= System Option: OpenVMS, UNIX, Windows, and z/OS" on page 457
- YEARCUTOFF= in *SAS Language Reference: Dictionary*

EURDFMY*w*. Informat

Reads month and year date values in the form *mmmyy* or *mmmyyyy*.

Category: Date and Time

Syntax

EURDFMY*w*.

Syntax Description

w
specifies the width of the input field.

Default: 5 (except Finnish)

Range: 5–32 (except Finnish)

Note: If you use the Finnish (FIN) language prefix, the *w* range is 7–32 and the default value for *w* is 7. △

Details

The date values must be in the form *mmmyy* or *mmmyyyy*:

mmm
is the first three letters of the month name.

yy or *yyyy*
is a two-digit or four-digit integer that represents the year.

You can place blanks and other special characters between day, month, and year values. A value that is read with EURDFMY*w*. results in a SAS date value that corresponds to the first day of the specified month.

Note: SAS interprets a two-digit year as belonging to the 100-year span that is defined by the YEARCUTOFF= system option. △

You can set the language for the SAS session with the DFLANG= system option. (Because the SAS Installation Representative usually sets a default language for the site, you might be able to skip this step.) If you work with dates in multiple languages, you can replace the EUR prefix with a language prefix. See "DFLANG= System Option: OpenVMS, UNIX, Windows, and z/OS" on page 457 for the list of language prefixes . When you specify the language prefix in the informat, SAS ignores the DFLANG= option.

Examples

This INPUT statement uses the value of DFLANG= system option to read the international date values in French.

```
options dflang=french;
input month eurdfmy7.;
```

The second INPUT statement uses the French language prefix, and DFLANG is not specified.

```
input month fradfmy7.;
```

Values	Results
	`----+----1`
`avr1999`	`14335`
`avr 99`	`14335`

See Also

Formats:

DDMMYYw. in *SAS Language Reference: Dictionary*

"EURDFMY*w*. Format" on page 575

MMDDYYw. in *SAS Language Reference: Dictionary*

MONYYw. in *SAS Language Reference: Dictionary*

YYMMDDw. in *SAS Language Reference: Dictionary*

Functions:

MONTH in *SAS Language Reference: Dictionary*

YEAR in *SAS Language Reference: Dictionary*

Informats:

"EURDFDE*w*. Informat" on page 639

"EURDFDT*w*. Informat" on page 640

MONYYw. in *SAS Language Reference: Dictionary*

System Options:

"DFLANG= System Option: OpenVMS, UNIX, Windows, and z/OS" on page 457

YEARCUTOFF= in *SAS Language Reference: Dictionary*

EUROCURR Function

Converts one European currency to another.

Category: Currency Conversion

Syntax

EUROCURR(*from-currency-amount*, *from-currency-code*, *to-currency-code*)

Arguments

from-currency-amount
is a numeric value that specifies the amount to convert.

from-currency-code
specifies a three-character currency code that identifies the currency that you are converting from. (See European Currency and Currency CodesTable A1.1 on page 645.)

Tip: If *from-currency-code* has a blank value, EUROCURR converts currency values from euros to the currency of the European country that you specify.

Featured in: Example 4 on page 647

to-currency-code
specifies a three-character currency code that identifies the currency that you are converting to. (See European Currency and Currency CodesTable A1.1 on page 645.)

Tip: If *to-currency-code* has a blank value, EUROCURR converts values from the currency of the European country that you specify to euros.

Details

The following table lists European currencies and the associated currency codes. Use the currency codes to identify the type of currency that you are converting to or converting from. Several countries use the Euro as their currency instead of the currency listed in the following table. This information is provided in order to satisfy user's historical data.buildnlsOTKEY

Table A1.1 European Currency and Currency Codes

Currency	Currency code
Austrian schilling	ATS
Belgian franc	BEF
British pound sterling	GBP
Czech koruna	CZK
Danish krone	DKK
Deutsche mark	DEM
Dutch guilder	NLG
Euro	EUR
Finnish markka	FIM
French franc	FRF
Greek drachma	GRD
Hungarian forint	HUF
Irish pound	IEP
Italian lira	ITL
Luxembourg franc	LUF
Norwegian krone	NOK

Currency	Currency code
Polish zloty	PLZ
Portuguese escudo	PTE
Romanian leu	ROL
Russian ruble	RUR
Slovenian tolar	SIT
Spanish peseta	ESP
Swedish krona	SEK
Swiss franc	CHF
Turkish lira	TRL
Yugoslavian dinar	YUD

The EUROCURR function converts a specific country's currency to an equivalent amount in another country's currency. It can also convert a specific country's currency to euros. EUROCURR uses the values in either the fixed currency conversion rate table or the changeable currency conversion rate table to convert currency.

If you are converting from one country's currency to euros, SAS divides the *from-currency-amount* by that country's rate from one of the conversion rate tables. See Example 1 on page 646. If you are converting from euros to a country's currency, SAS multiplies the *from-currency-amount* by that country's rate from one of the conversion rate tables. See Example 2 on page 646. If you are converting one country's currency to another country's currency, SAS first converts the *from-currency-amount* to euros. SAS stores the intermediate value in as much precision as your operating environment allows, and does not round the value. SAS then converts the amount in euros to an amount in the currency you are converting to. See Example 3 on page 646.

Examples

Example 1: Converting from Deutsche Marks to Euros The following example converts one Deutsche mark to an equivalent amount of euros.

```
data _null_;
   amount=eurocurr(50,'dem','eur');
   put amount= ;
run;
```

The value in the SAS log is: **amount=25.56459406**.

Example 2: Converting from Euros to Deutsche Marks The following example converts one euro to an equivalent amount of Deutsche marks.

```
data _null_;
   amount=eurocurr(25,'eur','dem');
   put amount= ;
run;
```

The value in the SAS log is: **amount=48.89575**.

Example 3: Converting from French Francs to Deutsche Marks The following example converts 50 French francs to an equivalent amount of Deutsche marks.

```
data _null_;
   x=50;
   amount=eurocurr(x,'frf','dem');
   put amount=;
run;
```

The value in the SAS log is: **amount=14.908218069**.

Example 4: Converting Currency When One Variable is Blank The following example converts 50 euros to Deutsche marks.

```
data _null_;
   x=50;
   amount=eurocurr(x,' ','dem');
   put amount=;
run;
```

The value in the SAS log is: **amount=97.7915**.

See Also

Formats:

"EURO*w*.*d* Format" on page 76

"EUROX*w*.*d* Format" on page 77

Informats:

"EURO*w*.*d* Informat" on page 312

"EUROX*w*.*d* Informat" on page 313

APPENDIX

2

Recommended Reading

Recommended Reading

Here is the recommended reading list for this title:

- *SAS Language Reference: Concepts*
- *SAS Language Reference: Dictionary*
- *SAS Output Delivery System: User's Guide*
- *Base SAS Procedures Guide*
- *SAS/CONNECT User's Guide*
- *SAS/GRAPH: Reference, Second Edition*
- SAS Companion for your operating environment

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Glossary

ANSI (American National Standards Institute)
an organization in the United States that coordinates voluntary standards and conformity to those standards. ANSI works with ISO to establish global standards. See also ISO (International Organization for Standardization).

ASCII (American Standard Code for Information Interchange)
a 7-bit encoding that is the U.S. national variant of ISO 646. The ASCII encoding includes the upper- and lowercase letters A-Z, digits, symbols (such as &, #, and mathematical symbols), punctuation marks, and control characters. This set of 128 characters is also included in most other encodings. See also ISO 646 family.

BIDI (bidirectional) text
a mixture of characters that are read from left to right and characters that are read from right to left. Most Arabic and Hebrew strings of text, for example, are read from right to left, but numbers and embedded Western terms within Arabic and Hebrew text are read from left to right.

CEDA (Cross-Environment Data Access)
a feature of SAS software that enables a SAS data file that was created in any directory-based operating environment (for example, Solaris, Windows, HP-UX) to be read by a SAS session that is running in another directory-based environment. You can access the SAS data files without using any intermediate conversion steps. See also data representation.

character set
the set of characters that are used by a language or group of languages. A character set includes national characters, special characters (such as punctuation marks and mathematical symbols), the digits 0-9, and control characters that are needed by the computer. Most character sets also include the unaccented upper- and lowercase letters A-Z. See also national character.

code page
an ordered character set in which a numeric index (code point) is associated with each character. See also character set.

code point
a hexadecimal value that represents a character in an encoding or that is associated with a character on a code page. See also code page, encoding.

code position
the row and column location of a character in a code page. See also code page.

code table
another term for code page. See code page.

data representation
the form in which data is stored in a particular operating environment. Different operating environments use different standards or conventions for storing floating-point numbers (for example, IEEE or IBM 390); for character encoding (ASCII or EBCDIC); for the ordering of bytes in memory (big Endian or little Endian); for word alignment (4-byte boundaries or 8-byte boundaries); and for data-type length (16-bit, 32-bit, or 64-bit).

DBCS (double-byte character set)
any East Asian character set (Japanese, Korean, Simplified Chinese, and Traditional Chinese) that requires a mixed-width encoding because most characters occupy more than one byte of computer memory or storage. This term is somewhat misleading because not all characters in a DBCS require more than one byte, and some DBCS characters actually require four bytes. See also character set.

EBCDIC (Extended Binary Coded Decimal Interchange Code)
a group of 8-bit encodings that each include up to 256 characters. EBCDIC is used on IBM mainframes and on most IBM mid-range computers. EBCDIC follows ISO 646 conventions in order to facilitate transcoding between EBCDIC encodings, ASCII, the ISO 646 family of encodings, and 8-bit extensions to ASCII such as the ISO 8859 family. The 95 EBCDIC graphical characters include 82 invariant characters (including the SPACE character), which occupy the same code positions across most single-byte EBCDIC code pages, and 13 variant graphic characters, which occupy varying code positions across most single-byte EBCDIC code pages. See also ASCII (American Standard Code for Information Interchange), encoding, ISO (International Organization for Standardization), ISO 646 family, ISO 8859 family.

encoding
a set of characters (letters, logograms, digits, punctuation marks, symbols, and control characters) that have been mapped to hexadecimal values (called code points) that can be used by computers. An encoding results from applying an encoding method to a specific character set. Groups of encodings that apply the same encoding method to different character sets are sometimes referred to as families of encodings. For example, German EBCDIC is an encoding in the EBCDIC family, Windows Cyrillic is an encoding in the Windows family, and Latin 1 is an encoding in the ISO 8859 family. See also character set, encoding method.

encoding method
the set of rules that is used for assigning numeric representations to the characters in a character set. For example, these rules specify how many bits are used for storing the numeric representation of the character, as well as the ranges in the code page in which characters appear. The encoding methods are standards that have been developed in the computing industry. An encoding method is often specific to a computer hardware vendor. See also character set, encoding.

internationalization
the process of designing a software application without making assumptions that are based on a single language or locale. See also NLS (National Language Support).

ISO (International Organization for Standardization)
an organization that promotes the development of standards and that sponsors related activities in order to facilitate the dissemination of products and services

among nations and to support the exchange of intellectual, scientific, and technological information.

ISO 646 family
a group of 7-bit encodings that are defined in the ISO 646 standard and that each include up to 128 characters. The ISO 646 encodings are similar to ASCII except for 12 code points that are used for national variants. National variants are specific characters that are needed for a particular language. See also ASCII (American Standard Code for Information Interchange), ISO (International Organization for Standardization).

ISO 8859 family
a group of 8-bit extensions to ASCII that support all 128 of the ASCII code points plus an additional 128 code points, for a total of 256 characters. ISO-8859-1 (Latin 1) is a commonly used member of the ISO 8859 family of encodings. In addition to the ASCII characters, ISO-8859-1 contains accented characters, other letters that are needed for languages of Western Europe, and some special characters. See also ASCII (American Standard Code for Information Interchange), ISO (International Organization for Standardization).

language
an aspect of locale that is not necessarily unique to any one country or geographic region. For example, Portuguese is spoken in Brazil as well as in Portugal, but there are separate locales for Portuguese_Portugal and Portuguese_Brazil. See also locale.

locale
a value that reflects the language, local conventions, and culture for a geographic region. Local conventions can include specific formatting rules for dates, times, and numbers, and a currency symbol for the country or region. Collating sequences, paper sizes, and conventions for postal addresses and telephone numbers are also typically specified for each locale. Some examples of locale values are French_Canada, Portuguese_Brazil, and Chinese_Singapore.

localization
the process of adapting a product to meet the language, cultural, and other requirements of a specific target environment or market so that customers can use their own languages and conventions when using the product. Translation of the user interface, system messages, and documentation is part of localization.

MBCS (multi-byte character set)
a synonym for DBCS. See DBCS (double-byte character set).

national character
any character that is specific to a language as it is written in a particular nation or group of nations.

NLS (national language support)
the set of features that enable a software product to function properly in every global market for which the product is targeted.

SBCS (single-byte character set)
a character set in which each character occupies only one byte of computer memory or storage. A single-byte character set can be either 7 bits (providing up to 128 characters) or 8 bits (providing up to 256 characters). An example of an 8-bit SBCS is the ISO-8859-5 character set, which includes the Cyrillic characters that are used in Russian and other languages. See also character set.

transcoding
the process of converting the contents of a SAS file from one encoding to another encoding. Transcoding is necessary if the session encoding and the file encoding are

different, such as when transferring data from a Latin 1 encoding under UNIX to a German EBCDIC encoding on an IBM mainframe. See also encoding, translation table.

translation table
a SAS catalog entry that is used for transcoding data from one encoding to another encoding. SAS language elements that control locale values and encoding properties automatically invoke the appropriate translation table. Translation tables are specific to the operating environment. For example, there is a specific translation table that maps the Windows Latin 2 encoding to the ISO Latin 2 encoding. See also encoding, transcoding.

Unicode
a 16-bit encoding that supports the interchange, processing, and display of characters and symbols from dozens of writing systems, for a total of up to 65,536 characters. Unicode includes all characters from most modern written languages as well as characters from some historical languages.

Unicode Consortium
an organization that develops and promotes the Unicode standard. See also Unicode.

Index

Numbers

A

B

C

D

E

F

G

H

I

J

K

L

M

N

O

P

Q

R

S

T

U

V

W

Y

Z

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