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What's New

Overview

- All information that is related to NLS has been consolidated into a single document for your convenience.
- The LOCALE= option supports a new set of locale values in the form of Portable Operating System Interface (POSIX) names.
- The LOCALE= option supports new values that identify unique language and country combinations.
- The LIBNAME statement for Base SAS supports three new options for NLS: CVPBYTES=, CVENGINE=, and CVMULTIPLIER=.
- The LIBNAME statement for the XML engine supports three new options for NLS: ODSCHARSET=, ODSSTRANTAB=, and XMLENCODING=.
- The LIBNAME statement in SAS/SHARE supports the RENCODING= option for NLS.
- Numerous NLS formats, informats, and functions are new. These new language elements are in the following categories: Bi-directional text handling, Date/Time, Monetary, and Unicode.

Note: z/OS is the successor to the OS/390 operating system. SAS 9.1 is supported on both OS/390 and z/OS operating systems and, throughout this document, any reference to z/OS also applies to OS/390, unless otherwise stated.

Details

New Document Consolidates Information about NLS

Expanded Values for the LOCALE= System Option

- Locale can be specified by using Portable Operating System Interface (POSIX) naming standards. For example, the en_US value is the POSIX equivalent for the SAS value English_UnitedStates.

- Previous releases of SAS software specified some LOCALE= values in the form of language. The LOCALE= option supports new values that identify unique language and country combinations that are specified in the form language_country. Some single LOCALE= values have been replaced by more granular values. Some new values have been added, and some values have been deleted. Here is a summary of the changes to LOCALE= values:

  Arabic
  - The single LOCALE= value for Arabic has been deleted. The following new values have been added: Arabic_Algeria, Arabic_Bahrain, Arabic_Egypt, Arabic_Jordan, Arabic_Kuwait, Arabic_Lebanon, Arabic_Morocco, Arabic_Oman, Arabic_Qatar, Arabic_SaudiArabia, Arabic_Tunisia, and Arabic_UnitedArabEmirates.

  Chinese
  - The single LOCALE= value for Chinese has been deleted. The values Chinese_Simplified and Chinese_Traditional have also been deleted.

  Dutch
  - The single LOCALE= value for Dutch has been deleted. The following new values have been added: Dutch_Belgium and Dutch_Netherlands.

  English
  - The single LOCALE= value for English has been deleted. The following new values have been added: English_HongKong, English_India, and English_Singapore. The English_Britain value has been changed to English_UnitedKingdom.

  Estonian_Estonia
  - The LOCALE= value for Estonian_Estonia is new.

  French
  - The single LOCALE= value for French has been deleted. A new value, French_Luxembourg, has been added.

  German
  - The single LOCALE= value for German has been deleted. The following new values have been added: German_Liechtenstein and German_Luxembourg.

  Spanish
  - The LOCALE= values for Spain and Spanish_LatinAmerica have been deleted. The single LOCALE= value for Spanish_LatinAmerica has been replaced by the following new values: Spanish_Argentina, Spanish_Bolivia, Spanish_Chile, Spanish_Columbia, Spanish_CostaRica, Spanish_DominicanRepublic, Spanish_Ecuador, Spanish_ElSalvador, Spanish_Guatemala, Spanish_Honduras, Spanish_Mexico, Spanish_Nicaragua, Spanish_Panama, Spanish_Paraguay, Spanish_Peru, Spanish_PuertoRico, Spanish_UnitedStates, Spanish_Uruguay, and Spanish_Venezuela.

  For a comprehensive list, see Chapter 21, “Values for the LOCALE= System Option,” on page 397.
New Options in LIBNAME Statements for NLS

- The LIBNAME statement in Base SAS supports the following new options for NLS:
  - CVPBYTES=, CVPENGINE=, and CVPMULTIPLIER=
    specify the attributes for character variables that are needed in order to process (or transcode) a SAS file.
- The LIBNAME statement for the XML engine supports the following new options for NLS:
  - ODSCHARSET=
    specifies the character set to be generated in the META declaration for the output.
  - ODSTRANTAB=
    specifies the translation table to use when transcoding an XML document for an output file.
  - XMLENCODING=
    specifies the encoding to use when reading, writing, copying, or saving an external file.
- The LIBNAME statement in SAS/SHARE supports the following new option for NLS:
  - RENCODING=
    specifies that the ASCII-based or EBCDIC-based encoding be used when transcoding data for a SAS/SHARE server session that is using an ASCIIANY or an EBCDICANY session encoding.

Formats for NLS

The following formats for NLS are new:

- $CPTDWw.
  writes a character string in Hebrew text that is encoded in IBM-PC (cp862) to Windows Hebrew encoding (cp1255).
- $CPTWDw.
  writes a character string that is encoded in Windows (cp1255) to Hebrew DOS (cp862) encoding.
- HDATEw.
  writes date values in the form yyyy mmmm dd where yyyy is the year, mmmm represents the month’s name in Hebrew, and dd is the day of month.
- HEBDATEw.
  writes date values according to the Jewish calendar.
- $LOGVSw.
  writes a character string that is in left-to-right logical order to visual order.
- $LOGVSRw.
  writes a character string that is in right-to-left logical order to visual order.
- NLDATEw.
  converts a SAS date value to the date value of the specified locale, and then writes the value in the format of the date value.
NLDATEMNWw.
  converts a SAS date value to the date value of the specified locale, and then
  writes the date value in the format of the name of the month.

NLDATENWw.
  converts a SAS date value to the date value of the specified locale, and then
  writes the date value in the format of the date and the day of the week.

NLDATENWw.
  converts the SAS date value to the date value of the specified locale, and then
  writes the date value in the format of the name of the day of the week.

NLDATMw.
  converts a SAS datetime value to the datetime value of the specified locale,
  and then writes the value in the format of the datetime.

NLDATMAPw.
  converts a SAS datetime value to the datetime value of the specified locale,
  and then writes the value in the format of the datetime with a.m. or p.m.

NLDATMTMw.
  converts the time portion of a SAS datetime value to the time-of-day value of
  the specified locale, and then writes the value in the format of the time of the
  day.

NLDATMWWw.
  converts a SAS date value to a datetime value of the specified locale, and
  then writes the value in the format of day of the week and the datetime.

NLMNYw.d
  writes the monetary format of the local expression in the specified locale
  using local currency.

NLMNYIw.d
  writes the monetary format of the international expression in the specified
  locale.

NLNUMw.d
  writes the numeric format of the local expression in the specified locale.

NLNUMIw.d
  writes the numeric format of the international expression in the specified
  locale.

NLPCTw.d
  writes percentage data of the local expression in the specified locale.

NLPCTIw.d
  writes percentage data of the international expression in the specified locale.

NLTIMAPw.
  converts a SAS time value to the time value of a specified locale, and then
  writes the value in the format of the time with a.m. or p.m.

NLTIMEw.
  converts a SAS time value to the time value of the specified locale, and then
  writes the value in the format of the time.

$UCS2Bw.
  writes a character string in big-endian, 16-bit, universal character set code in
  2 octets (UCS2), Unicode encoding.
$UCS2BEw.
writes a big-endian, 16-bit, universal character set code in 2 octets (UCS2), character string in the encoding of the current SAS session.

$UCS2Lw.
writes data in little-endian, 16-bit, universal character set code in 2 octets (UCS2), Unicode encoding.

$UCS2LEw.
writes a character string that is encoded in little-endian, 16-bit, universal character set code in 2 octets (UCS2), in the encoding of the current SAS session.

$UCS2Xw.
writes a character string in native-endian, 16-bit, universal character set code in 2 octets (UCS2), Unicode encoding.

$UCS4Bw.
writes a character string in big-endian, 32-bit, universal character set code in 4 octets (UCS4), Unicode encoding.

$UCS4BEw.
writes a big-endian, 32-bit, universal character set code in 4 octets (UCS4), character string in the encoding of the current SAS session.

$UCS4Lw.
writes a character string in little-endian, 32-bit, universal character set code in 4 octets (UCS4), Unicode encoding.

$UCS4LEw.
writes a little-endian, 32-bit, universal character set code in 4 octets (UCS4), character string in the encoding of the current SAS session.

$UCS4Xw.
writes a character string in native-endian, 32-bit, universal character set code in 4 octets (UCS4), Unicode encoding.

$UCS4XEw.
writes a native-endian, 32-bit, universal character set code in 4 octets (UCS4), character string in the encoding of the current SAS session.

$UESCw.
writes a character string that is encoded in the current SAS session in Unicode escape (UESC) representation.

$UESCEw.
writes a Unicode escape (UESC) representation character string in the encoding of the current SAS session.

$UNCRw.
writes a character string that is encoded in the current SAS session in numeric character representation (NCR).

$UNCREw.
writes the numeric character representation (NCR) character string in the encoding of the current SAS session.
$UPARENw.
writes a character string that is encoded in the current SAS session in Unicode parenthesis (UPAREN) representation.

$UPARENw.
writes a Unicode parenthesis (UPAREN) character string in the encoding of the current SAS session.

$UTF8Xw.
writes a character string in universal transformation format (UTF-8) encoding.

$VSLOGw.
writes a character string that is in visual order to left-to-right logical order.

$VSLOGRw.
writes a character string that is in visual order to right-to-left logical order.

WEEKUw.
writes a week number in decimal format by using the U algorithm.

WEEKVw.
writes a week number in decimal format by using the V algorithm.

WEEKWw.
writes a week number in decimal format by using the W algorithm.

Informats for NLS

The following informats for NLS are new:

$CPTDWw.
reads a character string that is encoded in Hebrew DOS (cp862) and then converts the character string to Windows (cp1255) encoding.

$CPTWDw.
reads a character string that is encoded in Windows (cp1255) and then converts the character string to Hebrew DOS (cp862) encoding.

$LOGVSw.
reads a character string that is in left-to-right logical order and then converts the character string to visual order.

$LOGVSRw.
reads a character string that is in right-to-left logical order and then converts the character string to visual order.

NLMNYw.d
reads monetary data in the specified locale for the local expression, and then converts the data to a numeric value.

NLMNYIw.d
reads monetary data in the specified locale for the international expression, and then converts the data to a numeric value.

NLNUMw.d
reads numeric data in the specified locale for local expressions, and then converts the data to a numeric value.

NLNUMIw.d
reads numeric data in the specified locale for international expressions, and then converts the data to a numeric value.
NLPCTw.d
reads percentage data in the specified locale for local expressions, and then converts the data to a numeric value.

NLPCTIw.d
reads percentage data in the specified locale for international expressions, and then converts the data to a numeric value.

$UCS2Bw.
reads a character string that is encoded in big-endian, 16-bit, universal character set code in 2 octets (UCS2), Unicode encoding, and then converts the character string to the encoding of the current SAS session.

$UCS2BEw.
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, universal character set code in 2 octets (UCS2), Unicode encoding.

$UCS2Lw.
reads a character string that is encoded in little-endian, 16-bit, universal character set code in 2 octets (UCS2), Unicode encoding, and then converts the character string to the encoding of the current SAS session.

$UCS2LEw.
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, universal character set code in 2 octets (UCS2), Unicode encoding.

$UCS2Xw.
reads a character string that is encoded in 16-bit, universal character set code in 2 octets (UCS2), Unicode encoding, and then converts the character string to the encoding of the current SAS session.

$UCS2XEw.
reads a character string that is in the encoding of the current SAS session and then converts the character string to 16-bit, universal character set code in 2 octets (UCS2), Unicode encoding.

$UCS4Bw.
reads a character string that is encoded in big-endian, 32-bit, universal character set code in 4 octets (UCS4), Unicode encoding, and then converts the character string to the encoding of the current SAS session.

$UCS4Lw
reads a character string that is encoded in little-endian, 32-bit, universal character set code in 4 octets (UCS4), Unicode encoding, and then converts the character string to the encoding of the current SAS session.

$UCS4Xw.
reads a character string that is encoded in 32-bit, universal character set code in 4 octets (UCS4), Unicode encoding, and then converts the character string to the encoding of the current SAS session.

$UCS4XEw.
reads a character string that is in the encoding of the current SAS session and then converts the character string to 32-bit, universal character set code in 4 octets (UCS4), Unicode encoding.

$UESCw.
reads a character string that is encoded in Unicode escape (UESC) representation, and then converts the character string to the encoding of the current SAS session.
$UESCEw.
reads a character string that is encoded in the current SAS session, and then converts the character string to Unicode escape (UESC) representation.

$UNCRw.
reads the numeric character representation (NCR) character string, and then converts the character string to the encoding of the current SAS session.

$UNCREw.
reads a character string in the encoding of the current SAS session, and then converts the character string to session-encoded numeric character representation (NCR).

$UPARENw.
reads a character string that is encoded in Unicode parenthesis (UPAREN) representation, and then converts the character string to the encoding of the current SAS session.

$UNCPARENEw.
reads a character string that is encoded in the current SAS session, and then converts the character string to the encoding of the Unicode parenthesis (UPAREN) representation.

$UPARENPw.
reads a character string that is encoded in Unicode parenthesis (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.

$UTF8Xw.
reads a character string that is encoded in Unicode transformation format (UTF-8), and then converts the character string to the encoding of the current SAS session.

$VSLOGw.
reads a character string that is in visual order and then converts the character string to left-to-right logical order.

$VSLOGRw.
reads a character string that is in visual order and then converts the character string to right-to-left logical order.

WEEKUw.
reads the format of the number-of-week value within the year and returns a SAS date value by using the U algorithm.

WEEKVw.
reads the format of the number-of-week value within the year and returns a SAS date value using the V algorithm.

WEEKWw.
reads the format of the number-of-week value within the year and returns a SAS date value using the W algorithm.

---

Functions for NLS

The following functions for NLS are new:

NLDATE
converts the SAS date value to the date value of the specified locale by using the date-format modifiers.
NLDATM
  converts the SAS datetime values to the time value of the specified locale using the datetime-format modifiers.

NLTIME
  converts the SAS time or datetime value to the time value of the specified locale using the time-format modifiers.

TRANTAB
  transcodes a data string by using a translation table.

VARTRANSCODE
  returns the transcode attribute of a SAS data set variable.

VTRANSCODE
  returns a value that indicates whether transcoding is enabled for the specified character variable.

VTRANSCODEX
  returns a value that indicates whether transcoding is enabled for the specified argument.

WEEK
  returns the week-number value.
PART 1

NLS Concepts

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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 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 employ 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.
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 may 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 may be represented as a number or as a name. The name may be fully spelled or abbreviated. The order of the month, day, and year may 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: 3.10.2002
- 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 may 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:

```plaintext
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 21, “Values for the LOCALE= System Option,” on page 397.

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:

```plaintext
options 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 349.
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.

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 “System Options for NLS by Category” on page 347.

Interaction between the `LOCALE=` and `ENCODING=` System Options

Most users will implicitly set encoding by using the `LOCALE=` system option. Here is how `LOCALE=` and `ENCODING=` interact:

- Setting the `LOCALE=` option implicitly sets the value for the `ENCODING=` option only at SAS invocation.

  Note: The `LOCALE=` setting can be changed during a SAS session, but `ENCODING=` cannot be changed during a SAS session. If `LOCALE=` is changed during a session, `ENCODING=` is not affected.

- Setting the `LOCALE=` option implicitly assigns a default value to each of the following options, unless an explicit value is set for a specific option:

  - `DATESTYLE=`
  - `DFLANG=`
  - `PAPERSIZE=`
  - `ENCODING=`
  - `TRANTAB=`
Note: Values for ENCODING= and TRANTAB= can be reset only at SAS invocation.

- If LOCALE= and ENCODING= are both set, ENCODING= will override and set the session encoding.
- If DBCS (which specifies that SAS process DBCS encodings) is set, the following options to identify locale and session encoding are also implicitly set:
  - DBCSLANG=
  - DBCSTYPE=

  The DBCS option settings would override LOCALE=.

Example 1:
When the Spanish_Spain locale is specified under windows, the implicit default encoding value is Windows Latin1 (wlatin1).

```
sas9 -locale spanish_spain
```

Example 2:
The explicit encoding value of Pcoem850 overrides the implicit default encoding value of Windows Latin1 (wlatin1) for the Spanish_Spain locale.

```
sas9 -locale spanish_spain -encoding pcoem850;
```

For details about these system options, see “System Options for NLS by Category” on page 347.
Overview of 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.
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 (273).

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

<table>
<thead>
<tr>
<th>HEX DIGITS</th>
<th>4-</th>
<th>5-</th>
<th>6-</th>
<th>7-</th>
<th>8-</th>
<th>9-</th>
<th>A-</th>
<th>B-</th>
<th>C-</th>
<th>D-</th>
<th>E-</th>
<th>F-</th>
</tr>
</thead>
<tbody>
<tr>
<td>1ST</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2ND</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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. 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 21.

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, see “Locale Values and Encoding Values for SBCS, DBCS, and Unicode” on page 400.

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, see Chapter 22, “SAS System Options for Processing DBCS Data,” on page 405.

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 14. 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 black 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 ISO Latin1.

Unicode provides up to 65,536 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 four 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

<table>
<thead>
<tr>
<th>ISO Standard</th>
<th>Name of Encoding</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISO 8859-1</td>
<td>Latin 1</td>
<td>US and West European</td>
</tr>
<tr>
<td>ISO 8859-2</td>
<td>Latin 2</td>
<td>Central and East European</td>
</tr>
<tr>
<td>ISO 8859-3</td>
<td>Latin 3</td>
<td>South European, Maltese and Esperanto</td>
</tr>
<tr>
<td>ISO 8859-4</td>
<td>Baltic</td>
<td>North European</td>
</tr>
<tr>
<td>ISO 8859-5</td>
<td>Cyrillic</td>
<td>Slavic languages</td>
</tr>
<tr>
<td>ISO 8859-6</td>
<td>Arabic</td>
<td>Arabic</td>
</tr>
<tr>
<td>ISO 8859-7</td>
<td>Greek</td>
<td>Modern Greek</td>
</tr>
<tr>
<td>ISO 8859-8</td>
<td>Hebrew</td>
<td>Hebrew and Yiddish</td>
</tr>
<tr>
<td>ISO 8859-9</td>
<td>Turkish</td>
<td>Turkish</td>
</tr>
<tr>
<td>ISO 8859-10</td>
<td>Latin 6</td>
<td>Nordic (Inuit, Sámi, Icelandic)</td>
</tr>
<tr>
<td>ISO 8859-11</td>
<td>Latin/Thai</td>
<td>Thai</td>
</tr>
<tr>
<td>ISO 8859-12</td>
<td>undefined</td>
<td></td>
</tr>
<tr>
<td>ISO 8859-13</td>
<td>Latin 7</td>
<td>Baltic Rim</td>
</tr>
<tr>
<td>ISO 8859-14</td>
<td>Latin 8</td>
<td>Celtic</td>
</tr>
<tr>
<td>ISO 8859-15</td>
<td>Latin 9</td>
<td>West European and Albanian</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Standard</th>
<th>Name of Encoding</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>GB 2312-80</td>
<td>Simplified Chinese</td>
<td>People’s Republic of China</td>
</tr>
<tr>
<td>CNS 11643</td>
<td>Traditional Chinese</td>
<td>Taiwan</td>
</tr>
<tr>
<td>Big-5</td>
<td>Traditional Chinese</td>
<td>Taiwan</td>
</tr>
<tr>
<td>KS C 5601</td>
<td>Korean National Standard</td>
<td>Korea</td>
</tr>
<tr>
<td>JIS</td>
<td>Japan Industry Standard</td>
<td>Japan</td>
</tr>
<tr>
<td>Shift-JIS</td>
<td>Japan Industry Standard</td>
<td>multibyte encoding</td>
</tr>
</tbody>
</table>

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>
<thead>
<tr>
<th>EBCDIC Code Points</th>
<th>U.S. English</th>
<th>Finnish</th>
<th>Spanish</th>
<th>German</th>
</tr>
</thead>
<tbody>
<tr>
<td>4A</td>
<td>€</td>
<td>$</td>
<td>[</td>
<td>Å</td>
</tr>
<tr>
<td>4F</td>
<td></td>
<td>!</td>
<td></td>
<td>!</td>
</tr>
<tr>
<td>5A</td>
<td>!</td>
<td>☐</td>
<td>]</td>
<td>Ü</td>
</tr>
<tr>
<td>5B</td>
<td>$</td>
<td>Å</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>5F</td>
<td>¬</td>
<td>^</td>
<td>¬</td>
<td>^</td>
</tr>
<tr>
<td>6A</td>
<td>;</td>
<td>ö</td>
<td>ñ</td>
<td>ö</td>
</tr>
<tr>
<td>79</td>
<td>‘</td>
<td>‘</td>
<td>‘</td>
<td>‘</td>
</tr>
<tr>
<td>7B</td>
<td>#</td>
<td>Å</td>
<td>Ñ</td>
<td>#</td>
</tr>
<tr>
<td>7C</td>
<td>@</td>
<td>Ö</td>
<td>@</td>
<td>$</td>
</tr>
<tr>
<td>A1</td>
<td>~</td>
<td>ü</td>
<td>“</td>
<td>ß</td>
</tr>
<tr>
<td>C0</td>
<td>{</td>
<td>ä</td>
<td>{</td>
<td>ä</td>
</tr>
<tr>
<td>D0</td>
<td>}</td>
<td>à</td>
<td>}</td>
<td>ü</td>
</tr>
<tr>
<td>E0</td>
<td>\</td>
<td>È</td>
<td>\</td>
<td>Ö</td>
</tr>
</tbody>
</table>

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 $.
Collation Sequence

A major effect of the session encoding is the collation sequence (or sorting sequence) that is used to perform alphanumeric sorting operations (such as the SORT procedure). Sort order corresponds directly to the arrangement of the code points in the code page. The two single-byte character-encoding systems that are most widely used in data processing are ASCII and EBCDIC. OpenVMS, UNIX, and Windows operating environments use ASCII, and IBM mainframe computers use EBCDIC.

The collation sequence that you use corresponds to your session encoding, by default. However, when using the SORT procedure, you can override your session's default encoding collation sequence and specify an explicit collation sequence.

The following SAS language elements support a collation sequence:

- SORT statement in the SORT procedure (see “Collation Sequence Option” on page 370)
- SORTSEQ= data set option (see “SORTSEQ= Data Set Option” on page 42)
- SORTSEQ= system option (see “SORTSEQ= Data Set Option” on page 42)

You can also select sort sequences by using the VIEWTABLE Window. In the VIEWTABLE Window, you can select from the sort sequences that are listed under the Advanced tab of the Sort dialog box. For details about viewing and editing SAS data sets, see SAS Language Reference: Concepts.

The collation sequence that you use corresponds to your session encoding, by default. However, when using the SORT procedure, you can override your session's default encoding collation sequence and specify an explicit collation sequence. Standard collation sequences include:

- ASCII
- EBCDIC
- Danish
- Finnish
- Italian
- Norwegian
- Polish
- Spanish
- Swedish

By viewing the contents of a sort translation table, you can determine the collation sequence because the sort trantabs contain the weight that is assigned to each character. You can use the following statement to view the trantab contents:

```sas
proc trantab table=table-name;
   list;
run;
```

The contents of the collation sequence are displayed in the SAS log.

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:

```sas
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

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

The CONTENTS Procedure

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

Engine/Host Dependent Information

<table>
<thead>
<tr>
<th>Data Set Page Size</th>
<th>4096</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Data Set Pages</td>
<td>1</td>
</tr>
<tr>
<td>First Data Page</td>
<td>1</td>
</tr>
<tr>
<td>Max Obs per Page</td>
<td>126</td>
</tr>
<tr>
<td>Obs in First Data Page</td>
<td>1</td>
</tr>
<tr>
<td>Number of Data Set Repairs</td>
<td>0</td>
</tr>
<tr>
<td>File Name</td>
<td>C:\TEMP\SAS Temporary Files_TD228\grades.sas7bdat</td>
</tr>
<tr>
<td>Release Created</td>
<td>9.0000M0</td>
</tr>
<tr>
<td>Host Created</td>
<td>WINNT</td>
</tr>
</tbody>
</table>

Alphabetic List of Variables and Attributes

<table>
<thead>
<tr>
<th>#</th>
<th>Variable</th>
<th>Type</th>
<th>Len</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>final</td>
<td>Num</td>
<td>8</td>
</tr>
<tr>
<td>1</td>
<td>student</td>
<td>Char</td>
<td>8</td>
</tr>
<tr>
<td>2</td>
<td>test1</td>
<td>Num</td>
<td>8</td>
</tr>
<tr>
<td>3</td>
<td>test2</td>
<td>Num</td>
<td>8</td>
</tr>
</tbody>
</table>
```

### 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.
5 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 3.4 Default SAS Session Encoding Values

<table>
<thead>
<tr>
<th>Operating Environment</th>
<th>Default ENCODING= Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>OpenVMS Alpha</td>
<td>Latin1</td>
<td>Western (ISO)</td>
</tr>
<tr>
<td>z/OS</td>
<td>OPEN_ED_1047</td>
<td>OpenEdition EBCDIC</td>
</tr>
<tr>
<td></td>
<td>cp1047-Latin1</td>
<td></td>
</tr>
<tr>
<td>UNIX</td>
<td>Latin1</td>
<td>Western (ISO)</td>
</tr>
<tr>
<td>Windows</td>
<td>WLatin1</td>
<td>Western (Windows)</td>
</tr>
</tbody>
</table>

For a complete list of supported encoding values for a SAS session, see “Locale Values and Encoding Values for SBCS, DBCS, and Unicode” on page 400.

Setting the Encoding of a SAS Session

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

Note: Valid values only for ENCODING= are dependent on the operating environment used.

- If ENCODING= is specified, the TRANTAB= option is implicitly set.
- If both LOCALE= and ENCODING= are set, ENCODING= will set the session encoding.
- If DBCS (which specifies that SAS process DBCS encodings) is set, the following options to identify locale and session encoding are also implicitly set:
  - DBCSLANG=
  - DBCSTYPE=.

  These options are used for East Asian languages or for English with DBCS extensions.

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

    sas9 -locale Spanish_Spain

    The wlatin1 encoding is the default encoding for the Spanish_Spain locale.
The following example shows that wlatin2 encoding is set explicitly at SAS invocation.

```bash
sas9 -encoding wlatin2
```

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

---

### 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.
- Data sets that are created in SAS 7 and SAS 8 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.
- 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 360.

### 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 23.
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 23, “Encoding Values in SAS Language Elements,” on page 407.

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 trantab values in the TRANTAB= option. Trantabs are used for transcoding one SBCS encoding to another and back again. For example, there is a specific trantab that maps Windows Latin2 to ISO Latin2.

The following figure shows a translation table. The area of a trantab 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](image)

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: OpenVMS, UNIX, Windows, and z/OS” on page 362. The TRANTAB procedure is used to create, edit, and display customized translation tables. For details, see Chapter 15, “The TRANTAB Procedure,” on page 319.

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

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

For complete details about these language elements, see Chapter 18, “Overview to NLS Options Used in Commands, Statements, and Procedures,” on page 367. For a list of supported encoding values to use for these options, see “SBCS, DBCS, and Unicode Encoding Values for Transcoding Data” on page 407.

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

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

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 possess 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. If a
  character variable contains binary data, transcoding might corrupt the data.
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 24, “Encoding Values for a SAS Session,” on page 413.

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 new-line 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 24, “Encoding Values for a SAS Session,” on page 413.
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 39 and “INENCODING= and OUTENCODING= Options” on page 381.
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 may 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:

```sas
/*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 “Locale Values and Encoding Values for SBCS, DBCS, and Unicode” on page 400.

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
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.

<table>
<thead>
<tr>
<th>Language Element</th>
<th>Type</th>
<th>Use</th>
<th>See</th>
</tr>
</thead>
<tbody>
<tr>
<td>KCVT</td>
<td>function</td>
<td>Converts DBCS data from one operating environment to another</td>
<td>“KCVT Function” on page 214</td>
</tr>
<tr>
<td>CPORT</td>
<td>procedure</td>
<td>Moves files from one environment to another</td>
<td><em>Base SAS Procedures Guide</em></td>
</tr>
<tr>
<td>CIMPORT</td>
<td>procedure</td>
<td>Imports a transport file created by CPORT</td>
<td><em>Base SAS Procedures Guide</em></td>
</tr>
</tbody>
</table>
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 employ 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 may 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). A 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 prior to 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, then 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

Data Set Options for NLS

Chapter 6 . . . . . . . . . . . . . Overview to Data Set Options for NLS 37

Chapter 7 . . . . . . . . . . . . . Data Set Options for NLS 39
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>
<thead>
<tr>
<th>Category</th>
<th>Data Set Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data Set Control</td>
<td>“ENCODING= Data Set Option” on page 39</td>
<td>Overrides the encoding to use for reading or writing a SAS data set</td>
</tr>
<tr>
<td></td>
<td>“OUTREP= Data Set Option” on page 41</td>
<td>Specifies the data representation for the output SAS data set</td>
</tr>
<tr>
<td></td>
<td>“SORTSEQ= Data Set Option” on page 42</td>
<td>Specifies a language-specific collation sequence for the SORT procedure to use for the specified SAS data set</td>
</tr>
</tbody>
</table>
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 “Locale Values and Encoding Values for SBCS, DBCS, and Unicode” on page 400.

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 will inherit 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 will use the encoding of the current session.

**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 data 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, you will see correct Latin1 characters in a Latin1 session encoding and correct Latin2 characters in a Latin2 session encoding.

```sas
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 might be necessary, for example, if the normal access to the file will use 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.

```sas
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.

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

**See Also**

- Conceptual discussion in Chapter 3, “Encoding for NLS,” on page 9
- Data Set Options:
  - “SORTSEQ= Data Set Option” on page 42
- Options in Statements and Commands:
  - “ENCODING= Option” on page 378
  - “INENCODING= and OUTENCODING= Options” on page 381
- System Options:
  - “ENCODING System Option: OpenVMS, UNIX, Windows, and z/OS” on page 354
  - “LOCALE System Option: OpenVMS, UNIX, Windows, and z/OS” on page 358

---

**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
SORTSEQ= Data Set Option

Specifies a language-specific collation sequence that the SORT procedure uses for the specified SAS data set.

Valid in: DATA step and PROC steps

Category: Data Set Control

Syntax

\[ \text{SORTSEQ} = \text{collation-sequence} \]

Syntax Description

\[ \text{collation-sequence} \]

specifies the collation sequence that the SORT procedure uses for the specified SAS data set. 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

If you want to create or change a collation 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 collation 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. Collation sequences are entries of the type TRANTAB.

```plaintext
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 collation sequences are displayed in the SAS log.

See Also

System Options:
   “SORTSEQ= System Option: OpenVMS, UNIX, Windows, and z/OS” on page 361
   “TRANTAB= System Option: OpenVMS, UNIX, Windows, and z/OS” on page 362
PART 3

Formats for NLS

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Chapter 9............. Formats for NLS  63
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 8.1  International Date and Datetime Formats

<table>
<thead>
<tr>
<th>Language</th>
<th>English Format</th>
<th>International Format</th>
<th>Min</th>
<th>Max</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>Afrikaans (AFR)</td>
<td>DATE.</td>
<td>EURDFDE.</td>
<td>5</td>
<td>9</td>
<td>7</td>
</tr>
<tr>
<td>DATETIME.</td>
<td>EURDFDT.</td>
<td>7</td>
<td>40</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>DDMMYY.</td>
<td>EURDFDD.</td>
<td>2</td>
<td>10</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>DOWNAME.</td>
<td>EURDFDWN.</td>
<td>1</td>
<td>32</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>MONNAME.</td>
<td>EURDFMN.</td>
<td>1</td>
<td>32</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>MONYY.</td>
<td>EURDFMY.</td>
<td>5</td>
<td>7</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>WEEKDATX.</td>
<td>EURDFWK.</td>
<td>2</td>
<td>38</td>
<td>28</td>
<td></td>
</tr>
<tr>
<td>WEEKDAY.</td>
<td>EURDFDN.</td>
<td>1</td>
<td>32</td>
<td>1</td>
<td></td>
</tr>
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</table>
### 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 that begin with EURFR converts specific European currencies to an amount in euros. The set of formats that begin with EURTO converts an amount in euros to an amount in a specific European currency. The EUROCURR function also converts one European currency to an amount in another currency.

<table>
<thead>
<tr>
<th>Language</th>
<th>English Format</th>
<th>International Format</th>
<th>Min</th>
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<th>Default</th>
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<td>18</td>
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</tbody>
</table>
The default value of the euro symbol is €. The euro symbol precedes the amount with the EUROW.d, and EUROXW.d formats.

Conversion Rate Tables

The conversion rates for the first eleven countries to agree to euro conversion were established on January 1, 1999. Greece joined the EMU (European Monetary Union) on January 1, 2001 and the conversion of Greek drachmas to euros was established at that time. These rates are fixed, and are incorporated into the EURFR and EURTO formats, and into the EUROCURRE function. The following table lists the currency codes and conversion rates for the specific currencies whose rates are fixed.

Note: Add the currency code to EURFR and EURTO to create the format that you need to use. For example, the EURFRATS format converts an amount from Austrian schillings to euros.

Table 8.2 Fixed Currency Conversion Rates

<table>
<thead>
<tr>
<th>Currency code</th>
<th>Conversion rate</th>
<th>Currency</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATS</td>
<td>13.7603</td>
<td>Austrian schilling</td>
</tr>
<tr>
<td>BEF</td>
<td>40.3399</td>
<td>Belgian franc</td>
</tr>
<tr>
<td>DEM</td>
<td>1.95583</td>
<td>Deutsche mark</td>
</tr>
<tr>
<td>ESP</td>
<td>166.386</td>
<td>Spanish peseta</td>
</tr>
<tr>
<td>EUR</td>
<td>1</td>
<td>Euro</td>
</tr>
<tr>
<td>FIM</td>
<td>5.94573</td>
<td>Finnish markka</td>
</tr>
<tr>
<td>FRF</td>
<td>6.55957</td>
<td>French franc</td>
</tr>
<tr>
<td>GRD</td>
<td>340.750</td>
<td>Greek drachma</td>
</tr>
<tr>
<td>IEP</td>
<td>0.787564</td>
<td>Irish pound</td>
</tr>
<tr>
<td>ITL</td>
<td>1936.27</td>
<td>Italian lira</td>
</tr>
<tr>
<td>LUF</td>
<td>40.3399</td>
<td>Luxembourg franc</td>
</tr>
<tr>
<td>NLG</td>
<td>2.20371</td>
<td>Dutch guilder</td>
</tr>
<tr>
<td>PTE</td>
<td>200.482</td>
<td>Portuguese escudo</td>
</tr>
</tbody>
</table>

For other countries, 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 specific currencies whose rates are changeable.

Table 8.3 Changeable Currency Conversion Rates

<table>
<thead>
<tr>
<th>Currency code</th>
<th>Conversion rate</th>
<th>Currency</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHF</td>
<td>1.60430</td>
<td>Swiss franc</td>
</tr>
<tr>
<td>CZK</td>
<td>34.8563</td>
<td>Czech koruna</td>
</tr>
<tr>
<td>DKK</td>
<td>7.49009</td>
<td>Danish krone</td>
</tr>
<tr>
<td>GBP</td>
<td>0.700132</td>
<td>British pound</td>
</tr>
<tr>
<td>Currency code</td>
<td>Conversion rate</td>
<td>Currency</td>
</tr>
<tr>
<td>--------------</td>
<td>-----------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>HUF</td>
<td>260.325</td>
<td>Hungarian forint</td>
</tr>
<tr>
<td>NOK</td>
<td>9.19770</td>
<td>Norwegian krone</td>
</tr>
<tr>
<td>PLZ</td>
<td>4.2</td>
<td>Polish zloty</td>
</tr>
<tr>
<td>ROL</td>
<td>13.71</td>
<td>Romanian leu</td>
</tr>
<tr>
<td>RUR</td>
<td>19.7680</td>
<td>Russian ruble</td>
</tr>
<tr>
<td>SEK</td>
<td>9.36591</td>
<td>Swedish krona</td>
</tr>
<tr>
<td>SIT</td>
<td>191</td>
<td>Slovenian tolar</td>
</tr>
<tr>
<td>TRL</td>
<td>336.912</td>
<td>Turkish lira</td>
</tr>
<tr>
<td>YUD</td>
<td>13.0644</td>
<td>Yugoslavian dinar</td>
</tr>
</tbody>
</table>

**Methods for Converting from One European Currency to Another European Currency**

The EUROCURR function uses the conversion rate tables to convert between currencies. If you are converting from one country’s currency to euros, SAS divides the country’s currency amount by that country’s rate from one of the conversion rate tables. If you are converting from euros to a country’s currency, SAS multiplies the country’s currency amount by that country’s rate from one of the conversion rate tables. If you are converting one country’s currency to another country’s currency, SAS first converts the amount you want to convert to euros. SAS stores the intermediate value as precisely 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.

**Formats for NLS by Category**

The following categories relate to NLS issues:

**Table 8.4 Categories of NLS Formats**

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

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>
<thead>
<tr>
<th>Category</th>
<th>Formats for NLS</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIDI text handling</td>
<td>&quot;$\text{BIDI}w.\ Format&quot; on page 65</td>
<td>Converts a logically ordered string to a visually ordered string, and vice versa by reversing the order of Hebrew characters while preserving the order of Latin words and numbers</td>
</tr>
<tr>
<td></td>
<td>&quot;$\text{LOGVS}w.\ Format&quot; on page 151</td>
<td>Processes a character string that is in left-to-right-logical order, and then writes the character string in visual order</td>
</tr>
<tr>
<td></td>
<td>&quot;$\text{LOGVSR}w.\ Format&quot; on page 152</td>
<td>Processes a character string that is in right-to-left-logical order, and then writes the character string in visual order</td>
</tr>
<tr>
<td></td>
<td>&quot;$\text{VSLOG}w.\ Format&quot; on page 196</td>
<td>Processes a character string that is in visual order, and then writes the character string in left-to-right logical order</td>
</tr>
<tr>
<td></td>
<td>&quot;$\text{VSLOGR}w.\ Format&quot; on page 197</td>
<td>Processes a character string that is in visual order, and then writes the character string in right-to-left logical order</td>
</tr>
<tr>
<td>Character</td>
<td>&quot;$\text{UCS2B}w.\ Format&quot; on page 174</td>
<td>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</td>
</tr>
<tr>
<td></td>
<td>&quot;$\text{UCS2BE}w.\ Format&quot; on page 175</td>
<td>Processes a character string that is in big-endian, 16-bit, UCS2, Unicode encoding, and then writes the character string in the encoding of the current SAS session</td>
</tr>
<tr>
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<td>&quot;$\text{UCS2L}w.\ Format&quot; on page 176</td>
<td>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</td>
</tr>
<tr>
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<td>&quot;$\text{UCS2LE}w.\ Format&quot; on page 177</td>
<td>Processes a character string that is in little-endian, 16-bit, UCS2, Unicode encoding, and then writes the character string in the encoding of the current SAS session</td>
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<tr>
<td></td>
<td>&quot;$\text{UCS2X}w.\ Format&quot; on page 178</td>
<td>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</td>
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<tr>
<td></td>
<td>&quot;$\text{UCS2XE}w.\ Format&quot; on page 180</td>
<td>Processes a character string that is in native-endian, 16-bit, UCS2, Unicode encoding, and then writes the character string in the encoding of the current SAS session</td>
</tr>
<tr>
<td></td>
<td>&quot;$\text{UCS4B}w.\ Format&quot; on page 181</td>
<td>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</td>
</tr>
<tr>
<td></td>
<td>&quot;$\text{UCS4BE}w.\ Format&quot; on page 182</td>
<td>Processes a character string that is in big-endian, 32-bit, UCS4, Unicode encoding, and then writes the character string in the encoding of the current SAS session</td>
</tr>
<tr>
<td></td>
<td>&quot;$\text{UCS4L}w.\ Format&quot; on page 183</td>
<td>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</td>
</tr>
</tbody>
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## Formats for NLS by Category

<table>
<thead>
<tr>
<th>Category</th>
<th>Formats for NLS</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>$UCS4LEw. Format</strong> on page 184</td>
<td>Processes a character string that is in little-endian, 32-bit, UCS4, Unicode encoding, and then writes the character string in the encoding of the current SAS session</td>
</tr>
<tr>
<td></td>
<td><strong>$UCS4Xw. Format</strong> on page 186</td>
<td>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</td>
</tr>
<tr>
<td></td>
<td><strong>$UCS4XEw. Format</strong> on page 187</td>
<td>Processes a character string that is in native-endian, 32-bit, UCS4, Unicode encoding, and then writes the character string in the encoding of the current SAS session</td>
</tr>
<tr>
<td></td>
<td><strong>$UESCw. Format</strong> on page 188</td>
<td>Processes a character string that is encoded in the current SAS session, and then writes the character string in Unicode escape (UESC) representation</td>
</tr>
<tr>
<td></td>
<td><strong>$UESCEw. Format</strong> on page 189</td>
<td>Processes a character string that is in Unicode escape (UESC) representation, and then writes the character string in the encoding of the current SAS session</td>
</tr>
<tr>
<td></td>
<td><strong>$UNCRw. Format</strong> on page 190</td>
<td>Processes a character string that is encoded in the current SAS session, and then writes the character string in numeric character representation (NCR)</td>
</tr>
<tr>
<td></td>
<td><strong>$UNCREw. Format</strong> on page 191</td>
<td>Processes a character string that is in numeric character representation (NCR), and then writes the character string in the encoding of the current SAS session</td>
</tr>
<tr>
<td></td>
<td><strong>$UPARENw. Format</strong> on page 192</td>
<td>Processes a character string that is encoded in the current SAS session, and then writes the character string in Unicode parenthesis (UPAREN) representation</td>
</tr>
<tr>
<td></td>
<td><strong>$UPARENEw. Format</strong> on page 194</td>
<td>Processes a character string that is in Unicode parenthesis (UPAREN), and then writes the character string in the encoding of the current SAS session</td>
</tr>
<tr>
<td>Currency Conversion</td>
<td><strong>EURFRATSw.d Format</strong> on page 86</td>
<td>Converts an amount from Austrian schillings to euros</td>
</tr>
<tr>
<td></td>
<td><strong>EURFRBFew.d Format</strong> on page 87</td>
<td>Converts an amount from Belgian francs to euros</td>
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<tr>
<td></td>
<td><strong>EURFRCHFw.d Format</strong> on page 88</td>
<td>Converts an amount from Swiss francs to euros</td>
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<tr>
<td></td>
<td><strong>EURFCZKw.d Format</strong> on page 89</td>
<td>Converts an amount from Czech koruny to euros</td>
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<tr>
<td></td>
<td><strong>EURFRDEMw.d Format</strong> on page 90</td>
<td>Converts an amount from Deutsche marks to euros</td>
</tr>
<tr>
<td></td>
<td><strong>EURFRDKKw.d Format</strong> on page 91</td>
<td>Converts an amount from Danish kroner to euros</td>
</tr>
<tr>
<td></td>
<td><strong>EURFRESPw.d Format</strong> on page 93</td>
<td>Converts an amount from Spanish pesetas to euros</td>
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<tr>
<td>Category</td>
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<tr>
<td>EURFRFIMw.d Format</td>
<td>Converts an amount from Finnish markkaa to euros on page 94</td>
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<tr>
<td>EURFRFRFw.d Format</td>
<td>Converts an amount from French francs to euros on page 95</td>
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<tr>
<td>EURFRGBPw.d Format</td>
<td>Converts an amount from British pounds to euros on page 96</td>
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<tr>
<td>EURFRGRDw.d Format</td>
<td>Converts an amount from Greek drachmas to euros on page 97</td>
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<tr>
<td>EURFRHUFw.d Format</td>
<td>Converts an amount from Hungarian forints to euros on page 98</td>
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<td>EURFRIEPw.d Format</td>
<td>Converts an amount from Irish pounds to euros on page 100</td>
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<tr>
<td>EURFRITLw.d Format</td>
<td>Converts an amount from Italian lire to euros on page 101</td>
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<tr>
<td>EURFRRLUFw.d Format</td>
<td>Converts an amount from Luxembourg francs to euros on page 102</td>
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<tr>
<td>EURFRNLGw.d Format</td>
<td>Converts an amount from Dutch guilders to euros on page 103</td>
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<tr>
<td>EURFRNOKw.d Format</td>
<td>Converts an amount from Norwegian krone to euros on page 104</td>
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<tr>
<td>EURFRPLZw.d Format</td>
<td>Converts an amount from Polish zlotys to euros on page 105</td>
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<tr>
<td>EURFRPTEw.d Format</td>
<td>Converts an amount from Portuguese escudos to euros on page 107</td>
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<td>EURFRROLw.d Format</td>
<td>Converts an amount from Romanian lei to euros on page 108</td>
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<tr>
<td>EURFRRURw.d Format</td>
<td>Converts an amount from Russian rubles to euros on page 109</td>
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<tr>
<td>EURFRSEKw.d Format</td>
<td>Converts an amount from Swedish kronor to euros on page 110</td>
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<td>EURFRSITw.d Format</td>
<td>Converts an amount from Slovenian tolars to euros on page 111</td>
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<td>EURFRTRLaw.d Format</td>
<td>Converts an amount from Turkish liras to euros on page 113</td>
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<tr>
<td>EURFRYUDw.d Format</td>
<td>Converts an amount from Yugoslavian dinars to euros on page 114</td>
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<td>EURTOATSw.d Format</td>
<td>Converts an amount from euros to Austrian schillings on page 118</td>
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<tr>
<td>EURTOBEFw.d Format</td>
<td>Converts an amount from euros to Belgian francs on page 119</td>
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<tr>
<td>EURTOCHFw.d Format</td>
<td>Converts an amount from euros to Swiss francs on page 120</td>
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<tr>
<td>EURTOCZKw.d Format</td>
<td>Converts an amount from euros to Czech koruny on page 121</td>
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<td></td>
<td>“EURTODEM$w.d$ Format”</td>
<td>Converts an amount from euros to Deutsche marks</td>
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<td>on page 122</td>
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<tr>
<td></td>
<td>“EURTODKK$w.d$ Format”</td>
<td>Converts an amount from euros to Danish kroner</td>
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<tr>
<td></td>
<td>“EURTOESP$w.d$ Format”</td>
<td>Converts an amount from euros to Spanish pesetas</td>
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<tr>
<td></td>
<td>“EURTOFIM$w.d$ Format”</td>
<td>Converts an amount from euros to Finnish markkaa</td>
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<tr>
<td></td>
<td>“EURTOFRF$w.d$ Format”</td>
<td>Converts an amount from euros to French francs</td>
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<tr>
<td></td>
<td>“EURTOGBP$w.d$ Format”</td>
<td>Converts an amount from euros to British pounds</td>
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<tr>
<td></td>
<td>“EURTOGRD$w.d$ Format”</td>
<td>Converts an amount from euros to Greek drachmas</td>
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<tr>
<td></td>
<td>“EURTOHUF$w.d$ Format”</td>
<td>Converts an amount from euros to Hungarian forints</td>
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<td></td>
<td>“EURTOIEP$w.d$ Format”</td>
<td>Converts an amount from euros to Irish pounds</td>
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<tr>
<td></td>
<td>“EURTOITL$w.d$ Format”</td>
<td>Converts an amount from euros to Italian lire</td>
</tr>
<tr>
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<td></td>
<td>“EURTOLUF$w.d$ Format”</td>
<td>Converts an amount from euros to Luxembourg francs</td>
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<td></td>
<td>“EURTONL$w.d$ Format”</td>
<td>Converts an amount from euros to Dutch guilders</td>
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<tr>
<td></td>
<td>“EURTONOK$w.d$ Format”</td>
<td>Converts an amount from euros to Norwegian krone</td>
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<tr>
<td></td>
<td>“EURTOPLZ$w.d$ Format”</td>
<td>Converts an amount from euros to Polish zlotys</td>
</tr>
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<tr>
<td></td>
<td>“EURTOPT$w.d$ Format”</td>
<td>Converts an amount from euros to Portuguese escudos</td>
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<tr>
<td></td>
<td>“EURTOROL$w.d$ Format”</td>
<td>Converts an amount from euros to Romanian lei</td>
</tr>
<tr>
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</tr>
<tr>
<td></td>
<td>“EURTORUR$w.d$ Format”</td>
<td>Converts an amount from euros to Russian rubles</td>
</tr>
<tr>
<td></td>
<td>on page 141</td>
<td></td>
</tr>
<tr>
<td></td>
<td>“EURTOSEK$w.d$ Format”</td>
<td>Converts an amount from euros to Swedish kronor</td>
</tr>
<tr>
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<tr>
<td></td>
<td>“EURTOSIT$w.d$ Format”</td>
<td>Converts an amount from euros to Slovenian tolers</td>
</tr>
<tr>
<td></td>
<td>on page 144</td>
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</tr>
<tr>
<td></td>
<td>“EURTOTRL$w.d$ Format”</td>
<td>Converts an amount from euros to Turkish liras</td>
</tr>
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</tr>
<tr>
<td></td>
<td>“EURTOYUD$w.d$ Format”</td>
<td>Converts an amount from euros to Yugoslavian dinars</td>
</tr>
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</tr>
<tr>
<td>DBCS</td>
<td>“SKANJ$w. Format”</td>
<td>Adds shift-code data to DBCS data</td>
</tr>
<tr>
<td></td>
<td>on page 149</td>
<td></td>
</tr>
<tr>
<td>Category</td>
<td>Formats for NLS</td>
<td>Description</td>
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<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Date and Time</td>
<td>“$KANJIXw. Format” on page 150</td>
<td>Removes shift-code data from DBCS data</td>
</tr>
<tr>
<td></td>
<td>“EURDFDDw. Format” on page 68</td>
<td>Writes international date values in the form <em>dd.mm.yy</em> or <em>dd.mm.yyyy</em></td>
</tr>
<tr>
<td></td>
<td>“EURDFDEw. Format” on page 70</td>
<td>Writes international date values in the form <em>ddmmyy</em> or <em>ddmmyyyy</em></td>
</tr>
<tr>
<td></td>
<td>“EURDFDNw. Format” on page 72</td>
<td>Writes international date values as the day of the week</td>
</tr>
<tr>
<td></td>
<td>“EURDFDTw.d Format” on page 73</td>
<td>Writes international datetime values in the form <em>ddmmyy:hh:mm:ss.ss</em> or <em>ddmmyyyy hh:mm:ss.ss</em></td>
</tr>
<tr>
<td></td>
<td>“EURDFDNw. Format” on page 75</td>
<td>Writes international date values as the name of the day</td>
</tr>
<tr>
<td></td>
<td>“EURDFMNw. Format” on page 77</td>
<td>Writes international date values as the name of the month</td>
</tr>
<tr>
<td></td>
<td>“EURDFMYw. Format” on page 79</td>
<td>Writes international date values in the form <em>mmmyy</em> or <em>mmmyyyy</em></td>
</tr>
<tr>
<td></td>
<td>“EURDFWDXw. Format” on page 81</td>
<td>Writes international date values as the name of the month, the day, and the year in the form <em>dd month-name yy</em> (or <em>yyyy</em>)</td>
</tr>
<tr>
<td></td>
<td>“EURDFWKKXw. Format” on page 83</td>
<td>Writes international date values as the name of the day and date in the form <em>day-of-week, dd month-name yy</em> (or <em>yyyy</em>)</td>
</tr>
<tr>
<td></td>
<td>“HDATEw. Format” on page 147</td>
<td>Writes date values in the form <em>yyyy mmmm dd</em> where <em>dd</em> is the day-of-the-month, <em>mmmm</em> represents the month’s name in Hebrew, and <em>yyyy</em> is the year</td>
</tr>
<tr>
<td></td>
<td>“HEBDATEw. Format” on page 148</td>
<td>Writes date values according to the Jewish calendar</td>
</tr>
<tr>
<td></td>
<td>“MINGUOw. Format” on page 153</td>
<td>Writes date values as Taiwanese dates in the form <em>yyyyymmd</em></td>
</tr>
<tr>
<td></td>
<td>“NENGOw. Format” on page 154</td>
<td>Writes date values as Japanese dates in the form <em>e.yymmd</em></td>
</tr>
<tr>
<td></td>
<td>“NLDATEw. Format” on page 155</td>
<td>Converts a SAS date value to the date value of the specified locale, and then writes the date value as a date</td>
</tr>
<tr>
<td></td>
<td>“NLDATEMNw. Format” on page 156</td>
<td>Converts a SAS date value to the date value of the specified locale, and then writes the value as the name-of-the-month</td>
</tr>
<tr>
<td></td>
<td>“NLDATEWw. Format” on page 157</td>
<td>Converts a SAS date value to the date value of the specified locale, and then writes the value as a date and the day-of-the-week</td>
</tr>
<tr>
<td></td>
<td>“NLDATEWNNw. Format” on page 158</td>
<td>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</td>
</tr>
<tr>
<td></td>
<td>“NLDATEWMw. Format” on page 159</td>
<td>Converts a SAS date-time value to the date-time value of the specified locale, and then writes the value as a date-time</td>
</tr>
<tr>
<td>Category</td>
<td>Formats for NLS</td>
<td>Description</td>
</tr>
<tr>
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</tr>
<tr>
<td></td>
<td>“NLDATMAPw. Format” on page 160</td>
<td>Converts a SAS date-time value to the date-time value of the specified locale, and then writes the value as a date-time with a.m. or p.m.</td>
</tr>
<tr>
<td></td>
<td>“NLDATMTMw. Format” on page 161</td>
<td>Converts the time portion of a SAS date-time value to the time-of-day value of the specified locale, and then writes the value as a time-of-day</td>
</tr>
<tr>
<td></td>
<td>“NLDATMWw. Format” on page 162</td>
<td>Converts a SAS date value to a date-time value of the specified locale, and then writes the value a day-of-week and date-time</td>
</tr>
<tr>
<td></td>
<td>“NLTIMEw. Format” on page 172</td>
<td>Converts a SAS time value to the time value of the specified locale, and then writes the value as a time value</td>
</tr>
<tr>
<td></td>
<td>“NLTIMAPw. Format” on page 173</td>
<td>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.</td>
</tr>
<tr>
<td>Hebrew text handling</td>
<td>“$CPTDWw. Format” on page 66</td>
<td>Processes a character string that is in Hebrew text, encoded in IBM-PC (cp862), and then writes the character string in Windows Hebrew encoding (cp 1255)</td>
</tr>
<tr>
<td></td>
<td>“$CPTWDw. Format” on page 67</td>
<td>Processes a character string that is encoded in Windows (cp1255), and then writes the character string in Hebrew DOS (cp862) encoding</td>
</tr>
<tr>
<td>Numeric</td>
<td>“EUROw.d Format” on page 115</td>
<td>Writes numeric values with a leading euro symbol (E), a comma that separates every three digits, and a period that separates the decimal fraction</td>
</tr>
<tr>
<td></td>
<td>“EUROXw.d Format” on page 116</td>
<td>Writes numeric values with a leading euro symbol (E), a period that separates every three digits, and a comma that separates the decimal fraction</td>
</tr>
<tr>
<td></td>
<td>“NLMNYw.d Format” on page 163</td>
<td>Writes the monetary format of the local expression in the specified locale using local currency</td>
</tr>
<tr>
<td></td>
<td>“NLMNYIw.d Format” on page 165</td>
<td>Writes the monetary format of the international expression in the specified locale</td>
</tr>
<tr>
<td></td>
<td>“NLNUMw.d Format” on page 166</td>
<td>Writes the numeric format of the local expression in the specified locale</td>
</tr>
<tr>
<td></td>
<td>“NLNUMIw.d Format” on page 168</td>
<td>Writes the numeric format of the international expression in the specified locale</td>
</tr>
<tr>
<td></td>
<td>“NLPCTw.d Format” on page 169</td>
<td>Writes percentage data of the local expression in the specified locale</td>
</tr>
<tr>
<td>Category</td>
<td>Formats for NLS</td>
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</tr>
<tr>
<td></td>
<td>“NLPCTlw.d Format” on page 170</td>
<td>Writes percentage data of the international expression in the specified locale</td>
</tr>
<tr>
<td></td>
<td>“YENw.d Format” on page 203</td>
<td>Writes numeric values with yen signs, commas, and decimal points</td>
</tr>
</tbody>
</table>
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$CPDT Dw. Format 66
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$\text{BIDI}_w$. Format

Converts a logically-ordered string to a visually-ordered string, and vice versa, by reversing the order of Hebrew characters while preserving the order of Latin words and numbers.

Category: BIDI text handling
Alignment: left

Syntax

$\text{BIDI}_w$.

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 text is stored in logical order. This means that 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. This can cause SAS users to encounter Hebrew 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 text from a visual operating environment to a logical one. The $\text{BIDI}$ format is a format that reverses Hebrew 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. Some mainframe operating environments might experience unsatisfactory results, because they use the OldCode Hebrew encoding. There is a hotfix for this encoding on SAS Institute’s Web site: http://support.sas.com/.

Comparisons

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

- $BIDIw$. 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 characters in the text string, the characters in the Hebrew word are reversed and the position of the Hebrew word is reversed in the string.

Examples

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

data;
  a=$BIDIw$. 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
b2=א abc 123

$CPTDWw. 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

$CPTDWw.$
Syntax Description

\( w \)

specifies the width of the output field.

**Default:** 200

**Range:** 1–32000

Comparisons

The \$CPTDw. format performs processing that is the opposite of the \$CPTWDw. format.

Examples

The following example uses the input value of “808182x.”

<table>
<thead>
<tr>
<th>Statement</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>put text $cptdw3.;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>----+----1----+</td>
</tr>
<tr>
<td></td>
<td>238</td>
</tr>
</tbody>
</table>

See Also

Formats:

“\$CPTWDw. Format” on page 67

Inforamts:

“\$CPTDw. Informat” on page 250

“\$CPTWDw. Informat” on page 251

\$CPTWDw. 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

\$CPTWDw.
Syntax Description

\[ w \]
specifies the width of the output field.

Default: 200
Range: 1–32000

Comparisons

The \$CPTWDw. format performs processing that is the opposite of the \$CPTDWw. format.

Examples

The following example uses the input value of “123”.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>put text $cptwd3.;</td>
<td>$\text{2}$,</td>
</tr>
</tbody>
</table>

See Also

Formats:
“\$CPTDWw. Format” on page 66

Informats:
“\$CPTDWw. Informat” on page 250
“\$CPTWDw. Informat” on page 251

EURDFDDw. Format

Writes international date values in the form \textit{dd.mm.yy} or \textit{dd.mm.yyyy}

Category: Date and Time
Alignment: right

Syntax

\texttt{EURDFDDw.}
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 353 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.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>put date eurdfdd8.;</code></td>
<td>02.01.02</td>
</tr>
<tr>
<td><code>put date espdfdd8.;</code></td>
<td>02.01.02</td>
</tr>
<tr>
<td><code>put date fradfdd8.;</code></td>
<td>02/01/02</td>
</tr>
</tbody>
</table>
See Also

Formats:
- DATEw. in SAS Language Reference: Dictionary
- DDMMYYw. in SAS Language Reference: Dictionary
- MMDYYw. in SAS Language Reference: Dictionary
- YYYMMDDw. 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
- MMDYYw. in SAS Language Reference: Dictionary
- YYYMMDDw. in SAS Language Reference: Dictionary

System Options:
- “DFLANG= System Option: OpenVMS, UNIX, Windows, and z/OS” on page 353

**EURDFDEw. Format**

Writes international date values in the form `ddmmmyy` or `ddmmmyyyy`

**Category:** Date and Time

**Alignment:** right

**Syntax**

EURDFDEw.

**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 EURDFDEw. 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 353 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, 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 the DFLANG= system option is set to Spanish.

```sas
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.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put date eurdfde9.;</td>
<td>02ene2002</td>
</tr>
<tr>
<td>put date espdfde9.;</td>
<td>02ene2002</td>
</tr>
<tr>
<td>put date fradfde9.;</td>
<td>02jan2002</td>
</tr>
</tbody>
</table>

**See Also**

Formats:

- `DATEw.` in *SAS Language Reference: Dictionary*

Functions:

- `DATE` in *SAS Language Reference: Dictionary*

Informats:

- “EURDFDEw. Informat” on page 252

System Options:

- “DFLANG= System Option: OpenVMS, UNIX, Windows, and z/OS” on page 353
EURDFDNw. Format

 Writes international date values as the day of the week

 Category: Date and Time
 Alignment: right

 Syntax
 EURDFDNw.

 Syntax Description

\( w \)

specifies the width of the output field.

Default: 1
Range: 1–32

Details

The EURDFDNw. format writes SAS date values in the form day-of-the-week:

\[ \text{day-of-the-week} \]

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 353 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 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
---|---
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 353

EURDFDTw.d Format

Writes international datetime values in the form *ddmmmyy:hh:mm:ss.ss* or *ddmmmyyy hh:mm:ss.ss*

Category: Date and Time
Alignment: right

Syntax

**EURDFDTw.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**

optionally 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 EURDFDTw.d format writes SAS datetime values in the form \( ddmmyy:hh:mm:ss.ss \):

- \( dd \)
  - 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 353 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 PM. The first PUT statement assumes the DFLANG= system option is set to German.

```sas
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.
<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put date eurdfdt20.;</td>
<td>12Sep2002:12:39:43</td>
</tr>
<tr>
<td>put date deudfdt20.;</td>
<td>12Sep2002:12:39:43</td>
</tr>
<tr>
<td>put date itadfdt20.;</td>
<td>12Set2002:12:39:43</td>
</tr>
</tbody>
</table>

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
- “EURDFDTw. Informat” on page 253
- TIMEw.d in SAS Language Reference: Dictionary

System Options:
- “DFLANG= System Option: OpenVMS, UNIX, Windows, and z/OS” on page 353

EURFDWDNW. Format

Writes international date values as the name of the day

Category: Date and Time

Alignment: right

Syntax

EURFDWDNW.

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:
<table>
<thead>
<tr>
<th>Language</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>Afrikaans (AFR)</td>
<td>9</td>
</tr>
<tr>
<td>Catalan (CAT)</td>
<td>9</td>
</tr>
<tr>
<td>Croatian (CRO)</td>
<td>10</td>
</tr>
<tr>
<td>Czech (CZ)</td>
<td>7</td>
</tr>
<tr>
<td>Danish (DAN)</td>
<td>7</td>
</tr>
<tr>
<td>Dutch (NLD)</td>
<td>9</td>
</tr>
<tr>
<td>Finnish (FIN)</td>
<td>11</td>
</tr>
<tr>
<td>French (FRA)</td>
<td>8</td>
</tr>
<tr>
<td>German (DEU)</td>
<td>10</td>
</tr>
<tr>
<td>Hungarian (HUN)</td>
<td>9</td>
</tr>
<tr>
<td>Italian (ITA)</td>
<td>9</td>
</tr>
<tr>
<td>Macedonian (MAC)</td>
<td>10</td>
</tr>
<tr>
<td>Norwegian (NOR)</td>
<td>7</td>
</tr>
<tr>
<td>Polish (POL)</td>
<td>12</td>
</tr>
<tr>
<td>Portuguese (PTG)</td>
<td>13</td>
</tr>
<tr>
<td>Russian (RUS)</td>
<td>11</td>
</tr>
<tr>
<td>Slovenian (SLO)</td>
<td>10</td>
</tr>
<tr>
<td>Spanish (ESP)</td>
<td>9</td>
</tr>
<tr>
<td>Swedish (SVE)</td>
<td>7</td>
</tr>
<tr>
<td>Swiss-French (FRS)</td>
<td>8</td>
</tr>
<tr>
<td>Swiss-German (DES)</td>
<td>10</td>
</tr>
</tbody>
</table>

**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 EURDFDWNw. 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 353 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 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 the DFLANG= system option is set to French.

```sas
options dflang=french;
put day eurfdw8.;
```

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.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>put day eurfdw8.;</code></td>
<td>Vendredi</td>
</tr>
<tr>
<td><code>put day fradw8.;</code></td>
<td>Vendredi</td>
</tr>
<tr>
<td><code>put day espwdw8.;</code></td>
<td>viernes</td>
</tr>
</tbody>
</table>

**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*
- “EURDFDTw. Informat” on page 253
- `TIMEw.d` in *SAS Language Reference: Dictionary*

System Options:
- “DFLANG= System Option: OpenVMS, UNIX, Windows, and z/OS” on page 353

**EURDFMNw. 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 \(\text{month-name}\):

\(\text{month-name}\)

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 353 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 15344, which is the SAS date value that corresponds to January 4, 2002. The first PUT statement assumes the DFLANG= system option is set to Italian.

```sas
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.
### Formats for NLS

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put date eurdfm10.;</td>
<td>janvier</td>
</tr>
<tr>
<td>put date itadfm10.;</td>
<td>Gennaio</td>
</tr>
<tr>
<td>put date deudfm10.;</td>
<td>Januar</td>
</tr>
</tbody>
</table>

### See Also

Formats:

MONNAMEw. in *SAS Language Reference: Dictionary*

Functions:

DATE in *SAS Language Reference: Dictionary*

Informats:

“EURDFDEw. Informat” on page 252

System Options:

“DFLANG= System Option: OpenVMS, UNIX, Windows, and z/OS” on page 353

---

**EURDFMYw. Format**

Writes international date values in the form *mmmyy* or *mmmyyyy*

**Category:** Date and Time

**Alignment:** right

---

**Syntax**

**EURDFMYw.**

**Syntax Description**

-w specifies the width of the output field.

- **Default:** 5 (excepte 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 EURDFMYw. 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 353 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 15342, which is the SAS date value that corresponds to January 2, 2002. The first PUT statement assumes the DFLANG= system option is set to Spanish.

```
options dflang=spanish;

put date eurdfmy7.; ene2002
put date espdfmy7.; ene2002
put date fradfmy7.; jan2002
```

See Also

- Formats:
  - DDMYYYw. 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:
“EURDFMYw. Informat” on page 255
MONYYYw. in SAS Language Reference: Dictionary

System Options:
“DFLANG= System Option: OpenVMS, UNIX, Windows, and z/OS” on page 353

---

**EURDFDWDXw. Format**

Writers 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**

EURDFDWDXw.

**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:

<table>
<thead>
<tr>
<th>Language</th>
<th>Maximum</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>Afrikaans (AFR)</td>
<td>37</td>
<td>29</td>
</tr>
<tr>
<td>Catalan (CAT)</td>
<td>40</td>
<td>16</td>
</tr>
<tr>
<td>Croatian (CRO)</td>
<td>40</td>
<td>16</td>
</tr>
<tr>
<td>Czech (CSY)</td>
<td>40</td>
<td>16</td>
</tr>
<tr>
<td>Danish (DAN)</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>Dutch (NLD)</td>
<td>37</td>
<td>29</td>
</tr>
<tr>
<td>Finnish (FIN)</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>French (FRA)</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>German (DEU)</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>Hungarian (HUN)</td>
<td>40</td>
<td>18</td>
</tr>
<tr>
<td>Italian (ITA)</td>
<td>17</td>
<td>17</td>
</tr>
<tr>
<td>Macedonian (MAC)</td>
<td>40</td>
<td>17</td>
</tr>
<tr>
<td>Norwegian (NOR)</td>
<td>17</td>
<td>17</td>
</tr>
</tbody>
</table>
### Details

The `EURDFWDXw.` 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 353 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 `EURDFWDXw.` format is the same as the `EURDFWDXw.` 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 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.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put day eurdfwdx29.;</td>
<td>2 januari 2002</td>
</tr>
<tr>
<td>put day nlddfwdx29.;</td>
<td>2 januari 2002</td>
</tr>
<tr>
<td>put day itadfwdx17.;</td>
<td>02 Gennaio 1998</td>
</tr>
</tbody>
</table>

See Also

Formats:

WORDDATXw. in SAS Language Reference: Dictionary

System Options:

“DFLANG= System Option: OpenVMS, UNIX, Windows, and z/OS” on page 353

---

EURDFWKXw. 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

EURDFWKXw.

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:

<table>
<thead>
<tr>
<th>Language</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>Afrikaans (AFR)</td>
<td>2</td>
<td>38</td>
<td>28</td>
</tr>
<tr>
<td>Catalan (CAT)</td>
<td>2</td>
<td>40</td>
<td>27</td>
</tr>
<tr>
<td>Croatian (CRO)</td>
<td>3</td>
<td>40</td>
<td>27</td>
</tr>
<tr>
<td>Czech (CSY)</td>
<td>2</td>
<td>40</td>
<td>25</td>
</tr>
<tr>
<td>Danish (DAN)</td>
<td>2</td>
<td>31</td>
<td>31</td>
</tr>
<tr>
<td>Dutch (NLD)</td>
<td>2</td>
<td>38</td>
<td>28</td>
</tr>
<tr>
<td>Finnish (FIN)</td>
<td>2</td>
<td>37</td>
<td>37</td>
</tr>
<tr>
<td>French (FRA)</td>
<td>3</td>
<td>27</td>
<td>27</td>
</tr>
<tr>
<td>German (DEU)</td>
<td>3</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Hungarian (HUN)</td>
<td>3</td>
<td>40</td>
<td>28</td>
</tr>
<tr>
<td>Italian (ITA)</td>
<td>3</td>
<td>28</td>
<td>28</td>
</tr>
<tr>
<td>Macedonian (MAC)</td>
<td>3</td>
<td>40</td>
<td>29</td>
</tr>
<tr>
<td>Norwegian (NOR)</td>
<td>3</td>
<td>26</td>
<td>26</td>
</tr>
<tr>
<td>Polish (POL)</td>
<td>2</td>
<td>40</td>
<td>34</td>
</tr>
<tr>
<td>Portuguese (PTG)</td>
<td>3</td>
<td>38</td>
<td>38</td>
</tr>
<tr>
<td>Russian (RUS)</td>
<td>2</td>
<td>40</td>
<td>29</td>
</tr>
<tr>
<td>Slovenian (SLO)</td>
<td>3</td>
<td>40</td>
<td>29</td>
</tr>
<tr>
<td>Spanish (ESP)</td>
<td>1</td>
<td>35</td>
<td>35</td>
</tr>
<tr>
<td>Swedish (SVE)</td>
<td>3</td>
<td>26</td>
<td>26</td>
</tr>
<tr>
<td>Swiss-French (FRS)</td>
<td>3</td>
<td>26</td>
<td>26</td>
</tr>
<tr>
<td>Swiss-German (DES)</td>
<td>3</td>
<td>30</td>
<td>30</td>
</tr>
</tbody>
</table>

**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\(rw\) 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 353 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 EURDFWKXw. format is the same as the EURDFWDXw. format except that EURDFWKXw. 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 the DFLANG= system option is set to German.

```sas
options dflang=German;
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
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
optionally 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 52.

Examples
The following table shows input values in Austrian schillings, SAS statements, and the conversion results in euros.

<table>
<thead>
<tr>
<th>Amounts</th>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>put amount eurfrats5.;</td>
<td>E4</td>
</tr>
<tr>
<td></td>
<td>put amount eurfrats9.2;</td>
<td>E3,63</td>
</tr>
</tbody>
</table>
See Also

Formats:
“EURTOATSw.d Format” on page 118

Functions:
“EUROCURR Function” on page 209

**EURFRBEFw.d Format**

Converts an amount from Belgian francs to euros

**Category:** Currency Conversion

**Alignment:** right

**Syntax**

EURFRBEFw.d

**Syntax Description**

w
specifies the width of the output field.

**Default:** 6

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

**Details**

The EURFRBEFw.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 EURFRBEFw.d format and the EUROCURR function. For more information about European currency conversion and currency conversion rate tables, see “European Currency Conversion” on page 52.
Examples

The following table shows input values in Belgian francs, SAS statements, and the conversion results in euros.

<table>
<thead>
<tr>
<th>Amounts</th>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>put amount eurfrbef5.;</td>
<td>E1</td>
</tr>
<tr>
<td></td>
<td>put amount eurfrbef9.2;</td>
<td>E1,24</td>
</tr>
<tr>
<td>5234.56</td>
<td>put amount eurfrbef5.;</td>
<td>E130</td>
</tr>
<tr>
<td></td>
<td>put amount eurfrbef9.2;</td>
<td>E129,76</td>
</tr>
<tr>
<td>52345</td>
<td>put amount eurfrbef5.;</td>
<td>1.298</td>
</tr>
<tr>
<td></td>
<td>put amount eurfrbef9.2;</td>
<td>E1.297,60</td>
</tr>
</tbody>
</table>

See Also

Formats:
“EURTOBEFw.d Format” on page 119

Functions:
“EUROCURR Function” on page 209

**EURFRCHFw.d Format**

Converts an amount from Swiss francs to euros

**Category:** Currency Conversion

**Alignment:** right

**Syntax**

**EURFRCHFw.d**

**Syntax Description**

\( w \)

specifies the width of the output field.

**Default:** 6

\( d \)

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

The EURFRCHFw.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 EURFRCHFw.d format and the EUROCURR function. For more information about European currency conversion and currency conversion rate tables, see “European Currency Conversion” on page 52.

Examples

The following table shows input values in Swiss francs, SAS statements, and the conversion results in euros.

<table>
<thead>
<tr>
<th>Amounts</th>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>put amount eurfrchf5.;</td>
<td>E31</td>
</tr>
<tr>
<td></td>
<td>put amount eurfrchf9.2;</td>
<td>E31,17</td>
</tr>
<tr>
<td>1234.56</td>
<td>put amount eurfrchf5.;</td>
<td>E770</td>
</tr>
<tr>
<td></td>
<td>put amount eurfrchf9.2;</td>
<td>E769,53</td>
</tr>
<tr>
<td>12345</td>
<td>put amount eurfrchf5.;</td>
<td>7.695</td>
</tr>
<tr>
<td></td>
<td>put amount eurfrchf9.2;</td>
<td>E7.694,94</td>
</tr>
</tbody>
</table>

See Also

Formats:
“EURTOCHFw.d Format” on page 120
Functions:
“EUROCURR Function” on page 209

EURFRCZKw.d Format

Converts an amount from Czech koruny to euros
Category: Currency Conversion
Alignment: right

Syntax

EURFRCZKw.d

Syntax Description

w
specifies the width of the output field.
Default: 6
The EURFRCZKw.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 EURFRCZKw.d format and the EUROCURR function. For more information about European currency conversion and currency conversion rate tables, see “European Currency Conversion” on page 52.

Examples

The following table shows input values in Czech koruny, SAS statements, and the conversion results in euros.

<table>
<thead>
<tr>
<th>Amounts</th>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>put amount eurfrczk5.;</td>
<td>E1</td>
</tr>
<tr>
<td></td>
<td>put amount eurfrczk9.2;</td>
<td>E1,43</td>
</tr>
<tr>
<td>5234.56</td>
<td>put amount eurfrczk5.;</td>
<td>E150</td>
</tr>
<tr>
<td></td>
<td>put amount eurfrczk9.2;</td>
<td>E150,18</td>
</tr>
<tr>
<td>52345</td>
<td>put amount eurfrczk5.;</td>
<td>1.502</td>
</tr>
<tr>
<td></td>
<td>put amount eurfrczk9.2;</td>
<td>E1.501,74</td>
</tr>
</tbody>
</table>

See Also

Formats:
“EURTOCZKw.d Format” on page 121

Functions:
“EUROCURR Function” on page 209

EURFRDEMw.d Format

Converts an amount from Deutsche marks to euros

Category: Currency Conversion
Alignment: right

Syntax

EURFRDEMw.d
Syntax Description

\( w \)

specifies the width of the output field.

Default: 6

\( d \)

optionally 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 52.

Examples

The following table shows input values in Deutsche marks, SAS statements, and the conversion results in euros.

<table>
<thead>
<tr>
<th>Amounts</th>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>put amount eurfrdem5.;</td>
<td>E26</td>
</tr>
<tr>
<td></td>
<td>put amount eurfrdem9.2;</td>
<td>E25.56</td>
</tr>
<tr>
<td>1234.56</td>
<td>put amount eurfrdem5.;</td>
<td>E631</td>
</tr>
<tr>
<td></td>
<td>put amount eurfrdem9.2;</td>
<td>E631.22</td>
</tr>
<tr>
<td>12345</td>
<td>put amount eurfrdem5.;</td>
<td>6.312</td>
</tr>
<tr>
<td></td>
<td>put amount eurfrdem9.2;</td>
<td>E6.311,90</td>
</tr>
</tbody>
</table>

See Also

Formats:

“EURTODEM\( w.d \) Format” on page 122

Functions:

“EUROCURR Function” on page 209
Syntax
EURFRDKK\(w.d\)

Syntax Description

\(w\)
specifies the width of the output field.

Default: 6

\(d\)
optionally 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 52.

Examples

The following table shows input values in Danish kroner, SAS statements, and the conversion results in euros.

<table>
<thead>
<tr>
<th>Amounts</th>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>put amount eurfrdkk5.;</td>
<td>E7</td>
</tr>
<tr>
<td></td>
<td>put amount eurfrdkk9.2;</td>
<td>E6.68</td>
</tr>
<tr>
<td>1234.56</td>
<td>put amount eurfrdkk5.;</td>
<td>E165</td>
</tr>
<tr>
<td></td>
<td>put amount eurfrdkk9.2;</td>
<td>E164.83</td>
</tr>
<tr>
<td>12345</td>
<td>put amount eurfrdkk5.;</td>
<td>1.648</td>
</tr>
<tr>
<td></td>
<td>put amount eurfrdkk9.2;</td>
<td>1.648,18</td>
</tr>
</tbody>
</table>

See Also

Formats:
“EURTODKK\(w.d\) Format” on page 124

Functions:
“EUROCURR Function” on page 209
EURFRESP\textit{w.d} Format

Converts an amount from Spanish pesetas to euros

**Category:** Currency Conversion

**Alignment:** right

**Syntax**

\texttt{EURFRESP\textit{w.d}}

**Syntax Description**

\textit{w}

specifies the width of the output field.

**Default:** 6

\textit{d}

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

**Details**

The EURFRESP\textit{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\textit{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 52.

**Examples**

The following table shows input values in Spanish pesetas, SAS statements, and the conversion results in euros.

<table>
<thead>
<tr>
<th>Amounts</th>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td>\texttt{put amount eurfresp5.;}</td>
<td>E1</td>
</tr>
<tr>
<td></td>
<td>\texttt{put amount eurfresp9.2;}</td>
<td>E1,20</td>
</tr>
<tr>
<td>20234.56</td>
<td>\texttt{put amount eurfresp5.;}</td>
<td>E122</td>
</tr>
<tr>
<td></td>
<td>\texttt{put amount eurfresp9.2;}</td>
<td>E121,61</td>
</tr>
<tr>
<td>202345</td>
<td>\texttt{put amount eurfresp5.;}</td>
<td>1.216</td>
</tr>
<tr>
<td></td>
<td>\texttt{put amount eurfresp9.2;}</td>
<td>E1.216,12</td>
</tr>
</tbody>
</table>
See Also

Formats:
“EURTOESPw.d Format” on page 125

Functions:
“EUROCURR Function” on page 209

EURRFIMw.d Format

Converts an amount from Finnish markkaa to euros

Category: Currency Conversion

Alignment: right

Syntax
EURRFIMw.d

Syntax Description

\( w \)

specifies the width of the output field.

Default: 6

\( d \)

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

Details

The EURRFIMw.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 EURRFIMw.d format and the EUROCURR function. For more information about European currency conversion and currency conversion rate tables, see “European Currency Conversion” on page 52.

Examples

The following table shows input values in Finnish markkaa, SAS statements, and the conversion results in euros.
<table>
<thead>
<tr>
<th>Amounts</th>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>put amount eurfrfim5.;</td>
<td>E8</td>
</tr>
<tr>
<td></td>
<td>put amount eurfrfim9.2;</td>
<td>E8,41</td>
</tr>
<tr>
<td>1234.56</td>
<td>put amount eurfrfim5.;</td>
<td>E208</td>
</tr>
<tr>
<td></td>
<td>put amount eurfrfim9.2;</td>
<td>E207,64</td>
</tr>
<tr>
<td>12345</td>
<td>put amount eurfrfim5.;</td>
<td>2.076</td>
</tr>
<tr>
<td></td>
<td>put amount eurfrfim9.2;</td>
<td>E2.076,28</td>
</tr>
</tbody>
</table>

**See Also**

Formats:

“EURTOFIMw.d Format” on page 126

Functions:

“EUROCURR Function” on page 209

---

**EURFRFRFw.d Format**

Converts an amount from French francs to euros

Category: Currency Conversion

Alignment: right

**Syntax**

EURFRFRFw.d

**Syntax Description**

\( w \)

specifies the width of the output field.

Default: 6

\( d \)

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

**Details**

The EURFRFRFw.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 EURFRFRFw.d format and the EUROCURR function. For more
information about European currency conversion and currency conversion rate tables, see “European Currency Conversion” on page 52.

**Examples**

The following table shows input values in French francs, SAS statements, and the conversion results in euros.

<table>
<thead>
<tr>
<th>Amounts</th>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>put amount eurfrf5.;</td>
<td>E8</td>
</tr>
<tr>
<td></td>
<td>put amount eurfrf9.2;</td>
<td>E7.62</td>
</tr>
<tr>
<td>1234.56</td>
<td>put amount eurfrf5.;</td>
<td>E188</td>
</tr>
<tr>
<td></td>
<td>put amount eurfrf9.2;</td>
<td>E188.21</td>
</tr>
<tr>
<td>12345</td>
<td>put amount eurfrf5.;</td>
<td>1.882</td>
</tr>
<tr>
<td></td>
<td>put amount eurfrf9.2;</td>
<td>E1.881.98</td>
</tr>
</tbody>
</table>

**See Also**

Formats:

“EURTOFRFw.d Format” on page 127

Functions:

“EUROCURR Function” on page 209

---

**EURFRGBPw.d Format**

Converts an amount from British pounds to euros

*Category:* Currency Conversion

*Alignment:* right

**Syntax**

EURFRGBPw.d

**Syntax Description**

\( w \)

specifies the width of the output field.

*Default:* 6
\( d \)

optionally 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 52.

**Examples**

The following table shows input values in British pounds, SAS statements, and the conversion results in euros.

<table>
<thead>
<tr>
<th>Amounts</th>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>put amount eurfrgbp5.;</td>
<td>E71</td>
</tr>
<tr>
<td></td>
<td>put amount eurfrgbp9.2;</td>
<td>E71.42</td>
</tr>
<tr>
<td>1234.56</td>
<td>put amount eurfrgbp5.;</td>
<td>1,763</td>
</tr>
<tr>
<td></td>
<td>put amount eurfrgbp9.2;</td>
<td>E1,763.32</td>
</tr>
<tr>
<td>12345</td>
<td>put amount eurfrgbp5.;</td>
<td>17632</td>
</tr>
<tr>
<td></td>
<td>put amount eurfrgbp9.2;</td>
<td>17,632.39</td>
</tr>
</tbody>
</table>

**See Also**

Formats:
“EURTOGBP\( w.d \) Format” on page 128

Functions:
“EUROCURR Function” on page 209

---

**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

\( d \)

optionally 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 52.

**Examples**

The following table shows input values in Greek drachmas, SAS statements, and the conversion results in euros.

<table>
<thead>
<tr>
<th>Amounts</th>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>400</td>
<td>put amount eurfrgrd5.;</td>
<td>E1</td>
</tr>
<tr>
<td></td>
<td>put amount eurfrgrd9.2;</td>
<td>E1,17</td>
</tr>
<tr>
<td>40234.56</td>
<td>put amount eurfrgrd5.;</td>
<td>E118</td>
</tr>
<tr>
<td></td>
<td>put amount eurfrgrd9.2;</td>
<td>E118,03</td>
</tr>
<tr>
<td>402345</td>
<td>put amount eurfrgrd5.;</td>
<td>1.180</td>
</tr>
<tr>
<td></td>
<td>put amount eurfrgrd9.2;</td>
<td>E1.180,30</td>
</tr>
</tbody>
</table>

**See Also**

Formats:

“EURTOGRD\(w.d\) Format” on page 130

Functions:

“EUROCURR Function” on page 209

**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>
  optionally 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 52.

Examples

The following table shows input values in Hungarian forints, SAS statements, and the conversion results in euros.

<table>
<thead>
<tr>
<th>Amounts</th>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>300</td>
<td>put amount eurfrhuf5.;</td>
<td>E1</td>
</tr>
<tr>
<td></td>
<td>put amount eurfrhuf9.2;</td>
<td>E1,15</td>
</tr>
<tr>
<td>30234.56</td>
<td>put amount eurfrhuf5.;</td>
<td>E116</td>
</tr>
<tr>
<td></td>
<td>put amount eurfrhuf9.2;</td>
<td>E116,14</td>
</tr>
<tr>
<td>302345</td>
<td>put amount eurfrhuf5.;</td>
<td>1.161</td>
</tr>
<tr>
<td></td>
<td>put amount eurfrhuf9.2;</td>
<td>E1.161,41</td>
</tr>
</tbody>
</table>

See Also

Formats:
  “EURTOHUF <w.d> Format” on page 131
Functions:
“EUROCURR Function” on page 209

**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
  optionally 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 52.

**Examples**

The following table shows input values in Irish pounds, SAS statements, and the conversion results in euros.

<table>
<thead>
<tr>
<th>Amounts</th>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>put amount eurfriep5.;</td>
<td>E1</td>
</tr>
<tr>
<td></td>
<td>put amount eurfriep9.2;</td>
<td>E1.27</td>
</tr>
<tr>
<td>1234.56</td>
<td>put amount eurfriep5.;</td>
<td>1,568</td>
</tr>
<tr>
<td></td>
<td>put amount eurfriep9.2;</td>
<td>E1,567.57</td>
</tr>
<tr>
<td>12345</td>
<td>put amount eurfriep5.;</td>
<td>15675</td>
</tr>
<tr>
<td></td>
<td>put amount eurfriep9.2;</td>
<td>15,674.92</td>
</tr>
</tbody>
</table>
See Also

Formats:

“EURTOIEPw.d Format” on page 132

Functions:

“EUROCURR Function” on page 209

EURFRITLw.d Format

Converts an amount from Italian lire to euros

Category: Currency Conversion

Alignment: right

Syntax

EURFRITLw.d

Syntax Description

w

specifies the width of the output field.

Default: 6

d

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

Details

The EURFRITLw.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 EURFRITLw.d format and the EUROCURR function. For more information about European currency conversion and currency conversion rate tables, see “European Currency Conversion” on page 52.

Examples

The following table shows input values in Italian lire, SAS statements, and the conversion results in euros.
### See Also

Formats:
- “EURTOITLw.d Format” on page 133

Functions:
- “EUROCURRE Function” on page 209

---

### EURFRLUFw.d Format

Converts an amount from Luxembourg francs to euros

**Category:** Currency Conversion

**Alignment:** right

#### Syntax

EURFRLUFw.d

#### Syntax Description

**w**

- specifies the width of the output field.
- **Default:** 6

**d**

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

#### Details

The EURFRLUFw.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 EURFRLUFw.d format and the EUROCURRE function. For more

---

<table>
<thead>
<tr>
<th>Amounts</th>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>put amount eurfr15.;</td>
<td>E1</td>
</tr>
<tr>
<td></td>
<td>put amount eurfr19.2;</td>
<td>E1,03</td>
</tr>
<tr>
<td>7234.56</td>
<td>put amount eurfr15.;</td>
<td>E4</td>
</tr>
<tr>
<td></td>
<td>put amount eurfr19.2;</td>
<td>E3,74</td>
</tr>
<tr>
<td>72345</td>
<td>put amount eurfr15.;</td>
<td>E37</td>
</tr>
<tr>
<td></td>
<td>put amount eurfr19.2;</td>
<td>E37,36</td>
</tr>
</tbody>
</table>
information about European currency conversion and currency conversion rate tables, see “European Currency Conversion” on page 52.

Examples

The following table shows input values in Luxembourg francs, SAS statements, and the conversion results in euros.

<table>
<thead>
<tr>
<th>Amounts</th>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>put amount eurfrluf5.;</td>
<td>E1</td>
</tr>
<tr>
<td></td>
<td>put amount eurfrluf9.2;</td>
<td>E1,24</td>
</tr>
<tr>
<td>1234.56</td>
<td>put amount eurfrluf5.;</td>
<td>E31</td>
</tr>
<tr>
<td></td>
<td>put amount eurfrluf9.2;</td>
<td>E30,60</td>
</tr>
<tr>
<td>12345</td>
<td>put amount eurfrluf5.;</td>
<td>E306</td>
</tr>
<tr>
<td></td>
<td>put amount eurfrluf9.2;</td>
<td>E306,02</td>
</tr>
</tbody>
</table>

See Also

Formats:

“EURTOLUFw.d Format” on page 134

Functions:

“EUROCURR Function” on page 209

EURFRNLGw.d Format

Converts an amount from Dutch guilders to euros

Category: Currency Conversion

Alignment: right

Syntax

EURFRNLGw.d

Syntax Description

w

specifies the width of the output field.

Default: 6
The **EURFRNLGw.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 EURFRNLGw.d format and the EUROCURR function. For more information about European currency conversion and currency conversion rate tables, see “European Currency Conversion” on page 52.

### Examples

The following table shows input values in Dutch guilders, SAS statements, and the conversion results in euros.

<table>
<thead>
<tr>
<th>Amounts</th>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>put amount eurfrnlg5.;</td>
<td>E23</td>
</tr>
<tr>
<td></td>
<td>put amount eurfrnlg9.2;</td>
<td>E22,69</td>
</tr>
<tr>
<td>1234.56</td>
<td>put amount eurfrnlg5.;</td>
<td>E560</td>
</tr>
<tr>
<td></td>
<td>put amount eurfrnlg9.2;</td>
<td>E560,22</td>
</tr>
<tr>
<td>12345</td>
<td>put amount eurfrnlg5.;</td>
<td>5.602</td>
</tr>
<tr>
<td></td>
<td>put amount eurfrnlg9.2;</td>
<td>E5.601,92</td>
</tr>
</tbody>
</table>

### See Also

Formats:

“EURTONLGw.d Format” on page 135

Functions:

“EUROCURR Function” on page 209

---

**EURFRNOKw.d Format**

**Converts an amount from Norwegian krone to euros**

*Category:* Currency Conversion

*Alignment:* right

**Syntax**

EURFRNOKw.d
Syntax Description

w
specifies the width of the output field.
Default: 6

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

Details

The EURFRNOKw.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 EURFRNOKw.d format and the EUROCURR function. For more information about European currency conversion and currency conversion rate tables, see “European Currency Conversion” on page 52.

Examples

The following table shows input values in Norwegian krone, SAS statements, and the conversion results in euros.

<table>
<thead>
<tr>
<th>Amounts</th>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>put amount eurfrnok5.; put amount eurfrnok9.2;</td>
<td>E5, E5,44</td>
</tr>
<tr>
<td>1234.56</td>
<td>put amount eurfrnok5.; put amount eurfrnok9.2;</td>
<td>E134, E134,22</td>
</tr>
<tr>
<td>12345</td>
<td>put amount eurfrnok5.; put amount eurfrnok9.2;</td>
<td>1.342, 1.342,18</td>
</tr>
</tbody>
</table>

See Also

Formats:
“EURTONOKw.d Format” on page 137

Functions:
“EUROCURR Function” on page 209

EURFRPLZw.d Format

Converts an amount from Polish zlotys to euros

Category: Currency Conversion
Syntax

EURFRPLZ\(w.d\)

Syntax Description

\(w\)

specifies the width of the output field.

Default: 6

\(d\)

optionally 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 52.

Examples

The following table shows input values in Polish zlotys, SAS statements, and the conversion results in euros.

<table>
<thead>
<tr>
<th>Amounts</th>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>put amount eurfrplz5.;</td>
<td>E12</td>
</tr>
<tr>
<td></td>
<td>put amount eurfrplz9.2;</td>
<td>E11,90</td>
</tr>
<tr>
<td>1234.56</td>
<td>put amount eurfrplz5.;</td>
<td>E294</td>
</tr>
<tr>
<td></td>
<td>put amount eurfrplz9.2;</td>
<td>E293,94</td>
</tr>
<tr>
<td>12345</td>
<td>put amount eurfrplz5.;</td>
<td>2.939</td>
</tr>
<tr>
<td></td>
<td>put amount eurfrplz9.2;</td>
<td>E2.939,29</td>
</tr>
</tbody>
</table>

See Also

Formats:

“EURTOPLZ\(w.d\) Format” on page 138

Functions:

“EUROCURR Function” on page 209
**EURFRPTE\textit{w}.\textit{d} Format**

Converts an amount from Portuguese escudos to euros

**Category:**  Currency Conversion

**Alignment:**  right

**Syntax**

\texttt{EURFRPTE\textit{w}.\textit{d}}

**Syntax Description**

\textit{w}

specifies the width of the output field.

**Default:**  6

\textit{d}

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

**Details**

The \texttt{EURFRPTE\textit{w}.\textit{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 \texttt{EURFRPTE\textit{w}.\textit{d}} format and the \texttt{EUROCURR} function. For more information about European currency conversion and currency conversion rate tables, see “European Currency Conversion” on page 52.

**Examples**

The following table shows input values in Portuguese escudos, SAS statements, and the conversion results in euros.

<table>
<thead>
<tr>
<th>Amounts</th>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>300</td>
<td>\texttt{put amount eurfrpte5.;}</td>
<td>E1</td>
</tr>
<tr>
<td></td>
<td>\texttt{put amount eurfrpte9.2;}</td>
<td>E1,50</td>
</tr>
<tr>
<td>30234.56</td>
<td>\texttt{put amount eurfrpte5.;}</td>
<td>E151</td>
</tr>
<tr>
<td></td>
<td>\texttt{put amount eurfrpte9.2;}</td>
<td>E150,81</td>
</tr>
<tr>
<td>302345</td>
<td>\texttt{put amount eurfrpte5.;}</td>
<td>1.508</td>
</tr>
<tr>
<td></td>
<td>\texttt{put amount eurfrpte9.2;}</td>
<td>E1.508,09</td>
</tr>
</tbody>
</table>
See Also

Formats:
“EURTOPEw.d Format” on page 139

Functions:
“EUROCURR Function” on page 209

---

**EURFRROLw.d Format**

Converts an amount from Romanian lei to euros
Category: Currency Conversion
Alignment: right

**Syntax**

EURFRROLw.d

**Syntax Description**

\( w \)

specifies the width of the output field.
Default: 6

\( d \)

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

**Details**

The EURFRROLw.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 EURFRROLw.d format and the EUROCURR function. For more information about European currency conversion and currency conversion rate tables, see “European Currency Conversion” on page 52.

**Examples**

The following table shows input values in Romanian lei, SAS statements, and the conversion results in euros.
EURFRRUR\(w,d\) Format

Converts an amount from Russian rubles to euros

Category: Currency Conversion
Alignment: right

Syntax

\texttt{EURFRRUR\(w,d\)}

Syntax Description

\(w\)

specifies the width of the output field.

Default: 6

\(d\)

optionally 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

<table>
<thead>
<tr>
<th>Amounts</th>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>put amount eurfrro15.;</td>
<td>E4</td>
</tr>
<tr>
<td></td>
<td>put amount eurfrro19.2;</td>
<td>E3,65</td>
</tr>
<tr>
<td>5234.56</td>
<td>put amount eurfrro15.;</td>
<td>E382</td>
</tr>
<tr>
<td></td>
<td>put amount eurfrro19.2;</td>
<td>E381,81</td>
</tr>
<tr>
<td>52345</td>
<td>put amount eurfrro15.;</td>
<td>3.818</td>
</tr>
<tr>
<td></td>
<td>put amount eurfrro19.2;</td>
<td>E3.818,02</td>
</tr>
</tbody>
</table>

See Also

Formats:
“EURTOROR\(w,d\) Format” on page 140

Functions:
“EUROCURR Function” on page 209
more information about European currency conversion and currency conversion rate tables, see “European Currency Conversion” on page 52.

Examples

The following table shows input values in Russian rubles, SAS statements, and the conversion results in euros.

<table>
<thead>
<tr>
<th>Amounts</th>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>put amount eurfrrur5.;</td>
<td>E3</td>
</tr>
<tr>
<td></td>
<td>put amount eurfrrur9.2;</td>
<td>E2,53</td>
</tr>
<tr>
<td>5234.56</td>
<td>put amount eurfrrur5.;</td>
<td>E265</td>
</tr>
<tr>
<td></td>
<td>put amount eurfrrur9.2;</td>
<td>E264,80</td>
</tr>
<tr>
<td>52345</td>
<td>put amount eurfrrur5.;</td>
<td>2.648</td>
</tr>
<tr>
<td></td>
<td>put amount eurfrrur9.2;</td>
<td>E2.647,97</td>
</tr>
</tbody>
</table>

See Also

Formats:
“EURTORURw.d Format” on page 141

Functions:
“EUROCURR Function” on page 209

EURFRSEKw.d Format

Converts an amount from Swedish kronor to euros

Category: Currency Conversion
Alignment: right

Syntax

EURFRSEKw.d

Syntax Description

\( w \)

specifies the width of the output field.

Default: 6

\( d \)
optionally specifies the number of digits to the right of the decimal point in the numeric value.

Details

The EURFRSEKw.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 EURFRSEKw.d format and the EUROCURR function. For more information about European currency conversion and currency conversion rate tables, see “European Currency Conversion” on page 52.

Examples

The following table shows input values in Swedish kronor, SAS statements, and the conversion results in euros.

<table>
<thead>
<tr>
<th>Amounts</th>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>put amount eurfrsek5.;</td>
<td>E5</td>
</tr>
<tr>
<td></td>
<td>put amount eurfrsek9.2;</td>
<td>E5,34</td>
</tr>
<tr>
<td>1234.56</td>
<td>put amount eurfrsek5.;</td>
<td>E132</td>
</tr>
<tr>
<td></td>
<td>put amount eurfrsek9.2;</td>
<td>E131,81</td>
</tr>
<tr>
<td>12345</td>
<td>put amount eurfrsek5.;</td>
<td>1.318</td>
</tr>
<tr>
<td></td>
<td>put amount eurfrsek9.2;</td>
<td>E1.318,08</td>
</tr>
</tbody>
</table>

See Also

Formats:

“EURTOSEKw.d Format” on page 142

Functions:

“EUROCURR Function” on page 209

EURFRSITw.d Format

Converts an amount from Slovenian tolars to euros

Category: Currency Conversion

Alignment: right

Syntax

EURFRSITw.d
Syntax Description

\(w\)

specifies the width of the output field.

**Default:** 6

\(d\)

optionally 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 “European Currency Conversion” on page 52.

Examples

The following table shows input values in Slovenian tolars, SAS statements, and the conversion results in euros.

<table>
<thead>
<tr>
<th>Amounts</th>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td>put amount eurfrsit5.;</td>
<td>E1</td>
</tr>
<tr>
<td></td>
<td>put amount eurfrsit9.2;</td>
<td>E1,05</td>
</tr>
<tr>
<td>20234.56</td>
<td>put amount eurfrsit5.;</td>
<td>E106</td>
</tr>
<tr>
<td></td>
<td>put amount eurfrsit9.2;</td>
<td>E105,94</td>
</tr>
<tr>
<td>202345</td>
<td>put amount eurfrsit5.;</td>
<td>1.059</td>
</tr>
<tr>
<td></td>
<td>put amount eurfrsit9.2;</td>
<td>E1.059,40</td>
</tr>
</tbody>
</table>

See Also

Formats:

“EURTOSIT\(w.d\) Format” on page 144

Functions:

“EUROCURR Function” on page 209
**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

\(d\)

optionally 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 “European Currency Conversion” on page 52.

**Examples**

The following table shows input values in Turkish liras, SAS statements, and the conversion results in euros.

<table>
<thead>
<tr>
<th>Amounts</th>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>400</td>
<td><code>put amount eurfrtl5.;</code></td>
<td>E1</td>
</tr>
<tr>
<td></td>
<td><code>put amount eurfrtl9.2;</code></td>
<td>E1,19</td>
</tr>
<tr>
<td>40234.56</td>
<td><code>put amount eurfrtl5.;</code></td>
<td>E119</td>
</tr>
<tr>
<td></td>
<td><code>put amount eurfrtl9.2;</code></td>
<td>E119,42</td>
</tr>
<tr>
<td>402345</td>
<td><code>put amount eurfrtl5.;</code></td>
<td>1.194</td>
</tr>
<tr>
<td></td>
<td><code>put amount eurfrtl9.2;</code></td>
<td>E1.194,21</td>
</tr>
</tbody>
</table>
See Also

Formats:
“EURTOTRLw.d Format” on page 145
Functions:
“EUROCURR Function” on page 209

EURFRYUDw.d Format

Converts an amount from Yugoslavian dinars to euros

Category: Currency Conversion
Alignment: right

Syntax
EURFRYUDw.d

Syntax Description

w
specifies the width of the output field.
Default: 6

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

Details
The EURFRYUDw.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 EURFRYUDw.d format and the EUROCURR function. For more information about European currency conversion and currency conversion rate tables, see “European Currency Conversion” on page 52.

Examples
The following table shows input values in Yugoslavian dinars, SAS statements, and the conversion results in euros.
Formats for NLS

EUROw.d Format

Writers 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

Syntax:

EUROw.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 116.

\( d \)

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

Default: 0

Range: 0-31

---

<table>
<thead>
<tr>
<th>Amounts</th>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>put amount eurfryud5.;</td>
<td>E4</td>
</tr>
<tr>
<td></td>
<td>put amount eurfryud9.2;</td>
<td>E3, 83</td>
</tr>
<tr>
<td>5234.56</td>
<td>put amount eurfryud5.;</td>
<td>E401</td>
</tr>
<tr>
<td></td>
<td>put amount eurfryud9.2;</td>
<td>E400, 67</td>
</tr>
<tr>
<td>52345</td>
<td>put amount eurfryud5.;</td>
<td>4.007</td>
</tr>
<tr>
<td></td>
<td>put amount eurfryud9.2;</td>
<td>E4.006, 69</td>
</tr>
</tbody>
</table>

See Also

Formats:

“EURTOYUDw.d Format” on page 146

Functions:

“EUROCURR Function” on page 209
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.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put amount euro10.2;</td>
<td>$1,254.71</td>
</tr>
<tr>
<td>put amount euro5.;</td>
<td>1,255</td>
</tr>
<tr>
<td>put amount euro9.2;</td>
<td>€1,254.71</td>
</tr>
<tr>
<td>put amount euro15.3;</td>
<td>€1,254.710</td>
</tr>
</tbody>
</table>

See Also

Formats:
- “EUROX\(w.d\) Format” on page 116

Informats:
- “EURO\(w.d\) Informat” on page 257
- “EUROX\(w.d\) Informat” on page 258

EURO\(X\)\(w.d\) Format

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

Category: Numeric
Alignment: right

Syntax

EURO\(X\)\(w.d\)
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 117.

\(d\)

optionally 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.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put amount eurox10.2;</td>
<td>E1.254,71</td>
</tr>
<tr>
<td>put amount eurox5.;</td>
<td>1.255</td>
</tr>
<tr>
<td>put amount eurox9.2;</td>
<td>E1.254,71</td>
</tr>
<tr>
<td>put amount eurox15.3;</td>
<td>E1.254,710</td>
</tr>
</tbody>
</table>

See Also

Formats:
“EURO\(w.d\) Format” on page 115

Informats:
“EURO\(w.d\) Informat” on page 257
“EUROX\(w.d\) Informat” on page 258
EURTOATSw.d Format

Converts an amount from euros to Austrian schillings

Category: Currency Conversion
Alignment: right

Syntax

EURTOATSw.d

Syntax Description

\( w \)

specifies the width of the output field.

Default: 6

\( d \)

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

Details

The EURTOATSw.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 EURTOATSw.d format and the EUROCURR function. For more information about European currency conversion and currency conversion rate tables, see “European Currency Conversion” on page 52.

Examples

The following table shows input values in euros, SAS statements, and the conversion results in Austrian schillings.

<table>
<thead>
<tr>
<th>Amounts</th>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>----+----1----2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>put amount eurtoats6.;</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>put amount eurtoats12.2;</td>
<td>13.76</td>
</tr>
<tr>
<td>1234.56</td>
<td>put amount eurtoats6.;</td>
<td>16988</td>
</tr>
<tr>
<td></td>
<td>put amount eurtoats12.2;</td>
<td>16987.92</td>
</tr>
<tr>
<td>12345</td>
<td>put amount eurtoats6.;</td>
<td>169871</td>
</tr>
<tr>
<td></td>
<td>put amount eurtoats12.2;</td>
<td>169870.90</td>
</tr>
</tbody>
</table>
See Also

Formats:
  “EURFRATS w.d Format” on page 86
Functions:
  “EUROCURR Function” on page 209

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
  optionally 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 “European Currency Conversion” on page 52.

Examples

The following table shows input values in euros, SAS statements, and the conversion results in Belgian francs.
### EURTOCHFw.d Format

Converts an amount from euros to Swiss francs

**Category:** Currency Conversion  
**Alignment:** right

#### Syntax Description

- **$w$**  
  Specifies the width of the output field.  
  **Default:** 6

- **$d$**  
  Optionally specifies the number of digits to the right of the decimal point in the numeric value.

#### Details

The EURTOCHFw.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 EURTOCHFw.d format and the EUROCURR function. For more information about European currency
conversion and currency conversion rate tables, see “European Currency Conversion” on page 52.

Examples

The following table shows input values in euros, SAS statements, and the conversion results in Swiss francs.

<table>
<thead>
<tr>
<th>Amounts</th>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>put amount eurtochf6.;</td>
<td>1.60</td>
</tr>
<tr>
<td></td>
<td>put amount eurtochf12.2;</td>
<td></td>
</tr>
<tr>
<td>1234.56</td>
<td>put amount eurtochf6.;</td>
<td>1981</td>
</tr>
<tr>
<td></td>
<td>put amount eurtochf12.2;</td>
<td>1980.60</td>
</tr>
<tr>
<td>12345</td>
<td>put amount eurtochf6.;</td>
<td>19805</td>
</tr>
<tr>
<td></td>
<td>put amount eurtochf12.2;</td>
<td>19805.08</td>
</tr>
</tbody>
</table>

See Also

Formats:

“EURFRCHFw.d Format” on page 88

Functions:

“EUROCURR Function” on page 209

EURTOCZKw.d Format

Converts an amount from euros to Czech koruny

Category: Currency Conversion

Alignment: right

Syntax

EURTOCZKw.d

Syntax Description

w

specifies the width of the output field.

Default: 6
$d$

optionally 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 “European Currency Conversion” on page 52.

**Examples**

The following table shows input values in euros, SAS statements, and the conversion results in Czech koruny.

<table>
<thead>
<tr>
<th>Amounts</th>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>put amount eurtoczk6.;</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>put amount eurtoczk12.2;</td>
<td>34.86</td>
</tr>
<tr>
<td>1234.56</td>
<td>put amount eurtoczk6.;</td>
<td>43032</td>
</tr>
<tr>
<td></td>
<td>put amount eurtoczk12.2;</td>
<td>43032.19</td>
</tr>
<tr>
<td>12345</td>
<td>put amount eurtoczk6.;</td>
<td>430301</td>
</tr>
<tr>
<td></td>
<td>put amount eurtoczk12.2;</td>
<td>430301.02</td>
</tr>
</tbody>
</table>

**See Also**

Formats:

“EURFRCZK$w.d$ Format” on page 89

Functions:

“EUROCURR Function” on page 209
Syntax

EURTODEM\(w.d\)

Syntax Description

\(w\)

specifies the width of the output field.

**Default:** 6

\(d\)

optionally 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 “European Currency Conversion” on page 52.

Examples

The following table shows input values in euros, SAS statements, and the conversion results in Deutsche marks.

<table>
<thead>
<tr>
<th>Amounts</th>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>put amount eurtodem6.;</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>put amount eurtodem12.2;</td>
<td>1.96</td>
</tr>
<tr>
<td>1234.56</td>
<td>put amount eurtodem6.;</td>
<td>2415</td>
</tr>
<tr>
<td></td>
<td>put amount eurtodem12.2;</td>
<td>2414.59</td>
</tr>
<tr>
<td>12345</td>
<td>put amount eurtodem6.;</td>
<td>24145</td>
</tr>
<tr>
<td></td>
<td>put amount eurtodem12.2;</td>
<td>24144.72</td>
</tr>
</tbody>
</table>

See Also

Formats:

“EURFRDEM\(w.d\) Format” on page 90

Functions:

“EUROCURR Function” on page 209
EURTODKK \textit{w.d} Format

Converts an amount from euros to Danish kroner

\textbf{Category:} Currency Conversion

\textbf{Alignment:} right

\section*{Syntax}

\textbf{EURTODKK \textit{w.d}}

\section*{Syntax Description}

\textit{w}

specifies the width of the output field.

\textbf{Default:} 6

\textit{d}

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

\section*{Details}

The EURTODKK \textit{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 \textit{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 52.

\section*{Examples}

The following table shows input values in euros, SAS statements, and the conversion results in Danish kroner:

<table>
<thead>
<tr>
<th>Amounts</th>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>\texttt{put amount eurtodkk6.;} \par \texttt{put amount eurtodkk12.2;}</td>
<td>7 \par 7.49</td>
</tr>
<tr>
<td>1234.56</td>
<td>\texttt{put amount eurtodkk6.;} \par \texttt{put amount eurtodkk12.2;}</td>
<td>9247 \par 9246.97</td>
</tr>
<tr>
<td>12345</td>
<td>\texttt{put amount eurtodkk6.;} \par \texttt{put amount eurtodkk12.2;}</td>
<td>92465 \par 92465.16</td>
</tr>
</tbody>
</table>
EURTOESP\(w.d\) Format

Converts an amount from euros to Spanish pesetas

Category: Currency Conversion

Syntax

\texttt{EURTOESP}\(w.d\)

Syntax Description

\(w\)

specifies the width of the output field.

Default: 6

\(d\)

optionally 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 “European Currency Conversion” on page 52.

Examples

The following table shows input values in euros, SAS statements, and the conversion results in Spanish pesetas.
Amounts | Statements | Results |
--- | --- | --- |
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:
“EURFRESPw.d Format” on page 93

Functions:
“EUROCURR Function” on page 209

EURTOFIMw.d Format

Converts an amount from euros to Finnish markkaa

Category: Currency Conversion
Alignment: right

Syntax
EURTOFIMw.d

Syntax Description

\( w \)

specifies the width of the output field.
Default: 6

\( d \)

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

Details

The EURTOFIMw.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 EURTOFIMw.d format and the EUROCURR function. For more information about
European currency conversion and currency conversion rate tables, see “European Currency Conversion” on page 52.

**Examples**

The following table shows input values in euros, SAS statements, and the conversion results in Finnish markkaa.

<table>
<thead>
<tr>
<th>Amounts</th>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>put amount eurtofim6.;</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>put amount eurtofim12.2;</td>
<td>5.95</td>
</tr>
<tr>
<td>1234.56</td>
<td>put amount eurtofim6.;</td>
<td>7340</td>
</tr>
<tr>
<td></td>
<td>put amount eurtofim12.2;</td>
<td>7340.36</td>
</tr>
<tr>
<td>12345</td>
<td>put amount eurtofim6.;</td>
<td>73400</td>
</tr>
<tr>
<td></td>
<td>put amount eurtofim12.2;</td>
<td>73400.04</td>
</tr>
</tbody>
</table>

**See Also**

Formats:

“EURFRFIMw.d Format” on page 94

Functions:

“EUROCURR Function” on page 209

---

**EURTOFRFw.d Format**

Converts an amount from euros to French francs

Category: Currency Conversion

Alignment: right

**Syntax**

EURTOFRFw.d

**Syntax Description**

\( w \)

specifies the width of the output field.

Default: 6
 optionally 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 “European Currency Conversion” on page 52.

**Examples**

The following table shows input values in euros, SAS statements, and the conversion results in French francs.

<table>
<thead>
<tr>
<th>Amounts</th>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>put amount eurtofrf6.;</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>put amount eurtofrf12.2;</td>
<td>6.56</td>
</tr>
<tr>
<td>1234.56</td>
<td>put amount eurtofrf6.;</td>
<td>8098</td>
</tr>
<tr>
<td></td>
<td>put amount eurtofrf12.2;</td>
<td>8098.18</td>
</tr>
<tr>
<td>12345</td>
<td>put amount eurtofrf6.;</td>
<td>80978</td>
</tr>
<tr>
<td></td>
<td>put amount eurtofrf12.2;</td>
<td>80977.89</td>
</tr>
</tbody>
</table>

**See Also**

Formats:

“EURFRFRF w.d Format” on page 95

Functions:

“EUROCURR Function” on page 209
**Syntax Description**

\[ w \]

specifies the width of the output field.

Default: 6

\[ d \]

optionally 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 “European Currency Conversion” on page 52.

**Examples**

The following table shows input values in euros, SAS statements, and the conversion results in British pounds.

<table>
<thead>
<tr>
<th>Amounts</th>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>put amount eurtogbp6.;</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>put amount eurtogbp12.2;</td>
<td>0.70</td>
</tr>
<tr>
<td>1234.56</td>
<td>put amount eurtogbp6.;</td>
<td>864</td>
</tr>
<tr>
<td></td>
<td>put amount eurtogbp12.2;</td>
<td>864.35</td>
</tr>
<tr>
<td>12345</td>
<td>put amount eurtogbp6.;</td>
<td>8643</td>
</tr>
<tr>
<td></td>
<td>put amount eurtogbp12.2;</td>
<td>8643.13</td>
</tr>
</tbody>
</table>

**See Also**

Formats:

“EURFRGBP\[w.d\] Format” on page 96

Functions:

“EUROCURR Function” on page 209
EURTOGRD\textit{w.d} Format

Converts an amount from euros to Greek drachmas

\textbf{Category:} Currency Conversion

\textbf{Alignment:} right

\section*{Syntax}

\texttt{EURTOGRDw.d}

\section*{Syntax Description}

\texttt{w}

specifies the width of the output field.

\textbf{Default:} 6

\texttt{d}

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

\section*{Details}

The \texttt{EURTOGRDw.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 \texttt{EURTOGRDw.d} format and the \texttt{EUROCURR} function. For more information about European currency conversion and currency conversion rate tables, see “European Currency Conversion” on page 52.

\section*{Examples}

The following table shows input values in euros, SAS statements, and the conversion results in Greek drachmas.

\begin{center}
\begin{tabular}{lll}
\hline
Amounts & Statements & Results \\
\hline
1 & put amount eurtogr8.; & 341 \\
& put amount eurtogr16.2; & 340.89 \\
1234.56 & put amount eurtogr8.; & 420843 \\
& put amount eurtogr16.2; & 420842.99 \\
12345 & put amount eurtogr8.; & 4208225 \\
& put amount eurtogr16.2; & 4208225.33 \\
\hline
\end{tabular}
\end{center}
See Also

Formats:
  “EURFRGRDw.d Format” on page 97
Functions:
  “EUROCURR Function” on page 209

EURTOHUFw.d Format

Converts an amount from euros to Hungarian forints

Category:   Currency Conversion
Alignment:  right

Syntax

EURTOHUFw.d

Syntax Description

\( w \)

specifies the width of the output field.

Default:   6

\( d \)

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

Details

The EURTOHUFw.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 EURTOHUFw.d format and the EUROCURR function. For more information about European currency conversion and currency conversion rate tables, see “European Currency Conversion” on page 52.

Examples

The following table shows input values in euros, SAS statements, and the conversion results in Hungarian forints.
See Also

Formats:

“EURFRHUFw.d Format” on page 98

Functions:

“EUROCURR Function” on page 209

EURTOIEPw.d Format

Converts an amount from euros to Irish pounds

Category: Currency Conversion

Alignment: right

Syntax

EURTOIEPw.d

Syntax Description

w

specifies the width of the output field.

Default: 6

d

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

Details

The EURTOIEPw.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 EURTOIEPw.d format and the EUROCURR function. For more information about European currency
conversion and currency conversion rate tables, see “European Currency Conversion” on page 52.

**Examples**

The following table shows input values in euros, SAS statements, and the conversion results in Irish pounds.

<table>
<thead>
<tr>
<th>Amounts</th>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>put amount eurtoiep6.;</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>put amount eurtoiep12.2;</td>
<td>0.79</td>
</tr>
<tr>
<td>1234.56</td>
<td>put amount eurtoiep6.;</td>
<td>972</td>
</tr>
<tr>
<td></td>
<td>put amount eurtoiep12.2;</td>
<td>972.30</td>
</tr>
<tr>
<td>12345</td>
<td>put amount eurtoiep6.;</td>
<td>9722</td>
</tr>
<tr>
<td></td>
<td>put amount eurtoiep12.2;</td>
<td>9722.48</td>
</tr>
</tbody>
</table>

**See Also**

Formats:

“EURFRIEPw.d Format” on page 100

Functions:

“EUROCURR Function” on page 209

---

**EURTOITLw.d Format**

Converts an amount from euros to Italian lire

**Category:** Currency Conversion

**Alignment:** right

**Syntax**

`EURTOITLw.d`

**Syntax Description**

`w` specifies the width of the output field.

**Default:** 6
 optionally specifies the number of digits to the right of the decimal point in the numeric value.

Details

The EURTOITLw.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 EURTOITLw.d format and the EUROCURR function. For more information about European currency conversion and currency conversion rate tables, see “European Currency Conversion” on page 52.

Examples

The following table shows input values in euros, SAS statements, and the conversion results in Italian lire.

<table>
<thead>
<tr>
<th>Amounts</th>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>put amount eurtoit18.;</td>
<td>1936</td>
</tr>
<tr>
<td></td>
<td>put amount eurtoit112.2;</td>
<td>1936.27</td>
</tr>
<tr>
<td>1234.56</td>
<td>put amount eurtoit18.;</td>
<td>2390441</td>
</tr>
<tr>
<td></td>
<td>put amount eurtoit112.2;</td>
<td>2390441.49</td>
</tr>
<tr>
<td>12345</td>
<td>put amount eurtoit18.;</td>
<td>23903253</td>
</tr>
<tr>
<td></td>
<td>put amount eurtoit112.2;</td>
<td>23903253.15</td>
</tr>
</tbody>
</table>

See Also

Formats:

“EURFRITLw.d Format” on page 101

Functions:

“EUROCURR Function” on page 209

EURTOLUFw.d Format

Converts an amount from euros to Luxembourg francs

Category: Currency Conversion

Alignment: right

Syntax

EURTOLUFw.d
Syntax Description

\( w \)

specifies the width of the output field.

Default: 6

\( d \)

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

Details

The EURTOLUFw,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 EURTOLUFw,d format and the EUROCURR function. For more information about European currency conversion and currency conversion rate tables, see “European Currency Conversion” on page 52.

Examples

The following table shows input values in euros, SAS statements, and the conversion results in Luxembourg francs.

<table>
<thead>
<tr>
<th>Amounts</th>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>put amount eurtoluf6.;</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>put amount eurtoluf12.2;</td>
<td>40.34</td>
</tr>
<tr>
<td>1234.56</td>
<td>put amount eurtoluf6.;</td>
<td>49802</td>
</tr>
<tr>
<td></td>
<td>put amount eurtoluf12.2;</td>
<td>49802.03</td>
</tr>
<tr>
<td>12345</td>
<td>put amount eurtoluf6.;</td>
<td>497996</td>
</tr>
<tr>
<td></td>
<td>put amount eurtoluf12.2;</td>
<td>497996.07</td>
</tr>
</tbody>
</table>

See Also

Formats:

“EURFRLUFw,d Format” on page 102

Functions:

“EUROCURR Function” on page 209

EURTONLGw,d Format

Converts an amount from euros to Dutch guilders

Category: Currency Conversion
Syntax

\texttt{EURTONLg.w.d}

Syntax Description

\textit{w}  
specifies the width of the output field.  
\textbf{Default:} 6

\textit{d}  
optionally specifies the number of digits to the right of the decimal point in the numeric value.

Details

The \texttt{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 \texttt{EURTONLg.w.d} format and the \texttt{EUROCURR} function. For more information about European currency conversion and currency conversion rate tables, see “European Currency Conversion” on page 52.

Examples

The following table shows input values in euros, SAS statements, and the conversion results in Dutch guilders.

<table>
<thead>
<tr>
<th>Amounts</th>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>\texttt{put amount eurton lg6.;}</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>\texttt{put amount eurton lg12.2;}</td>
<td>2.20</td>
</tr>
<tr>
<td>1234.56</td>
<td>\texttt{put amount eurton lg6.;}</td>
<td>2721</td>
</tr>
<tr>
<td></td>
<td>\texttt{put amount eurton lg12.2;}</td>
<td>2720.61</td>
</tr>
<tr>
<td>12345</td>
<td>\texttt{put amount eurton lg6.;}</td>
<td>27205</td>
</tr>
<tr>
<td></td>
<td>\texttt{put amount eurton lg12.2;}</td>
<td>27204.80</td>
</tr>
</tbody>
</table>

See Also

Formats:

“EURFRNLGw.d Format” on page 103

Functions:

“EUROCURR Function” on page 209
EURTONOK\textit{w.d} Format

Converts an amount from euros to Norwegian krone

\textbf{Category:} Currency Conversion

\textbf{Alignment:} right

\textbf{Syntax}

\texttt{EURTONOK\textit{w.d}}

\textbf{Syntax Description}

\textit{w}

specifies the width of the output field.

\textbf{Default:} 6

\textit{d}

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

\textbf{Details}

The EURTONOK\textit{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\textit{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 52.

\textbf{Examples}

The following table shows input values in euros, SAS statements, and the conversion results in Norwegian krone.

<table>
<thead>
<tr>
<th>Amounts</th>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>put amount eurtonok\textit{6};</td>
<td>9</td>
</tr>
<tr>
<td>1</td>
<td>put amount eurtonok\textit{12.2};</td>
<td>9.20</td>
</tr>
<tr>
<td>1234.56</td>
<td>put amount eurtonok\textit{6};</td>
<td>11355</td>
</tr>
<tr>
<td></td>
<td>put amount eurtonok\textit{12.2};</td>
<td>11355.11</td>
</tr>
<tr>
<td>12345</td>
<td>put amount eurtonok\textit{6};</td>
<td>113546</td>
</tr>
<tr>
<td></td>
<td>put amount eurtonok\textit{12.2};</td>
<td>113545.61</td>
</tr>
</tbody>
</table>
**EURTOPLZw.d Format**

Converts an amount from euros to Polish zlotys

- **Category:** Currency Conversion
- **Alignment:** right

**Syntax**

`EURTOPLZw.d`

**Syntax Description**

- `w` specifies the width of the output field.  
  - **Default:** 6
- `d` optionally specifies the number of digits to the right of the decimal point in the numeric value.

**Details**

The EURTOPLZw.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 EURTOPLZw.d format and the EUROCURR function. For more information about European currency conversion and currency conversion rate tables, see “European Currency Conversion” on page 52.

**Examples**

The following table shows input values in euros, SAS statements, and the conversion results in Polish zlotys.

---

**See Also**

Formats:

- “EURFRNOKw.d Format” on page 104

Functions:

- “EUROCURR Function” on page 209
## EURTOPTE\(w.d\) Format

Converts an amount from euros to Portuguese escudos

### Category:
Currency Conversion

### Alignment:
right

### Syntax

\[
\text{EURTOPTE} \(w.d\)
\]

### Syntax Description

- \(w\)
  
  specifies the width of the output field.
  
  Default: 6

- \(d\)
  
  optionally 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 “European Currency Conversion” on page 52.

Examples

The following table shows input values in euros, SAS statements, and the conversion results in Portuguese escudos.

<table>
<thead>
<tr>
<th>Amounts</th>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><code>put amount eurtopte8.;</code></td>
<td>200</td>
</tr>
<tr>
<td></td>
<td><code>put amount eurtopte12.2;</code></td>
<td>200.48</td>
</tr>
<tr>
<td>1234.56</td>
<td><code>put amount eurtopte8.;</code></td>
<td>247507</td>
</tr>
<tr>
<td></td>
<td><code>put amount eurtopte12.2;</code></td>
<td>247507.06</td>
</tr>
<tr>
<td>12345</td>
<td><code>put amount eurtopte8.;</code></td>
<td>2474950</td>
</tr>
<tr>
<td></td>
<td><code>put amount eurtopte12.2;</code></td>
<td>2474950.29</td>
</tr>
</tbody>
</table>

See Also

Formats:

“EURFRPTEw.d Format” on page 107

Functions:

“EUROCURR Function” on page 209

EURTOROLw.d Format

Converts an amount from euros to Romanian lei

Category: Currency Conversion

Alignment: right

Syntax

EURTOROLw.d

Syntax Description

\( w \)

specifies the width of the output field.

Default: 6
$d$

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

Details

The EURTOROR$w.d$ format converts an amount in euros to an amount in Romanian lei. The conversion rate is a changeable rate that is incorporated into the EURTOROR$w.d$ format and the EURCURR function. For more information about European currency conversion and currency conversion rate tables, see “European Currency Conversion” on page 52.

Examples

The following table shows input values in euros, SAS statements, and the conversion results in Romanian lei.

<table>
<thead>
<tr>
<th>Amounts</th>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>put amount eurtor06.;</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>put amount eurtor12.2;</td>
<td>13.71</td>
</tr>
<tr>
<td>1234.56</td>
<td>put amount eurtor06.;</td>
<td>16926</td>
</tr>
<tr>
<td></td>
<td>put amount eurtor12.2;</td>
<td>16925.82</td>
</tr>
<tr>
<td>12345</td>
<td>put amount eurtor06.;</td>
<td>169250</td>
</tr>
<tr>
<td></td>
<td>put amount eurtor12.2;</td>
<td>169249.95</td>
</tr>
</tbody>
</table>

See Also

Formats:

“EURFRROL$w.d$ Format” on page 108

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

\( d \)

optionally 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 “European Currency Conversion” on page 52.

## Examples

The following table shows input values in euros, SAS statements, and the conversion results in Russian rubles.

<table>
<thead>
<tr>
<th>Amounts</th>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>put amount eurtorur6.; put amount eurtorur12.2;</td>
<td>20</td>
</tr>
<tr>
<td>1234.56</td>
<td>put amount eurtorur6.; put amount eurtorur12.2;</td>
<td>24405</td>
</tr>
<tr>
<td>12345</td>
<td>put amount eurtorur6.; put amount eurtorur12.2;</td>
<td>244036</td>
</tr>
</tbody>
</table>

## See Also

Formats:

“EURFRRUR\(w.d\) Format” on page 109

Functions:

“EUROCURR Function” on page 209

---

**EURTOSEK\(w.d\) Format**

Converts an amount from euros to Swedish kronor

**Category:** Currency Conversion
Alignment: right

Syntax
EURTOSEKw.d

Syntax Description

$w$

specifies the width of the output field.
Default: 6

d

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

Details

The EURTOSEKw.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 EURTOSEKw.d format and the EUROCURR function. For more information about European currency conversion and currency conversion rate tables, see “European Currency Conversion” on page 52.

Examples

The following table shows input values in euros, SAS statements, and the conversion results in Swedish kronor.

<table>
<thead>
<tr>
<th>Amounts</th>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>put amount eurtosek6.;</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>put amount eurtosek12.2;</td>
<td>9.37</td>
</tr>
<tr>
<td>1234.56</td>
<td>put amount eurtosek6.;</td>
<td>11563</td>
</tr>
<tr>
<td></td>
<td>put amount eurtosek12.2;</td>
<td>11562.78</td>
</tr>
<tr>
<td>12345</td>
<td>put amount eurtosek6.;</td>
<td>115622</td>
</tr>
<tr>
<td></td>
<td>put amount eurtosek12.2;</td>
<td>115622.16</td>
</tr>
</tbody>
</table>

See Also

Formats:
“EURFRSEKw.d Format” on page 110

Functions:
“EUROCURR Function” on page 209
**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

\( d \)

optionally 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 “European Currency Conversion” on page 52.

### Examples

The following table shows input values in euros, SAS statements, and the conversion results in Slovenian tolars.

<table>
<thead>
<tr>
<th>Amounts</th>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>put amount eurtosit8.;</td>
<td>191</td>
</tr>
<tr>
<td></td>
<td>put amount eurtosit14.2;</td>
<td>191.00</td>
</tr>
<tr>
<td>1234.56</td>
<td>put amount eurtosit8.;</td>
<td>235801</td>
</tr>
<tr>
<td></td>
<td>put amount eurtosit14.2;</td>
<td>235800.96</td>
</tr>
<tr>
<td>12345</td>
<td>put amount eurtosit8.;</td>
<td>2357895</td>
</tr>
<tr>
<td></td>
<td>put amount eurtosit14.2;</td>
<td>2357895.00</td>
</tr>
</tbody>
</table>
See Also

Formats:
“EURFRSITw.d Format” on page 111
Functions:
“EUROCURR Function” on page 209

EURTOTRLw.d Format

Converts an amount from euros to Turkish liras
Category: Currency Conversion
Alignment: right

Syntax
EURTOTRLw.d

Syntax Description

w
specifies the width of the output field.
Default: 6

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

Details
The EURTOTRLw.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 EURTOTRLw.d format and the EUROCURR function. For more information about European currency conversion and currency conversion rate tables, see “European Currency Conversion” on page 52.

Examples
The following table shows input values in euros, SAS statements, and the conversion results in Turkish liras.
### EURTOYUD \(w.d\) Format

Converts an amount from euros to Yugoslavian dinars

**Category:** Currency Conversion  
**Alignment:** right

#### Syntax

\[
\text{EURTOYUD}\, w.d
\]

#### Syntax Description

- \(w\)
  - Specifies the width of the output field.  
  - **Default:** 6

- \(d\)
  - Optionally 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 “European Currency Conversion” on page 52.

**Examples**

The following table shows input values in euros, SAS statements, and the conversion results in Yugoslavian dinars.

<table>
<thead>
<tr>
<th>Amounts</th>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>put amount eurtoyud6.;</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>put amount eurtoyud12.2;</td>
<td>13.06</td>
</tr>
<tr>
<td>1234.56</td>
<td>put amount eurtoyud6.;</td>
<td>16129</td>
</tr>
<tr>
<td></td>
<td>put amount eurtoyud12.2;</td>
<td>16128.79</td>
</tr>
<tr>
<td>12345</td>
<td>put amount eurtoyud6.;</td>
<td>161280</td>
</tr>
<tr>
<td></td>
<td>put amount eurtoyud12.2;</td>
<td>161280.02</td>
</tr>
</tbody>
</table>

**See Also**

Formats:

“EURFRYUDw.d Format” on page 114

Functions:

“EUROCURR Function” on page 209

---

**HDATEw. Format**

Writes date values in the form *yyyy mmmm 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**

HDATEw.

**Syntax Description**

*w* specifies the width of the output field.

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

The HDATEw. format writes the SAS date value in the form \textit{yyyy mmmm dd}:

- \textit{yyyy} is the year
- \textit{mmmmm} is the Hebrew name of the month
- \textit{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.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put day hdate9.;</td>
<td>03 י&quot;ט 16</td>
</tr>
<tr>
<td>put day hdate11.;</td>
<td>2003 י&quot;ט 16</td>
</tr>
<tr>
<td>put day hdate17.;</td>
<td>2003 י&quot;ט 16</td>
</tr>
</tbody>
</table>

See Also

Formats:

“HEBDATEw. Format” on page 148

HEBDATEw. Format

Writes date values according to the Jewish calendar

Category: Date and Time

Alignment: right

Syntax

\texttt{HEBDATEw.}
Syntax Description

\( w \)
specifies the width of the output field.

**Default:** 16

**Range:** 7–24

Details

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

**long**

ר"ץ אָשֶׁר הָיוֹם

**default**

י לַאֵוָר הָיוֹם

**short**

י לַהֲוָי

Examples

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

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put day hebd13.;</td>
<td>י&quot;ב אָלֶיֶה יָנָיוֹם</td>
</tr>
<tr>
<td>put day hebd16.;</td>
<td>י&quot;ב אָלֶיֶה יָנָיוֹם</td>
</tr>
<tr>
<td>put day hebd24.;</td>
<td>רָשׁוֹן י&quot;ב אָדָר בַּעֲשָׂן יָנָיוֹם</td>
</tr>
</tbody>
</table>

See Also

Informats:

“`HDATEw. Format`” on page 147

---

**$KANJlw. Format**

Adds shift-code data to DBCS data

**Category:** DBCS

**Alignment:** left

Syntax

$KANJlw.
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.

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

See Also

Formats:
- “$KANJIXw. Format” on page 150

Informats:
- “$KANJIw. Informat” on page 263
- “$KANJIXw. Informat” on page 263

System Options:
- “DBCSTYPE System Option: UNIX, Windows, and z/OS” on page 351

$KANJIXw. Format

Removes shift-code data from DBCS data

**Category:** DBCS

**Alignment:** left

Syntax

$KANJIXw.

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.

**Range:** The minimum width of the format is 2.

Details

The input data length must be \( 2 + (\text{SO/Sl length}) \times 2 \). The data must start with SO and end with SI, unless single-byte data is returned. This format always returns a blank for DBCSTYPE data that does not use a shift-code mechanism.
See Also

Formats:
   “$KANJIw. Format” on page 149
Informats:
   “$KANJIw. Informat” on page 263
   “$KANJIIXw. Informat” on page 263
System Options:
   “DBCSTYPE System Option: UNIX, Windows, and z/OS” on page 351

$LOGVS\textit{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

$\textbackslash LOGVS\textit{w}.$

Syntax Description

\textit{w}

specifies the width of the output field.

Default:  200
Range:  1–32000

Details

The $\textbackslash LOGVS\textit{w}.$ format is used when you store logical-ordered text on a visual server.

Note:  If the $\textbackslash LOGVS\textit{w}.$ format is not accessible, then the Hebrew portion of the data will be reversed. $\triangle$

Comparisons

The $\textbackslash LOGVS\textit{w}.$ format performs processing that is the opposite of the $\textbackslash LOGVSR\textit{w}.$ format.

Examples

The following example uses the input value of “_flight”.

flight

flight

flight

flight
$LOGVSRw. 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
$LOGVSRw.

Syntax Description

\( w \)

specifies the width of the output field.

Default: 200
Range: 1–32000

Details

The $LOGVSRw. format is used when you store logical-ordered text on a visual server. The Hebrew portion of the text will be reversed if the $LOGVSWw. format is not on the server.

Comparisons

The $LOGVSRw. format performs processing that is opposite of the $LOGVSWw. format.

Examples

The following example uses the input value of “_flight”.

See Also

Formats:
“$LOGVSRw. Format” on page 152
Informats:
“$LOGVSRw. Informat” on page 265
“$LOGVSWw. Informat” on page 264

Statements | Results
--- | ---
| put text $logvs12.; | ----------1----------2-----+
| | $flight

Put text $logvs12.;
### MINGUOw. Format

**Writes date values as Taiwanese dates in the form yyyy-mm-dd**

**Category:** Date and Time  
**Alignment:** left

### Syntax

**MINGUOw.**

### Syntax Description

- **w** specifies the width of the output field.  
  - **Default:** 8  
  - **Range:** 1–10

### Details

The MINGUOw. format writes SAS date values in the form yyyy-mm-dd, 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.

### See Also

Formats:  
- “$LOGVSw. Format” on page 151  
Informats:  
- “$LOGVSw. Informat” on page 264  
- “$LOGVSRw. Informat” on page 265
The Taiwanese calendar uses 1912 as the base year (01/01/01 is January 1, 1912). Dates prior to 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.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put date minguo10.;</td>
<td>0082/01/01</td>
</tr>
<tr>
<td></td>
<td>0101/01/01</td>
</tr>
<tr>
<td></td>
<td>0101/01/01</td>
</tr>
<tr>
<td></td>
<td>**********</td>
</tr>
</tbody>
</table>

**See Also**

Informs:

“MINGUOw. Informat” on page 266

---

**NENGOw. Format**

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

**Category:** Date and Time

**Alignment:** left

**Syntax**

NENGOw.

**Syntax Description**

w

specifies the width of the output field.

**Default:** 10

**Range:** 2–10
Details
The NENGOW. format writes SAS date values in the form e.yymmd, 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.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put date nengo3.;</td>
<td>H14</td>
</tr>
<tr>
<td>put date nengo6.;</td>
<td>H14/01</td>
</tr>
<tr>
<td>put date nengo8.;</td>
<td>H.140102</td>
</tr>
<tr>
<td>put date nengo9.;</td>
<td>H14/01/02</td>
</tr>
<tr>
<td>put date nengo10.;</td>
<td>H.14/01/02</td>
</tr>
</tbody>
</table>

See Also
Informats:

“NENGOW. Informat” on page 267

NLDATEx. 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
NLDATEx.
**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.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>options locale=English_UnitedStates;</td>
<td></td>
</tr>
<tr>
<td>put day nldate.;</td>
<td>February 24, 2003</td>
</tr>
<tr>
<td>options locale=German_Germany;</td>
<td></td>
</tr>
<tr>
<td>put day nldate.;</td>
<td>24. Februar 2003</td>
</tr>
</tbody>
</table>

**See Also**

Formats:

“NLDATEMN\( w \). Format” on page 156

“NLDATEW\( w \). Format” on page 157

“NLDATEWN\( w \). Format” on page 158

---

**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.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>options locale=English_UnitedStates; put month nldatemn.;</td>
<td>February</td>
</tr>
<tr>
<td>options locale=German_Germany; put month nldatemn.;</td>
<td>Februar</td>
</tr>
</tbody>
</table>

See Also

Formats:

“NLDATE\( w \). Format” on page 155
“NLDATE\( w \). Format” on page 157
“NLDATEN\( w \). Format” on page 158

NLDATEN\( w \). 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

NLDATEN\( w \).
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

NLDATE\( w \). is similar to WEEKDATE\( w \). 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.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>options locale=English_UnitedStates; put date nldatew.;</td>
<td>Sun, Feb 24, 03</td>
</tr>
<tr>
<td>options locale=German_Germany; put date nldatew.;</td>
<td>So, 24. Feb 03</td>
</tr>
</tbody>
</table>

See Also

Formats:
“NLDATE\( w \). Format” on page 155
“NLDATEMN\( w \). Format” on page 156
“NLDATE\( w \). Format” on page 158

**NLDATE\( w \). 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

NLDATE\( w \).
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.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>options locale=English_UnitedStates;</td>
<td></td>
</tr>
<tr>
<td>put date nldatewn.;</td>
<td>Sunday</td>
</tr>
<tr>
<td>options locale=German_Germany;</td>
<td></td>
</tr>
<tr>
<td>put date nldatewn.;</td>
<td>Sonntag</td>
</tr>
</tbody>
</table>

See Also

Formats:
“NLDATE\( w \). Format” on page 155
“NLDATEMN\( w \). Format” on page 156
“NLDATEW\( w \). Format” on page 157

NLDATM\( w \). Format

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

Category: Date and Time
Alignment: left
Syntax

NLDATMw.

Syntax Description

\( w \)

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

Default: 30

Range: 10–200

Comparisons

The NLDATMw. format is similar to the DATETIMEw. format except that the NLDATMw. 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.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>options locale=English_UnitedStates;</td>
<td>24Feb03:12:39:43</td>
</tr>
<tr>
<td>put day nldatm.;</td>
<td></td>
</tr>
<tr>
<td>options locale=German_Germany;</td>
<td>24. Februar 2003 12.39 Uhr</td>
</tr>
<tr>
<td>put day nldatm.;</td>
<td></td>
</tr>
</tbody>
</table>

See Also

Formats:

“NLDATMAPw. Format” on page 160

“NLDATMTMw. Format” on page 161

“NLDATMWr. Format” on page 162

NLDATMAPw. Format

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

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>options locale=English_UnitedStates; put event nldatmap.;</td>
<td>February 24, 2003 12:39:43 PM</td>
</tr>
<tr>
<td>options locale=Spanish_Mexico; put event nldatmap.;</td>
<td>01 de enero de 2003 01:24:35 PM</td>
</tr>
</tbody>
</table>

**See Also**

Formats:

“NLDATM\(_w\). Format” on page 159
“NLDATMTM\(_w\). Format” on page 161
“NLDATMW\(_w\). Format” on page 162

**NLDATMTM\(_w\). Format**

Converts the time portion of a SAS date-time 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

\texttt{NLDATMTMw.}

Syntax Description

\texttt{w}

specifies the width of the output field.

\textbf{Default:} 16
\textbf{Range:} 16–200

Comparisons

The \texttt{NLDATMTMw.} format is similar to the \texttt{TODw.} format except that the \texttt{NLDATMTMw.} 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.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>\texttt{options locale=English_UnitedStates;} \texttt{put event nldatmtm.;}</td>
<td>12:39:43</td>
</tr>
<tr>
<td>\texttt{options locale=German_Germany;} \texttt{put event nldatmtm.;}</td>
<td>12.39 Uhr</td>
</tr>
</tbody>
</table>

See Also

Formats:

“\texttt{NLDATMw. Format}” on page 159
“\texttt{NLDATMAPw. Format}” on page 160
“\texttt{NLDATMWWw. Format}” on page 162

\textbf{NLDATMWWw. Format}

Converts a SAS date value to a date-time value of the specified locale, and then writes the value a day-of-week and date-time
Category: Date and Time
Alignment: left

Syntax

\texttt{NLDATM}\texttt{w}.

Syntax Description

\textit{w} specifies the width of the output field. If necessary, SAS abbreviates the day-of-week and date-time to fit the format width.

Default: 30
Range: 16–200

Comparisons

The \texttt{NLDATM}\texttt{w}. format is similar to the \texttt{TWMDY}\texttt{w}. format except that the \texttt{NLDATM}\texttt{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.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>options locale=English_UnitedStates;</td>
<td>----+----1----+----2----+----3</td>
</tr>
<tr>
<td>put event nldatmw.;</td>
<td>Sun, Feb 24, 2003 12:39:43</td>
</tr>
<tr>
<td>options locale=German_Germany;</td>
<td></td>
</tr>
<tr>
<td>put event nldatmw.;</td>
<td>So, 24. Feb 2003 12:39 Uhr</td>
</tr>
</tbody>
</table>

See Also

Formats:

“\texttt{NLDATM}\texttt{w}. Format” on page 159
“\texttt{NLDATMAP}\texttt{w}. Format” on page 160
“\texttt{NLDATMTM}\texttt{w}. Format” on page 161

NLMNY\texttt{w}.\texttt{d} Format

Writes the monetary format of the local expression in the specified locale using local currency.
Category:  Numeric
Alignment:  left

Syntax

NLMNYw.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

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\(w.d\) format writes the monetary format of the local expression in the specified locale using local currency. The NLMNYI\(w.d\) format writes the monetary format of the international expression in the specified locale. Typically the NLMNY\(w.d\) format and the NLMNYI\(w.d\) format return the same results, however some of the locales produce different results for the local and international expressions.

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.

\[
x = \text{put}(-1234.56789, \text{nlmny32.2});
y = \text{put}(-1234.56789, \text{dollar32.2});
\]
Statements | Results
---|---
put \(x=;\) | \(-1,234.57\)
put \(y=;\) | \(-1,234.57\)

### See Also

Formats:

“NLMNYI\(w.d\) Format” on page 165

Informats:

“NLMNY\(w.d\) Informat” on page 270

“NLMNYI\(w.d\) Informat” on page 272

### NLMNYI\(w.d\) Format

Writes the monetary format of the international expression in the specified locale

**Category:** Numeric

**Alignment:** left

### Syntax

\[ \text{NLMNYI}w.d \]

### 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 separators, the \(d\) value is ignored.

**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 currency symbol, the thousands separator, and the decimal separator that is used by the locale.
Note: The NLMNYIw.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 NLMNYw.d format writes the monetary format of the local expression in the specified locale using local currency. The NLMNYIw.d format writes the monetary format of the international expression in the specified locale. Typically the NLMNYw.d format and the NLMNYIw.d format return the same results, however, some of the locales produce different results for the local and international expressions.

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

```plaintext
x=put(-1234.56789,nlmnyi32.2);
y=put(-1234.56789,nlmny32.2);
z=put(-1234.56789,dollar32.2);
```

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>(USD1,234.57)</td>
</tr>
<tr>
<td>put y=;</td>
<td>($1,234.57)</td>
</tr>
<tr>
<td>put z=;</td>
<td>$-1,234.57</td>
</tr>
</tbody>
</table>

See Also
Formats:
“NLMNYw.d Format” on page 163
Informats:
“NLMNYw.d Informat” on page 270
“NLMNYIw.d Informat” on page 272

NLMNYw.d Format
Writes the numeric format of the local expression in the specified locale
Category: Numeric
Alignment: left

Syntax
NLMNUMw.d
Syntax Description

\( w \)
- specifies the width of the output 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 NLNUM\( w,d \) 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 format of the local expression in the specified locale. The NLNUMI\( w,d \) format writes the numeric format of the international expression in the specified locale. Typically the NLNUM\( w,d \) format and the NLNUMI\( w,d \) format return the same results, however some of the locales produce different results for the local and international expressions.

The NLNUM\( w,d \) format is similar to the COMMA\( w,d \) format except that the NLNUM\( w,d \) format is locale specific.

Examples

\[
x=\text{put}(-1234356.7891,\text{nlnum32.2});
\]

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>---+-----+---+-----+</td>
<td></td>
</tr>
<tr>
<td>options LOCALE=English_UnitedStates;</td>
<td>-1,234,356.79</td>
</tr>
<tr>
<td>put x=;</td>
<td>-1,234,356.79</td>
</tr>
<tr>
<td>options LOCALE=German_Germany;</td>
<td>-1.234.356,79</td>
</tr>
<tr>
<td>put x=;</td>
<td>-1.234.356,79</td>
</tr>
</tbody>
</table>

See Also

Formats:

“NLNUMI\( w,d \) Format” on page 168
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

$d$

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

**Details**

The NLNUMI$_{w.d}$ 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 the thousands separator and the decimal separator that is used by the locale.

**Comparisons**

The NLNUMI$_{w.d}$ format writes the numeric format of the local expression in the specified locale. The NLNUMI$_{w.d}$ format writes the numeric format of the international expression in the specified locale. Typically the NLNUMI$_{w.d}$ format and the NLNUMI$_{w.d}$ format return the same results, however, some of the locales produce different results for the local and international expressions.

The NLNUMI$_{w.d}$ format is similar to the COMMA$_{w.d}$ format except that the NLNUMI$_{w.d}$ format is locale specific.
Examples

```
x=put(-1234356.7891,nlnumi32.2);
```

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>options LOCALE=English_UnitedStates; put x=;</td>
<td>-1,234,356.79</td>
</tr>
<tr>
<td>options LOCALE=German_Germany; put x=;</td>
<td>-1.234.356,79</td>
</tr>
</tbody>
</table>

See Also

Formats:

“NLNUMw.d Format” on page 166

Informats:

“NLNUMw.d Informat” on page 273
“NLNUMIw.d Informat” on page 274

NLPCTw.d Format

Writes percentage data of the local expression in the specified locale

Category: Numeric
Alignment: left

Syntax

NLPCTw.d

Syntax Description

\( w \)

specifies the width of the output 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

Comparisons

The NLPCTw.d format writes percentage data of the local expression in the specified locale. The NLPCTIw.d format writes percentage data of the international expression in the specified locale. Typically the NLPCTw.d format and the NLPCTIw.d format return the same results, however some of the locales produce different results for the local and international expressions.

The NLPCTw.d format is similar to the PERCENTw.d format except the NLPCTw.d format is locale specific.

Examples

```
x=put(-12.3456789,nlpct32.2);
y=put(-12.3456789,nlpcti32.2);
z=put(-12.3456789.percent32.2);
```

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>options LOCALE=English_UnitedStates;</td>
<td></td>
</tr>
<tr>
<td>put x=;</td>
<td>-1,234.57%</td>
</tr>
<tr>
<td>put y=;</td>
<td>-1,234.57%</td>
</tr>
<tr>
<td>put z=;</td>
<td>(1234.57%)</td>
</tr>
<tr>
<td>options LOCALE=German_Germany;</td>
<td></td>
</tr>
<tr>
<td>put x=;</td>
<td>-1.234,57%</td>
</tr>
<tr>
<td>put y=;</td>
<td>-1,234.57%</td>
</tr>
<tr>
<td>put z=;</td>
<td>(1234.57%)</td>
</tr>
</tbody>
</table>

See Also

Formats:

“NLPCTIw.d Format” on page 170

Informats:

“NLPCTIw.d Informat” on page 275

“NLPCTIw.d Informat” on page 277

NLPCTIw.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: 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

Comparisons
The NLPCT\(w.d\) format writes percentage data of the local expression in the specified locale. The NLPCTI\(w.d\) format writes percentage data of the international expression in the specified locale. Typically the NLPCT\(w.d\) format and the NLPCTI\(w.d\) format return the same results, however some of the locales produce different results for the local and international expressions.

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.

\[x=\text{put}(-12.3456789,\text{nlpcti}32.2);\]
\[y=\text{put}(-12.3456789,\text{percent}32.2);\]

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put x=;</td>
<td>-1,234.57%</td>
</tr>
<tr>
<td>put y=;</td>
<td>(1234.57)</td>
</tr>
</tbody>
</table>

See Also

Formats:
“NLPCT\(w.d\) Format” on page 169
Informs:
“NLPCTw.d Informat” on page 275
“NLPCTIw.d Informat” on page 277

**NLTIMEw. Format**

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

**Category:** Date and Time

**Alignment:** left

### Syntax

**NLTIMEw.**

**Syntax Description**

\( w \)

specifies the width of the input field.

**Default:** 20

**Range:** 10–200

### Comparisons

The NLTIMEw. format is similar to the TIMEw. format except that the NLTIMEw. 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.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>options locale=English_UnitedStates; put time nltime.;</td>
<td>4:24:43</td>
</tr>
<tr>
<td>options locale=German_Germany; put time nltime.;</td>
<td>16.24</td>
</tr>
</tbody>
</table>
See Also

Formats:
“NLTIMAPw. Format” on page 173

NLTIMAPw. Format

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.
Category: Date and Time
Alignment: left

Syntax

NLTIMAPw.

Syntax Description

$w$

specifies the width of the output field.

Default: 10
Range: 4–200

Comparisons

The NLTIMAPw. format is similar to the TIMEAMPMw. format except that the
NLTIMAPw. 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.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>options locale=English_UnitedStates;</td>
<td></td>
</tr>
<tr>
<td>put time nltimap.;</td>
<td>4:24:43 PM</td>
</tr>
<tr>
<td>options locale=German_Germany;</td>
<td></td>
</tr>
<tr>
<td>put time nltimap.;</td>
<td>16.24 Uhr</td>
</tr>
</tbody>
</table>
$UCS2Bw$ 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

$UCS2Bw$

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 $UCS2Bw$ 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 $UCS2Bw$ format performs processing that is the opposite of the $UCS2BEw$ format.

Examples

This example uses the Japanese Shift_JIS encoding, which is supported under the UNIX operating environment.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>x = \text{&quot;$&quot;};\text{ } \text{&quot;¥&quot;} ;</td>
<td>\text{‘5927’x (binary)}</td>
</tr>
</tbody>
</table>
See Also

Formats:

“$UCS2Lw. Format” on page 176
“$UCS2Xw. Format” on page 178
“$UTF8Xw. Format” on page 195
“$UCS2BEw. Format” on page 175

Informats:

“$UCS2Bw. Informat” on page 282
“$UCS2BEw. Informat” on page 283
“$UCS2Lw. Informat” on page 284
“$UCS2Xw. Informat” on page 286
“$UTF8Xw. Informat” on page 300

$UCS2BEw. 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

$UCS2BEw.

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 $UCS2BEw. 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 $UCS2BEw. format performs processing that is the opposite of the $UCS2Bw. format.
Example

This example uses the Japanese Shift_JIS encoding, which is supported under the UNIX operating environment.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>x = ’592700410042’x;</td>
<td>AB</td>
</tr>
<tr>
<td>put x $ucs2be4.;</td>
<td>AB</td>
</tr>
</tbody>
</table>

See Also

Formats:

“$UCS2Bw. Format” on page 174

Informats:

“$UCS2Bw. Informat” on page 282
“$UCS2BEw. Informat” on page 283

$UCS2Lw. 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

$UCS2Lw.

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 $UCS2Lw. 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 $UCS2Lw. format performs processing that is the opposite of the $UCS2LEw. format.

Example

This example uses the Japanese Shift_JIS encoding, which is supported under the UNIX operating environment.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>x = '¥';</td>
<td>2759'x (binary)</td>
</tr>
<tr>
<td>put x $ucs212.;</td>
<td></td>
</tr>
</tbody>
</table>

See Also

Formats:

- “$UCS2Bw. Format” on page 174
- “$UCS2LEw. Format” on page 177
- “$UCS2Xw. Format” on page 178
- “$UTF8Xw. Format” on page 195

Informats:

- “$UCS2Bw. Informat” on page 282
- “$UCS2Lw. Informat” on page 284
- “$UCS2LEw. Informat” on page 285
- “$UCS2Xw. Informat” on page 286
- “$UTF8Xw. Informat” on page 300

$UCS2LEw. 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

$UCS2LEw.
Syntax Description

$\text{w}$
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 $\text{UCS2LEw}$. 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 $\text{UCS2LEw}$. format performs processing that is the opposite of the $\text{UCS2Lw}$. format.

Example

This example uses the Japanese Shift_JIS encoding, which is supported under the UNIX operating environment.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>x = '275941004200'x;</td>
<td></td>
</tr>
<tr>
<td>put x $\text{ucs2le4.}$;</td>
<td>\text{AB}</td>
</tr>
</tbody>
</table>

See Also

- **Formats:**
  - “$\text{UCS2Lw}$. Format” on page 176
- **Informats:**
  - “$\text{UCS2Lw}$. Informat” on page 284
  - “$\text{UCS2LEw}$. Informat” on page 285

$\text{UCS2Xw}$. 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

$UCS2X\text{w}$.

Syntax Description

\textit{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 $UCS2X\text{w}$ 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 $UCS2X\text{w}$ format performs processing that is the opposite of the $UCS2XE\text{w}$ format. If you are exchanging data within the same operating environment, use the $UCS2X\text{w}$ format. If you are exchanging data with a different operating environment, use the $UCS2B\text{w}$ format or $UCS2L\text{w}$ format.

Example

This example uses the Japanese Shift_JIS session encoding, which is supported under the UNIX operating environment.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>\texttt{x \textasciitilde \textdagger;}</td>
<td>\texttt{5927\textasciitilde x (binary) or 2759\textasciitilde x (little endian)}</td>
</tr>
</tbody>
</table>

See Also

Formats:

“$UCS2B\text{w}$. Format” on page 174
“$UCS2XE\text{w}$. Format” on page 180
“$UCS2L\text{w}$. Format” on page 176
“$UTF8X\text{w}$. Format” on page 195

Informats:

“$UCS2B\text{w}$. Informat” on page 282
“$UCS2L\text{w}$. Informat” on page 284
“$UCS2X\text{w}$. Informat” on page 286
“$UCS2XE\text{w}$. Informat” on page 287
“$UTF8X\text{w}$. Informat” on page 300
$UCS2XEw. 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

$UCS2XEw.

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 $UCS2XEw. 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 $UCS2XEw. format performs processing that is the opposite of the $UCS2Xw. format.

Example

This example uses the Japanese Shift_JIS encoding, which is supported under the UNIX operating environment.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Result</th>
</tr>
</thead>
</table>
| x = 'e5a4a7'x; /* Japanese '駄' in UTF8 */; | \n
See Also

Formats:
“$UCS2Xw. Format” on page 178
Informats:
“$UCS2Xw. Informat” on page 286
“$UCS2XEw. Informat” on page 287

$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
$UCS4Bw.

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 $UCS4Bw. format performs processing that is the opposite of the $UCS4BEw. format.

Examples
This example uses the Japanese Shift_JIS encoding, which is supported under the UNIX operating environment.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>x = 'اكتُشف';</td>
<td>'اكتُشف'</td>
</tr>
<tr>
<td>put x $ucs4b4.;</td>
<td>'00005927'x (binary)</td>
</tr>
</tbody>
</table>
See Also

Formats:

- “$UCS2Lw. Format” on page 176
- “$UCS2Xw. Format” on page 178
- “$UCS4BEw. Format” on page 182
- “$UCS4Lw. Format” on page 183
- “$UCS4Xw. Format” on page 186
- “$UTF8Xw. Format” on page 195

Informats:

- “$UCS2Bw. Informat” on page 282
- “$UCS2Lw. Informat” on page 284
- “$UCS2Xw. Informat” on page 286
- “$UCS4Bw. Informat” on page 288
- “$UCS4Lw. Informat” on page 289
- “$UCS4Xw. Informat” on page 290
- “$UTF8Xw. Informat” on page 300

$UCS4BEw. 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

$UCS4BEw.

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 $UCS4BEw. 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 $\text{UCS4BE}w$. format performs processing that is the opposite of the $\text{UCS4B}w$. format.

Example

This example uses the Japanese Shift_JIS encoding, which is supported under the UNIX operating environment.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>$x = '000059270000041000000042'x; put x $\text{ucs4be}4.;$</td>
<td>$\text{AB}$</td>
</tr>
</tbody>
</table>

See Also

Formats:
“$\text{UCS4B}w$. Format” on page 181

Informats:
“$\text{UCS4B}w$. Informat” on page 288

$\text{UCS4Lw. Format}$

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

$\text{UCS4Lw}$.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 $UCS4LEw. 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 $UCS4LEw. format performs processing that is the opposite of the $UCS4LEw. format.

Examples
This example uses the Japanese Shift_JIS encoding, which is supported under the UNIX operating environment.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>x = '¥' ;</td>
<td></td>
</tr>
<tr>
<td>put x $ucs4l4. ;</td>
<td>'27590000'x (binary)</td>
</tr>
</tbody>
</table>

See Also

Formats:
“$UCS2Bw. Format” on page 174
“$UCS2Xw. Format” on page 178
“$UCS4Bw. Format” on page 181
“$UCS4LEw. Format” on page 184
“$UCS4Xw. Format” on page 186
“$UTF8Xw. Format” on page 195

Informats:
“$UCS2Bw. Informat” on page 282
“$UCS2Lw. Informat” on page 284
“$UCS2Xw. Informat” on page 286
“$UCS4Bw. Informat” on page 288
“$UCS4Lw. Informat” on page 289
“$UCS4Xw. Informat” on page 290
“$UTF8Xw. Informat” on page 300

$UCS4LEw. 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

\$UCS4LEw.

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 \$UCS4LEw. 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 \$UCS4LEw. format performs processing that is the opposite of the \$UCS4Lw. format.

Example

This example uses the Japanese Shift_JIS encoding, which is supported under the UNIX operating environment.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>(x = '275900004100000042000000'x; )</td>
<td>(AB)</td>
</tr>
<tr>
<td>put x $ucs4led.;</td>
<td></td>
</tr>
</tbody>
</table>

See Also

Formats:

“\$UCS4Lw. Format” on page 183

Informats:

“\$UCS4Lw. Informat” on page 289
$UCS4Xw. 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

$UCS4Xw.

Syntax Description

$UCS4Xw.

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 $UCS4Xw. 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 $UCS4Xw. format performs processing that is the opposite of the $UCS4XEw. format. If you are exchanging data within the same operating environment, use the $UCS4Xw. format. If you are exchanging data with a different operating environment, use the $UCS4Bw. format or $UCS4Lw. format.

Example

This example uses the Japanese Shift_JIS session encoding, which is supported under the UNIX operating environment.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>x = '浙江大学' ;</td>
<td>'00005927'x (binary) or '27590000'x (little endian)</td>
</tr>
</tbody>
</table>
$UCS4XEw. 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
$UCS4XEw.

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 $UCS4XEw. 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.

See Also

Formats:

“$UCS2Lw. Format” on page 176
“$UCS4XEw. Format” on page 187
“$UCS2Xw. Format” on page 178
“$UCS4Bw. Format” on page 181
“$UCS4Lw. Format” on page 183
“$UTF8Xw. Format” on page 195

Informats:

“$UCS2Bw. Informat” on page 282
“$UCS2Lw. Informat” on page 284
“$UCS2Xw. Informat” on page 286
“$UCS4Bw. Informat” on page 288
“$UCS4Lw. Informat” on page 289
“$UCS4Xw. Informat” on page 290
“$UTF8Xw. Informat” on page 300
Comparison
The $UCS4XEw. format performs processing that is the opposite of the $UCS4Xw. format.

Example
This example uses the Japanese Shift_JIS encoding, which is supported under the UNIX operating environment.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>x = '275900004100000042000000'x;</td>
<td>AB (little endian)</td>
</tr>
<tr>
<td>put x $ucs4be4.;</td>
<td></td>
</tr>
</tbody>
</table>

See Also
Formats:
“$UCS4Xw. Format” on page 186
Informats:
“$UCS4Xw. Informat” on page 290

$UESCw. 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
$UESCw.

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. $UESCw. can be nested.
Comparison

The $UESCw. format performs processing that is opposite of the $UESCEw. format.

Examples

This example uses the Japanese Shift_JIS encoding, which is supported under the UNIX operating system.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>x='\x';</td>
<td>¥u5927</td>
</tr>
<tr>
<td>y='u5927'</td>
<td>¥uu5927</td>
</tr>
<tr>
<td>z='uu5927';</td>
<td>¥uuu5927</td>
</tr>
</tbody>
</table>

See Also

Formats:
“$UESCEw. Format” on page 189
Informats:
“$UESCw. Informat” on page 292
“$UESCEw. Informat” on page 294

$UESCEw. 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

$UESCEw.

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 will remain in UESC.

Comparisons
The $UESCEw. format performs processing that is the opposite of the $UESCw. format.

Examples
This example uses the Japanese Shift_JIS session encoding, which is supported under the UNIX operating system.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>x=put(’¥u5927’,$uesce10.) ;</td>
<td>x=¥u5927</td>
</tr>
<tr>
<td>x=put(’¥uu5927’,$uesce10.) ;</td>
<td>x=¥u5927</td>
</tr>
<tr>
<td>x=put(’¥uuu5927’,$uesce10.) ;</td>
<td>x=¥uu5927</td>
</tr>
</tbody>
</table>

See Also

Formats:

“$UESCw. Format” on page 188

Informats:

“$UESCw. Informat” on page 292
“$UESCEw. Informat” on page 294

$UNCRw. 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

$UNCRw.
Syntax Description

\( \text{w} \)

specifies the width of the output field.

Default: 8

Range: 1–32000

Comparison

The \$UNCREw. 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.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>( x='\text{91E5}' ); /* Japanese '決定' in Shift-JIS */</td>
<td></td>
</tr>
<tr>
<td>( y='\text{abc}' );</td>
<td></td>
</tr>
<tr>
<td>put ( x ) $uncr10.;</td>
<td>&amp;#22823</td>
</tr>
<tr>
<td>put ( y ) $uncr10.;</td>
<td>abc</td>
</tr>
</tbody>
</table>

See Also

Formats:

“\$UNCREw. Format” on page 191

Informats:

“\$UNCRw. Informat” on page 295

“\$UNCREw. Informat” on page 296

\$UNCREw. 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

\$UNCREw.

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 \$UNCREw. format performs processing that is the opposite of the \$UNCRw. format.

Examples

This example uses the Japanese Shift_JIS session encoding, which is supported under the UNIX operating system.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>x='&amp;#22823;abc';</td>
<td></td>
</tr>
<tr>
<td>put x $uncr10.;</td>
<td>abc</td>
</tr>
</tbody>
</table>

See Also

Formats:

“\$UNCRw. Format” on page 190

Informats:

“\$UNCRw. Informat” on page 295

“\$UNCREw. Informat” on page 296

\$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

$\text{UPAREN}w$. Format

Syntax Description

$w$

specifies the width of the output field.

Default: 8

Range: 27–32000

Details

The character string will be encoded with parenthesis and Unicode hex representation.

Comparisons

The $\text{UPAREN}w$. format performs processing that is the opposite of the $\text{UPARENE}w$. format.

Examples

This example uses the Japanese Shift_JIS session encoding, which is supported under the UNIX operating system.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>$x=\text{&quot;¥&quot;;}$;</td>
<td>&lt;u5927&gt;</td>
</tr>
<tr>
<td>$y=\text{&quot;abc3&quot;;}$;</td>
<td>&lt;u0061&gt; &lt;u0062&gt; &lt;u0063&gt; &lt;u0033&gt;</td>
</tr>
<tr>
<td>put $x$ $\text{uparen}7$.;</td>
<td></td>
</tr>
<tr>
<td>put $y$ $\text{uparen}28$.;</td>
<td></td>
</tr>
</tbody>
</table>

See Also

Formats:

“$\text{UPARENE}w$. Format” on page 194

Informats:

“$\text{UPAREN}w$. Informat” on page 297

“$\text{UPARENE}w$. Informat” on page 298
**$UPARENEw. 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**

$UPARENEw.

**Syntax Description**

w

specifies the width of the output field.

**Default:** 8

**Range:** 1–32000

**Comparisons**

The $UPARENEw. format performs processing that is the opposite of the $UPARENw. format.

**Examples**

This example uses the Japanese Shift_JIS encoding, which is supported under the UNIX operating system.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>x='＜u0061＞＜u0062＞＜u0063＞＜u0033＞';</td>
<td>abc3</td>
</tr>
</tbody>
</table>

**See Also**

- Formats:
  - “$UPARENw. Format” on page 192
- Informats:
  - “$UPARENw. Informat” on page 297
  - “$UPARENEw. Informat” on page 298
$UTF8Xw. 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

$UTF8Xw.

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 will be 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.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>x = '91E5'x; /* Japanese 'ァ' in Shift-JIS */</td>
<td>x='e5a4a7'x</td>
</tr>
<tr>
<td>put x $utf8x10.;</td>
<td></td>
</tr>
</tbody>
</table>

See Also

Formats:
“$UCS2Bw. Format” on page 174
“$UCS2Lw. Format” on page 176
“$UCS2Xw. Format” on page 178

Informat: $UCS2Bw. Informat” on page 282
“$UCS2Lw. Informat” on page 284
“$UCS2Xw. Informat” on page 286
**$VSLOGw. 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**

$VSLOGw.

**Syntax Description**

\( w \)

specifies the width of the output field.

**Default:** 200

**Range:** 1–32000

**Details**

The $VSLOGw. 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 $VSLOGw. format does not correctly process all combinations of data strings. △

**Comparisons**

The $VSLOGw. format performs processing that is opposite to the $VSLOGRw. format.

**Examples**

The following example used the input value of “アメリカ航空”.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put text $vslog12.;</td>
<td>世界航空</td>
</tr>
<tr>
<td></td>
<td>フライト</td>
</tr>
</tbody>
</table>

**See Also**

Formats:

“$VSLOGRw. Format” on page 197
$VSLOGRw. 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

$VSLOGRw.

Syntax Description

\( w \)

specifies the width of the output field.

Default: 200
Range: 1–32000

Details

The $VSLOGRw. 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 $VSLOGRw. format does not correctly process all combinations of data strings.

Comparisons

The $VSLOGRw. format performs processing that is opposite to the $VSLOGw. format.

Examples

The following example uses the input value of “üp ün flight.”

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>put text $logvsl2;</td>
<td>flight ünw</td>
</tr>
</tbody>
</table>

Informats:

“$VSLOGw. Informat” on page 301
“$VSLOGRw. Informat” on page 302
See Also

Formats:

$VSLOGw.

Informats:

“$VSLOGw. Informat” on page 301

“$VSLOGRw. Informat” on page 302

WEEKUw. Format

WEEKUw. Format

Writes a week number in decimal format by using the U algorithm

Category: Date and Time

Alignment: left

Syntax

WEEKUw.

Syntax Description

\(w\)

specifies the width of the output field.

Default: 11

Range: 3–200

Details

The WEEKUw. format writes a week-number format. The WEEKUw. 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:

<table>
<thead>
<tr>
<th>Widths</th>
<th>Formats</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-4</td>
<td>Www</td>
<td>w01</td>
</tr>
<tr>
<td>5-6</td>
<td>yyWww</td>
<td>03W01</td>
</tr>
<tr>
<td>7-8</td>
<td>yyWwwdd</td>
<td>03W0101</td>
</tr>
<tr>
<td>9-10</td>
<td>yyyyWwwdd</td>
<td>2003W0101</td>
</tr>
<tr>
<td>11-200</td>
<td>yyyy-Www-dd</td>
<td>2003-W01-01</td>
</tr>
</tbody>
</table>
Comparisons

The WEEKVw. 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 WEEKWw. 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 WEEKUw. 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

```sas
sasdate = '01JAN2003'd;
```

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>v=put(sasdate,weeku3.);</td>
<td>W00</td>
</tr>
<tr>
<td>w=put(sasdate,weeku5.);</td>
<td>03W00</td>
</tr>
<tr>
<td>x=put(sasdate,weeku7.);</td>
<td>03W0004</td>
</tr>
<tr>
<td>y=put(sasdate,weeku9.);</td>
<td>2003W0004</td>
</tr>
<tr>
<td>z=put(sasdate,weeku11.);</td>
<td>2003-W00-04</td>
</tr>
</tbody>
</table>

See Also

Formats:
“WEEKVw. Format” on page 199
“WEEKWw. Format” on page 201

Functions:
“WEEK Function” on page 239

Informats:
“WEEKUw. Informat” on page 303
“WEEKVw. Informat” on page 305
“WEEKWw. Informat” on page 307

WEEKVw. Format

Writes a week number in decimal format by using the V algorithm

Category: Date and Time

Alignment: left
Syntax

WEEKV<var>w</var>.

Syntax Description

<var>w</var>

specifies the width of the output field.

Default: 11

Range: 3–200

Details

The WEEKV<var>w</var> 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:

<table>
<thead>
<tr>
<th>Widths</th>
<th>Formats</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-4</td>
<td>Www</td>
<td>w01</td>
</tr>
<tr>
<td>5-6</td>
<td>yyWww</td>
<td>03W01</td>
</tr>
<tr>
<td>7-8</td>
<td>yyWwwdd</td>
<td>03W0101</td>
</tr>
<tr>
<td>9-10</td>
<td>yyyyWwwdd</td>
<td>2003W0101</td>
</tr>
<tr>
<td>11-200</td>
<td>yyyy-Www-dd</td>
<td>2003-W01-01</td>
</tr>
</tbody>
</table>

Comparisons

The WEEKV<var>w</var> 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<var>w</var> 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<var>w</var> 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

```sas
cdate='01JAN2003'd;
```
WEEKW. Format

WEEKW. Format writes a week number in decimal format by using the W algorithm.

Category: Date and Time
Alignment: left

Syntax

WEEKW.

Syntax Description

w

specifies the width of the output field.

Default: 11
Range: 3–200

See Also

Formats:

“WEEKUw. Format” on page 198
“WEEKW. Format” on page 201

Functions:

“WEEK Function” on page 239

Informats:

“WEEKUw. Informat” on page 303
“WEEKVw. Informat” on page 305
“WEEKWw. Informat” on page 307
Details

The WEEKWw. 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:

<table>
<thead>
<tr>
<th>Widths</th>
<th>Formats</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-4</td>
<td>Www</td>
<td>w01</td>
</tr>
<tr>
<td>5-6</td>
<td>yyWww</td>
<td>03W01</td>
</tr>
<tr>
<td>7-8</td>
<td>yyWwwdd</td>
<td>03W0101</td>
</tr>
<tr>
<td>9-10</td>
<td>yyyyWwwdd</td>
<td>2003W0101</td>
</tr>
<tr>
<td>11-200</td>
<td>yyyy-Www-dd</td>
<td>2003-W01-01</td>
</tr>
</tbody>
</table>

Comparisons

The WEEKVw. 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 WEEKWw. 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 WEEKUw. 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

```sas
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:
- “WEEKUw. Format” on page 198
- “WEEKVw. Format” on page 199

Functions:
- “WEEK Function” on page 239

Informats:
- “WEEKUw. Informat” on page 303
- “WEEKVw. Informat” on page 305
- “WEEKWw. Informat” on page 307

YENw.d Format

Writes numeric values with yen signs, commas, and decimal points

Category: Numeric
Alignment: right

Syntax
YENw.d

Syntax Description

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

d
optionally 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 YENw.d writes a decimal point and two decimal digits. If d is 0, then YENw.d does not write a decimal point or decimal digits.

Details
The YENw.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 may be different in other countries.
Examples

```plaintext
put cost yen10.2;
```

<table>
<thead>
<tr>
<th>Cost</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>1254.71</td>
<td>¥1,254.71</td>
</tr>
</tbody>
</table>

See Also

Informats:

“YENw.d Informat” on page 309
Functions for NLS

Chapter 10. . . . . . . Overview to Functions for NLS  207

Chapter 11. . . . . . . Functions for NLS  209
# Functions for NLS by Category

The following table provides brief descriptions of the SAS functions. For more detailed descriptions, see the NLS entry for each function.

## Table 10.1  NLS Functions Summary

<table>
<thead>
<tr>
<th>Category</th>
<th>Functions for NLS</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Character</td>
<td>“KCVT Function” on page 214</td>
<td>Converts data from an encoding code to another encoding code</td>
</tr>
<tr>
<td></td>
<td>“TRANTAB Function” on page 235</td>
<td>Transcodes a data string by using a translation table</td>
</tr>
<tr>
<td>Currency Conversion</td>
<td>“EUROCURR Function” on page 209</td>
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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 11.1 on page 210.)
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 212

to-currency-code
specifies a three-character currency code that identifies the currency that you are converting to. (See European Currency and Currency CodesTable 11.1 on page 210.)
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.

Table 11.1  European Currency and Currency Codes

<table>
<thead>
<tr>
<th>Currency</th>
<th>Currency code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austrian schilling</td>
<td>ATS</td>
</tr>
<tr>
<td>Belgian franc</td>
<td>BEF</td>
</tr>
<tr>
<td>British pound sterling</td>
<td>GBP</td>
</tr>
<tr>
<td>Czech koruna</td>
<td>CZK</td>
</tr>
<tr>
<td>Danish krone</td>
<td>DKK</td>
</tr>
<tr>
<td>Deutsche mark</td>
<td>DEM</td>
</tr>
<tr>
<td>Dutch guilder</td>
<td>NLG</td>
</tr>
<tr>
<td>Euro</td>
<td>EUR</td>
</tr>
<tr>
<td>Finnish markka</td>
<td>FIM</td>
</tr>
<tr>
<td>French franc</td>
<td>FRF</td>
</tr>
<tr>
<td>Greek drachma</td>
<td>GRD</td>
</tr>
<tr>
<td>Hungarian forint</td>
<td>HUF</td>
</tr>
<tr>
<td>Irish pound</td>
<td>IEP</td>
</tr>
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### Functions for NLS

<table>
<thead>
<tr>
<th>Currency</th>
<th>Currency code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Italian lira</td>
<td>ITL</td>
</tr>
<tr>
<td>Luxembourg franc</td>
<td>LUF</td>
</tr>
<tr>
<td>Norwegian krone</td>
<td>NOK</td>
</tr>
<tr>
<td>Polish zloty</td>
<td>PLZ</td>
</tr>
<tr>
<td>Portuguese escudo</td>
<td>PTE</td>
</tr>
<tr>
<td>Romanian leu</td>
<td>ROL</td>
</tr>
<tr>
<td>Russian ruble</td>
<td>RUR</td>
</tr>
<tr>
<td>Slovenian tolar</td>
<td>SIT</td>
</tr>
<tr>
<td>Spanish peseta</td>
<td>ESP</td>
</tr>
<tr>
<td>Swedish krona</td>
<td>SEK</td>
</tr>
<tr>
<td>Swiss franc</td>
<td>CHF</td>
</tr>
<tr>
<td>Turkish lira</td>
<td>TRL</td>
</tr>
<tr>
<td>Yugoslavian dinar</td>
<td>YUD</td>
</tr>
</tbody>
</table>

The EUROCURR function converts a specific country’s currency to an equivalent amount in another country’s currency. It also can 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 211. 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 211. 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 212.

### Examples

**Example 1: Converting from Deutsche Marks to Euros**

1 Deutsche mark to an equivalent amount of euros.

```sas
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**

1 euro to an equivalent amount of Deutsche marks.

```sas
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.

```sas
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.

```sas
data _null_
   x=50;
   amount=eurocurr(x,’ ‘,’dem’);
   put amount=;
run;
```

The value in the SAS log is: amount=97.7915.

**See Also**

Formats:
- “EUROw.d Format” on page 115
- “EUROXw.d Format” on page 116

Informats:
- “EUROw.d Informat” on page 257
- “EUROXw.d Informat” on page 258

---

**KCOMPARE Function**

Returns the result of a comparison of character strings

**Category:** DBCS

**Syntax**

```
KCOMPARE(source,<pos, <count,>>/findstr)
```

**Arguments**

- **source**
  specifies the character string 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 string 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 string

**Category:** DBCS

**Syntax**

`KCOMPRESS(source,<characters-to-remove>)`

**Arguments**

**source**
specifies a character string that contains the characters to be removed. When only `source` is specified, KCOMPRESS returns this string with all of the single and double-byte blanks removed.

**characters-to-remove**
specifies the character or characters that KCOMPRESS removes from the character string.

*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 217
- “KTRIM Function” on page 224
**KCOUNT Function**

Returns the number of double-byte characters in a string

Category: DBCS

---

**Syntax**

```kcount```

**Arguments**

`source`

specifies the character string to count.

---

**KCVT Function**

Converts data from one type of encoding data to another encoding data

Category: Character

---

**Syntax**

```kcvt```

**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 407.

*Note:* ASCIIANY and EBCDICANY 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 407.

*Note:* ASCIIANY and EBCDICANY are invalid encoding values.

`options`

specifies character data options. Following are the available options:

- NOSOSI | No shift code or Hankaku characters
- NOSHIFT
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.

```sas
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 349
- “DBCSLANG System Option: UNIX, Windows, and z/OS” on page 350
- “DBCSTYPE System Option: UNIX, Windows, and z/OS” on page 351

Procedure:

Chapter 14, “The DBCSTAB Procedure,” on page 313
KINDEX Function

Searches a character expression for a string of characters

Category: DBCS

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 216

KINDEXC Function

Searches a character expression for specified characters

Category: DBCS

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 216

KLEFT Function

Left-aligns a character expression by removing unnecessary leading DBCS blanks and SO/SI
Category: DBCS

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 213
“KRIGHT Function” on page 219
“KTRIM Function” on page 224

KLENGTH Function

Returns the length of an argument

Category: DBCS

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

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.

KREVERSE Function

Reverses a character expression
Category: DBCS

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

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.
KSCAN Function

Selects a specified word from a character expression

Category: DBCS

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 string you want KSCAN to select.

Tip: If n is negative, KSCAN selects the word in the character string starting from the end of the string. If |n| is greater than the number of words in the character string, KSCAN returns a blank value.

delimiters
specifies a character expression that produces characters that you want KSCAN to use as word separators in the character string.

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 strings

Category: DBCS

Syntax

KSTRCAT(argument-1, argument-2<,... argument-n>)

Arguments

argument
specifies any single-byte or double-byte character string.

Details

KSTRCAT concatenates two or more single-byte or double-byte character strings. It also removes unnecessary SO/SI pairs between the strings.

KSUBSTR Function

Extracts a substring from an argument

Category: DBCS

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 222

KSUBSTRB Function

Extracts a substring from an argument according to the byte position of the substring in the argument

Category: DBCS

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 221

---

**KTRANSLATE Function**

Replaces specific characters in a character expression

**Category:** DBCS

**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

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 213
“KLEFT Function” on page 217
“KRIGHT Function” on page 219

KTRUNCATE Function

Truncates a numeric value to a specified length

Category: DBCS

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 single-byte letters in an argument to uppercase

**Category:** DBCS

**Syntax**

KUPCASE(argument)

**Arguments**

**argument**
specifies any SAS character expression.

**Details**
The KUPCASE function copies a character argument, converts all single-byte lowercase letters to uppercase letters, and returns the altered value as a result.

---

**KUPDATE Function**

Inserts, deletes, and replaces character value contents

**Category:** DBCS

**Syntax**

KUPDATE(argument,position,n<,characters-to-replace>)
**KUPDATE Function**

**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* can not 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 will 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 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*.

**See Also**

Functions:

“KUPDATEB Function” on page 226

---

**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

**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:** $n$ can not 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 225

---

**KVERIFY Function**

Returns the position of the first character that is unique to an expression

**Category:** DBCS

**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 will be formatted in output. The following descriptors are case sensitive:

%%
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.

d
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 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 file name that is created from a SAS date value.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>options locale=English_unitedstates;</td>
<td></td>
</tr>
<tr>
<td>logfile=nldate('24Feb2003'd,'%B-%d.log');</td>
<td>February-24.log</td>
</tr>
<tr>
<td>put logfile;</td>
<td></td>
</tr>
<tr>
<td>options locale=German_Germany;</td>
<td></td>
</tr>
<tr>
<td>logfile=nldate('24Feb2003'd,'%B-%d.log');</td>
<td>Februar-24.log</td>
</tr>
<tr>
<td>put logfile;</td>
<td></td>
</tr>
</tbody>
</table>

The following example shows a weekday name that is created from a SAS date value.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>options locale=English_unitedstates;</td>
<td>Monday</td>
</tr>
<tr>
<td>weekname=nldate('24Feb2003'd,'%A');</td>
<td></td>
</tr>
<tr>
<td>put weekname;</td>
<td></td>
</tr>
<tr>
<td>options locale=German_Germany;</td>
<td>Montag</td>
</tr>
<tr>
<td>weekname=nldate('24Feb2003'd,'%A');</td>
<td></td>
</tr>
<tr>
<td>put weekname;</td>
<td></td>
</tr>
</tbody>
</table>

**See Also**

Format:

“NLDATEw. Format” on page 155
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 will be formatted in output. The following descriptors are case sensitive:

%%
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 are 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 NLTIME 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.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>options locale=English;</td>
<td>00 PM</td>
</tr>
<tr>
<td>time_ampm=nldatm('24Feb2003:12:39:43'dt,'%I%p');</td>
<td>00 PM</td>
</tr>
<tr>
<td>options locale=German;</td>
<td>00 nachm</td>
</tr>
<tr>
<td>time_ampm=nldatm('24Feb2003:12:39:43'dt,'%I%p');</td>
<td>00 nachm</td>
</tr>
</tbody>
</table>

See Also
Format:
“NLDATMw. Format” on page 159

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:

%%
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 AM or PM time that is created from a SAS time.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
</table>
| 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   |
TRANTAB Function

Transcodes a data string by using the specified translation table

Syntax

TRANTAB(string,trantab_name)

Arguments

string
  input string 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_ucl');
put teststrg;

TESTING
See Also

Procedures:
Chapter 15, “The TRANTAB Procedure,” on page 319

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.


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 237
   “VTRANSCODEX Function” on page 238

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

<table>
<thead>
<tr>
<th>Statements</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>attrib x transcode = yes;</td>
<td>----+----1----+</td>
</tr>
<tr>
<td>attrib y transcode = no;</td>
<td></td>
</tr>
<tr>
<td>rcl = vtranscode(y);</td>
<td></td>
</tr>
<tr>
<td>put rcl=;</td>
<td>rcl=0</td>
</tr>
</tbody>
</table>

See Also

- Functions: "VTRANSCODEX Function" on page 238
- 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 VTRANSCODE 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

<table>
<thead>
<tr>
<th>Statements</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>attrib x transcode = yes;</td>
<td></td>
</tr>
<tr>
<td>attrib y transcode = no;</td>
<td></td>
</tr>
<tr>
<td>rcl = vtranscodex('y');</td>
<td>rcl=0</td>
</tr>
<tr>
<td>put rcl=;</td>
<td></td>
</tr>
</tbody>
</table>

See Also

Functions:
“VTRANSCODE Function” on page 237

Statements:
ATTRIB in SAS Language Reference: Dictionary

WEEK Function

Returns the week-number value

Category: Date and Time

Syntax

WEEK(<sas_date>, <descriptor>)
**Arguments**

*sas_date*

specifies the SAS date value. If the SAS date argument is not specified, the WEEK function returns the week-number value of the current date.

**descriptor**

specifies the value of the descriptor. The following descriptors can be specified in uppercase or lowercase characters.

- **U**
  
  specifies the SAS date value by using the number-of-week 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 and uses a leading zero and a maximum value of 53.

- **V**
  
  specifies 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**
  
  calculates the 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.

**Details**

The WEEK function reads a SAS date value and returns the week number.

**Examples**

The following example shows a week number that is created from a SAS date value.

```sas
week('01FEB2003'd,modifier);
```

<table>
<thead>
<tr>
<th>Descriptors</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>U</td>
<td>4</td>
</tr>
<tr>
<td>V</td>
<td>5</td>
</tr>
<tr>
<td>W</td>
<td>4</td>
</tr>
</tbody>
</table>

**See Also**

Formats:

“WEEKUw. Format” on page 198
“WEEKVw. Format” on page 199
“WEEKWw. Format” on page 201

Informats:
“WEEKUw. Informat” on page 303
“WEEKVw. Format” on page 199
“WEEKWw. Informat” on page 307
Informats for NLS

Chapter 12. Overview to Informats for NLS 245

Chapter 13. Informats for NLS 249
Overview to Informats for NLS

Informats for NLS by Category

There are six categories of SAS informats that support NLS:

Table 12.1  Categories of Informats for NLS

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIDI text handling</td>
<td>Instructs SAS to read bidirectional data values from data variables.</td>
</tr>
<tr>
<td>Character</td>
<td>Instructs SAS to read character data values into character variables.</td>
</tr>
<tr>
<td>DBCS</td>
<td>Instructs SAS to manage various Asian languages.</td>
</tr>
<tr>
<td>Date and Time</td>
<td>Instructs SAS to read data values into variables that represent dates, times, and datetimes.</td>
</tr>
<tr>
<td>Hebrew text handling</td>
<td>Instructs SAS to read Hebrew data from data variables.</td>
</tr>
<tr>
<td>Numeric</td>
<td>Instructs SAS to read numeric data values into numeric variables.</td>
</tr>
</tbody>
</table>

The following table provides brief descriptions of the SAS informats. For more detailed descriptions, see the NLS entry for each informat.

Table 12.2  Summary of NLS Informats by Category

<table>
<thead>
<tr>
<th>Category</th>
<th>Informats for NLS</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIDI text handling</td>
<td>“$LOGVS\varw. Informat” on page 264</td>
<td>Reads a character string that is in left-to-right logical order, and then converts the character string to visual order</td>
</tr>
<tr>
<td></td>
<td>“$LOGVSR\varw. Informat” on page 265</td>
<td>Reads a character string that is in right-to-left logical order, and then converts the character string to visual order</td>
</tr>
<tr>
<td></td>
<td>“$VSLOG\varw. Informat” on page 301</td>
<td>Reads a character string that is in visual order, and then converts the character string to left-to-right logical order</td>
</tr>
<tr>
<td></td>
<td>“$VSLOGR\varw. Informat” on page 302</td>
<td>Reads a character string that is in visual order, and then converts the character string to right-to-left logical order</td>
</tr>
<tr>
<td>Character</td>
<td>“$REVER\varw. Informat” on page 280</td>
<td>Reads character data from right to left and preserves blanks</td>
</tr>
<tr>
<td>Category</td>
<td>Informs for NLS</td>
<td>Description</td>
</tr>
<tr>
<td>----------------</td>
<td>--------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>&quot;$REVERSEw. Informat&quot; on page 281</td>
<td>Reads character data from right to left, and then left aligns the text</td>
<td></td>
</tr>
<tr>
<td>&quot;$UCS2Bw. Informat&quot; on page 282</td>
<td>Reads a character string that is encoded in big-endian, 16-bit, UCS2, Unicode encoding, and then converts the character string to the encoding of the current SAS session</td>
<td></td>
</tr>
<tr>
<td>&quot;$UCS2BEw. Informat&quot; on page 283</td>
<td>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</td>
<td></td>
</tr>
<tr>
<td>&quot;$UCS2Lw. Informat&quot; on page 284</td>
<td>Reads a character string that is encoded in little-endian, 16-bit, UCS2, Unicode encoding, and then converts the character string to the encoding of the current SAS session</td>
<td></td>
</tr>
<tr>
<td>&quot;$UCS2LEw. Informat&quot; on page 285</td>
<td>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</td>
<td></td>
</tr>
<tr>
<td>&quot;$UCS2Xw. Informat&quot; on page 286</td>
<td>Reads a character string that is encoded in 16-bit, UCS2, Unicode encoding, and then converts the character string to the encoding of the current SAS session</td>
<td></td>
</tr>
<tr>
<td>&quot;$UCS2XEw. Informat&quot; on page 287</td>
<td>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</td>
<td></td>
</tr>
<tr>
<td>&quot;$UCS4Bw. Informat&quot; on page 288</td>
<td>Reads a character string that is encoded in big-endian, 32-bit, UCS4, Unicode encoding, and then converts the character string to the encoding of the current SAS session</td>
<td></td>
</tr>
<tr>
<td>&quot;$UCS4Le. Informat&quot; on page 289</td>
<td>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</td>
<td></td>
</tr>
<tr>
<td>&quot;$UCS4Xw. Informat&quot; on page 290</td>
<td>Reads a character string that is encoded in 32-bit, UCS4, Unicode encoding, and then converts the character string to the encoding of the current SAS session</td>
<td></td>
</tr>
<tr>
<td>&quot;$UCS4XEw. Informat&quot; on page 291</td>
<td>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</td>
<td></td>
</tr>
<tr>
<td>&quot;$UESCw. Informat&quot; on page 292</td>
<td>Reads a character string that is encoded in UESC representation, and then converts the character string to the encoding of the current SAS session</td>
<td></td>
</tr>
<tr>
<td>&quot;$UESCEw. Informat&quot; on page 294</td>
<td>Reads a character string that is in the encoding of the current SAS session, and then converts the character string to UESC representation</td>
<td></td>
</tr>
<tr>
<td>&quot;$UNCRw. Informat&quot; on page 295</td>
<td>Reads an NCR character string, and then converts the character string to the encoding of the current SAS session</td>
<td></td>
</tr>
<tr>
<td>Category</td>
<td>Informs for NLS</td>
<td>Description</td>
</tr>
<tr>
<td>------------------</td>
<td>-------------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>&quot;$UNCREw. Informat&quot; on page 296</td>
<td>Reads a character string in the encoding of the current SAS session, and then converts the character string to NCR</td>
</tr>
<tr>
<td></td>
<td>&quot;$UPARENw. Informat&quot; on page 297</td>
<td>Reads a character string that is encoded in UPAREN representation, and then converts the character string to the encoding of the current SAS session</td>
</tr>
<tr>
<td></td>
<td>&quot;$UPARENW. Informat&quot; on page 298</td>
<td>Reads a character string that is in the encoding of the current SAS session, and then converts the character string to UPAREN representation</td>
</tr>
<tr>
<td></td>
<td>&quot;$UPARENPh. Informat&quot; on page 299</td>
<td>Reads a character string that is encoded in UPAREN representation, and then converts the character string to the encoding of the current SAS session, with national characters remaining in the encoding of the UPAREN representation</td>
</tr>
<tr>
<td></td>
<td>&quot;$UTF8Xw. Informat&quot; on page 300</td>
<td>Reads a character string that is encoded in UTF-8, and then converts the character string to the encoding of the current SAS session</td>
</tr>
<tr>
<td>Date and Time</td>
<td>&quot;$KANJIw. Informat&quot; on page 263</td>
<td>Removes shift code data from DBCS data</td>
</tr>
<tr>
<td></td>
<td>&quot;$KANJIXw. Informat&quot; on page 263</td>
<td>Adds shift-code data to DBCS data</td>
</tr>
<tr>
<td></td>
<td>&quot;$EURDFDEw. Informat&quot; on page 252</td>
<td>Reads international date values</td>
</tr>
<tr>
<td></td>
<td>&quot;$EURDFDTw. Informat&quot; on page 253</td>
<td>Reads international datetime values in the form &quot;ddmmyy hh:mm:ss.ss&quot; or &quot;ddmmyyyyy hh:mm:ss.ss&quot;</td>
</tr>
<tr>
<td></td>
<td>&quot;$EURDFMYw. Informat&quot; on page 255</td>
<td>Reads month and year date values in the form &quot;mmmyy&quot; or &quot;mmmyyyy&quot;</td>
</tr>
<tr>
<td></td>
<td>&quot;JDATENMDw. Informat&quot; on page 260</td>
<td>Reads Japanese Kanji date values in the format &quot;ymmmdd&quot; or &quot;yyyyymmmdd&quot;</td>
</tr>
<tr>
<td></td>
<td>&quot;JNENGOW. Informat&quot; on page 261</td>
<td>Reads Japanese Kanji date values in the format &quot;ymmmdd&quot;</td>
</tr>
<tr>
<td></td>
<td>&quot;MINGUOW. Informat&quot; on page 266</td>
<td>Reads dates in Taiwanese format</td>
</tr>
<tr>
<td></td>
<td>&quot;NENGOW. Informat&quot; on page 267</td>
<td>Reads Japanese date values in the format &quot;eyymmd&quot;</td>
</tr>
<tr>
<td></td>
<td>&quot;NLDATEw. Informat&quot; on page 269</td>
<td>Reads the date value in the specified locale, and then converts the date value to the local SAS date value</td>
</tr>
<tr>
<td></td>
<td>&quot;NLDATAMw. Informat&quot; on page 269</td>
<td>Reads the datetime value of the specified locale, and then converts the datetime value to the local SAS datetime value</td>
</tr>
<tr>
<td></td>
<td>&quot;NLTIMAPw. Informat&quot; on page 278</td>
<td>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</td>
</tr>
<tr>
<td></td>
<td>&quot;NLTIMEw. Informat&quot; on page 279</td>
<td>Reads the time value in the specified locale, and then converts the time value to the local SAS time value</td>
</tr>
<tr>
<td>Category</td>
<td>Informats for NLS</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------------</td>
<td>---------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>“WEEKUw. Informat” on</td>
<td>Reads the format of the number-of-week value within the year and returns a SAS date value by using the U algorithm</td>
</tr>
<tr>
<td></td>
<td>page 303</td>
<td></td>
</tr>
<tr>
<td></td>
<td>“WEEKVw. Informat” on</td>
<td>Reads the format of the number-of-week value within the year and returns a SAS date value using the V algorithm</td>
</tr>
<tr>
<td></td>
<td>page 305</td>
<td></td>
</tr>
<tr>
<td></td>
<td>“WEEKWw. Informat” on</td>
<td>Reads the format of the number-of-week value within the year and returns a SAS date value using the W algorithm</td>
</tr>
<tr>
<td></td>
<td>page 307</td>
<td></td>
</tr>
<tr>
<td>Hebrew text handling</td>
<td>“$CPTDWw. Informat” on</td>
<td>Reads a character string that is in Hebrew DOS (cp862) encoding, and then converts the character string to Windows (cp1255) encoding</td>
</tr>
<tr>
<td></td>
<td>page 250</td>
<td></td>
</tr>
<tr>
<td></td>
<td>“$CPTWDw. Informat” on</td>
<td>Reads a character string that is in Windows (cp1255) encoding, and then converts the character string to Hebrew DOS (cp862) encoding</td>
</tr>
<tr>
<td></td>
<td>page 251</td>
<td></td>
</tr>
<tr>
<td>Numeric</td>
<td>“EUROw.d Informat” on</td>
<td>Reads numeric values, removes embedded characters in European currency, and reverses the comma and decimal point</td>
</tr>
<tr>
<td></td>
<td>page 257</td>
<td></td>
</tr>
<tr>
<td></td>
<td>“EUROXw.d Informat” on</td>
<td>Reads numeric values and removes embedded characters in European currency</td>
</tr>
<tr>
<td></td>
<td>page 258</td>
<td></td>
</tr>
<tr>
<td></td>
<td>“NLMNYw.d Informat” on</td>
<td>Reads monetary data in the specified locale for the local expression, and then converts the data to a numeric value</td>
</tr>
<tr>
<td></td>
<td>page 270</td>
<td></td>
</tr>
<tr>
<td></td>
<td>“NLMNYIw.d Informat” on</td>
<td>Reads monetary data in the specified locale for the international expression, and then converts the data to a numeric value</td>
</tr>
<tr>
<td></td>
<td>page 272</td>
<td></td>
</tr>
<tr>
<td></td>
<td>“NLNUMw.d Informat” on</td>
<td>Reads numeric data in the specified locale for local expressions, and then converts the data to a numeric value</td>
</tr>
<tr>
<td></td>
<td>page 273</td>
<td></td>
</tr>
<tr>
<td></td>
<td>“NLNUMIlw.d Informat” on</td>
<td>Reads numeric data in the specified locale for international expressions, and then converts the data to a numeric value</td>
</tr>
<tr>
<td></td>
<td>page 274</td>
<td></td>
</tr>
<tr>
<td></td>
<td>“NLPCTw.d Informat” on</td>
<td>Reads percentage data in the specified locale for local expressions, and then converts the data to a numeric value</td>
</tr>
<tr>
<td></td>
<td>page 275</td>
<td></td>
</tr>
<tr>
<td></td>
<td>“NLPCTItw.d Informat” on</td>
<td>Reads percentage data in the specified locale for international expressions, and then converts the data to a numeric value</td>
</tr>
<tr>
<td></td>
<td>page 277</td>
<td></td>
</tr>
<tr>
<td></td>
<td>“YENw.d Informat” on</td>
<td>Removes embedded yen signs, commas, and decimal points</td>
</tr>
<tr>
<td></td>
<td>page 309</td>
<td></td>
</tr>
</tbody>
</table>
Informats for NLS

$CPTDWw. Informat 250
$CPTWDw. Informat 251
EURDFDEw. Informat 252
EURDFDTw. Informat 253
EURDFMYw. Informat 255
EUROw.d Informat 257
EUROXw.d Informat 258
JDATEMYMDw. Informat 260
JNENGOw. Informat 261
$KANJ1w. Informat 263
$KANJ1Xw. Informat 263
$LOGVSw. Informat 264
$LOGVSRw. Informat 265
MINGUOW. Informat 266
NENGOw. Informat 267
NLDATEw. Informat 269
NLDATEm. Informat 269
NLMNYw.d Informat 270
NLMNYw.d Informat 272
NLMNUMw.d Informat 273
NLMNUMw.d Informat 274
NLPCTw.d Informat 275
NLPCTw.d Informat 277
NLTIMAPw. Informat 278
NLTIMEw. Informat 279
$REVERJw. Informat 280
$REVERSw. Informat 281
$UCS2Bw. Informat 282
$UCS2BEw. Informat 283
$UCS2Lw. Informat 284
$UCS2LeW. Informat 285
$UCS2Xw. Informat 286
$UCS2XEw. Informat 287
$UCS4Bw. Informat 288
$UCS4Lw. Informat 289
$UCS4Xw. Informat 290
$UCS4Xw. Informat 291
$UESCw. Informat 292
$UESCEw. Informat 294
$UNCRw. Informat 295
$UNCREw. Informat 296
**$CPTDWw. 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**

$CPTDWw.

**Syntax Description**

\( w \)

specifies the width of the input field.

**Default:** 200

**Range:** 1–32000

**Comparisons**

The $CPTDWw. informat performs processing that is opposite of the $CPTWDw. informat.

**Examples**

The following example uses the input value of 808182.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>[x=input(‘808182’,$cptdw6.);] [put x;]</td>
<td>ḲR</td>
</tr>
</tbody>
</table>
See Also

Formats:
“$CPTDWw. Format” on page 66
“$CPTWDw. Format” on page 67

Informs:
“$CPTWDw. Informat” on page 251

$CPTWDw. 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
$CPTWDw.

Syntax Description

\( w \)

specifies the width of the input field.

Default: 200

Range: 1–32000

Comparisons

The $CPTWDw. informat performs processing that is opposite of the $CPTDWw. informat.

Examples

The following example uses the input value of הונ.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>x=input ('הונ', $cptwd6.)</td>
<td>אונ,</td>
</tr>
<tr>
<td>put x;</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
See Also

Formats:

“$CPTWDw. Format” on page 67
“$CPTDWw. Format” on page 66

Informat:

“$CPTDWw. Informat” on page 250

EURDFDEw. Informat

Reads international date values

Category: Date and Time

Syntax

EURDFDEw.

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 ddmmyy or ddmmyyyy:

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 353 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.

```plaintext
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.

```plaintext
input day espdfde10.;
```

<table>
<thead>
<tr>
<th>Values</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>01abr1999</td>
<td>14335</td>
</tr>
<tr>
<td>01-abr-99</td>
<td>14335</td>
</tr>
</tbody>
</table>

See Also

Formats:
“EURDFDEw. Format” on page 70
Informats:
DATEw. in SAS Language Reference: Dictionary
“EURDFDTw. Informat” on page 253
“EURDFMYw. Informat” on page 255
System Options:
“DFLANG= System Option: OpenVMS, UNIX, Windows, and z/OS” on page 353
YEARCUTOFF= in SAS Language Reference: Dictionary

EURDFDTw. Informat

Reads international datetime values in the form ddmmyy hh:mm:ss.ss or ddmmyyyy hh:mm:ss.ss

Category: Date and Time

Syntax
EURDFDTw.
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 the 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 EURDFDTw. 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 353 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.
Informats for NLS

**EURDFMY**w. Informat

Reads month and year date values in the form *mmmy* or *mmmyyyy*

**Category:** Date and Time

**Syntax**

**EURDFMY**w.

**Syntax Description**

w specifies the width of the input field.

---

**Input Data**

```sas
input date deudfdt20.;
```

<table>
<thead>
<tr>
<th>Values</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>23dez99:10:03:17.2</td>
<td>1261562597.2</td>
</tr>
<tr>
<td>23dez1999:10:03:17.2</td>
<td>1261562597.2</td>
</tr>
</tbody>
</table>

---

**See Also**

Formats:
- DATEw. in *SAS Language Reference: Dictionary*
- DATETIMEw.d in *SAS Language Reference: Dictionary*
- “EURDFDTw.d Format” on page 73
- TIMEw.d in *SAS Language Reference: Dictionary*

Functions:
- DATETIME in *SAS Language Reference: Dictionary*

Informats:
- DATETIMEw. in *SAS Language Reference: Dictionary*
- “EURDFDEw. Informat” on page 252
- “EURDFMYw. Informat” on page 255

System Options:
- “DFLANG= System Option: OpenVMS, UNIX, Windows, and z/OS” on page 353
- YEARCUTOFF= in *SAS Language Reference: Dictionary*
**EURDFMYw Informat**

**Chapter 13**

**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 EURDFMYw 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 \( \text{YEARCUTOFF=} \) 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 353 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.

```plaintext
options dflang=french;
input month eurdfmy7.;
```

The second INPUT statement uses the French language prefix, and DFLANG is not specified.

```plaintext
input month fradfmy7.;
```

<table>
<thead>
<tr>
<th>Values</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>avr1999</td>
<td>14335</td>
</tr>
<tr>
<td>avr 99</td>
<td>14335</td>
</tr>
</tbody>
</table>
See Also

Formats:
- DDMMYYw. in SAS Language Reference: Dictionary
- “EURDFMYw. Format” on page 79
- 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:
- “EURDFDEw. Informat” on page 252
- “EURDFDTw. Informat” on page 253
- MONYYw. in SAS Language Reference: Dictionary

System Options:
- “DFLANG= System Option: OpenVMS, UNIX, Windows, and z/OS” on page 353
- YEARCUTOFF= in SAS Language Reference: Dictionary

**EUROw.d Informat**

Reads numeric values, removes embedded characters in European currency, and reverses the comma and decimal point

**Category:** Numeric

**Syntax**

**EUROw.d**

**Syntax Description**

**w**

specifies the width of the input field.

**Default:** 6

**Range:** 1–32

**d**

optionally 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 EUROw.d informat reads numeric values and removes embedded euro symbols (E), commas, blanks, percent signs, dashes, and right parentheses from the input data. A decimal point is assumed to be a separator between the whole number and the decimal portion. The EUROw.d informat converts a left parenthesis at the beginning of a field to a minus sign.

Comparisons

- The EUROw.d informat is similar to the EUROXw.d informat, but EUROXw.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 EUROw.d and the EUROXw.d informats are interchangeable.

Examples

The following table shows input values for currency in euros, the SAS statements that are applied, and the results.

<table>
<thead>
<tr>
<th>Values</th>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>E1</td>
<td>input x euro10.; put x;</td>
<td>1</td>
</tr>
<tr>
<td>E1.23</td>
<td>input x euro10.; put x;</td>
<td>1.23</td>
</tr>
<tr>
<td>1.23</td>
<td>input x euro10.; put x;</td>
<td>1.23</td>
</tr>
<tr>
<td>1,234.56</td>
<td>input x euro10.; put x;</td>
<td>1234.56</td>
</tr>
</tbody>
</table>

See Also

Formats:

“EUROw.d Format” on page 115
“EUROXw.d Format” on page 116

Informats:

“EUROXw.d Informat” on page 258
Syntax
EUROXw.d

Syntax Description

$w$
specifies the width of the input field.
Default: 6
Range: 1–32

d
optionally 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 EUROXw.d informat reads numeric values and removes embedded euro symbols
(E), periods, blanks, percent signs, dashes, and right parentheses from the input data.
A comma is assumed to be a separator between the whole number and the decimal
portion. The EUROXw.d informat converts a left parenthesis at the beginning of a field
to a minus sign.

Comparisons

☐ The EUROXw.d informat is similar to the EUROw.d informat, but EUROw.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 EUROXw.d and the EUROw.d
informats are interchangeable.

Examples

The following table shows input values for currency in euros, the SAS statements
that are applied, and the results.

<table>
<thead>
<tr>
<th>Values</th>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>E1</td>
<td>input x eurox10.;</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>put x;</td>
<td></td>
</tr>
<tr>
<td>E1.23</td>
<td>input x eurox10.;</td>
<td>123</td>
</tr>
<tr>
<td></td>
<td>put x;</td>
<td></td>
</tr>
<tr>
<td>1.23</td>
<td>input x eurox10.;</td>
<td>123</td>
</tr>
<tr>
<td></td>
<td>put x;</td>
<td></td>
</tr>
<tr>
<td>1,234.56</td>
<td>input x eurox10.;</td>
<td>1.23456</td>
</tr>
<tr>
<td></td>
<td>put x;</td>
<td></td>
</tr>
</tbody>
</table>
See Also

Formats:
“EUROw.d Format” on page 115
“EUROXw.d Format” on page 116

Informats:
“EUROw.d Informat” on page 257

JDATEYMD\(w\). Informat

Reads Japanese Kanji date values in the format \(yymmdd\) or \(yyyyymmdd\)

Category: Date and Time

Syntax

\texttt{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 \(yymmdd\) or \(yyyyymmdd\).

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 datalines 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.

\textit{Note:} SAS interprets a two-digit year as belonging to the 100-year span that is defined by the \texttt{YEARCUTOFF=} system option. \(\Delta\)

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

Informs:
  “JNENGOw. Informat” on page 261

System Options:
  YEARCUTOFF= in SAS Language Reference: Dictionary

JNENGOw. Informat

Reads Japanese Kanji date values in the form yymmdd  

Category: Date and Time

Alignment: left

Syntax

JNENGOw.
**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 \texttt{ymmd}.

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 datalines 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 \texttt{YEARCUTOFF=} system option.

**Examples**

The following examples show how to use the JNENGO informat to convert Kanji values to SAS date values.

```sas
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 260

System Options:

- \texttt{YEARCUTOFF=} in *SAS Language Reference: Dictionary*
$KANJIw. Informat

Removes shift code data from DBCS data

Category: DBCS

Syntax

$KANJIw.

Syntax Description

$KANJIw.

Syntax Description

$KANJIw.

Syntax Description

$KANJIw.

Syntax Description

$KANJIw.

Syntax Description

$KANJIw.

Syntax Description

$KANJIw.

Syntax Description

$KANJIw. Informat

Adds shift-code data to DBCS data

Category: DBCS

Syntax

$KANJIXw.
$LOGVS\textit{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

$\$LOGVS\textit{w}$. 

### Syntax Description

\textit{w}

specifies the width of the input field.

**Default:** 200

**Range:** 1–32000

**Comparisons**

The $\$LOGVS\textit{w}$. informat performs processing that is opposite to the LOGVSR\textit{w}. informat.

---

\textbf{Syntax Description}

\textit{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.

**Range:** The minimum width for the informat is \(2 + (\text{length of shift code used on the current DBCSTYPE= setting}) \times 2\).

### See Also

**Formats:**

- "$\$KANJItw$. Format" on page 149
- "$\$KANJIXtw$. Format" on page 150

**Informats:**

- "$\$KANJItw$. Informat" on page 263
Examples

The following example uses the input value of “-flight.”

<table>
<thead>
<tr>
<th>Statements</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>$x=input('flight',$logvs12.); put $x;</td>
<td>&quot;flight&quot;</td>
</tr>
</tbody>
</table>

See Also

Formats:
- “$LOGVSRw. Format” on page 152
- “$LOGVSw. Format” on page 151

Informats:
- “$LOGVSRw. Informat” on page 265

$LOGVSRw. 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

$LOGVSRw.

Syntax Description

$w$

specifies the width of the input field.

Default: 200

Range: 1–32000

Comparisons

The $LOGVSRw. informat performs processing that is opposite to the $LOGVSw. informat.

Examples

The following example uses the input value of “flight.”
x=input('_flight','logvsr12.);
pput x;  
flight_ _ _ _

See Also

Formats:

“$LOGVSw. Format” on page 151
“$LOGVSRw. Format” on page 152

Informs:

“$LOGVSw. Informat” on page 264

MINGUOW. Informat

Reads dates in Taiwanese format

Category: Date and Time

Syntax

MIN G U O

Syntax Description

\( w \)

specifies the width of the input field.

Default: 6

Range: 6–10

Details

The general form of a Taiwanese date is \( yyyy mm dd \):

\( yyyy \)

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 prior to 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 YYMMDw. 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.

```sas
input date minguo10.;
put date date9.;
```

<table>
<thead>
<tr>
<th>Values</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>49/01/01</td>
<td>01JAN1960</td>
</tr>
<tr>
<td>891215</td>
<td>15DEC2000</td>
</tr>
<tr>
<td>103-01-01</td>
<td>01JAN2014</td>
</tr>
</tbody>
</table>

**See Also**

Formats:
- “MINGUOw. Format” on page 153

Informats:
- YYMMDw. in *SAS Language Reference: Dictionary*

### NENGOW. Informat

Reads Japanese date values in the form *eyymmd*.

**Category:** Date and Time

**Syntax**

NENGOWw.
Syntax Description

\( w \)

specifies the width of the input field.

**Default:** 10  
**Range:** 7–32

**Details**  
The general form of a Japanese date is \( eyyyydd \):

- **\( e \)** 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.

```plaintext
input nengo_date nengo8.;
put nengo_date date9.;
```

<table>
<thead>
<tr>
<th>Values</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>h1108</td>
<td>08OCT1999</td>
</tr>
<tr>
<td>.1108</td>
<td>08OCT1999</td>
</tr>
<tr>
<td>11/10/08</td>
<td>08OCT1999</td>
</tr>
</tbody>
</table>

**See Also**

Formats:

“NENGO\( w \). Format” on page 154
NLDATEm. 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

NLDATEm.

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.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>options locale=English_UnitedStates;</td>
<td>y=February 24, 2003</td>
</tr>
<tr>
<td>y=input('February 24, 2003',nldate17.);</td>
<td>y=February 24, 2003</td>
</tr>
<tr>
<td>put y=nldate;</td>
<td>y=February 24, 2003</td>
</tr>
<tr>
<td>options locale=German_Germany;</td>
<td>y=24. Februar 2003</td>
</tr>
<tr>
<td>put y=nldate;</td>
<td>y=24. Februar 2003</td>
</tr>
</tbody>
</table>

See Also

Formats:

“NLDATEm. Format” on page 155

NLDATMw. 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

\[
\text{NLDATM}_w. \\
\]

### 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.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
</table>
| 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\textit{w}. Format” on page 159

---

\textbf{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

\[
\text{NLMNY}_w.d \\
\]
Syntax Description

\( w \)

specifies the width of the input field.

Default: \( 9 \)
Range: \( 1\text{–}32 \)

\( d \)

optionally specifies whether to divide the number by \( 10^d \). If the data contains decimal separators, the \( d \) value is ignored.

Default: \( 0 \)
Range: \( 0\text{–}31 \)

Details

The NLMNYw.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 right parenthesis from the input data.

Comparisons

The NLMNYw.d informat performs processing that is the opposite of the NLMNYIw.d informat.

The NLMNYw.d informat is similar to the DOLLARw.d informat except that the NLMNYw.d informat is locale specific.

Examples

The following examples use the input value of \$12,345.67.\

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>options LOCALE=English_UnitedStates;</td>
<td>----+----</td>
</tr>
<tr>
<td>x=input('($12,345.67)',nlmny32.2);</td>
<td>-12345.67</td>
</tr>
<tr>
<td>y=input('($12,345.67)',dollar32.2);</td>
<td>-12345.67</td>
</tr>
<tr>
<td>put x=;</td>
<td></td>
</tr>
<tr>
<td>put y=;</td>
<td></td>
</tr>
</tbody>
</table>

See Also

Formats:

“NLMNYw.d Format” on page 163
“NLMNYIw.d Format” on page 165
NLMNY1w.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

NLMNY1w.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 NLMNY1w.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 right parenthesis from the input data.

Comparisons

The NLMNY1w.d Informat performs processing that is the opposite of the NLMNYw.d Informat.

Examples

The following examples use the input value of 12,345.67.
Statements | Results  
---|---
options LOCALE=English_UnitedStates;  
x=input('(USD12,345.67)',nlmnyi32.2);  
y=input('$-12,345.67)',dollar32.2);  
put x=;  
put y=;  
-12345.67  
-12345.67

See Also

Formats:
“NLMNYw.d Format” on page 163  
“NLMNYIw.d Format” on page 165  
Informats:
“NLMNYw.d Informat” on page 270

NLNUMw.d Informat

Reads numeric data in the specified locale for local expressions, and then converts the data to a numeric value.

Category: Numeric

Syntax

NLNUMw.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 NLNUMw.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 right parenthesis from the input data.

**Comparisons**

The NLNUMIw.d informat performs processing that is opposite to the NLNUMIw.d informat.

**Examples**

The following example uses -1234356.78 as the input value.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>options locale=English_UnitedStates;</td>
<td>-1234356.78</td>
</tr>
<tr>
<td>x=input(’-1,234,356.78’,nlnum32.2);</td>
<td>-1234356.78</td>
</tr>
<tr>
<td>put x=;</td>
<td>-1234356.78</td>
</tr>
</tbody>
</table>

**See Also**

Formats:

“NLNUMIw.d Format” on page 166
“NLMNYIw.d Format” on page 165

Informats:

“NLNUMIw.d Informat” on page 274

---

**NLNUMIw.d Informat**

Reads numeric data in the specified locale for international expressions, and then converts the data to a numeric value

**Category:** Numeric

**Syntax**

NLNUMIw.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 right 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.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>options locale=English_UnitedStates;</td>
<td>----+----1----+</td>
</tr>
<tr>
<td>x=input('−1,234,356.78', nlnumi32.2);</td>
<td>−1234356.78</td>
</tr>
<tr>
<td>put x=;</td>
<td>−1234356.78</td>
</tr>
</tbody>
</table>

See Also

Formats:

“NLNUM\(w.d\) Format” on page 166

“NLNUMI\(w.d\) Format” on page 168

Informats:

“NLNUM\(w.d\) Informat” on page 273

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 right 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.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>options LOCALE=English_UnitedStates;</td>
<td></td>
</tr>
<tr>
<td>x=input('(-12,345.67%)',nlpc32.2);</td>
<td>-123.4567</td>
</tr>
<tr>
<td>y=input('(12,345.67%)',percent32.2);</td>
<td>-123.4567</td>
</tr>
<tr>
<td>put x=;</td>
<td></td>
</tr>
<tr>
<td>put y=;</td>
<td></td>
</tr>
</tbody>
</table>
See Also

Formats:
“NLPCTw.d Format” on page 169
“NLPCTIw.d Format” on page 170

Informats:
“NLPCTIw.d Informat” on page 277

NLPCTIw.d Informat

Reads percentage data in the specified locale for international expressions, and then converts the
data to a numeric value

Category: Numeric

Syntax

NLPCTIw.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 NLPCTIw.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 right parentheses from the input data.

Comparisons

The NLPCTIw.d informat performs processing that is opposite of the NLPCTw.d
informat.

Examples

The following example uses -12,345.67% as the input value.
Statements | Results
---+---+----+
```nltk
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:
“NLPCTw.d Format” on page 169
“NLPCTIw.d Format” on page 170

Informs:
“NLPCTw.d Informat” on page 275

---

**NLTIMAPw. 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**

NLTIMAPw.

**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
---|---
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:
“NLTIMAPw. Format” on page 173

**NLTIMEw. 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**

NLTIMEw.

**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.
### $REVERJw. Informat

**Reads** character data from right to left and preserves blanks

**Category:** Character

#### Syntax

$\textit{REVERJ}w.$

#### Syntax Description

\(w\)

specifies the width of the input field.

- **Default:** 1 if \(w\) is not specified
- **Range:** 1–32767

#### Comparisons

The $\textit{REVERJ}w.$ informat is similar to the $\textit{REVERS}w.$ informat except that $\textit{REVERJ}w.$ informat left aligns the result by removing all leading blanks.

#### Examples

The following example uses ABCD as the input value.

```plaintext
input @1 name $reverj7.;
```
### Informat \$REVERS w.

#### Values

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ABCD</td>
<td>###DCBA</td>
</tr>
<tr>
<td>ABCD</td>
<td>DCBA###</td>
</tr>
</tbody>
</table>

* The character # represents a blank space.

#### See Also

Informat:

“\$REVERS w. Informat” on page 281

---

### \$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.;
```
See Also

Informats:
“$REVERJw. Informat” on page 280

$UCS2Bw. 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

$UCS2Bw.

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 $UCS2Bw. informat performs processing that is opposite of the $UCS2BEw. informat. If you are processing data within the same operating environment, then use the $UCS2Xw. informat. If you are processing data from different operating environments, then use the $UCS2Bw. and $UCS2Lw. informats.

Examples

This example uses the Japanese Shift_JIS encoding, which is supported under the UNIX operating environment.
x=input('5927'x,ucs2b.);
put x=$hex4.; x=91e5

See Also

Formats:

“$UCS2Bw. Format” on page 174
“$UCS2Lw. Format” on page 176
“$UCS2Xw. Format” on page 178
“$UTF8Xw. Format” on page 195

Informats:

“$UCS2Lw. Informat” on page 284
“$UCS2Xw. Informat” on page 286
“$UTF8Xw. Informat” on page 300

$UCS2BEw. 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

$UCS2BEw.

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 $UCS2BEw. informat performs processing that is opposite of the $UCS2Bw. informat.
Examples

This example uses the Japanese Shift_JIS encoding, which is supported under the UNIX operating environment.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>ucs2str=input ('&quot;, $ucs2be2.);</td>
<td></td>
</tr>
<tr>
<td>put ucs2str=$hex4; ucs2str=5927</td>
<td></td>
</tr>
</tbody>
</table>

See Also

Formats:

“$UCS2Bw. Format” on page 174
“$UCS2BEw. Format” on page 175

Informat:

“$UCS2Bw. Informat” on page 282

$UCS2Lw. 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

$UCS2Lw.

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 $UCS2Lw. informat performs processing that is opposite of the $UCS2LEw. informat. If you are processing data within the same operating environment, then use
the $UCS2Xw. informat. If you are processing data from different operating environments, then use the $UCS2Bw. and $UCS2Lw. informats.

**Examples**

This example uses the Japanese Shift_JIS encoding, which is supported under the UNIX operating environment.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>x=input('2759'x,ucs2l.);</td>
<td></td>
</tr>
<tr>
<td>put x=$hex4.;</td>
<td>x=91e5</td>
</tr>
</tbody>
</table>

**See Also**

Formats:

- “$UCS2Bw. Format” on page 174
- “$UCS2Lw. Format” on page 176
- “$UCS2Xw. Format” on page 178
- “$UTF8Xw. Format” on page 195

Informats:

- “$UCS2Bw. Informat” on page 282
- “$UCS2Xw. Informat” on page 286
- “$UTF8Xw. Informat” on page 300

---

**$UCS2LEw. 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**

$UCS2LEw.

**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 $UCS2LEw. informat performs processing that is opposite of the $UCS2Lw. informat.

Examples
This example uses the Japanese Shift_JIS encoding, which is supported under the UNIX operating environment.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>ucs2str=input ('�', $ ucs2le2.);</td>
<td></td>
</tr>
<tr>
<td>put ucs2str=$hex4;</td>
<td>ucs2str=2759</td>
</tr>
</tbody>
</table>

See Also
Formats:

“$UCS2Lw. Format” on page 176
“$UCS2LEw. Format” on page 177

Informats:

“$UCS2Lw. Informat” on page 284

$UCS2Xw. 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
$UCS2Xw.

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 $UCS2Xw. informat performs processing that is the opposite of the $UCS2XEw. informat. If you are processing data within the same operating environment, then use the $UCS2Xw. informat. If you are processing data from different operating environments, then use the $UCS2Bw. and $UCS2Lw. informats.

Examples

This example uses the Japanese Shift_JIS encoding, which is supported under the UNIX operating environment. This example uses little-endian formatting.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>x=input('5927'x,ucs2x.);</td>
<td></td>
</tr>
<tr>
<td>put x=$hex4.;</td>
<td>x=91e5</td>
</tr>
</tbody>
</table>

See Also

Formats:

“$UCS2Bw. Format” on page 174
“$UCS2Lw. Format” on page 176
“$UCS2Xw. Format” on page 178
“$UTF8Xw. Format” on page 195

Informats:

“$UCS2Bw. Informat” on page 282
“$UCS2Lw. Informat” on page 284
“$UTF8Xw. Informat” on page 300

$UCS2XEw. 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

$UCS2XEw.
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 \$UCS2XEw. informat performs processing that is opposite of the \$UCS2Xw.
informat.

Examples

This example uses the Japanese Shift_JIS encoding, which is supported under the
UNIX operating environment.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>ucs2str=input ('假', $ ucs2xe2.); put ucs2str=$hex6;</td>
<td>ucs2str=5927</td>
</tr>
</tbody>
</table>

See Also

Formats:

“\$UCS2Xw. Format” on page 178
“\$UCS2XEw. Format” on page 180

Informats:

“\$UCS2Xw. Informat” on page 286

\$UCS4Bw. 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

\$UCS4Bw.
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 $UCS4Xw$. informat. If you are processing data from different operating environments, then use the $UCS4Bw.$ and $UCS4Lw.$ informats.

Examples

These examples use the Japanese Shift_JIS encoding, which is supported under the UNIX operating environment.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>z=put('Zero1',$UCS4B20.);</td>
<td></td>
</tr>
<tr>
<td>x=input(z,$UCS4B20.);</td>
<td></td>
</tr>
<tr>
<td>put x;</td>
<td>Zero1</td>
</tr>
</tbody>
</table>

See Also

Formats:

“$UCS4Bw. Format” on page 181

Informats:

“$UCS4Lw. Informat” on page 289

“$UCS4Xw. Informat” on page 290

$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

$UCS4Lw.$
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 \$UCS4Xw. informat. If you are processing data from different operating environments, then use the \$UCS4Bw. and \$UCS4Lw. informats.

Examples

These examples use the Japanese Shift_JIS encoding, which is supported under the UNIX operating environment.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>z=put('.com',$UCS4L16.); put z $hex32.;</td>
<td>2E0000000630000006F0000006D000000</td>
</tr>
</tbody>
</table>

See Also

Formats:
“\$UCS4Lw. Format” on page 183
Informats:
“\$UCS4Bw. Informat” on page 288
“\$UCS4Xw. Informat” on page 290

\textbf{\$UCS4Xw. 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

\$UCS4Xw.
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 $UCS4Xw. informat performs processing that is the opposite of the $UCS4XEw. informat. Use the $UCS4Xw. informat when you are processing data within the same operating environment. Use the $UCS4Bw. and $UCS4Lw. 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.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>ucs4=put('91e5'x,$ucs4x.); sjis=input(ucs4,$ucs4x.); put ucs4=$hex8. sjis=$hex8.; run;</td>
<td>ucs4=27590000 sjis=91E52020</td>
</tr>
</tbody>
</table>

See Also
Formats:
“$UCS2Xw. Format” on page 178
“$UCS2Bw. Format” on page 174
“$UCS2Lw. Format” on page 176
“$UCS4Xw. Format” on page 186
“$UTF8Xw. Format” on page 195
Informats:
“$UCS2Bw. Informat” on page 282
“$UCS2Lw. Informat” on page 284
“$UTF8Xw. Informat” on page 300

$UCS4XEw. 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

\$UCS4XEw.

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 \$UCS4XEw. informat performs processing that is the opposite of the \$UCS4Xw. informat.

Examples

This example uses the Japanese Shift_JIS encoding, which is supported under the UNIX operating environment.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>ucs4str=INPUT (' TESTING ', $ ucs4xe2.);</td>
<td></td>
</tr>
<tr>
<td>put ucs4str=$hex8;</td>
<td>ucs4str=00005927</td>
</tr>
</tbody>
</table>

See Also

Formats:

“\$UCS4Xw. Format” on page 186
“\$UCS4XEw. Format” on page 187

Informats:

“\$UCS4Xw. Informat” on page 290

\$UESCw. 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.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>x=input('¥u5927', $uesc10.);</td>
<td>¥u5927</td>
</tr>
<tr>
<td>y=input('¥uu5927', $uesc10.);</td>
<td>¥uu5927</td>
</tr>
<tr>
<td>z=input('¥uuu5927', $uesc10.);</td>
<td>¥uuu5927</td>
</tr>
<tr>
<td>put x;</td>
<td>¥u5927</td>
</tr>
<tr>
<td>put y;</td>
<td>¥uu5927</td>
</tr>
<tr>
<td>put z;</td>
<td>¥uuu5927</td>
</tr>
</tbody>
</table>

**See Also**

Formats:

“$UESC_w$. Format” on page 188

“$UESCE_w$. Format” on page 189

Informats:

“$UESCE_w$. Informat” on page 294
$UESCEw. 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

$UESCEw.

Syntax Description

$UESCEw

$UESCEw.

w

specifies the width of the input field.

Default: 8

Range: 1–32000

Details

The $UESCEw. informat can be nested.

Comparisons

The $UESCEw. informat performs processing that is opposite of the $UESCw. informat.

Examples

These examples use the Japanese Shift_JIS encoding, which is supported under the UNIX operating system.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>x=input('¥u5927', $uesc10.);</td>
<td>¥u5927</td>
</tr>
<tr>
<td>y=input('¥uu5927', $uesc10.);</td>
<td>¥uu5927</td>
</tr>
<tr>
<td>z=input('¥uuu5927', $uesc10.);</td>
<td>¥uuu5927</td>
</tr>
<tr>
<td>put x y z;</td>
<td></td>
</tr>
</tbody>
</table>

See Also

Formats:

“$UESCw. Format” on page 188

“$UESCEw. Format” on page 189
Informats for NLS

Informat:

“$UESCw. Informat” on page 292

$UNCRw. Informat

Reads an NCR character string, and then converts the character string to the encoding of the current SAS session

Category: Character

Syntax

$UNCRw.

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 $UNCRw. informat performs processing that is opposite of the $UNCREw. informat.

Examples

These examples use the Japanese Shift_JIS encoding, which is supported under the UNIX operating system.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>x=input ('大', $uncr10.);</td>
<td></td>
</tr>
<tr>
<td>y=input('abc', $uncr10);</td>
<td></td>
</tr>
<tr>
<td>put X;</td>
<td></td>
</tr>
<tr>
<td>put Y;</td>
<td></td>
</tr>
</tbody>
</table>

abc
$UNCREw. Informat

Reads a character string in the encoding of the current SAS session, and then converts the character string to NCR

Category: Character

Syntax

$UNCREw.

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 $UNCREw. informat performs processing that is the opposite of the $UNCRw. informat.

Examples

These examples use the Japanese Shift_JIS encoding, which is supported under the UNIX operating system.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>x=input ('abc', $uncre12.);</td>
<td>&quot;#22823; abc&quot;</td>
</tr>
<tr>
<td>put x;</td>
<td></td>
</tr>
</tbody>
</table>
$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

$UPARENw.

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 $UNCREw. 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

See Also

Formats:

“$UPARENEw. Format” on page 192
“$UPARENEw. Format” on page 194

Informats:

“$UPARENEw. Informat” on page 298
“$UPARENpw. Informat” on page 299

$UPARENEw. 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

$UPARENEw.

Syntax Description

\( w \)

specifies the width of the input field.

**Default:** 8

**Range:** 1–32000

Comparisons

The $UPARENEw. informat performs processing that is opposite of the $UPARENw. informat.
Examples

These examples use the Japanese Shift_JIS encoding, which is supported under the UNIX operating system.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>v=input('a',$uparen10.);</td>
<td>&lt;u0061&gt;</td>
</tr>
<tr>
<td>w=input('b',$uparen10.);</td>
<td>&lt;u0062&gt;</td>
</tr>
<tr>
<td>x=input('c',$uparen10.);</td>
<td>&lt;u0063&gt;</td>
</tr>
<tr>
<td>y=input('3',$uparen10.);</td>
<td>&lt;u0033&gt;</td>
</tr>
<tr>
<td>z=input('☎',$uparen10.);</td>
<td>&lt;u5927&gt;</td>
</tr>
<tr>
<td>put v;</td>
<td>&lt;u0061&gt;</td>
</tr>
<tr>
<td>put w;</td>
<td>&lt;u0062&gt;</td>
</tr>
<tr>
<td>put x;</td>
<td>&lt;u0063&gt;</td>
</tr>
<tr>
<td>put y;</td>
<td>&lt;u0033&gt;</td>
</tr>
<tr>
<td>put z;</td>
<td>&lt;u5927&gt;</td>
</tr>
</tbody>
</table>

See Also

Formats:

“$UPARENw. Format” on page 192
“$UPARENEw. Format” on page 194

Informats:

“$UPARENw. Informat” on page 297
“$UPARENPw. Informat” on page 299

$UPARENPw. 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

$UPARENPw.

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>',$uparen10.);   a  
w=input('<u0062>',$uparen10.);   b  
x=input('<u0063>',$uparen10.);   c  
y=input('<u0033>',$uparen10.);   3  
z=input('<u5927>',$uparen10.);   <u5927>
```

See Also

Formats:

“$UPARENw. Format” on page 192
“$UPARENEw. Format” on page 194

Informats:

“$UPARENw. Informat” on page 297
“$UPARENEw. Informat” on page 298

$UTF8Xw. 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

$UTF8Xw.
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.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>x=input (' e5a4a7' x, utf8x3.); put x;</td>
<td>✗</td>
</tr>
</tbody>
</table>

See Also

Formats:

“$UCS2Bw. Format” on page 174
“$UCS2Lw. Format” on page 176
“$UCS2Xw. Format” on page 178
“$UTF8Xw. Format” on page 195

Informats:

“$UCS2Bw. Informat” on page 282
“$UCS2Lw. Informat” on page 284
“$UCS2Xw. Informat” on page 286

$VSLOGw. 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

$VSLOGw.
Syntax Description

$w$

specifies the width of the input field.

**Default:** 200

**Range:** 1–32000

Comparisons

The $\$VSLOGw$. informat performs processing that is opposite of the $\$VSLOGRw$. informat.

Examples

The following example used the input value of “📅 图飞”.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>x=input ('📅 图飞',$vslog12.);</td>
<td>Feb 2019 flight</td>
</tr>
<tr>
<td>put x;</td>
<td>Feb 2019 flight</td>
</tr>
</tbody>
</table>

See Also

Formats:

“$\$VSLOGRw$. Format” on page 197

“$\$VSLOGw$. Format” on page 196

Informats:

“$\$VSLOGRw$. Informat” on page 302

$\$VSLOGw$. 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

$\$VSLOGw$. 
**Syntax Description**

\( w \)

specifies the width of the input field.

**Default:** 200

**Range:** 1–32000

**Comparisons**

The $VSLOGRw. informat performs processing that is opposite of the $VSLOGw. informat.

**Examples**

The following example used the input value of “U, U, flight.”

<table>
<thead>
<tr>
<th>Statements</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>----+----1----+</td>
<td>----+----1----+</td>
</tr>
<tr>
<td>x=input ('U ', U, flight',vslog12.);</td>
<td>flight</td>
</tr>
<tr>
<td>put x;</td>
<td></td>
</tr>
</tbody>
</table>

**See Also**

Formats:

“$VSLOGw. Format” on page 196

“$VSLOGRw. Format” on page 197

Informats:

“$VSLOGw. Informat” on page 301

---

**WEEKUw. Informat**

Reads the format of the number-of-week value within the year and returns a SAS date value by using the U algorithm

**Category:** Date and Time

**Syntax**

WEEKUw.
**Syntax Description**

\[ w \]

specifies the width of the input field.

**Default:** 11

**Range:** 3–200

**Details**

The WEEKUw. informat reads the format of the number-of-week within the year, and then returns a SAS date value by using the U algorithm. If the input does not contain a year expression, then WEEKUw. uses the current year as the year expression, which is the default. If the input does not contain a day expression, then WEEKUw. uses the first day of the week as the day expression, which is the default.

The U Algorithm calculates the SAS date value using 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, with a leading zero and maximum value of 53. For example, the fifth week of the year would be represented as 05.

The inputs to the WEEKUw. informat are the same date for the following example. The current year is 2003.

<table>
<thead>
<tr>
<th>Widths</th>
<th>Formats</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-4</td>
<td>Www</td>
<td>w01</td>
</tr>
<tr>
<td>5-6</td>
<td>yyWww</td>
<td>03W01</td>
</tr>
<tr>
<td>7-8</td>
<td>yyWwwd</td>
<td>03W0101</td>
</tr>
<tr>
<td>9-10</td>
<td>yyyyWwwd</td>
<td>2003W0101</td>
</tr>
<tr>
<td>11-200</td>
<td>yyyy-Www-dd</td>
<td>2003-W01-01</td>
</tr>
</tbody>
</table>

**Comparisons**

The WEEKUw. informat reads the number-of-week value within the year. Sunday is the first day of the week, as a decimal number in the range 0–53, with a leading zero. The WEEKVw. informat reads the number-of-week value as a decimal number in the range 01–53. 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. The WEEKWw. informat reads the week-number-of-year value as a decimal number in the range 00–53, with Monday as the first day of week 1.

**Examples**

The current year is 2003 in the following examples.
Informats for NLS

Statements Results

v=input('W01',weeku3.);
w=input('03W01',weeku5.);
x=input('03W0101',weeku7.);
y=input('2003W0101',weeku9.);
z=input('2003-W01-01',weeku11.);

put v; 15710
put w; 15710
put x; 15710
put y; 15710
put z; 15710

See Also

Formats:
“WEEKUw. Format” on page 198
“WEEKVw. Format” on page 199
“WEEKWw. Format” on page 201

Functions:
“WEEK Function” on page 239

Informats:
“WEEKVw. Informat” on page 305
“WEEKWw. Informat” on page 307

WEEKVw. Informat

Reads the format of the number-of-week value within the year and returns a SAS date value using the V algorithm

Category: Date and Time

Syntax

WEEKVw.

Syntax Description

w
  specifies the width of the input field.

Default: 11
Range: 3–200

Details

The WEEKVw. informat reads a format of the number-of-week value. If the input does not contain a year expression, WEEKVw. uses the current year as the year expression, which is the default. If the input does not contain a day expression, WEEKVw. uses the first day of the week as the day expression, which is the default.

The V algorithm calculates the SAS date value. The number-of-week value is 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.

The inputs to the WEEKVw. informat are the same date for the following example. The current year is 2003.

<table>
<thead>
<tr>
<th>Widths</th>
<th>Formats</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-4</td>
<td>Www</td>
<td>w01</td>
</tr>
<tr>
<td>5-6</td>
<td>yyWww</td>
<td>03W01</td>
</tr>
<tr>
<td>7-8</td>
<td>yyWwwdd</td>
<td>03W0101</td>
</tr>
<tr>
<td>9-10</td>
<td>yyyyWwwdd</td>
<td>2003W0101</td>
</tr>
<tr>
<td>11-200</td>
<td>yyyy-Www-dd</td>
<td>2003-W01-01</td>
</tr>
</tbody>
</table>

Comparisons

The WEEKUw. informat reads the number-of-week value within the year. Sunday is the first day of the week, as a decimal number in the range 0–53, with a leading zero. The WEEKVw. informat reads the number-of-week value as a decimal number in the range 01–53. 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. The WEEKWw. informat reads the week-number-of-year value as a decimal number in the range 00–53, with Monday as the first day of week 1.

Examples

The current year is 2003 in the following examples.
Informats for NLS /

WEEKWw. Informat

Reads the format of the number-of-week value within the year and returns a SAS date value using the W algorithm

Category: Date and Time

Syntax

WEEKWw.

Syntax Description

w

specifies the width of the input field.

Default: 11

See Also

Formats:

“WEEKUw. Format” on page 198
“WEEKVw. Format” on page 199
“WEEKWw. Format” on page 201

Functions:

“WEEK Function” on page 239

Informats:

“WEEKUw. Informat” on page 303
“WEEKWw. Informat” on page 307
Range: 3–200

Details
The WEEKWw. informat reads a format of the number-of-week value. If the input does not contain a year expression, the WEEKWw. informat uses the current year as the year expression, which is the default. If the input does not contain a day expression, the WEEKWw. informat uses the first day of the week as the day expression, which is the default. 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-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.

The inputs to the WEEKWw. informat are the same date for the following example. The current year is 2003.

<table>
<thead>
<tr>
<th>Widths</th>
<th>Formats</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-4</td>
<td>Www</td>
<td>w01</td>
</tr>
<tr>
<td>5-6</td>
<td>yyWww</td>
<td>03W01</td>
</tr>
<tr>
<td>7-8</td>
<td>yyWwwdd</td>
<td>03W0101</td>
</tr>
<tr>
<td>9-10</td>
<td>yyyyWwwdd</td>
<td>2003W0101</td>
</tr>
<tr>
<td>11-200</td>
<td>yyyy-Www-dd</td>
<td>2003-W01-01</td>
</tr>
</tbody>
</table>

Comparisons
The WEEKUw. informat reads the number-of-week value within the year. Sunday is the first day of the week, as a decimal number in the range 0–53, with a leading zero. The WEEKVw. informat reads the number-of-week value as a decimal number in the range 01–53. 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. The WEEKWw. informat reads the week-number-of-year value as a decimal number in the range 00–53, with Monday as the first day of week 1.

Examples
The current year is 2003 in the following examples.
### Statements

<table>
<thead>
<tr>
<th></th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>v=input('W01',weekw3.);</td>
<td>15711</td>
</tr>
<tr>
<td>w=input('03W01',weekw5.);</td>
<td>15711</td>
</tr>
<tr>
<td>x=input('03W01101',weekw7.);</td>
<td>15711</td>
</tr>
<tr>
<td>y=input('2003W01101',weekw9.);</td>
<td>15711</td>
</tr>
<tr>
<td>z=input('2003-W01-01',weekw11.);</td>
<td>15711</td>
</tr>
</tbody>
</table>

#### See Also

Formats:
- “WEEKU\textit{w}. Format” on page 198
- “WEEKV\textit{w}. Format” on page 199
- “WEEKW\textit{w}. Format” on page 201

Function:
- “WEEK Function” on page 239

Informats:
- “WEEKU\textit{w}. Informat” on page 303
- “WEEKV\textit{w}. Informat” on page 305

### YEN\textit{w}.d Informat

Removes embedded yen signs, commas, and decimal points

**Category:** Numeric

### Syntax

\begin{verbatim}
YENw.d
\end{verbatim}

### Syntax Description

\textit{w}

specifies the width of the input field.

- **Default:** 1
- **Range:** 1–32

\textit{d}

optionally 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.

```plaintext
input value yen10.2;
```

<table>
<thead>
<tr>
<th>Value</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>¥1254.71</td>
<td>1254.71</td>
</tr>
</tbody>
</table>

**See Also**

Formats:

“YEN\(w.d\) Format” on page 203
PART 6

Procedures for NLS

Chapter 14. . . . . . . . The DBCSTAB Procedure  313

Chapter 15. . . . . . . . The TRANTAB Procedure  319
Overview: DBCSTAB Procedure

The DBCSTAB procedure produces conversion tables for the double-byte character sets that SAS supports.

Syntax: DBCSTAB Procedure

PROC DBCSTAB TABLE=table-name
   <Basetype=base-type> <CATALOG=libref: catalog-name>
   <DATA=libref: table-name > <DBCSSLANG=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.
When to Use the DBCSTAB Procedure

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, then specify the use of the new table with the TRANTAB option.
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 may 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 dataset WORK.JA_JPN.

See Also

Functions:
   “KCVT Function” on page 214

Procedures:
   Chapter 15, “The TRANTAB Procedure,” on page 319

System Options:
   “TRANTAB= System Option: OpenVMS, UNIX, Windows, and z/OS” on page 362
   “DBCS System Option: UNIX, Windows, and z/OS” on page 349
   “DBCSLANG System Option: UNIX, Windows, and z/OS” on page 350
   “DBCSTYPE System Option: UNIX, Windows, and z/OS” on page 351
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 329 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 Coordinator 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 Coordinator, 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:

```sas
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:

```sas
proc sort sortseq=ascii;
```

You can also create a customized translation table with PROC TRANTAB and specify the new table with PROC SORT. This is useful when you want to specify sorting sequences for languages other than U.S. English.

See Example 6 on page 339 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: OpenVMS, UNIX, Windows, and z/OS” on page 361.

**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 may 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 391 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.

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 may 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:

```sas
  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 is made up 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 329 for a listing of the ASCII translation table (a SAS supplied 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.


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;

<table>
<thead>
<tr>
<th>Task</th>
<th>Use this statement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set all positions in the translation table to zero</td>
<td>CLEAR</td>
</tr>
<tr>
<td>Create an inverse of table 1</td>
<td>INVERSE</td>
</tr>
<tr>
<td>Display a translation table in hexadecimal representation</td>
<td>LIST</td>
</tr>
<tr>
<td>Load a translation table into memory for editing</td>
<td>LOAD</td>
</tr>
<tr>
<td>Replace the characters in a translation table with specified values</td>
<td>REPLACE</td>
</tr>
<tr>
<td>Save the translation table in your SASUSER.PROFILE catalog</td>
<td>SAVE</td>
</tr>
<tr>
<td>Exchange table 1 with table 2</td>
<td>SWAP</td>
</tr>
</tbody>
</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 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.
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 8 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 337

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 335

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 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 330, Example 3 on page 332, and Example 4 on page 335

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 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.

\textit{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 \textit{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 332 shows a mixture of all three types of values in the REPLACE statement.

\section*{SAVE Statement}

\textbf{SAVE Statement}

Saves the translation table in your SASUSER.PROFILE catalog

\textbf{Featured in:} Example 2 on page 330 and Example 4 on page 335

\begin{verbatim}
SAVE <TABLE=table-name> <ONE|TWO|BOTH>;
\end{verbatim}

\section*{Options}

\textbf{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.

\textbf{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.

\textbf{ONE | TWO | BOTH}

\textbf{ONE}

\begin{verbatim}
    saves table one.
\end{verbatim}

\textbf{TWO}

\begin{verbatim}
    saves table two.
\end{verbatim}

\textbf{BOTH}

\begin{verbatim}
    saves both table one and table two.
\end{verbatim}

\textbf{Default:} BOTH

\section*{SWAP Statement}

\textbf{SWAP Statement}

Exchanges table 1 with table 2 to enable you to edit positions 256 through 511

\textbf{Tip:} After you edit the table, you must the issue SWAP statement again to reposition the table.

\textbf{Featured in:} Example 7 on page 341
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 SAS supplied ASCII translation table.

Program

```
set the options and specify a translation table.
options nodate pageno=1 linesize=80pagesize=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;
```
NOTE: Table specified is ASCII.

ASCII table 1:

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>00</td>
<td>'00102030405060708090A0B0C0D0E0F'x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>'101112131415161718191A1B1C1D1E1F'x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>'202122232425262728292A2B2C2D2E2F'x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>'303132333435363738393A3B3C3D3E3F'x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>'404142434445464748494A4B4C4D4E4F'x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>'505152535455565758595A5B5C5D5E5F'x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>60</td>
<td>'606162636465666768696A6B6C6D6E6F'x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>70</td>
<td>'707172737475767778797A7B7C7D7E7F'x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>80</td>
<td>'808182838485868788898A8B8C8D8E8F'x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>90</td>
<td>'90919293949596979899A9B9C9D9E9F'x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A0</td>
<td>'A0A1A2A3A4A5A6A7A8A9AAABACADADAEAF'x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B0</td>
<td>'B0B1B2B3B4B5B6B7B8B9BABBBCBDCBDEDF'x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C0</td>
<td>'C0C1C2C3C4C5C6C7C8C9CACBBCBCCBCCDCEF'x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D0</td>
<td>'D0D1D2D3D4D5D6D7D8D9DADBDCCDDEDDEF'x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E0</td>
<td>'E0E1E2E3E4E5E6E7E8E9EABEBCBCEDEEEFF'x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F0</td>
<td>'F0F1F2F3F4F5F6F7F8F9F9FABFBFCFDFEFF'x</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ASCII table 2:

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>00</td>
<td>'00102030405060708090A0B0C0D0E0F'x</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>'101112131415161718191A1B1C1D1E1F'x</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>'202122232425262728292A2B2C2D2E2F'x</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>30</td>
<td>'303132333435363738393A3B3C3D3E3F'x</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>40</td>
<td>'404142434445464748494A4B4C4D4E4F'x</td>
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<tr>
<td>50</td>
<td>'505152535455565758595A5B5C5D5E5F'x</td>
<td></td>
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</tr>
<tr>
<td>60</td>
<td>'606162636465666768696A6B6C6D6E6F'x</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>70</td>
<td>'707172737475767778797A7B7C7D7E7F'x</td>
<td></td>
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<tr>
<td>80</td>
<td>'808182838485868788898A8B8C8D8E8F'x</td>
<td></td>
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</tr>
<tr>
<td>90</td>
<td>'90919293949596979899A9B9C9D9E9F'x</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>A0</td>
<td>'A0A1A2A3A4A5A6A7A8A9AAABACADADAEAF'x</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B0</td>
<td>'B0B1B2B3B4B5B6B7B8B9BABBBCBDCBDEDF'x</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C0</td>
<td>'C0C1C2C3C4C5C6C7C8C9CACBBCBCCBCCDCEF'x</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D0</td>
<td>'D0D1D2D3D4D5D6D7D8D9DADBDCCDDEDDEF'x</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E0</td>
<td>'E0E1E2E3E4E5E6E7E8E9EABEBCBCEDEEEFF'x</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F0</td>
<td>'F0F1F2F3F4F5F6F7F8F9F9FABFBFCFDFEFF'x</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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.
The TRANTAB Procedure

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
  '000102030405060708090a0b0c0d0e0f'x
  '101112131415161718191a1b1c1d1e1f'x
  'c7f6e7e8e9eaebecedefeef0f1f2f3f4f5f6f7f8f9faffbbffcffdffefff'x
  '202122232425262728292a2b2c2d2e2f'x
  '262728292a2b2c2d2e2f'x
  '2d2e2f'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;
```
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 337.) To edit table 2, you can use the SWAP statement with the REPLACE statement. (See Example 7 on page 341.)

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 '1011213A5B008E71819C6C51C1D1E1F'x
20 'C7FCE9E240A171BEEBEEBEEBEEBEEBEE'x
30 'C9E61F46F6F6F6F6F6F6F6F6F6F6F6F6F'x
40 '20E1EDDF3FAD1DAABABFAA2E3C282B7C'x
50 '265FACDBCA1ABBB5F5F21242A93BAC'x
60 '2D25FA6A6A6A6A6A6A6A6A6A6A6A6A6A'x
80 '2B6162636466666666666666666666666'x
90 '2D6A56C6D6E6F7071727DA6D2B2D2D2D'x
B0 '2B2B2B5F5FA65F5F5FD5F5F5F55F5F5F5F'x
C0 '7B4142434445464748495F5F5F5F5F5F5F'x
D0 '7D4A4B4C4D4E4F505152535455555555F'x
E0 '5C8355555555555555555555555555555'x
F0 '303132333435363738393B75F6E2B5555F'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

```
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 330. 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.

```sas
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.

```sas
list one;
```

**SAS Log**

The Original NEWTABLE Translation Table

```
NOTE: Table specified is NEWTABLE.
NOTE: NEWTABLE table 2 is uninitialized.
NEWTABLE table 1:

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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<th>7</th>
<th>8</th>
<th>9</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>00</td>
<td>00010203A09E57FF9ECC40B0C0DOE0F'x</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>10</td>
<td>'10111213A5E008E71819C6C51C1DE1F'x</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>20</td>
<td>'C7FCE9E2E40A171BEAEEBE8EFE050607'x</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>30</td>
<td>'C9E616F4F6F2F804FFD6DCA2B6A7501A'x</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>40</td>
<td>'20E1EDF3FAF1D1ABABFA22E3C2B2B7C'x</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>50</td>
<td>'265FA3DCA1234565F21242A293BAC'x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>60</td>
<td>'2D2F5FA9B6A6A62B2BA62C255F3E3F'x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>70</td>
<td>'A61B2B22B2B2D2D2D6A3A2340273D22'x</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>80</td>
<td>'2B6162636465666768692D2A62B2B2B'x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>90</td>
<td>'2D6A6B6C6D6E6F07717222A62D2B2D2'x</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>C0</td>
<td>'7B41243443444347498955F5F5F5F5F'x</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>D0</td>
<td>'7D4A4B4C5D4E4F5F5055255F5F5F5F5F'x</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E0</td>
<td>'5C83535455555555758595A5F5F5F5F'x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F0</td>
<td>'30313233343536373839B75F6B2B5F'x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
```
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 '00010203A09E57FF9EC140A878757B' 'x
10 '09204013A5E008E71819C6C51C1D1EF' 'x
20 '09204013A5E008E71819C6C51C1D1EF' 'x
30 'C9E616F4F6F2FB04FFD6DCA2B6A7501A' 'x
40 '20E1EDF3FAE1ABABFA22E3C282B7C' 'x
50 '26DAFCBDDC1ABA5F6F212A293BAC' 'x
60 '2D2F5FA6A6A62B2B6A62C255F3E3F' 'x
80 '2B61263646666768692D2BA6A62B2B' 'x
90 '2D6A6B6C6D6E6F7071722D6A62B2D2D' 'x
B0 '2B62B25F5FA65F5FDF5FB65F5FB55F' 'x
C0 '7B4124344454647448495F5F5F5F5F' 'x
D0 '7D4A4B4C4D4E4F505152535F5F5F5F5F' 'x
E0 '5CB355555565758595A5F5F5F5F5F5F' 'x
F0 '303132333333536373839875F6EB25F5F' '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 differs from Example 3 on page 332 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.

```sas
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;
```
NOTE: Table specified is ASCII.
ASCII table 1:

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>00</td>
<td>001002030405060708090A0B0C0D0E0F'x</td>
<td>10</td>
<td>011112131415161718191A1B1C1D1E1F'x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>202122232425262728292A2B2C2D2E2F'x</td>
<td>30</td>
<td>303132333435363738393A3B3C3D3E3F'x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>404142434445464748494A4B4C4D4E4F'x</td>
<td>50</td>
<td>505152535455565758595A5B5C5D5E5F'x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>60</td>
<td>606162636465666768696A6B6C6D6E6F'x</td>
<td>70</td>
<td>707172737475767778797A7B7C7D7E7F'x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>80</td>
<td>808182838485868788898A8B8C8D8E8F'x</td>
<td>90</td>
<td>909192939495969798999A9B9C9D9E9F'x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A0</td>
<td>A0A1A2A3A4A5A6A7A8A9AAABACADAEAF'x</td>
<td>A9</td>
<td>'B0B1B2B3B4B5B6B7B8B9BABBBCBDBEBFB'x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B0</td>
<td>'B9C9D9E9F'x</td>
<td>C0</td>
<td>'C0C1C2C3C4C5C6C7C8C9CACBCCCCCCEF'x</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D0</td>
<td>'D0D1D2D3D4D5D6D7D8D9DADBCDDEDF'x</td>
<td>E0</td>
<td>'E0E1E2E3E4E5E6E7E8E9EAEABCEDEEEF'x</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F0</td>
<td>'F0F1F2F3F4F5F6F7F8F9FAFBFCFDFEFF'x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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;
```
The TRANTAB Procedure
Program 337

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 '606162636465666768696A6B6C6D6E6F'x
70 '707172737475767778797A7B7C7D7E7F'x
80 '808182838485868788898A8B8C8D8E8F'x
90 '909192939495969798999A9B9C9D9E9F'x
A0 'A0A1A2A3A4A5A6A7A8A9A9ABACADAEAF'x
B0 'B0B1B2B3B4B5B6B7B8B9BABBBCBDCBEBF'x
C0 'C0C1C2C3C4C5C6C7C8C9CACCDCDCDCECF'x
D0 'D0D1D2D3D4D5D6D7D8D9DADDDEDED'E'x
E0 'E0E1E2E3E4E5E6E7E8E9EAEBECDEDEEE'E'x
F0 'F0F1F2F3F4F5F6F7F8F9FAFBFCFDFEFEFF'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 335. The new translation table that is created in this example is the operating environment-to-device translation for use in data communications.

Program

```sas
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:

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>00</td>
<td>'000102030405060708090A0B0C0D0E0F'x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>10</td>
<td>'101112131415161718191A1B1C1D1E1F'x</td>
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<td></td>
</tr>
<tr>
<td>20</td>
<td>'202122232425262728292A2B2C2D2E2F'x</td>
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<td></td>
</tr>
<tr>
<td>30</td>
<td>'303132333435363738393A3B3C3D3E3F'x</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>40</td>
<td>'404142434445464748494A4B4C4D4E4F'x</td>
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<tr>
<td>50</td>
<td>'505152535455565758595A5B5C5D5E5F'x</td>
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</tr>
<tr>
<td>60</td>
<td>'606162636465666768696A6B6C6D6E6F'x</td>
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<td></td>
</tr>
<tr>
<td>70</td>
<td>'707172737475767778797A7B7C7D7E7F'x</td>
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<td></td>
</tr>
<tr>
<td>80</td>
<td>'808182838485868788898A8B8C8D8E8F'x</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>90</td>
<td>'909192939495969798999A9B9C9D9E9F'x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A0</td>
<td>'A0A1A2A3A4A5A6A7A8A9AAABACADAEAF'x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B0</td>
<td>'B0B1B2B3B4B5B6B7B8B9BABBBCBDBDEBF'x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C0</td>
<td>'C0C1C2C3C4C5C6C7C8C9CAACBCCDCECF'x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D0</td>
<td>'D0D1D2D3D4D5D6D7D8D9DADBCDDEDF'x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E0</td>
<td>'E0E1E2E3E4E5E6E7E8E9EABEBCDEDEEF'x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F0</td>
<td>'F0F1F2F3F4F5F6F7F8F9FAFBFCDFEFFFF'x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

UPPER table 2:

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>00</td>
<td>'000102030405060708090A0B0C0D0E0F'x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>'101112131415161718191A1B1C1D1E1F'x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>'202122232425262728292A2B2C2D2E2F'x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>'303132333435363738393A3B3C3D3E3F'x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>'404142434445464748494A4B4C4D4E4F'x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>'505152535455565758595A5B5C5D5E5F'x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>60</td>
<td>'606162636465666768696A6B6C6D6E6F'x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>70</td>
<td>'707172737475767778797A7B7C7D7E7F'x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>80</td>
<td>'808182838485868788898A8B8C8D8E8F'x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>90</td>
<td>'909192939495969798999A9B9C9D9E9F'x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A0</td>
<td>'A0A1A2A3A4A5A6A7A8A9AAABACADAEAF'x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B0</td>
<td>'B0B1B2B3B4B5B6B7B8B9BABBBCBDBDEBF'x</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C0</td>
<td>'C0C1C2C3C4C5C6C7C8C9CAACBCCDCECF'x</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D0</td>
<td>'D0D1D2D3D4D5D6D7D8D9DADBCDDEDF'x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E0</td>
<td>'E0E1E2E3E4E5E6E7E8E9EABEBCDEDEEF'x</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F0</td>
<td>'F0F1F2F3F4F5F6F7F8F9FAFBFCDFEFFFF'x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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 335, 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 may 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 different languages.

Program

Set the SAS system options.

options nodate pageno=1 linesize=80 pagesize=60;

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.

<table>
<thead>
<tr>
<th>Default Sort Sequence</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Values</td>
<td>1</td>
</tr>
<tr>
<td>Always</td>
<td></td>
</tr>
<tr>
<td>Forever</td>
<td></td>
</tr>
<tr>
<td>Later</td>
<td></td>
</tr>
<tr>
<td>Yesterday</td>
<td></td>
</tr>
<tr>
<td>always</td>
<td></td>
</tr>
<tr>
<td>forever</td>
<td></td>
</tr>
<tr>
<td>later</td>
<td></td>
</tr>
<tr>
<td>yesterday</td>
<td></td>
</tr>
</tbody>
</table>

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 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;
```
The TRANTAB Procedure

Program 341

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.

<table>
<thead>
<tr>
<th>Customized Sort Sequence</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Values</td>
<td></td>
</tr>
<tr>
<td>Always</td>
<td></td>
</tr>
<tr>
<td>always</td>
<td></td>
</tr>
<tr>
<td>Forever</td>
<td></td>
</tr>
<tr>
<td>forever</td>
<td></td>
</tr>
<tr>
<td>Later</td>
<td></td>
</tr>
<tr>
<td>later</td>
<td></td>
</tr>
<tr>
<td>Yesterday</td>
<td></td>
</tr>
<tr>
<td>yesterday</td>
<td></td>
</tr>
</tbody>
</table>

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.

```sas
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;
```

The Original UPPER Translation Table

<table>
<thead>
<tr>
<th>NOTE: Table specified is UPPER.</th>
</tr>
</thead>
<tbody>
<tr>
<td>UPPER table 1:</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>0 1 2 3 4 5 6 7 8 9 A B C D E F</td>
</tr>
<tr>
<td>00 '000102030405060708090A0B0C0D0E0F'x</td>
</tr>
<tr>
<td>10 '101112131415161718191A1B1C1D1E1F'x</td>
</tr>
<tr>
<td>20 '202122232425262728292A2B2C2D2E2F'x</td>
</tr>
<tr>
<td>30 '303132333435363738393A3B3C3D3E3F'x</td>
</tr>
<tr>
<td>40 '404142434445464748494A4B4C4D4E4F'x</td>
</tr>
<tr>
<td>50 '505152535455565758595A5B5C5D5E5F'x</td>
</tr>
<tr>
<td>60 '606162636465666768696A6B6C6D6E6F'x</td>
</tr>
<tr>
<td>70 '707172737475767778797A7B7C7D7E7F'x</td>
</tr>
<tr>
<td>80 '808182838485868788898A8B8C8D8E8F'x</td>
</tr>
<tr>
<td>90 '90919293949596979899A0A1A2A3A4A5A6</td>
</tr>
<tr>
<td>A0 'A0A1A2A3A4A5A6A7A8A9AAABACADAEAF'x</td>
</tr>
<tr>
<td>B0 'B0B1B2B3B4B5B6B7B8B9BABAABBBCBDBEBF'x</td>
</tr>
<tr>
<td>C0 'C0C1C2C3C4C5C6C7C8C9CAACBCCDCECF'x</td>
</tr>
<tr>
<td>D0 'D0D1D2D3D4D5D6D7D8D9DADBDCDDDEDF'x</td>
</tr>
<tr>
<td>E0 'E0E1E2E3E4E5E6E7E8E9EAEBEBCDEDEEFF'x</td>
</tr>
<tr>
<td>F0 'F0F1F2F3F4F5F6F7F8F9FAFBFCFDFEFFFF'x</td>
</tr>
</tbody>
</table>

| 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 '606162636465666768696A6B6C6D6E6F'x |
| 70 '707172737475767778797A7B7C7D7E7F'x |
| 80 '808182838485868788898A8B8C8D8E8F'x |
| 90 '90919293949596979899A0A1A2A3A4A5A6 |
| A0 'A0A1A2A3A4A5A6A7A8A9AAABACADAEAF'x |
| B0 'B0B1B2B3B4B5B6B7B8B9BABAABBBCBDBEBF'x |
| C0 'C0C1C2C3C4C5C6C7C8C9CAACBCCDCECF'x |
| D0 'D0D1D2D3D4D5D6D7D8D9DADBDCDDDEDF'x |
| E0 'E0E1E2E3E4E5E6E7E8E9EAEBEBCDEDEEFF'x |
| F0 'F0F1F2F3F4F5F6F7F8F9FAFBFCFDFEFFFF'x |

SAS Log

---

**Display the original translation table.** The LIST statement displays the original UPPER translation table.

```sas
list both;
```

**SAS Log**

---

**The Original UPPER Translation Table**

<table>
<thead>
<tr>
<th>NOTE: Table specified is UPPER.</th>
</tr>
</thead>
<tbody>
<tr>
<td>UPPER table 1:</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>0 1 2 3 4 5 6 7 8 9 A B C D E F</td>
</tr>
<tr>
<td>00 '000102030405060708090A0B0C0D0E0F'x</td>
</tr>
<tr>
<td>10 '101112131415161718191A1B1C1D1E1F'x</td>
</tr>
<tr>
<td>20 '202122232425262728292A2B2C2D2E2F'x</td>
</tr>
<tr>
<td>30 '303132333435363738393A3B3C3D3E3F'x</td>
</tr>
<tr>
<td>40 '404142434445464748494A4B4C4D4E4F'x</td>
</tr>
<tr>
<td>50 '505152535455565758595A5B5C5D5E5F'x</td>
</tr>
<tr>
<td>60 '606162636465666768696A6B6C6D6E6F'x</td>
</tr>
<tr>
<td>70 '707172737475767778797A7B7C7D7E7F'x</td>
</tr>
<tr>
<td>80 '808182838485868788898A8B8C8D8E8F'x</td>
</tr>
<tr>
<td>90 '90919293949596979899A0A1A2A3A4A5A6</td>
</tr>
<tr>
<td>A0 'A0A1A2A3A4A5A6A7A8A9AAABACADAEAF'x</td>
</tr>
<tr>
<td>B0 'B0B1B2B3B4B5B6B7B8B9BABAABBBCBDBEBF'x</td>
</tr>
<tr>
<td>C0 'C0C1C2C3C4C5C6C7C8C9CAACBCCDCECF'x</td>
</tr>
<tr>
<td>D0 'D0D1D2D3D4D5D6D7D8D9DADBDCDDDEDF'x</td>
</tr>
<tr>
<td>E0 'E0E1E2E3E4E5E6E7E8E9EAEBEBCDEDEEFF'x</td>
</tr>
<tr>
<td>F0 'F0F1F2F3F4F5F6F7F8F9FAFBFCFDFEFFFF'x</td>
</tr>
</tbody>
</table>

---

**Display the original translation table.** The LIST statement displays the original UPPER translation table.

```sas
list both;
```

**SAS Log**

---

**The Original UPPER Translation Table**

<table>
<thead>
<tr>
<th>NOTE: Table specified is UPPER.</th>
</tr>
</thead>
<tbody>
<tr>
<td>UPPER table 1:</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>0 1 2 3 4 5 6 7 8 9 A B C D E F</td>
</tr>
<tr>
<td>00 '000102030405060708090A0B0C0D0E0F'x</td>
</tr>
<tr>
<td>10 '101112131415161718191A1B1C1D1E1F'x</td>
</tr>
<tr>
<td>20 '202122232425262728292A2B2C2D2E2F'x</td>
</tr>
<tr>
<td>30 '303132333435363738393A3B3C3D3E3F'x</td>
</tr>
<tr>
<td>40 '404142434445464748494A4B4C4D4E4F'x</td>
</tr>
<tr>
<td>50 '505152535455565758595A5B5C5D5E5F'x</td>
</tr>
<tr>
<td>60 '606162636465666768696A6B6C6D6E6F'x</td>
</tr>
<tr>
<td>70 '707172737475767778797A7B7C7D7E7F'x</td>
</tr>
<tr>
<td>80 '808182838485868788898A8B8C8D8E8F'x</td>
</tr>
<tr>
<td>90 '90919293949596979899A0A1A2A3A4A5A6</td>
</tr>
<tr>
<td>A0 'A0A1A2A3A4A5A6A7A8A9AAABACADAEAF'x</td>
</tr>
<tr>
<td>B0 'B0B1B2B3B4B5B6B7B8B9BABAABBBCBDBEBF'x</td>
</tr>
<tr>
<td>C0 'C0C1C2C3C4C5C6C7C8C9CAACBCCDCECF'x</td>
</tr>
<tr>
<td>D0 'D0D1D2D3D4D5D6D7D8D9DADBDCDDDEDF'x</td>
</tr>
<tr>
<td>E0 'E0E1E2E3E4E5E6E7E8E9EAEBEBCDEDEEFF'x</td>
</tr>
<tr>
<td>F0 'F0F1F2F3F4F5F6F7F8F9FAFBFCFDFEFFFF'x</td>
</tr>
</tbody>
</table>
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;
```
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 '606162636465666768696A6B6C6D6E6F'x
    70 '707172737475767778797A7B7C7D7E7F'x
80 '808182838485868788898A8B8C8D8E8F'x
90 '909192939495969798999A9B9C9D9E9F'x
A0 'A0A1A2A3A4A5A6A7A8A9AAABACADADAEAF'x
B0 'B0B1B2B3B4B5B6B7B8B9BBBCBCDEDEFF'x
C0 'C0C1C2C3C4C5C6C7C8C9CACBCCDCECF'x
D0 'D0D1D2D3D4D5D6D7D8D9DADBDCDDEDEF'x
E0 'E0E1E2E3E4E5E6E7E8E9EAEBCEDDEEEF'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 '60606060606060606060606060606060'x
    70 '00000000000000000000007B7C7D7E7F'x
80 '808182838485868788898A8B8C8D8E8F'x
90 '909192939495969798999A9B9C9D9E9F'x
A0 'A0A1A2A3A4A5A6A7A8A9A9AAABACADADAEAF'x
B0 'B0B1B2B3B4B5B6B7B8B9BBBCBCDEDEFF'x
C0 'C0C1C2C3C4C5C6C7C8C9CACBCCDCECF'x
D0 'D0D1D2D3D4D5D6D7D8D9DADBDCDDEDEF'x
E0 'E0E1E2E3E4E5E6E7E8E9EAEBCEDDEEEF'x
F0 'F0F1F2F3F4F5F6F7F8F9FAFBFCFDFEFF'x
```

See Also

Conceptual discussion about “Transcoding and Translation Tables” on page 22

System Options:
   “TRANTAB= System Option: OpenVMS, UNIX, Windows, and z/OS” on page 362

NLS Options for Commands, Statements, and Procedures:
   “TRANTAB Statement” on page 391
System Options for NLS

Chapter 16. ........ Overview to SAS System Options for NLS 347

Chapter 17. ........ System Options for NLS 349
### 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 16.1  Summary of Categories of System Options for NLS

<table>
<thead>
<tr>
<th>Category</th>
<th>System Options for NLS</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment control:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Language control:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>“DATESTYLE= System Option” on page 349</td>
<td>Identifies the sequence of month, day, and year when the ANYYDTDTM, ANYYDTDTE, or ANYYDTTME informats encounter input where the year, month, and day determination is ambiguous</td>
</tr>
<tr>
<td></td>
<td>“DBCS System Option: UNIX, Windows, and z/OS” on page 349</td>
<td>Recognizes double-byte character sets (DBCS)</td>
</tr>
<tr>
<td></td>
<td>“DBCSSLANG System Option: UNIX, Windows, and z/OS” on page 350</td>
<td>Specifies a double-byte character set (DBCS) language</td>
</tr>
<tr>
<td></td>
<td>“DBCSTYPE System Option: UNIX, Windows, and z/OS” on page 351</td>
<td>Specifies the encoding method to use for a double-byte character set (DBCS)</td>
</tr>
<tr>
<td></td>
<td>“DFLANG= System Option: OpenVMS, UNIX, Windows, and z/OS” on page 353</td>
<td>Specifies the language for international date informats and formats</td>
</tr>
<tr>
<td></td>
<td>“ENCODING System Option: OpenVMS, UNIX, Windows, and z/OS” on page 354</td>
<td>Specifies the default character-set encoding for the SAS session</td>
</tr>
<tr>
<td></td>
<td>“FSDBTYPE System Option: UNIX” on page 356</td>
<td>Specifies a full-screen double-byte character set (DBCS) encoding method</td>
</tr>
<tr>
<td>Category</td>
<td>System Options for NLS</td>
<td>Description</td>
</tr>
<tr>
<td>-------------------</td>
<td>----------------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>“FSIMM System Option: UNIX” on page 357</td>
<td>Specifies input method modules (IMMs) for full-screen double-byte character set (DBCS)</td>
<td></td>
</tr>
<tr>
<td>“FSIMMOPT System Option: UNIX” on page 357</td>
<td>Specifies options for input method modules (IMMs) that are used with a full-screen double-byte character set (DBCS)</td>
<td></td>
</tr>
<tr>
<td>“LOCALE System Option: OpenVMS, UNIX, Windows, and z/OS” on page 358</td>
<td>Specifies a set of attributes in a SAS session that reflect the language, local conventions, and culture for a geographical region</td>
<td></td>
</tr>
<tr>
<td>“NLSCOMPATMODE System Option: z/OS” on page 360</td>
<td>Provides national language compatibility with previous releases of SAS</td>
<td></td>
</tr>
<tr>
<td>“PAPERSIZE= System Option: OpenVMS, UNIX, Window, and z/OS” on page 361</td>
<td>Specifies the paper size for the printer to use</td>
<td></td>
</tr>
<tr>
<td>“TRANTAB= System Option: OpenVMS, UNIX, Windows, and z/OS” on page 362</td>
<td>Specifies the translation tables that are used by various parts of SAS</td>
<td></td>
</tr>
<tr>
<td>Sort: Procedure options</td>
<td>“SORTSEQ= System Option: OpenVMS, UNIX, Windows, and z/OS” on page 361</td>
<td>Specifies a language-specific collation sequence for the SORT procedure to use in the current SAS session</td>
</tr>
</tbody>
</table>
CHAPTER 17
System Options for NLS

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 29
“DBCS Values for a SAS Session” on page 405
System Options:
“DBCSLANG System Option: UNIX, Windows, and z/OS” on page 350
“DBCSTYPE System Option: UNIX, Windows, and z/OS” on page 351

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)
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

DBCSTYPE = language (z/OS)

language

depends on the operating environment. The following table contains valid language values:

Table 17.1  Supported DBCS Languages According to Operating Environment

<table>
<thead>
<tr>
<th>Language</th>
<th>z/OS</th>
<th>UNIX</th>
<th>Windows</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHINESE (simplified)</td>
<td>yes*</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>JAPANESE</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>KOREAN</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>TAIWANESE (traditional)</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>NONE</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>UNKNOWN</td>
<td>yes</td>
<td>no</td>
<td>no</td>
</tr>
</tbody>
</table>

* 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 about Chapter 5, “Double-Byte Character Sets (DBCS),” on page 29
“DBCS Values for a SAS Session” on page 405
System Options:
“DBCS System Option: UNIX, Windows, and z/OS” on page 349
“DBCSTYPE System Option: UNIX, Windows, and z/OS” on page 351
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 17.2 DBCS Encoding Methods for z/OS

<table>
<thead>
<tr>
<th>DBCSTYPE= Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBM</td>
<td>IBM PC encoding method</td>
</tr>
</tbody>
</table>

Table 17.3 DBCS Encoding Methods for UNIX

<table>
<thead>
<tr>
<th>DBCSTYPE= Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEC</td>
<td>DEC encoding method</td>
</tr>
<tr>
<td>EUC</td>
<td>Extended UNIX Code encoding method</td>
</tr>
<tr>
<td>HP15</td>
<td>Hewlett Packard encoding method</td>
</tr>
<tr>
<td>PCIBM</td>
<td>IBM PC encoding method</td>
</tr>
<tr>
<td>PCMS</td>
<td>Microsoft PC encoding method</td>
</tr>
</tbody>
</table>
### System Options for NLS

DFLANG= System Option: OpenVMS, UNIX, Windows, and z/OS

Specifies the language for international date informat and format.

**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 informat and format.

These are valid values for `language`:

<table>
<thead>
<tr>
<th>DBCSTYPE= Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SJIS</td>
<td>Shift-JIS encoding method for the Japanese language only</td>
</tr>
<tr>
<td>NONE</td>
<td>Disables DBCS processing</td>
</tr>
</tbody>
</table>

#### See Also

Conceptual Information:

- Chapter 5, “Double-Byte Character Sets (DBCS),” on page 29
- “DBCS Values for a SAS Session” on page 405
- System Options:
  - “DBCS System Option: UNIX, Windows, and z/OS” on page 349
  - “DBCSLANG System Option: UNIX, Windows, and z/OS” on page 350

<table>
<thead>
<tr>
<th>DBCSTYPE= Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCMS</td>
<td>Microsoft PC encoding method</td>
</tr>
<tr>
<td>WINDOWS</td>
<td>Alias for PCMS</td>
</tr>
<tr>
<td>SJIS</td>
<td>Shift-JIS encoding method for the Japanese language only</td>
</tr>
</tbody>
</table>
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
OpenVMS specifics: Also valid in VMS_SAS_OPTIONS DCL symbol
PROC OPTIONS GROUP: LANGUAGECONTROL

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.

See Also
Chapter 8, “Overview to Formats for NLS,” on page 47

- Afrikaans
- Catalan
- Croatian
- Czech
- Danish
- Dutch
- English
- Finnish
- French
- German
- Hungarian
- Italian
- Japanese
- Macedonian
- Norwegian
- Polish
- Portuguese
- Russian
- Slovenian
- Spanish
- Swedish
- Swiss_French
- Swiss_German
**Syntax**

-ENCODING= ASCIIANY | EBCDICANY | encoding-value (UNIX and Windows)

ENCODING= encoding-value (OpenVMS, UNIX, Windows, and z/OS)

**ASCIIANY**

is valid only for OpenVMS, UNIX, and OpenVMS. 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 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 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 24, “Encoding Values for a SAS Session,” on page 413.

**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 of Encoding for NLS” on page 9
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 17.5  Full-Screen DBCS Encoding Methods

<table>
<thead>
<tr>
<th>FSDBTYPE= Encoding Method</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>dec</td>
<td>Digital Equipment Corporation encoding method</td>
</tr>
<tr>
<td>euc</td>
<td>Extended UNIX encoding method</td>
</tr>
<tr>
<td>hp15</td>
<td>HP-UX encoding method</td>
</tr>
<tr>
<td>jis7</td>
<td>7-bit Shift-JIS encoding method used in an X windows environment for the Japanese language only</td>
</tr>
<tr>
<td>pcibm</td>
<td>IBM PC encoding method</td>
</tr>
<tr>
<td>sjis</td>
<td>Shift-JIS encoding method for the Japanese language only</td>
</tr>
<tr>
<td>default</td>
<td>default method that is used by the specific host</td>
</tr>
</tbody>
</table>

See Also

Conceptual Information:
Chapter 5, “Double-Byte Character Sets (DBCS),” on page 29
“DBCS Values for a SAS Session” on page 405

FSIMMM 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.motif drivers, you would specify:

-FSIMM X11.motif=PIPE

Note: The server is specified by using the FSIMMOPT option.

See Also

Conceptual Information:
Chapter 5, “Double-Byte Character Sets (DBCS),” on page 29

System Option:
“FSIMMOPT System Option: UNIX” on page 357

FSIMMOPT System Option: UNIX

Specifies options for input method modules (IMMs) that are used with a full-screen double-byte character set (DBCS)
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 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 29

System Option:

“FSIMM System Option: UNIX” on page 357
LOCALE=locale-name (OpenVMS, UNIX, Windows, and z/OS)

**locale-name**

For a complete list of locale values (SAS names and POSIX names), see Chapter 21, “Values for the LOCALE= System Option,” on page 397.

**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 21, “Values for the LOCALE= System Option,” on page 397
System Options:
“ENCODING System Option: OpenVMS, UNIX, Windows, and z/OS” on page 354
DATESTYLE in SAS Language Reference: Dictionary
“DFLANG= System Option: OpenVMS, UNIX, Windows, and z/OS” on page 353
PAPERSIZE in SAS Language Reference: Dictionary
“TRANTAB= System Option: OpenVMS, UNIX, Windows, and z/OS” on page 362

---

**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

---

**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. If the ENCODING option is set, you will see the encoding values that you specified when you display the option, even though parts of SAS will not use the encoding value for processing when NLSCOMPATMODE is in effect.
PAPERSIZE= System Option: OpenVMS, UNIX, Window, and z/OS

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

SORTSEQ= System Option: OpenVMS, UNIX, Windows, and z/OS

Specifies a language-specific collation sequence for the SORT procedure 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=collation-sequence

Syntax Description

collation-sequence

specifies the collation 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 collation 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 collation 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. Collation sequences are entries of the type TRANTAB.

```plaintext
proc catalog catalog=sashelp.host;
   contents;
run;
```

To see the contents of a particular translation table, use these statements:

```plaintext
proc trantab table=translation-table-name;
   list;
run;
```

The contents of collation sequences are displayed in the SAS log.

**See Also**

“Collation Sequence” on page 16

Data Set Options:

“SORTSEQ= Data Set Option” on page 42

System Options:

“TRANTAB= System Option: OpenVMS, UNIX, Windows, and z/OS” on page 362

---

**TRANTAB= System Option: OpenVMS, UNIX, Windows, and z/OS**

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 9.1 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 parenthesized list that 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:

<table>
<thead>
<tr>
<th>Position</th>
<th>Type of Translation Table</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>local-to-transport-format</td>
</tr>
<tr>
<td>2nd</td>
<td>transport-to-local-format</td>
</tr>
<tr>
<td>3rd</td>
<td>lowercase-to-uppercase</td>
</tr>
<tr>
<td>4th</td>
<td>uppercase-to-lowercase</td>
</tr>
<tr>
<td>5th</td>
<td>character classification</td>
</tr>
<tr>
<td>6th</td>
<td>scanner translation</td>
</tr>
<tr>
<td>7th</td>
<td>delta characters</td>
</tr>
<tr>
<td>8th</td>
<td>scanner character classification</td>
</tr>
<tr>
<td>9th</td>
<td>not used</td>
</tr>
<tr>
<td>10th</td>
<td>DBCS user table</td>
</tr>
</tbody>
</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:

```sas
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:

```sas
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 319
Other Commands, Statements, and Procedure Statements for NLS

Chapter 18 ........ Overview to NLS Options Used in Commands, Statements, and Procedures 367

Chapter 19 ........ Options for Commands, Statements, and Procedures for NLS 369

Chapter 20 ........ The TRANTAB Statement Used with Procedures 391
Overview to NLS Options Used in Commands, Statements, and Procedures

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 18.1 Summary of NLS Statements by Category

<table>
<thead>
<tr>
<th>Category</th>
<th>Statements for NLS</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data Access</td>
<td>“CVPBYTES=, CVPENGINE=, and CVPMULTIPLIER= Options” on page 373</td>
<td>Specifies attributes for character variables that are needed in order to transcode a SAS file</td>
</tr>
<tr>
<td></td>
<td>“ENCODING= Option” on page 378</td>
<td>Overrides and transcodes the encoding for input or output processing of external files</td>
</tr>
<tr>
<td></td>
<td>“INENCODING= and OUTENCODING= Options” on page 381</td>
<td>Overrides and changes the encoding when reading or writing SAS data sets in the SAS data library</td>
</tr>
<tr>
<td></td>
<td>“ODSCHARSET= Option” on page 382</td>
<td>Specifies the character set to be generated in the META declaration for the output</td>
</tr>
<tr>
<td></td>
<td>“ODISTRANTAB = Option” on page 383</td>
<td>Specifies the translation table to use when transcoding an XML document for an output file</td>
</tr>
<tr>
<td></td>
<td>“RENCODING= Option” on page 385</td>
<td>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</td>
</tr>
<tr>
<td></td>
<td>“XMLENCODING= Option” on page 390</td>
<td>Overrides the encoding of an XML document to import or export an external document</td>
</tr>
<tr>
<td>Information</td>
<td>“TRANSCODE= Option” on page 387</td>
<td>Specifies an attribute in the ATTRIB statement (which associates a format, informat, label, and/or length with one or more variables) that indicates whether character variables are to be transcoded</td>
</tr>
<tr>
<td>Category</td>
<td>Statements for NLS</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------------</td>
<td>-----------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>ODS: Third-Party Formatted</td>
<td>“CHARSET= Option” on page 369</td>
<td>Specifies the character set to be generated in the META declaration for the output</td>
</tr>
<tr>
<td></td>
<td>“TRANTAB= Option” on page 389</td>
<td>Specifies the translation table to use when you are transcoding character data in a SAS file for the appropriate output file</td>
</tr>
</tbody>
</table>
CHAPTER 19
Options for Commands, Statements, and Procedures for NLS

CHARSET= Option  369
Collation Sequence Option  370
CORRECTENCODING = Option  372
CVPBYTES=, CVPENGINE=, and CVPMULTIPLIER= Options  373
ENCODING= Option  378
INENCODING= and OUTENCODING= Options  381
ODSCHARSET= Option  382
ODSTANTAB = Option  383
TRANSCODE= Column Modifier on PROC SQL  384
RENCODING= Option  385
TRANSCODE= Option  387
TRANTAB= Option  389
XMLENCODING= Option  390

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**

```xml
<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*

---

**Collation Sequence Option**

Specifies the collation 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 collation-sequence-option;`

**Options**

<table>
<thead>
<tr>
<th>Specify the Collation Sequence</th>
<th>Use this option</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specify ASCII</td>
<td>ASCII</td>
</tr>
<tr>
<td>Specify EBCDIC</td>
<td>EBCDIC</td>
</tr>
<tr>
<td>Specify Danish</td>
<td>DANISH</td>
</tr>
<tr>
<td>Specify Finnish</td>
<td>FINNISH</td>
</tr>
<tr>
<td>Specify Norwegian</td>
<td>NORWEGIAN</td>
</tr>
<tr>
<td>Specify Polish</td>
<td>POLISH</td>
</tr>
<tr>
<td>Specify Swedish</td>
<td>SWEDISH</td>
</tr>
<tr>
<td>Specify a customized sequence</td>
<td>NATIONAL</td>
</tr>
<tr>
<td>Specify any of these collating sequences: ASCII, EBCDIC, DANISH, FINNISH, ITALIAN, NORWEGIAN, POLISH, SPANISH, SWEDISH</td>
<td>SORTSEQ=</td>
</tr>
</tbody>
</table>
Explanations for the options follow:

**ASCII**  
sorts character variables using the ASCII collation sequence. You need this option only when you sort by ASCII on a system where EBCDIC is the native collation sequence.

**DANISH**  
**NORWEGIAN**  
sorts characters according to the Danish and Norwegian national standard.

**EBCDIC**  
sorts character variables using the EBCDIC collation sequence. You need this option only when you sort by EBCDIC on a system where ASCII is the native collation sequence.

**FINNISH**  
**SWEDISH**  
sorts characters according to the Finnish and Swedish national standard.

**NATIONAL**  
sorts character variables using an alternate collation 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 if a customized national sort sequence is available.

**NORWEGIAN**  
See **DANISH**.

**POLISH**  
sorts characters according to the Polish national standard.

**SWEDISH**  
See **FINNISH**.

**SORTSEQ=collation-sequence**  
specifies the collation sequence. The value of *collation-sequence* can be any one of the *collation-sequence-options* in the PROC SORT statement, or the value can be the name of a translation table, either a default translation table or one that you have created in the TRANTAB procedure. For an example of using PROC TRANTAB and PROC SORT with SORTSEQ=, see Example 6 on page 339. These are the available translation tables:

- Danish
- Finnish
- Italian
- Norwegian
- Polish
- Spanish
- Swedish

**CAUTION:**  
If you use a host sort utility to sort your data, then specifying the SORTSEQ= option might corrupt the character BY variables. For more information, see the PROC SORT documentation for your operating environment.
See Also

“Collation Sequence” on page 16
System Options:
  “SORTSEQ= System Option: OpenVMS, UNIX, Windows, and z/OS” on page 361
  “TRANTAB= System Option: OpenVMS, UNIX, Windows, and z/OS” on page 362
Data Set Option:
  “SORTSEQ= Data Set Option” on page 42

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 407.
Restriction: CORRECTENCODING= can be used only when the SAS file uses the default base engine, which is V9 in SAS 9.

Examples

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 prior to 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 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:
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 CVPPBYTES= and CVPMULTIPLIER=.

Specify one of these options.

Featured in: Example 1 on page 374

See also: “Avoiding Character Data Truncation by Using the CVP Engine” on page 32

CVPPBYTES=engine

specifies the engine to use in order to process the SAS file. The CVP engine expands the character variable lengths prior 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 32

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 CVPPBYTES=, 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 CVPPBYTES=.

Specify one of these options.

See also: “Avoiding Character Data Truncation by Using the CVP Engine” on page 32

Examples

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.

**Output 19.1** PROC PRINT Output for MYFILES.WLATIN2

```
The SAS System 1

Obs var1 var2 var3 var4
1 A | 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 19.2** 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

<table>
<thead>
<tr>
<th>#</th>
<th>Variable</th>
<th>Type</th>
<th>Len</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Var1</td>
<td>Char</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Var2</td>
<td>Char</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>Var3</td>
<td>Char</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>Var4</td>
<td>Char</td>
<td>1</td>
</tr>
</tbody>
</table>
```

The following code is executed with the session encoding Wlatin2.

```sas
options msglevel=i;
libname myfiles 'SAS data-library';
data myfiles.utf8 (encoding="utf-8");
```
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 19.3 SAS Log with Transcoding Error

```sas
options msglevel=i;
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
data myfiles.utf8 (encoding="utf-8");
set myfiles.wlatin2;
r
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 dataset 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.

```sas
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;
r
```

In this example, the CVP engine is used to expand character variable lengths by adding 2 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 19.4  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: CV
  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 19.5  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
Last Modified   Thursday, November 07, 2003 02:40:34
Protection      Compressed NO
Data Set Type   DATA                Sorted       NO
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 407.

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:

```sas
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:

```sas
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
    attach=('C:\My Files\Test.out'
        content_type='text/plain'
        encoding='ebcdic1047'
        outencoding='latin1');
  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 Alpha
%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
INENCODING= and OUTENCODING= Options

Overrides and changes the encoding when reading or writing SAS data sets in the SAS data 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 “Locale Values and Encoding Values for SBCS, DBCS, and Unicode” on page 400.

Details

The INENCODING= option is used to read SAS data sets in the SAS data library. The OUTENCODING= option is used to write SAS data sets in the SAS data 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 data 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 data 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.

See Also

“Overview of 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 354
“LOCALE System Option: OpenVMS, UNIX, Windows, and z/OS” on page 358

Data Set Options:

“ENCODING= Data Set Option” on page 39

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](http://www.unicode.org/reports/tr22/index.html) and [www.iana.org/assignments/character-sets](http://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 9.1, 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 22
Conceptual discussion of Chapter 2, “Locale for NLS,” on page 5
System Options:
“TRANTAB= System Option: OpenVMS, UNIX, Windows, and z/OS” on page 362
“LOCALE System Option: OpenVMS, UNIX, Windows, and z/OS” on page 358
Procedures:
Chapter 15, “The TRANTAB Procedure,” on page 319
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 21
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 prior to 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 OpenVMS, UNIX, and Windows, see Chapter 24, “Encoding Values for a SAS Session,” on page 413.

**EBCDIC-encoding-value**

For a list of valid values for EBCDIC encodings for z/OS, see Chapter 24, “Encoding Values for a SAS Session,” on page 413.

**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 9.1, 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, visit http://support.sas.com and search for “Unicode Server”. Read the article SUGI 28: Multi-Lingual Computing with the 9.1 SAS® Unicode Server.

Background

In SAS 9 and 9.1, 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.

Prior to 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 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 21

Statements:
  - LIBNAME in SAS/SHARE User’s Guide
**TRANSCODE= Option**

Specifies an attribute in the ATTRIB statement (which associates a format, informat, label, and/or 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 21.

Default: YES

Restriction: Prior releases of SAS cannot access a SAS 9.1 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 will print 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 will be 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 237
  “VTRANSCODEX Function” on page 238
Options for Commands, Statements, and Procedures for NLS

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 22
Chapter 2, “Locale for NLS,” on page 5

System Options:

“TRANTAB= System Option: OpenVMS, UNIX, Windows, and z/OS” on page 362
“LOCALE System Option: OpenVMS, UNIX, Windows, and z/OS” on page 358

Procedures:
Chapter 15, “The TRANTAB Procedure,” on page 319

Statements:

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 407.

Default: SAS uses the current session encoding.

See Also

Statements:

LIBNAME XML in SAS XML LIBNAME Engine User’s Guide
The TRANTAB Statement Used with Procedures

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 9.1 supports the TRANTAB statement for backward compatibility. However, using the LOCALE= system option is preferred in later SAS releases.

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 SASHELPHOST catalog. The SASUSER.PROFILE catalog is searched first, and then the SASHELPHOST 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 specified catalog entries.

**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.

```sas
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 21

System Options:
- “TRANTAB= System Option: OpenVMS, UNIX, Windows, and z/OS” on page 362

Procedures:
- Chapter 15, “The TRANTAB Procedure,” on page 319
- CPORT in *Base SAS Procedures Guide*
- UPLOAD in *SAS/CONNECT User’s Guide*
- DOWNLOAD in *SAS/CONNECT User’s Guide*
Values for Locale, Encoding, and Transcoding

Chapter 21. . . . . . Values for the LOCALE= System Option  397
Chapter 22. . . . . . SAS System Options for Processing DBCS Data  405
Chapter 23. . . . . . Encoding Values in SAS Language Elements  407
Chapter 24. . . . . . Encoding Values for a SAS Session  413
CHAPTER 21

Values for the LOCALE= System Option

**LOCALE= and Default Values for DFLANG, DATESTYLE, and PAPERSIZE Options**

The valid LOCALE= values are specified by using either the SAS name or the POSIX name. The settings for the DFLANG=, DATESTYLE=, and PAPERSIZE= system options are set automatically.

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>
<thead>
<tr>
<th>LOCALE=</th>
<th>DFLANG=</th>
<th>DATESTYLE=</th>
<th>PAPERSIZE=</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arabic_Algeria</td>
<td>English</td>
<td>DMY</td>
<td>A4</td>
</tr>
<tr>
<td>Arabic_Bahrain</td>
<td>English</td>
<td>DMY</td>
<td>A4</td>
</tr>
<tr>
<td>Arabic_Egypt</td>
<td>English</td>
<td>DMY</td>
<td>A4</td>
</tr>
<tr>
<td>Arabic_Jordan</td>
<td>English</td>
<td>DMY</td>
<td>A4</td>
</tr>
<tr>
<td>Arabic_Kuwait</td>
<td>English</td>
<td>DMY</td>
<td>A4</td>
</tr>
<tr>
<td>Arabic_Lebanon</td>
<td>English</td>
<td>DMY</td>
<td>A4</td>
</tr>
<tr>
<td>Arabic_Morocco</td>
<td>English</td>
<td>DMY</td>
<td>A4</td>
</tr>
<tr>
<td>Arabic_Oman</td>
<td>English</td>
<td>DMY</td>
<td>A4</td>
</tr>
<tr>
<td>Arabic_Qatar</td>
<td>English</td>
<td>DMY</td>
<td>A4</td>
</tr>
<tr>
<td>Arabic_SaudiArabia</td>
<td>English</td>
<td>DMY</td>
<td>A4</td>
</tr>
<tr>
<td>SAS Name</td>
<td>POSIX Name</td>
<td>DFLANG=</td>
<td>DATESTYLE=</td>
</tr>
<tr>
<td>---------------------</td>
<td>------------</td>
<td>---------</td>
<td>------------</td>
</tr>
<tr>
<td>Arabic_Tunisia</td>
<td>ar_TN</td>
<td>English</td>
<td>DMY</td>
</tr>
<tr>
<td>Arabic_UnitedArabEmirates</td>
<td>ar_AE</td>
<td>English</td>
<td>DMY</td>
</tr>
<tr>
<td>Bulgarian_Bulgaria</td>
<td>bg_BG</td>
<td>English</td>
<td>YMD</td>
</tr>
<tr>
<td>Byelorussian_Belarus</td>
<td>be_BY</td>
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## Locale Values and Encoding Values for SBCS, DBCS, and Unicode

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<td>open_ed-1143</td>
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<td>open_ed-1130</td>
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</table>
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. DBCS is not supported under the OpenVMS operating environment. △

Note: If an encoding value contains a hyphen (-), enclose the encoding value in quotation marks. △

Table 22.1 DBCS Supported Values for the DBCSLANG= and DBCSTYPE= System Options

<table>
<thead>
<tr>
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<th>Windows DBCSTYPE=</th>
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<td>pcms</td>
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<td>pcms</td>
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<td>Japanese</td>
<td>ibm</td>
<td>dec</td>
<td>pcms</td>
</tr>
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<td>sjis</td>
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<td>hp15</td>
<td>n/a</td>
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<td>sjis</td>
<td>n/a</td>
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<td>pcibm</td>
<td>pcms</td>
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<td>UNIX DBCSTYPE=</td>
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<td>n/a</td>
<td>pcms</td>
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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 21.

SBCS, DBCS, and Unicode Encoding Values for Transcoding Data

The following table presents a list of SBCS, DBCS, and Unicode encoding values for transcoding data for all operating environments: The encoding values in the following table 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.

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<td>ibm-939</td>
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</tr>
<tr>
<td>ibm-942</td>
<td>Japanese PCIBM</td>
</tr>
<tr>
<td>ibm-949</td>
<td>Korean PCIBM</td>
</tr>
<tr>
<td>latin1</td>
<td>Western ISO</td>
</tr>
<tr>
<td>latin2</td>
<td>Central Europe ISO</td>
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<tr>
<td>latin5</td>
<td>Turkish ISO</td>
</tr>
<tr>
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<td>Baltic ISO</td>
</tr>
<tr>
<td>latin9</td>
<td>European ISO</td>
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<tr>
<td>macos-1</td>
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</tr>
<tr>
<td>macos-2</td>
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</tr>
<tr>
<td>macos-25</td>
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</tr>
<tr>
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</tr>
<tr>
<td>ms-932</td>
<td>Japanese PCMS</td>
</tr>
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<td>ms-936</td>
<td>Simplified Chinese PCMS</td>
</tr>
<tr>
<td>ms-949</td>
<td>Korean PCMS</td>
</tr>
<tr>
<td>ms-950</td>
<td>Traditional Chinese PCMS</td>
</tr>
<tr>
<td>msdos720</td>
<td>Arabic MS-DOS</td>
</tr>
<tr>
<td>msdos737</td>
<td>Greek MS-DOS</td>
</tr>
<tr>
<td>Encoding Value</td>
<td>Description</td>
</tr>
<tr>
<td>----------------</td>
<td>-------------</td>
</tr>
<tr>
<td>msdos775</td>
<td>Baltic MS-DOS</td>
</tr>
<tr>
<td>open_ed-275</td>
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<tr>
<td>open_ed-425</td>
<td>Arabic OpenEdition</td>
</tr>
<tr>
<td>open_ed-838</td>
<td>Thai OpenEdition</td>
</tr>
<tr>
<td>open_ed-924</td>
<td>European OpenEdition</td>
</tr>
<tr>
<td>open_ed-1025</td>
<td>Cyrillic OpenEdition</td>
</tr>
<tr>
<td>open_ed-1026</td>
<td>Turkish OpenEdition</td>
</tr>
<tr>
<td>open_ed-1047</td>
<td>Western OpenEdition</td>
</tr>
<tr>
<td>open_ed-1112</td>
<td>Baltic OpenEdition</td>
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<tr>
<td>open_ed-1122</td>
<td>Estonian OpenEdition</td>
</tr>
<tr>
<td>open_ed-1130</td>
<td>Vietnamese OpenEdition</td>
</tr>
<tr>
<td>open_ed-1140</td>
<td>North American OpenEdition</td>
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<tr>
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<td>Austria/Germany OpenEdition</td>
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<td>Finland/Sweden OpenEdition</td>
</tr>
<tr>
<td>open_ed-1144</td>
<td>Italy OpenEdition</td>
</tr>
<tr>
<td>open_ed-1145</td>
<td>Spain OpenEdition</td>
</tr>
<tr>
<td>open_ed-1146</td>
<td>United Kingdom OpenEdition</td>
</tr>
<tr>
<td>open_ed-1147</td>
<td>France OpenEdition</td>
</tr>
<tr>
<td>open_ed-1148</td>
<td>International OpenEdition</td>
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<tr>
<td>open_ed-424</td>
<td>Hebrew OpenEdition</td>
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<tr>
<td>open_ed-870</td>
<td>Central Europe OpenEdition</td>
</tr>
<tr>
<td>open_ed-875</td>
<td>Greek OpenEdition</td>
</tr>
<tr>
<td>pcoem437</td>
<td>USA IBM-PC</td>
</tr>
<tr>
<td>pcoem850</td>
<td>Western IBM-PC</td>
</tr>
<tr>
<td>pcoem852</td>
<td>Central Europe IBM-PC</td>
</tr>
<tr>
<td>pcoem857</td>
<td>Turkish IBM-PC</td>
</tr>
<tr>
<td>pcoem858</td>
<td>European IBM-PC</td>
</tr>
<tr>
<td>pcoem860</td>
<td>Portuguese MS-DOS</td>
</tr>
<tr>
<td>pcoem862</td>
<td>Hebrew IBM-PC</td>
</tr>
<tr>
<td>pcoem863</td>
<td>French Canadian IBM-PC</td>
</tr>
<tr>
<td>pcoem864</td>
<td>Arabic IBM-PC</td>
</tr>
<tr>
<td>pcoem865</td>
<td>Nordic IBM-PC</td>
</tr>
<tr>
<td>pcoem866</td>
<td>Cyrillic IBM-PC</td>
</tr>
<tr>
<td>pcoem869</td>
<td>Greek IBM-PC</td>
</tr>
<tr>
<td>pcoem874</td>
<td>Thai IBM-PC</td>
</tr>
<tr>
<td>pcoem921</td>
<td>Baltic IBM-PC</td>
</tr>
<tr>
<td>Encoding Value</td>
<td>Description</td>
</tr>
<tr>
<td>----------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>pcoem922</td>
<td>Estonia IBM-PC</td>
</tr>
<tr>
<td>pcoem1129</td>
<td>Vietnamese IBM-PC</td>
</tr>
<tr>
<td>shift-jis</td>
<td>Japanese SJIS</td>
</tr>
<tr>
<td>thai</td>
<td>Thai ISO</td>
</tr>
<tr>
<td>utf-8</td>
<td>Unicode (UTF-8)</td>
</tr>
<tr>
<td>utf-16</td>
<td>Unicode (UTF-16)</td>
</tr>
<tr>
<td>utf-32</td>
<td>Unicode (UTF-32)</td>
</tr>
<tr>
<td>warabic</td>
<td>Arabic Windows</td>
</tr>
<tr>
<td>wbaltic</td>
<td>Baltic Windows</td>
</tr>
<tr>
<td>wcyrillic</td>
<td>Cyrillic Windows</td>
</tr>
<tr>
<td>wgreek</td>
<td>Greek Windows</td>
</tr>
<tr>
<td>whebrew</td>
<td>Hebrew Windows</td>
</tr>
<tr>
<td>wlatin1</td>
<td>Western Windows</td>
</tr>
<tr>
<td>wlatin2</td>
<td>Central Europe Windows</td>
</tr>
<tr>
<td>wturkish</td>
<td>Turkish Windows</td>
</tr>
<tr>
<td>wvietnamese</td>
<td>Vietnamese Windows</td>
</tr>
</tbody>
</table>
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>
<thead>
<tr>
<th>ENCODING= Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>arabic</td>
<td>Arabic (ISO)</td>
</tr>
<tr>
<td>cyrillic</td>
<td>Cyrillic (ISO)</td>
</tr>
<tr>
<td>greek</td>
<td>Greek (ISO)</td>
</tr>
<tr>
<td>hebrew</td>
<td>Hebrew (ISO)</td>
</tr>
<tr>
<td>latin1</td>
<td>Western (ISO)</td>
</tr>
<tr>
<td>latin2</td>
<td>Central Europe (ISO)</td>
</tr>
<tr>
<td>latin5</td>
<td>Turkish (ISO)</td>
</tr>
<tr>
<td>latin6</td>
<td>Baltic (ISO)</td>
</tr>
<tr>
<td>latin9</td>
<td>European (ISO)</td>
</tr>
<tr>
<td>thai</td>
<td>Thai (ISO)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ENCODING= Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>big5</td>
<td>Traditional Chinese (Big5)</td>
</tr>
<tr>
<td>dec-cn</td>
<td>Simplified Chinese (DEC)</td>
</tr>
</tbody>
</table>
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 24.3 Single-Byte Encodings for UNIX

<table>
<thead>
<tr>
<th>ENCODING= Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>arabic</td>
<td>Arabic (ISO)</td>
</tr>
<tr>
<td>cyrillic</td>
<td>Cyrillic (ISO)</td>
</tr>
<tr>
<td>greek</td>
<td>Greek (ISO)</td>
</tr>
<tr>
<td>hebrew</td>
<td>Hebrew (ISO)</td>
</tr>
<tr>
<td>latin1</td>
<td>Western (ISO)</td>
</tr>
<tr>
<td>latin2</td>
<td>Central Europe (ISO)</td>
</tr>
<tr>
<td>latin5</td>
<td>Turkish (ISO)</td>
</tr>
<tr>
<td>latin6</td>
<td>Baltic (ISO)</td>
</tr>
<tr>
<td>latin9</td>
<td>European (ISO)</td>
</tr>
<tr>
<td>thai</td>
<td>Thai (ISO)</td>
</tr>
</tbody>
</table>

### Table 24.4 Double-Byte Encodings for UNIX

<table>
<thead>
<tr>
<th>ENCODING= Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>big5</td>
<td>Traditional Chinese (Big5)</td>
</tr>
<tr>
<td>euc-cn</td>
<td>Simplified Chinese (EUC)</td>
</tr>
<tr>
<td>euc-jp</td>
<td>Japanese (EUC)</td>
</tr>
<tr>
<td>euc-kr</td>
<td>Korean (EUC)</td>
</tr>
<tr>
<td>euc-tw</td>
<td>Traditional Chinese (EUC)</td>
</tr>
</tbody>
</table>
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 24.5 Single-Byte Encodings for Windows

<table>
<thead>
<tr>
<th>Description</th>
<th>Windows ENCODING= Value</th>
<th>MS-DOS ENCODING= Value</th>
<th>IBM-PC ENCODING= Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arabic</td>
<td>warabic</td>
<td>msdos720</td>
<td>pcoem864</td>
</tr>
<tr>
<td>Baltic</td>
<td>wbaltic</td>
<td>msdos775</td>
<td>pcoem921</td>
</tr>
<tr>
<td>Central Europe</td>
<td>wlatin2</td>
<td>n/a</td>
<td>pcoem852</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cyrillic</td>
<td>wcyrillic</td>
<td>n/a</td>
<td>pcoem866</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>pcoem855</td>
</tr>
<tr>
<td>Central Europe</td>
<td>n/a</td>
<td>n/a</td>
<td>pcoem852</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Estonia</td>
<td>n/a</td>
<td>n/a</td>
<td>pcoem922</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>European</td>
<td>n/a</td>
<td>n/a</td>
<td>pcoem858</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>French Canadian</td>
<td>n/a</td>
<td>n/a</td>
<td>pcoem863</td>
</tr>
<tr>
<td>Greek</td>
<td>wgreek</td>
<td>msdos737</td>
<td>n/a</td>
</tr>
<tr>
<td>Hebrew</td>
<td>whebrew</td>
<td>n/a</td>
<td>pcoem862</td>
</tr>
<tr>
<td>Nordic</td>
<td>n/a</td>
<td>n/a</td>
<td>pcoem865</td>
</tr>
<tr>
<td>Portuguese</td>
<td>n/a</td>
<td>pcoem860</td>
<td>n/a</td>
</tr>
</tbody>
</table>
Table 24.6  Windows Double-Byte Encodings

<table>
<thead>
<tr>
<th>Description</th>
<th>PCMS ENCODING= Value</th>
<th>No Vendor ENCODING= Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional Chinese</td>
<td>n/a</td>
<td>big5</td>
</tr>
<tr>
<td>Simplified Chinese</td>
<td>ms-936</td>
<td>n/a</td>
</tr>
<tr>
<td>Japanese</td>
<td>ms-932</td>
<td>shift-jis</td>
</tr>
<tr>
<td>Korean</td>
<td>ms-949</td>
<td>n/a</td>
</tr>
</tbody>
</table>

*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 24.7  Single-Byte Encodings for z/OS

<table>
<thead>
<tr>
<th>Encoding ENCODING= Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EBCDIC037</td>
<td>Old North America (EBCDIC)</td>
</tr>
<tr>
<td>EBCDIC275</td>
<td>EBCDIC cp275-Brazil</td>
</tr>
<tr>
<td>EBCDIC425</td>
<td>EBCDIC cp425-Arabic</td>
</tr>
<tr>
<td>EBCDIC838</td>
<td>EBCDIC cp838-Thai</td>
</tr>
<tr>
<td>EBCDIC870</td>
<td>EBCDIC cp870-Central Europe</td>
</tr>
<tr>
<td>EBCDIC875</td>
<td>EBCDIC cp875-Greek</td>
</tr>
<tr>
<td>EBCDIC924</td>
<td>EBCDIC cp924-Western Europe</td>
</tr>
<tr>
<td>EBCDIC1025</td>
<td>EBCDIC cp1025-Cyrillic</td>
</tr>
<tr>
<td>EBCDIC1026</td>
<td>EBCDIC cp1026-Turkish</td>
</tr>
<tr>
<td>EBCDIC1047</td>
<td>EBCDIC cp1047-Latin1</td>
</tr>
<tr>
<td>EBCDIC1112</td>
<td>EBCDIC cp1112-Baltic</td>
</tr>
<tr>
<td>EBCDIC1122</td>
<td>EBCDIC cp1122-Estonian</td>
</tr>
<tr>
<td>EBCDIC1130</td>
<td>EBCDIC cp1130-Vietnamese</td>
</tr>
<tr>
<td>Encoding ENCODING= Value</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------------</td>
<td>--------------------------------------------</td>
</tr>
<tr>
<td>EBCDIC1140</td>
<td>EBCDIC cp1140-North America</td>
</tr>
<tr>
<td>EBCDIC1141</td>
<td>EBCDIC cp1141-German/Austrian</td>
</tr>
<tr>
<td>EBCDIC1142</td>
<td>EBCDIC cp1142-Danish/Norwegian</td>
</tr>
<tr>
<td>EBCDIC1143</td>
<td>EBCDIC cp1143-Finnish/Swedish</td>
</tr>
<tr>
<td>EBCDIC1144</td>
<td>EBCDIC cp1144-Italian</td>
</tr>
<tr>
<td>EBCDIC1145</td>
<td>EBCDIC cp1145-Spanish</td>
</tr>
<tr>
<td>EBCDIC1146</td>
<td>EBCDIC cp1146-English (UK)</td>
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<tr>
<td>EBCDIC1147</td>
<td>EBCDIC cp1147-French</td>
</tr>
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<td>EBCDIC1148</td>
<td>EBCDIC cp1148-International</td>
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</tr>
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<td>OPEN_ED-275</td>
<td>OpenEdition EBCDIC cp275-Brazil</td>
</tr>
<tr>
<td>OPEN_ED-425</td>
<td>OpenEdition EBCDIC cp425-Arabic</td>
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<td>OPEN_ED-838</td>
<td>OpenEdition EBCDIC cp838-Thai</td>
</tr>
<tr>
<td>OPEN_ED-870</td>
<td>OpenEdition EBCDIC cp870-Central Europe</td>
</tr>
<tr>
<td>OPEN_ED-875</td>
<td>OpenEdition EBCDIC cp875-Greek</td>
</tr>
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<td>OpenEdition EBCDIC cp924-Western Europe</td>
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<tr>
<td>OPEN_ED-1025</td>
<td>OpenEdition EBCDIC cp1025-Cyrillic</td>
</tr>
<tr>
<td>OPEN_ED-1026</td>
<td>OpenEdition EBCDIC cp1026-Turkish</td>
</tr>
<tr>
<td>OPEN_ED-1047</td>
<td>OpenEdition EBCDIC cp1047-Latin1</td>
</tr>
<tr>
<td>OPEN_ED-1112</td>
<td>OpenEdition EBCDIC cp1112-Baltic</td>
</tr>
<tr>
<td>OPEN_ED-1122</td>
<td>OpenEdition EBCDIC cp1122-Estonian</td>
</tr>
<tr>
<td>OPEN_ED-1130</td>
<td>OpenEdition EBCDIC cp1130-Vietnamese</td>
</tr>
<tr>
<td>OPEN_ED-1140</td>
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<td>OpenEdition EBCDIC cp1142-Danish/Norwegian</td>
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<td>OPEN_ED-1143</td>
<td>OpenEdition EBCDIC cp1143-Finnish/Swedish</td>
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<tr>
<td>OPEN_ED-1144</td>
<td>OpenEdition EBCDIC cp1144-Italian</td>
</tr>
<tr>
<td>OPEN_ED-1145</td>
<td>OpenEdition EBCDIC cp1145-Spanish</td>
</tr>
<tr>
<td>OPEN_ED-1146</td>
<td>OpenEdition EBCDIC cp1146-English (UK)</td>
</tr>
<tr>
<td>OPEN_ED-1147</td>
<td>OpenEdition EBCDIC cp1147-French</td>
</tr>
<tr>
<td>OPEN_ED-1148</td>
<td>OpenEdition EBCDIC cp1148-International</td>
</tr>
</tbody>
</table>
Table 24.8  Double-Byte Encodings for z/OS

<table>
<thead>
<tr>
<th>Description</th>
<th>ENCODING= Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Japanese</td>
<td>IBM-939</td>
</tr>
<tr>
<td>Korean</td>
<td>IBM-933</td>
</tr>
<tr>
<td>Simplified Chinese</td>
<td>IBM-935</td>
</tr>
<tr>
<td>Traditional Chinese</td>
<td>IBM-937</td>
</tr>
</tbody>
</table>
PART 10

Appendix 1  Recommended Reading  421
Recommended Reading

Here is the recommended reading list for this title:

- SAS Language Reference: Concepts
- SAS Language Reference: Dictionary
- Base SAS Procedures Guide
- SAS/CONNECT User’s Guide
- SAS/GRAPH Reference, Volumes 1 and 2
- 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,
OpenVMS) 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.
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