International Language Environments Guide

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CETTE PUBLICATION EST FOURNIE "EN L'ETAT" ET AUCUNE GARANTIE, EXPRESSE OU IMPLICITE, N'EST ACCORDEE, Y COMPRIS DES GARANTIES CONCERNANT LA VALEUR MARCHANDE, L'APTITUDE DE LA PUBLICATION A REPONDRE A UNE UTILISATION PARTICULIERE, OU LE FAIT QU'ELLE NE SOIT PAS CONTREFAISANTE DE PRODUIT DE TIERS. CE DENI DE GARANTIE NE S'APPLIQUERAIT PAS, DANS LA MESURE OU IL SERAIT TENU JURIDIQUEMENT NUL ET NON AVENU.

Adobe PostScript

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Preface

The *International Language Environments Guide* describes internationalization features that are new in the Solaris™ 9 operating environment. It contains important information on how to use this release to build global software products that support various languages and cultural conventions.

This publication describes the basic attributes associated with language enabling, as well as specific features provided by the Solaris platform to facilitate global application development and administration of language services around the world.

Specifically, this preface contains information about:

- "Who Should Use This Guide" on page 15
- "How This Guide Is Organized" on page 16
- "Related Books and Sites" on page 16

Where appropriate, this guide points you to other guides in the documentation set that contain additional or more detailed information on internationalization features in this release. You get pointers to how to order Sun documents online, and the typographic conventions used in the guide.

Who Should Use This Guide

This guide is intended for software developers and administrators who want to design global products and applications for the Solaris 9 operating environment.

This guide assumes knowledge of the C programming language.

All operating system information pertains to the SunOS™ 5.9 operating environment.

How This Guide Is Organized

The chapters in this guide are organized as follows:

- Chapter 1 describes the new internationalization and localization features in Solaris 9, including the introduction of the euro (€) in several countries.
- Chapter 2 describes support for Codeset Independence, CSI, and the APIs in `libc` for the Solaris 9 product.
- Chapter 3 describes the contents of the Solaris 9 localized product, including localizing the multilingual Solaris product, and new keyboard support, including nineteen new keyboards.
- Chapter 4 describes the Asian supported locales, input systems, and character support.
- Chapter 5 covers the `en_US.UTF-8` locales and the internationalization features incorporated into this release. These include the Cyrillic, Greek, Arabic, Hebrew, Hindi, and Thai input methods, as well as those for the Japanese, Korean, and Simplified and Traditional Chinese input modes.
- Chapter 6 describes Complex Text Layout (CTL) extensions that enable Motif APIs to support writing systems that require complex transformations between logical and physical text representations, such as Arabic, Hebrew, and Thai.
- Chapter 7 explains printing support under the Solaris 9 operating environment, with specific information for European and Asian printing, and the `mp`(1) print filter enhancement.
- Appendix A contains lists of tables of available `iconv` conversions.
- Appendix B contains a table of the partial localization package names on the OS CD.
- Appendix C contains tables representing the language packages on the language CD. There are tables for Simplified Chinese, French, German, Italian, Japanese, Korean, Spanish, Swedish, Traditional Chinese, and Shared.

Related Books and Sites

Sun Global Application Developer Corner

For information to help developers globalize their applications, refer to the Sun Global Application Developer Corner (Sun GADC)

The Sun Global Application Developer Corner is an updated web version of the previously released Sun Global Application Developer Kit 1.0. It is accessible at: http://www.sun.com/developers/gadc

Sun's Global Application Developer Corner contains comprehensive internationalization tools and documentation that address various design and development issues encountered while creating global software, including how to test for global compliance and troubleshoot problems.

The site includes testing tools such as the Sun Multibyte English (MBE) locale, which allows developers to test their internationalized applications using pseudo English. This has been extremely useful for English-speaking developers who need to test their applications developed in a specific native language. The Sun Multibyte English locale is available for free download. Other useful resources include sample references and code in C, white papers on international language support found in the Solaris operating environment, technical articles, and useful globalization links for quick reference. There is a checklist available for developers to use to assess the internationalization of a product, as well as a contact page for you to ask any Sun globalization-related queries.

Java Development Kit

For information about the Java Development Kit, see `http://java.sun.com/j2se/1.3/docs/guide/intl/index.html`

Solaris Common Desktop Environment

The *Solaris Common Desktop Environment: Programmer's Guide* is also part of the CDE Developer's Collection that is shipped on the Solaris documentation CD.

OSF/Motif Information

OSF/Motif Programmer's Guide, Release 1.2 Englewood Cliffs, New Jersey, Prentice-Hall, 1993. The Open Software Foundation's (OSF) Guide describes how to use the OSF/Motif application programming interface to create Motif applications. It presents an overview of Motif widget set architecture, explains the Motif toolkit, and gives models and examples of Motif applications.

PostScript Information

This set of books is essential for successfully developing PostScript applications.

The *PostScript Language Reference Manual (Second Edition)* is the standard reference work for PostScript. It is the definitive documentation of every operator, Display PostScript (DPS), Level 1, and Level 2. The book covers the fundamentals of PostScript as a device-independent printing language. The special capabilities for handling fonts and characters in PostScript are explained. The book's Appendix E also explains standard character sets and encoding vectors. It discusses the organization of fonts that are built into interpreters or supplied from other sources.

Programming the Display PostScript System with X is for application developers who are working with X Windows and Display PostScript. The book documents how to write applications that use Display PostScript to produce information for the screen display and the printer output. It describes coding techniques in detail.

The X Window System has been extended with the X Display PostScript system (often described as X/DPS). It uses application-callable libraries on the client side and corresponding extensions on the X server side.

Internationalization Process Under the Solaris Operating Environment

Tuthill, Bill, and David Smallberg. *Creating Worldwide Software: Solaris International Developer's Guide*, 2nd edition. Mountain View, California, Sun Microsystems Press, 1997. Available through `books@sun.com` and `www.sun.com/books/`. The book offers a general overview of the internationalization process under the Solaris operating environment.

Accessing Sun Documentation Online

The docs.sun.com^{SM} Web site enables you to access Sun technical documentation online. You can browse the docs.sun.com archive or search for a specific book title or subject. The URL is `http://docs.sun.com`.

Typographic Conventions

The following table describes the typographic changes used in this book.

TABLE P–1 Typographic Conventions

Typeface or Symbol	Meaning	Example
`AaBbCc123`	The names of commands, files, and directories; on-screen computer output	Edit your `.login` file. Use `ls -a` to list all files. `machine_name% you have mail.`

`AaBbCc123`	What you type, contrasted with on-screen computer output	`machine_name%` **`su`**
		`Password:`

AaBbCc123	Command-line placeholder: replace with a real name or value	To delete a file, type **`rm`** *filename*.
AaBbCc123	Book titles, new words, or terms, or words to be emphasized.	Read Chapter 6 in *User's Guide*. These are called *class* options. You must be *root* to do this.

Shell Prompts in Command Examples

The following table shows the default system prompt and superuser prompt for the C shell, Bourne shell, and Korn shell.

TABLE P–2 Shell Prompts

Shell	Prompt
C shell prompt	`machine_name%`
C shell superuser prompt	`machine_name#`
Bourne shell and Korn shell prompt	`$`
Bourne shell and Korn shell superuser prompt	`#`

CHAPTER 1

Solaris Internationalization Overview

This section discusses some general information about internationalization and localization.

- "New Internationalization and Localization Features" on page 22
- "Internationalization and Localization Defined" on page 23
- "What Is a Locale?" on page 26
- "Using Locale Categories for Localization" on page 29
- "Language Word and Letter Differences" on page 33

The Solaris 9 product includes full Unicode 3.1 support, as defined in Unicode and ISO/IEC 10646, for selected locales. The Solaris 9 release is a major release for Sun's international markets. It includes a number of new features.

The Solaris 9 operating environment has been designed to speak the languages of the world since its inception. With a pluggable, service-based approach to globalization, the Solaris internationalization architecture eases development, deployment and management of applications and language services around the world. In one convenient, multilingual product, users benefit from extensive support for 39 different languages and 162 locales, including complex text layout environments needed to support Thai and Hindi, and bidirectional layout environments for languages like Arabic and Hebrew.

The Solaris internationalization architecture provides a flexible and pluggable method of handling input methods, character set encodings, codeset conversion and other basic aspects of language services. You can choose between the powerful tools already provided, or customize your environment. You can deploy applications in multiple language environments without knowing how input methods work or which codeset converter needs to be enabled, simply by following standard APIs. You can also customize particular language attributes. The architecture enables you to change converter tables or add a new input method editor.

The source code for the Solaris X globalization framework was released to the open community in the fall of 2000. You now have the ability to enhance compatibility and interoperability of global applications by following a common reference implementation while also participating in the evolution of the code base. The codeset independent approach to globalization enables you to operate in native encoded environments or join the growing world of Unicode. The Solaris framework gives the power to scale across platforms with a rich set of data converters designed to ensure interoperability between various encodings and various platforms (from Microsoft Windows or Macintosh, for example).

Solaris also helps multinational corporations scale their server administration worldwide. Unlike competitive platforms, the Solaris platform uses a service-based approach to administration of language services. Server administrators can enable language services remotely across a worldwide network, regardless of the client system. This client-independent approach enables the easy upgrade of the system without changing client applications. For example, an Arabic-speaking user needing to read an email from an internet cafe in Paris would still be able to read that email in his or her own language without modifying the local client application.

New Internationalization and Localization Features

The following features are new to the Solaris 9 release:

- Additional Unicode (UTF-8) locale support features for Thailand, India, Hong Kong, Turkey, Egypt, Brazil, Finland, and Belgium (Walloon).
- Latin-3 character support in Unicode locales.
- PCL support in `mp` printing filter.
- Traditional Chinese (Hong Kong) `Big5+HKSCS` locale `(zh_HK.BIG5HK).`
- Traditional Chinese (Hong Kong) UTF-8 locale (`zh_HK.UTF-8`).
- Thai UTF-8 locale (`th_TH.UTF-8`).
- Thai ISO8859–11 locale (`th_TH.ISO8859-11`).
- Hindi script support in Unicode locales.
- Hindi UTF-8 locale (`hi_IN.UTF-8`).
- ISCII `iconv` module to support conversion between ISCII and UTF-8 encodings.
- Collation locales for Asian Solaris.
- New `zh_CN.GB18030` locale to support the new GB18030–2000 standard.
- HKSCS `iconv` modules.
- New Chinese input methods.
- Thai input methods enhancement.
- Input Method Auxiliary Window support for Asian Solaris.

- Additional Japanese `iconv` module conversions for Fujitsu JEF, Hitachi KEIS and NEC JIPS.
- Euro currency. Only those locales participating in using the euro have the euro symbol defined as their national currency symbol. The other ISO8859-15 locales support the euro symbol € .
- Enhanced Unicode `iconv` modules. The `iconv` modules have been added and enhanced for various new Unicode encoding formats and international and *de facto* industry standard codesets.
- Unicode 3.1 support in Unicode locales.
- Support of new `iconv` code conversions for ISO8859–16.

Internationalization and Localization Defined

Internationalization and localization are different procedures. Internationalization is the process of making software portable between languages or regions, while localization is the process of adapting software for specific languages or regions. Internationalized software can be developed using interfaces that modify program behavior at runtime in accordance with specific cultural requirements. Localization involves establishing online information to support a language or region, called a *locale*.

Unlike software that must be completely rewritten before it can work with different native languages and customs, internationalized software does not require rewriting. The internationalized software can be ported from one locale to another without change. The Solaris system is internationalized, providing the infrastructure and interfaces you need to create internationalized software.

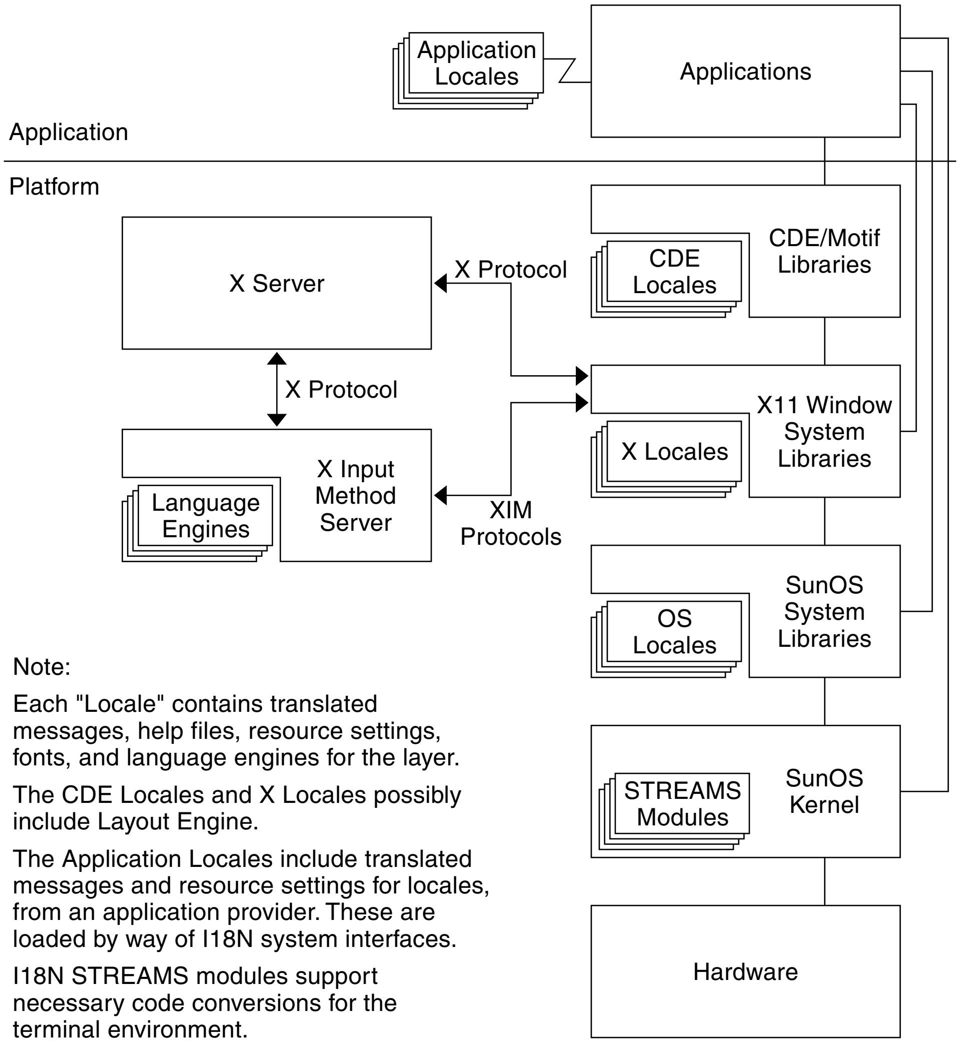
Basic Steps in Internationalization

An internationalized application's executable image is portable between languages and regions. To internationalize software, you should:

- Use the interfaces described in this book to create software with an environment that can be modified dynamically without the necessity of recompiling.
- Divide software into executable code and messages. The messages include all printable and displayable messages that the user might see. Keep the message strings in a message catalog.

Message strings are translated for a language or region. A *locale* includes the message strings and methods to specify sorting.

To use a localized version of a product, the user sets certain environment variables. The product then displays messages in their translated form. Date, time, currency and other information is formatted and displayed according to locale-specific conventions. Message translations and online help contents are provided throughout different layers, as described in the following diagram.



Note:

Each "Locale" contains translated messages, help files, resource settings, fonts, and language engines for the layer.

The CDE Locales and X Locales possibly include Layout Engine.

The Application Locales include translated messages and resource settings for locales, from an application provider. These are loaded by way of I18N system interfaces.

I18N STREAMS modules support necessary code conversions for the terminal environment.

FIGURE 1–1 Functions and Structure of Locales in the Solaris Operating Environment

Localization Functions in Solaris Interfaces

The OS locale layer provides the basic locale database and functions that are plugged into the OS system interface at the application's runtime. Applications access these OS locale modules through standard APIs.

The X11 locale layer provides the interface to X input method and X output method so that the X11 applications can allow local text input and display. Fonts are provided to enable applications to display characters from various languages.

CDE/Motif is built on top of the X11 window system. Hence, it can utilize the X11 locale capability through X11 APIs. Solaris localizations have various locale-specific configurations for CDE applications in order to make the desktop functional within the target locale. Message translations and online help contents are provided throughout different layers.

What Is a Locale?

A key concept for application programs is that of a program's *locale*. The locale is an explicit model and definition of a native-language environment. The notion of a locale is explicitly defined and included in the library definitions of the ANSI C Language standard.

A locale consists of a number of categories for which there is country-dependent formatting or other specifications. A program's locale defines its codesets, date and time formatting conventions, monetary conventions, decimal formatting conventions, and collation (sort) order.

A locale can be composed of a base language, the country (territory) of use, and optional codeset. Codeset is usually assumed. For example, German is `de`, an abbreviation for Deutsch, while Swiss German is `de_CH`, `CH` being an abbreviation for Confederation Helvetica. This allows for specific differences by country, such as currency units notation.

More than one locale can be associated with a particular language, which allows for regional differences. For example, an English-speaking user in the United States can select the `en_US` locale (English for the United States), while an English-speaking user in Great Britain can select `en_GB` (English for Great Britain).

Generally the locale name is specified by the `LANG` environment variable. Locale categories are subordinate to `LANG`, but can be set separately, in which case they override `LANG`. If the `LC_ALL` operand is set, it overrides not only `LANG`, but all the separate locale categories as well.

The locale naming convention is:

language[_*territory*][.*codeset*] [@*modifier*]

where a two-letter *language* code is from ISO 639, a two-letter *territory* code is from ISO 3166, *codeset* is the name of the codeset that is being used in the locale, and *modifier* is the name of the characteristics that differentiate it from the locale without the modifier.

All Solaris product locales preserve the Portable Character Set characters with US-ASCII code values.

For more information on the Portable Character Set, refer to "X/Open CAE Specification: System Interface Definitions, Issue 5" (ISBN 1–85912–186–1).

A single locale can have more than one locale name. For example, `POSIX` is the same as `C`.

Full and Partial Locales

A full Solaris locale has all of the listed functions and the localized system messages in the relevant language. *Partial locales* have no localized messages installed. All locales in the Solaris environment are capable of displaying localized messages, provided that localized messages for the relevant language are installed. For example, the following locales can be either partial or full locales:

- `de_DE.ISO8859-1`
- `de_DE.ISO8859-15`
- `de_DE.UTF-8`
- `de_AT.ISO8859-1`
- `de_AT.ISO8859-15`
- `de_CH.ISO8859-1`

When the German message translations are installed using the Language CD, all of the above locales become *full locales* because they have access to a fully translated desktop. The language CD contains message translations for the following languages and locales:

- German
- French
- Spanish
- Swedish
- Italian
- Japanese
- Korean
- Simplified Chinese locale
- Traditional Chinese locale

All partial locales are available on the Software CD. Message translations are available on the Languages CD.

All English locales are also full locales and are available on the Software CD.

Behavior Affected by Locales

Different cultures often use different conventions for writing the date and time, formatting numbers, delimiting words and phrases, and quoting material. Throughout the system, a locale determines the behavior of the following items:

- Encoding and processing of text data.
- Identifying the language and encoding of resource files.
- Rendering and layout of text strings.
- Interchanging text that is used for interclient text communication.
- Selecting the input method (that is, which codeset is generated) and the processing of text data.
- Font and icon files that are culturally specific.
- Actions and file types.
- User Interface Definition (UID) files.
- Date and time formats.
- Numeric formats.
- Monetary formats.
- Collation order.
- Regular expression handling specific to the locale.
- Format for informative and diagnostic messages and interactive responses.

The Solaris environment separates language and culture-dependent information from the application and saves it outside the application. Doing so eliminates the need to translate, rewrite, or recompile the application for each market. The only requirement to enter a new market is to localize the external information to the local language and customs.

Locale Categories

The locale categories are as follows:

`LC_CTYPE` Controls the behavior of character handling functions.

`LC_TIME` Specifies date and time formats, including month names, days of the week, and common full and abbreviated representations.

`LC_MONETARY` Specifies monetary formats, including currency symbol for the locale, thousands separator, sign position, the number of fractional digits, and so forth.

`LC_NUMERIC` Specifies the decimal delimiter (or radix character), the thousands separator, and the grouping.

`LC_COLLATE` Specifies a collation order, and regular expression definition for the locale.

`LC_MESSAGES` Specifies the language in which the localized messages are written, affirmative and negative responses of the locale (`yes` and `no` strings and expressions).

`LO_LTYPE` Specifies the layout engine that provides information about language rendering. Language rendering (or text rendering) consists of text shaping and directionality.

Using Locale Categories for Localization

The localization of a product should be done in consultation with native users in that target language or region. Certain information styles and formats might seem perfectly obvious and universal to the developer but to the user, they could look awkward, wrong, or even offensive. The following sections describe the elements in the Solaris operating environment that you can control and specify so that you can successfully localize your product.

Time Formats

The following table shows some of the ways in which different locales write 11:59 P.M.

TABLE 1–1 International Time Formats

Locale	Format
Canadian	23:59
Finnish	23.59
German	23.59 Uhr
Norwegian	23.59
Thai	23:59
Great Britain	23:59

Time is represented by both a 12-hour clock and a 24-hour clock. The hour and minute separator can be either a colon (:) or a period (.).

Time zone splits occur between and within countries. Although a time zone can be described in terms of how many hours it is ahead of, or behind, Coordinated Universal Time, UTC (or Greenwich Mean Time, GMT), this number is not always an integer. For example, Newfoundland is in a time zone that is half an hour different from the adjacent time zone.

Daylight Savings Time (DST) starts and ends on different dates that can vary from country to country. Many countries do not implement DST at all. Additionally, Daylight Savings Time can vary within a time zone. In the U.S. it is a state decision.

Date Formats

The following table shows some of the date formats used around the world. Notice that even within a country, there can be variations.

TABLE 1–2 International Date Formats

Locale	Convention	Example
Canadian (English)	dd/mm/yy	24/08/01
Danish	yyyy-mm-dd	2001–08–24
Finnish	dd.mm.yyyy	24.08.2001
French	dd/mm/yyyy	24/08/2001
German	yyyy-mm-dd	2001–08–24
Italian	dd/mm/yy	24/08/01
Norwegian	dd-mm-yy	24–08–01
Spanish	dd-mm-yy	24-08-01
Swedish	yyyy-mm-dd	2001-08-24
Great Britain	dd/mm/yy	24/08/01
United States	mm-dd-yy	08-24-01
Thai	dd/mm/yyyy	24/08/2001

Numbers

Great Britain and the United States are two of the few places in the world that use a period to indicate the decimal place. Many other countries use a comma instead. The decimal separator is also called the *radix* character. Likewise, while Great Britain and the United States use a comma to separate groups of thousands, many other countries use a period instead, and some countries separate thousands groups with a thin space.

Data files containing locale-specific formats are frequently misinterpreted when transferred to a system in a different locale. For example, a file containing numbers in a French format is not useful to a British-specific program.

The following table shows some commonly used numeric formats.

TABLE 1–3 International Numeric Conventions

Locale	Large Number
Canadian (English)	4,294,967.00
Danish	4.294 967.295,00
Finnish	4 294 967 295,00
French	4 294 967 295,00
German	4,294,967.00
Italian	4.294.967,00
Norwegian	4.294.967.295,00
Spanish	4.294.967.295,00
Swedish	4 294 967 295,00
Great Britain	4,294,967,295.00
Uhited States	4,294,967,295.00
Thai	4,294,967,295.00

Note – There are no particular locale conventions that specify how to separate numbers in a list.

Currency

Currency units and presentation order vary greatly around the world. Local and international symbols for currency can differ. The following table shows monetary formats in some countries.

TABLE 1–4 International Monetary Conventions

Locale	Currency	Example
Canadian (English)	Dollar ($)	$1,234.56

TABLE 1–4 International Monetary Conventions *(Continued)*

Locale	Currency	Example
Canadian (French	Dollar ($)	1 234,56$
Danish	Kroner (kr)	Kr 1.234,56
Finnish	Euro (€)	€ 1 234,56
French	Euro (€)	€ 1,234
Japanese	Yen (¥)	¥ 1,234
Norwegian	Krone (kr)	kr 1.234,56
Swedish	Krona (Kr)	1 234,56 Kr
Great Britain	Pound (£)	£1,234.56
United States	Dollar ($)	$1,234.56
Thai	Baht	2539 Baht
Euro	Euro (€)	€ 5,000

The Solaris 9 software supports the euro currency. Local currency symbols are still available for backward compatibility.

TABLE 1–5 User Locales To Support the Euro Currency

Region	Locale Name	ISO Codeset
Austria	`de_AT.ISO8859-15`	8859-15
Belgium (French)	`fr_BE.ISO8859-15`	8859-15
Belgium (Flemish)	`nl_BE.ISO8859-15`	8859-15
Denmark	`da_DK.ISO8859-15`	8859-15
Finland	`fi_FI.ISO8859-15`	8859-15
France	`fr_FR.ISO8859-15`	8859-15
Germany	`de_DE.ISO8859-15`	8859-15
Ireland	`en_IE.ISO8859-15`	8859-15
Italy	`it_IT.ISO8859-15`	8859-15
Netherlands	`nl_NL.ISO8859-15`	8859-15
Portugal	`pt_PT.ISO8859-15`	8859-15
Catalan Spain	`ca_ES.ISO8859-15`	8859–15
Estonia	`et_EE.ISO8859–15`	8859–15

TABLE 1–5 User Locales To Support the Euro Currency *(Continued)*

Region	Locale Name	ISO Codeset
Spain	es_ES.ISO8859-15	8859-15
Sweden	sv_SE.ISO8859-15	8859-15
Great Britain	en_GB.ISO8859-15	8859-15
U.S.A.	en_US.ISO8859-15	8859-15

Euro locales are based on the ISO8859–15 codeset.

Keep in mind that a *converted* currency amount can take up more or less space than the original amount. To illustrate: $1,000 can become € 1.307.000.

The current status of the locale settings for locales within the euro zone is illustrated for the LC_MONETARY operand of the locale utility. The status for Germany, for example, is shown in the following table.

TABLE 1–6 German Locale and Corresponding LC_MONETARY

Locale	LC_MONETARY
de_DE.ISO8859-1	DM
de_DE.ISO8859-15	Euro
de_DE.UTF-8	Euro
de_DE.ISO8859-15@euro	Euro
de_DE.UTF-8@euro	Euro

Language Word and Letter Differences

This section describes important differences between languages.

Word Delimiters

In English, words are usually separated by a space character. In languages such as Chinese, Japanese, and Thai, however, there is often no delimiter between words.

Sort Order

Sorting order for particular characters is not the same in all languages. For example, the character “ö” sorts with the ordinary “o” in Germany, but sorts separately in Sweden, where it is the last letter of the alphabet. In some languages, characters have weight to determine the priority of the character sequences. For example, the Thai dictionary defines sorting through the sequences of characters that have different weights.

Character Sets

Character sets can differ in the number of alphabetic characters and special characters. While the English alphabet contains only 26 characters, some languages contain many more characters. Japanese, for example, can contain over 20,000 characters, Chinese can contain even more characters.

Western European Alphabets

The alphabets of most western European countries are similar to the standard 26-character alphabet used in English-speaking countries, but there are often some additional basic characters, some marked (or accented) characters, and some ligatures.

Japanese Text

Japanese text is composed of three different scripts mixed together: Kanji ideographs derived from Chinese, and two phonetic scripts (or syllabaries), hiragana and katakana.

Although each character in hiragana has an equivalent in katakana, hiragana is the most common script, with cursive rather than block-like letter forms. Kanji characters are used to write root words. Katakana is mostly used to represent “foreign” words, that is, words “imported” from languages other than Japanese.

Kanji has tens of thousands of characters, but the number commonly used has been declining steadily over the years. Now only about 3500 are frequently used, although the average Japanese writer has a vocabulary of about 2000 kanji characters. Nonetheless, computer systems must support more than 7000 because that is what the Japan Industry Standard (JIS) requires. In addition, there are about 170 hiragana and katakana characters. On average, 55% of Japanese text is hiragana, 35% kanji, and 10% katakana. Arabic numerals and Roman letters are also present in Japanese text.

Although completely avoiding the use of kanji is possible, most Japanese readers find a text that is composed without any kanji hard to understand.

Korean Text

Korean text can be written using a phonetic writing system called Hangul. Hangul has more than 11,000 characters, which consist of consonants and vowels known as jamos. About 3000 characters from the entire Hangul vocabulary of characters are usually used in Korean computer systems. Korean also uses ideographs based on the set invented in China, called hanja. Korean text requires over 6000 hanja characters. Hanja is used mostly to avoid confusion when Hangul would be ambiguous. Hangul characters are formed by combining consonants and vowels. After combining them, they can compose one syllable, which is a Hangul character. Hangul characters are often arranged in a square, so that the group takes up the same space as a hanja character. Arabic numerals, Roman letters, and special symbol characters are also present in Korean text.

Thai Text

A Thai character can be defined as a column position on a display screen with four display cells. Each column position can have up to three characters. The composition of a display cell is based on the Thai character's classification. Some Thai characters can be composed with another character's classification. If they can be composed together, both characters are in the same cell. Otherwise, they are in separate cells.

Chinese Text

Chinese usually consists entirely of characters from the ideographic script called hanzi.

- In the People's Republic of China (PRC) there are about 7000 commonly used hanzi characters in the GB2312 (`zh` locale), more than 20,000 characters in the GBK charset (`zh.GBK` locale), and about 30,000 characters in the GB18030-2000 charset (`zh_CN.GB18030` locale), including all CJK extension A characters defined in Unicode 3.0.
- In Taiwan, the most frequently used charsets are the CNS11643-1992 (`zh_TW` locale) and the Big5 (`zh_TW.BIG5` locale). They share about 13,000 hanzi characters.
- In Hong Kong, 4702 characters have been added into the Big5 charset to become the Big5-HKSCS charset (`zh_HK.BIG5HK`).

If a character is not a root character, it usually consists of two or more parts, two being most common. In two-part characters, one part generally represents meaning, and the other represents pronunciation. Occasionally both parts represent meaning. The radical is the most important element, and characters are traditionally arranged by radical, of which there are several hundred. A single sound can be represented by many different characters, which are not interchangeable in usage. A single character can have different sounds.

Some characters are more appropriate than others in a given context—the appropriate one is distinguished phonetically by the use of tones. By contrast, spoken Japanese and Korean lack tones.

Several phonetic systems represent Chinese. In the People's Republic of China the most common is *pinyin*, which uses Roman characters and is widely employed in the West for place names such as Beijing. The Wade-Giles system is an older phonetic system, formerly used for place names such as Peking. In Taiwan *zhuyin* (or *bopomofo*), a phonetic alphabet with unique letter forms, is often used instead.

Hebrew Text

Hebrew text is used for writing scripts in the Hebrew and Yiddish languages, and predates the English language by thousands of years. Hebrew is an example of a bidirectional script, in that Hebrew letters are written and read from right to left, while numbers are read from left to right. Any English text that is embedded in Hebrew text is also read from left to right.

Hebrew uses a 27-character alphabet, and takes punctuation marks and numbers from the standard Latin (or English) alphabet. Hebrew text also includes vowel and pronunciation marks. These marks appear either as a dot (Dagesh) inside the base character, vowel marks below the character, or accents to the upper left of the character. These marks are generally only used in liturgical text, and are rarely seen in day-to-day use. There are also no uppercase letters in Hebrew.

Hindi Text

Hindi text is written in a script called Devanagari, which means "the writing of the gods". Hindi is a phonetic language, and is written as a series of syllables. Each syllable is built up of alphabetic pieces (the Devanagari characters) of three types: consonant letters, independent vowels and dependent vowel signs. The syllable itself consists of a consonant and vowel core, with an optional preceding consonant. Unlike English, which starts from a baseline, Devanagari characters hang from a horizontal line (called the head stroke) written at the top of the characters. These characters can combine or change shape depending on their context. Like Hebrew, Hindi text makes no distinction between uppercase or lowercase letters.

Keyboard Differences

Not all characters on the U.S. keyboard appear on other keyboards. Similarly, other keyboards often contain many characters not visible on the U.S. keyboard.

Note – On SPARC™ machines, the Compose key can be used to produce any Latin character with a diacritic in any of the supported ISO8859 character sets.

The Compose key can be used with Latin-based locales, but not with Korean, Chinese, or Japanese locales, except the UTF-8 locales.

Any keyboard can be used to input characters from any locale because input is handled by the Solaris operating environment.

Differences in Paper Sizes

Within each country, a small number of paper sizes are commonly used. Normally, one of those sizes is much more common than the others. Most countries follow ISO Standard 216: "Writing paper and certain classes of printed matter-Trimmed sizes-A and B series."

Internationalized applications should not make assumptions about the page sizes available to them. The Solaris system provides no support for tracking output page size. Tracking this is the responsibility of the application program. The following table shows common international page sizes.

TABLE 1–7 Common International Page Sizes

Paper Type	Dimensions	Countries
ISO A4	21.0 cm by 29.7 cm	Everywhere except U.S.
ISO A5	14.8 cm by 21.0 cm	Everywhere except U.S.
JIS B4	25.9 cm by 36.65 cm	Japan
JIS B5	18.36 cm by 25.9 cm	Japan
U.S. Letter	8.5 inches by 11 inches	U.S. and Canada
U.S. Legal	8.5 inches by 14 inches	U.S. and Canada

CHAPTER **2**

General Internationalization Features

This section discusses several internationalization features contained in the Solaris 9 environment.

Support for Codeset Independence

EUC is an abbreviation for Extended UNIX Code. The Solaris 9 operating environment supports non-EUC encodings such as PC-Kanji (better known as Shift_JIS) in Japan, Big5 in Taiwan, and GBK in the People's Republic of China. Because a large part of the computer market demands non-EUC codeset support, the Solaris 9 environment provides a solid framework to enable both EUC and non-EUC codeset support. This support is called *Codeset Independence*, or CSI.

The goal of CSI is to remove dependencies on specific codesets or encoding methods from Solaris operating environment libraries and commands. The CSI architecture allows the Solaris operating environment to support any UNIX file system safe encoding. CSI supports a number of new codesets, such as UTF-8, PC-Kanji, and Big5.

CSI Approach

Codeset independence enables application and platform software developers to keep their code independent of any encoding, such as UTF-8, and also provides the ability to adopt any new encoding without having to modify the source code. This architecture approach differs from Java™ internationalization in that Java requires applications to be UTF-16–dependent.

Many existing internationalized applications (for example, Motif) automatically inherit CSI support from the underlying system. These applications work in the new locales without modification.

CSI is inherently independent from any codesets. However, the following assumptions about file code encodings (codesets) still apply to the Solaris 9 environment:

- File code is a superset of ASCII.
- NULL byte value (0x00) does not appear as part of multibyte character bytes for support of null-terminated multibyte character strings.
- ASCII Slash character byte value (0x2f) does not appear as part of multibyte character bytes for support of the UNIX path names.

CSI-enabled Commands

This section lists the CSI-enabled commands in the Solaris 9 environment. The man page for each command has an attribute section that indicates whether the command is CSI-enabled.

All commands are in the `/usr/bin` directory, unless otherwise noted.

```
/usr/lib/diffh
/usr/sbin/accept
/usr/sbin/reject
/usr/ucb/lpr
/usr/xpg4/bin/awk
/usr/xpg4/bin/cp
/usr/xpg4/bin/date
/usr/xpg4/bin/du
/usr/xpg4/bin/ed
/usr/xpg4/bin/edit
/usr/xpg4/bin/egrep
/usr/xpg4/bin/env
/usr/xpg4/bin/ex
/usr/xpg4/bin/expr
/usr/xpg4/bin/fgrep
/usr/xpg4/bin/lp
/usr/xpg4/bin/ls
/usr/xpg4/bin/more
/usr/xpg4/bin/mv
/usr/xpg4/bin/nice
/usr/xpg4/bin/nohup
/usr/xpg4/bin/od
/usr/xpg4/bin/pr
/usr/xpg4/bin/rm
/usr/xpg4/bin/sed
/usr/xpg4/bin/sort
/usr/xpg4/bin/tail
/usr/xpg4/bin/tr
/usr/xpg4/bin/vedit
/usr/xpg4/bin/vi
/usr/xpg4/bin/view
acctcom
apropos
batch
bdiff
cancel
cat
catman
chgrp
chmod
chown
cmp
col
comm
compress
cpio
csh
csplit
cut
diff
diff3
```

disable
echo
expand
file
find
fold
ftp
gencat
geteopt
getoptcvt
head
join
jsh
kill
ksh
lp
man
mkdir
msgfmt
news
nroff
pack
paste
pcat
pg
printf
priocntl
ps
pwd
rcp
red
remsh
rksh
rsmdir
rsh
script
sdiff
settime
sh
split
strconf
strings
sum
tabs
tar
tee
touch
tty
uncompress
unexpand
uniq
unpack
wc
whatis
write
xargs
zcat

Solaris 9 CSI-enabled Libraries

Nearly all functions in `libc (/usr/lib/libc.so)` are CSI-enabled. However, the following functions in `libc` are not CSI-enabled because they are EUC-dependent functions:

- `csetcol()`
- `csetlen()`
- `euccol()`
- `euclen()`
- `eucscol()`
- `getwidth()`
- `csetno()`
- `wcsetno()`

In the Solaris 9 product, `libgen` `/usr/ccs/lib/libgen.a` and `libcurses` `/usr/ccs/lib/libcurses.a` are internationalized but not CSI-enabled.

Locale Database

The locale database format and structure is private and subject to change in a future release. Therefore, when developing an internationalized application, do not directly access the locale database. Instead, use the internationalization APIs in `libc`, described in “Internationalization APIs in `libc`” on page 45.

Note – When working with the Solaris 9 environment, use the locale databases that are included with the Solaris 9 product. Do not use locales from previous Solaris versions.

Process Code Format

The process code format, which is also known as wide-character code format in the Solaris 9 product, is private and subject to change in a future release. Therefore, when developing an international application, do not assume the process code format is the same. Instead, use the internationalization APIs in `libc` described in "Internationalization APIs in `libc`" on page 45.

Note – The process code for all Unicode locales is in UTF-32 representation. For more detail on UTF-32, refer to the "Unicode Standard Annex #19: UTF 32" and "Unicode Standard Annex #27: Unicode 3.1" from The Unicode Consortium or http://www.unicode.org/.

Multibyte Support Environment

A multibyte character is a character that cannot be stored in a single byte, such as Chinese, Japanese, or Korean characters. These characters require 2, 3, or 4 bytes of storage. A more precise definition can be found in ISO/IEC 9899:1990 subclause 3.13.

The Amendment 1 to ANSI C, which is also known as ISO/IEC 9899:1990, added new internationalization features, collectively known as the Multibyte Support Environment (MSE). Amendment 1 defines additional internationalization APIs for multibyte codesets with state and also for better wide-character handling support.

The programming model enables these multibyte characters to be read in as logical units and stored internally as wide characters. These wide characters can be processed by the program as logical entities in their own right. Finally, these wide characters can be written out, undergoing appropriate translation, as logical units.

This procedure is analogous to the way single-byte characters are read in, manipulated, and written out again. The MSE enables programs to be written to handle multibyte characters using the same programming model that is used for single-byte characters.

Dynamically Linked Applications

Solaris 9 product users can choose how to link applications with the system libraries, such as `libc`, by using dynamic linking or static linking. Any application that requires internationalization features in the system libraries must be dynamically linked. If the application has been statically linked, the operation to set the locale to anything other than C and POSIX using the `setlocale` function will fail. Statically linked applications can be operated only in C and POSIX locales.

By default, the linker program tries to link the application dynamically. If the command line options to the linker and the compiler include `-Bstatic` or `-dn` specifications, your application might be statically linked. You can check whether an existing application is dynamically linked using the `/usr/bin/ldd` command.

For example, if you type:

```
% /usr/bin/ldd /sbin/sh
```

the command indicates that the `/sbin/sh` command is not a dynamically linked program, as shown by the following response:

```
ldd: /sbin/sh: file is not a dynamic executable or shared object
```

If you type:

```
% /usr/bin/ldd /usr/bin/ls
```

the command displays the following message:

```
libc.so.1 =>     /usr/lib/libc.so.1
libdl.so.1 => /usr/lib/libdl.so.1
```

This message indicates that the `/usr/bin/ls` command has been dynamically linked with two libraries, `libc.so.1` and `libdl.so.1`.

Changed Interfaces

`libw` and `libintl` have moved to `libc` and are no longer in `libw` and `libintl`.

The shared objects ensure runtime compatibility for existing applications and, together with the archives, provide compilation environment compatibility for building applications. However, you no longer must build applications against `libw` or `libintl`.

For more information on filters, see the *Linker and Libraries Guide*.

The following list shows the stub entry points in `libw`.

```
fgetwc
fgetws
fputwc
fputws
getwc
getwchar
getws
isenglish
isideogram
isnumber
isphonogram
isspecial
iswalnum
iswalpha
iswcntrl
iswctype
iswdigit
iswgraph
iswlower
iswprint
iswpunct
iswspace
iswupper
iswxdigit
putwc
putwchar
putws
strtows
towlower
towupper
ungetwc
watoll
wcscat
wcschr
wcscmp
wcscoll
wcscpy
wcscspn
wcsftime
wcsclen
wscncat
wcsncmp
wcsncpy
wcspbrk
wcsrchr
wcsspn
wcstod
wcstok
wcstol
wcstoul
wcswcs
wcswidth
wcsxfrm
wctype
wcwidth
wscasecmp
wscat
wschr
wscmp
wscol
wscoll
wscpy
wscspn
wsdup
wslen
wsncasecmp
wsncat
wsncmp
wsncpy
wspbrk
wsprintf
wsrchr
wsscanf
wsspn
wstod
wstok
wstol
wstoll
wstostr
wsxfrm
```

This shorter list contains stub entry points in `libintl`:

```
bindtextdomain
dcgettext
dgettext
gettext
textdomain
```

`ctype` Macros

Character classification and character transformation macros are defined in `/usr/include/ctype.h`. The Solaris 9 environment provides a set of `ctype` macros that support character classification and transformation semantics defined by XPG4. For all `XPG4` and `XPG4.2` applications to automatically access new macros, one of the following conditions must be met:

- `_XPG4_CHAR_CLASS` is defined.
- `_XOPEN_SOURCE` and `_XOPEN_VERSION=4` are defined.
- `_XOPEN_SOURCE` and `_XOPEN_SOURCE_EXTENDED=1` are defined.

Because _XOPEN_SOURCE, _XOPEN_VERSION, and _XOPEN_SOURCE_EXTENDED bring in extra XPG4 related features in addition to new ctype macros, non-XPG4 or XPG4.2 applications should use __XPG4_CHAR_CLASS__.

Corresponding ctype functions also exist. The Solaris 9 environment functions also support XPG4 semantics. Refer to the ctype(3C) man page for details.

Internationalization APIs in libc

The Solaris 9 environment offers two sets of APIs:

- Multibyte (file codes)
- Wide characters (process code)

Wide-character codes are fixed-width units of logical entities. Therefore, you do not have to keep track of maintaining proper character boundaries when you are using multibyte characters.

When a program takes input from a file, you can convert your file's multibyte data into wide-character process code directly with input functions like fscanf(3S) and fwscanf(3S) or by using conversion functions like mbtowc(3C) and mbsrtowcs(3C) after the input. To convert output data from wide-character format to multibyte character format, use output functions like fwprintf(3S) and fprintf(3S), or apply conversion functions like wctomb(3C) and wcsrtombs(3C) before the output.

The tables in the remainder of this chapter describe the internationalization APIs included in the Solaris 9 product.

The following table describes the messaging function APIs in libc.

TABLE 2–1 Messaging Functions in libc

Library Routine	Description
catclose()	Close a message catalog
catgets()	Read a program message
catopen()	Open a message catalog
dgettext()	Get a message from a message catalog with domain specified
dcgettext()	Get a message from a message catalog with domain and category specified
textdomain()	Set and query the current domain

TABLE 2–1 Messaging Functions in `libc` *(Continued)*

Library Routine	Description
`bindtextdomain()`	Bind the path for a message domain
`gettext()`	Retrieve text string from message database

The following table describes the code conversion function APIs in `libc`.

TABLE 2–2 Code Conversion in `libc`

Library Routine	Description
`iconv()`	Convert codes
`iconv_close()`	Deallocate the conversion descriptor
`iconv_open()`	Allocate the conversion descriptor

Thise following table describes the regular expression APIs in `libc`.

TABLE 2–3 Regular Expressions in `libc`

Library Routine	Description
`regcomp()`	Compile the regular expression
`regexec()`	Execute regular expression matching
`regerror()`	Provide a mapping from error codes to error messages
`regfree()`	Free memory allocated by `regcomp()`
`fnmatch()`	Match file name or path name

The following table describes the wide character function APIs in `libc`.

TABLE 2–4 Wide Character Class in `libc`

Library Routine	Description
`wctype()`	Define character class
`wctrans()`	Define character mapping

The following table lists the modify and query locale in `libc`.

TABLE 2–5 Modify and Query Locale in `libc`

Library Routine	Description
`setlocale()`	Modify and query a program's locale

The following table lists the query locale data in `libc`.

TABLE 2–6 Query Locale Data in `libc`

Library Routine	Description
`nl_langinfo()`	Get language and cultural information of current locale
`localeconv()`	Get monetary and numeric formatting information of current locale

The following table describes the character classification function APIs in `libc`.

TABLE 2–7 Character Classification and Transliteration in `libc`

Library Routine	Description
`isalpha()`	Is character alphabetic?
`isupper()`	Is character uppercase?
`islower()`	Is character lowercase?
`isdigit()`	Is character a digit?
`isxdigit()`	Is character a hex digit?
`isalnum()`	Is character alphabetic or digital?
`isspace()`	Is character a space?
`ispunct()`	Is character a punctuation mark?
`isprint()`	Is character printable?
`iscntrl()`	Is character a control character?
`isascii()`	Is character an ASCII character?
`isgraph()`	Is character a visible character?
`isphonogram()`	Is wide character a phonogram?
`isideogram()`	Is wide character an ideogram?
`isenglish()`	Is wide character in English alphabet from a supplementary codeset?

TABLE 2–7 Character Classification and Transliteration in `libc` *(Continued)*

Library Routine	Description
`isnumber()`	Is wide character a digit from a supplementary codeset?
`isspecial()`	Is special wide character from a supplementary codeset?
`iswalpha()`	Is wide character alphabetic?
`iswupper()`	Is wide character uppercase?
`iswlower()`	Is wide character lowercase?
`iswdigit()`	Is wide-character a digit?
`iswxdigit()`	Is wide character a hex digit?
`iswalnum()`	Is wide character an alphabetic character or digit?
`iswspace()`	Is wide character a white space?
`iswpunct()`	Is wide character a punctuation mark?
`iswprint()`	Is wide character a printable character?
`iswgraph()`	Is wide character a visible character?
`iswcntrl()`	Is wide character a control character?
`iswascii()`	Is wide character an ASCII character?
`toupper()`	Convert a lowercase character to uppercase.
`tolower()`	Convert an uppercase character to lowercase.
`towupper()`	Convert a lowercase wide character to uppercase.
`towlower()`	Convert an uppercase wide character to lowercase.
`towctrans()`	Wide character mapping.

The following table describes the character collation function APIs in `libc`.

TABLE 2–8 Character Collation in `libc`

Library Routine	Description
`strcoll()`	Collate character strings
`strxfrm()`	Transform character strings for comparison
`wcscoll()`	Collate wide-character strings
`wcsxfrm()`	Transform wide-character strings for comparison

The following table describes the monetary handling function APIs in `libc`.

TABLE 2–9 Monetary Formatting in `libc`

Library Routine	Description
`localeconv()`	Get monetary formatting information for the current locale
`strfmon()`	Convert monetary value to string representation

The following table describes the date and time formatting in `libc`.

TABLE 2–10 Date and Time Formatting in `libc`

Library Routine	Description
`getdate()`	Convert user format date and time.
`strftime()`	Convert date and time to string representation. The `%u` conversion function conforms to the X/Open CAE Specification, System Interfaces and Headers, Issue 4, Version 2. This function represents a weekday as a decimal number [1,7], with 1 now representing Monday.
`strptime()`	Date and time conversion.

The following table describes the multibyte handling function APIs in `libc`.

TABLE 2–11 Multibyte Handling in `libc`

Library Routine	Description
`btowc()`	Single-byte to wide-character conversion
`mbrlen()`	Get number of bytes in character (restartable)
`mbsinit()`	Determine conversion object status
`mbrtowc()`	Convert a character to a wide-character code (restartable)
`mbsrtowcs()`	Convert a character string to a wide-character string (restartable)
`mblen()`	Get number of bytes in a character
`mbtowc()`	Convert a character to a wide-character code
`mbstowcs()`	Convert a character string to a wide-character string

The following table describes the wide character and string handling in `libc`.

TABLE 2–12 Wide Character and String Handling in `libc`

Library Routine	Description
`wcsncat()`	Concatenate wide-character strings to length *n*
`wsdup()`	Duplicate wide-character string
`wcscmp()`	Compare wide-character strings
`wcsncmp()`	Compare wide-character strings to length *n*
`wcscpy()`	Copy wide-character strings
`wcsncpy()`	Copy wide-character strings to length *n*
`wcschr()`	Find character in wide-character string
`wcsrchr()`	Find character in wide-character string from right
`wcslen()`	Get length of wide-character string
`wscol()`	Return display width of wide-character string
`wcsspn()`	Return span of one wide-character string in another
`wcscspn()`	Return span of one wide-character string not in another
`wcspbrk()`	Return pointer to one wide-character string in another
`wcstok()`	Move token through wide-character string
`wscwcs()`	Find string in wide-character string
`wcstombs()`	Convert wide-character string to multibyte string
`wctomb()`	Convert wide-character to multibyte character
`wcwidth()`	Determine number of column positions of a wide character
`wcswidth()`	Determine number of column positions of a wide-character string
`wctob()`	Wide character to single byte conversion
`wcrtomb()`	Convert a wide-character code to a character (restartable)
`wcstol()`	Convert wide-character string to long integer
`wcstoul()`	Convert wide-character string to unsigned long integer
`wcstod()`	Convert wide-character string to double precision
`wcsrtombs()`	Convert a wide-character string to a character string (restartable)
`wcscat()`	Concatenate wide-character strings

The following table describes the formatted wide-character input and output in `libc`.

TABLE 2–13 Formatted Wide-character Input and Output in `libc`

Library Routine	Description
`wsprintf()`	Generate wide-character string according to format
`wsscanf()`	Formatted input conversion
`fwprintf()`	Print formatted wide-character output
`fwscanf()`	Convert formatted wide-character input
`wprintf()`	Print formatted wide-character output
`wscanf()`	Convert formatted wide-character input
`swprintf()`	Print formatted wide-character output
`swscanf()`	Convert formatted wide-character input
`vfwprintf()`	Wide-character formatted output of a `stdarg` argument list
`vswprintf()`	Wide-character formatted output of a `stdarg` argument list

This table describes the wide strings function APIs in `libc`.

TABLE 2–14 Wide Strings`libc`

Library Routine	Description
`wscasecmp()`	Compare wide-character strings, ignore case differences
`wsncasecmp()`	Process code-string operations
`wcsstr()`	Find a wide-character substring
`wmemchr()`	Find a wide character in memory
`wmemcmp()`	Compare wide characters in memory
`wmemcpy()`	Copy wide characters in memory
`wmemmove()`	Copy wide characters in memory with overlapping areas
`wmemset()`	Set wide characters in memory

The following table describes the wide-character input and output in `libc`.

TABLE 2–15 Wide-character Input and Output in`libc`

Library Routine	Description
`fgetwc()`	Get multibyte character from stream, convert to wide character

TABLE 2–15 Wide-character Input and Output inlibc *(Continued)*

Library Routine	Description
getwchar()	Get multibyte character from stdin, convert to wide character
fgetws()	Get multibyte string from stream, convert to wide character
getws()	Get multibyte string from stdin, convert to wide character
fputwc()	Convert wide character to multibyte character, puts to stream
fwide()	Set stream orientation
putwchar()	Convert wide character to multibyte character, puts to stdin
fputws()	Convert wide character to multibyte string, puts to stream
putws()	Convert wide character to multibyte string, puts to stdin
ungetwc()	Push a wide character back into input stream.

genmsg Utility

The new genmsg utility can be used with the catgets() family of functions to create internationalized source message catalogs. The utility examines a source program file for calls to functions in catgets and builds a source message catalog from the information it finds. For example:

```
% cat example.c
    ...
    /* NOTE: %s is a file name */
    printf(catgets(catd, 5, 1, "%s cannot be opened."));
    /* NOTE: "Read" is a past participle, not a present

            tense verb */
    printf(catgets(catd, 5, 1, "Read"));
    ...
% genmsg -c NOTE example.c
The following file(s) have been created.
            new msg file = "example.c.msg"
% cat example.c.msg
$quote "
$set 5
1            "%s cannot be opened"
    /* NOTE: %s is a file name */
2           "Read"
    /* NOTE: "Read" is a past participle, not a present
            tense verb */
```

In the above example, genmsg is run on the source file example.c, which produces a source message catalog named example.c.msg. The -c option with the argument NOTE causes genmsg to include comments in the catalog. If a comment in the source program contains the string specified, the comment appears in the message catalog after the next string extracted from a call to catgets.

You can use genmsg to number the messages in a message set automatically.

For more information, see the genmsg(1) man page.

To generate a formatted message catalog file, use the gencat(1) utility.

For information on the message extraction utility for Portable Message files (.po files) and also on how to generate message object files (.mo files) from the .po files, see the xgettext(1), and msgfmt(1) man pages, respectively.

User Defined and User Extensible Code Conversions

Solaris users can create user-defined codeset converters by using the geniconvtbl utility.

This utility enables user-defined and user-customizable codeset conversions with a standard system utility and interface like iconv(1) and iconv(3C). This feature enhances the ability of an application to deal with incompatible data types, particularly data generated from proprietary or legacy applications. Modification to existing Solaris codeset conversions is also supported.

More details and also examples can be found in the geniconvtbl(1) and geniconvtbl(4) man pages. Sample input source files for the utility are also available for reference from the /usr/lib/iconv/geniconvtbl/srcs/ directory.

Once the user-defined code conversions are prepared and placed as specified in the geniconvtbl(1) man page, users can use the code conversions from the iconv(1) utility and the iconv(3C) functions of both 32-bit and 64-bit Solaris operating environments.

CHAPTER 3

Localization in the Solaris 9 Environment

This section discusses several localization features contained in the Solaris 9 environment.

- "Software Support for Localization" on page 55
- "Supported Locales" on page 57
- "Multiple Key Compose Sequences for Locales" on page 63
- "Keyboard Support in the Solaris 9 Product" on page 64

Software Support for Localization

This section contains information about the Solaris 9 locale packages, localization content on the Solaris 9 CD-ROMs, localization functions in the interfaces, and script enabling.

Summary of the Solaris 9 Locale Packages

All Solaris 9 locale packages are classified into two categories.

The first category is for partial locales, which are the enablers of the locales. With partial locales installed on the system, users can input, display, print text and run applications on the target locales, while the OS/GUI messages from Solaris are English. All partial locale packages are available on the Solaris Software CDs. Japanese and Asian pertial locales are packaged according to the language and the other partial locales are packaged according to the geographic region.

The second category is for full locale packages. These packages include translations of software messages, online help files, optional fonts, and language-specific features. Full locale packages provide the full set of language features to many languages. All locales based on the following languages are full locales:

- German
- French
- Spanish
- Swedish
- Italian
- Japanese
- Korean
- Simplified Chinese
- Traditional Chinese

Full locale packages are packaged according to the language and are available on the Language CD.

Note – Partial locale packages (locale enablers) must be installed in order for the full locales to be functional.

During the Solaris installation process, you are prompted to choose which geographic regions require your support. The locale support available after installation completes depends on the choices made at this stage. Partial locales are installed from the Solaris Software CD-ROMs with the Solaris 9 Operating Environment and full locales are installed from the Languages CD. If you do not need full locale support, you can skip the installation from the Languages CD-ROM during the installation process. Note that the English locale is installed as the default.

Additional Locales in This Release

The new partial locales for this release are the addition of UTF–8 locales for Russian and Polish, two new locales for Catalan, a new Thai locale, a new Indic locale, two new Traditional Chinese locales, and a new Simplified Chinese locale. The locale names are:

- `ar_EG.UTF-8`
- `ca_ES.ISO8859-1`
- `ca_ES.ISO8859-15`
- `fi_FI.UTF-8`
- `fr_BE.UTF-8`
- `pl_PL.UTF-8`
- `pt_BR.UTF-8`
- `ru_RU.UTF-8`
- `tr_TR.UTF-8`
- `th_TH.UTF-8`

- hi_IN.UTF-8
- zh_HK.BIG5HK

  This is a Traditional Chinese (Hong Kong) Big5–HKSCS locale. It is a full locale if the Traditional Chinese message packages are installed from the Languages CD.
- zh_HK.UTF-8

  This is a Traditional Chinese (Hong Kong) UTF—8 locale. It is a full locale if the Traditional Chinese message packages are installed from the Languages CD.
- zh_CN.GB18030

  This is a Simplified Chinese GB18030 locale. It is a full locale if the Simplified Chinese message packages are installed from the Languages CD.

Supported Locales

The following tables list all the locales supported by the Solaris 9 environment. The locale names have been updated in keeping with international naming standards.

TABLE 3–1 Asia

Locale	User Interface	Territory	Codeset	Language Support
hi_IN.UTF-8	English	India	UTF-8[1]	Hindi (UTF-8) Unicode 3.1
ja	Japanese	Japan	eucJP[2]	Japanese (EUC) JIS X 0201-1976 JIS X 0208-1990 JIS X 0212-1990
ja_JP.eucJP	Japanese	Japan	eucJP	Japanese (EUC) JIS X 0201-1976 JIS X 0208-1990 JIS X 0212-1990
ja_JP.PCK	Japanese	Japan	PCK[3]	Japanese (PC kanji) JIS X 0201-1976 JIS X 0208-1990
ja_JP.UTF-8	Japanese	Japan	UTF-8	Japanese (UTF-8) Unicode 3.1

TABLE 3–1 Asia *(Continued)*

Locale	User Interface	Territory	Codeset	Language Support
`ko_KR.EUC`	Korean	Korea	1001	Korean (EUC) KS X 1001
`ko_KR.UTF-8`	Korean	Korea	UTF-8	Korean (UTF-8) Unicode 3.1
`th_TH.UTF-8`	English	Thailand	UTF-8	Thai (UTF-8) Unicode 3.1
`th_TH.TIS620`	English	Thailand	TIS620.2533	Thai TIS620.2533
`zh_CN.EUC`	Simplified Chinese	PRC	gb2312[4]	Simplified Chinese (EUC) GB2312-1980
`zh_CN.GBK`	Simplified Chinese	PRC	GBK [5]	Simplified Chinese (GBK)
`zh_CN.GB18030`	Simplified Chinese	PRC	GB18030–2000	Simplified Chinese (GB18030–2000) GB18030–2000
`zh_CN.UTF-8`	Simplified Chinese	PRC	UTF-8	Simplified Chinese (UTF-8) Unicode 3.1
`zh_HK.BIG5HK`	Traditional Chinese	Hong Kong	Big5+HKSCS	Traditional Chinese (BIG5+HKSCS)
`zh_HK.UTF-8`	Traditional Chinese	Hong Kong	UTF-8	Traditional Chinese (UTF-8) Unicode 3.1
`zh_TW.EUC`	Traditional Chinese	Taiwan	cns11643	Traditional Chinese (EUC) CNS 11643-1992
`zh_TW.BIG5`	Traditional Chinese	Taiwan	BIG5	Traditional Chinese (BIG5)
`zh_TW.UTF-8`	Traditional Chinese	Taiwan	UTF-8	Traditional Chinese (UTF-8) Unicode 3.1

[1] UTF-8 is the UTF-8 defined in ISO/IEC 10646–1:2000 and also Unicode 3.1.

[2] eucJP signifies the Japanese EUC codeset. Specification of `ja_JP.eucJP` locale conforms to UI_OSF Japanese Environment Implementation Agreement Version 1.1 and `ja` locale conforms to the traditional specification from the past Solaris releases.

[3] PCK is also known as Shift_JIS (SJIS).

[4] gb2312 signifies Simplified Chinese EUC codeset, which contains GB 1988–80 and GB 2312–80.

[5] GBK signifies GB extensions. This includes all GB 2312–80 characters and all Unified Han characters of ISO/IEC 10646–1, as well as Japanese Hiragana and Katakana characters. It also includes many characters of Chinese, Japanese, and Korean character sets and of ISO/IEC 10646–1

TABLE 3–2 Australasia

Locale	User Interface	Territory	Codeset	Language Support
`en_AU.ISO8859-1`	English	Australia	ISO8859-1	English (Australia)
`en_NZ.ISO8859-1`	English	New Zealand	ISO8859-1	English (New Zealand)

TABLE 3–3 Central America

Locale	User Interface	Territory	Codeset	Language Support
es_CR.ISO8859-1	Spanish	Costa Rica	ISO8859-1	Spanish (Costa Rica)
es_GT.ISO8859-1	Spanish	Guatemala	ISO8859-1	Spanish (Guatemala)
es_NI.ISO8859-1	Spanish	Nicaragua	ISO8859-1	Spanish (Nicaragua)
es_PA.ISO8859-1	Spanish	Panama	ISO8859-1	Spanish (Panama)
es_SV.ISO8859-1	Spanish	El Salvador	ISO8859-1	Spanish (El Salvador)

TABLE 3–4 Central Europe

Locale	User Interface	Territory	Codeset	Language Support
cs_CZ.ISO8859-2	English	Czech Republic	ISO8859-2	Czech (Czech Republic)
de_AT.ISO8859-1	German	Austria	ISO8859-1	German (Austria)
de_AT.ISO8859-15	German	Austria	ISO8859-15	German (Austria, ISO8859-15 - Euro)
de_CH.ISO8859-1	German	Switzerland	ISO8859-1	German (Switzerland)
de_DE.UTF-8	German	Germany	UTF-8	German (Germany, Unicode 3.1)
de_DE.ISO8859-1	German	Germany	ISO8859-1	German (Germany)
de_DE.ISO8859-15	German	Germany	ISO8859-15	German (Germany, ISO8859-15 - Euro)
fr_CH.ISO8859-1	French	Switzerland	ISO8859-1	French (Switzerland)
hu_HU.ISO8859-2	English	Hungary	ISO8859-2	Hungarian (Hungary)
pl_PL.ISO8859-2	English	Poland	ISO8859-2	Polish (Poland)
pl_PL.UTF-8	English	Poland	UTF-8	Polish (Poland, Unicode 3.1)
sk_SK.ISO8859-2	English	Slovakia	ISO8859-2	Slovak (Slovakia)

TABLE 3–5 Eastern Europe

Locale	User Interface	Territory	Codeset	Language Support
bg_BG.ISO8859-5	English	Bulgaria	ISO8859-5	Bulgarian (Bulgaria)
et_EE.ISO8859-15	English	Estonia	ISO8859-15	Estonian (Estonia)

TABLE 3–5 Eastern Europe *(Continued)*

Locale	User Interface	Territory	Codeset	Language Support
hr_HR.ISO8859-2	English	Croatia	ISO8859-2	Croatian (Croatia)
lt_LT.ISO8859-13	English	Lithuania	ISO8859-13	Lithuanian (Lithuania)
lv_LV.ISO8859-13	English	Latvia	ISO8859-13	Latvian (Latvia)
mk_MK.ISO8859-5	English	Macedonia	ISO8859-5	Macedonian (Macedonia)
ro_RO.ISO8859-2	English	Romania	ISO8859-2	Romanian (Romania)
ru_RU.KOI8-R	English	Russia	KOI8-R	Russian (Russia, KOI8-R)
ru_RU.ANSI1251	English	Russia	ansi-1251	Russian (Russia, ANSI 1251)
ru_RU.ISO8859-5	English	Russia	ISO8859-5	Russian (Russia)
ru_RU.UTF-8	English	Russia	UTF-8	Russian (Russia, Unicode 3.1)
sh_BA.ISO8859-2@bosnia	English	Bosnia	ISO8859-2	Bosnian (Bosnia)
sl_SI.ISO8859-2	English	Slovenia	ISO8859-2	Slovenian (Slovenia)
sq_AL.ISO8859-2	English	Albania	ISO8859-2	Albanian (Albania)
sr_YU.ISO8859-5	English	Serbia	ISO8859-5	Serbian (Serbia)
tr_TR.ISO8859-9	English	Turkey	ISO8859-9	Turkish (Turkey)
tr_TR.UTF-8	English	Turkey	UTF-8	Turkish (Turkey, Unicode 3.1)

TABLE 3–6 Middle East

Locale	User Interface	Territory	Codeset	Language Support
He	English	Israel	ISO8859-8	Hebrew (Israel)

TABLE 3–7 North Africa

Locale	User Interface	Territory	Codeset	Language Support
ar_EG.UTF-8	English	Egypt	UTF-8	Arabic (Egypt)

TABLE 3–7 North Africa *(Continued)*

Locale	User Interface	Territory	Codeset	Language Support
Ar	English	Egypt	ISO8859-6	Arabic (Egypt)

TABLE 3–8 North America

Locale	User Interface	Territory	Codeset	Language Support
en_CA.ISO8859-1	English	Canada	ISO8859-1	English (Canada)
en_US.ISO8859-1	English	USA	ISO8859-1	English (U.S.A.)
en_US.ISO8859-15	English	USA	ISO8859-15	English (U.S.A., ISO8859-15 - Euro)
en_US.UTF-8	English	USA	UTF-8	English (U.S.A., Unicode 3.1)
fr_CA.ISO8859-1	French	Canada	ISO8859-1	French (Canada)
es_MX.ISO8859-1	Spanish	Mexico	ISO8859–1	Spanish (Mexico)

TABLE 3–9 Northern Europe

Locale	User Interface	Territory	Codeset	Language Support
da_DK.ISO8859-1	English	Denmark	ISO8859–1	Danish (Denmark)
da_DK.ISO8859-15	English	Denmark	ISO8859–15	Danish (Denmark, ISO8859–15–Euro)
fi_FI.ISO8859-1	English	Finland	ISO8859–1	Finnish, Unicode 3.1)
fi_FI.ISO8859-15	English	Finland	ISO8859–15	Finnish (Finland, ISO8859–15–Euro)
fi_FI.UTF-8	English	Finland	UTF-8	Finnish (Finland)
is_IS.ISO8859-1	English	Iceland	ISO8859–1	Icelandic (Iceland)
no_NO.ISO8859-1@bokmal	English	Norway	ISO8859–1	Norwegian (Norway-Bokmal)
no_NO.ISO8859-1@nyorsk	English	Norway	ISO8859–1	Norwegian (Norway-Nynorsk)
sv_SE.ISO8859-1	Swedish	Sweden	ISO8859–1	Swedish (Sweden)
sv_SE.ISO8859-15	Swedish	Sweden	ISO8859–15	Swedish (Sweden, ISO8859–15–Euro)
sv_SE.UTF-8	Swedish	Sweden	UTF-8	Swedish (Sweden, Unicode 3.1)

TABLE 3–10 South America

Locale	User Interface	Territory	Codeset	Language Support
`es_AR.ISO8859-1`	Spanish	Argentina	ISO8859-1	Spanish (Argentina)
`es_BO.ISO8859-1`	Spanish	Bolivia	ISO8859-1	Spanish (Bolivia)
`es_CL.ISO8859-1`	Spanish	Chile	ISO8859-1	Spanish (Chile)
`es_CO.ISO8859-1`	Spanish	Colombia	ISO8859-1	Spanish (Colombia)
`es_EC.ISO8859-1`	Spanish	Ecuador	ISO8859-1	Spanish (Ecuador)
`es_PE.ISO8859-1`	Spanish	Peru	ISO8859-1	Spanish (Peru)
`es_PY.ISO8859-1`	Spanish	Paraguay	ISO8859-1	Spanish (Paraguay)
`es_UY.ISO8859-1`	Spanish	Uruguay	ISO8859-1	Spanish (Uruguay)
`es_VE.ISO8859-1`	Spanish	Venezuela	ISO8859-1	Spanish (Venezuela)
`pt_BR.ISO8859-1`	English	Brazil	ISO8859-1	Portuguese (Brazil)
`pt_BR.UTF-8`	English	Brazil	UTF-8	Portuguese (Brazil, Unicode 3.1)

TABLE 3–11 South Europe

Locale	User Interface	Territory	Codeset	Language Support
`ca_ES.ISO8859-1`	English	Spain	ISO8859-1	Catalan (Spain)
`ca_ES.ISO8859-15`	English	Spain	ISO8859-15	Catalan (Spain, ISO8859-15 - Euro)
`el_GR.ISO8859-7`	English	Greece	ISO8859-7	Greek (Greece)
`es_ES.ISO8859-1`	Spanish	Spain	ISO8859-1	Spanish (Spain)
`es_ES.ISO8859-15`	Spanish	Spain	ISO8859-15	Spanish (Spain, ISO8859-15 - Euro)
`es_ES.UTF-8`	Spanish	Spain	UTF-8	Spanish (Spain, Unicode 3.1)
`it_IT.ISO8859-1`	Italian	Italy	ISO8859-1	Italian (Italy)
`it_IT.ISO8859-15`	Italian	Italy	ISO8859-15	Italian (Italy, ISO8859-15 - Euro)
`it_IT.UTF-8`	Italian	Italy	UTF-8	Italian (Italy, Unicode 3.1)
`pt_PT.ISO8859-1`	English	Portugal	ISO8859-1	Portuguese (Portugal)
`pt_PT.ISO8859-15`	English	Portugal	ISO8859-15	Portuguese (Portugal, ISO8859-15 - Euro)

TABLE 3–12 Western Europe

Locale	User Interface	Territory	Codeset	Language Support
`en_GB.ISO8859-1`	English	Great Britain	ISO8859-1	English (Great Britain)
`en_IE.ISO8859-1`	English	Ireland	ISO8859-1	English (Ireland)
`fr_BE.ISO8859-1`	French	Belgium-Walloon	ISO8859-1	French (Belgium-Walloon, Unicode 3.1)
`fr_BE.UTF-8`	French	Belgium-Walloon	UTF-8	French (Belgium-Walloon, Unicode 3.1)
`fr_FR.ISO8859-1`	French	France	ISO8859-1	French (France)
`fr_FR.UTF-8`	French	France	UTF-8	French (France, Unicode 3.1)
`nl_BE.ISO8859-1`	English	Belgium-Flemish	ISO8859-1	Dutch (Belgium-Flemish)
`nl_NL.ISO8859-1`	English	Netherlands	ISO8859-1	Dutch (Netherlands)

Multiple Key Compose Sequences for Locales

Many of the Solaris locales, especially the European and Unicode locales, allow input of various characters by using so-called “dead key sequences,” which are also known as Compose key sequences.

The Compose key sequence input is used to input characters with diacritical marks and other characters that are not shown on the keyboard key caps.

The following table shows a few examples of Compose key sequences. For more complete information about the Compose key sequences, see “English/European Input Mode” on page 99.

TABLE 3–13 Diacritical Characters Created With Compose Key

Mark	Compose Key Combination	Example
Diaeresis	”	Compose A “ —> A with diaeresis
Caron	V	Compose Z v —> Z with caron
Breve	u	Compose G u —> G with breve
Ogonek	a	Compose A a —> A with Ogonek

TABLE 3–13 Diacritical Characters Created With Compose Key *(Continued)*

Mark	Compose Key Combination	Example
Cedilla	,	Compose K , —> K with cedilla
Registered Sign	R O	Compose R O —> Registered sign
Inverted Exclamation Mark	! !	Compose ! ! —> Inverted Exclamation Mark

Note – If the current locale's codeset does not have a corresponding character, a compose sequence cannot be used. For example, since there is no `Z` with a `caron` in ISO8859–1, it is not possible to input a `Z` with a `caron` in the `en_US.ISO8859-1` locale.

Keyboard Support in the Solaris 9 Product

Solaris recognizes and supports various keyboards with different key layouts made for specific regions, and layout support for both Sun SPARC and Intel Architecture (IA) platforms. Solaris 9 supports the regional keyboards listed in the following table:

TABLE 3–14 Support for Regional Keyboards

Region	Country	Sun Keyboard (Type 4/5/5c)	Sun Keyboard (Type 6)	PC Keyboard
Asia	Japan	X	X	X
	Korea	X	X	X
	Taiwan	X	X	X
Europe	Belgium	X	X	X
	Czech Republic	X		X
	Denmark	X	X	X
	Finland		X	
	France	X	X	X

TABLE 3–14 Support for Regional Keyboards *(Continued)*

Region	Country	Sun Keyboard (Type 4/5/5c)	Sun Keyboard (Type 6)	PC Keyboard
	Germany	X	X	X
	Great Britain	X	X	X
	Greece	X		X
	Hungary	X		X
	Italy	X	X	X
	Latvia	X		X
	Lithuania	X		X
	The Netherlands	X	X	X
	Norway	X	X	X
	Poland	X		X
	Portugal	X	X	X
	Russia	X	X	X
	Spain	X	X	X
	Sweden	X	X	X
	Switzerland (French)	X	X	X
	Switzerland (German)	X	X	X
	Turkey	X	X	X
America	Canada (French)	X	X	X
	Latin America (Spanish)	X		
	U.S.A.	X	X	X
Middle East	Arabic	X	X	

For regions with keyboard layouts that conform to the International Standard, such as China, use the keyboard layout support provided for the U.S.A. to input the locale's characters. The underlying keyboard mappings are identical. Some countries, like Japan, Turkey, and Switzerland have multiple keyboards, because multiple languages are being used, or because multiple keyboard layouts exist.

Sun Type 4, 5, and 5c keyboards use Sun I/O interfaces through a Mini DIN 8–pin connection. Sun Type 6 keyboards have two versions of interfaces:

- Sun I/O through a Mini DIN 8–pin connection
- USB

Sun keyboard types are printed on the back of each Sun keyboard.

PC keyboards use various interfaces, such as PS/2 or USB, for example.

Changing Between Keyboards on SPARC Systems

Users can change keyboard layouts in the Solaris product by using the DIP switch settings under most of Sun Type 4, 5 and 5c keyboards. A list of keyboard type, names and corresponding layout ids that can be used for the DIP switch settings is in the `/usr/openwin/share/etc/keytables/keytable.map` file.

Note – Users cannot change the layouts of Type 6 keyboards because there are no DIP switches at the back of the keyboards. Some Type 5 and 5c keyboards, for instance, U.S.A., U.S.A./UNIX, and Japanese keyboards have jumpers instead of DIP switches. There are no utilities or tools for both SPARC and IA platforms (apart from a standard UNIX tool, like `xmodmap`(1)) bundled into the Solaris 9 operating environment for switching keyboards.

The following is a table of the layout id values for Type 4, 5, and 5c keyboards. (1 = switch up, 0 = switch down).

TABLE 3–15 Layouts for Type 4, 5, and 5c Keyboards

DIP Switch	Keyboard (Keytable file)	Setting in Binary
0	U.S.A. (`US4.kt`)	000000
1	U.S.A. (`US4.kt`)	000001
2	Belgium (`FranceBelg4.kt`)	000010
3	Canada (`Canada4.kt`)	000011
4	Denmark (`Denmark4.kt`)	000100
5	Germany (`Germany4.kt`)	000101
6	Italy (`Italy4.kt`)	000110
7	The Netherlands (`Netherland4.kt`)	000111
8	Norway (`Norway4.kt`)	001000
9	Portugal (`Portugal4.kt`)	001001

TABLE 3–15 Layouts for Type 4, 5, and 5c Keyboards *(Continued)*

DIP Switch	Keyboard (Keytable file)	Setting in Binary
10 (0x0a)	Latin America/Spanish (SpainLatAm4.kt)	001010
11 (ox0b)	Sweden (SwedenFin4.kt)	001011
12 (0x0c)	Switzerland/French (Switzer_Fr4.kt)	001100
13 (0x0d)	Switzerland/German (Switzer_Ge4.kt)	001101
14 (0x0e)	Great Britain (UK4.kt)	001110
16 (0x10)	Korea (Korea4.kt)	010000
17 (0x11)	Taiwan (Taiwan4.kt)	010001
33 (0x21)	U.S.A. (US5.kt)	100001
34 (0x22)	U.S.A./UNIX (US_UNIX5.kt)	100010
35 (0x23)	France (France5.kt)	100011
36 (0x24)	Denmark (Denmark5.kt)	100100
37 (0x25)	Germany (Germany5.kt)	100101
38 (0x26)	Italy (Italy5.kt)	100110
39 (0x27)	The Netherlands (Netherland5.kt)	100111
40 (0x28)	Norway (Norway5.kt)	101000
41 (0x29)	Portugal (Portugal5.kt)	101001
42 (0x2a)	Spain (Spain5.kt)	101010
43 (0x2b)	Sweden (Sweden5.kt)	101011
44 (0x2c)	Switzerland/French (Switzer_Fr5.kt)	101101
45 (0x2d)	Switzerland/German (Switzer_Ge5.kt)	101110
46 (0x2e)	Great Britain (UK5.kt)	101111
47 (0x2f)	Korea (Korea5.kt)	101111
48 (0x30)	Taiwan (Taiwan5.kt)	110000
49 (0x31)	Japan (Japan5.kt)	110001
50 (0x32), see also 63 (0x3f)	Canada/French (Canada_Fr5.kt)	110010
51 0(x33)	Hungary (Hungary5.kt)	110011
52 (0x34	Poland (Poland5.kt)	110100
53 (0x35)	Czech (Czech5.kt)	110101

TABLE 3–15 Layouts for Type 4, 5, and 5c Keyboards *(Continued)*

DIP Switch	Keyboard (Keytable file)	Setting in Binary
54 (0x36)	Russia (`Russia5.kt`)	110110
55 (0x37)	Latvia (`Latvia5.kt`)	110111
56 (0x38) see also 62 (0x3e)	Turkey-Q5 (`TurkeyQ5.kt`)	111000
57 (0x39)	Greece (`Greece5.kt`)	111001
58 (0x3a)	Arabic (`Arabic5.kt`)	111011
59 (0x3b)	Lithuania (`Lithuania5.kt`)	111010
60 (0x3c)	Belgium (`Belgian5.kt`)	111100
62 (0x3e)	Turkey-F5 (`TurkeyF5.kt`)	111110
63 (0x3f)	Canada/French (`Canada_Fr5_TBITS5.kt`)	111111

Keytable file names with `4` are for a Type 4 keyboard. Keytable file names with `5` are for a Type 5 keyboard.

Changing the layout from one keyboard layout to another layout (Czech for example), requires the following steps:

1. Find out the correct DIP switch id (or layout id) either from the table or from the `/usr/openwin/share/etc/keytables/keytable.mp` file. The layout id value in the `keytable.mp` file is a decimal value.

   For Czech, the layout id is 53 in decimal (0x35 in hexadecimal).
2. Convert the layout id to binary, or use a proper “Setting in Binary” value from the column in the above table. For base conversion, calculator utilities such as `dtcalc`(1) may be used.

   The correct binary value for the Czech keyboard is 110101.
3. Become superuser. Shut down and power off the system.
4. Change the DIP switch settings at the back of the keyboard by using the binary value in step 2.

   The first DIP switch is on your left. Move the switch `up` for “1” and `down` for “0”.

   The Czech keyboard binary value 110101, corresponds to: up up down up down up.
5. Power on and boot the system for use.

Note – Unlike Type 4 keyboards, Type 5 and 5c keyboards have only five DIP switches. For the Type 5 and 5c keyboards, disregard the first binary digit. For the Czech Type 5c keyboard, for example, the correct DIP switch settings are "Up Down Up Down Up", using only the last five digits from 10101.

Changing Between Keyboards on Intel Systems

On Intel architecture systems, a keyboard is selected during the `kdmconfig`(1M) part of the installation. To change this at any time after installation, first exit your GUI desktop environment to the command-line mode. As superuser, type `kdmconfig` to run the program. Follow the instructions to get the desired keyboard layout.

Keyboard Layout Illustrations

The following figure shows the Arabic keyboard.

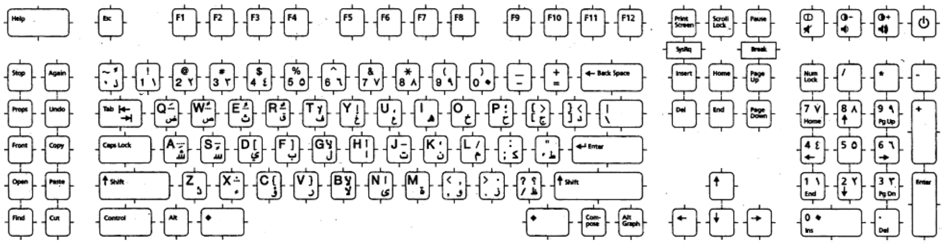


FIGURE 3–1 Arabic Keyboard

The following figure shows the Belgian keyboard.

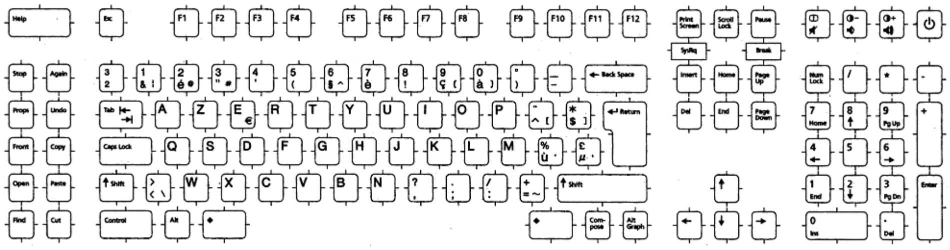


FIGURE 3–2 Belgian Keyboard

The following figure shows the Cyrillic keyboard.

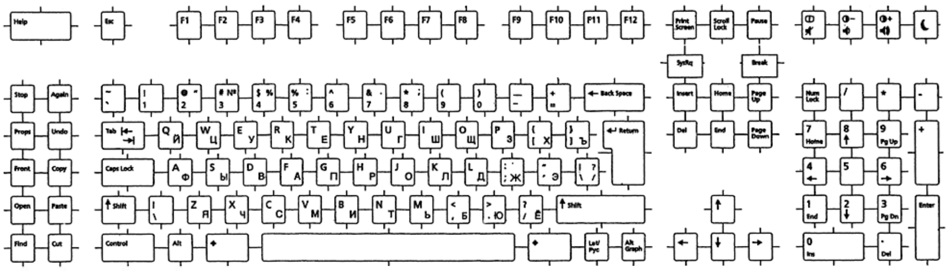

Help Esc F1 F2 F3 F4 F5 F6 F7 F8 F9 F10 F11 F12 Print Screen Scroll Lock Pause
SysRq Break
Stop Again Back Space Insert Home Page Up Num Lock / * -
Props Undo Tab Q Й W Ц E У R К T Е Y Н U Г I Ш O Щ P З { Х } Ъ Return Del End Page Down 7 Home 8 9 Pg Up +
Front Copy Caps Lock A Ф S Ы D В F А G П H Р J О K Л L Д Ж Э 4 5 6
Open Paste Shift Z Я X Ч C С V М B И N Т M Ь Б Ю Ё Shift 1 End 2 3 Pg Dn Enter
Find Cut Control Alt Lat/Рус Alt Graph 0 Ins Del

FIGURE 3–3 Cyrillic (Russian) Keyboard

The following figure shows the Danish keyboard.

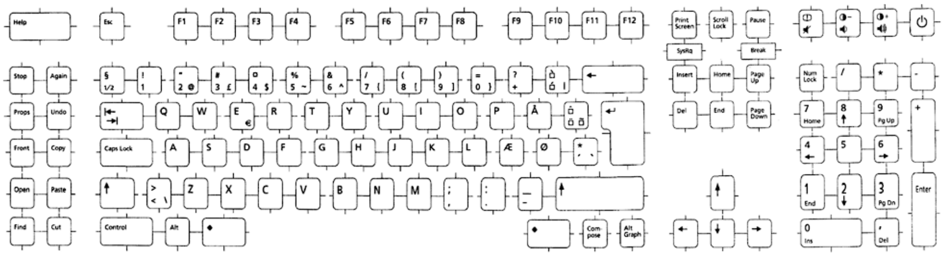

Help Esc F1 F2 F3 F4 F5 F6 F7 F8 F9 F10 F11 F12 Print Screen Scroll Lock Pause
SysRq Break
Stop Again Insert Home Page Up Num Lock / * -
Props Undo Q W E € R T Y U I O P Å Del End Page Down 7 Home 8 9 Pg Up +
Front Copy Caps Lock A S D F G H J K L Æ Ø 4 5 6
Open Paste Z X C V B N M 1 End 2 3 Pg Dn Enter
Find Cut Control Alt Com-pose Alt Graph 0 Ins Del

FIGURE 3–4 Danish Keyboard

The following figure shows the Finnish keyboard.

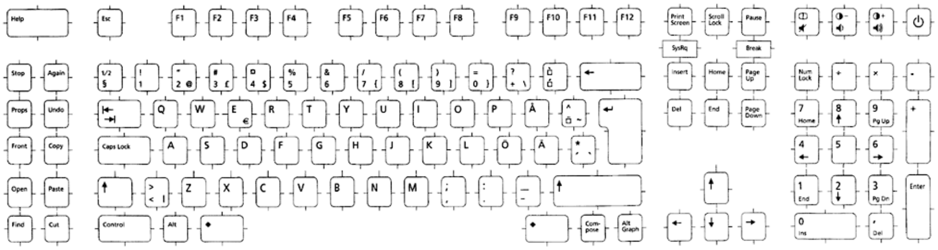

Help Esc F1 F2 F3 F4 F5 F6 F7 F8 F9 F10 F11 F12 Print Screen Scroll Lock Pause
SysRq Break
Stop Again Insert Home Page Up Num Lock + × -
Props Undo Q W E € R T Y U I O P Å Del End Page Down 7 Home 8 9 Pg Up +
Front Copy Caps Lock A S D F G H J K L Ö Ä 4 5 6
Open Paste Z X C V B N M 1 End 2 3 Pg Dn Enter
Find Cut Control Alt Com-pose Alt Graph 0 Ins Del

FIGURE 3–5 Finnish Keyboard

The following figure shows the French keyboard.

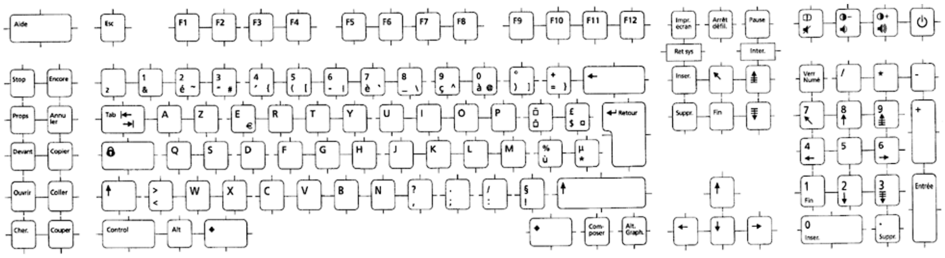


FIGURE 3–6 French Keyboard

The following figure shows the German keyboard.

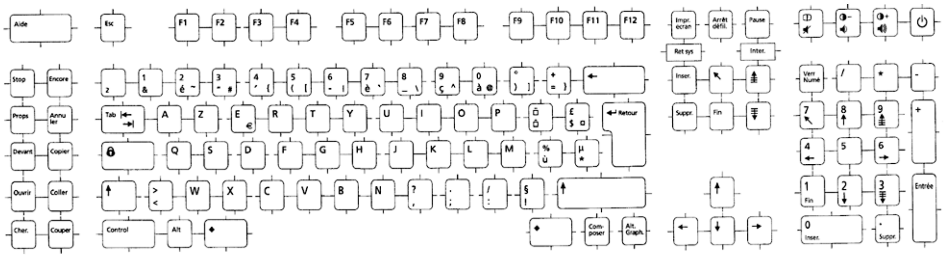


FIGURE 3–7 German Keyboard

The following figure shows the Italian keyboard.

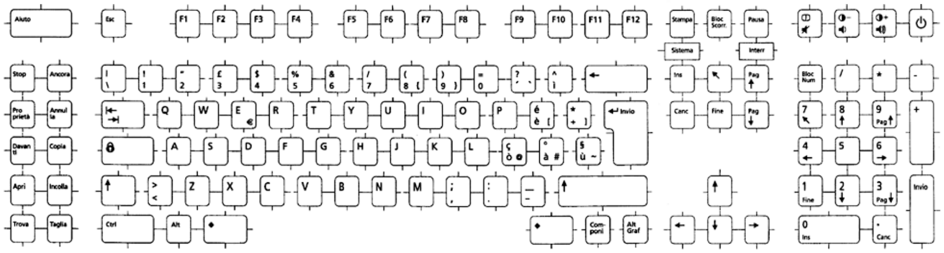


FIGURE 3–8 Italian Keyboard

The following figure shows the Japanese keyboard,

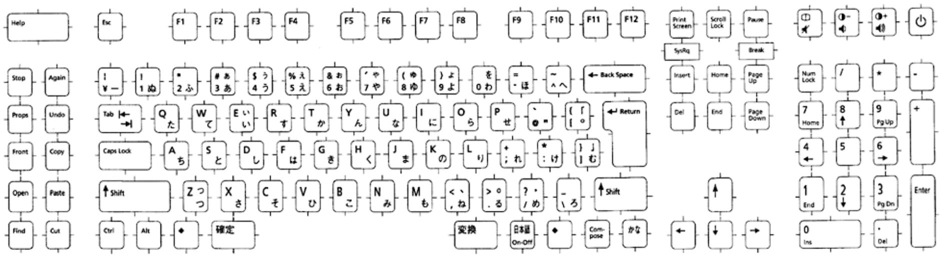


FIGURE 3–9 Japanese Keyboard

The following shows the Korean keyboard,

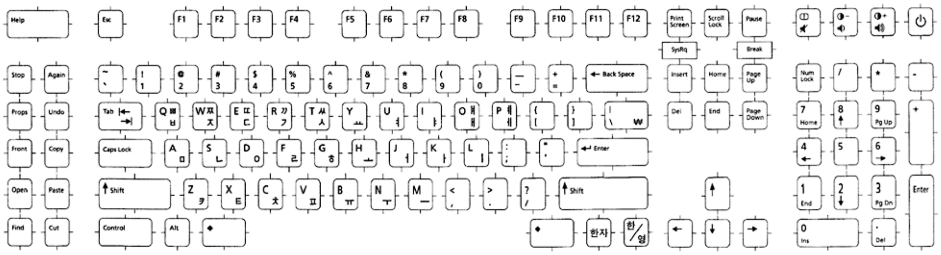


FIGURE 3–10 Korean Keyboard

The following shows the Netherlands (Dutch) keyboard,

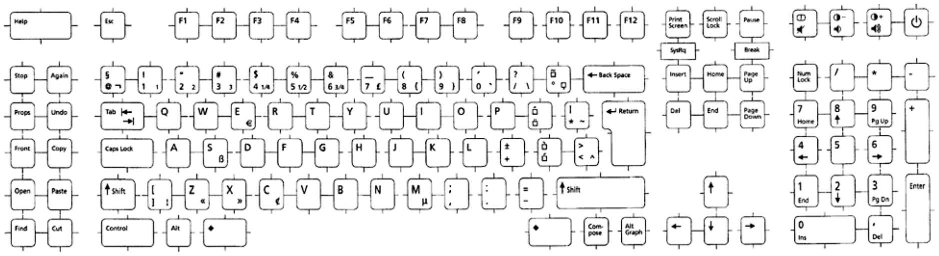


FIGURE 3–11 Netherlands (Dutch) Keyboard

The following figure shows the Norwegian keyboard.

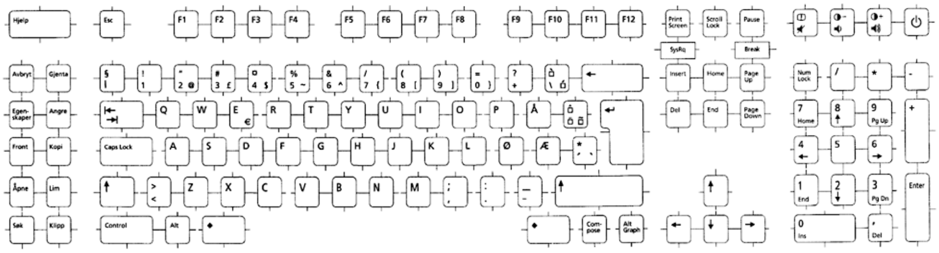


FIGURE 3–12 Norwegian Keyboard

The following figure shows the Portuguese keyboard.

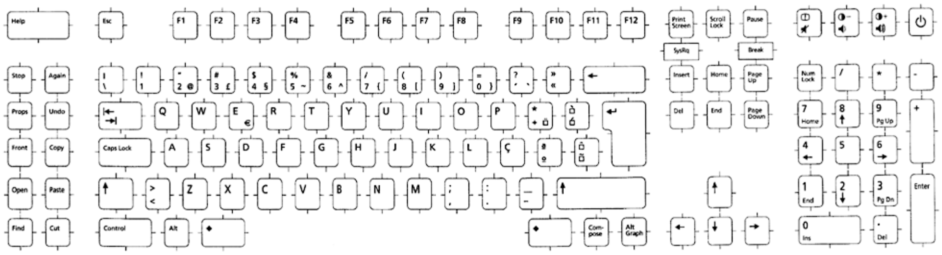


FIGURE 3–13 Portuguese Keyboard

The following figure shows the Spanish keyboard.

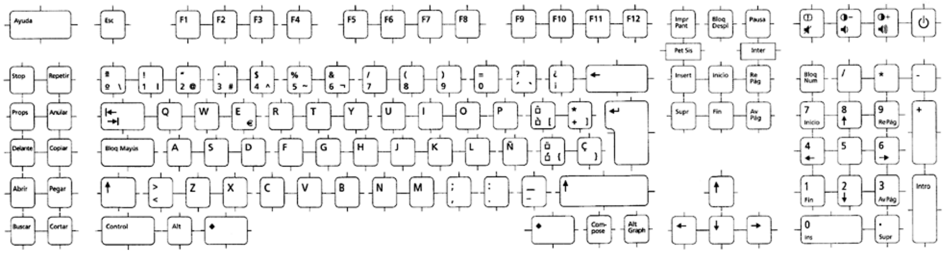


FIGURE 3–14 Spanish Keyboard

The following figure shows the Swedish keyboard.

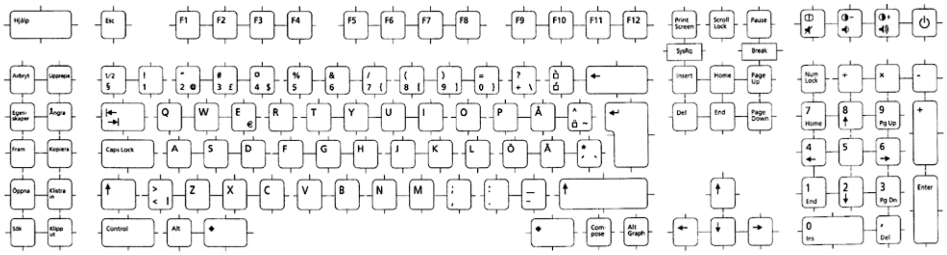


FIGURE 3–15 Swedish Keyboard

The following figure shows Swiss (French) keyboard.

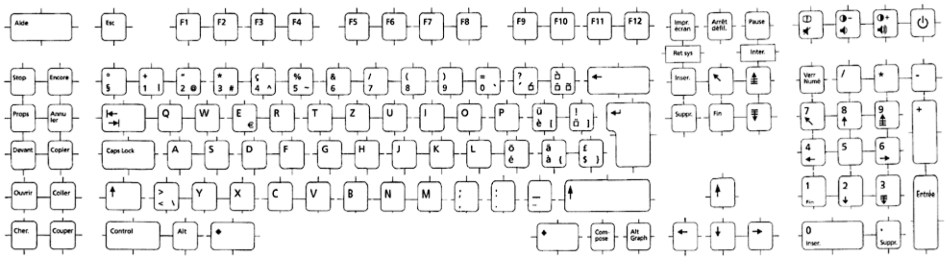


FIGURE 3–16 Swiss (French) Keyboard

The following figure shows the Swiss (German) keyboard.

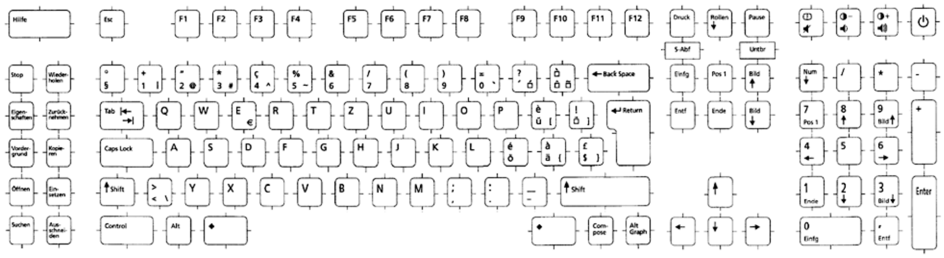


FIGURE 3–17 Swiss (German) Keyboard

The following figure shows the Traditional Chinese keyboard.

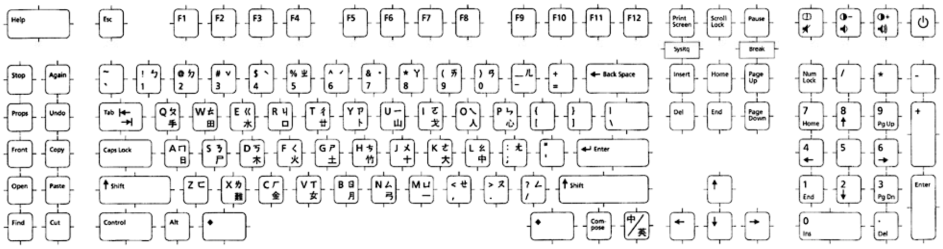


FIGURE 3–18 Traditional Chinese Keyboard

The following figure shows the Turkish F keyboard.

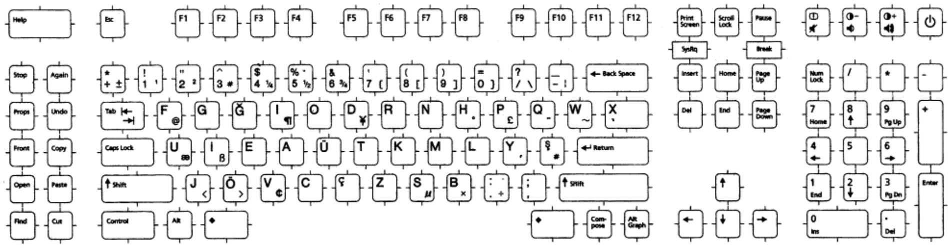


FIGURE 3–19 Turkish F Keyboard

The following figure shows the Turkish Q keyboard.

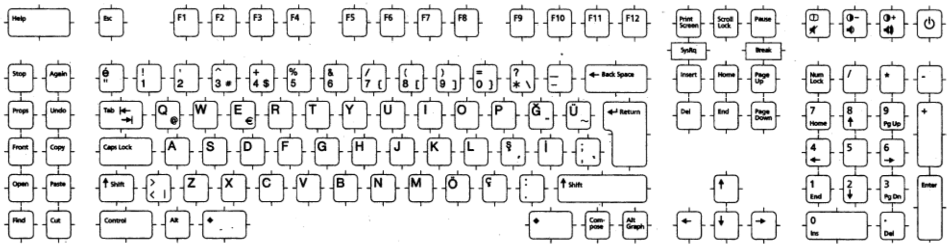


FIGURE 3–20 Turkish Q Keyboard

The following figure shows the United Kingdom keyboard.

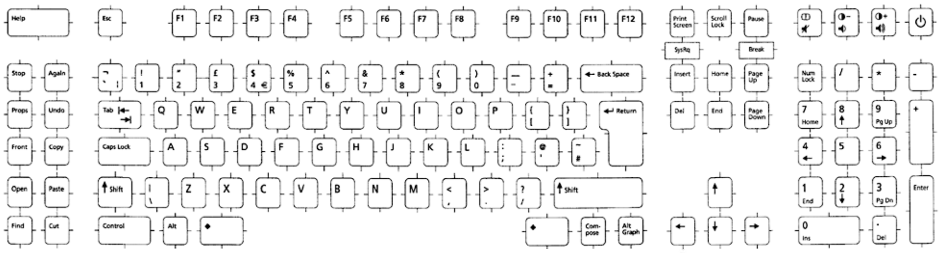


FIGURE 3–21 United Kingdom Keyboard

The following figure shows the United States keyboard.

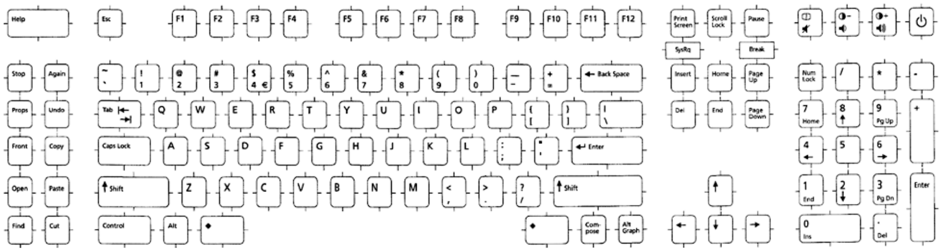


FIGURE 3–22 United States Keyboard

The following figure shows the U.S.A./UNIX keyboard.

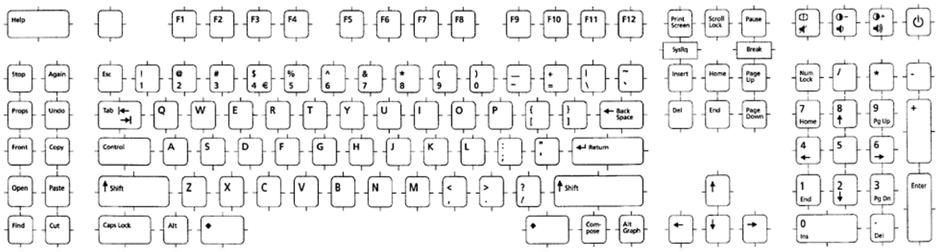


FIGURE 3–23 U.S.A./UNIX Keyboard

CHAPTER 4

Supported Asian Locales

The following sections describe the Asian supported locales:

- “Thai Localization” on page 80
- “Simplified Chinese Localization” on page 80
- “Traditional Chinese Localization” on page 83
- “Japanese Localization” on page 86
- “Korean Localization” on page 90

Asian Supported Locales

The following table provides the a summary of Asian supported locales.

TABLE 4–1 Summary of Asian Locales

Language	Locale Name	Description	Supported Character Set
Korean	`ko`	Korean (EUC)	KS X 1001
	`ko.UTF-8`	Korean (UTF-8)	KS X 1005–1
Simplified Chinese	`zh_CN.EUC`	Simplified Chinese (EUC)	GB 2312-1980
	`zh_CN.GBK`	Simplified Chinese (GBK)	GBK
	`zh_CN.GB18030`	Simplified Chinese (GB18030–2000)	GB18030–2000
	`zh_CN.UTF-8`	Simplified Chinese (UTF-8)	Unicode 3.1

TABLE 4–1 Summary of Asian Locales *(Continued)*

Language	Locale Name	Description	Supported Character Set
Traditional Chinese	`zh_TW.EUC`	Traditional Chinese (EUC)	CNS 11643 –1992
	`zh_TW.UTF-8`	Traditional Chinese (UTF-8)	Unicode 3.1
	`zh_TW.BIG5`	Traditional Chinese (BIG5)	BIG5
	`zh_HK.BIG5HK`	Traditional Chinese (BIG5+HKSCS)	BIG5+HKSCS
	`zh_HK.UTF—8`	Traditional Chinese (UTF-8)	Unicode 3.1
Japanese	`ja`	Japanese (EUC)	JIS[1]
	`ja_JP.eucJP`	Japanese (EUC)	JIS[2]
	`ja_JP.PCK`	Japanese (PCK)	Unicode3.1
	`ja_JP.UTF-8`	Japanese (UTF-8)	
Thai	`th_TH.TIS620`	Thai (TIS620.2533)	TIS620.2533
	`th_TH.UTF-8`	Thai (UTF-8)	Unicode 3.1
	`th_TH.ISO8859-11`	`Thai(ISO8859-11)`	`ISO8859-11`
Hindi	`hi_IN.UTF-8`	Hindi (UTF-8)	Unicode 3.1

[1] JIS X 0201-1976, JIS X 0208-1990 and JIS X 0212-1990

[2] JIS X 0201–1976 and JIS X 0208–1990

Input Method Auxiliary Window Support for Simplified and Traditional Chinese

This window provides a friendly and extensible input method management tool for all Chinese customer., A new input method auxiliary window supports the following new functions and utilities:

- Input method switching
- Chinese full-width/half-width character mode switching
- Chinese/English punctuation mode switching
- Input method properties setting
- Input method selection
- Lookup tables for GB2312/GBK/GB18030/CNS11643/Big5/HKSCS/Unicode character sets

- Virtual keyboard

For more detailed information, please see the *Simplified Chinese User's Guide* and the *Traditional Chinese User's Guide*.

The input method auxiliary windows supports all UTF-8 locales and the following Chinese locales:

- `zh/zh_CN.EUC`
- `zh.GBK/zh_CN.GBK`
- `zh.UTF-8/zh_CN.UTF-8`
- `zh_TW/zh_TW.EUC`
- `zh_TW.BIG5`
- `zh_TW.UTF-8`
- `zh_HK.BIG5HK`
- `zh_HK.UTF-8`
- `zh_CN.GB18030`

Two kinds of input methods are supported:

- Methods based on a code table such as CangJie
- Methods developed by a vendor (such as NewPinYin or NeiMa)

The interface model for auxiliary window support is shown in the following figure.

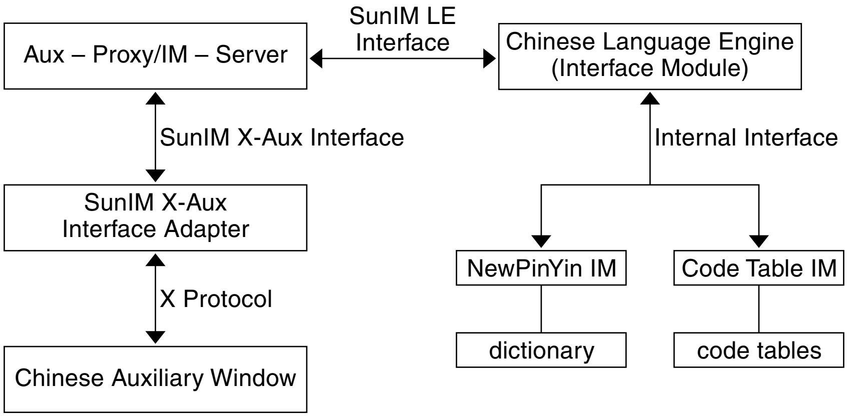


FIGURE 4–1 Interface Model for Auxiliary Window Support

Thai Localization

According to the Thai IT Standard, there are three input levels for the Thai character sequence checking method:

1. Passthrough level, no input check.
2. Basic input check level.
3. Strict input check level.

In the Solaris 9 release, the default input check level is still passthrough level. This means no sequence check, which is the same level as in previous Solaris releases. You can use the F2 Function key to switch between the three levels:

```
passthrough -> basic -> strict -> passthrough
```

Thai Input Method Auxiliary Window

A Thai input method auxiliary window supports the following new functions and utilities:

- Switching between the three input levels (passthrough/basic/strict)
- Thai virtual keyboard

Click the input level button on the auxiliary bar to select a specific Thai input level and input check level. Click the keyboard button to display the Thai virtual keyboard. Use the Thai virtual keyboard to input Thai characters.

Simplified Chinese Localization

Simplified Chinese in the Solaris 9 environment provides four locales: `zh`, `zh.GBK`, `zh_CN.GB18030`, and `zh.UTF-8`. In the `zh` locale, the EUC scheme is used to encode GB2312–80. The `zh.GBK` locale supports the GBK codeset, which is a superset of GB2312–80.

The new GB18030–2000 codeset is now supported in the `zh_CN.GB18030` locale.

Simplified Chinese is used mostly in the People's Republic of China (PRC) and in Singapore.

The following input methods are supported for the `zh` locale:

- New QuanPin

- New ShuangPin
- QuanPin
- ShuangPin
- GB2312 NeiMa
- English-Chinese
- Optional codetable input methods
- Input method auxiliary window support for Simplified Chinese

The following input methods are supported for the `zh_CN.GB18030` locale:

- New QuanPin
- New ShuangPin
- QuanPin
- ShuangPin
- GB18030–2000 NeiMa
- English-Chinese
- Optional codetable input methods
- Input method auxiliary window support for Simplified Chinese

The following input methods are supported for both the `zh.GBK` and the `zh.UTF-8` locales:

- New QuanPin
- New ShuangPin
- QuanPin
- ShuangPin
- GBK NeiMa
- English-Chinese
- Optional codetable input methods
- Input method auxiliary window support for Simplified Chinese

The auxiliary window for Chinese input methods provides a friendly and extensible input method user interface for all Chinese locales. See "Input Method Auxiliary Window Support for Simplified and Traditional Chinese" on page 78.

For more detailed information about auxiliary windows for Chinese input methods, please see *Simplified Chinese User's Guide* and *Traditional Chinese User's Guide*.

The following table shows the TrueType fonts for the `zh` locale.

TABLE 4–2 TrueType Fonts for the `zh_CN.EUC` Locale

Full Family Name	Subfamily	Format	Vendor	Encoding
Fangsong	R	TrueType	Hanyi	GB2312.1980
Hei	R	TrueType	Monotype	GB2312.1980
Kai	R	TrueType	Monotype	GB2312.1980

TABLE 4–2 TrueType Fonts for the zh_CN.EUC Locale *(Continued)*

Full Family Name	Subfamily	Format	Vendor	Encoding
Song	R	TrueType	Monotype	GB2312.1980

The following table shows the bitmap fonts for the zh locale.

TABLE 4–3 Bitmap Fonts for the zh_CN.EUC Locale

Full Family Name	Subfamily	Format	Encoding
Song	B	PCF (14,16)	GB2312.1980
Song	R	PCF (12,14,16,20,24)	GB2312.1980

The following table shows the TrueType fonts for the zh_CN.GBK locale.

TABLE 4–4 TrueType Fonts for the zh_CN.GBK Locale

Full Family Name	Subfamily	Format	Vendor	Encoding
Fangsong	R	TrueType	Zhongyi	GBK
Hei	R	TrueType	Zhongyi	GBK
Kai	R	TrueType	Zhongyi	GBK
Song	R	TrueType	Zhongyi	GBK

The following table shows the bitmap fonts for the zh_CN.GBK locale.

TABLE 4–5 Bitmap Fonts for the zh_CN.GBK Locale

Full Family Name	Subfamily	Format	Encoding
Song	R	PCF (12,14,16,20,24)	GBK

The following table shows the TrueType fonts for the zh_CN.GB18030 locale.

TABLE 4–6 TrueType Fonts for the zh_CN.GB18030 Locale

Family Name	Subfamily	Format	Vendor	Encoding
FangSong	R	TrueType	FangZheng	GB18030–2000
Song	R	TrueType	FangZheng	GB18030–2000
Hei	R	TrueType	FangZheng	GB18030–2000
Kai	R	TrueType	FangZheng	GB18030–2000

The following table shows bitmap fonts for the zh_CN.GB18030 locale.

TABLE 4–7 Bitmap Fonts for the `zh_CN.GB18030` Locale

Family Name	Subfamily	Format	Encoding
Song	R	PCF(12,14,16,20,24)	GB18030–2000

The following table shows the supported codeset conversions for Simplified Chinese.

TABLE 4–8 Codeset Conversions for Simplified Chinese

Code	Symbol	Target Code	Symbol
`GB2312-80`	`zh_CN.euc`	`ISO 2022-7`	`zh_CN.iso2022-7`
`GB2312-80`	`zh_CN.euc`	`ISO 2022-CN`	`zh_CN.iso2022-CN`
`GB2312-80`	`zh_CN.euc`	`UTF-8`	`UTF-8`
`GB18030`	`zh_CN.gb18030`	`UTF-8`	`UTF-8`
`HZ-GB-2312`	`HZ-GB-2312`	`GB2312-80`	`zh_CN.euc`
`HZ-GB-2312`	`HZ-GB-2312`	`GBK`	`zh_CN.gbk`
`HZ-GB-2312`	`HZ-GB-2312`	`UTF-8`	`UTF-8`
`ISO2022-7`	`zh_CN.iso2022-7`	`GB2312-80`	`zh_CN.euc`
`ISO2022-CN`	`zh_CN.iso2022-CN`	`GB2312-80`	`zh_CN.euc`
`ISO2022-CN`	`zh_CN.iso2022-CN`	`UTF-8`	`UTF-8`
`ISO2022-CN`	`zh_CN.iso2022-CN`	`zh.GBK`	`zh_CN.gbk`
`UTF-8`	`UTF-8`	`GB2312-80`	`zh_CN.euc`
`UTF-8`	`UTF-8`	`GB18030`	`zh_CN.gb18030`
`UTF-8`	`UTF-8`	`ISO2022-CN`	`zh_CN.iso2022-CN`
`UTF-8`	`UTF-8`	`zh.GBK`	`zh_CN.gbk`
`zh.GBK`	`zh_CN.gbk`	`ISO2022-CN`	`zh_CN.iso2022-CN`
`zh.GBK`	`zh_CN.gbk`	`UTF-8`	`UTF-8`

Traditional Chinese Localization

Traditional Chinese in the Solaris 9 product provides five locales:

- `zh_TW.EUC` where the EUC scheme is used to encode the CNS11643.1992 codeset
- `zh_TW.BIG5` where the locale supports Big5

- zh_TW.UTF-8 where the locale supports Unicode 3.1
- zh_HK.BIG5HK where the locale supports Big5-HKSCS
- zh_HK.UTF-8 where the locale supports Unicode 3.1

Traditional Chinese is used mostly in Taiwan and Hong Kong, China. The following input methods are supported in the zh_TW.EUC, zh_TW.BIG5, and zh_TW.UTF-8 locales:

- New ChuYin
- ChuYin
- TsangChieh
- Array
- BoShiaMy
- DaYi
- JianYi
- Cantonese
- EUC NeiMa
- Big5 NeiMa
- English-Chinese
- Optional codetable input methods (such as PinYin)
- Input method auxiliary window support for Traditional Chinese

The following input methods are supported in the zh_HK.BIG5HK and zh_HK.UTF-8 locales.

- ChuYin
- TsangChieh
- Array
- BoShiaMy
- DaYi
- JianYi
- Cantonese
- BIG5+HKSCS NeiMa
- English-Chinese
- Optional codetable input methods (such as PinYin)
- Input method auxiliary window support for Traditional Chinese
- New ChuYin

The following table shows the Traditional Chinese TrueType Fonts for the zh_TW locales.

TABLE 4–9 Traditional Chinese TrueType Fonts for the zh_TW Locales

Full Family Name	Subfamily	Format	Vendor	Encoding
Hei	R	TrueType	Hanyi	CNS11643.1992
Kai	R	TrueType	Hanyi	CNS11643.1992

TABLE 4–9 Traditional Chinese TrueType Fonts for the zh_TW Locales *(Continued)*

Full Family Name	Subfamily	Format	Vendor	Encoding
Ming	R	TrueType	Hanyi	CNS11643.1992

The following table shows the Traditional Chinese bitmap fonts for the zh_TW locales.

TABLE 4–10 Traditional Chinese Bitmap Fonts for the zh_TW Locales

Full Family Name	Subfamily	Format	Encoding
Ming	R	PCF (12,14,16,20,24)	CNS11643.1992

The following table shows the TrueType fonts for the zh_HK.BIG5HK locale.

TABLE 4–11 TrueType Fonts for the zh_HK.BIG5HK Locale

Family Name	Subfamily	Format	Vendor	Encoding
Ming	R	TrueType	FangZheng	Big5–HKSCS
Hei	R	TrueType	FangZheng	Big5–HKSCS
Kai	R	TrueType	FangZheng	Big5–HKSCS

The following table shows the bitmap fonts for the zh_HK.BIG5HK locale.

TABLE 4–12 Bitmap Fonts for the zh_HK.BIG5HK Locale

Family Name	Subfamily	Format	Encoding
Ming	R	PCF(12,14,16,20,24)	Big5–HKSCS

The following table shows the supported codeset conversions for Traditional Chinese.

TABLE 4–13 Codeset Conversions for Traditional Chinese

Code	Symbol	Target Code	Symbol
BIG5	zh_TW-big5	CNS 11643	zh_TW-euc
BIG5	zh_TW-big5	ISO2022-CN	zh_TW-iso2022-CN-EXT
BIG5	zh_TW-big5	UTF-8	UTF-8
BIG5+HKSCS	zh_HK.big5hk	UTF-8	UTF-8
CNS 11643	zh_TW-euc	BIG5	zh_TW-big5
CNS 11643	zh_TW-euc	UTF-8	UTF-8

TABLE 4–13 Codeset Conversions for Traditional Chinese *(Continued)*

Code	Symbol	Target Code	Symbol
CNS 11643	zh_TW-euc	ISO2022-7	zh_TW-iso2022-7
CNS 11643	zh_TW-euc	ISO2022-CN-EXT	zh_TW-iso2022-CN-EXT
CNS 11643	zh_TW-euc	UTF-8	UTF-8
ISO2022-7	zh_TW-iso2022-7	CNS 11643	zh_TW-euc
ISO2022-7	zh_TW-iso2022-7	UTF-8	UTF-8
ISO2022-CN	zh_TW-iso2022-CN-EXT	BIG5	zh_TW-big5
ISO2022-CN-EXT	zh_TW-iso2022-CN-EXT	CNS 11643	zh_TW-euc
UTF-8	UTF-8	BIG5	zh_TW-big5
UTF-8	UTF-8	BIG5+HKSCS	zh_HK.big5hk
UTF-8	UTF-8	CNS 11643	zh_TW-euc
UTF-8	UTF-8	ISO 2022-7	zh_TW-iso2022-7

Japanese Localization

This section describes Japanese locale-specific information.

Japanese Locales

Four Japanese locales, which support different character encodings, are available in the Solaris 9 environment. The ja and ja_JP.eucJP locales are based on the Japanese EUC. The ja_JP.eucJP locale conforms to the UI-OSF Japanese Environment Implementation Agreement Version 1.1 and the ja locale conforms to the traditional specification from earlier Solaris releases. The ja_JP.PCK locale is based on PC-Kanji code (known as Shift_JIS) and the ja_JP.UTF-8 is based on UTF-8.

See the eucJP(5) man page for a map between Japanese EUC and the character set. See the PCK(5) man page for the map between PC-Kanji code and the character set.

Japanese Character Sets

The supported Japanese character sets are:

- JIS X 0201–1976

- JIS X 0208–1990
- JIS X 0212–1990
- JIS X 0213–2000 (only characters defined in Unicode 3.1)

JIS X 0212–1990 is not supported in the `ja_JP.PCK` locale. JIS X 0213–2000 is supported in the `ja_JP.UTF-8` locale only. Not all characters defined in the JIS X 0213–2000 are available. Only those characters defined in the Unicode 3.1 character set are available.

Vendor-defined characters (VDC) and user-defined characters (UDC) are also supported. VDCs occupy unused (reserved) code points of JIS X 0208–1990 or JIS X 0212–1990. UDCs occupy the same code points as VDCs, except those code points allocated for VDCs.

Japanese Fonts

Three Japanese font formats are supported: bitmap, TrueType and Type1. The Japanese Type1 font includes only JIS X 0212 for printing. The Type1 font is also used by UDC.

Japanese bitmap fonts are described in the following table.

TABLE 4–14 Japanese Bitmap Fonts

Full Family Name	Subfamily	Format	Vendor	Encoding
`sun gothic`	R, B	PCF(12,14,16,20,24)		JIS X 0208–1983, JIS X 0201–1976
`sun minchou`	R	PCF(12,14,16,20,24)		JIS X 0208–1983, JIS X 0201–1976
`ricoh hg gothic b`	R	PCF(10,12,14,16,18,20,24)	RICOH	JIS X 0208–1983, JIS X 0201–1976
`ricoh hg mincho l`	R	PCF(10,12,14,16,18,20,24)	RICOH	JIS X 0208–1983, JIS X 0201–1976
`ricoh gothic`	R	PCF(10,12,14,16,18,20,24)	RICOH	JIS X 0212–1990, JIS X 0213–2000
`ricoh mincho`	R	PCF(10,12,14,16,18,20,24)	RICOH	JIS X 0212–1990, JIS X 0213–2000
`ricoh heiseimin`	R	PCF(12,14,16,18,20,24)	RICOH	JIS X 0212–1990

Japanese TrueType fonts are described in the following table.

TABLE 4–15 Japanese TrueType Fonts

Full Family Name	Subfamily	Format	Vendor	Encoding
`ricoh hg gothic b`	Fixed	TrueType	RICOH	JIS X 0208–1983, JIS X 0201–1976
`ricoh hg mincho l`	Fixed	TrueType	RICOH	JIS X 0208–.1983, JIS X 0201–1976
`ricoh gothic`	Fixed, Proportional	TrueType	RICOH	JIS X 0201–176, JIS X 0208–1983, JIS X 0213–2000
`ricoh mincho`	Fixed, Proportional	TrueType	RICOH	JIS X 0201–1976, JIS X 0208–1983, JIS X 0213–2000
`ricoh heiseimin`	Fixed	TrueType	RICOH	JIS X 0212–1990

Japanese Input Systems

ATOK12 is the default Japanese input system in the Solaris 9 environment. It is available for all Japanese locales and all UTF-8 locales when the Japanese locale is installed. The Wnn6 Japanese input system is also available for all Japanese locales. You can switch input systems from the Workspace menu. For Japanese Solaris 1.x BCP support, the kkcv Japanese input system is available.

The following example describes how you would input Japanese input using ATOK12.

1. Turn conversion mode on by pressing `Control + spacebar`.
2. Type Kana character text (for example kanjihenkan).
3. Convert to kanji character by pressing the spacebar.

   To display other kanji characters, press the space bar to display the conversion candidate table. Type the number you want to select.
4. To commit the entire text to kanji character text, press return.

   Press the down arrow key to commit only selected characters.
5. Turn conversion mode off by pressing `Control + spacebar`.

Terminal Setting for Japanese Terminals

Using Japanese locales on a character-based terminal (TTY) requires that you use terminal settings to make line editing work correctly.

- If your terminal is a CDE Terminal emulator (`dtterm`), use `stty`(1) with argument `-defeucw` in any Japanese locale (`ja`, `ja_JP.PCK`, or `ja_JP.UTF-8`). An example in locale `ja` is:

  ```
  % setenv LANG ja
  % stty defeucw
  ```

- If your terminal is not a CDE Terminal emulator, but the codeset of your terminal is the same as that of the current locale, use stty(1) with argument -defeucw.
- If your terminal's codeset doesn't match that of the current locale, use setterm(1) to enable code conversion. For example, if you are in locale ja but your terminal requires PCK (Shift_JIS code), specify:

  ```
  % setenv LANG ja
  % setterm -x PCK
  ```
  See the setterm(3CURSES) man page for details.

Japanese iconv Module

Several Japanese codeset conversions are supported with iconv(1) and iconv(3). See the iconv_ja(5) man page for details.

User-Defined Character Support

The user-defined character utility sdtudctool handles both outline (Type1) and bitmap (PCF) fonts. Some utilities are also available to migrate the UDC fonts that were created by old utilities in prior releases, such as fontedit, type3creator, and fontmanager.

Differences Between Partial and Full Locales

The following components are only available in the Japanese full locale environment with the Language CD:

- Translated message, help, and man pages
- Wnn6 Japanese input system
- Japanese Solaris 1.x BCP support
- Mincho (min*) typeface bitmap fonts
- JIS X 0212 Type1 fonts for printing
- Japanese-specific dumb printer and jpostprint support
- Legacy Japanese utilities such as kanji(1)

Korean Localization

In December 1995, the Korean government announced a standard Korean codeset, KS X 1005–1, which is based on ISO 10646-1/Unicode 2.0.

The ISO-10646 character set uses two universal character sets:

- UCS-2. Universal Character Set (two-byte form)
- UCS-4. Universal Character Set (four-byte form).

The ISO-10646 character set cannot be used directly on IBM PC-based operating systems. For example, the kernel and many other modules of the Solaris operating environment interpret certain byte values as control instructions, such as a null character (0x00) in any string. The ISO-10646 character set can be encoded with any bit combinations in the first or subsequent bytes. The ISO-10646 characters cannot be freely transmitted through the Solaris system with these limitations.

In order to establish a migration path, the ISO-10646 character set defines the UCS Transformation Format (UTF), which recodes the ISO-10646 characters without using C0 controls (0x00..0x1F), C1 controls (0x80..0x9F), space (0x20), and DEL (0x7F).

The `ko.UTF-8` is a Solaris locale to support KS X 1005–1, the Korean standard codeset. This locale supports all characters in the previous KS X 1005 and all 11,172 Korean characters. Korean UTF-8 supports the Korean language-related ISO-10646 characters and fonts. Because ISO-10646 covers all characters in the world, all of the various input methods and fonts are supplied so that you can input and output any character in any language. Before Universal UTF/UCS becomes available, Korean UTF-8 supports the ISO-10646 code subset that is related to Korean characters as well as all other characters in the previous Korean standard codeset, and extended ASCII.

In the `ko` locale, the EUC scheme is used to encode KS X 1001. The `ko.UTF-8` locale supports the KS X 1005–1/Unicode 2.0 codeset, which is a superset of KS X 1001. These two locales look the same to the end user, but the internal character encoding is different. The Korean Solaris product supports the following input methods:

For the `ko` locale:

- Hangul 2–BeolSik (one set of consonants and one set of vowels)
- Hangul-Hanja conversion
- Special character
- Hexadecimal code

For the `ko.UTF-8` locale:

- Hangul 2–BeolSik (one set of consonants and one set of vowels)
- Hangul-Hanja conversion
- Special character
- Hexadecimal code

The following table shows the Korean bitmap fonts for the `ko` locale.

TABLE 4–16 Solaris 9 Korean Bitmap Fonts for the `ko` Locale

Full Family Name	Subfamily	Format	Encoding
Gothic	R/B	PCF (12,14,16,18,20,24)	KS X 1001
Graphic	R/B	PCF (12,14,16,18,20,24)	KS X 1001
Haeso	R/B	PCF (12,14,16,18,20,24)	KS X 1001
Kodig	R/B	PCF (12,14,16,18,20,24)	KS X 1001
Myeongijo	R/B	PCF (12,14,16,18,20,24)	KS X 1001
Pilki	R/B	PCF (12,14,16,18,20,24)	KS X 1001
Round gothic	R/B	PCF (12,14,16,18,20,24)	KS X 1001

The following table shows the Korean bitmap fonts for the `ko.UTF-8` locale.

TABLE 4–17 Solaris 9 Korean Bitmap Fonts for the `ko.UTF-8` Locale

Full Family Name	Subfamily	Format	Encoding
Gothic	R/B	PCF (12,14,16,18,20,24)	`KS X 1001 (Johap)`
Graphic	R/B	PCF (12,14,16,18,20,24)	`KS X 1001 (Johap)`
Haeso	R/B	PCF (12,14,16,18,20,24)	`KS X 1001 (Johap)`
Kodig	R/B	PCF (12,14,16,18,20,24)	`KS X 1001 (Johap)`
Myeongijo	R/B	PCF (12,14,16,18,20,24)	`KS X 1001 (Johap)`
Pilki	R/B	PCF (12,14,16,18,20,24)	`KS X 1001 (Johap)`

The following table shows the Korean TrueType Fonts for the `ko/ko.UTF-8` locales.

TABLE 4–18 Solaris 9 Korean TrueType Fonts for the `ko/ko.UTF-8` Locales

Full Family Name	Subfamily	Format	Vendor	Encoding
Kodig/Gothic	R	TrueType	Hanyang	Unicode
Myeongijo	R	TrueType	Hanyang	Unicode
Haeso	R	TrueType	Hanyang	Unicode
Round gothic	R	TrueType	Hanyang	Unicode

The following table shows the Korean `iconv`.

TABLE 4–19 Korean `iconv`

Code	Symbol	Target Code	Symbol
IBM CP933	cp933	UTF-8 (Unicode 2.0)	ko_KR-UTF-8
ISO646	646	KS X 1001	5601
ISO2022-KR	iso2022-7	KS X 1001	ko_KR-euc
ISO2022-KR	iso2022-7	UTF-8 (Unicode 2.0)	ko_KR-UTF-8
KS X 1001	5601	UTF-8	UTF-8
KS X 1001	EUC-KR	UTF-8	UTF-8
KS X 1001	KSC5601	UTF-8	UTF-8
KS X 1001	ko_KR-euc	UTF-8 (Unicode 2.0)	ko_KR-UTF-8
KS X 1001	ko_KR-euc	ISO2022-KR	ko_KR-iso2022-7
KS X 1001	ko_KR-euc	KS X 1001	ko_KR-johap
KS X 1001	ko_KR-euc	KS X 1001	ko_KR-johap92
KS X 1001	ko_KR-euc	KS X 1001	ko_KR-nbyte
KS X 1001	ko-KR-nbyte	KS X 1001	ko_KR-euc
KS X 1001	ko-KR-johap	UTF-8 (Unicode 2.0)	ko_KR-UTF-8
KS X 1001	ko-KR-johap	KS X 1001	ko_KR-euc
KS X 1001	ko-KR-johap92	UTF-8 (Unicode 2.0)	ko_KR-UTF-8
KS X 1001	ko-KR-johap92	KS X 1001	ko_KR-euc
UTF-8	UTF-8	KS X 1001	5601
UTF-8	UTF-8	KS X 1001	EUC-KR
UTF-8	UTF-8	KS X 1001	KSC5601
UTF-8	ko-KR-UTF-8	IBM CP 933	cp 933
UTF-8	ko-KR-UTF-8	KS X 1001	ko_KR-euc
UTF-8	ko-KR-UTF-8	ISO2022-KR	ko_KR-iso2022-7
UTF-8	ko-KR-UTF-8	KS X 1001	ko_KR-johap
UTF-8	ko-KR-UTF-8	KS X 1001	ko_KR-johap92

CHAPTER **5**

Overview of UTF-8 Locale Support

This section describes the following

- “Unicode Overview” on page 93
- “Unicode Locale: en_US.UTF-8 Support Overview” on page 94
- “Desktop Input Methods ” on page 96
- “System Environment” on page 115
- “Code Conversions” on page 119
- “DtMail” on page 120
- “Programming Environment” on page 122

Unicode Overview

The Unicode Standard is the universal character encoding standard used for representation of text for computer processing. It is fully compatible with the international standards ISO/IEC 10646-1:2000 and ISO/IEC 10646–2:2001, and contains all the same characters and encoding points as ISO/IEC 10646. The Unicode Standard provides additional information about the characters and their use. Any implementation that conforms to Unicode also conforms to ISO/IEC 10646.

The Unicode Standard provides a consistent way of encoding multilingual plain text and facilitates exchanging international text files. Computer users who deal with multilingual text, business people, linguists, researchers, scientists, and others find that the Unicode Standard greatly simplifies their work. Mathematicians and technicians, who regularly use mathematical symbols and other technical characters, also find the Unicode Standard valuable.

The maximum possible number of code points Unicode can support is 1,114,112 through seventeen 16-bit planes. Each plane can support 65,536 different code points.

Among the more than one million code points that Unicode can support, version 3.1 currently defines 94,140 characters at plane 0, 1, 2, and 14. Planes 15 and 16 are for private use, also known as user-defined characters. Planes 15 and 16 together can support total 131,068 user-defined characters.

Unicode can be encoded using any of the following character encoding schemes:

- UTF-8
- UTF-16
- UTF-32

UTF-8 is a variable-length encoding form of Unicode that preserves ASCII character code values transparently. This form is used as file code in Solaris Unicode locales.

UTF-16 is a 16-bit encoding form of Unicode. In UTF-16, characters up to 65,535 are encoded as single 16-bit values. Characters mapped above 65,535 to 1,114,111 are encoded as pairs of 16-bit values (surrogates).

UTF-32 is a fixed-length, 21-bit encoding form of Unicode usually represented in a 32-bit container or data type. This form is used as the process code (wide-character code) in Solaris Unicode locales.

For more details on the Unicode Standard and ISO/IEC 10646 and their various representative forms, refer to:

- *The Unicode Standard, Version 3.0*, *The Unicode Standard Annex #19: UFT-32*, and *The Unicode Standard Annex #27: Version 3.1* from The Unicode Consortium
- ISO/IEC 10646-1:2000, Information Technology-Universal Multiple-Octet Character Set (UCS) - Part 1: Architecture and Basic Multilingual Plane
- ISO/IEC 10646-2: Information Technology-Universal Multiple-Octet Character Set (UCS) - Part 2: Secondary Multilingual Plane for Scripts and Symbols, Supplementary Plane for CJK Ideographs, Special Purpose Plane
- The Unicode Consortium web site at http://www.unicode.org/.

Unicode Locale: `en_US.UTF-8` Support Overview

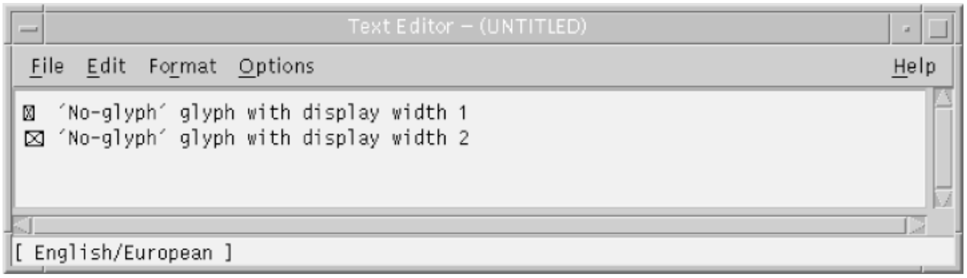
The Unicode/UTF-8 locales support Unicode 3.1. The `en_US.UTF-8` locale provides multiscript processing support by using `UTF-8` as its codeset. This locale handles processing of input and output text in multiple scripts, and was the first locale with this capability in the Solaris operating environment. The capabilities of other UTF-8 locales are similar to those of `en_us.UTF-8`; the discussion of `en_US.UTF-8` that follows applies equally to these locales.

Note – UTF-8 is a file-system safe Universal Character Set Transformation Format of Unicode / ISO/IEC 10646-1 formulated by X/Open-Uniforum Joint Internationalization Working Group (XoJIG) in 1992 and approved by ISO and IEC, as Amendment 2 to ISO/IEC 10646-1:1993 in 1996. This standard has been adopted by the Unicode Consortium, the International Standards Organization, and the International Electrotechnical Commission as a part of Unicode 2.0 and ISO/IEC 10646-1.

Unicode locales in Solaris support the processing of every code point value that is defined in Unicode 3.1 and ISO/IEC 10646-1 and 10646-2. Supported scripts include not only pan-European scripts and Asian scripts but also complex text layout scripts such as Arabic, Hebrew, Hindi, and Thai. Due to limited font resources, the Solaris 9 software includes only character glyphs from the following character sets:

- ISO 8859-1 (most Western European languages, such as English, French, Spanish, and German)
- ISO 8859-2 (most Central European languages, such as Czech, Polish, and Hungarian)
- ISO 8859-4 (Scandinavian and Baltic languages)
- ISO 8859-5 (Russian)
- ISO 8859-6 (Arabic, including many more presentation form character glyphs)
- ISO 8859–7 (Greek)
- ISO 8859–8 (Hebrew)
- ISO 8859-9 (Turkish)
- TIS 620.2533 (Thai, including many more presentation form character glyphs)
- ISO 8859–15 (most Western European languages with euro sign)
- GB 2312–1980 (Simplified Chinese)
- JIS X 0201–1976, JIS X 0208–1990 (Japanese)
- KSC 5601–1992 Annex 3 (Korean)
- GB 18030 (Simplified Chinese)
- HKSCS (Traditional Chinese, Hong Kong)
- Big5 (Traditional Chinese, Taiwan)
- IS 13194.1991, also known as ISCII (Hindi, including many more presentation-form character glyphs)

If you try to view characters for which the `en_US.UTF-8` locale does not have corresponding glyphs, the locale displays a "no-glyph" glyph instead, as shown in the following illustration:



```
▯ 'No-glyph' glyph with display width 1
☒ 'No-glyph' glyph with display width 2
```

The locale is selectable at installation time and may be designated as the system default locale.

The same level of `en_US.UTF-8` locale support is provided for both 64-bit and 32-bit Solaris systems.

Note – Motif and CDE desktop applications and libraries support the `en_US.UTF-8` locale. However, XView™ and OLIT libraries do *not* support the `en_US.UTF-8` locale.

Desktop Input Methods

CDE provides the ability to enter localized input for an internationalized application using Xm Toolkit. The `XmText[Field]` widgets are enabled to interface with input methods from each locale. Input methods are internationalized because some language environments write their text from right-to-left, top-to-bottom, and so forth. Within the same application, you can use different input methods that apply several fonts.

The pre-edit area displays the string that is being pre-edited. This can be done in four modes:

- OffTheSpot
- OverTheSpot (default)
- Root
- None

In OffTheSpot mode, the location is just below the Main Window area at the right of the status area. In OverTheSpot mode, the pre-edit area is at the cursor point. In Root mode, the pre-edit and status areas are separate from the client's window.

For more details, refer to the `XmNpreeditType` resource description on the `VendorShell`(3X) man page.

Note – In the Solaris 9 environment, native Asian input methods exist for Simplified/Traditional Chinese, Japanese, and Korean. These methods are in addition to the current multiscript input methods for Unicode locales.

The following discussion includes descriptions of selected input methods, how to use them, and how to switch between them.

Script Selection and Input Modes

Solaris Unicode locales support multiple scripts. Every Unicode locale has a total of fourteen input modes:

- English/European
- Cyrillic
- Greek
- Arabic
- Hebrew
- Thai
- Japanese
- Korean
- Simplified Chinese
- Traditional Chinese
- Traditional Chinese (Hong Kong)
- Hindi
- Unicode Hexadecimal and Octal code input methods
- Table lookup input method

Accessing Input Mode

You can switch into a particular input mode by using a Compose key combination or through the input mode selection window. To access the input mode selection window, press mouse button 1 in the status area at the bottom left corner of your application window. The input mode selection window is shown in following figure.

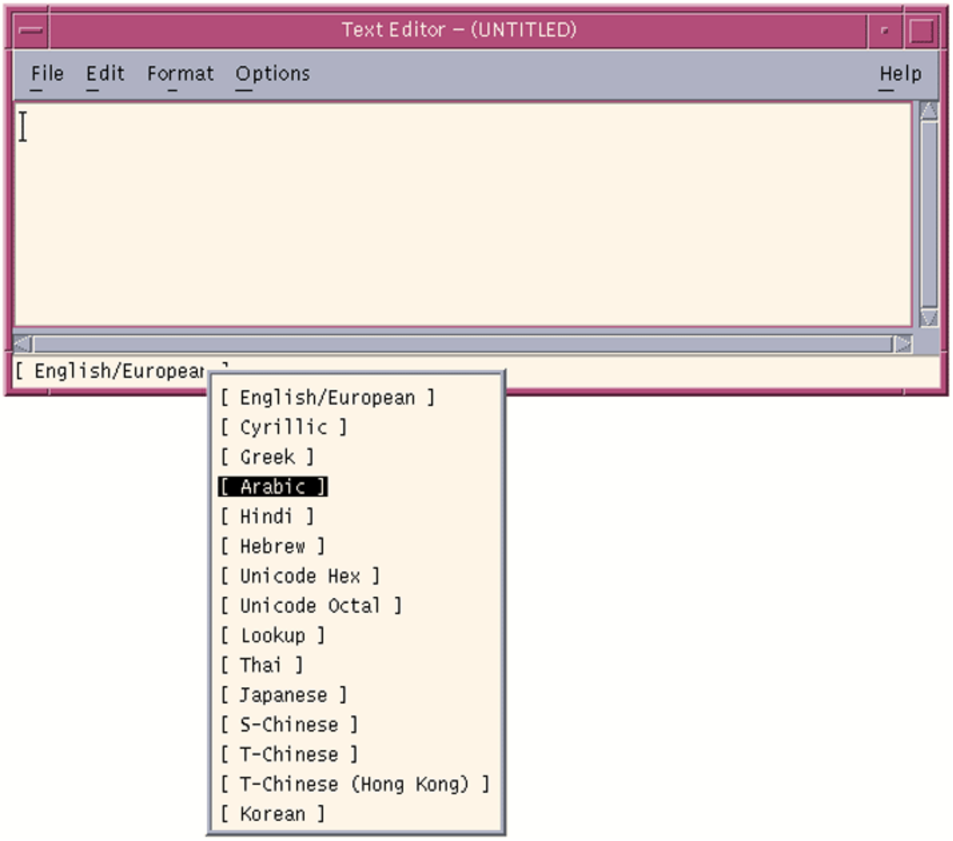


FIGURE 5–1 Input Mode Selection Window

Input Mode Switch Key Sequences

You can change the current input mode to a new input mode by using the key sequences listed in Table 5–1. The only restriction for using these key sequences is that if you are in one of the Asian input modes, you need to switch back to English/European input mode by pressing Control and spacebar together. Once you are in the English/European input mode, you can switch freely to any other input mode by using the key sequences.

The following key sequences show how to switch to Cyrillic from the English/European input mode:

- Press the Compose key.
- Press and release `c`.
- Press `c`.

TABLE 5–1 Input Mode Switch Key Sequences

Key Sequences	Input Mode
`Control + Spacebar`	English/European
`Compose c c`	Cyrillic
`Compose g g`	Greek
`Compose a r`	Arabic
`Compose h h`	Hebrew
`Compose t t`	Thai
`Compose h i`	Hindi
`Compose j a`	Japanese
`Compose k o`	Korean
`Compose s c`	Simplified Chinese
`Compose t c`	Traditional Chinese
`Compose h k`	Traditional Chinese (Hong Kong)
`Compose u o`	Unicode octal code input method
`Compose u h`	Unicode hexadecimal code input method
`Compose l l`	Table lookup input method

English/European Input Mode

The English/European input mode includes the English alphabet plus characters with diacritical marks (for example, á, è, î, õ, and ü) and characters (such as ¡, §, ¿) from European scripts.

This input mode is the default mode for any application. The input mode is displayed at the bottom left corner of the GUI application window.

To insert characters with diacritical marks or special characters from Latin-1, Latin-2, Latin-4, Latin-5, and Latin-9, you must type a Compose key sequence, as described in the following examples.

To display the Ä character:

- Press and release the Compose key.
- Press Shift and A simultaneously. Release Shift and A.
- Press and release ".

To display the ¿, character:

- Press and release the Compose key.
- Press and release ?.
- Press and release ?.

When there is no Compose key available on your keyboard, you can emulate its operation by simultaneously pressing the Control key and the Shift key.

For the input of the Euro currency symbol (Unicode value U+20AC) from the locale, you can use any one of following input sequences:

- AltGraph and E together
- AltGraph and 4 together
- AltGraph and 5 together

With these input sequences, you press both keys simultaneously. If there is no AltGraph key available on your keyboard, you can substitute the Alt key.

The following tables show the most commonly used compose sequences for Latin-1, Latin-2, Latin-3, Latin-4, Latin-5, and Latin-9 script input for the Solaris operating environment.

The following table lists the common Latin-1 Compose key sequences.

TABLE 5–2 Common Latin-1 Compose Key Sequences

Press `Compose`, then Press and Release	Then Press and Release	Result
`spacebar`	`spacebar`	no-break space
`s`	`1`	superscripted 1
`s`	`2`	superscripted 2
`s`	`3`	superscripted 3
`!`	`!`	inverted exclamation mark
`x`	`o`	currency symbol ¤
`p`	`!`	paragraph symbol ¶
`/`	`u`	mu u
`’`	`"`	acute accent ´
`,`	`,` (comma)	cedilla Ç
`"`	`"`	diaeresis ¨
`-`	`^`	macron ¯
`o`	`o`	degree °
`x`	`x`	multiplication sign x

TABLE 5–2 Common Latin-1 Compose Key Sequences *(Continued)*

Press Compose, then Press and Release	Then Press and Release	Result
+	-	plus-minus ±
-	-	soft hyphen –
-	:	division sign ÷
-	a	ordinal (feminine) ª
-	o	ordinal (masculine) º
-	, (comma)	not sign ¬
.	.	middle dot ·
1	2	vulgar fraction ½
1	4	vulgar fraction ¼
3	4	vulgar fraction ¾
<	<	left double angle quotation mark «
>	>	right double angle quotation mark »
?	?	inverted question mark ¿
A	` (backquote)	A grave À
A	' (single quote)	A acute Á
A	*	A ring above Å
A	"	A diaeresis Ä
A	^	A circumflex Â
A	~	A tilde Ã
A	E	AE diphthong Æ
C	, (comma)	C cedilla Ç
C	o	copyright sign ©
D	-	Capital eth
E	` (backquote)	E grave È
E	'	E acute É
E	"	E diaeresis Ë
E	^	E circumflex Ê
I	` (backquote)	I grave Ì

TABLE 5–2 Common Latin-1 Compose Key Sequences *(Continued)*

Press `Compose`, then Press and Release	**Then Press and Release**	**Result**
`I`	`'`	I acute Í
`I`	`"`	I diaeresis ˙
`I`	`^`	I circumflex Î
`L`	`-`	pound sign £
`N`	`~`	N tilde Ñ
`O`	`` ` `` (backquote)	O grave Ò
`O`	`'`	O acute Ó
`O`	`/`	O slash Ø
`O`	`"`	O diaeresis Ö
`O`	`^`	O circumflex Ô
`O`	`~`	O tilde Õ
`R`	`O`	registered mark ®
`T`	`H`	Thorn Þ
`U`	`` ` `` (backquote)	U grave Ù
`U`	`'`	U acute Ú
`U`	`"`	U diaeresis Ü
`U`	`^`	U circumflex Û
`Y`	`'`	Y acute ý
`Y`	`-`	yen sign ¥
`a`	`` ` `` (backquote)	a grave à
`a`	`'`	a acute á
`a`	`*`	a ring above å
`a`	`"`	a diaeresis ä
`a`	`~`	a tilde ã
`a`	`^`	a circumflex â
`a`	`e`	ae diphthong æ
`c`	`,` (comma)	c cedilla ç
`c`	`/`	cent sign ¢

TABLE 5–2 Common Latin-1 Compose Key Sequences *(Continued)*

Press Compose, then Press and Release	Then Press and Release	Result
c	o	copyright sign ©
d	-	eth
e	` (backquote)	e grave è
e	'	e acute é
e	"	e diaeresis ë
e	^	e circumflex ê
i	` (backquote)	i grave ì
i	'	i acute í
i	"	i diaeresis ï
i	^	i circumflex î
n	~	n tilde ñ
o	` (backquote)	o grave ò
o	'	o acute ó
o	/	o slash ø
o	"	o diaeresis ö
o	^	o circumflex ô
o	~	o tilde õ
s	s	German double s ß also known as sharp S
t	h	thorn Þ
u	` (backquote)	u grave ù
u	'	u acute ú
u	"	u diaeresis ü
u	^	u circumflex û
y	'	y acute y
y	"	y diaeresis ÿ
|	|	broken bar ¦

The following table lists the common Latin-2 and Latin-4 Compose key sequences.

TABLE 5–3 Common Latin-2 Compose Key Sequences

Press `Compose`, then Press and Release	Press and Release	Result
`a`	`spacebar`	ogonek
`u`	`spacebar`	breve
`v`	`spacebar`	caron
`"`	`spacebar`	double acute
`A`	`a`	A ogonek
`A`	`u`	A breve
`C`	`'`	C acute
`C`	`v`	C caron
`D`	`v`	D caron
`-`	`D`	D stroke
`E`	`v`	E caron
`E`	`a`	E ogonek
`L`	`'`	L acute
`L`	`-`	L stroke
`L`	`>`	L caron
`N`	`'`	N acute
`N`	`v`	N caron
`O`	`>`	O double acute
`S`	`'`	S acute
`S`	`v`	S caron
`S`	`,`	S cedilla
`R`	`'`	R acute
`R`	`v`	R caron
`T`	`v`	T caron
`T`	`,`	T cedilla
`U`	`*`	U ring above
`U`	`>`	U double acute
`Z`	`'`	Z acute

TABLE 5–3 Common Latin-2 Compose Key Sequences *(Continued)*

Press `Compose`, then Press and Release	Press and Release	Result
Z	v	Z caron
Z	.	Z dot above
k	k	kra
A	_	A macron
E	_	E macron
E	.	E dot above
G	,	G cedilla
I	_	I macron
I	~	I tilde
I	a	I ogonek
K	,	K cedilla
L	,	L cedilla
N	,	N cedilla
O	_	O macron
R	,	R cedilla
T	|	T stroke
U	~	U tilde
U	a	U ogonek
U	_	U macron
N	N	Eng
a	_	a macron
e	_	e macron
e	.	e dot above
g	,	g cedilla
i	_	i macron
i	~	i tilde
i	a	i ogonek
k	,	k cedilla

TABLE 5–3 Common Latin-2 Compose Key Sequences *(Continued)*

Press `Compose`, then Press and Release	Press and Release	Result
`l`	`,`	l cedilla
`n`	`,`	n cedilla
`o`	`_`	o macron
`r`	`,`	r cedilla
`t`	|	t stroke
`u`	`~`	u tilde
`u`	`a`	u ogonek
`u`	`_`	u macron
`n`	`n`	eng

The following table lists the common Latin-3 Compose key sequences.

TABLE 5–4 Common Latin-3 Compose Key Sequences

Press `Compose`, then Press and Release	Press and Release	Result
`C`	`>`	C circumflex
`C`	`.`	C dot above
`G`	`>`	G circumflex
`G`	`.`	G dot above
`H`	`>`	H circumflex
`J`	`>`	j circumflex
`S`	`>`	S circumflex
`U`	`u`	U breve
`c`	`>`	c circumflex
`c`	`.`	c dot above
`g`	`>`	g circumflex
`g`	`.`	g dot above
`h`	`>`	h circumflex

TABLE 5–4 Common Latin-3 Compose Key Sequences *(Continued)*

Press Compose, then Press and Release	Press and Release	Result
j	>	j circumflex
s	>	s circumflex
u	u	u breve

The following table lists the common Latin-5 Compose key sequences.

TABLE 5–5 Common Latin-5 Compose Key Sequences

Press Compose, then Press and Release	Press and Release	Result
G	u	G breve
I	.	I dot above
g	u	g breve
i	.	i dotless

The following table lists the Common Latin-9 Compose key sequences.

TABLE 5–6 Common Latin-9 Compose Key Sequences

Press Compose, then Press and Release	Press and Release	Result
o	e	Ligature oe
O	E	Ligature OE
Y	"	Y diaeresis

Arabic Input Mode

To switch to Arabic input mode, either type `Compose a r`, or select Arabic from the input mode selection window. For information on accessing the input mode selection window, see Figure 5–1.

The following figure shows the Arabic keyboard layout.

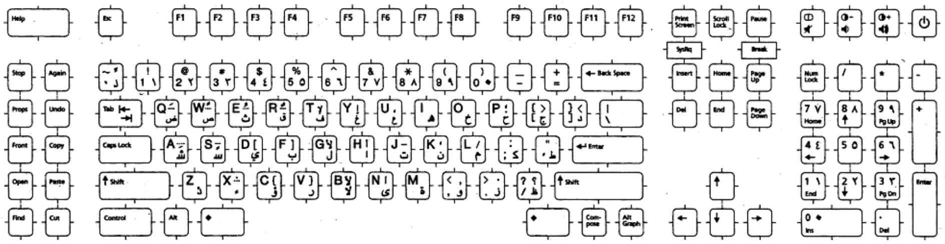


FIGURE 5–2 Arabic Keyboard

Cyrillic Input Mode

To switch to Cyrillic input mode, either press `Compose c c`, or select Cyrillic from the Input Mode Selection Window. For information on accessing the input mode selection window, see Figure 5–1.

The Cyrillic (Russian) keyboard layout appears in the following figure.

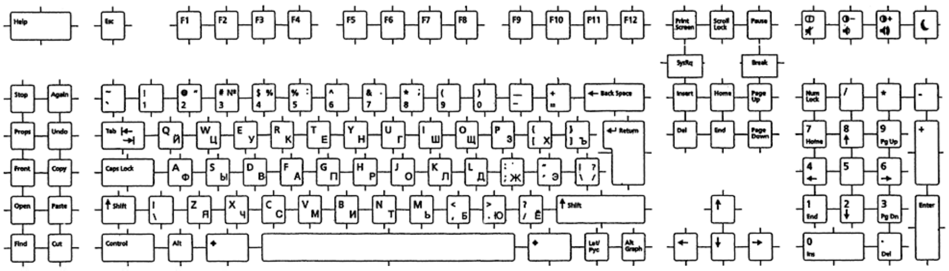


FIGURE 5–3 Cyrillic (Russian) Keyboard

After you switch to Cyrillic input mode, you cannot enter English or European text. To switch back to the English/European input mode, type `Control` and `spacebar` together, or select English/European input mode from the Input Mode Selection Window by clicking in the status area. See Figure 5–1.

You can also switch into other input modes by typing the corresponding input mode switch key sequence.

Greek Input Mode

To switch to Greek input mode, either press `Compose g g`, or select Greek, from the input mode selection window. For information on accessing the input mode selection window, see Figure 5–1.

After you switch to Greek input mode, you cannot enter English or European text. To switch back to the English/European input mode, type `Control` and `spacebar` together, or select English/European input mode from the Input Mode Selection Window by clicking in the status area. The Greek Euro keyboard layout appears in the following figure.

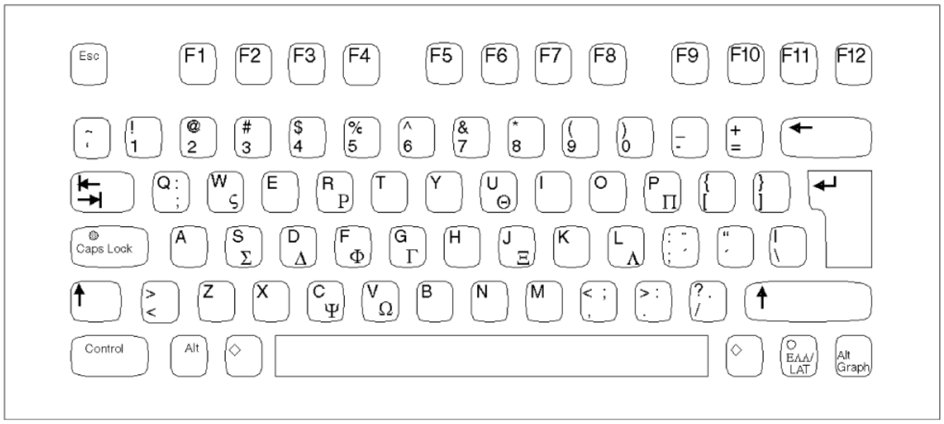

Esc
F1 F2 F3 F4 F5 F6 F7 F8 F9 F10 F11 F12
~ ‘ ! 1 @ 2 # 3 $ 4 % 5 ^ 6 & 7 * 8 (9) 0 _ - + =
Q : ; W ς E R Ρ T Y U Θ I O P Π { [}]
Caps Lock A S Σ D Δ F Φ G Γ H J Ξ K L Λ : ¨ ; ΄ " ' | \
> < Z X C Ψ V Ω B N M < ; , > : . ? . /
Control Alt ◇ ◇ ΕΛΛ/ LAT Alt Graph

FIGURE 5–4 Greek Euro Keyboard

The following figure shows the Greek UNIX keyboard.

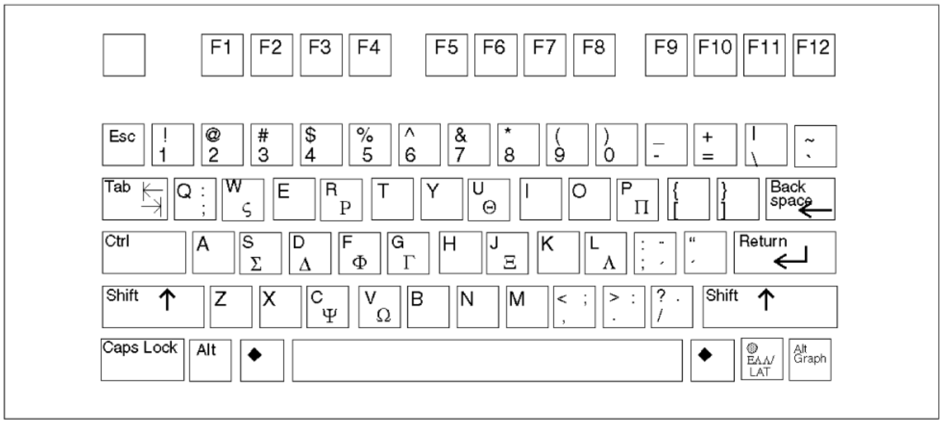


FIGURE 5–5 Greek UNIX Keyboard

Hebrew Input Mode

To switch into Hebrew input mode, either press `Compose h h`, or select Hebrew from the input mode selection window. For information on accessing the input mode selection window, see Figure 5–1.

The following figure shows the Hebrew keyboard layout.

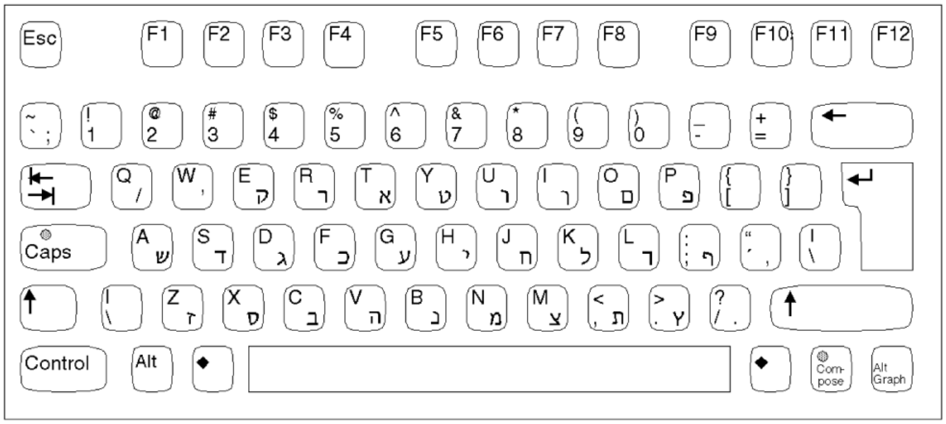


FIGURE 5–6 Hebrew Keyboard

Hindi Input Mode

To switch to Hindi input mode, either press `Compose h i`, or select Hindi from the input mode selection window. For more information on accessing the input mode selection window, see Figure 5–1. To switch back to English/European input mode type `Control` and `spacebar` together, or select English/European input mode from the input mode selection window by clicking in the status area.

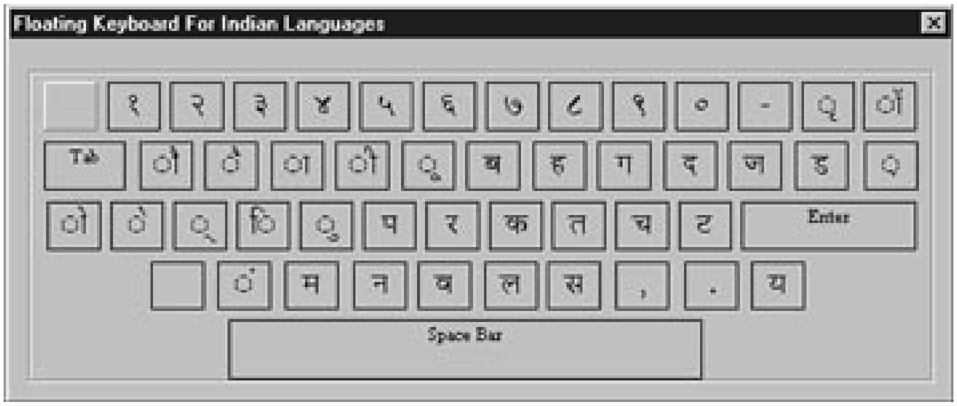


FIGURE 5–7 Hindi Keyboard

The keyboard for Hindi-Shift is shown in the following figure.

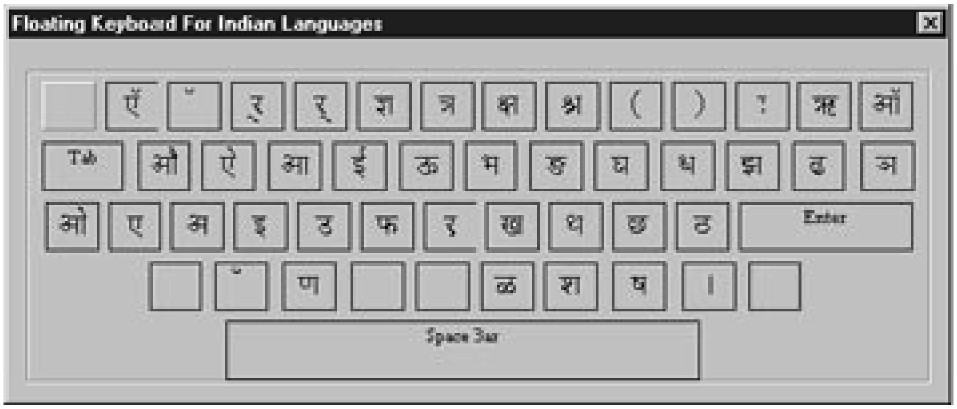


FIGURE 5–8 Hindi-Shift Keyboard

Japanese Input Mode

To switch to Japanese input mode, either press `Compose j a`, or select Japanese from the input mode selection window. For information on accessing the input mode selection window, see Figure 5–1.

To use the native Japanese input system, you need to install one or more of the Japanese locales and reboot the system. After you install the Japanese locale, you can use ATOK12 in all `UTF-8` locales. Wnn6 is not available in `UTF-8` locales except `ja_JP.UTF-8`.

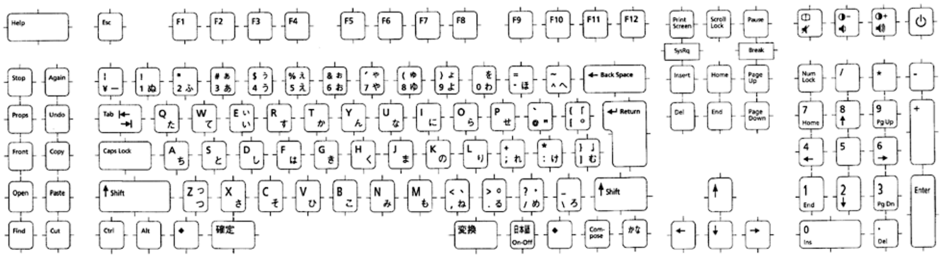


FIGURE 5–9 Japanese Keyboard

Korean Input Mode

To switch to Korean input mode, either press `Compose k o`, or select Korean from the input mode selection window. For information on accessing the input mode selection window, see Figure 5–1.

To have the native Korean input system, you need to install one or more Korean locales on your system. Once you install the Korean locale, you can use the native Korean input system. For more details on how to use the Korean Input System, refer to *Korean Solaris User's Guide*.

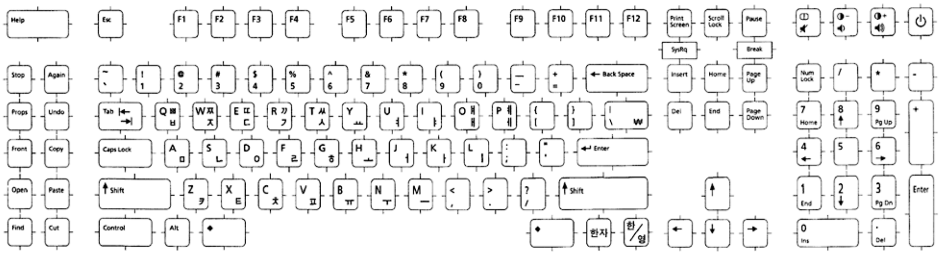


FIGURE 5–10 Korean Keyboard

Simplified Chinese Input Mode

To switch to Simplified Chinese input mode, either press `Compose s c`, or select S-Chinese from the input mode selection window. For information on accessing the input mode selection window, see Figure 5–1.

To use the native Simplified Chinese input system, you need to install one or more Simplified Chinese locales on your system. For more details on how to use Simplified Chinese Input System, refer to *Simplified Chinese Solaris User's Guide*.

Thai Input Mode

To switch to Thai input mode, either press `Compose t t`, or select Thai, from the input mode selection window. For information on accessing the input mode selection window, see Figure 5–1.

To switch back to English/European input mode type `Control` and `spacebar` together, or select English/European input mode from the input mode selection window by clicking in the status area.

The Thai keyboard layout is shown in the following figure.

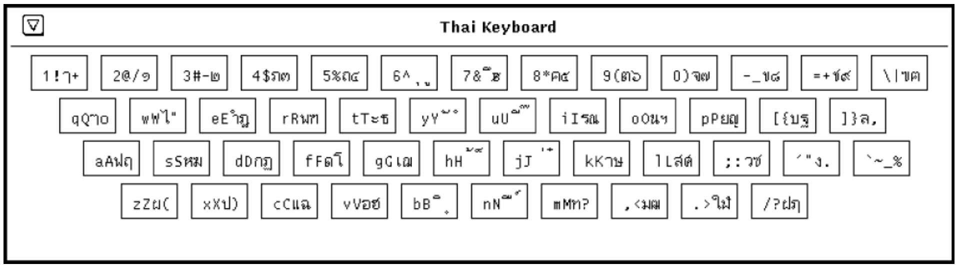


FIGURE 5–11 Thai Keyboard

Traditional Chinese Input Mode

To switch to Traditional Chinese input mode, either press `Compose t c`, or select T-Chinese from the input mode selection window. For information on accessing the input mode selection window, see Figure 5–1.

To have access to the native Traditional Chinese input system, you need to install one or more Traditional Chinese locales at your system. For more details on how to use the Traditional Chinese Input System, refer to *Traditional Chinese Solaris User's Guide*.

Traditional Chinese (Hong Kong) Input Mode

To switch to Traditional Chinese input mode, either press `Compose h k`, or select T-Chinese (Hong Kong) from the input mode selection window. For information on accessing the input mode selection window, see Figure 5–1.

To have access to the native Traditional Chinese (Hong Kong) input system, you need to install one or more Traditional Chinese (Hong Kong) locales on your system.

Unicode Hexadecimal Input Mode

To switch to Unicode hexadecimal code input method input mode, either press `Compose u h`, or select Unicode Hex from the input mode selection window. To switch to the octal number system, press `Compose u o` or select Unicode Octal. For information on accessing the input mode selection window, see Figure 5–1.

To use these input modes, you need to know either the hexadecimal or the octal code point values of the characters. Refer to *The Unicode Standard, Version 3.0* for the mapping between code point values and characters.

If you are in the Unicode hexadecimal code input mode, to input a character you would type four hexadecimal digits. Some sample hexadecimal values are:

- 00A1 for Inverted Exclamation Mark
- 03B2 for Greek Small Letter Beta
- AC00 for a Korean Hangul Syllable
- 30A1 for Japanese Katakana Letter A
- 4E58 for a Unified Han character

You can use both uppercase and lowercase letters of A, B, C, D, E, and, F for hexadecimal digits. If you prefer the octal number system instead of hexadecimal numbers, you can input octal digits, 0 to 7. If you mistype a digit or two, you can delete the digits by using the `Delete` or `Backspace` key.

Table Lookup Input Mode

To switch to table lookup input mode, either press `Compose l l`, or select Lookup from the input mode selection window. For information on accessing the input mode selection window, see Figure 5–1.

The second lookup window shows candidates for the group only display, 80 candidates at a time maximum. Press `Control n` for the next set of candidates or `Control p` for previous set of candidates.

System Environment

This section describes locale environment variables, TTY environment setup, 32–bit and 64–bit STREAMS modules , and terminal support.

Locale Environment Variable

Be sure you have the `en_US.UTF-8` locale installed on your system. To check current locale settings in various categories, use the `locale`(1) utility.

```
system% locale
LANG=en_US.UTF-8
LC_CTYPE="en_US.UTF-8"
LC_NUMERIC="en_US.UTF-8"
LC_TIME="en_US.UTF-8"
LC_COLLATE="en_US.UTF-8"
LC_MONETARY="en_US.UTF-8"
LC_MESSAGES="en_US.UTF-8"
LC_ALL=
```

To use the `en_US.UTF-8` locale desktop environment, choose the locale first. In a TTY environment, choose the locale first by setting the `LANG` environment variable to `en_US.UTF-8`, as in the following C-shell example:

```
system% setenv LANG en_US.UTF-8
```

Make sure that the LC_ALL, LC_COLLATE, LC_CTYPE, LC_MESSAGES, LC_NUMERIC, LC_MONETARY, and LC_TIME categories are not set, or are set to en_US.UTF-8. If any of these categories is set, they override the lower-priority LANG environment variable. See the setlocale(3C) man page for more details about the hierarchy of environment variables.

You can also start the en_US.UTF-8 environment from the CDE desktop. At the CDE login screen's Options -> Language menu, choose en_US.UTF-8.

TTY Environment Setup

Depending on the terminal and terminal emulator that you are using, you might need to push certain codeset-specific STREAMS modules onto your streams.

For more information on STREAMS modules and streams in general, see the *STREAMS Programming Guide*.

The following table shows STREAMS modules supported by the en_US.UTF-8 locale in the terminal environment.

TABLE 5–7 32–bit STREAMS Modules Supported by en_US.UTF-8

32–bit STREAMS Module	Description
/usr/kernel/strmod/u8lat1	Code conversion STREAMS module between UTF-8 and ISO8859-1 (Western European)
/usr/kernel/strmod/u8lat2	Code conversion STREAMS module between UTF-8 and ISO8859-2 (Eastern European)
/usr/kernel/strmod/u8koi8	Code conversion STREAMS module between UTF-8 and KOI8-R (Cyrillic)

The following table lists the 64–bit STREAMS modules supported by en_US.UTF-8.

TABLE 5–8 64–bit STREAMS Modules Supported by en_US.UTF-8

64-bit STREAMS module	Description
/usr/kernel/strmod/sparcv9/u8lat1	Code conversion STREAMS module between UTF-8 and ISO8859-1 (Western European)
/usr/kernel/strmod/sparcv9/u8lat2	Code conversion STREAMS module between UTF-8 and ISO8859-2 (Eastern European)

TABLE 5–8 64–bit STREAMS Modules Supported by `en_US.UTF-8` *(Continued)*

64-bit STREAMS module	Description
`/usr/kernel/strmod/sparcv9/u8koi8`	Code conversion STREAMS module between `UTF-8` and `KOI8-R` (Cyrillic)

Loading a STREAMS Module at Kernel

To load a STREAMS module at kernel, first become root.

To determine whether you are running a 64-bit Solaris or 32-bit Solaris system, use the `isainfo`(1) utility as follows:

```
system# isainfo -v
64-bit sparcv9 applications
32-bit sparc applications
```

If the command returns this information, you are running the 64-bit Solaris system. If you are running the 32-bit Solaris system, the utility shows the following:

```
system# isainfo -v
32-bit sparc applications
```

Use `modinfo`(1M) to be certain that your system has not already loaded the STREAMS module:

```
system# modinfo | grep modulename
```

If the STREAMS module, such as `u8lat1`, is already installed, the output looks as follows:

```
system# modinfo | grep u8lat1
89 ff798000  4b13  18   1  u8lat1 (UTF-8 <--> ISO 8859-1 module)
```

If the module is already installed, you do not need to load it. However, if the module has not yet been loaded, use `modload`(1M) as follows:

```
system# modload /usr/kernel/strmod/u8lat1
```

This command loads the 32–bit `u8lat1` STREAMS module at the kernel so you can push it onto a stream. If you are running the 64–bit Solaris product, use `modload`(1M) as follows:

```
system# modload /usr/kernel/strmod/sparcv9/u8lat1
```

The STREAMS module is loaded at the kernel and you can now push it onto a stream.

To unload a module from the kernel, use `modunload`(1M), as shown below. In this example, the `u8lat1` module is being unloaded.

```
system# modinfo | grep u8lat1
89 ff798000  4b13  18   1  u8lat1 (UTF-8 <--> ISO 8859-1 module)
system# modunload -i 89
```

dtterm and Terminals Capable of Input and Output of UTF-8 Characters

Unlike in previous releases of the Solaris operating environment, the dtterm(1) Terminal and any other terminals that support input and output of the UTF-8 codeset do not need to have any additional STREAMS modules in their stream. ldterm(7M) module is now codeset independent and supports Unicode/UTF-8 as well.

To set up the proper terminal environment for the Unicode locales, use the stty(1) utility. To query the current settings use the -a option of the stty(1) utility, as shown below:

```
system% /bin/stty -a
```

Note – Because /usr/ucb/stty is not internationalized, use /bin/stty instead.

Terminal Support for Latin-1, Latin-2, or KOI8-R

For terminals that support only Latin-1 (ISO8859-1), Latin-2 (ISO8859-2), or KOI8-R, you should have the following STREAMS configuration:

```
head <-> ttcompat <->  ldterm <->  u8lat1 <-> TTY
```

This configuration is only for terminals that support Latin-1. For Latin-2 terminals, replace the STREAMS module u8lat1 with u8lat2. For KOI8-R terminals, replace the module with u8koi8.

Make sure you already have the STREAMS module loaded into the kernel.

To set up the STREAMS configuration shown above, use strchg(1M), as shown in the second command line of the example:

```
system% cat > tmp/mystreams
ttcompat
ldterm
u8lat1
ptem
^D
system% strchg -f /tmp/mystreams
```

Be sure that you are either root or the owner of the device when you use strchg(1). To see the current configuration, use strconf(1) as follows:

```
system% strconf
ttcompat
ldterm
u8lat1
ptem
pts
```

```
system%
```

To reset the original configuration, set the STREAMS configuration as follows:

```
system% cat > /tmp/orgstreams
ttcompat
ldterm
ptem
^D
system% strchg -f /tmp/orgstreams
```

Saving the Settings in ~/.cshrc

Assuming the necessary STREAMS modules are already loaded with the kernel, you can save the following lines in your .cshrc file (C shell example) for convenience:

```
setenv LANG en_US.UTF-8
if ($?USER != 0 && $?prompt != 0) then
     cat >! /tmp/mystreams$$ << _EOF
     ttcompat
     ldtterm
     u8lat1
     ptem
_EOF
     /bin/strchg -f /tmp/mystreams$$
     /bin/rm -f /tmp/mystreams$$
     /bin/stty cs8 -istrip defeucw
endif
```

With these lines in your .cshrc file, you do not have to type all of the commands each time you use the STREAMS module. Note that the second _EOF should start from the first column of the file.

Code Conversions

Unicode locale support adds various code conversions among major codesets of many countries through iconv(1), iconv(3C), and sdtconvtool(1).

In the Solaris 9 environment, the utility geniconvtbl enables user-defined code conversions. The user-defined code conversions created with the geniconvtbl utility can be used with both iconv(1) and iconv(3). For more detail on this utility, refer to thegeniconvtbl(1) and geniconvtbl(4) man pages.

The available fromcode and tocode names that can be applied to iconv(1), iconv_open(3C), and sdtconvtool(1) are shown in the tables in Appendix A. For more details on iconv code conversion, see the iconv(1), iconv_open(3C), iconv

(3) , `iconv_close`(3C) `geniconvtbl`(1) `geniconvtbl`(4) and `sdtconvtool`(1) man pages. For more information on available code conversions, see the `iconv_en_US.UTF-8`(5), `iconv`(5), `iconv_ja`(5), `iconv_ko`(5), `iconv_zh`(5), and `iconv_zh_TW`(5) man pages. Also see Appendix A.

Note – UCS-2, UCS-4, UTF-16 and UTF-32 are all Unicode/ ISO/IEC 10646 representation forms that recognize Byte Order Mark (BOM) characters defined in the Unicode 3.1 and ISO/IEC 10646-1:2000 standards if the character appears at the beginning of the character stream. Other forms, like UCS-2BE, UCS-4BE, UTF-16BE, and UTF-32BE are all fixed-width Unicode/ISO/IEC 10646 representation forms that do not recognize the BOM character and also assume big endian byte ordering. Representation forms like UCS-2LE, UCS-4LE, UTF-16LE, and UTF-32LE, on the other hand, assume little endian byte ordering. They also do not recognize the BOM character.

For associated scripts and languages of ISO8859–* and KO18–*, see http://czyborra.com/charsets/iso8869.html.

DtMail

As a result of increased coverage in scripts, Solaris 9 DtMail running in the `en_US.UTF-8` locale supports the following character sets, indicated by MIME names:

- US-ASCII (7-bit US ASCII)
- UTF-8 (UCS Transmission Format 8 bit)
- UTF-7 (UCS Transmission Format 7 bit)
- ISO-8859-1 (Latin-1)
- ISO-8859-2 (Latin-2)
- ISO-8859-3 (Latin-3)
- ISO-8859-4 (Latin-4)
- ISO-8859-5 (Latin/Cyrillic)
- ISO-8859-6 (Latin/Arabic)
- ISO-8859-7 (Latin/Greek)
- ISO-8859-8 (Latin/Hebrew)
- ISO-8859-9 (Latin-5)
- ISO-8859-10 (Latin-6)
- ISO-8859-13 (Latin-7/Baltic)
- ISO-8859-14 (Latin-8/Celtic)
- ISO-8859-15 (Latin-9)
- ISO-8859-16 (Latin-10)
- KOI8-R (Cyrillic)
- ISO-2022-JP and EUC-JP (Japanese)

- ISO-2022-KR and EUC-KR (Korean)
- ISO-2022-CN (Simplified Chinese)
- ISO-8859–13 (Latin-7/Baltic)
- ISO-8859–14 (Latin-8/Celtic)
- KOI8–U (Cyrillic/Ukrainian)
- Shift_JIS (Japanese in Shift JIS)
- GB2312 (Simplified Chinese in EUC)
- TIS-620 (Thai)
- UTF-16 (UCS Transmission Format 16 bit)
- UTF-16BE (UTF-16 Big-Endian)
- UTF-16LE (UTF-16 Little-Endian)
- Windows-1250
- Windows-1251
- Windows-1252
- Windows-1253
- Windows-1254
- Windows-1255
- Windows-1256
- Windows-1257
- Windows-1258
- Big5 (Traditional Chinese)
- UTF-32 (UCS Transmission Format 32 bit)
- UTF-32BE (UTF-32 Big-Endian)
- UTF-32LE (UTF-32 Little-Endian)

This support supports users to view virtually any kind of email encoded in various character sets from any region of the world in a single instance of DtMail. DtMail decodes received email by looking at the MIME charset and content transfer encoding provided with the email. Windows-125x MIME charsets are supported.

For sending email, you need to specify a MIME charset that is understood by the recipient mail user agent (mail client), or you can use the default MIME charset provided by the `en_US.UTF-8` locale. You can switch the character set of outgoing email, in the New Message window, press `Control Y`, or click the Format menu button and then click the Change Char Set button. The next available character set name displays in the bottom left corner at the top of the Send button.

If your email message header or message body contains characters that cannot be represented by the MIME charset specified, the system automatically switches the charset to `UTF-8` which can represent any character.

If your message contains characters from the 7-bit US-ASCII character set only, the default MIME charset of your email is `US-ASCII`. Any mail user agent can interpret such email messages without loss of characters or information.

If your message contains characters from a mixture of scripts, the default MIME charset is `UTF-8`. Any 8-bit characters of `UTF-8` are encoded with Quoted-Printable encoding. For more details on MIME, registered MIME charsets, and Quoted-Printable encoding, refer to RFCs 2045, 2046, 2047, 2048, 2049, 2279, 2152, 2237, 1922, 1557, 1555, and 1489.

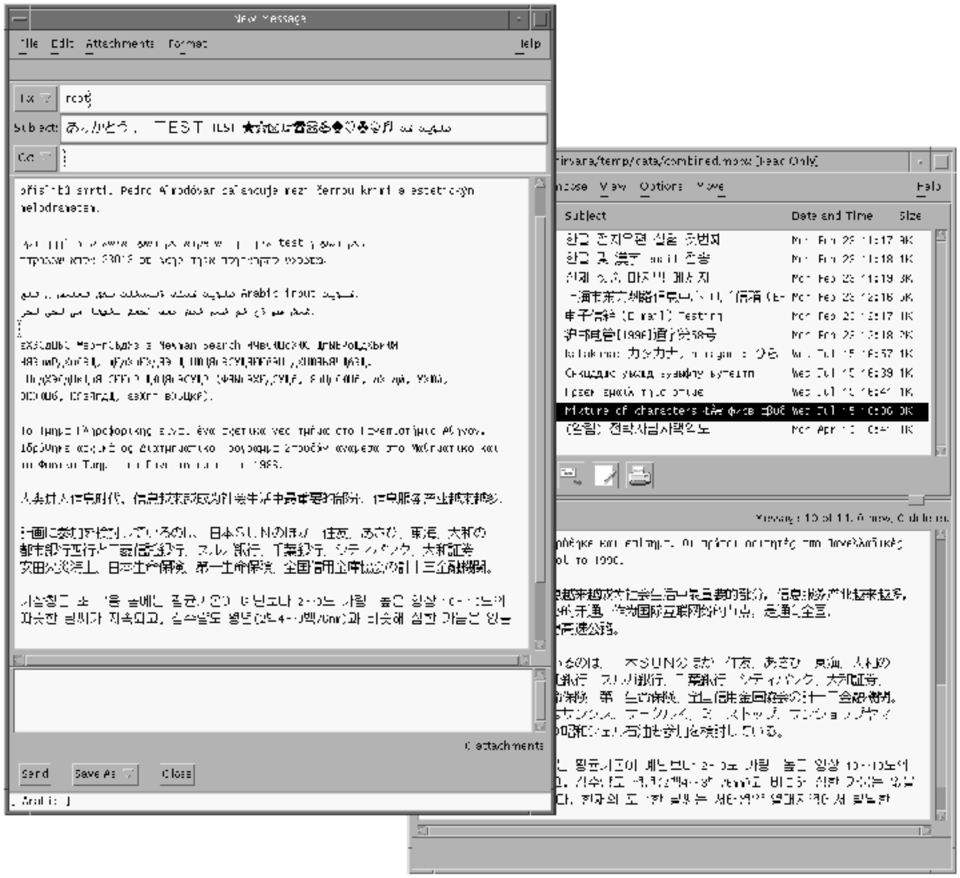


FIGURE 5–12 DtMail New Message Window

Programming Environment

Internationalized applications should automatically enable the `en_US.UTF-8` locale. However, proper FontSet/XmFontList definitions in the application's resource file are required.

For information on internationalized applications, see *Creating Worldwide Software: Solaris International Developer's Guide*, 2nd edition.

FontSet Used with X Applications

For information about the FontSet used with X applications, please see "Unicode Locale: en_US.UTF-8 Support Overview" on page 94.

Because the Solaris 9 environment supports the CDE desktop environment, each character set has a guaranteed set of fonts.

The following is a list of the Latin-1 fonts that are supported in the Solaris 9 product:

```
-dt-interface system-medium-r-normal-xxs sans utf-10-100-72-72-p-59-iso8859-1
-dt-interface system-medium-r-normal-xs sans  utf-12-120-72-72-p-71-iso8859-1
-dt-interface system-medium-r-normal-s sans  utf-14-140-72-72-p-82-iso8859-1
-dt-interface system-medium-r-normal-m sans  utf-17-170-72-72-p-97-iso8859-1
-dt-interface system-medium-r-normal-l sans  utf-18-180-72-72-p-106-iso8859-1
-dt-interface system-medium-r-normal-xl sans utf-20-200-72-72-p-114-iso8859-1
-dt-interface system-medium-r-normal-xxl sans utf-24-240-72-72-p-137-iso8859-1
```

For information on CDE common font aliases, including `-dt-interface user-*` and `-dt-application-*` aliases, see *Common Desktop Environment: Internationalization Programmer's Guide*.

In the `en_US.UTF-8` locale, `utf` is also included in the locale's common font aliases as an additional attribute in the style field of the X logical font description name. Therefore, to have a proper set of fonts, the additional style has to be included in the font set creation as in the following example:

```
fs = XCreateFontSet(display,
"-dt-interface system-medium-r-normal-s*utf*",
 &missing_ptr, &missing_count, &def_string);
```

FontList Definition in CDE/Motif Applications

As with FontSet definition, the XmFontList resource definition of an application should also include the additional style attribute supported by the locale.

```
*fontList:\
 -dt-interface system-medium-r-normal-s*utf*:
```

CHAPTER 6

Complex Text Layout

Complex Text Layout (CTL) extensions enable Motif APIs to support writing systems that require complex transformations between logical and physical text representations, such as those required for Arabic, Hebrew, and Thai. CTL Motif provides character shaping, such as ligatures, diacritics, and segment ordering , and supports the transformation of static and dynamic text widgets. It also supports right-to-left and left-to-right text orientation and tabbing for dynamic text widgets. Because text rendering is handled through the rendition layer, other widget libraries can be easily extended to support CTL.

Overview of CTL Technology

To leverage the new features, users must have the Portable Layout Services (PLS) library and the appropriate language engine. CTL uses PLS as the interface to the language engine, and uses the language engine to transform text before the text is rendered. Applications that support CTL must include additional resources, as described in the CTL documentation.

Specifically, XomCTL supports the following complex language shaping and reordering features provided by underlying locale-dependent PLS module transformations:

- Positional variation
- Ligation (many-to-one) and character composition (one-to-many)
- Diacritics
- Bidirectionality
- Symmetrical swapping
- Numeral shaping
- String validation

Overview of CTL Architecture

The CTL architecture is organized as shown in Figure 6–1. Dt Apps at the top of the stack employs Motif CTL functionality for rendering text. Motif in turn interfaces with locale-specific language engines using PLS, and performs transformations to support positional variation, numeral shaping, and so on.

The CTL architecture is built to support new languages by adding a new locale-specific engine. In other words, support for Thai and Vietnamese can be added without altering Motif or Dt Apps.

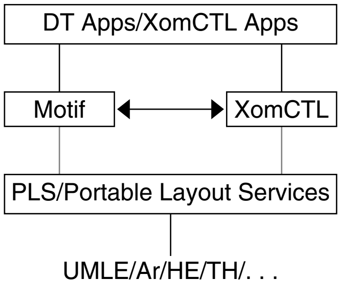


FIGURE 6–1 CTL Architecture

CTL Support for X Library Based Applications

XomCTL (Complex Text Layout support in X Library Output Module) allows all pure X Windows applications (such as an X-based terminal emulator) to have CTL support. XomCTL provides a full-featured Open Source XI18N implementation including X11 dumb font support.

New XOC Resources

The following XOC resources are provided by the Solaris 9 environment:

XNText	Enables user to set the text buffer on which CTL operation needs to be performed.

`XNTextLayoutNumGlyphs`	Provides number of glyphs for the text in the text buffer.
`XNTextLayoutModifier`	Same as XmNLayoutModifier of Motif.
`XNTextLayoutProperty`	Same as PLS Property, input-to-output and output-to-input.
`XNTextLayoutMapInpToOut`	Same as PLS Property, input-to-output and output-to-input.
`XNTextLayoutMapOutToInp`	Same as PLS Property, input-to-output and output-to-input.

Descriptions of these may be obtained from the specification of X/Open or PLS Portable Layout Services.

Changes in Motif to Support CTL Technology

The following chages to Motif support the CTL technology:

`XmNlayoutDirection`	Controls object layout.
`XmStringDirection`	Specifies the direction in which the system displays characters of a string.
`XmRendition`	Adds new pseudo resources to `XmRendition`.
`XmText` and `XmTextField`	Affects the layout behavior of the text associated with the `XmRendition`.
`XmTextFieldGetLayoutModifier`	Returns the layout modifier string of a rendition layout object.
`XmTextGetLayoutModifier`	Returns the value of the current layout object settings of the rendition associated with the widget.
`XmTextFieldSetLayoutModifier`	Sets the layout modifier values for the layout object tied to its rendition.
`XmTextSetLayoutModifier`	Modifies the layout object settings of a rendition associated with the widget.
`XmStringDirectionCreate`	Creates a compound string.

XmNlayoutDirection

The XmNlayoutDirection resource[1] controls object layout. It interacts with the orientation value of the LayoutObject in the manner described below.

Determining the Layout Direction

When XmNlayoutDirection is specified as XmDEFAULT_DIRECTION, then the widget's layout direction is set at creation time from the governing pseudo-XOC. In the case of dynamic text (XmText and XmTextField), the governing pseudo-XOC is the one that is associated with the XmRendition used for the widget. In the case of static text (XmList, XmLabel, XmLabelG), the layout direction is set from the first compound string component that specifies a direction. This specification happens in one of two ways:

Directly The component is of type XmSTRING_COMPONENT_LAYOUT_PUSH or XmSTRING_COMPONENT_DIRECTION.

Indirectly The component is of type XmSTRING_COMPONENT_LOCALE_TEXT, XmSTRING_COMPONENT_WIDECHAR_TEXT, or XmSTRING_COMPONENT_TEXT, from the component's associated XmRendition's and associated LayoutObject.

When XmNlayoutDirection is not specified as XmDEFAULT_DIRECTION, and the XmNlayoutModifier @ls orientation value is not specified explicitly in the layout modifier string, then the XmNlayoutDirection value is passed through to the XOC and its LayoutObject.

If both XmNlayoutDirection and the XmNlayoutModifier @ls orientation value are explicitly specified, then the behavior is mixed. The XmNlayoutDirection controls widget object layout, and the XmNlayoutModifier @ls orientation value controls layout transformations.

See *CAE Specification: Portable Layout Services: Context-dependent and Directional Text*. The Open Group: Feb 1997; ISBN 1-85912-142-X; document number C616 for a description of portable functions for handling context-dependent and bidirectional text transformations as a logical extension to the existing POSIX locale model. The document is intended for system and application programmers who want to provide support for complex-text languages.

[1] See section 11.3 of the Motif *Programmer's Guide* (Release 2.1) for an overview of XmNlayoutDirection, and especially for a description of the interaction between XmStringDirection and XmNlayoutDirection.

XmStringDirection

XmStringDirection is the data type used to specify the direction in which the system displays characters of a string.

The XmNlayoutDirection resource sets a default rendering direction for any compound string (XmString) that does not have a component specifying the direction of that string. Therefore, to set the layout direction, you need to set the appropriate value for the XmNlayoutDirection resource. You do not need to create compound strings with specific direction components. When the application renders an XmString, the application should look to see if the string was created with an explicit direction (XmStringDirection). If there is no direction component, the application should check the value of the XmNlayoutDirection resource for the current widget and use that value as the default rendering direction for the XmString.

XmRendition

CTL adds the new pseudo resources to XmRendition listed in the following table:

TABLE 6–1 New Resources in XmRendition

Name	Class/Type	Access	Default Value
XmNfontType	XmCFontType/XmFontType	CSG	XmAS_IS
XmNlayoutAttrObject	XmClayoutAttrObject/String	CG	NULL
XmNlayoutModifier	XmClayoutModifier/String	CSG	NULL

XmNfontType

Specifies the type of the Rendition font object. For CTL, the value of this resource must be the XmFONT_IS_XOC value. If the value does not match, then the XmNlayoutAttrObject and XmNlayoutModifier resources are ignored.

When the value of this resource is XmFont_IS_XOC, and if the XmNfont resource is not specified, then at create time the value of the XmNfontName resource is converted into an XOC object in either the locale specified by the XmNlayoutAttrObject resource or the current locale. Furthermore, the value of the XmNlayoutModifier resource is passed through to any layout object associated with the XOC.

`XmNlayoutAttrObject`

Specifies the layout `AttrObject` argument. This resource is used to create the layout object associated with the XOC associated with this `XmRendition`. Refer to the layout services `m_create_layout`() specification for the syntax and semantics of this string. See the description of `XmNfontType` for an explanation of the interaction between the Layout Modifier Orientation output value and the `XmNlayoutDirection` widget resource.

`XmNlayoutModifier`

Specifies the layout values to be passed through to the layout object used with the XOC for this `XmRendition`. For the syntax and semantics of this string, see *CAE Specification*.

Setting this resource using `XmRendition{Retrieve,Update}` causes the string to be passed through to the layout object associated with the XOC associated with this rendition. This is the mechanism for configuring layout services dynamically. Unpredictable behavior can result if the `Orientation`, `Context`, `TypeOfText`, `TextShaping`, or `ShapeCharset` are changed.

Additional Layout Behavior

The `XmNlayoutModifier` affects the layout behavior of the text associated with the `XmRendition`. For example, if the layout default treatment of numerals is `NUMERALS_NOMINAL`, the user can change to `NUMERALS_NATIONAL` by setting `XmNlayoutModifier` to `@ls numerals=nominal:national`, or `@ls numerals=:national`.

The layout values can be classified into the following groups:

- Encoding description-`TypeOfText`, `TextShaping`, `ShapeCharset` (and locale codeset)

  `TypeOfText` is essentially segment ordering and can be illustrated with opaque blocks. Modifying these values dynamically, through the rendition object, is not usually meaningful, and is almost certain to result in unpredictable behavior.
- Layout behavior-`Orientation`, `Context`, `ImplicitAlg`, `Swapping`, and `Numerals`. `Orientation` and `Context` should not be modified dynamically. You can safely modify `ImplicitAlg`, `Swapping`, and `Numerals`.
- Editing behavior-`CheckMode`

XmText and XmTextField

Xm CTL extends XmText and XmTextField by adding a parallel set of movement and deletion actions that operate visually, patterned after the Motif 2.0 CSText widget. The standard Motif 2.1 Text and TextField do not distinguish between logical and physical order: *next* and *forward* mean “to the right,” while *previous* and *backward* mean “to the left.” CSText, however, makes the proper distinction and defines a new set of actions with strictly physical names (for example, left-character(), delete-right-word(), and so on). All of these action routines are defined to be sensitive to the XmNlayoutDirection of the widget and to call the appropriate *next-* or *previous-* action. The Xm CTL extensions are slightly more complex than the CSText extensions. The Xm CTL extensions are sensitive not to the global orientation of the widget, but to the specific directionality of the physical characters surrounding the cursor, as determined by the pseudo-XOC, including neutral stabilization.

There is also a new resource to control selection policy, to provide a rendition tag, and to control alignment.

The set of new Xm CTL actions is roughly the cross product of {Move,Delete,Kill} by {Left,Right} by {Character,Word}, and is listed below.

TABLE 6–2 New Resources in Xm CTL

Name	Class/Type	Access	Default Value
XmNrenditionTag	XmCRenditionTag/XmRString	CSG	XmFONTLIST_DEFAULT_TAG
XmNalignment	XmCAlignment/XmRAlignment	CSG	XmALIGNMENT_BEGINNING
XmNeditPolicy	XmCEditPolicy/XmREditPolicy	CSG	XmEDIT_LOGICAL

XmNrenditionTag
: Specifies the rendition tag of the XmRendition that is in the XmNrenderTable resource, used for this widget.

XmNalignment
: Specifies the text alignment used in the widget. Only XmALIGNMENT_END and XmALIGNMENT_CENTER are supported.

XmNeditPolicy
: Specifies the editing policy used for the widget, either XmEDIT_LOGICAL or XmEDIT_VISUAL. In the case of XmEDIT_VISUAL, selection, cursor movement, and deletion are in a visual style. Setting this resource also changes the translations for the standard keyboard movement and deletion events either to the new “visual” actions list or to the existing logical actions.

Character Orientation Action Routines

The `forward-cell()` and `backward-cell()` actions query the orientation of the character in the direction specified. If the direction is left-to-right, they call the corresponding *next-/forward-* or *previous-/backward-* variants:

Character Orientation Additional Behavior

The actions determine the orientation of characters by using the Layout Services transformation `OutToInp` and `Property` buffers (for the nesting level). The widget's behavior is therefore dependent on the locale-specific transformation. If the information in the `OutToInp` or, especially, `Property` buffers is inaccurate, the widget might behave unexpectedly. Moreover, as the locale-specific modules fall outside of the scope of this specification, bi-directional editing behavior can differ from platform to platform for the same text, application, resource values, and `LayoutObject` configuration.

The visual mode actions result in a display of cell-based behavior. The logical mode actions result in logical character-based behavior. For example, the `delete-right-character()` operation deletes the input buffer characters that correspond to the display cell. That is, one input buffer character whole `LayoutObject` transformation "property" byte "new cell indicator" is 1, and all of the succeeding characters whose "new cell indicator"[2] is 0.

Similarly, for `backward-character()`, the insertion point is moved backward one character in the input buffer, and the cursor is redrawn at the visual location corresponding to the associated output buffer character. This means that several keystrokes are required to move across a composite display cell; the cursor does not actually change display location as the insertion point moves across input buffer characters whose "new cell indicator" is 0 (that is, diacritics or ligature fragments).

This means that deletion operates either from the logical/input buffer side, or from the display cell level of the physical/output side. There is no mode for a strict, physical character-by-character deletion, since there is no one-to-one correspondence between the input and output buffers. A given physical character can represent only a fragment of a logical character, for example.

`XmText` Action Routines

The follwoing list describes the `XmText` action routines.

`left-character(extend)`

If the `XmNeditPolicy` is `XmEDIT_LOGICAL` and is called without arguments, the insertion cursor moves back logically by a character. If the insertion cursor is at the

[2] For more information on the `Property` buffer, see the specification for `m_transform_layout()` in *CAE Specification*.

beginning of the line, the insertion cursor moves to the logical last character of the previous line, if one exists. Otherwise, the insertion cursor position doesn't change.

If the `XmNeditPolicy` is `XmEDIT_VISUAL`, then the cursor moves to the left of the cursor position. If the insertion cursor is at the beginning of the line, then it moves to the end character of the previous line, if one exists.

If `left-character`() is called with an `extend` argument, the insertion cursor moves, as in the case of no argument, and extends the current selection.

The `left-character`() action produces calls to the `XmNmotionVerifyCallback` procedures with the reason value `XmCR_MOVING_INSERT_CURSOR`. If called with an `extend` argument, this action can produce calls to the `XmNgainPrimaryCallback` procedures. See the callback description in the *Motif Programmer's Reference* for more information.

`right-character(extend)`

If the `XmNeditPolicy` is `XmEDIT_LOGICAL` and is called without any arguments, it moves the insertion cursor logically forward by a character. If the insertion cursor is at the logical end of the line, it moves the insertion cursor to the logical starting of the next line, if one exists.

If the `XmNeditPolicy` is `XmEDIT_VISUAL`, then the cursor moves to the right of the cursor position. If the insertion cursor is at the end of the line, it moves the insertion cursor to the starting of the next line, if one exists.

If called with an argument of `extend`, it moves the insertion cursor, as in the case of no argument, and extends the current selection.

The `right-character()` action produces calls to the `XmNmotionVerifyCallback` procedures with the reason value `XmCR_MOVING_INSERT_CURSOR`. If called with `extend` argument, this can produce calls to the `XmNgainPrimaryCallback` procedures. See the callback description in the *Motif Programmer's Reference* for more information.

`right-word(extend)`

If the `XmNeditPolicy` is `XmEDIT_LOGICAL` and is called without any arguments, it moves the insertion cursor to the logical starting of the logical succeeding word, if one exists; otherwise, it moves to the logical end of the current word. If the insertion cursor is at the logical end of the line or in the logical last word of the line, it moves the cursor to the logical first word in the next line, if one exists; otherwise, it moves to the logical end of the current word.

If the `XmNeditPolicy` is `XmEDIT_VISUAL` and is called without arguments, it moves the insertion cursor to the first nonwhite space character after the first white space character to the right or after the end of the line.

If called with an argument of `extend`, it moves the insertion cursor, as in the case of no argument, and extends the current selection.

The `left-word()` action produces calls to the `XmNmotionVerifyCallback` procedures with the reason value `XmCR_MOVING_INSERT_CURSOR`. If called with `extend` argument, this can produce calls to the `XmNgainPrimaryCallback` procedures. See the callback description in the *Motif Programmer's Reference* for more information.

`delete-left-character()`
If the `XmNeditPolicy` is `XmEDIT_LOGICAL`, it is equivalent to `delete-previous-char()`. If the `XmNeditPolicy` is `XmEDIT_VISUAL`, then in normal mode, if there is a non-null selection, it deletes the selection; otherwise it deletes the character left of the insertion cursor. In add mode, if there is a non-null selection, the cursor is not disjointed from the selection and `XmNpendingDelete` is set to True, it deletes the selection; otherwise, it deletes the character left of the insertion cursor. This can impact the selection.

The `delete-left-character()` action produces calls to the `XmNmodifyVerifyCallback` procedures with reason value `XmCR_MODIFYING_TEXT_VALUE` and the `XmNvalueChangedCallback` procedures with reason value `XmCR_VALUE_CHANGED`.

`delete-right-character()`
If the `XmNeditPolicy` is `XmEDIT_VISUAL`, it is equivalent to `delete-next-character()`. If the `XmNeditPolicy` is `XmEDIT_VISUAL`, then in normal mode, if there is a non-null selection, it deletes the selection; otherwise, it deletes the character right of the insertion cursor. In add mode, if there is a non-null selection and the cursor is not disjointed from the selection, the `XmNpendingDelete` is set to True and the selection is deleted; otherwise, the character right of the insertion cursor is deleted. This can impact the selection.

The `delete-right-character()` action produces calls to the `XmNmodifyVerify-Callback` procedures with reason value `XmCR_MODIFYING_TEXT_VALUE`, and the `XmNvalue-ChangedCallback` procedures with reason value `XmCR_VALUE_CHANGED`.

A few cell-based routines are implemented to support character composition, ligatures, and diacritics. In other words, two or more characters might be represented by a single glyph occupying one presentation cell.

The `XmText` cell action routines are as follows:

`backward-cell(extend)`
Moves the insertion cursor back one cell. If the `XmNeditPolicy` is `XmEDIT_LOGICAL`, then the insertion cursor is moved to the start of the cell that precedes the current cell logically, if one exists; otherwise, it moves to the start of the current cell.

If the `XmNeditPolicy` is `XmEDIT_VISUAL`, then the cursor moves to the start of cell to the left of the cursor, if one exists. The `prev-cell()` action produces calls to the `XmNmotionVerifyCallback` procedures with the reason value

XmCR_MOVING_INSERT_CURSOR. If called with an extend argument, this can produce calls to the XmNgainPrimaryCallback procedures. See the callback description in the *Motif Programmer's Reference* for more information.

forward-cell(extend)

Moves the insertion cursor to the start of the logical next cell, if one exists; otherwise it moves it to the end of the cell. If the XmNeditPolicy is XmEDIT_LOGICAL, then the cursor moves forward one cell.

If the XmNeditPolicy is XmEDIT_VISUAL, then the cursor moves to the start of the cell to the right of the cursor position, if one exists; otherwise, it moves to the end of the current cell. The forward-cell() action produces calls to the XmNmotionVerifyCallback procedures with the reason value XmCR_MOVING_INSERT_CURSOR. If called with an extend argument, this can produce calls to the XmNgainPrimaryCallback procedures. See the callback description in the *Motif Programmer's Reference* for more information.

XmTextFieldGetLayoutModifier

XmTextFieldGetLayoutModifier() returns the layout modifier string that reflects the state of the layout object tied to its rendition.

The syntax for XmTextFieldGetLayoutModifier() is:

```
#include <Xm/TextF.h>
String XmTextFieldGetLayoutModifier(Widget widget)
```

XmTextFieldGetLayoutModifier() accesses the value of the current layout object settings of the rendition associated with the widget. When the layout object modifier values are changed using a convenience function, the XmTextFieldGetLayoutModifier function returns the complete state of the layout object, not only the changed values.

XmTextFieldGetLayoutModifier() returns the layout object modifier values in the form of a string value.

XmTextGetLayoutModifier

XmTextGetLayoutModifier() returns the layout modifier string that reflects the state of the layout object tied to its rendition.

The syntax for XmTextGetLayoutModifier() is:

```
#include <Xm/Text.h>
String XmTextGetLayoutModifier(Widget widget)
```

XmTextGetLayoutModifier accesses the value of the current layout object settings of the rendition associated with the widget. When the layout object modifier values are changed using a convenience function, the XmTextGetLayoutModifier function returns the complete state of the layout object, not just the changed values.

XmTextGetLayoutModifier returns the layout object modifier values in the form of a string value.

XmTextFieldSetLayoutModifier

XmTextFieldSetLayoutModifier() sets the layout modifier values, which changes the behavior of the layout object tied to its rendition.

The syntax for XmTextFieldSetLayoutModifier() is:

```
#include <Xm/TextF.h>
void XmTextFieldSetLayoutModifier(Widget widget,string layout_modifier)
```

XmTextFieldSetLayoutModifier modifies the layout object settings of a rendition associated with the widget. When the layout object modifier values are set using this convenience function, only the attributes specified in the input parameter are changed; the rest of the attributes remain untouched.

XmTextSetLayoutModifier

XmTextSetLayoutModifier() sets the layout modifier values, which changes the behavior of the layout object tied to its rendition.

The syntax for XmTextSetLayoutModifier() is:

```
#include <Xm/Text.h>
void XmTextSetLayoutModifier(Widget widget,string layout_modifier)
```

XmTextSetLayoutModifier modifies the layout object settings of a rendition associated with the widget. When the layout object modifier values are set using this convenience function, only the attributes specified in the input parameter are changed; the rest of the attributes are left untouched.

XmStringDirectionCreate

XmStringDirectionCreate creates a compound string.

The syntax for XmTextSetLayoutModifier() is:

```
#include <Xm/Xm.h>
XmString XmStringDirectionCreate(direction)
XmStringDirection direction
```

XmStringDirectionCreate creates a compound string with a single component, a direction with the given value. On the other hand, the XmNlayoutDirection resource sets a default rendering direction for any compound string (XmString) that does not have a component specifying the direction for that string. Therefore, to set the layout direction, all you need to do is set the appropriate value for the XmNlayoutDirection resource. You need not create compound strings with specific direction components. When the application renders an XmString, it should look to see if the string was created with an explicit direction (XmStringDirection). If there is no direction component, the application should check the value of the XmNlayoutDirection resource for the current widget and use that value as the default rendering direction for the XmString.

UIL Arguments

The following table shows the UIL arguments.

TABLE 6–3 UIL

UIL Argument Name	Argument Type
XmNlayoutAttrObject	String
XmNlayoutModifier	String
XmNrenditionTag	String
XmNalignment	Integer
XmNeditPolicy	Integer

How to Develop CTL Applications

The following sections show how to develop CTL applications.

Layout Direction

The direction of a compound string is stored so that the data structure is equally useful for describing text in left-to-right languages such as English, Spanish, French, and German, or for text in right-to-left languages, such as Hebrew and Arabic. In Motif applications, you can set the layout direction using the `XmNlayoutDirection` resource from the VendorShell or MenuShell. Manager and Primitive widgets (as well as Gadgets) also have an `XmNlayoutDirection` resource. The default value is inherited from the closest ancestor with the same resource.

In the case of an `XmText` widget, you must specify the vertical direction as well. Setting the `layoutDirection` to `XmRIGHT_TO_LEFT` results in the string direction from right-to-left, but the cursor moves vertically down. If the vertical direction is important and you require top to bottom alignment, be sure to specify `XmRIGHT_TO_LEFT_TOP_TO_BOTTOM`, which specifies that the components are laid out from right-to-left first and then top-to-bottom, and results in the desired behavior.

Furthermore, the behavior of `XmText` and `TextField` widgets is influenced by the `XmNalignment` and `XmNlayoutModifier` resources of the `XmRendition`. These resources, in addition to `XmNlayoutDirection`, control the layout behavior of the Text widget. This behavior is illustrated in Figure 6–2.

The input string used in the figure is:

A B و ض

The `XmNlayoutModifier` string `@ls orientation=` setting values for the following figure are shown in the left column.

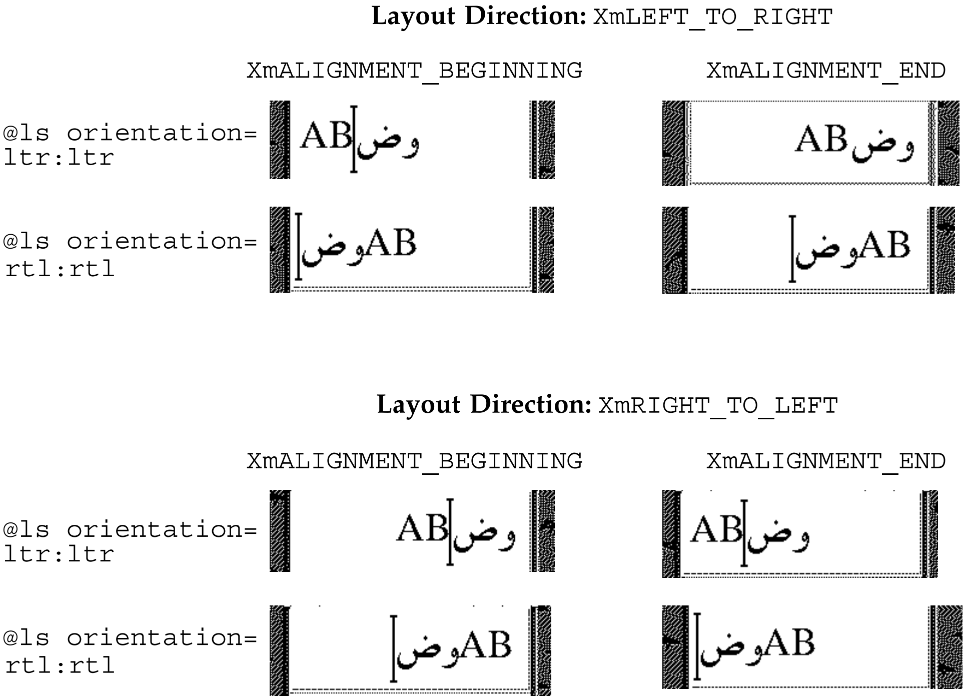


FIGURE 6–2 Layout Direction

As the illustration shows, XmNAlignment dictates whether the text is flush right or left in conjunction with the layout direction. XmNlayoutModifier breaks the text into segments and arranges them left-to-right or right-to-left, depending on the orientation value. In other words, if the XmNlayoutDirection is XmRIGHT_TO_LEFT, and the XmNAlignment value is XmALIGNMENT_BEGINNING, the string is flush right.

Creating a Rendition

The following code creates an XmLabel whose XmNlabelString is of the type XmCHARSET_TEXT, using the Rendition whose tag is “ArabicShaped.” The Rendition is created with an XmNlayoutAttrObject of “ar” (corresponding to the locale name for the Arabic locale) and a layout modifier string that specifies for the output buffer a Numerals value of NUMERALS_CONTEXTUAL and a ShapeCharset value of “unicode-3.0.”

The locale-specific layout module transforms its input text into an output buffer of physical characters encoded using the 16-bit Unicode 3.0 codeset. Because an explicit layout locale has been specified, this text is rendered properly independent of the runtime locale setting. In this example, the input is encoded in ISO 8859–6.

```
int n;
Arg args[10];
Widget w;
XmString labelString;
XmRendition rendition;
XmStringTag renditionTag;
XmRenderTable renderTable;
      /* alef lam baa noon taa - iso8859-6 */
labelString = XmStringGenerate("\307\344\310\346\312\", NULL
                                       XmCHARSET_TEXT, "ArabicShaped");
w = XtVaCreateManagedWidget("a label", xmLabelWidgetClass, parent,
                             XmNlabelString, labelString,
                                  XmNlabelType, XmSTRING,
                             NULL);
n = 0;
XtSetArg(args[n], XmNfontName, "-*-*-medium-r-normal-*-24-*-*-*-*-*");
      n++;
XtSetArg(args[n], XmNfontType, XmFONT_IS_XOC); n++;
XtSetArg(args[n], XmNlayoutAttrObject, "ar"); n++;
XtSetArg(args[n], XmNlayoutModifier,
          "@ls numerals=:contextual, shapecharset=iso8859-6"); n++;
renditionTag = (XmStringTag) "ArabicShaped";
rendition = XmRenditionCreate(w, renditionTag, argcs
s, n);
renderTable =
    XmRenderTableAddRenditions(NULL, &rendition, 1, XmREPLACE_MERGE);
XtVaSetValues(w, XmNrenderTable, renderTable, NULL);
```

Editing a Rendition

The following code creates a TextField widget and a RenderTable with a single Rendition. Both the XmNlayoutAttrObject and XmNlayoutModifier pseudo resources have been left unspecified and therefore default to NULL. This value means the layout object associated with the Rendition belongs to the default locale, if one exists.

For this example to work properly, the locale must be set to one whose codeset is ISO 8859-6 and whose locale-specific layout module can support the IMPLICIT_BASIC algorithm. The Rendition's LayoutObject's ImplicitAlg value is modified through the Rendition's XmNlayoutModifier pseudo resource.

```
int n;
Arg args[10];
Widget w;
    XmRendition rendition;
XmStringTag renditionTag;
```

```
XmRenderTable renderTable;
w = XmCreateTextField(parent, "text field", args, 0);
n = 0;
    XtSetArg(args[n], XmNfontName, "-*-*-medium-r-normal-*-24-*-*-*-*-*-*-*");
     n++;
    XtSetArg(args[n], XmNfontType, XmFONT_IS_XOC); n++;
renditionTag = (XmStringTag) "ArabicShaped";
rendition = XmRenditionCreate(w, renditionTag, args, n);
renderTable =
    XmRenderTableAddRenditions(NULL, &rendition, 1, XmREPLACE_MERGE);
XtVaSetValues(w, XmNrenderTable, renderTable, NULL);
    ....
n = 0;
XtSetArg(args[n], XmNlayoutModifier, "@ls implicitalg=basic");
     n++;
XmRenditionUpdate(rendition, args, n);
```

Creating a Render Table in a Resource File

`Renditions` and render tables should be specified in resource files for a properly internationalized application. When the render tables are specified in a file, the program binaries are made independent of the particular needs of a given locale, and can be easily customized to local needs.

Render tables are specified in resource files with the following syntax:
resource_spec : [*tag* [, *tag*] *]

where *tag* is some string suitable for the `XmNtag` resource of a rendition.

This line creates an initial render table containing one or more renditions as specified. The renditions are attached to the specified tags:

resource_spec [* | .] *rendition* [* | .] *resource_name* : *value*

The following examples illustrate the CTL resources related to `XmRendition` that can be set using resource files. The `fontType` must be set to `FONT_IS_XOC` for the layout object to take effect. The `layoutModifier` specified using `@ls` is passed on to the layout object by the rendition object.

For a complete list of resources that can be set on the layout object using `layoutModifier`, see *CAE Specification: Portable Layout Services: Context-dependent and Directional Text*, The Open Group: Feb 1997; ISBN 1-85912-142-X; document number C616.

Creating a Render Table in an Application

Before creating a render table, an application program must first have created at least one of the renditions that is part of the table. The XmRenderTableAddRenditions() function, as its name implies, is also used to augment a render table with new renditions. To create a new render table, call the XmRenderTableAddRenditions() function with a NULL argument in place of an existing render table.

The following code creates a render table using a rendition created with XmNfontType set to XmFONT_IS_XOC.

```
int n;
Arg args[10];
Widget w;
XmString labelString;
XmRendition rendition;
XmStringTag renditionTag;
XmRenderTable renderTable;
      /* alef lam baa noon taa - iso8859-6 */
labelString = XmStringGenerate("\307\344\310\346\312\", NULL
                                       XmCHARSET_TEXT, "ArabicShaped");
w = XtVaCreateManagedWidget("a label", xmLabelWidgetClass, parent,
                            XmNlabelString, labelString,
                                 XmNlabelType, XmSTRING,
                            NULL);
n = 0;
XtSetArg(args[n], XmNfontName, "-*-*-medium-r-normal-*-24-*-*-*-*-*-*");
     n++;
XtSetArg(args[n], XmNfontType, XmFONT_IS_XOC); n++;
XtSetArg(args[n], XmNlayoutAttrObject, "ar"); n++;
XtSetArg(args[n], XmNlayoutModifier,
          "@ls numerals=nominal:contextual, shapecharset=iso8859-6"); n++;
renditionTag = (XmStringTag) "ArabicShaped";
rendition = XmRenditionCreate(w, renditionTag, args, n);
renderTable =
    XmRenderTableAddRenditions(NULL, &rendition, 1, XmREPLACE);
XtVaSetValues(w, XmNrenderTable, renderTable, NULL);
```

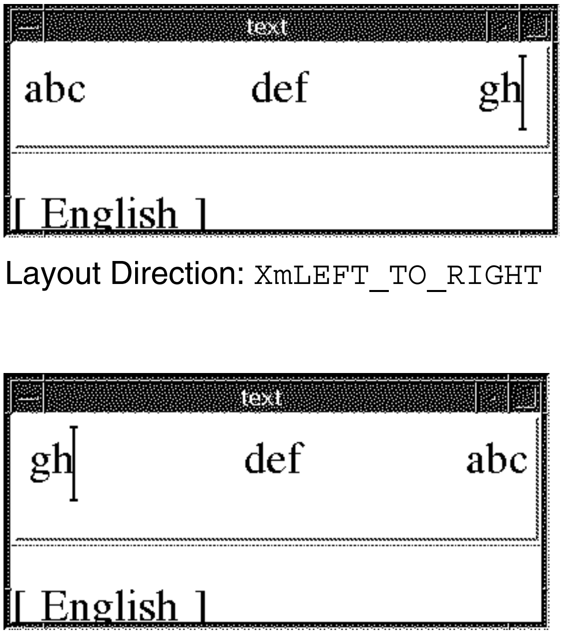
Horizontal Tabs

To control the placement of text, a compound string can contain tab characters. To interpret those characters on display, a widget refers to the rendition in effect for that compound string, where it finds a list of tab stops. However, the dynamic widgets,`TextField` and `XmText`, do not use the tab resource of the rendition. Instead, they compute the tab width using the formula of `8*(width of character 0)`.

The tab measurement is the distance from the left margin of the compound string display. This distance is measured from the right margin, if the layout direction is right-to-left. Regardless of the direction of the text (Arabic right-to-left or English left-to-right), the tab inserts space to the right or left, as specified by the layout direction (`XmNlayoutDirection`).

The text following a tab is always aligned at the tab stop. The tab stop is calculated from the start of the widget, which in turn is influenced by `XmNlayoutDirection`. The behavior of the tabs and their interaction with directionality of the text and the `XmNlayoutDirection` of the widget is illustrated in the following figure.

The input for this illustration is `abc\tdef\tgh`.



Layout Direction: `XmLEFT_TO_RIGHT`

Layout Direction: `XmRIGHT_TO_LEFT`

FIGURE 6–3 Tabbing Behavior

Mouse Selection

The user makes a primary selection with mouse button 1. Pressing this button deselects any existing selection and moves the insertion cursor and the anchor to the position in the text where the button is pressed. Dragging while holding down mouxse button 1 selects all text between the anchor and the pointer position, deselecting any text outside the range.

The text selected is influenced by the resource `XmNeditPolicy`, which can be set to `XmEDIT_LOGICAL` or `XmEDIT_VISUAL`. If the `XmNeditPolicy` is set to `XmEDIT_LOGICAL`, and if the text selected is bi-directional, the selected text is not contiguous visually and is a collection of segments. This is because the text in the logical buffer does not have a one-to-one correspondence with the display.

As a result, the contiguous buffer of logical characters of bidirectional text, when rendered does not result in a continuous stream of characters. Conversely, when the `XmNeditPolicy` is set to `XmEDIT_VISUAL`, the selected text can be contiguous visually but is segmented in the logical buffer. Therefore, the sequence of selection, deletion, and insertion of bidirectional text at the same cursor point does not result in the same string.

Keyboard Selection

The selection operation available with the mouse is also available with the keyboard. The combination of `Shift-arrow` keys allows the selection of text.

The selected text is influenced by the resource `XmNeditPolicy`, which can be set to `XmEDIT_LOGICAL` or `XmEDIT_VISUAL`. If the `XmNeditPolicy` is set to `XmEDIT_LOGICAL`, and if the selected text is bidirectional, the selected text is not contiguous visually. Because the text in the logical buffer does not have one-to-one correspondence with the display, the contiguous buffer of logical characters of bidirectional text, when rendered, does not result in a continuous stream of characters.

Conversely, when the `XmNeditPolicy` is set to `XmEDIT_VISUAL`, the text selected can be contiguous visually but is segmented in the logical buffer. Therefore, the sequence of selection, deletion, and insertion of bidirectional text at the same cursor point does not result in the same string.

Text Resources and Geometry

The text resources that relate to geometry are the following:

- The render table `XmNrenderTable` that the widget uses to select a font or font set and other attributes in which to display the text.

  The `Text` and `Textfield` widgets can use only the font-related rendition resources, such as `XmNfontType`. These widgets can also specify the attributes of the layout object, such as `XmNlayoutAttrObject`, usually a locale identifier, and `XmNlayoutModifier`, which specifies the layout values to be passed through to the Layout Object associated with the XOC associated with this `XmRendition`.
- A resource (`XmNwordWrap`) that specifies whether lines are broken at word boundaries when the text would be wider than the widget.

  Breaking a line at a word boundary does not insert a new line into the text. In the case of cursive languages like Arabic, if the word length is greater than the widget length, the word is wrapped to the next line, but the first character in the next line is shaped independently of the previous character in the logical buffer.

Porting Instructions

The new Motif library enabled for Complex Text Layout (CTL) , is located in `/usr/dt/lib/libXm.so.4`. If your application links to `libXm.so.3` it does not support CTL. `ldd app_name` shows the library to which the application is linking. To port the existing applications to enable CTL, you need to perform the following steps.

1. Add `-DSUN_CTL` to your `Makefile`. This flag is important and includes the necessary data structures to support CTL. This should be set during compilation.
2. Recompile the existing application. This recompilation automatically links with the CTL-enabled Motif library `libXm.so.4`
3. Add the `XmText.translations` resources to your application resource file. Without these resources, the layout engine of the locale does not launch.
4. Refer to the sample application attached to your documentation.

Note – Use the font name that is available and appropriate to your locale in the `fontName` resource.

For example, if you want the cell-based character movement (Thai) in `XmTextField` or `XmText` widgets, set the translations of the corresponding widgets as follows:

```
XmText.translations: #override \n\

<Key>osfRight:forward-cell() \n\

<Key>osfLeft:backward-cell() \n\

<Key>osfDelete:delete-next-cell() \n\

<Key>osfBackSpace:delete-previous-cell()  \n\
```

CHAPTER 7

Print Filter Enhancement With mp

This chapter describes print enhancement with mp. It discusses the following topics:

Printing for UTF-8

An enhanced mp(1) print filter is available in the Solaris 9 environment that can print various input file formats including flat text files written in UTF-8. It uses TrueType and Type 1 scalable fonts and X11 bitmap fonts available on the Solaris system. It can also make use of printer resident fonts and can act as an X print server client.

The output from the utility is standard PostScript and can be sent to any PostScript printer. mp(1) can also output any page description language when working as an X Print server client, mp is supported by the print server.

To use the utility, type the following:

```
system% mp filename | lp
```

You can also use the utility as a filter, since the utility accepts stdin stream

```
system% cat filename | mp | lp
```

:

You can set the utility as a printing filter for a line printer. For example, the following command sequence tells the printer service LP that the printer lp1 accepts only mp format files. This command also installs the printer lp1 on port /dev/ttya. See the lpadmin(1M) man page for more details.

```
system# lpadmin -p lp1 -v /dev/ttya -I MP
system# accept lp1
system# enable lp1
```

Using lpfilter(1M), you can add the utility for a filter as follows:

```
system# lpfilter -f lp1 -F pathname
```

The command tells LP that a converter (in this case, mp) is available through the filter description file named *pathname*. *pathname* contains the following:

```
Input types: simple
Output types: MP
Command: /usr/bin/mp
```

The filter converts the default type file input to PostScript output using /usr/bin/mp.

To print a UTF-8 text file, use the following command

```
system% lp -T MP UTF-8-file
```

Refer to the mp man page for more detail.

mp Print Filter Enhancement Overview

The mp print filter is enhanced in the Solaris 9 release. The latest mp can work internally in three different modes to produce the output file in a locale to print international text. The available modes are:

- mp working with locale-specific font configuration file mp.conf.
- mp working with locale-specific PostScript prolog file prolog.ps.
- mp working as an Xprt (X Print Server) client.

The following sections describe when to use a specific printing method and which configuration and supporting files are used by mp for these printing methods.

Using mp with the Locale Specific Font Configuration File mp.conf

If the -D or -P option is not given in the command line, this printing method is the default method, unless the prolog.ps file is present in either of the/usr/openwin/lib/locale/$LANG/print or /usr/lib/lp/locale/$LANG/mp directories. The prolog.ps file forces mp to print using PostScript embedded fonts in the file. Even if a prolog.ps exists in a locale, using the -M option ignores the prolog.ps file and uses a mp.conf file, if it exists, instead.

This method uses the /usr/lib/lp/locale/$LANG/mp/mp.conf font configuration file. You may not need to change this file unless you need to print using alternate fonts. This file can be configured with TrueType, Type 1 or .pcf fonts. /usr/lib/lp/locale/C/ contains .ps print page layout files common for this mode of printing as well as the next method. A description of how to customize these files is provided in "Customizing Existing prolog Files and Adding New prolog Files" on page 156.

Using mp With the Locale-specific PostScript Prologue Files

If the -D or -P option is not given in the command line, and /usr/openwin/lib/locale/$LANG/print/prolog.ps exists, then the prolog.ps file is prepended to the output. Depending upon the print style of the .ps prolog page, the layout file is also prepended to the output.

This method of printing makes use of PostScript font files only. Customization of prolog.ps files is described in "Using mp as an Xprt (X Print Server) Client" on page 149.

Using mp as an Xprt (X Print Server) Client

This support enables mp to print output for any printer connected to the network supported by an X Print Server. PostScript and many versions of PCL are also supported with this command.

If either the -D or -P command opton is used, and no XPDISPLAY variable is set in your environment, the print server startup script starts an Xprt server at port 2100 in the machine in which the client is running. The script also terminates the print server after mp completes. If XPDISPLAY is set, the mp client tries to contact the print server running at XPDISPLAY. In this case, no attempt is made to start the server if it is not running.

.The /usr/lib/lp/locale/C/mp directory contains .xpr print page layout files for mp working as the Xprt client. These are sample files created for 300 dpi printers. If the target printer has a different dpi value, the dpi value will automatically be converted to the target printer's resolution.

Localization of the Configuration File

Configuration files provide the flexibility for adding or changing font entries, or font group entries.

The system default configuration file /usr/lib/lp/locale/$LANG/mp/mp.conf where $LANG is a locale environment variable in the locale in which printing occurs. Users can have a personal configuration file that can be specified by the -u *config.file path* option.

A ligature or variant glyph that has been encoded as a character for compatibility is called a *presentation form*. The mp.conf file is used mainly for mapping the intermediate code points in a locale to the presentation forms in the encoding of the font that is used to print that code point.

Intermediate code points can either be wide characters, or output of the Portable Layout Services (PLS) layer. Complex Text Layout printing requires that the intermediate code points be PLS output. The default intermediate code generated by mp(1) is PLS output.

Font formats currently supported are Portable Compiled Format (PCF), TrueType, and Type1 format. Both system-resident and printer-resident Type1 fonts are supported. Keep in mind the following about the format and contents of the mp.conf configuration file:

- Lines must begin with a valid keyword (directive).
- Arguments to a keyword must appear on the same line as the keyword.
- Lines that begin with a # character are treated as comments until the end of the line.
- Numeric arguments that begin with 0x are interpreted as a hexadecimal number.

The different sections in the mp.conf file include:

- Font aliasing
- Font group definition
- Mapping from the intermediate code ranges to the font group in a locale
- Associating each font with the shared object that maps the intermediate code points to the presentation forms in the font encoding

Font Aliasing

The font aliasing section of the mp.conf file is used to define alias names for each font used for printing. Each line in this section is of the form:

FontNameAlias *font-alias-name font-type font-path*

font-alias-name
The usual convention for aliasing a font name is to specify the encoding/script name of the font followed by a letter that indicates whether the font is Roman, Bold, Italic, or BoldItalic (R, B, I or BI).

For example, /usr/openwin/lib/X11/fonts/75dpi/courR18.pcf.Z, because it is an iso88591 Roman font, can be given the alias name iso88591R.

font-type
Specify PCF for .pcf fonts, Type1 for Adobe Type1 fonts, and TrueType for truetype fonts. Only these three kinds of fonts can be configured in this mp.config file.

font-path
Give the absolute path name for the font files here. For Type1 printer-resident fonts, just specify the font name, such as Helvetica.

For example,

```
FontNameAlias   prnHelveticaR   Type1   Helvetica
```

Font Group Definition

You can combine same-type fonts to form a font group. The format of the font group is as follows.

keyword	FontGroup.
fontgroupname	The group name for the fonts.
GroupType	The font type. Create font groups for the same type of fonts only (PCF, Type1, TrueType).
Roman	The Roman Font name in the font group.
Bold	The Bold Font name in the font group.
Italic	The Italic Font name in the font group.
BoldItalic	The BoldItalic Font name in the font group.

For creating a group, only a Roman font entry is required. The Bold, Italic, and BoldItalic fonts are optional. The different types of fonts are used to display the header lines for mail/news articles, for example. If only the Roman font is defined, it is used in place of other fonts.

Mapping Section

The mapping section of the mp.conf files maps from the intermediate code ranges to the font group in a locale. Each line in this section is as follows.

keyword MapCode2Font.

range_start A 4–byte hexadecimal value that starts with 0x, that indicates the start of the code range to map to one or more font group.

range_end Indicates the end of the code range to map. It can be '-' in which case only a single intermediate code point is mapped to the target font.

group A Type1, PCF, or TrueType font group, with which the presentation forms are to be printed.

Association Section

The association section of the mp.conf file associates each font with the shared object that maps the intermediate code points to the presentation forms in the fonts encoding. Each line in this section is as follows.

keyword CnvCode2Font.

font alias name The alias name defined for the font.

mapping function Takes in the intermediate code and returns presentation forms in fonts encoding, which is in turn used to get the glyph index, and draw the glyph.

file path having mapping function The .so file name that contains the mapping function. You can use the utility in dumpcs to find out the intermediate codeset for EUC locales.

Note – The current TrueType engine used by mp (1) can deal only with format 4 and PlatformID 3 cmap. That is, you can only configure Microsoft .ttf files. Additionally, the character map encoding has to be Unicode or Symbol for the TrueType font engine to work correctly. Because most of the .ttf fonts in the Solaris environment obey these restrictions, you can map all TrueType fonts in Solaris software within the mp.conf file.

When you create a shared object for mapping a font that corresponds to a PCF type1 X Logical Fonts Description (XLFD), then create the shared object that maps from the intermediate code range to the encoding specified by XLFD. For example:

```
-monotype-arial-bold-r-normal-bitmap-10-100-75-75-p-54-iso8859-8
```

The corresponding PCF font is:

```
/usr/openwin/lib/locale/iso_8859_8/X11/fonts/75dpi/ariabd10.pcf.Z
```

This font is encoded in isoISO 8859-8, so shared objects have to map between intermediate code and corresponding ISO 8859-8 code points.

If a TrueType font with XLFD:

```
-monotype-arial-medium-r-normal--0-0-0-0-p-0-iso8859-8
```

has the corresponding font:

```
/usr/openwin/lib/locale/iso_8859_8/X11/fonts/TrueType/arial__h.ttf
```

you should map between the intermediate code and Unicode, because the `cmap` encoding for the previous TrueType font is in Unicode. In the example of this TrueType font, suppose a sample intermediate code in the `en_US.UTF-8` locale that corresponds to a Hebrew character (produced by the PLS layer) is `0xe50000e9`. Because the font is Unicode encoded, design the function within the corresponding `.so` module in such a way that when you are passing `0xe50000e9`, the output corresponds to presentation form in Unicode. The example here is `0x000005d9`.

The function prototype for the mapping function should be:

```
unsigned int function(unsigned int inter_code_pt)
```

The following are optional keyword/value pairs that you can use in `mp.conf`:

```
PresentationForm        WC/PLSOutput
```

The default value is `PLSOutput`. If the user specifies `WC`, then the intermediate code points that are generated are wide characters. For CTL printing, this default value should be used.

If the locale is a non-CTL locale and has the keyboard value is PLSOutput, that value is ignored and the `mp`(1) generates wide-character codes instead.

You can use the optional keyword/value pairs listed in the following table if the locale supports CTL. These variables can assume any of the possible values given in the middle column of the table.

TABLE 7–1 Optional Keyword/Value Pairs

Optional Keyword	Optional Value	Default

`Orientation`	`ORIENTATION_LTR/`
	`ORIENTATION_RTL/`
	`ORIENTATION_CONTEXTUAL`
		`ORIENTATION_LTR`

TABLE 7–1 Optional Keyword/Value Pairs *(Continued)*

Optional Keyword	Optional Value	Default
Numerals	NUMERALS_NOMINAL/ NUMERALS_NATIONAL/ NUMERALS_CONTEXTUAL	NUMERALS_NOMINAL
TextShaping	TEXT_SHAPED/ TEXT_NOMINAL/ TEXT_SHFORM1/ TEXT_SHFORM2/ TEXT_SHFORM3/ TEXT_SHFORM4	TEXT_SHAPED

Adding a Printer-resident Font

The following example illustrates the steps that you need to follow when you add a new PCF, TrueType, or Type1 printer-resident font to the configuration file.

Replace the font for displaying characters in the range `0x00000021` - `0x0000007f` with a TrueType font instead of the currently configured PCF font.

Before adding a new font, look at various components in the configuration file that correspond to the currently configured font, as shown next.

```
FontNameAlias iso88591R  PCF  /usr/openwin/lib/X11/fonts/75dpi/courR18PCF.Z
FontNameAlias iso88591B  PCF  /usr/openwin/lib/X11/fonts/75dpi/courB18PCF.Z
.
.
.
FontGroup       iso88591         PCF       iso88591R iso88591B
.
.
.
MapCode2Font    0x00000020      0x0000007f      iso88591
.
.
.
CnvCode2Font iso88591R _xuiso88591 /usr/lib/lp/locale/$LANG/mp/xuiso88591.so
CnvCode2Font iso88591B _xuiso88591 /usr/lib/lp/locale/$LANG/mp/xuiso88591.so
```

Suppose you selected `/usr/openwin/lib/locale/ja/X11/fonts/TT/HG-MinchoL.ttf` as your candidate for doing the mapping in the `en_US.UTF-8` locale. Because this is a Unicode character-mapped TrueType font file, in the mapping function within the `.so` module you only need to have a function that directly returns the incoming ucs-2 code points.

```
unsigned short _ttfjis0201(unsigned short ucs2) {
                 return(ucs2);
         }
```

Save this in a `ttfjis0201.c` file. Create a shared object as follows.

```
cc -G -Kpic -o ttfjis0201.so ttfjis0201.c
```

But if you are mapping a PCF file, such as `/usr/openwin/lib/locale/ja/X11/fonts/75dpi/gotmrk20.pcf.Z`, then look in the `fonts.dir` file in the `/usr/openwin/lib/locale/ja/X11/fonts/75dpi/` directory. Become familiar with the encoding, corresponding to XLFD, which is:

```
-sun-gothic-medium-r-normal--22-200-75-75-c-100-jisx0201.1976-0
```

If `jisx0201` is the encoding, prepare a shared object that maps from ucs-2 to jisx0201. You need to obtain the mapping table for creating the `.so` module (if one is not already provided). For a Unicode locale, find the mappings from the many charsets to Unicode under `ftp.unicode.org/pub/MAPPINGS/`. Follow these mappings(1)(1) in order to write a `xu2jis0201.c` file:

```
 unsigned short _xu2jis0201(unsigned short ucs2) {
                         if(ucs2 >= 0x20 && ucs2 <= 0x7d )
                                 return (ucs2);
                         if(ucs2==0x203e)
                                 return (0x7e);
                         if(ucs2 >= 0xff61 && ucs2 <= 0xff9f)
                                 return (ucs2 - 0xff60 + 0xa0);
                        return(0);
                 }
```

When you create a mapping file, include all the UCS-2 to jisx0201 cases.

```
cc  -G -o xu2jis0201.so xu2jis0201.c
```

Creating a Shared Object File

This example creates a shared object file.

Add this font by adding the following lines to the corresponding sections of `mp.conf`. The following example shows how to add the TrueType font. The PCF font follows the same pattern except that you change the keyword to PCF instead of TrueType.

```
FontNameAlias   jis0201R TrueType /home/fn/HG-Minchol.ttf
FontGroup     jis0201 TrueType jis0201R
MapCode2Font  0x0020     0x007f  jis0201
CnvCode2Font   jis0201R      _ttfjis0201 <.so path>
```

where the `.so` path points to the `xu2jis0201.so` file.

Invoking mp(1) with the changed mp.conf file causes the range 0x0020-0x007f to be printed in the new font. Map the other Japanese character ranges too with the same .so file, for example, the range 0x0000FF61 0x0000FF9F.

To maintain backward compatibility, the /usr/openwin/lib/locale/$LANG/print/prolog.ps file, if it exists, is used to create output in the current locale, where $LANG is one of the locale components. In that situation, no configuration file mechanism is used.

Refer to /usr/lib/lp/locale/en_US.UTF-8/mp/mp.conf, which is a sample mp.conf file.

Customizing Existing prolog Files and Adding New prolog Files

The prolog files can be divided into two main categories:

- PostScript prolog files (.ps)
- X print server client prolog files(.xpr).

PostScript File Customization

The PostScript files fall into the following categories:

- Common prolog file
- Print layout prolog files

Locale-dependent prolog Files

The purpose of the prolog.ps file is to set up non-generic fonts. Applications use these predefined PostScript font names for printing. The prolog file must define at least the following font names for Desk Set Calendar manager and mp.

- LC_Times-Roman
- LC_Times-Bold
- LC_Helvetica
- LC_Helvetica-Bold
- LC_Courier
- LC_Helvetica-BoldOblique
- LC_Times-Italic

The following example uses these fonts to print the particular local character set specified:

```
100 100 moveto
/LC_Times-Roman findfont 24 scale font setfont
(Any text string in your locale) show
```

The Solaris localization kit provides a sample `prolog.ps` file for the Japanese environment. Alternatively, this file is found in the `/usr/openwin/lib/locale/ja/print/` directory.

The following example shwos how to add or change composite fonts in an existing `prolog.ps`.

```
%
(Foo-Fine) makecodeset12
(Base-Font) makeEUCfont
%
```

Suppose you want to define a composite font called LC_Base-Font:

LC_Base-Font is a composite font of Foo-Fine and a base font called Base-Font. Foo-Fine is a font that contains the local character set. You do not need any in-depth PostScript knowledge to add or change a font.

The best way to create a `prolog.ps` File is to study the example version. In the example `prolog.ps`, two routines need to be written, `makecodeset12` and `makeEUCfont`. `Makecodeset12` sets up local font-encoding information. This routine might differ from locale to locale. `MakeEUCfont` combines the base font and the locale font to form a composite font. The creator of the `prolog` file should have good knowledge of PostScript in order to write `makecodeset12` and `makeEUCfont`.

`prolog.ps` file support is kept for backward compatibility only. Do not create a new `prolog.ps` file for the printing needs of a locale. Use `mp.conf` instead.

The path for `prolog.ps` is

```
/usr/openwin/lib/locale/$LANG/print/prolog.ps
```

Common PostScript `prolog` Files

The common `prolog` file is `mp.common.ps`.

Every other page layout prolog file needs to include this file.

The `mp.common.ps` file resides in the `/usr/lib/lp/locale/C/mp/` directory, contains a PostScript routine to re-encode a font from the standard encoding to the ISO 8859–1 encoding. The `.reencodeISO` routine is called from the print layout `prolog` files to change encoding of the fonts. Usually this `prolog` file does not need any customization. If the users are creating their own `prolog` files, set the environment variable `MP_PROLOGUE` to point to the directory that contains the modified `prolog` files.

Print Layout `prolog` Files

The print layout `prolog` files, `mp.*.ps` files, contain routines for controlling the page layout for printing. In addition to giving a header and a footer for a print page with user name, print date, and page number, these `prolog` files can provide other information. For example, the `prolog` files can give effective print area dimensions and landscape and portrait mode of printing to be used.

The Print Layout `prolog` files are:

- `mp.pro.ps`
- `mp.pro.alt.ps`
- `mp.pro.fp.ps`
- `mp.pro.ps`
- `mp.pro.ts.ps`
- `mp.pro.altl.ps`
- `mp.pro.ff.ps`
- `mp.pro.l.ps`
- `mp.pro.ll.ps`
- `mp.pro.tm.ps`

A set of standard functions needs to be defined in every `prolog` file. These functions are called when a new print page starts, a print page ends, or a new column ends. The implementations of these functions define the print attributes of the printout.

The following PostScript variables are defined at runtime by the `mp`(1) binary. All the print layout files can use these variables for printing dynamic information such as `user name`, `subject`, `print time`. This information taken from the variables normally appears in the header or footer of the print page.

User — The name of the user who is running `mp`, obtained from the system `passwd` file.

MailFor — Variable used to hold the name of the type of article to print. The possible values for this variable are:

- "Listing for" - When the input is a text file
- "Mail for" - When the input is a mail file
- "Article from" - When the input is an article from a news group

Subject — The subject taken from the mail and news headers. You can use the `-s` option to force a subject to the mail and news files as well as to normal text files.

Timenow — The time of print that appears in the header and footer. This information is taken from the `localtime()` function.

The following functions are implemented in print layout `prolog` files. All these functions can use subfunctions.

`endpage` usage : `page_number endpage`

Called when the bottom of a printed page is reached. This function restores the graphic context of the page and issues a “showpage.” In some `prolog` files the header and footer information is displayed in only a page-by-page mode rather than in a column-by-column mode. You can implement this function to call subfunctions that display the header and footer gray scale lozenges.

`newpage` usage : `page_number newpage`

Routines or commands to be executed when a new page begins. Setting landscape print mode, saving the print graphic context, and translating the page coordinates are some of the functions for routine.

`endcol` usage : `page_number col_number endcol`

Used to display header and footer information. Move to the new print position, and so forth.

For adding new print layout `prolog` files, you need to define the following variables explicitly within the print layout `prolog` file.

NumCols Number of columns in a print page. Default is 2.

PrintWidth Width of print area in inches. Default is 6.

PrintHeight Height of print area in inches. Default is 9.

`.xpr` File Customization

These files are located by default at `/usr/lib/lp/locale/C/mp/`. An `.xpr` file corresponds to each PostScript `prolog` layout file, except for `mp.common.ps.` You can define an alternate `prolog` directory by defining the `MP_PROLOGUE` environment variable.

These files work as keyword/values pairs. Lines that start with # are considered comments. Spaces separate different tokens unless explicitly stated. Three main sections for each `.xpr` file are bound by the following keyword pairs:

- `STARTCOMMON/ENDCOMMON`
- `STARTPAGE/ENDPAGE`
- `STARTCOLUMN/ENDCOLUMN`
- `STARTFORCEDPAGE/ENDFORCEDPAGE`
- `STARTFORCEDCOLUMN/ENDFORCEDCOLUMN`

Certain keyword/value pairs can be used in these three areas. Each area is described next.

`STARTCOMMON/ENDCOMMON` Keywords

All the keyword/value pairs that appear after the `STARTCOMMON` keyword and before the `ENDCOMMON` keyword define general properties of the print page. Different valid values for a keyword are separated by using "/".

`ORIENTATION 0/1`
"0" means the printing occurs in portrait and "1" means in landscape.

`PAGELENGTH` *unsigned-integer*
A value that indicates the number of lines per logical page.

`LINELENGTH` *unsigned-integer*
A value that indicates the number of single column characters per line.

`NUMCOLS` *unsigned-integer*
The number of logical pages per physical page.

`HDNGFONTSIZE` *unsigned-integer*
The heading font point size in decipoints.

`BODYFONTSIZE` *unsigned-integer*
The body font point size in decipoints.

`PROLOGDPI` *unsigned-integer*
The dots-per-inch scale in which the current `.xpr` file is created.

`YTEXTBOUNDARY` *unsigned-integer*
This y-coordinate establishes the boundary for text printing in a page or logical page (column). This boundary is used as an additional check to see whether text printing is occurring within the expected area. This boundary is needed for Complex Text Layout and EUC printing, as character height information obtained from corresponding fonts can be wrong.

`STARTTEXT` *unsigned-integer unsigned-integer*
The decipoint `x/y` points where the actual text printing starts in the first logical page in a physical page.

`PAGESTRING 0/1`
The 1 indicates that a "Page" string needs to be appended before the page number in the heading.

0 indicates that only the page number is displayed.

`EXTRAHDNGFONT` *font string 1, font string 2, ... font string n*
The 'font string 1' to 'font string n' are X Logical Font Descriptions. The Token that separates the keyword EXTRAHDNGFONT from the comma separated font name list is `"`, not spaces or tabs. These fonts are given preference over the built-in fonts when the heading is printed. Usually, EXTRABODYFONT is used to assign

printer-resident fonts that are configured in /usr/openwin/server/etc/XpConfig/C/print/models/<model name>/fonts directory.

The fonts.dir file contains the XLFD of the printer-resident fonts.

Usually a font is specified as

```
"-monotype-Gill Sans-Regular-r-normal- -*-%d-*-*-p-0-iso8859-2"
```

in the .xpr file. "%d", if present, is replaced by mp(1) to the point size of the current heading fonts in the .xpr file. The x resolution and y resolution are specified by * and the average width field is set as 0 to indicate selection of a scalable font, if possible. You can give more specific font names also.

EXTRABODYFONT *font string 1, font string 2, ... font string n*
The same as EXTRAHDNGFONT, except that these fonts are used to print the page body.

XDISPLACEMENT *signed/unsigned int*
Gives the x coordinate displacement to be applied to the page for shifting the contents of the page in the x direction. This displacement can be a +ve or -ve value.

YDISPLACEMENT *signed/unsigned int*
The same as x displacement except that the shifting happens in the y direction.

These two keywords are useful when you find that some printers have nonstandard margin widths and you need to shift the printed contents in a page.

STARTPAGE/ENDPAGE

The keyword value pairs in this section are bound by STARTPAGE and ENDPAGE keywords. This section contains drawings and heading information that is to be applied for a physical page. A physical page can contain many logical pages, but all the drawing routines that are contained between these keywords are applied only once to a physical page.

The valid drawing entities are LINE and ARC. XDrawLine() and XDrawArc() functions are executed on values of these keywords.

The dimensions within this section are mapped in PROLOGDPI units. Angles are in degrees.

LINE x1 y1 x2 y2	The x/y unsigned coordinates define a pair of points for connecting a line.
ARC x y width height angle1 angle2	x and y are both unsigned integers that represent the arc origin. Width and height are unsigned integers that represent the width and height of the arc.
USERSTRINGPOS x y	Unsigned coordinates represent the position in which the user information is printed on the heading.

TIMESTRINGPOS x y Unsigned coordinates represent the position in which the time for printing is printed on the heading.

PAGESTRINGPOS x y Unsigned coordinates represent the position to print the page string for each printed page.

SUBJECTSTRINGPOS x y Unsigned coordinates represent the position to print the subject in the page.

STARTFORCEDPAGE/ENDFORCEDPAGE

When the -n option is given to mp, all the decorations given within a STARTPAGE/ENDPAGE section do not print. However, everything included within a STARTFORCEDPAGE/ENDFORCEDPAGE section prints even if the -n option is given.

STARTCOLUMN/ENDCOLUMN

All keywords are the same as secribed in "STARTPAGE/ENDPAGE" on page 161 except that the entries in this section are applied to NUMCOLS times to a physical page.

If NUMCOLS is 3, then the printable area of the physical page is divided into three, and lines, arcs, or heading decorations appear three times per page.

STARTFORCEDCOLUMN/ENDFORCEDCOLUMN

When the -n option is given to mp, all the decorations given within a STARTCOLUMN/ENDCOLUMN section do not print. However, everything included within a STARTFORCEDCOLUMN/ENDFORCEDCOLUMN section prints even if the -n option is given.

Creating a New .xpr File

The following values are the mp(1) program defaults for different keywords if these values are not specified in the .xpr file for the STARTCOMMON/ENDCOMMON section.

```
ORIENTATION 0
PAGELENGTH 60
LINELENGTH 80
YTEXTBOUNDARY 3005
NUMCOLS 01
HDNGFONTSIZE 120
PROLOGDPI 300
```

```
STARTTEXT 135 280
PAGESTRING 0
```

No default values are needed for the other two sections bound by STARTPAGE/ENDPAGE and STARTCOLUMN/ENDCOLUMN.

When you create a new .xpr prolog file, you need to specify only the values that differ from the default.

To create a page with no decoration, use four logical pages per physical page, in portrait format.

- STARTCOMMON
- NUMCOLS 04
- LINELENGTH 20
- ENDCOMMON

In this situation, you do not need the other two sections:

- STARTPAGE/ENDPAGE
- STARTCOLUMN/ENDCOLUMN

These parameters are not needed if you are not putting decorations on the printed page. All the coordinates are in 300 dpi default unless you are not specifying the PROLOGDPI keyword. If target printer resolution is different, the .xpr file is scaled to fit into that resolution by the program.

When you create a .xpr file, you must know the paper dimensions beforehand. For U.S. paper, 8.5x11 inches, for a printer of resolution 300 dpi, 2550X3300 are the total dimensions. Most printers cannot print from the top left corner of the paper. Instead, they put some margin around the physical paper. That means that even if you try to print from 0,0 the printing won't be in the top left corner of the page. You need to consider this limitation when you create a new .xpr file.

APPENDIX **A**

iconv Code Conversions

The following table lists the Unicode-related code conversion modules available in the Solaris 9 Environment.

TABLE A–1 Available Unicode Related iconv Code Conversion Modules

From Code (Symbol)	To Code (Symbol)
646 (ISO 646)	UCS-2
646 (ISO 646)	USC-2BE
646 (ISO 646)	UCS-2LE
646 (ISO 646)	USC-4
646 (ISO 646)	USC-4BE
646 (ISO 646)	USC-4LE
646 (ISO 646)	UTF-8
646 (ISO 646)	UTF-16
646 (ISO 646)	UTF-16BE
646 (ISO 646)	UTF-16LE
646 (ISO 646)	UTF-32
646 (ISO 646)	UTF-32BE
646 (ISO 646)	UTF-32LE
ISO8859–11	UTF-8
8859-1 (ISO8859-1)	UCS-2
8859-1 (ISO8859-1)	UCS-2BE
8859-1 (ISO8859-1)	UCS-2LE

TABLE A–1 Available Unicode Related `iconv` Code Conversion Modules *(Continued)*

From Code (Symbol)	To Code (Symbol)
8859-1 (ISO8859-1)	UCS-4
8859-1 (ISO8859-1)	UCS–4BE
8859-1 (ISO8859-1)	UCS-4LE
8859-1 (ISO8859-1)	UTF-8
8859-1 (ISO8859-1)	UTF-16
8859-1 (ISO8859-1)	UTF-16BE
8859-1 (ISO8859-1)	UTF-16LE
8859-1 (ISO8859-1)	UTF-32
8859-1 (ISO8859-1)	UTF-32BE
8859-1 (ISO8859-1)	UTF-32LE
8859-2 (ISO8859-2)	UCS-2
8859-2 (ISO8859-2)	UCS-2BE
8859-2 (ISO8859-2)	UCS-2LE
8859-2 (ISO8859-2)	UCS-4
8859-2 (ISO8859-2)	UCS–4BE
8859-2 (ISO8859-2)	UCS-4LE
8859-2 (ISO8859-2)	UTF-8
8859-2 (ISO8859-2)	UTF-16
8859-2 (ISO8859-2)	UTF-16BE
8859-2 (ISO8859-2)	UTF-16LE
8859-2 (ISO8859-2)	UTF-32
8859-2 (ISO8859-2)	UTF-32BE
8859-2 (ISO8859-2)	UTF-32LE
8859-3 (ISO8859-3)	UCS-2
8859-3 (ISO8859-3)	UCS-2BE
8859-3 (ISO8859-3)	UCS-2LE
8859-3 (ISO8859-3)	UCS-4
8859-3 (ISO8859-3)	UCS–4BE

TABLE A–1 Available Unicode Related `iconv` Code Conversion Modules *(Continued)*

From Code (Symbol)	To Code (Symbol)
8859-3 (ISO8859-3)	UCS-4LE
8859-3 (ISO8859-3)	UTF-8
8859-3 (ISO8859-3)	UTF-16
8859-3 (ISO8859-3)	UTF-16BE
8859-3 (ISO8859-3)	UTF-16LE
8859-3 (ISO8859-3)	UTF-32
8859-3 (ISO8859-3)	UTF-32BE
8859-3 (ISO8859-3)	UTF-32LE
8859-4 (ISO8859-4)	UCS-2
8859-4 (ISO8859-4)	UCS-2BE
8859-4 (ISO8859-4)	UCS-2LE
8859-4 (ISO8859-4)	UCS-4
8859-4 (ISO8859-4)	UCS–4BE
8859-4 (ISO8859-4)	UCS-4LE
8859-4 (ISO8859-4)	UTF-8
8859-4 (ISO8859-4)	UTF-16
8859-4 (ISO8859-4)	UTF-16BE
8859-4 (ISO8859-4)	UTF-16LE
8859-4 (ISO8859-4)	UTF-32
8859-4 (ISO8859-4)	UTF-32BE
8859-4 (ISO8859-4)	UTF-32LE
8859-5 (ISO8859-5)	UCS-2
8859-5 (ISO8859-5)	UCS-2BE
8859-5 (ISO8859-5)	UCS-2LE
8859-5 (ISO8859-5)	UCS-4
8859-5 (ISO8859-5)	UCS–4BE
8859-5 (ISO8859-5)	UCS-4LE
8859-5 (ISO8859-5)	UTF-8

TABLE A–1 Available Unicode Related `iconv` Code Conversion Modules *(Continued)*

From Code (Symbol)	To Code (Symbol)
8859-5 (ISO8859-5)	UTF-16
8859-5 (ISO8859-5)	UTF-16BE
8859-5 (ISO8859-5)	UTF-16LE
8859-5 (ISO8859-5)	UTF-32
8859-5 (ISO8859-5)	UTF-32BE
8859-5 (ISO8859-5)	UTF-32LE
8859-6 (ISO8859-6)	UCS-2
8859-6 (ISO8859-6)	UCS-2BE
8859-6 (ISO8859-6)	UCS-2LE
8859-6 (ISO8859-6)	UCS-4
8859-6 (ISO8859-6)	UCS–4BE
8859-6 (ISO8859-6)	UCS-4LE
8859-6 (ISO8859-6)	UTF-8
8859-6 (ISO8859-6)	UTF-16
8859-6 (ISO8859-6)	UTF-16BE
8859-6 (ISO8859-6)	UTF-16LE
8859-6 (ISO8859-6)	UTF-32
8859-6 (ISO8859-6)	UTF-32BE
8859-6 (ISO8859-6)	UTF-32LE
8859-7 (ISO8859-7)	UCS-2
8859-7 (ISO8859-7)	UCS-2BE
8859-7 (ISO8859-7)	UCS-2LE
8859-7 (ISO8859-7)	UCS-4
8859-7 (ISO8859-7)	UCS–4BE
8859-7 (ISO8859-7)	UCS-4LE
8859-7 (ISO8859-7)	UTF-8
8859-7 (ISO8859-7)	UTF-16
8859-7 (ISO8859-7)	UTF-16BE

TABLE A–1 Available Unicode Related `iconv` Code Conversion Modules *(Continued)*

From Code (Symbol)	To Code (Symbol)
8859-7 (ISO8859-7)	UTF-16LE
8859-7 (ISO8859-7)	UTF-32
8859-7 (ISO8859-7)	UTF-32BE
8859-7 (ISO8859-7)	UTF-32LE
8859-8 (ISO8859-8)	UCS-2
8859-8 (ISO8859-8)	UCS-2BE
8859-8 (ISO8859-8)	UCS-2LE
8859-8 (ISO8859-8)	UCS-4
8859-8 (ISO8859-8)	UCS–4BE
8859-8 (ISO8859-8)	UCS-4LE
8859-8 (ISO8859-8)	UTF-8
8859-8 (ISO8859-8)	UTF-16
8859-8 (ISO8859-8)	UTF-16BE
8859-8 (ISO8859-8)	UTF-16LE
8859-8 (ISO8859-8)	UTF-32
8859-8 (ISO8859-8)	UTF-32BE
8859-8 (ISO8859-8)	UTF-32LE
8859-9 (ISO8859-9)	UCS-2
8859-9 (ISO8859-9)	UCS-2BE
8859-9 (ISO8859-9)	UCS-2LE
8859-9 (ISO8859-9)	UCS-4
8859-9 (ISO8859-9)	UCS–4BE
8859-9 (ISO8859-9)	UCS-4LE
8859-9 (ISO8859-9)	UTF-8
8859-9 (ISO8859-9)	UTF-16
8859-9 (ISO8859-9)	UTF-16BE
8859-9 (ISO8859-9)	UTF-16LE
8859-9 (ISO8859-9)	UTF-32

TABLE A–1 Available Unicode Related `iconv` Code Conversion Modules *(Continued)*

From Code (Symbol)	To Code (Symbol)
8859-9 (ISO8859-9)	UTF-32BE
8859-9 (ISO8859-9)	UTF-32LE
8859-10 (ISO8859-10)	UCS-2
8859-10 (ISO8859-10)	UCS-2BE
8859-10 (ISO8859-10)	UCS-2LE
8859-10 (ISO8859-10)	UCS-4
8859-10 (ISO8859-10)	UCS–4BE
8859-10 (ISO8859-10)	UCS-4LE
8859-10 (ISO8859-10)	UTF-8
8859-10 (ISO8859-10)	UTF-16
8859-10 (ISO8859-10)	UTF-16BE
8859-10 (ISO8859-10)	UTF-16LE
8859-10 (ISO8859-10)	UTF-32
8859-10 (ISO8859-10)	UTF-32BE
8859-10 (ISO8859-10)	UTF-32LE
8859-13 (ISO8859-13)	UCS-2
8859-13 (ISO8859-13)	UCS-2BE
8859-13 (ISO8859-13)	UCS-2LE
8859-13 (ISO8859-13)	UCS-4
8859-13 (ISO8859-13)	UCS–4BE
8859-13 (ISO8859-13)	UCS-4LE
8859-13 (ISO8859-13)	UTF-8
8859-13 (ISO8859-13)	UTF-16
8859-13 (ISO8859-13)	UTF-16BE
8859-13 (ISO8859-13)	UTF-16LE
8859-13 (ISO8859-13)	UTF-32
8859-13 (ISO8859-13)	UTF-32BE
8859-13 (ISO8859-13)	UTF-32LE

TABLE A–1 Available Unicode Related `iconv` Code Conversion Modules *(Continued)*

From Code (Symbol)	To Code (Symbol)
8859-14 (ISO8859-14)	UCS-2
8859-14 (ISO8859-14)	UCS-2BE
8859-14 (ISO8859-14)	UCS-2LE
8859-14 (ISO8859-14)	UCS-4
8859-14 (ISO8859-14)	UCS–4BE
8859-14 (ISO8859-14)	UCS-4LE
8859-14 (ISO8859-14)	UTF-8
8859-14 (ISO8859-14)	UTF-16
8859-14 (ISO8859-14)	UTF-16BE
8859-14 (ISO8859-14)	UTF-16LE
8859-14 (ISO8859-14)	UTF-32
8859-14 (ISO8859-14)	UTF-32BE
8859-14 (ISO8859-14)	UTF-32LE
8859-15 (ISO8859-15)	UCS-2
8859-15 (ISO8859-15)	UCS-2BE
8859-15 (ISO8859-15)	UCS-2LE
8859-15 (ISO8859-15)	UCS-4
8859-15 (ISO8859-15)	UCS–4BE
8859-15 (ISO8859-15)	UCS-4LE
8859-15 (ISO8859-15)	UTF-8
8859-15 (ISO8859-15)	UTF-16
8859-15 (ISO8859-15)	UTF-16BE
8859-15 (ISO8859-15)	UTF-16LE
8859-15 (ISO8859-15)	UTF-32
8859-15 (ISO8859-15)	UTF-32BE
8859-15 (ISO8859-15)	UTF-32LE
8859-16 (ISO8859-16)	UCS-2
8859-16 (ISO8859-16)	UCS-2BE

TABLE A–1 Available Unicode Related `iconv` Code Conversion Modules *(Continued)*

From Code (Symbol)	To Code (Symbol)
8859-16 (ISO8859-16)	UCS-2LE
8859-16 (ISO8859-16)	UCS-4
8859-16 (ISO8859-16)	UCS–4BE
8859-16 (ISO8859-16)	UCS-4LE
8859-16 (ISO8859-16)	UTF-8
8859-16 (ISO8859-16)	UTF-16
8859-16 (ISO8859-16)	UTF-16BE
8859-16 (ISO8859-16)	UTF-16LE
8859-16 (ISO8859-16)	UTF-32
8859-16 (ISO8859-16)	UTF-32BE
8859-16 (ISO8859-16)	UTF-32LE
eucJP	UTF-8
gb2312	UTF-8
iso2022	UTF-8
ko_KR-cp933	UTF-8
ko_KR-euc	UTF-8
ko_KR-iso2022–7	UTF-8
ko_KR-johap	UTF-8
ko_KR-johap92	UTF-8
zh_TW-euc	UTF-8
zh_TW-cp937	UTF-8
zh_TW-iso2022–7	UTF-8
GBK	UTF-8
FujitsuJEF-ascii-code	UTF-8
FujitsuJEF-ascii-face	UTF-8
FujitsuJEF-kana-code	UTF-8
FujitsuJEF-kana-face	UTF-8
HitachiKEIS83	UTF-8

TABLE A–1 Available Unicode Related `iconv` Code Conversion Modules *(Continued)*

From Code (Symbol)	To Code (Symbol)
HitachiKEIS90	UTF-8
ISO-2022–JP	UTF-8
KOI8-R	UCS-2
KOI8-R	UCS-2BE
KOI8-R	UCS-2LE
KOI8-R	UCS-4
KOI8-R	UCS–4BE
KOI8-R	UCS-4LE
KOI8-R	UTF-8
KOI8-R	UTF-16
KOI8-R	UTF-16BE
KOI8-R	UTF-16LE
KOI8-R	UTF-32
KOI8-R	UTF-32BE
KOI8-R	UTF-32LE
KOI8-U	UCS-2
KOI8-U	UCS-2BE
KOI8-U	UCS-2LE
KOI8-U	UCS-4
KOI8-U	UCS-4BE
KOI8-U	UCS-4LE
KOI8-U	UTF–8
KOI8-U	UTF-16
KOI8-U	UTF-16BE
KOI8-U	UTF-16LE
KOI8-U	UTF-32
KOI8-U	UTF-32BE
KOI8-U	UTF-32LE

TABLE A–1 Available Unicode Related `iconv` Code Conversion Modules *(Continued)*

From Code (Symbol)	To Code (Symbol)
NECJIPS	UTF-8
PCK	UTF-8
UCS-2	646 (ISO 646)
UCS-2	8859-1 (ISO8859-1)
UCS-2	8859-2 (ISO8859-2)
UCS-2	8859-3 (ISO8859-3)
UCS-2	8859-4 (ISO8859-4)
UCS-2	8859-5 (ISO8859-5)
UCS-2	8859-6 (ISO8859-6)
UCS-2	8859-7 (ISO8859-7)
UCS-2	8859-8 (ISO8859-8)
UCS-2	8859-9 (ISO8859-9)
UCS-2	8859-10 (ISO8859-10)
UCS-2	8859-13 (ISO8859-13)
UCS-2	8859-14 (ISO8859-14)
UCS-2	8859-15 (ISO8859-15)
UCS-2	8859-16 (ISO8859-16)
UCS-2	KOI8-R
UCS-2	KOI8-U
UCS-2	UCS-4
UCS-2	UCS-4BE
UCS-2	UCS-4LE
UCS-2	UTF-7
UCS-2	UTF-8
UCS-2BE	646 (ISO 646)
UCS-2BE	8859-1 (ISO8859-1)
UCS-2BE	8859-2 (ISO8859-2)
UCS-2BE	8859-3 (ISO8859-3)

TABLE A–1 Available Unicode Related iconv Code Conversion Modules *(Continued)*

From Code (Symbol)	To Code (Symbol)
UCS-2BE	8859-4 (ISO8859-4)
UCS-2BE	8859-5 (ISO8859-5)
UCS-2BE	8859-6 (ISO8859-6)
UCS-2BE	8859-7 (ISO8859-7)
UCS-2BE	8859-8 (ISO8859-8)
UCS-2BE	8859-9 (ISO8859-9)
UCS-2BE	8859-10 (ISO8859-10)
UCS-2BE	8859-13 (ISO8859-13)
UCS-2BE	8859-14 (ISO8859-14)
UCS-2BE	8859-15 (ISO8859-15)
UCS-2BE	8859-16 (ISO8859-16)
UCS-2BE	KOI8-R
UCS-2BE	KOI8-U
UCS-2BE	UCS-4
UCS-2BE	UCS-4BE
UCS-2BE	UCS-4LE
UCS-2BE	UTF-8
UCS-2LE	646 (ISO 646)
UCS-2LE	8859-1 (ISO8859-1)
UCS-2LE	8859-2 (ISO8859-2)
UCS-2LE	8859-3 (ISO8859-3)
UCS-2LE	8859-4 (ISO8859-4)
UCS-2LE	8859-5 (ISO8859-5)
UCS-2LE	8859-6 (ISO8859-6)
UCS-2LE	8859-7 (ISO8859-7)
UCS-2LE	8859-8 (ISO8859-8)
UCS-2LE	8859-9 (ISO8859-9)
UCS-2LE	8859-10 (ISO8859-10)

TABLE A–1 Available Unicode Related `iconv` Code Conversion Modules *(Continued)*

From Code (Symbol)	To Code (Symbol)
UCS-2LE	8859-13 (ISO8859-13)
UCS-2LE	8859-14 (ISO8859-14)
UCS-2LE	8859-15 (ISO8859-15)
UCS-2LE	8859-16 (ISO8859-16)
UCS-2LE	KOI8-R
UCS-2LE	KOI8-U
UCS-2LE	UCS-4
UCS-2LE	UCS-4BE
UCS-2LE	UCS-4LE
UCS-2LE	UTF-8
UCS-2LE	UTF-32
UCS-2LE	UTF-32BE
UCS-2LE	UTF-32LE
UCS-4	646
UCS-4	8859-1 (ISO8859-1)
UCS-4	8859-2 (ISO8859-2)
UCS-4	8859-3 (ISO8859-3)
UCS-4	8859-4 (ISO8859-4)
UCS-4	8859-5 (ISO8859-5)
UCS-4	8859-6 (ISO8859-6)
UCS-4	8859-7 (ISO8859-7)
UCS-4	8859-8 (SO 8859-8)
UCS-4	8859-9 (ISO8859-9)
UCS-4	8859-10 (ISO8859-10)
UCS-4	8859-13 (ISO8859-13)
UCS-4	8859-14 (ISO8859-14)
UCS-4	8859-15 (ISO8859-15)
UCS-4	8859-16 (ISO8859-16)

TABLE A–1 Available Unicode Related `iconv` Code Conversion Modules *(Continued)*

From Code (Symbol)	To Code (Symbol)
UCS-4	KOI8-R
UCS-4	KOI8-U
UCS-4	UCS-2
UCS-4	UCS-2BE
UCS-4	UCS-2LE
UCS-4	UTF-7
UCS-4	UTF-8
UCS-4	UCS-16
UCS-4	UCS-16BE
UCS-4	UCS-16LE
UCS-4	UTF-32
UCS-4	UCS-32BE
UCS-4	UCS-32LE
UCS-4BE	646
UCS-4BE	8859-1 (ISO8859-1)
UCS-4BE	8859-2 (ISO8859-2)
UCS-4BE	8859-3 (ISO8859-3)
UCS-4BE	8859-4 (ISO8859-4)
UCS-4BE	8859-5 (ISO8859-5)
UCS-4BE	8859-6 (ISO8859-6)
UCS-4BE	8859-7 (ISO8859-7)
UCS-4BE	8859-8 (SO 8859-8)
UCS-4BE	8859-9 (ISO8859-9)
UCS-4BE	8859-10 (ISO8859-10)
UCS-4BE	8859-13 (ISO8859-13)
UCS-4BE	8859-14 (ISO8859-14)
UCS-4BE	8859-15 (ISO8859-15)
UCS-4BE	8859-16 (ISO8859-16)

TABLE A–1 Available Unicode Related `iconv` Code Conversion Modules *(Continued)*

From Code (Symbol)	To Code (Symbol)
UCS-4BE	KOI8-R
UCS-4BE	KOI8-U
UCS-4BE	UCS-2
UCS-4BE	UCS-2BE
UCS-4BE	UCS-2LE
UCS-4BE	UCS-8
UCS-4BE	UCS-16
UCS-4BE	UCS-16BE
UCS-4BE	UCS-16LE
UCS-4BE	UCS-32
UCS-4BE	UCS-32BE
UCS-4BE	UCS-32LE
UCS-4LE	646 (ISO 646)
UCS-4LE	8859-1 (ISO8859-1)
UCS-4LE	8859-2 (ISO8859-2)
UCS-4LE	8859-3 (ISO8859-3)
UCS-4LE	8859-4 (ISO8859-4)
UCS-4LE	8859-5 (ISO8859-5)
UCS-4LE	8859-6 (ISO8859-6)
UCS-4LE	8859-7 (ISO8859-7)
UCS-4LE	8859-8 (SO 8859-8)
UCS-4LE	8859-9 (ISO8859-9)
UCS-4LE	8859-10 (ISO8859-10)
UCS-4LE	8859-13 (ISO8859-13)
UCS-4LE	8859-14 (ISO8859-14)
UCS-4LE	8859-15 (ISO8859-15)
UCS-4LE	8859-16 (ISO8859-15)
UCS-4LE	KOI8-R

TABLE A–1 Available Unicode Related `iconv` Code Conversion Modules *(Continued)*

From Code (Symbol)	To Code (Symbol)
UCS-4LE	KOI8-U
UCS-4LE	UCS-2
UCS-4LE	UCS-2BE
UCS-4LE	UCS-2LE
UCS-4LE	UTF-16
UCS-4LE	UTF-16BE
UCS-4LE	UTF-16LE
UCS-4LE	UTF-8
UTF-7	UCS-2
UTF-7	UCS-4
UTF-7	UCS-8
UTF-8	646 (ISO 646)
UTF-8	8859-1 (ISO8859-1)
UTF-8	8859-2 (ISO8859-2)
UTF-8	8859-3 (ISO8859-3)
UTF-8	8859-4 (ISO8859-4)
UTF-8	8859-5 (ISO8859-5)
UTF-8	8859-6 (ISO8859-6)
UTF-8	8859-7 (ISO8859-7)
UTF-8	8859-8 (ISO8859-8)
UTF-8	8859-9 (ISO8859-9)
UTF-8	8859-10 (ISO8859-10)
UTF-8	8859-11 (ISO8859-11)
UTF-8	8859-13 (ISO8859-13)
UTF-8	8859-14 (ISO8859-14)
UTF-8	8859-15 (ISO8859-15)
UTF-8	8859-16 (ISO8859-16)
UTF-8	eucJP

TABLE A–1 Available Unicode Related `iconv` Code Conversion Modules *(Continued)*

From Code (Symbol)	To Code (Symbol)
UTF-8	gb2312
UTF-8	iso2022
UTF-8	ko_KR-euc
UTF-8	ko_KR-johap
UTF-8	ko_KR-johap92
UTF-8	ko_KR-iso2022–7
UTF-8	zh_TW-euc
UTF-8	zh_TW-iso2022–7
UTF-8	zh_TW-cp937
UTF-8	FujitsuJEF-ascii-code
UTF-8	FujitsuJEF-ascii-face
UTF-8	FujitsuJEF-kana-code
UTF-8	FujitsuJEF-kana-face
UTF-8	GBK
UTF-8	HitachiKEIS83
UTF-8	HitachiKEIS90
UTF-8	ISO-2022–JP
UTF-8	KOI8–R
UTF-8	KOI8-U
UTF-8	UTF-7
UTF-8	NECJIPS
UTF-8	PCK
UTF-8	UCS-2
UTF-8	UCS-2BE
UTF-8	UCS-2LE
UTF-8	UCS-4
UTF-8	UCS-4BE
UTF-8	UCS-4LE

TABLE A–1 Available Unicode Related iconv Code Conversion Modules *(Continued)*

From Code (Symbol)	To Code (Symbol)
UTF-8	UTF-7
UTF-8	UTF-16
UTF-8	UTF-16BE
UTF-8	UCS-16LE
UTF-16	646 (ISO 646)
UTF-16	8859-1 (ISO8859-1)
UTF-16	8859-2 (ISO8859-2)
UTF-16	8859-3 (ISO8859-3)
UTF-16	8859-4 (ISO8859-4)
UTF-16	8859-5 (ISO8859-5)
UTF-16	8859-6 (ISO8859-6)
UTF-16	8859-7 (ISO8859-7)
UTF-16	8859-8 (ISO8859-8)
UTF-16	8859-9 (ISO8859-9)
UTF-16	8859-10 (ISO8859-10)
UTF-16	8859-13 (ISO8859-13)
UTF-16	8859-14 (ISO8859-14)
UTF-16	8859-15 (ISO8859-15)
UTF-16	8859-15 (ISO8859-15)
UTF-16	8859-16 (ISO8859-16)
UTF-16	KOI8-R
UTF-16	KOI8-U
UTF-16	UCS-4
UTF-16	UCS-4BE
UTF-16	UCS-4LE
UTF-16	UTF-8
UTF-16BE	646 (ISO 646)
UTF-16BE	8859-1 (ISO8859-1)

TABLE A–1 Available Unicode Related `iconv` Code Conversion Modules *(Continued)*

From Code (Symbol)	To Code (Symbol)
UTF-16BE	8859-2 (ISO8859-2)
UTF-16BE	8859-3 (ISO8859-3)
UTF-16BE	8859-4 (ISO8859-4)
UTF-16BE	8859-5 (ISO8859-5)
UTF-16BE	8859-6 (ISO8859-6)
UTF-16BE	8859-7 (ISO8859-7)
UTF-16BE	8859-8 (ISO8859-8)
UTF-16BE	8859-9 (ISO8859-9)
UTF-16BE	8859-10(ISO8859-10)
UTF-16BE	8859-13 (ISO8859-13)
UTF-16BE	8859-14 (ISO8859-14)
UTF-16BE	8859-15 (ISO8859-15)
UTF-16BE	8859-16 (ISO8859-16)
UTF-16BE	KOI8-R
UTF-16BE	KOI8-U
UTF-16BE	UCS-4
UTF-16BE	UCS-4BE
UTF-16BE	UCS-4LE
UTF-16BE	UTF-8
UTF-16LE	646 (ISO 646)
UTF-16LE	8859-1 (ISO8859-1)
UTF-16LE	8859-2 (ISO8859-2)
UTF-16LE	8859-3 (ISO8859-3)
UTF-16LE	8859-4 (ISO8859-4)
UTF-16LE	8859-5 (ISO8859-5)
UTF-16LE	8859-6 (ISO8859-6)
UTF-16LE	8859-7 (ISO8859-7)
UTF-16LE	8859 -8 (ISO8859-8)

TABLE A–1 Available Unicode Related iconv Code Conversion Modules *(Continued)*

From Code (Symbol)	To Code (Symbol)
UTF-16LE	8859-9 (ISO8859-9)
UTF-16LE	8859-10 (ISO8859-10)
UTF-16LE	8859-13 (ISO8859-13)
UTF-16LE	8859-14 (ISO8859-14)
UTF-16LE	8859-15 (ISO8859-15)
UTF-16LE	8859-16 (ISO8859-16)
UTF-16LE	KOI8-R
UTF-16LE	KOI8-U
UTF-16LE	UCS-4
UTF-16LE	UCS-4BE
UTF-16LE	UCS-4LE
UTF-16LE	UTF-8
UTF-32	UTF-8
UTF-32	UCS-2
UTF-32	UCS-2BE
UTF-32	UCS-2LE
UTF-32	UCS-4
UTF-32	UCS-4BE
UTF-32	UCS-4LE
UTF-32	UTF-16
UTF-32	UTF-16LE
UTF-32	UTF–32BE
UTF-32	646 (ISO 646)
UTF-32	ISO8859–1
UTF-32	ISO8859–2
UTF-32	ISO8859–3
UTF-32	ISO8859–4
UTF-32	ISO8859–5

TABLE A–1 Available Unicode Related `iconv` Code Conversion Modules *(Continued)*

From Code (Symbol)	To Code (Symbol)
UTF-32	ISO8859–6
UTF-32	ISO8859–7
UTF-32	ISO8859–8
UTF-32	ISO8859–9
UTF-32	ISO8859–10
UTF-32	ISO8859–13
UTF-32	ISO8859–14
UTF-32	ISO8859–15
UTF-32	ISO8859–16
UTF-32	KOI8–R
UTF-32	KOI8–U
UTF-32BE	UTF-8
UTF-32BE	UCS-2
UTF-32BE	UCS-2BE
UTF-32BE	UCS-2LE
UTF-32BE	UCS-4
UTF-32BE	UCS-4BE
UTF-32BE	UCS-4LE
UTF-32BE	UTF-16
UTF–32BE	UTF-16BE
UTF-32 BE	UTF-16LE
UTF-32BE	646 (ISO 646)
UTF-32BE	ISO8859–1
UTF-32BE	ISO8859–2
UTF-32BE	ISO8859–3
UTF-32BE	ISO8859–4
UTF-32BE	ISO8859–5
UTF-32BE	ISO8859–6

TABLE A–1 Available Unicode Related `iconv` Code Conversion Modules *(Continued)*

From Code (Symbol)	To Code (Symbol)
UTF-32BE	ISO8859–7
UTF-32BE	ISO8859–8
UTF-32BE	ISO8859–9
UTF-32BE	ISO8859–10
UTF-32BE	ISO8859–13
UTF-32BE	ISO8859–14
UTF-32BE	ISO8859–15
UTF-32BE	ISO8859–16
UTF-32BE	KOI8–R
UTF-32BE	KOI8–U
UTF-32LE	UTF-8
UTF-32LE	UCS-2
UTF-32LE	UCS-2BE
UTF-32LE	UCS-2LE
UTF-32LE	UCS-4
UTF-32LE	UCS-4BE
UTF-32LE	UCS-4LE
UTF32–LE	UTF-16
UTF32–LE	UTF-16BE
UTF-32LE	UTF-16LE
UTF-32LE	646 (ISO 646)
UTF-32LE	ISO8859–1
UTF-32LE	ISO8859–2
UTF-32LE	ISO8859–3
UTF-32LE	ISO8859–4
UTF-32LE	ISO8859–5
UTF-32LE	ISO8859–6
UTF-32LE	ISO8859–7

TABLE A–1 Available Unicode Related iconv Code Conversion Modules *(Continued)*

From Code (Symbol)	To Code (Symbol)
UTF-32LE	ISO8859–8
UTF-32LE	ISO8859–9
UTF-32LE	ISO8859–10
UTF-32LE	ISO8859–13
UTF-32LE	ISO8859–14
UTF-32LE	ISO8859–15
UTF-32LE	ISO8859–16
UTF-32LE	KOI8–R
UTF-32LE	KOI8–U

Note – UTF-EBCDIC is a new IBM codepage name. The Solaris 9 environment also supports bidirectional UTF-8 <—> UTF-EBCDIC conversion.

The following table lists the Unicode and IBM/Microsoft EBCDIC and PC iconv code conversion modules available in the Solaris 9 Environment.

TABLE A–2 Available Unicode and IBM/Microsoft EBCDIC and PC Code Page Related iconv Code Conversions Modules

From Code (Symbol)	To Code (Symbol)
UTF-8	IBM-037
UTF-8	IBM-273
UTF-8	IBM-277
UTF-8	IBM-278
UTF-8	IBM-280
UTF-8	IBM-284
UTF-8	IBM-285
UTF-8	IBM-297
UTF-8	IBM-420
UTF-8	IBM-424

TABLE A–2 Available Unicode and IBM/Microsoft EBCDIC and PC Code Page Related `iconv` Code Conversions Modules *(Continued)*

From Code (Symbol)	To Code (Symbol)
UTF-8	IBM-500
UTF-8	IBM-850
UTF-8	IBM-852
UTF-8	IBM-855
UTF-8	IBM-856
UTF-8	IBM-857
UTF-8	IBM-862
UTF-8	IBM-864
UTF-8	IBM-866
UTF-8	IBM-869
UTF-8	IBM-870
UTF-8	IBM-871
UTF-8	IBM-875
UTF-8	IBM-880
UTF-8	IBM-1025
UTF-8	IBM-1026
UTF-8	IBM-1112
UTF-8	IBM-1122
UTF-8	IBM-921
UTF-8	IBM-922
UTF-8	IBM-1046
UTF-8	IBM-1140
UTF-8	IBM-1141
UTF-8	IBM-1142
UTF-8	IBM-1143
UTF-8	IBM-1144
UTF-8	IBM-1145

TABLE A–2 Available Unicode and IBM/Microsoft EBCDIC and PC Code Page Related `iconv` Code Conversions Modules *(Continued)*

From Code (Symbol)	To Code (Symbol)
UTF-8	IBM-1146
UTF-8	IBM-1147
UTF-8	IBM-1148
UTF-8	IBM-1149
UTF-8	CP850
UTF-8	CP852
UTF-8	CP855
UTF-8	CP857
UTF-8	CP862
UTF-8	CP864
UTF-8	CP866
UTF-8	CP869
UTF-8	CP874
UTF-8	CP1250
UTF-8	CP1251
UTF-8	CP1252
UTF-8	CP1253
UTF-8	CP1254
UTF-8	CP1255
UTF-8	CP1256
UTF-8	CP1257
UTF-8	CP1258

The following table lists the available `iconv` code conversions IBM and Microsoft EBCDIC/PC code pages to UTF-8.

TABLE A–3 Available `iconv` Code Conversions - IBM and Microsoft EBCDIC/PC Code Pages to UTF-8

UTF-EBCDIC	UTF-8
IBM-037	UTF-8

TABLE A–3 Available `iconv` Code Conversions - IBM and Microsoft EBCDIC/PC Code Pages to UTF-8 *(Continued)*

UTF-EBCDIC	UTF-8
IBM-273	UTF-8
IBM-277	UTF-8
IBM-278	UTF-8
IBM-280	UTF-8
IBM-284	UTF-8
IBM-285	UTF-8
IBM-297	UTF-8
IBM-420	UTF-8
IBM-424	UTF-8
IBM-500	UTF-8
IBM-850	UTF-8
IBM-852	UTF-8
IBM-855	UTF-8
IBM-856	UTF-8
IBM-857	UTF-8
IBM-862	UTF-8
IBM-864	UTF-8
IBM-866	UTF-8
IBM-869	UTF-8
IBM-870	UTF-8
IBM-871	UTF-8
IBM-875	UTF-8
IBM-880	UTF-8
IBM-921	UTF-8
IBM-922	UTF-8
IBM-1025	UTF-8
IBM-1026	UTF-8
IBM-1046	UTF-8

TABLE A–3 Available `iconv` Code Conversions - IBM and Microsoft EBCDIC/PC Code Pages to UTF-8 *(Continued)*

UTF-EBCDIC	UTF-8
IBM-1112	UTF-8
IBM-1122	UTF-8
IBM-1140	UTF-8
IBM-1141	UTF-8
IBM-1142	UTF-8
IBM-1143	UTF-8
IBM-1144	UTF-8
IBM-1145	UTF-8
IBM-1146	UTF-8
IBM-1147	UTF-8
IBM-1148	UTF-8
IBM-1149	UTF-8
CP850	UTF-8
CP852	UTF-8
CP855	UTF-8
CP857	UTF-8
CP862	UTF-8
CP864	UTF-8
CP866	UTF-8
CP869	UTF-8
CP874	UTF-8
CP1250	UTF-8
CP1251	UTF-8
CP1252	UTF-8
CP1253	UTF-8
CP1254	UTF-8
CP1255	UTF-8
CP1256	UTF-8

TABLE A–3 Available iconv Code Conversions - IBM and Microsoft EBCDIC/PC Code Pages to UTF-8 *(Continued)*

UTF-EBCDIC	UTF-8
CP1257	UTF-8
CP1258	UTF-8

APPENDIX **B**

Partial Locale Package List on Software CDs

The following table lists the packages and contents of the Software CDs.

TABLE B–1 List of Partial Locales

Package Name	Description
JSatsvr	Japanese Input System ATOK12 root files for Japanese Solaris.
JSatsvu	Japanese Input System ATOK12 usr files for Japanese Solaris.
JSatsvw	Japanese Input System ATOK12 X11 support files for Japanese Solaris
NSCPcpcom	Simplified Chinese partial version of Netscape Communicator 4.7 supporting International security.
NSCPhpcom	Traditional Chinese partial version of Netscape Communicator 4.7 supporting International security.
NSCPjacom	Japanese (common) localization of Netscape Communicator 4.7 supporting International security.
NSCPkpcom	Korean Partial version of Netscape Communicator 4.78 supporting International security.
SUNW5ttf	Traditional Chinese TrueType fonts package.
SUNWale	Common files shared by Chinese, Japanese and Korean locales. It is a required package to run Asian Language Environment.
SUNWaled	Man pages shared by Chinese, Japanese, and Korean locales.
SUNWalex	Common files shared by Chinese, Japanese and Korean locales. This package is required to run Asian Language Environment (64-bit).
SUNWauadt	Australasia CDE Support.
SUNWauaos	Australasia OS Support.

TABLE B–1 List of Partial Locales *(Continued)*

Package Name	Description
SUNWauaow	Australasia Open Windows Support.
SUNWauaox	Australasia 64-bit Open Windows Support.
SUNWcamdt	Central America CDE Support.
SUNWcamos	Central America OS Support.
SUNWcamow	Central America Open Windows Support.
SUNWcamox	Central America 64-bit OS Support.
SUNWcdt	Simplified Chinese Localizations for CDE Desktop Login Environment.
SUNWceudt	Central Europe CDE Support.
SUNWceuos	Central Europe OS Support.
SUNWceuow	Central Europe Open Windows Support.
SUNWceuox	Central Europe 64-bit OS Support.
SUNWcleu	Simplified Chinese (EUC) Language Environment specific files. It is a required package to run Simplified Chinese (EUC) Language Environment.
SUNWcleux	Simplified Chinese Language Environment specific files. It is a required package to run Simplified Chinese Language Environment (64-bit).
SUNWcttf	Simplified Chinese (EUC) True Type fonts.
SUNWcufnt	Simplified Chinese (UTF-8) X Windows Platform required fonts.
SUNWcxplt	Simplified Chinese X Windows Platform Software Package.
SUNWdelu	
SUNWdespl	Spell Checking Engine - German Dictionary.
SUNWeeudt	Eastern Europe CDE Support.
SUNWeeuos	Eastern Europe OS Support.
SUNWeeuow	Eastern Europe Open Windows Support.
SUNWeeuox	Eastern Europe 64-bit OS Support.
SUNWeslu	Spanish message files for Live Upgrade L10N.
SUNWesspl	Spell Checking Engine - Spanish Dictionary.
SUNWeu8df	American English/UTF-8 Core Desktop Files.
SUNWeu8os	American English/UTF-8 L10N For OS Environment User Files.

TABLE B–1 List of Partial Locales *(Continued)*

Package Name	Description
SUNWeu8ox	American English/UTF-8 L10N For OS Environment User Files (64–bit).
SUNWeudba	American English/UTF-8 L10N For CDE Base.
SUNWeudbd	American English/UTF-8 L10N For CDE Dtbuilder.
SUNWeudda	American English/UTF-8 L10N For CDE Desktop Applications.
SUNWeudhr	American English/UTF-8 L10N For CDE Help Runtime.
SUNWeudhs	American English/UTF-8 L10N For CDE Help Runtime.
SUNWeudis	American English/UTF-8 L10N For CDE Icons.
SUNWeudiv	American English/UTF-8 L10N For Desktop Image tools.
SUNWeudlg	American English/UTF-8 L10N For CDE Desktop Login Environment.
SUNWeudmg	American English/UTF-8 L10N For Desktop Window Manager.
SUNWeuezt	American English/UTF-8 L10N For Desktop Power Pack Applications.
SUNWeuhed	American English/UTF-8 L10N For CDE Help Developer Environment.
SUNWeuluf	American English/UTF-8 L10N For Environment User Files.
SUNWeulux	American English/UTF-8 L10N For Environment User Files (64–bit).
SUNWeusru	American English/UTF-8 L10N For Solaris User Registration.
SUNWfrlu	French message files for Live Upgrade L10N.
SUNWfrspl	Spell Checking Engine - French Dictionary.
SUNWgttf	Simplified Chinese (GBK) True Type Fonts.
SUNWgxfnt	Simplified Chinese (GBK) X Windows Platform required fonts.
SUNWgxplx	Simplified Chinese (GBK) X Windows Platform Software Package (64-bit).
SUNWhdt	Traditional Chinese Localizations for CDE Desktop Login Environment.
SUNWhkdt	Traditional Chinese (Hong Kong) localization for CDE Desktop Login Environment.
SUNWhkfnt	Traditional Chinese BIG5 (Hong Kong) X Windows Platform required Fonts Package.

TABLE B–1 List of Partial Locales *(Continued)*

Package Name	Description
SUNWhkleu	Traditional Chinese (Hong Kong) Language Environment user files.
SUNWhklex	Traditional Chinese (Hong Kong) language Environment user files (64-bit).
SUNWhkplt	Traditional Chinese (Hong Kong) X Windows Platform Software Package.
SUNWhkplx	Traditional Chinese (Hong Kong) X Windows Platform Software Package (64-bit).
SUNWhkttf	Traditional Chinese Hong Kong Supplementary Character Set True Type Fonts Package.
SUNWhleu	Traditional Chinese Language Environment specific files. It is a required package to run Traditional Chinese Language Environment.
SUNWhleux	Traditional Chinese (EUC) Language Environment specific files. It is a required package to run Traditional Chinese Language Environment (64-bit).
SUNWhttf	Traditional Chinese TrueType Fonts Package.
SUNWhufnt	Traditional Chinese (UTF-8) X Windows Platform required Fonts.
SUNWhxfnt	Traditional Chinese X Windows Platform required Fonts Package.
SUNWhxplt	Traditional Chinese X Windows Platform Software Package.
SUNWi1cs	X11 ISO8859-1 Codeset Support.
SUNWi2cs	X11 ISO8859-2 Codeset Support.
SUNWi2of	X11 fonts for ISO-8859-2 character set (optional fonts).
SUNWi5cs	X11 ISO8859–5 Codeset Support.
SUNWi7cs	X11 ISO8859–7 Codeset Support.
SUNWi9cs	X11 ISO8859–9 Codeset Support.
SUNWi13cs	X11 ISO8859-13 Codeset Support.
SUNWi15cs	X11 ISO8859-15 Codeset Support.
SUNWiiimr	Internet/Intranet Input Method Framework (Root).
SUNWiiimu	Internet/Intranet Input Method Framework (Usr).
SUNWindt	Indic localizations for CDE Desktop Login Environment.
SUNWinfnt	Indic (UTF-8) X Windows Platform Required Fonts.

TABLE B–1 List of Partial Locales *(Continued)*

Package Name	Description
SUNWinleu	Indic package contains Indic language environment specific files. It is a required package for running Indic language environment.
SUNWinlex	Indic package contains Indic language environment specific files. It is a required package for running the Indic language environment (64–bit).
SUNWinplt	Indic X Window System platform software.
SUNWinttf	Indic TrueType Fonts.
SUNWitlu	Italian message files for Live Upgrade L10N.
SUNWitspl	Spell Checking Engine - Italian Dictionary.
SUNWj3jmp	Japanese Localizations for J2SDK RELEASE man pages.
SUNWjedt	Japanese (EUC) Localization for CDE DESKTOP LOGIN ENVIRONMENT.
SUNWjexpx	Japanese (EUC) Localizations for X Window System platform software (64-bit).
SUNWjfpr	Stream modules for Japanese Feature Package (JFP); it is a required package to run JFP environment.
SUNWjfpu	Japanese Feature Package (JFP) specific files for usr; it is a required package to run JFP environment.
SUNWjfpux	Japanese Feature Package (JFP) specific 64-bit files for usr; it is a required package to run JFP environment.
SUNWjman	Japanese Feature Package Man Pages to see English man pages for SUNWjfpr and SUNWjfpu.
SUNWjulcf	Japanese UTF-8 Locale Environment Common Files.
SUNWjxplt	Japanese Localizations for X Window System platform software.
SUNWkdt	Korean Localizations for CDE Desktop Login Environment.
SUNWkleu	Korean Language Environment specific files. It is a required package to run Korean Language Environment.
SUNWkleux	Korean (EUC) Language Environment specific files. It is a required package to run Korean Language Environment (64-bit).
SUNWkttf	Korean True Type Fonts.
SUNWkxfnt	Korean X Windows Platform Required Fonts
SUNWkxplt	Korean X Windows Platform Software Package.
SUNWmeadt	Middle East CDE Support.

TABLE B–1 List of Partial Locales *(Continued)*

Package Name	Description
SUNWmeaos	Middle East OS Support.
SUNWmeaow	Middle East OW Support.
SUNWmeaox	Middle East 64-bit OS Support.
SUNWnafos	Northern Africa OS Support.
SUNWnafow	Northern Africa OW Support.
SUNWnafox	Northern Africa 64-bit OS Support.
SUNWneudt	Northern Europe CDE Support.
SUNWneuos	Northern Europe OS Support.
SUNWneuow	Northern Europe OW Support.
SUNWneuox	Northern Europe 64-bit OS Support.
SUNWplow	OpenWindows enabling for Partial Locales.
SUNWplow1	OpenWindows enabling for Supplementary Partial Locales.
SUNWsamdt	Southern America CDE Support.
SUNWsamos	Southern America OS Support.
SUNWsamow	Southern America OW Support.
SUNWsamox	Southern America 64-bit OS Support.
SUNWseudt	Southern Europe CDE Support.
SUNWseuos	Southern Europe OS Support.
SUNWseuow	Southern Europe Open Windows Support.
SUNWseuox	Southern Europe 64-bit OS Support.
SUNWsvis	Swedish install software localization.
SUNWsvlu	Swedish message files for Live Upgrade L10N.
SUNWsvspl	Spell Checking Engine - Swedish Dictionary.
SUNWtdbas	Thai Localizations for CDE Base functionality.
SUNWtddst	Thai Localizations for CDE Desktop Applications.
SUNWtddte	Thai Localizations for CDE Desktop Login Environment.
SUNWtdft	Thai Localizations for CDE Fonts.
SUNWtdwm	Thai Localizations for CDE Desktop Window Manager.

TABLE B–1 List of Partial Locales *(Continued)*

Package Name	Description
`SUNWtleu`	Thai Language Environment specific files. It is a required package to run Thai Language Environment.
`SUNWtleux`	Thai Language Environment specific files. It is a required package to run Thai Language Environment (64-bit)
`SUNWtxplt`	Thai X Windows Platform Software Package.
`SUNWweudt`	Western Europe CDE Support.
`SUNWweuos`	Western Europe OS Support.
`SUNWweuow`	Western Europe Open Windows Support.
`SUNWweuox`	Western Europe 64-bit OS Support.

APPENDIX C

Full Locale Package List on Languages CD

The following table lists the Simplified Chinese language packages and their contents.

TABLE C–1 Simplified Chinese

Package Name	Description
NSCPccom	Simplified Chinese Localization of Netscape Communicator 4.7 supporting International security.
NSCPcucom	zh.UTF-8 Localization of Netscape Communicator 4.7 supporting International security.
NSCPgcom	zh.GBK Localization of Netscape Communicator 4.7 supporting International security.
SUNWcacx	Simplified Chinese AccessX client program.
SUNWcadis	Simplified Chinese (EUC) Localizations for admintool and GUI install.
SUNWcadma	Simplified Chinese (EUC) Localizations for Software used to perform system administration tasks. Admintool requires both this and the SUNWhadis packages for Simplified Chinese (EUC) Localization.
SUNWcbcp	Simplified Chinese (EUC) Language Environment binary compatibility files.
SUNWcdab	Simplified Chinese (EUC) Localizations for CDE Desktop Application Builder.
SUNWcdbas	Simplified Chinese (EUC) Localizations for CDE Base functionality.
SUNWcdcl	Simplified Chinese Localizations for Solaris Diskless Client Management Applications.
SUNWcddst	Simplified Chinese (EUC) Localizations for CDE Desktop Applications.
SUNWcddte	Simplified Chinese (EUC) Localizations for CDE Desktop Login Environment.
SUNWcdezt	Simplified Chinese (EUC) Localizations for Desktop Power Pack Applications.
SUNWcdft	Simplified Chinese (EUC) Localizations for CDE Fonts.

TABLE C–1 Simplified Chinese *(Continued)*

Package Name	Description
SUNWcdhcm	Simplified Chinese Localizations for DHCP Manager.
SUNWcdhe	Simplified Chinese (EUC) Localizations for CDE Help Runtime environment.
SUNWcdhev	Simplified Chinese (EUC) CDE Help Volumes.
SUNWcdhez	Simplified Chinese (EUC) (Common) Desktop Power Pack Help Volumes.
SUNWcdicn	Simplified Chinese (EUC) Localizations for CDE Icons.
SUNWcdim	Simplified Chinese (EUC) Localizations for CDE ImageTool.
SUNWcdwm	Simplified Chinese (EUC) Localizations for CDE Desktop Window Manager.
SUNWcepmw	Simplified Chinese (EUC) Localization for Power Management OW Utilities.
SUNWcfdl	Simplified Chinese Solaris Font Downloader for Adobe Postscript TCP/IP printers.
SUNWcj2p	Simplified Chinese Localization of Java Plug-in 1.2.2.
SUNWcj2rt	Java virtual machine and core class libraries (Simplified Chinese supplement).
SUNWcjmfp	Simplified Chinese Localization for JMF player
SUNWckcsr	Simplified Chinese (EUC) KCMS Runtime Environment.
SUNWcleex	Simplified Chinese Language Environment specific files. It is a required package to run Simplified Chinese Language Environment (64-bit) - Extension.
SUNWcleue	Simplified Chinese (EUC) Language Environment specific files. It is a required package to run Simplified Chinese (EUC) Language Environment.
SUNWclvma	Simplified Chinese Localizations for Solaris Volume Management.
SUNWclvmg	Simplified Chinese Localizations for Solaris Volume Management.
SUNWcmga	Simplified Chinese Solaris Management Applications.
SUNWcorte	Simplified Chinese (EUC) Open Look Toolkits Runtime Environment Package.
SUNWcos	This package contains Simplified Chinese Language Environment specific files. It is a required package to run Simplified Chinese Language Environment.
SUNWcpdas	Simplified Chinese Localization for tools to synchronize desktop applications with the Palm Pilot PDA.
SUNWcreg	Simplified Chinese (EUC) Localizations for Solaris User Registration.
SUNWcrmui	Simplified Chinese Resource Management User Interface Components.
SUNWcsadl	Simplified Chinese (EUC) Localizations for Solstice Admintool launcher and associated libraries.
SUNWcscgu	Simplified Chinese Localizable Solaris Smart Card Administration - Graphical User Interface component.

TABLE C–1 Simplified Chinese *(Continued)*

Package Name	Description
SUNWcsfw	Simplified Chinese localizable message files for SFW consolidation.
SUNWcsmc	Simplified Chinese Solaris Management Console 2.0.
SUNWctltk	Simplified Chinese (EUC) ToolTalk Runtime Package.
SUNWcttfe	Simplified Chinese (EUC) TrueType Fonts.
SUNWcudc	Simplified Chinese (EUC) Localizations for User Defined Character tool for Solaris CDE environment.
SUNWcwbc	Simplified Chinese Localizations for Solaris WBEM Services.
SUNWcwbcp	Simplified Chinese (EUC) OpenWindows Binary Compatibility Package.
SUNWcwdev	Simplified Chinese Localizations for Solaris WBEM Services.
SUNWcwsr2	Simplified Chinese Localizations for Solaris Product Registry.
SUNWcwsrv	Simplified Chinese Localizations for Solaris Product Registry Viewer.
SUNWcxe	Simplified Chinese (EUC) X Windows Platform Software Package.
SUNWcxfnt	Simplified Chinese (EUC) X Windows Platform Required Fonts.
SUNWcxman	Simplified Chinese (EUC) X Windows Online User Man Pages Package.
SUNWgttfe	Simplified Chinese (GBK) True Type Fonts.

The following table lists the French language packages and their contents.

TABLE C–2 French

Package Name	Description
NSCPfrcdo	French Localization of Netscape Communicator 4.7 supporting U.S. security.
NSCPfrcom	French Localization of Netscape Communicator 4.7 supporting International security.
SUNWfbcp	French OS Binary Compatibility Package.
SUNWfdcl	Diskless Client Management Application French Localization.
SUNWfdhcm	French Localizations for DHCP Manager.
SUNWffdl	Localizable strings for the Font Downloader.
SUNWfj2rt	Java virtual machine and core class libraries (French supplement).
SUNWfjmfp	Localizable JMF Player for playing audio and video files.
SUNWflvma	French Localizations for Solaris Volume Management API's.

TABLE C–2 French *(Continued)*

Package Name	Description
SUNWflvmg	French Localizations for Solaris Volume Management Application.
SUNWfmgp	Solaris Management Applications French Localization.
SUNWforte	French OPEN LOOK (R) toolkits runtime environment.
SUNWfpdas	French tools to synchronize desktop applications with the Palm Pilot PDA.
SUNWfrbas	Base L10N fr CDE functionality to run a CDE application.
SUNWfrdis	French Localizations for admintool and GUI install.
SUNWfrdma	French Localizations for Software used to perform system administration tasks.
SUNWfrdst	CDE Desktop Applications.
SUNWfrdte	CDE Desktop Environment.
SUNWfrhe	CDE Help L10N fr Runtime Environment.
SUNWfrhed	CDE L10N fr Help Developer Environment.
SUNWfrhev	CDE Help Volumes.
SUNWfrhez	French Localizations for Desktop Power Pack Help Volumes.
SUNWfrim	CDE Desktop apps.
SUNWfrj2p	French Localization of Java Plug-in 1.2.2.
SUNWfrmui	French Resource Management for Solaris.
SUNWfros	Localizable message files for the OS-Networking consolidation.
SUNWfrpmw	French (EUC) Localizations for Power Management Open Windows Utilities.
SUNWfrreg	Solaris User Registration prompts at desktop login for user registration.
SUNWfrsmc	Solaris Management Console French Localization.
SUNWfrwbc	French Localisations for Solaris WBEM Services.
SUNWfrwm	French CDE Desktop Window Manages Messages.
SUNWfrws2	French Localizations Solaris Product Registry.
SUNWfrwsv	French Localizations for Solaris Product Registry Viewer.
SUNWfsadl	French Localizations for Solstice Admintool launcher and associated libraries.
SUNWfscgu	French Localization for Solaris Smart Card Administration - Grahical User Interface component.
SUNWfsfw	French localizable message files for SFW consolidation.
SUNWftltk	French ToolTalk binaries and shared libraries.

TABLE C–2 French *(Continued)*

Package Name	Description
SUNWfwacx	French OPEN LOOK (R) AccessX.
SUNWfwbcp	French OpenWindows Binary Compatibility Package.
SUNWfwdev	French Sun WBEM SDK resources.
SUNWfxplt	French X Windows platform software.

The following table lists the German language packages and their contents.

TABLE C–3 German

Package Name	Description
NSCPdecom	German Localization of Netscape Communicator 4.7 supporting International security.
SUNWdbcp	German OS Binary Compatibility Package.
SUNWddcl	German Localizations for Solaris Diskless Client Management Application.
SUNWddhcm	German Localizations for DHCP Manager.
SUNWdebas	Base L10N German CDE functionality to run a CDE application.
SUNWdedis	German Localizations for admintool and GUI install.
SUNWdedma	German Localizations for Software used to perform system administration tasks.
SUNWdedst	CDE Desktop Applications.
SUNWdedte	CDE Desktop Login Environment.
SUNWdehe	CDE Help L10N German Runtime Environment.
SUNWdehed	CDE L10N German Help Developer Environment.
SUNWdehev	CDE Help Volumes.
SUNWdehez	German Localizations for Desktop Power Pack Help Volumes.
SUNWdeim	CDE Desktop apps.
SUNWdej2p	German Localization of Java Plug-in 1.2.2.
SUNWdeos	Localizable message files for the OS-Networking consolidation.
SUNWdepmw	German (EUC) Localizations for Power Management OW Utilities.
SUNWdereg	Solaris User Registration prompts at desktop login for user registration.
SUNWdesmc	Solaris Management Console German Localization.
SUNWdewbc	German Localisations for Solaris WBEM Services.

TABLE C–3 German *(Continued)*

Package Name	Description
SUNWdewm	German CDE Desktop Window Manages Messages.
SUNWdews2	German Localisations Solaris Product Registry.
SUNWdewsv	German Localisations for Solaris Product Registry Viewer.
SUNWdfdl	Localizable strings for the Font Downloader.
SUNWdj2rt	Java virtual machine and core class libraries (German supplement).
SUNWdjmfp	Localizable JMF Player for playing audio and video files.
SUNWdlvma	German Localizations for Solaris Volume Management API's.
SUNWdlvmg	German Localizations for Solaris Volume Management Application.
SUNWdmgp	Solaris Management Applications German Localization.
SUNWdorte	German OPEN LOOK® toolkits runtime environment.
SUNWdpdas	German tools to synchronize desktop applications with the Palm Pilot PDA.
SUNWdrmui	German Resource Management for Solaris.
SUNWdsadl	German Localizations for Solstice Admintool launcher and associated libraries.
SUNWdscgu	Localizable Solaris Smart Card Administration - Grahical User Interface component.
SUNWdsfw	German localizable message files for SFW consolidation.
SUNWdtltk	German ToolTalk binaries and shared libraries.
SUNWdwacx	German OPEN LOOK® AccessX.
SUNWdwbcp	German OpenWindows Binary Compatibility Package.
SUNWdwdev	German Sun WBEM SDK resources.
SUNWdxplt	German X Windows platform software.

The following table lists the Italian language packages and their contents.

TABLE C–4 Italian

Package Name	Description
NSCPitcom	Italian Localization of Netscape Communicator 4.78 supporting International security.
SUNWibcp	Italian OS Binary Compatibility Package.
SUNWidcl	Diskless Client Management Application Italian Localization.
SUNWidhcm	Italian Localizations for DHCP Manager.

TABLE C–4 Italian *(Continued)*

Package Name	Description
SUNWifdl	Localizable strings for the Font Downloader.
SUNWij2rt	Java virtual machine and core class libraries (Italian supplement).
SUNWijmfp	Localizable JMF Player for playing audio and video files.
SUNWilvma	Italian Localizations for Solaris Volume Management API's.
SUNWilvmg	Italian Localizations for Solaris Volume Management Application.
SUNWimgp	Solaris Management Applications Italian Localization.
SUNWiorte	Italian OPEN LOOK (R) toolkits runtime environment.
SUNWipdas	Italian tools to synchronize desktop applications with the Palm Pilot PDA.
SUNWirmui	Italian Resource Management for Solaris.
SUNWisadl	Italian Localizations for Solstice Admintool launcher and associated libraries.
SUNWiscgu	Localizable Solaris Smart Card Administration - Grahical User Interface component.
SUNWisfw	Italian localizable message files for SFW consolidation.
SUNWitbas	Base L10N it CDE functionality to run a CDE application.
SUNWitdis	talian Localizations for admintool and GUI install.
SUNWitdma	Italian Localizations for Software used to perform system administration tasks.
SUNWitdst	CDE it Desktop Applications messages.
SUNWitdte	CDE Italian Desktop Login Environment.
SUNWithe	CDE Help L10N it Runtime Environment.
SUNWithed	CDE L10N it Help Developer Environment.
SUNWithev	CDE Help Volumes.
SUNWithez	Italian Localization for CDE Help Volumes.
SUNWitim	CDE Italian Desktop Image editor.
SUNWitj2p	Italian Localization of Java Plug-in 1.2.2.
SUNWitltk	Italian ToolTalk binaries and shared libraries.
SUNWitos	Localizable message files for the OS-Networking consolidation.
SUNWitpmw	Italian (EUC) Localizations for Power Management OW Utilities.
SUNWitreg	Solaris User Registration prompts at desktop login for user registration.
SUNWitsmc	Solaris Management Console Italian Localization.

TABLE C–4 Italian *(Continued)*

Package Name	Description
SUNWitwbc	Italian Localisations for Solaris WBEM Services.
SUNWitwm	Italian CDE Desktop Window Manages Messages.
SUNWitws2	Italian Localisations Solaris Product Registry.
SUNWitwsv	Italian Localisations for Solaris Product Registry Viewer.
SUNWiwacx	Italian OPEN LOOK (R) AccessX.
SUNWiwbcp	Italian OpenWindows Binary Compatibility Package.
SUNWiwdev	Italian Sun WBEM SDK resources.
SUNWixplt	Italian X Windows platform software.

The following table lists the Japanese language packages and their contents.

TABLE C–5 Japanese

Package Name	Description
NSCPjecom	Japanese (EUC) Localization of Netscape Communicator 4.7 supporting International security.
NSCPjpcom	Japanese (PCK) Localization of Netscape Communicator 4.7 supporting International security.
NSCPjucom	Japanese (UTF-8) Localization of Netscape Communicator 4.7 supporting International security.
SUNWjadcl	Japanese Localizations for Solaris Diskless Client Management Application.
SUNWjadis	Japanese (EUC) Localizations for admintool and GUI install.
SUNWjadma	Japanese (EUC) Localizations for Software used to perform system administration tasks. Admintool requires both this and SUNWjadis packages for Japanese (EUC) Localization.
SUNWjaj2p	Japanese Localization of Java Plug-in 1.2.2.
SUNWjbcp	Japanese (EUC) utilities including libc and locale data to provide a binary-compatible execution environment for SunOS 4.x applications.
SUNWjcs3f	Japanese JIS X0212 Type1 fonts for printing.
SUNWjdab	Japanese (Common) Localization for CDE Desktop Application Builder.
SUNWjdbas	Japanese (Common) Localization for CDE application basic runtime environment.
SUNWjddst	Japanese (EUC) Localization for CDE Desktop Applications.
SUNWjddte	Japanese (EUC) Localization for Solaris Desktop Login Environment

TABLE C–5 Japanese *(Continued)*

Package Name	Description
SUNWjdhcm	Japanese Localizations for DHCP Manager
SUNWjdhe	Japanese (EUC) Localization for CDE Help Runtime environment
SUNWjdhed	Japanese (EUC) Localization for CDE Help Developer Environment
SUNWjdhev	Japanese (Common) Localization for CDE Help Volumes
SUNWjdhez	Japanese (Common) Localizations for Desktop Power Pack Help Volumes
SUNWjdim	Japanese (EUC) Localization for Solaris CDE Image Viewer.
SUNWjdma	Japanese Localization for CDE MAN PAGES.
SUNWjdoc	Japanese Documentation Tools.
SUNWjdwm	Japanese (EUC) Localization for CDE Desktop Window Manager.
SUNWject	Japanese (EUC) Localizations for UTF-8 Code Conversion Tool.
SUNWjedev	Japanese (EUC) Development Environment Package specific files.
SUNWjeezt	Japanese (EUC) Localizations for Desktop Power Pack Applications.
SUNWjej2m	Japanese (EUC) man pages.
SUNWjeman	Japanese Feature Package Man Pages to see Japanese (EUC) manpages for SUNWjfpr and SUNWjfpu and Japanese manpages for SUNWman and SUNWaled.
SUNWjepmm	Japanese (EUC) Power Management OW Utilities Man Pages.
SUNWjepmw	Japanese (EUC) Localizations for Power Management OW Utilities.
SUNWjeudc	Japanese (EUC) Localizations for User Defined Character tool for Solaris CDE environment.
SUNWjfdl	Japanese Localization for Solaris Desktop Font Downloader for Adobe PostScript printers.
SUNWjfpre	Stream modules for Japanese Feature Package (JFP). It is a extended package to run JFP environment.
SUNWjfpue	Japanese Feature Package (JFP) specific files for user. It is a extended package to run JFP environment.
SUNWjfxmn	English manpages of Japanese features for X Window System.
SUNWjj2rt	Japanese Java virtual machine and core class libraries.
SUNWjjmfp	Japanese Localization for JMF player.
SUNWjkcsr	Japanese (EUC) Localizations for Kodak Color Management System Runtime.
SUNWjlvma	Japanese Localizations for Solaris Volume Management API's.
SUNWjlvmg	Japanese Localizations for Solaris Volume Management Application.

TABLE C–5 Japanese *(Continued)*

Package Name	Description
SUNWjmane	Japanese Feature Package Man Pages (Extension) to see English manpages for SUNWjfpre and SUNWjfpue.
SUNWjmfrn	Japanese (EUC) Localizations for Motif 1.2.3 RunTime Kit.
SUNWjmga	Japanese Solaris Management Applications.
SUNWjorte	Japanese (EUC) Localizations for OPEN LOOK toolkits runtime environment.
SUNWjos	Japanese ON message files.
SUNWjpdas	Japanese Localization for tools to synchronize desktop applications with the Palm Pilot PDA.
SUNWjpj2m	Japanese (PCK) man pages.
SUNWjreg	Japanese Localizations for Solaris User Registration.
SUNWjrmui	Japanese Resource Management for Solaris.
SUNWjsadl	Japanese (EUC) Localizations for Solstice Admintool launcher and associated libraries.
SUNWjscag	Japanese Localization for Solaris Smart Card Administration - Grahical User Interface component.
SUNWjsfw	Japanese localizable message files for SFW consolidation.
SUNWjsmc	Japanese Solaris Management Console 2.0.
SUNWjtlmn	Japanese (EUC) ToolTalk manual pages for ToolTalk programmers, OpenWindows users, and Common Desktop Environment (CDE) users.
SUNWjtltk	Japanese Localizations for ToolTalk binaries and shared libraries needed for Common Desktop Environment (CDE), OpenWindows, and all ToolTalk clients.
SUNWjuj2m	Japanese (UTF-8) man pages.
SUNWjwacx	Japanese (EUC) Localizations for AccessX client program.
SUNWjwbc	Japanese Localizations for Solaris WBEM Services.
SUNWjwbcp	Japanese (EUC) Localizations for Support files, programs, and libraries for OpenWindows Binary Compatibility.
SUNWjwbd	Japanese Localizations for Sun WBEM SDK resources.
SUNWjwncr	Japanese Input System, Wnn6 Client, (Root).
SUNWjwncu	Japanese Input System, Wnn6 Client, (Usr).
SUNWjwncx	Japanese Input System, Wnn6 Client X Window System.
SUNWjwndt	Japanese Input System, Wnn6 Client for CDE.

TABLE C–5 Japanese *(Continued)*

Package Name	Description
SUNWjwnsr	Japanese Input System, Wnn6 Server, (Root).
SUNWjwnsu	Japanese Input System, Wnn6 Server, (Usr).
SUNWjws2	Japanese Localizations for Solaris Product Registry.
SUNWjwsv	Japanese Localizations for Solaris Product Registry Viewer.
SUNWjxfa	Japanese (Common) Localizations for Font Administration application for Solaris platforms.
SUNWjxfnt	Japanese X Window System Fonts (required fonts), gothic bold fonts and TrueType map files.
SUNWjxim	Japanese X Window System X Input Method Server Package.
SUNWjxoft	Sun Minchou bitmap fonts.
SUNWjxpmn	Japanese (EUC) X Window System online programmers man pages.
SUNWjxumn	Japanese (EUC) X Window System online user man pages.

The following table lists the Korean language packages and their contents.

TABLE C–6 Korean

Package Name	Description
NSCPkocom	Korean Localization of Netscape Communicator 4.7 supporting International security.
NSCPkucom	ko.UTF-8 localization of Netscape Communicator 4.78 supporting International security.
SUNWkacx	Korean AccessX client program.
SUNWkadis	Korean Localizations for admintool and GUI install.
SUNWkadma	Korean Localizations for Software used to perform system administration tasks. Admintool requires both this and SUNWkadis packages for Korean localization.
SUNWkbcp	This package contains Korean Language Environment binary compatibility files.
SUNWkcoft	Korean/Korean UTF-8 common optional font package.
SUNWkdab	Korean Localizations for CDE Desktop Application Builder.
SUNWkdbas	Korean Localizations for CDE Base functionality.
SUNWkdcl	Korean Localizations for Solaris Diskless Client Management Application.
SUNWkdcst	The Localized tools package for Korean.

TABLE C–6 Korean *(Continued)*

Package Name	Description
SUNWkddst	Korean Localizations for CDE Desktop Applications.
SUNWkddte	Korean Localizations for CDE Desktop Login Environment.
SUNWkdezt	Korean (EUC) Localizations for Desktop Power Pack Applications.
SUNWkdft	Fonts for the common desktop environment, Korean L10N CDE.
SUNWkdhcm	Korean Localizations for DHCP Manager.
SUNWkdhe	Korean Localizations for CDE Help Runtime environment.
SUNWkdhev	Korean CDE Help Volumes.
SUNWkdhez	Korean (Common) Localizations for Desktop Power Pack Help Volumes.
SUNWkdicn	Korean Localizations for CDE Icons.
SUNWkdim	Korean Localizations for CDE Imagetool.
SUNWkdwm	Korean Localizations for CDE Desktop Window Manager.
SUNWkepmw	Korean (EUC) Localization for Power Management OW Utilities.
SUNWkfdl	Korean Solaris Font Downloader for Adobe Postscript (tm) TCP/IP printers.
SUNWkj2rt	Java virtual machine and core class libraries (Korean supplement).
SUNWkjmfp	Korean Localization for JMF player.
SUNWkkcsr	Korean (EUC) KCMS Runtime Environment.
SUNWkleex	Korean Language Environment specific files. It is a required package to run Korean Language Environment (64-bit).
SUNWkler	This package contains the stream modules for Korean Language Environment. It is a required package to run Korean Language Environment.
SUNWkleue	This package contains Korean Language Environment specific files. It is a required package to run Korean Language Environment.
SUNWklvma	Korean Localizations for Solaris Volume Management API's.
SUNWklvmg	Korean Localizations for Solaris Volume Management Application.
SUNWkmga	Korean Solaris Management Applications.
SUNWkoj2p	Korean Localization of Java Plug-in 1.2.2.
SUNWkorte	Korean OPENLOOK Toolkits Runtime Environment Package.
SUNWkos	This package contains Korean Language Environment specific files. It is a required package to run Korean Language Environment.
SUNWkpdas	Korean Localization for tools to synchronize desktop applications with the Palm Pilot PDA.

TABLE C–6 Korean *(Continued)*

Package Name	Description
SUNWkreg	Korean Localizations for Solaris User Registration.
SUNWkrmui	Korean Resource Management User Interface Components.
SUNWksadl	Korean Localizationsfor Solstice Admintool launcher and associated libraries.
SUNWkscgu	Korean Localizable Solaris Smart Card Administration - Grahical User Interface component.
SUNWksfw	Korean localizable message files for SFW consolidation.
SUNWksmc	Korean Solaris Management Console 2.0.
SUNWktltk	Korean ToolTalk Runtime Package Package.
SUNWkttfe	Korean True Type Font Extension.
SUNWkudc	Korean (EUC) Localizations for User Defined Character tool for Solaris CDE environment.
SUNWkuxft	Korean UTF-8 X Windows Platform Required Fonts.
SUNWkwbc	Korean Localisations for Solaris WBEM Services.
SUNWkwbcp	Korean OpenWindows Binary Compatibility Package.
SUNWkwdev	Korean Localizations for Solaris WBEM Services.
SUNWkwsr	Korean prodreg 2.0 Localizable text resources.
SUNWkwsr2	Korean Localizations for Solaris Product Registry.
SUNWkwsrv	Korean Localizations for Solaris Product Registry Viewer.
SUNWkxe	Korean X Windows Platform Software Package.
SUNWkxfte	Korean X Windows Platform Required Fonts
SUNWkxman	Korean X Windows Online User Man Pages Package

The following table lists the Spanish language packages and their contents.

TABLE C–7 Spanish

Package Name	Description
NSCPescom	Spanish Localization of Netscape Communicator 4.7 supporting International security.
SUNWedcl	Diskless Client Management Application Spanish Localization.
SUNWedhcm	Spanish Localizations for DHCP Manager.

TABLE C–7 Spanish *(Continued)*

Package Name	Description
SUNWefdl	Localizable strings for the Font Downloader.
SUNWej2rt	Java virtual machine and core class libraries (Spanish supplement).
SUNWejmfp	Localizable JMF Player for playing audio and video files.
SUNWelvma	Spanish Localizations for Solaris Volume Management API's.
SUNWelvmg	Spanish Localizations for Solaris Volume Management Application.
SUNWemgp	Solaris Management Applications Spanish Localization.
SUNWeorte	Spanish OPEN LOOK (R) toolkits runtime environment.
SUNWepdas	Spanish Localizations for tools to synchronize desktop applications with the Palm Pilot PDA.
SUNWermui	Spanish Resource Management for Solaris.
SUNWesadl	Spanish Localizations for Solstice Admintool launcher and associated libraries.
SUNWesbas	Base L10N fr CDE functionality to run a CDE application.
SUNWescgu	Localizable Solaris Smart Card Administration - Grahical User Interface component.
SUNWesdis	Spanish Localizations for admintool and GUI install.
SUNWesdma	Spanish Localizations for Software used to perform system administration tasks.
SUNWesdst	CDE Desktop Applications.
SUNWesdte	CDE Desktop Login Environment.
SUNWesfw	Spanish localizable message files for SFW consolidation.
SUNWeshe	CDE Help L10N es Runtime Environment.
SUNWeshed	CDE L10N es Help Developer Environment.
SUNWeshev	CDE Help Volumes.
SUNWeshez	Spanish Localizations for Desktop Power Pack Help Volumes.
SUNWesim	CDE Desktop apps.
SUNWesj2p	Spanish Localization of Java Plug-in 1.2.2.
SUNWesos	Localizable message files for the OS-Networking consolidation.
SUNWespmw	Spanish (EUC) Localizations for Power Management OW Utilities.
SUNWesreg	Solaris User Registration prompts at desktop login for user registration.
SUNWessmc	Solaris Management Console Spanish Localization.
SUNWeswbc	Spanish Localisations for Solaris WBEM Services.

TABLE C–7 Spanish *(Continued)*

Package Name	Description
SUNWeswm	Spanish CDE Desktop Window Manages Messages.
SUNWesws2	Spanish Localisations Solaris Product Registry.
SUNWeswsv	Spanish Localisations for Solaris Product Registry Viewer.
SUNWetltk	Spanish ToolTalk binaries and shared libraries.
SUNWewacx	Spanish OPEN LOOK (R) AccessX.
SUNWewdev	Spanish Sun WBEM SDK resources.
SUNWexplt	Spanish X Windows platform software.

The following table lists the Swedish language packages and their contents.

TABLE C–8 Swedish

Package Name	Description
NSCPsvcom	Swedish Localization of Netscape Communicator 4.7 supporting International security.
SUNWsdcl	Diskless Client Management Application Swedish Localization.
SUNWsdhcm	Swedish Localizations for DHCP Manager.
SUNWsfdl	Localizable strings for the Font Downloader.
SUNWsj2rt	Java virtual machine and core class libraries (Swedish supplement).
SUNWsjmfp	Localizable JMF Player for playing audio and video files.
SUNWslvma	Swedish Localizations for Solaris Volume Management API's.
SUNWslvmg	Swedish Localizations for Solaris Volume Management Application.
SUNWsmgp	Solaris Management Applications Swedish Localization.
SUNWsorte	Swedish OPEN LOOK (R) toolkits runtime environment.
SUNWspdas	Swedish tools to synchronize desktop applications with the Palm Pilot PDA.
SUNWsrmui	Swedish Resource Management for Solaris.
SUNWssadl	Swedish Localizations for Solstice Admintool launcher and associated libraries.
SUNWsscgu	Localizable Solaris Smart Card Administration - Grahical User Interface component.
SUNWssfw	Swedish localizable message files for SFW consolidation.
SUNWstltk	Swedish ToolTalk binaries and shared libraries.
SUNWsvbas	Base Swedish CDE functionality messages.

TABLE C–8 Swedish *(Continued)*

Package Name	Description
SUNWsvdis	Swedish Localizations for admintool and GUI install.
SUNWsvdma	Swedish Localizations for Software used to perform system administration tasks.
SUNWsvdst	Swedish CDE Desktop Applications messages.
SUNWsvdte	Swedish CDE Desktop Login Environment messages.
SUNWsvhe	Swedish CDE Help Runtime Environment.
SUNWsvhed	Swedish CDE Help Developer Environment messages.
SUNWsvhev	CDE Help Volumes.
SUNWsvhez	Swedish Localizations for Desktop Power Pack Help Volumes.
SUNWsvim	Swedish CDE Image editor messages.
SUNWsvj2p	Swedish Localization of Java Plug-in 1.2.2.
SUNWsvos	Localizable message files for the OS-Networking consolidation.
SUNWsvpmw	Swedish (EUC) Localizations for Power Management Open Windows. Utilities
SUNWsvreg	Solaris User Registration prompts at desktop login for user registration.
SUNWsvsmc	Solaris Management Console Swedish Localization.
SUNWsvwbc	Swedish Localizations for Solaris WBEM Services.
SUNWsvwm	Swedish CDE Desktop Window Manages Messages.
SUNWsvws2	Swedish Localisations Solaris Product Registry.
SUNWsvwsv	Swedish Localisations for Solaris Product Registry Viewer.
SUNWsvwsv	Swedish Localisations for Solaris Product Registry Viewer.
SUNWswacx	Swedish Open Look AccessX.
SUNWsxplt	Swedish X Windows platform software.
SUNWvbcp	Swedish OS Binary Compatibility Package.

The following table lists the Traditional Chinese language packages and their contents.

TABLE C–9 Traditional Chinese

Package Name	Description
NSCP5com	zh_TW.BIG5 Localization of Netscape Communicator 4.7 supporting International security.

TABLE C–9 Traditional Chinese *(Continued)*

Package Name	Description
NSCPhcom	Traditional Chinese Localization of Netscape Communicator 4.7 supporting International security.
NSCPhucom	zh_TW.UTF-8 Localization of Netscape Communicator 4.7 supporting International security.
SUNW5ttfe	Traditional Chinese True Type Fonts Package Extension.
SUNW5xfnt	Traditional Chinese BIG5 X Windows Platform required Fonts Package.
SUNWhacx	Traditional Chinese AccessX client program.
SUNWhadis	Traditional Chinese (EUC) Localizations for admintool and GUI install.
SUNWhadma	Traditional Chinese (EUC) Localizations for Software used to perform system administration tasks. Admintool requires both this and SUNWhadis packages for Traditional Chinese (EUC) Localization.
SUNWhbcp	This package contains Traditional Chinese Language Environment binary compatibility files.
SUNWhdab	Traditional Chinese Localizations for CDE Desktop Application Builder.
SUNWhdbas	Traditional Chinese Localizations for CDE Base functionality.
SUNWhdcl	Traditional Chinese Localizations for Solaris Diskless Client Management Application.
SUNWhddst	Traditional Chinese Localizations for CDE Desktop Applications.
SUNWhddte	Traditional Chinese Localizations for CDE Desktop Login Environment.
SUNWhdezt	Traditional Chinese (EUC) Localizations for Desktop Power Pack Applications.
SUNWhdft	Traditional Chinese Localizations for CDE Fonts.
SUNWhdhcm	Traditional Chinese Localizations for DHCP Manager.
SUNWhdhe	Traditional Chinese Localizations for CDE Help Runtime environment.
SUNWhdhev	Traditional Chinese CDE Help Volumes
SUNWhdhez	Traditional Chinese (Common) Localizations for Desktop Power Pack Help Volumes.
SUNWhdicn	Traditional Chinese Localizations for CDE Icons.
SUNWhdim	Traditional Chinese Localizations for CDE Imagetool.
SUNWhdwm	Traditional Chinese Localizations for CDE Desktop Window Manager.
SUNWhepmw	Traditional Chinese (EUC) Localization for Power Management OW Utilities.

TABLE C–9 Traditional Chinese *(Continued)*

Package Name	Description
SUNWhfdl	Traditional Chinese Solaris Font Downloader for Adobe Postscript TCP/IP printers.
SUNWhj2p	Traditional Chinese Localization of Java Plug-in 1.2.2.
SUNWhj2rt	Java virtual machine and core class libraries (Traditional Chinese supplement).
SUNWhjmfp	Traditional Chinese Localization for JMF player.
SUNWhkcsr	Traditional Chinese (EUC) KCMS runtime environment.
SUNWhkdcl	Traditional Chinese (Hong Kong) Localizations for Solaris Diskless Client Management Application.
SUNWhkeex	Traditional Chinese (Hong Kong BIG5) Language Environment specific files. It is a required package to run Traditional Chinese (Hong Kong BIG5) Language Environment (64-bit).
SUNWhkeue	This package contains Traditional Chinese (Hong Kong) Language Environment specific files. It is a required package to run Traditional Chinese (Hong Kong) Language Environment.
SUNWhklvmg	Traditional Chinese (Hong Kong) Localizations for Solaris Volume Management Application.
SUNWhkmga	Traditional Chinese (Hong Kong) Solaris Management Applications.
SUNWhkrmui	Traditional Chinese (Hong Kong) Resource Management User Interface Components.
SUNWhksmc	Traditional Chinese (Hong Kong) Solaris Management Console 2.0.
SUNWhkxe	Traditional Chinese(Hong Kong) X Windows Platform Software Package.
SUNWhleex	Traditional Chinese Language Environment specific files. It is a required package to run Traditional Chinese Language Environment (64-bit).
SUNWhleue	Traditional Chinese Language Environment specific files. It is a required package to run Traditional Chinese Language Environment.
SUNWhlvma	Traditional Chinese Localizations for Solaris Volume Management API's.
SUNWhlvmg	Traditional Chinese Localizations for Solaris Volume Management Application.
SUNWhmga	Traditional Chinese Solaris Management Applications.
SUNWhorte	Traditional Chinese OPENLOOK Toolkits Runtime Environment Package.
SUNWhos	This package contains Traditional Chinese Language Environment specific files. It is a required package to run Traditional Chinese Language Environment.
SUNWhpdas	Traditional Chinese Localization for tools to synchronize desktop applications with the Palm Pilot PDA.
SUNWhreg	Traditional Chinese Localizations for Solaris User Registration.

TABLE C–9 Traditional Chinese *(Continued)*

Package Name	Description
SUNWhrmui	Traditional Chinese Resource Management User Interface Components.
SUNWhsadl	Traditional Chinese Localizationsfor Solstice Admintool launcher and associated libraries.
SUNWhscgu	Traditional Chinese Localizable Solaris Smart Card Administration - Grahical User Interface component.
SUNWhsfw	Traditional Chinese localizable message files for SFW consolidation.
SUNWhsmc	Traditional Chinese Solaris Management Console 2.0.
SUNWhtltk	Traditional Chinese ToolTalk Runtime Package Package.
SUNWhttfe	Traditional Chinese True Type optional Fonts Package Extension.
SUNWhudc	Traditional Chinese (EUC) Localizations for User Defined Character tool for Solaris CDE environment.
SUNWhwbc	Traditional Chinese Localisations for Solaris WBEM Services.
SUNWhwbcp	Traditional Chinese OpenWindows Binary Compatibility Package.
SUNWhwdev	Traditional Chinese Localizations for Solaris WBEM Services.
SUNWhwsr2	Traditional Chinese Localizations for Solaris Product Registry.
SUNWhwsrv	Traditional Chinese Localizations for Solaris Product Registry Viewer.
SUNWhxe	Traditional Chinese X Windows Platform Software Package.
SUNWhxman	Traditional Chinese X Windows Online User Man Pages Package.

The following table lists the shared packages and their contents.

TABLE C–10 Asian Shared

Package Name	Description
SUNWabcp	Asian common files for SunOS 4.x Binary Compatibility.
SUNWudct	User Defined Character tool for Solaris CDE environment.

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