

Tru64 UNIX

Technical Reference for Using Korean Features

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This manual provides the information on the use of the Korean-specific features supported on the Tru64 UNIX operating system.

Product Version:

Tru64 UNIX Version 5.1B or higher

**Hewlett-Packard Company
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About This Manual

This manual provides information for end users and programmers who want to use and develop internationalized applications in Korean locales on the Tru64 UNIX operating system.

Audience

This guide is for new and experienced end users and programmers who are interested in the Korean variant of the Tru64 UNIX operating system.

Organization

This manual is organized as follows:

- Chapter 1 Describes the Korean character sets supported in the Tru64 UNIX operating system software
- Chapter 2 Describes the Korean codesets and the conversion among different codesets
- Chapter 3 Describes the Korean locales
- Chapter 4 Describes the local hardware devices that support the Korean locales
- Chapter 5 Provides information on Korean fonts
- Chapter 6 Provides information on Korean keyboards
- Chapter 7 Describes how to input Korean characters
- Chapter 8 Introduces the Korean printing support
- Chapter 9 Describes other Korean features

Related Documents

Tru64 UNIX *Writing Software for the International Market* and Tru64 UNIX *Using International Software* describe how to create internationalized programs on Tru64 UNIX and how to use internationalization features of the operating system. These manuals are part of the Tru64 UNIX documentation set and are available on the World Wide Web at the following URL:
<http://www.tru64unix.compaq.com/docs/>.

Programming for the World: A Guide to Internationalization (O'Donnell, Sandra Martin, Prentice-Hall, Inc., Englewood Cliffs, New Jersey, 1994) provides information about cultural and linguistic requirements around the world and the changes needed in computer systems to handle those requirements.

X Window System, Third Edition, Robert W. Scheifler and James Gettys, 1992, Digital Press, One Burlington Woods Drive, Burlington, MA, USA, 01803

Programmer's Supplement for Release 5 of the X Window System, Version 11, David Flanagan, O'Reilly & Associates, Inc., 103 Morris Street, Sebastopol, CA, USA, 95472

The Unicode Standard, Version 3.0 and Version 3.1, The Unicode Consortium,
<http://www.unicode.org/>

Information Technology-Universal Multiple-Octet Coded Character Set, ISO/IEC 10646:2001. The basic multilingual plane defined by this standard is identical with the main body of Unicode character encoding.

Conventions

The following typographical conventions are used in this manual:

<code>%</code>	A percent sign represents the C shell system prompt.
<code>\$</code>	A dollar sign represents the system prompt for the Bourne and Korn shell.
<code>#</code>	A number sign represents the superuser prompt.
<code>% cat</code>	Boldface type in interactive examples indicates typed user input.
<i>file</i>	Italic (slanted) type indicates variable values, placeholders, and function argument names.
<code>[]</code> <code>{ }</code>	In syntax definitions, brackets indicate items that are optional and braces indicate items that are required. Vertical bars separating items inside brackets or braces indicate that you choose one item from among those listed.
<code>...</code>	In syntax definitions, a horizontal ellipsis indicates that the preceding item can be repeated one or more times.
<code>cat(1)</code>	A cross-reference to a reference page includes the appropriate section number in parentheses. For example, <code>cat(1)</code> indicates that you can find information on the <code>cat</code> command in Section 1 of the reference pages.
<code>[RETURN]</code>	In an example, a key name enclosed in a box indicates that you press that key.
<code>Ctrl/x</code>	This symbol indicates that you hold down the first named key while pressing the key or mouse button that follows the slash. In examples, this key combination is enclosed in a box (for example <code>[Ctrl/C]</code>).

Character Sets

The Tru64 UNIX operating system software supports the following character sets that are relevant to the Korean language:

- KSC5636-1993
- KSC5601-1992
- Unicode
- ISO/IEC 10646

1.1 KSC5636-1993

This character set was published on January 6, 1993 and was formerly called KSC5636-1989 (published on April 22, 1989). The character set is sometimes referred to as KS-Roman. KSC5636-1993 is the Korean analog to ASCII and ISO 646 with the exception of the ASCII backslash (0x5C), which is represented as a Won symbol under KSC5636.

1.2 KSC5601–1992

This basic Korean character set standard enumerates 8,224 characters, 4,888 of which are Hanja, and 2,350 of which are precombined Hangul. The Hanja and Hangul blocks are arranged phonetically. The standard name has recently been changed to KS X 1001:1992; however, the more well-known name, KSC, is used throughout the book. The following is a break-down of the character set:

- Row 1: 94 symbols
- Row 2: 69 abbreviations and symbols
- Row 3: 94 full-width KSC5636-1993 characters
- Row 4: 94 Hangul elements

- Row 5: 68 lowercase and uppercase Roman numerals and lowercase and uppercase Greek alphabet
- Row 6: 68 line-drawing elements
- Row 7: 79 abbreviations
- Row 8: 91 phonetic symbols, circled characters, and fractions
- Row 9: 94 phonetic symbols, parenthesized characters, subscripts, and superscripts
- Row 10: 83 Hiragana characters
- Row 11: 86 Katakana characters
- Row 12: 66 lowercase and uppercase Cyrillic (Russian) alphabet
- Rows 16 through 40: 2,350 precombined Hangul (last is 40-94) characters
- Rows 42 through 93: 4,888 Hanja (last is 93-94) characters

Rows 41 and 94 are designated for user-defined characters.

The KSC5601-1992 character set is similar to the obsolete KSC5601-1987 character set; however, KSC5601-1992 provides more material in annexes.

Note that there are 4,888 Hanja characters in the Hanja block (Rows 42 through 93), but not all characters are unique. The Hanja block is arranged phonetically and, in some cases, the same Hanja character has more than one application. In those cases, the Hanja character is duplicated (sometimes more than once) in the same character set. There are 268 such cases of duplicate Hanja characters in KSC5601-1992, therefore it contains 4,620 unique Hanja characters.

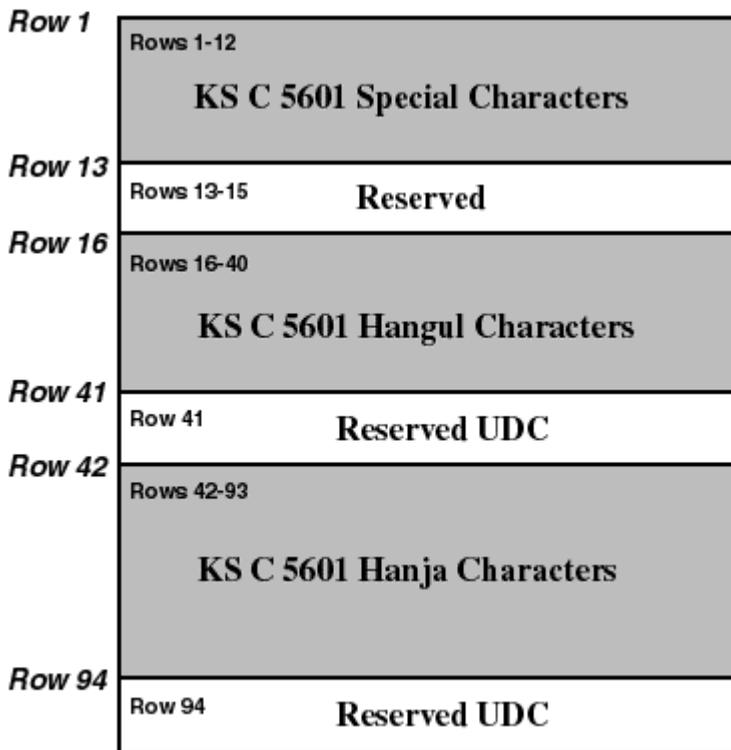
Korean Hangul characters are typically encoded in precombined form where 2 or 3 Hangul elements bound into a single character. The KSC5601-1992 character set enumerates 2,350 such precombined forms. While this number is sufficient for most purposes, it does not account for the total number of possible permutations. The encoding system that encodes all possible precombined Hangul characters is known as johab encoding (also known as "two-byte combination code" because the Korean word "johab" means "combine"), and is described in Annex 3 of the KSC5601-1992 standard. This encoding is similar to encoding all possible three-letter words in English; while all combinations are possible, only a fraction represent real words.

Precombined Hangul can be composed of 19 initial, 21 medial, and 27 final Hangul elements (28 characters, if you count the placeholder). This provides a maximum of 11,172 precombined Hangul characters. Of these 67 Hangul elements, 51 are unique (some can occur in different positions). Each of these positions are encoded using five bits each (five bits can encode up to 32 unique objects). The encoding array has the following characteristics:

- Bit 1: always on
- Bits 2-6: initial Hangul element
- Bits 7-11: medial Hangul element
- Bits 12-16: final Hangul element

The initial and final elements are consonants, and the medial elements are vowels. This encoding must be treated as a 16-bit entity because the bit array of the medial Hangul element spans the first and second byte.

Figure 1–1: KSC5601 Character Set



1.3 Unicode

The Unicode Standard, Version 3.0 specifies a universal character set (UCS) that contains definitions for 49,194 characters and also includes a Private Use Area for vendor-defined or user-defined characters. The main features of this character set are:

- All characters are treated as 16-bit units.

- Some nonspacing diacritic marks are defined, which can be combined with base characters in Unicode. For example, you can encode the character **á** as the 16-bit character *a* plus the 16-bit nonspacing grave accent. The result is a 32-bit composed sequence.
- Characters have properties, such as base, numeric, spacing, combination, and directionality. The Unicode standard provides rules for ordering characters with different properties so that parsing of characters is unambiguous.
- The relationship between Unicode characters and the glyphs in the native language script that users see, type, or print is not necessarily one-to-one. A glyph may be mapped to a single character or a composite sequence. Conversely, more than one glyph can be mapped to a character.
- The ISO 8859-1 character set occupies the first 256 code positions (and the ASCII character set the first 128 positions) of the UCS.

1.4 ISO/IEC 10646

The ISO/IEC 10646 standard, which is specified in Information Technology-Universal Multiple-Octet Coded Character Set, ISO/IEC 10646, allows characters to be specified as either 32-bit units or like Unicode, as 16-bit units. In their 32-bit form, the 16-bit character values in Unicode are zero-extended.

Codesets and Codeset Conversion

The Tru64 UNIX operating system fully supports the following Korean codesets by including locales and codeset conversion support:

- DEC Korean
- Korean EUC (Extended UNIX Code)
- UTF-8

It also provides codeset conversion support for the following codesets:

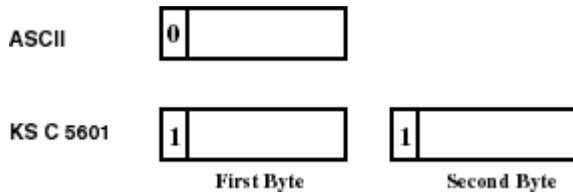
- KSC5601 (Unified Hangul)
- ISO-2022-KR
- UCS-4

2.1 DEC Korean

The ASCII, KSC5636-1993 (KS Roman), and KSC5601-1992 character sets (excluding the additional Hangul characters defined in Annex 3 of the standard) are combined to form the DEC Korean codeset, which is denoted as `deckorean`.

DEC Korean uses a two-byte data representation for symbols and ideographic characters defined in KSC5601-1992. To differentiate KSC5601-1992 characters from ASCII, the most significant bit (MSB) of both bytes of KSC5601 characters is always set on.

Figure 2–1: Representations of DEC Korean Characters



The first byte of a two-byte code determines its row number, while the second determines its column number. The following formula illustrates the code of a two-byte KSC5601 character in relation to its row and column numbers:

$$\text{1st byte} = A0 + \text{row number}$$

$$\text{2nd byte} = A0 + \text{column number}$$

For example, if a character is positioned at the first column of the 36th row, its encoding value is calculated as follows:

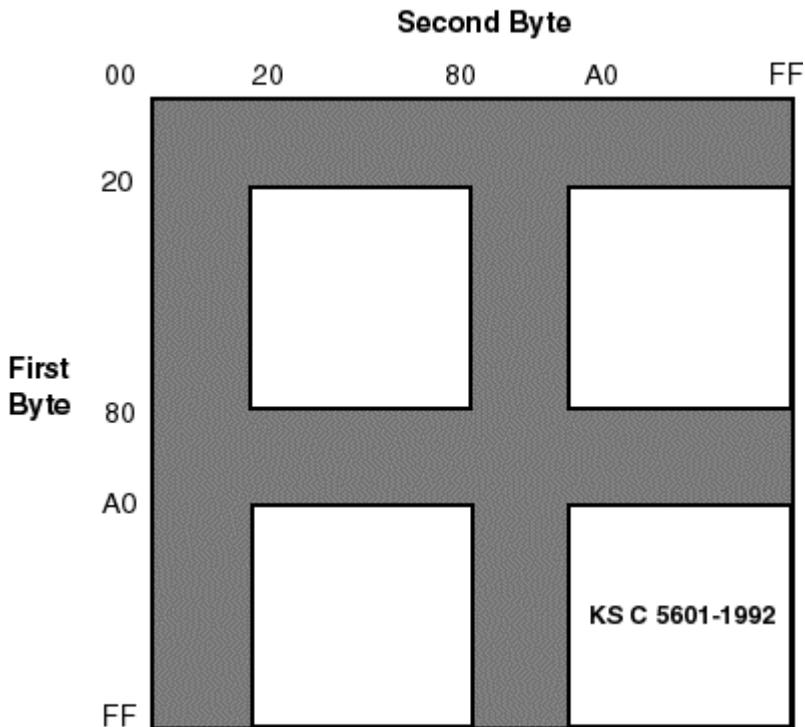
$$\text{1st byte} = A0 (\text{hex}) + 36 = C4 (\text{hex})$$

$$\text{2nd byte} = A0 (\text{hex}) + 01 = A1 (\text{hex})$$

In this case, the character code is C4A1.

Figure 2–2 illustrates the division of a two-byte code space and the position of KSC5601-1992 characters.

Figure 2–2: Code Space for KSC5601-1992



2.2 Korean EUC

Extended UNIX Code (EUC) is the codeset system extended by AT&T Bell Laboratories for use by various countries in the world. Korean EUC is the EUC codeset for representing Korean data. The encoding of Korean EUC is currently identical to that of DEC Korean, and is denoted as `eucKR`.

2.3 KSC5601 (Unified Hangeul)

Microsoft has developed Unified Hangeul Code (UHC) also known as "Extended Wansung" for its Windows 95 operating system. It is an optional character set of Win95K. Microsoft calls this Code Page 949.

Unified Hangeul provides full compatibility with KSC5601-1992 EUC encoding, but adds additional encoding ranges to hold additional precombined Hangeul characters (more precisely, the 8,822 that are needed to fully support the Johab character set). The following table provides the encoding ranges for UHC encoding:

Two-Byte Standard Characters	Encoding Ranges
First byte range	0x81-0xFE
Second byte ranges	0x41-0x5A, 0x61-0x7A and 0x81-0xFE

One-Byte Characters	Encoding Range
ASCII	0x21-0x7E

Note that the encoding ranges 0xA1A1 through 0xFEFE are identical in terms of character-to-code allocation with KSC5601-1992 in EUC Encoding.

2.4 ISO-2022-KR

The ISO-2022-KR codeset consists of the following character sets:

- ASCII
- KSC5601-1992

It is assumed that the starting code of the text is ASCII. ASCII and Korean characters are distinguished by use of the shift function. For example, the code SO indicates that the upcoming bytes are Korean characters as defined in KSC5601. To return to ASCII the SI code is used.

Therefore, the escape sequence, shift function, and character set used in a text are as follows:

Control Sequence	Character Set
SO	KSC5601-1992
SI	ASCII
ESC \$) C	Appears once in the beginning of a line before any appearance of SO characters

Currently, the ISO-2022-KR codeset can be used in codeset conversion.

2.5 UCS-4/UTF-16

The UCS codeset is a standard character encoding for the universal character set (UCS) specified in the Unicode and ISO/IEC 10646 standards. There are two encoding schemes for UCS. An implementation that parses in 16-bit units (2 octet units) is known as UTF-16. This is the canonical Unicode encoding in wide use on personal computers. An implementation that parses in 32-bit units (4 octet units) is known as UCS-4. This is the canonical ISO/IEC 10646 encoding that is in use on systems that support larger data unit size.

On Tru64 UNIX, UTF-16 and UCS-4 encoding can be used in codeset conversion. In addition, UCS-4 is used as the internal process code for some locales. For information about codeset conversion, see Section 2.7. For information about locales, see Chapter 3.

2.6 UTF-8

Unicode and ISO/IEC 10646 standards define transformation formats for the universal character set. For the most part, the following UCS transformation formats (UTFs) exist to transform UCS values into sequences of bytes to be handled by various byte-oriented protocols:

- UTF-8, the standard method for transforming UCS-encoded data into a sequence of 8-bit bytes and ensuring interchange transparency for characters from the ASCII character set (code positions 0 through 127).
- UTF-7, the standard interchange format for environments that strip the eighth bit from each byte.
- UTF-16, a transformation format that allows systems that can process only 16-bit units to support the extended character definition space that is included in UCS-4.

The operating system supports UTF-8 and UTF-16. UTF-8 can be used in codeset conversion and in locales. For information about codeset conversion, see Section 2.7. For information about locale variants, see Chapter 3.

2.7 Codeset Conversion

The `iconv` utility provided by Tru64 UNIX converts the encoding of characters in one codeset to another and writes the results to standard output. Table 2–1 describes the Korean codeset converters.

Table 2–1: Codeset Conversion

	DEC Korean	Korean EUC	ISO- 2022-KR	KSC5601/cp949	UTF-16	UCS-4	UTF-8
DEC Korean	-	Y	N	Y	Y	Y	Y
Korean EUC	Y	-	Y	N	N	N	N
ISO-2022- KR	N	Y	-	Y	N	N	N
KSC5601/ cp949	Y	N	Y	-	Y	Y	Y
UTF-16	Y	N	N	Y	-	Y	Y
UCS-4	Y	N	N	Y	Y	-	Y
UTF-8	Y	N	N	Y	Y	Y	-

For example, you can enter the following command to convert a DEC Korean file to a Korean UTF-8 file:

```
% iconv -f deckorean -t UTF-8 <file>
```

Table 2–2 shows the codesets and the strings you use as parameters to the `iconv` utility.

Table 2–2: Codeset Names

Codeset	Parameter String
DEC Korean	Deckorean
Korean EUC	EucKR
ISO-2022-KR	ISO-2022-KR, iso-2022-kr
Unified Hangul	KSC5601, cp949
Universal Codeset	UTF-16, UCS-4
Universal Transfer Format	UTF-8

2.8 Codeset for Peripheral Devices

The operating system provides a mechanism by which you configure your system to run applications with peripherals, such as terminals and printers, supporting different codesets. You can specify the codesets for the applications, terminals, and printers independently as shown in Table 2–3. The operating system software automatically does the necessary codeset conversion.

Table 2–3: Feasible Korean Codeset for Applications, Terminals, and Printers

Application Code	Terminal Code	Printer Code
DEC Korean	DEC Korean	DEC Korean
Korean EUC	Korean EUC	Korean EUC
UTF-8	UTF-8	

Note

The `dxtterm` terminal emulator utility does not support UTF-8 as a terminal code. Use the `dtterm` terminal emulator utility when UTF-8 is required for a terminal code.

For details about setting up terminal code and printer code, see *Using International Software*.

Locales

The operating system supports the Korean locales shown in Table 3–1.

Table 3–1: Korean Locales

Codeset	Locale
DEC Korean	ko_KR ko_KR@ucs4 ko_KR.deckorean ko_KR.deckorean@ucs4
Korean EUC	ko_KR.eucKR
UTF-8	ko_KR.UTF-8

The `ko_KR.UTF-8` locale uses file code and internal process code (`wchar_t` encoding) defined in ISO 10646 and Unicode standards. The other, non-UTF-8, Unicode locales use UCS-4 as the internal process code. The classification information, however, is not provided for the full set of UCS-4 characters, but only for the characters defined in the Korean locale. The `ko_KR.deckorean@ucs4` locale is the same as the other, non-UTF-8, Unicode locales, and is provided for backward compatibility and may be removed in the future. See `l10n_intro.5` for more information.

If you are using DECwindows Motif, you can select the locale through the Language Menu of Session Manager. If you are using CDE, you can select the Options option from the CDE login screen and then choose the Language submenu. If you are superuser, you can use the `SYSMAN I18NCONFIG` utility to select a locale and define it as the system default.

The applicable locales are shown in Table 3–2.

Table 3–2: Korean Language Names

Locale	Language Name
ko_KR	Korean
ko_KR.deckorean	Korean (DEC Korean)
ko_KR.eucKR	Korean (EUC)
ko_KR.UTF-8	Korean (Unicode)

3.1 Sorting Behavior In Korean Locales

Beginning with Tru64 UNIX Version 4.0, the DEC Korean locale and the Korean EUC locale have the same collating order and all undefined characters collate after valid characters. This collation prevents intermixing valid characters and undefined characters and removes discrepancies between Korean locales.

The following are value ranges for undefined characters in the DEC Korean and Korean EUC locales:

0xA2E6 - 0xA2FE	0xA4D4	0xA5AB - 0xA5AF	0xA5BA - 0xA5C0
0xA5D9 - 0xA5E0	0xA5F9 - 0xA5FE	0xA6Ef - 0xA6FE	0xA7F0 - 0xA7FE
0xA8A5, 0xA8A7, 0xA8B0	0xA AF4 - 0xA AFE	0xABF7 - 0xABFE	0xACC2 - 0xACD0
0xACF2 - 0xACEF	0xADA1 - 0xADFE	0xAEA1 - 0xAEFE	0xAFA1 - 0xAFFE
0xC9A1 - 0xC9FE	0xF1A1 - 0xF1FD	0xFEA1 - 0xFEFE	-

Local Language Devices

4.1 Terminals

The Tru64 UNIX operating system supports the VT382-K Korean terminal. Hangul DECterm is the emulation of the VT382-K Korean terminal, which provides compatible functionality for running Korean character-cell terminal applications. You can also run `dtterm` in a Korean locale to support Korean character-cell terminal applications. For details about Hangul DECterm, see Chapter 9.

4.2 Printers

The operating system supports the following dot matrix Korean printers:

- LA380-K printer
- DL510-KA printer

The following print filters are provided to support these Korean printers:

Filter Name	Designated For
la380kof	LA380-K printer
dl510kaof	DL510-KA printer
wwpsof	All level 2 PostScript printers or level 1 PostScript printers with composite font support

For details about setting up Korean printer queues, see Chapter 8.

5.1 DECwindows Fonts

The operating system provides the Korean DECwindows fonts described in Table 5–1 in various sizes and typefaces for 75 dpi (dots-per-inch) display devices.

Table 5–1: Korean Screen Fonts

Typefaces	Glyph Size	Bounding Box	Remarks
Screen	15 x 16	16 x 18	Mandatory font
	22 x 22	24 x 24	Mandatory font
Myungcho	15 x 16	16 x 16	Optional font
	22 x 22	24 x 24	Optional font
	30 x 30	32 x 32	Optional font
Gotic	15 x 16	16 x 16	Optional font
	22 x 22	24 x 24	Optional font

In addition to these Korean fonts, several miscellaneous fonts are also provided for use in Hangul DECterm and Motif toolkit.

The mandatory fonts are available after you install the mandatory Korean subsets. Other fonts are optional and are available only if you install the optional Korean font subset IOSKOFONTP*. If you cannot find the optional fonts on your system, contact your system administrator.

No 100 dpi Korean fonts are provided in the Tru64 UNIX kit. To allow you to use the Korean fonts on 100 dpi display devices, a font alias file is provided to map the 75 dpi font names to the respective 100 dpi font names.

5.2 XLFD Font Names

You must specify the DECwindows font names in X Logical Font Description (XLFD) format in your application programs or in the application resource files. You can specify wildcards (*) for any fields in the font names. For compatibility, font names retained the year 1987.

You can use the following font names for either 75 dpi or 100 dpi display devices. To explicitly state the display resolution, you can specify 75 and 100 in the X- and Y-resolution fields; that is, the second and third asterisks in the following XLFD names:

- Screen family:
 - ADECW-Screen-medium-r-normal--*-180-*-*M-160-KSC5601.1987-1
 - ADECW-Screen-medium-r-normal--*-240-*-*M-240-KSC5601.1987-1
- Myungcho family:
 - ADECW-Myungcho-medium-r-normal--*-160-*-*M-160-KSC5601.1987-1
 - ADECW-Myungcho-medium-r-normal--*-240-*-*M-240-KSC5601.1987-1
 - ADECW-Myungcho-medium-r-normal--*-320-*-*M-320-KSC5601.1987-1
- Gothic family:
 - ADECW-Gotic-medium-r-normal--*-160-*-*M-160-KSC5601.1987-1
 - ADECW-Gotic-medium-r-normal--*-240-*-*M-240-KSC5601.1987-1

Table 5–2 shows the XLFD font names and associated character sets for miscellaneous Korean screen fonts.

Table 5–2: XLFD of Miscellaneous Korean Screen Fonts

XLFD Font Name	Character Set
-ADECW-Screen-medium-r-normal--*-180-*-*M-80-iso8859-1	ISO Latin-1
-ADECW-Screen-medium-r-normal--*-180-*-*M-80-DEC-DECctrl	DEC Display Control
-ADECW-Screen-medium-r-normal--*-180-*-*M-80-DEC-DECsuppl	DEC Supplemental
-ADECW-Screen-medium-r-normal--*-180-*-*M-80-DEC-DECtech	DEC Technical
-ADECW-Screen-medium-r-normal--*-180-*-*M-80-KS-Roman	KS Roman
-ADECW-Screen-medium-r-normal--*-240-*-*M-120-iso8859-1	ISO Latin-1
-ADECW-Screen-medium-r-normal--*-240-*-*M-120-DEC-DECctrl	DEC Display Control
-ADECW-Screen-medium-r-normal--*-240-*-*M-120-DEC-DECsuppl	DEC Supplemental
-ADECW-Screen-medium-r-normal--*-240-*-*M-120-DEC-DECtech	DEC Technical
-ADECW-Screen-medium-r-normal--*-240-*-*M-120-KS-Roman	KS Roman

5.2.1 Bitmap Font Samples

Figure 5–1 and Figure 5–2 show samples of the two families of Korean fonts.

Figure 5–1: Myungcho Font Sample

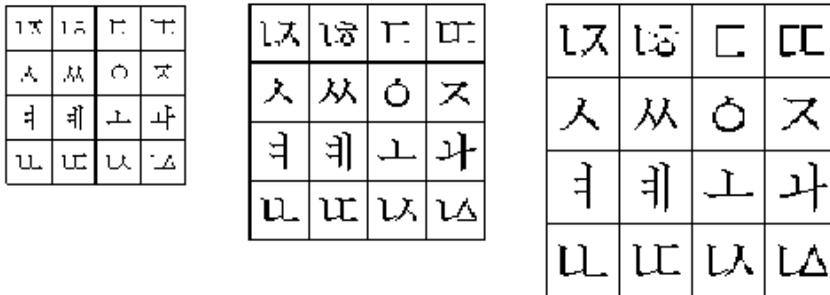
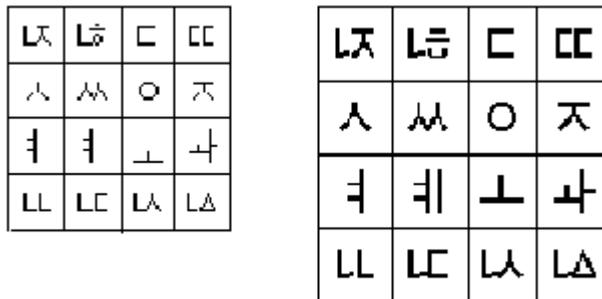


Figure 5–2: Gothic Font Sample



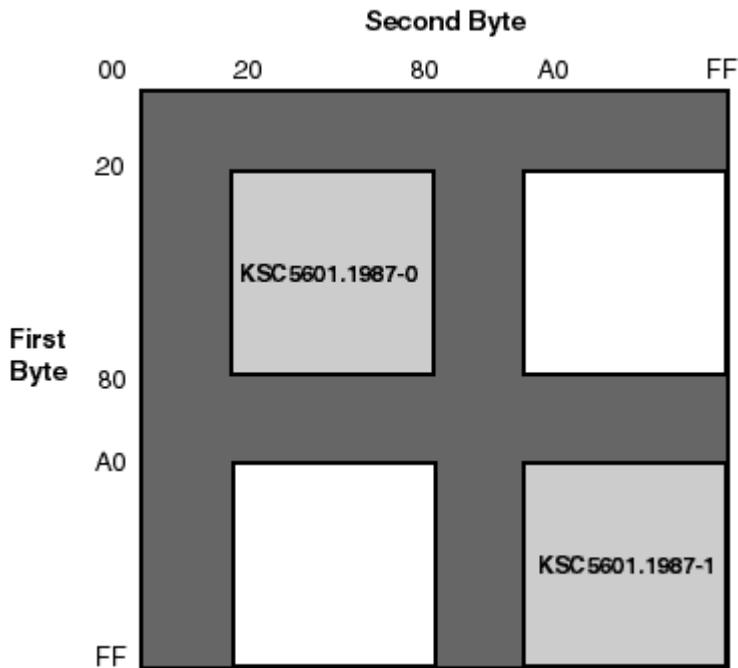
5.2.2 DECwindows Font Encoding

The X Window System defines two encodings for the KSC5601 character set, as shown in Table 5–3 and Figure 5–3.

Table 5–3: Korean DECwindows Font Encoding

Encoding	Character Set Registry
GL	KSC5601.1987-0
GR	KSC5601.1987-1

Figure 5–3: Korean Font Encoding Schemes



Different vendors may adopt different encoding schemes to produce their fonts. The Korean DECwindows fonts supplied by the operating system are in GR encoding.

To allow you to run applications on third-party workstations on which only GL-encoded fonts are installed, the operating system implementation of X Windows Release 6 (X11R6) Xlib supports the conversion of GR encoding to GL encoding for text drawing and measurement as shown in Table 5–4.

Table 5–4: Font Encoding Conversion

From	To
KSC5601.1987-1	KSC5601.1987-0

For details, see *Writing Software for the International Market*.

5.2.3 Specifying Fonts in DECwindows Applications

The default font list used in the Motif Toolkit is shown in Table 5–5.

Table 5–5: Default Korean Fonts

XLFD Font Name	Character Set
-ADECW-Screen-medium-r-normal--*-180-*-*M-80-iso8859-1	ISO8859-1
-ADECW-Screen-medium-r-normal--*-180-*-*M-160-ksc5601.1987-1	KSC5601.1987-1
-ADECW-Screen-medium-r-normal--*-180-*-*.*.*	Fontset

To override the default font list of a Korean DECwindows application, you should specify both the ISO Latin-1 and Korean fonts as well as the Korean fontset when creating widget instances. For details, see *Writing Software for the International Market*.

5.3 Outline Fonts

The operating system provides the following Korean outline font for printing on PostScript printers and for display through the Level II Display PostScript extension:

- Munjo

The encoding of the Munjo font is the same as that illustrated in Figure 5–3.

The Korean outline font can be used for:

- Printing on PostScript printers. For details see Chapter 8.
- Displaying through the X11R6 Type 1 rasterizer. To use these outline fonts, you must add the `$I18NPATH/usr/lib/X11/fonts/KoreanPS` directory to your font path by using the following command:

```
% xset +fp $I18NPATH/usr/lib/X11/fonts/KoreanPS
```
- Displaying through Display PostScript. You can view PostScript files with Korean characters using the CDA Viewer or through the Display PostScript extension.

5.3.1 XLFD Font Names of Korean Outline Fonts

To use the Korean outline fonts through the Type 1 rasterizer, you can specify the font names in XLFD format in your application programs or in application resource files, just as you do ordinary DECwindows bitmap fonts.

To specify the XLFD font name of an outline font, replace the fields currently marked with 0 (zero) with the following information:

- Field 1 — The font height in number of dots. An asterisk is usually entered in this field.
- Field 2 — The font height in point size. For example, you can enter 240 to specify a 24 point font.
- Fields 3 and 4 — The X- and Y-resolution. These fields usually have the value of 75 or 100.
- Field 5 — The average font width in point size. An asterisk is usually entered in this field.

For example, to use a 48 point font of the Munjo family in 100 dpi display device, you would specify:

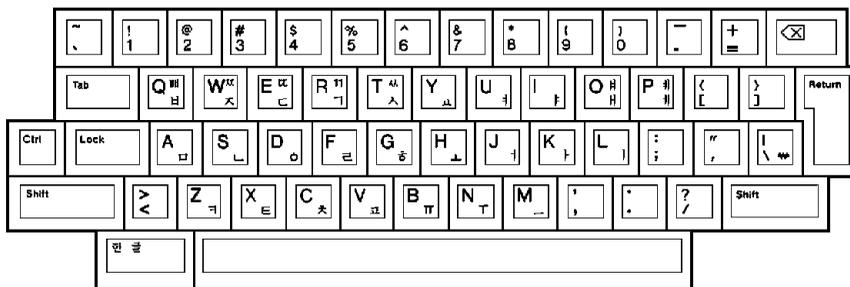
```
-dyna-munjo-medium-r-normal--*-480-100-100-m-*-KSC5601.1987-1
```

Keyboards

The Tru64 UNIX operating system supports any standard English PC-style keyboard to enter Korean. See `keyboard(5)` for more information.

There are some keyboard variants for different countries. For example, in Korea, the LK201-K variant has additional symbols printed on the keycaps for the Korean input method. The following figures illustrate some of the Korean keyboard layouts. You can find online copies of these figures at the location specified. These figures are in `.ddif` format.

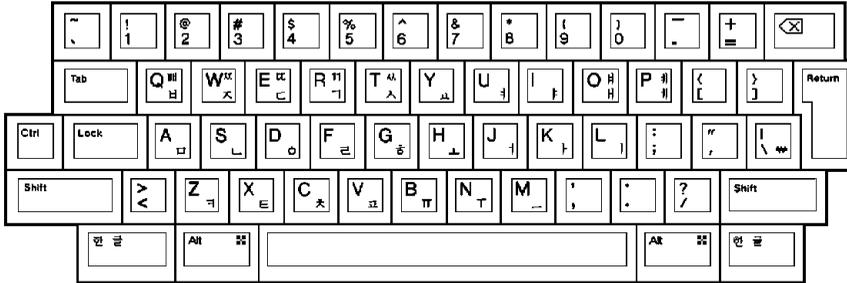
Figure 6–1: LK201-K keyboard Layout



Required Keymap: `us_lk201re`

Location of File: `/usr/lib/cda/hangul-lk201k.ddif`

Figure 6–2: LK401-K keyboard Layout



Required Keymap: us_ik401re

Location of File: /usr/lib/cda/hangul-ik401k.ddif

Korean Input Methods

Use the following input methods for entering Korean characters on Tru64 UNIX.

- Hangul
- Hanja
- Row-Column code
- Phrase

The operating system provides two input method servers for Korean language input. The `dxhangulim` input server provides command line access to the Hangul, Hanja, and Row-Column input methods. The `dxim` input server is a menu-driven input server that allows you to configure, manage, and use the Korean Hangul, Hanja, and Row-Column input methods. In addition, the operating system provides a Phrase Utility. The `dxim` input server also provides a Phrase input method that is separate from the operating system Phrase Utility.

This chapter describes:

- Each of the input methods listed above, as well as the `dxim` and `dxhangulim` input servers.
- How to activate, deactivate, and customize Korean input methods.
- How to switch between input methods.
- How to work with input methods and the `dxim` input server under the DECwindows Motif interface.

7.1 Activating the Korean Input Methods

You must activate Korean input methods for response to the requirements of applications that are internationalized for the Korean language. The steps you follow to activate Korean input methods differ for character cell terminals, DECwindows Motif and CDE environments, and the `dxim` input server. The following sections describe these activation steps.

7.1.1 Korean Input Methods and Character–Cell Terminal Applications

For character-cell terminal applications, Korean input methods are implemented by means of the VT382-K Korean terminal firmware or are incorporated in the terminal emulation software, such as Hangul DECterm. Applications need not provide software to handle the input of Korean characters; the VT382-K terminal or Hangul DECterm provides the input method services.

Hangul DECterm can be regarded as a DECwindows Motif application and is activated and deactivated using the same methods as similar applications. See Section 7.1.2 for more information.

If you have a VT382-K terminal, select input mode by using the [Compose] key, which is located on the lower left side of the main keyboard. On the Korean LK201-K or LK401-K keyboard, the [Compose] key is labeled "한글" . For details, see Chapter 6.

After you activate the Korean input mode, the VT382-K terminal firmware or the input methods incorporated in Hangul DECterm compose Korean characters and return the input data as appropriate.

7.1.2 dxhangulim Input Server and DECwindows Motif Applications

DECwindows Motif applications implement Korean input methods using an independent process called the `dxhangulim` input server. The `dxhangulim` input server is an X client process that works on a standard X-server provided the required Korean fonts are installed. This means that the input server can run on any system that can access your X display device, including the device itself.

The `dxhangulim` input server provided by the Tru64 UNIX operating system is interoperable with all existing DECwindows Motif /Hangul platforms, including VMS DECwindows Motif /Hangul and UWS/Hangul. In addition, it can provide input method services to the R6 X library (Xlib) supported by Tru64 UNIX. You can write internationalized applications using the standard R6 application programming interface and communicate with this input server. For details about developing internationalized software with X11R6, see *Writing Software for the International Market*.

Before you can input Korean data, you must start the `dxhangulim` input server on your workstation or any system that your workstation can access through the network.

English and Korean user interfaces are provided, so be sure to set the correct session language before starting the input server. There are several ways to start the `dxhangulim` Korean input server:

- Using the Session Manager

After logging in to a session, you can start the Korean input server by selecting "Hangul IM" from the Applications menu of the Session Manager.

- Starting the input server automatically

If you start your session in a Korean locale, by default, the menu item "Hangul IM" is added to the Session Manager's Automatic Startup list. When you log in, the input server starts automatically. If you do not want to automatically start the input server, you can remove this item from the Automatic Startup list by using the Session Manager's Customize menu.

- Using commands

To start the input server on the workstation you are using, enter the following command:

```
% /usr/bin/X11/dxhangulim &
```

To start the input server on a remote system, enter the following command on that system:

```
% setenv DISPLAY <display-name>:0
% /usr/bin/X11/dxhangulim &
```

In the `<display-name>` field enter the display name for your workstation.

After you invoke the `dxhangulim` input server, the DECwindows Motif applications that were internationalized to support Korean can communicate with the server for input method services.

Note

Applications that are started before `dxhangulim` cannot connect to the input server. Therefore, Hangul IM should be the first item on the Automatic Startup list. However, if the application contains an `XmText` or `XmTextField` widget with the reconnectable resource set to `True`, the application is able to establish a connection with the input server if the application starts before the input server or when the application is running and the input server stops and restarts. For more information, see `XmText(3X)` and `XmTextField(3X)`.

7.1.3 dxhangulim Input Server and CDE Applications

There are two ways to start the dxhangulim Korean input server in CDE:

- Starting the input server automatically

If the Korean language is selected on the CDE login menu, the dxhangulim Korean input server automatically starts. The following script runs automatically when you log in:

```
/usr/dt/config/Xsession.d/0020.dtims
```

The value of the DTSTARTIMS environment variable determines whether the specified Korean input server starts automatically.

- Using commands

To start the input server on the workstation you are using, enter the following command:

```
% /usr/bin/X11/dxhangulim &
```

To start the input server on a remote system, enter the following command on that system:

```
% setenv DISPLAY <display-name>:0  
% /usr/bin/X11/dxhangulim &
```

In the <display-name> field, enter the display name for your workstation.

After you invoke the dxhangulim Korean input server, the CDE applications that were internationalized to support Korean can communicate with the server for input method services.

Note

Applications that are started before dxhangulim cannot connect to the input server. Therefore, Hangul IM should be the first item on the Automatic Startup list. However, if the application contains an XmText or XmTextField widget with the reconnectable resource set to True, the application is able to establish a connection with the input server if the application starts before the input server or when the application is running and the input server stops and restarts. For more information, see XmText(3X) and XmTextField(3X).

7.1.4 Setting Default Input Method with the `i18nconfig` Utility

The Configure International Software utility (`i18nconfig`) is an option on the SysMan menu that you can use to select a default input method for locales, such as Korean, that support multiple input methods. To set a default input method with `i18nconfig`, you must be logged in as superuser and use the following steps:

- Start the SysMan menu from the CDE front panel or from the command line.
- From the SysMan menu, select *Software*. From the list of tasks under Software, select *Configure International Software*. From the list of tasks under Configure International Software, select *Managing Locales*.
- If you select a locale from the Locales Supported On... display that supports multiple input methods, the Select Input Method button is active. Click on the Select Input Method button to display a list of input methods appropriate for the selected locale.
- Double click on an input method to assign it as the system-wide default for the selected locale.

To have the change take effect, log off the system then log back in.

7.1.5 DXIM Input Server

Use the `dxim` input server to activate a Korean input method, which converts alphabetic keyboard entry to the appropriate Korean characters and sends them to an X client application.

As with the `dxhanguim` input server, the `dxim` input server is an X client process that runs on a standard X server. The `dxim` input server can run on any system that can access your X display device.

To run successfully, the `dxim` input server requires that you perform the following prerequisite steps:

- Install WLS (Worldwide Language Support) options on the system.
- Install Korean fonts on the system. The fonts should be those associated with the Korean input methods you intend to use.
- Set the current locale set to Korean.
- Stop any other input server process running on the system. Keep in mind that if you use the CDE login language option to set the locale, an associated input server process starts. You must stop this process before starting `dxim`.
- Set the preediting style, or interaction style, to either Off-the-Spot or Root as described in Section 7.3.2.

Start the `dxim` input server as a background process with the following command:

```
% /usr/bin/X11/dxim &
```

If you want to start `dxim` from a remote system, log on to the remote system and enter the following command:

```
% setenv DISPLAY <display-name>:0  
% /usr/bin/X11/dxim &
```

In the `<display-name>` field, enter the display name for your workstation.

Section 7.1.5.1 describes how to use the `dxim` menu interface to select and activate Korean input methods and establish a default input method for Korean applications.

After you activate a Korean input method, applications that have been internationalized to support that input method can communicate with the server to obtain input method services. You must start these applications after the input server starts.

Note

Applications that are started before `dxim` cannot connect to the input server. However, if the application contains an `XmText` or `XmTextField` widget with the `reconnectable` resource set to `True`, the application is able to establish a connection with the input server if the application starts before the input server or when the application is running and the input server stops and restarts. See `XmText(3X)` and `XmTextField(3X)`.

7.1.5.1 Using DXIM to Select and Activate Input Methods

The `dxim` input server is a multilingual input server because it gives you the means to use and manage input methods for traditional and simplified Chinese, as well as Korean. This manual focuses on `dxim` and the Korean input methods. For additional information on the input server, see the `dxim` online help.

The `dxim` input server menu is a single menu system divided into two functional parts; Customizing Input Method Classes and Methods and Customizing Input Method Window. The Customizing Input Method Classes and Methods menus are described in Section 7.5.1.1 and allow you to do the following:

- Select a class of input methods that is appropriate to the locale of the client application. For an application internationalized for the Korean language, you select and activate the Korean or Phrase classes, or both.

- Select and activate one or more input methods within a class. Under the Korean input method class there is only one input method, Hangul, which supports three modes: Hangul, Hanja, and Row-Column. The Phrase input method class also has only one input method.
- Establish an input method class as the default.
- Establish an input method as the default for its class.
- Customize error bell volume and set the input method invocation key.

The Customizing Input Method Window menus are described in Section 7.5.1.2 and allow you to do the following:

- Increase or decrease the root input window font size.
- Set the root input window foreground and background color.
- Set the root input window line spacing.

The `dxim` input server can support multiple clients working under different locales. When a client application connects to `dxim`, the input server determines the client's locale and, if compatible, uses the default input method. If the client locale is not compatible with the default, `dxim` searches for an active input method that is compatible. The input server uses the first compatible input method it finds.

For example, when a `ko_KR.eucKR` client connects to `dxim`, the input server checks the application's locale and determines that the Korean input method is available for use with the application. You then enter the invocation key for the Korean input method and any keyboard input, which `dxim` converts and transmits to the application. If you later connect a `zh_CN.dechanzi` client to `dxim`, the input server checks the application's locale and determines that the Korean input method is not appropriate. It then checks to make sure that either the simplified or traditional Chinese input method is available for use with the application. You then enter the invocation key for the Chinese input method and any keyboard input, which `dxim` converts and transmits to the application. If you attempt to enter the invocation key for Korean, which is inappropriate for this application, `dxim` ignores it.

Systemwide default definitions for the `dxim` input server are stored in the resource file, `/usr/lib/X11/app-defaults/DXim`, and in the configuration file, `/usr/i18n/share/dxim/im_modules.conf`. As superuser, the system administrator can modify these files to make systemwide changes. For example, the seek order that `dxim` uses in its search for an input method compatible with a client's locale is defined in `/usr/i18n/share/dxim/im_modules.conf` and can be modified by the system administrator.

Depending on the locale, the `dxim` input server does not restrict an application to a single input method. For example, an application under the `ko_KR.eucKR` locale is restricted to the Korean input method. However, an application under a Unicode locale, such as `ko_KR.UTF-8` can be supported by all of the Korean and Chinese input methods.

7.2 Switching Input Methods

By default, a client application starts in English language input mode and, depending on which input server is active on your system (`dxhangulim` or `dxim`), you use different key combinations to switch from English language input mode to Korean or Phrase input mode.

If the Korean Input Server, `dxhangulim`, is active on your system, select the Korean input mode using the key sequences shown in Table 7-1.

Table 7-1: Key Sequences for Invoking the Korean Input Method Under `dxhangulim`

Input Method	VT382-K	LK201-K	DECwindows Motif LK401-K
Hangul	[Compose]	[Compose/Space]	[Compose]
Hanja	[Shift/Compose]	[Shift/Compose/Space]	[Shift/Compose]
Row-Column	[Ctrl/Compose]	[Ctrl/Compose/Space]	[Ctrl/Compose]
Phrase	—	[F6]	[F6]

If the `dxim` input server is active on your system, use the [Ctrl/Space] key sequence to shift from English language input to non-English language input. When you use [Ctrl/Space] to shift to non-English mode, keyboard character input is transmitted to `dxim`, which converts the input using a selected input method and transmits the converted input to the client application.

To select the Korean input method and Hangul input method mode, use the [F3][F5] key sequences. Once in Hangul input method mode, use [F6] to switch to Hanja input method mode or [F7] to switch to Row-Column input method mode. To switch back to Hangul, use [F5].

To select the Phrase input method, use the [F12] key.

Note

These key sequences can be customized through the `dxhangulim` Options menu or the `dxim` Customize Input Method menu.

7.3 DECwindows Motif Interface

You can interact with the Korean input server (`dxim` or `dxhangulim`) through a Motif-style user interface that allows an input method to provide feedback about the data being edited. This feedback helps you compose a character, list choices for selection, provide options for customizing the input server, and so on.

7.3.1 Input Areas

The X Input Method specification defines the three input areas described in Table 7–2.

Table 7–2: Window Input Areas

Area	Description
Auxiliary area	An option menu helps you customize the Korean input methods and the input method window.
Status area	This area displays the internal state of the Korean input method that is critical to you.
Preedit area	This area displays the intermediate text that is being composed. This area also provides a lookup region which displays a list of valid candidates for the input key sequences.

7.3.2 Interaction Styles

The use of the input areas depends on the interaction style (or preedit style) selected for the application. The `dxim` and `dxhangulim` input method servers enable you to type multiple keystrokes to compose Asian characters. The process of composing characters from keystrokes is called preediting and the type of preediting used is called the interaction style.

The `dxhangulim` Korean input server supports four interaction styles:

- Root window
- Off-the-Spot
- On-the-Spot
- Over-the-Spot

The `dxim` input server supports two interaction styles; Off-the-Spot and Root window.

You can use the `VendorShell` resource `XmNpreeditType` to specify the priority of the interaction styles for DECwindows Motif applications. By default, the resource value priority order is set to "overthespot,offthespot,root,onthespot". The first style in the list is used in an input method. If that interaction style is not available, the second style in the list is use, and so on.

To set a preferred interaction style, you can do one of the following:

- Use the command line option `-xrm` to specify the resource value when you start an application. For example, the following command starts Cardfiler with the Root window interaction style:

```
% dxcardfiler -xrm '*preeditType: root' &
```

- Use the Session Manager's Options menu in XDM.

From the Session Manager's Options menu, select Input Method...

In the popup Input Style Options window, click on one of the preedit styles

The `XmNpreeditType` resource is set to a priority list beginning with the preedit style that you have chosen.

- Use the `dtimsstart` utility.

From the command line, enter the following command:

```
% /usr/dt/bin/dtimsstart
```

From the `dtimsstart` dialog box, click on an interaction style.

Click on the Default Input Method radio button.

Click on OK. The preferences you set remain in effect until you change them.

After you choose your preferred interaction style, the applications you invoke start up with the new setting.

Keep in mind that the `dxim` input server supports only Root window and Off-the-Spot interaction styles. If you use an unsupported interaction style, client applications will be unable to connect to the `dxim` input server.

Note

Some applications, such as DECterm, may provide their own user interface to handle interaction styles. Those mechanisms may override the methods described here.

7.3.2.1 Root Window

Both the `dxhanguim` and `dxim` input servers support Root window interaction style.

If you want to display the preedit data in a separate input window which lies outside the application window, choose the Root window interaction style. The input window is scalable and movable; you can modify its size and position to meet your preferences. If you want to free up more screen space, you can iconize the input method window. You can also choose

to display preedit data in vertical or horizontal layout. Figure 7-1 shows an example of Root window interaction style.

Figure 7-1: Root Window Interaction Style



If you are an experienced user, you may not need to perform input by looking at the preedit area. In this case, you can iconize the input window to improve performance. See Figure 7-2.

Figure 7-2: Icon of Korean Input Window



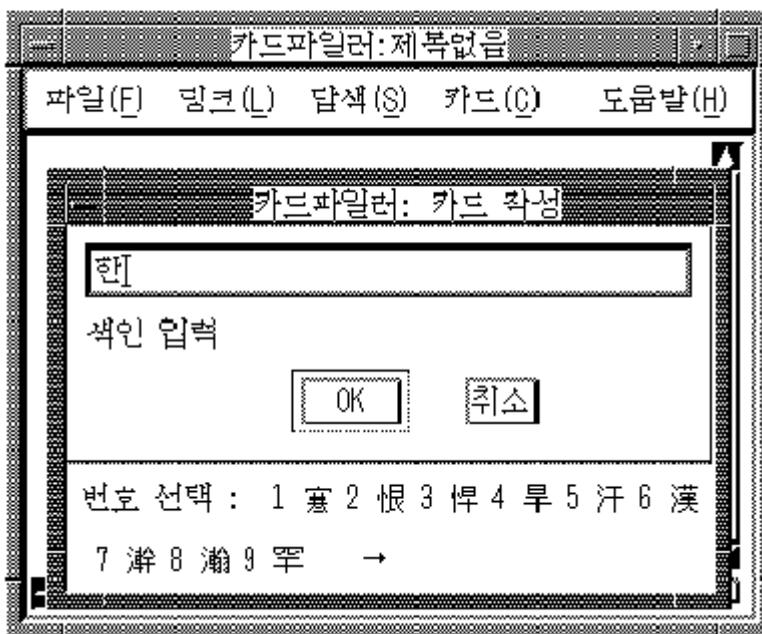
When the input window is iconized, you can continue to input Korean characters through a Korean application window. To let you know the input status, the input state is displayed on the icon title which is updated according to the input mode and the input focus. If you want to see the preedit data, you can double click on the icon to display the input window.

7.3.2.2 Off-the-Spot

Both the dxhanguim and dxim input servers support Off-the-Spot window interaction style.

If you want to display the preedit data in a fixed location of the application window, you can choose the Off-the-Spot interaction style. When you choose this interaction style, the Korean input server creates the input window at the bottom of the application window. You no longer need to refer to the Root window; you can iconize it to save screen area. Figure 7-3 shows an example of Off-the-Spot interaction style.

Figure 7-3: Off-the-Spot Interaction Style



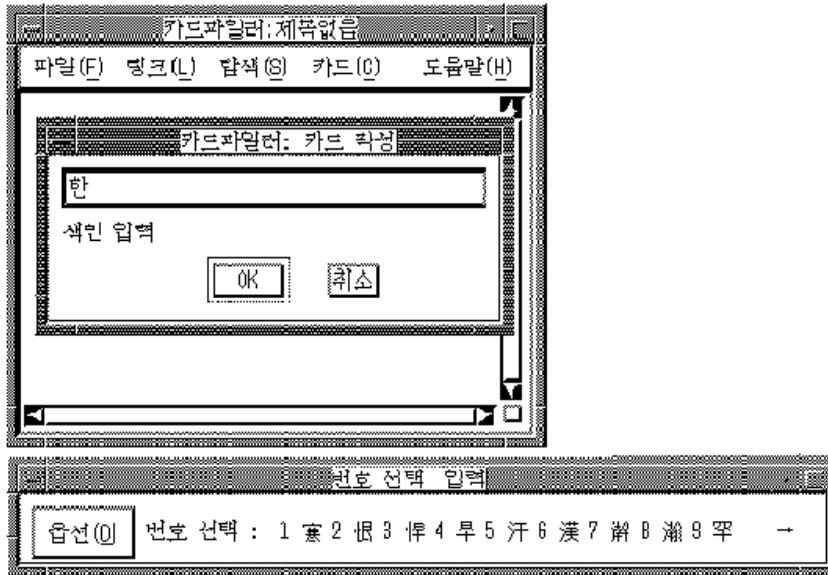
7.3.2.3 On-the-Spot

Only the dxhanguim input method server supports On-the-Spot interaction style.

If you want to focus your attention at the point of insertion during Korean data input, you can choose the On-the-Spot interaction style. In this style, the Korean input server directs your applications to display the preedit data in a way which is consistent with the appearance of the existing data in the input field. For instance, an application can select the font size and typeface to display the preedit data and control how the data is highlighted. You can also

format existing data to allow the preedit data to be displayed at the insertion point. Figure 7-4 shows an example of On-the-Spot interaction style.

Figure 7-4: On-the-Spot Interaction Style

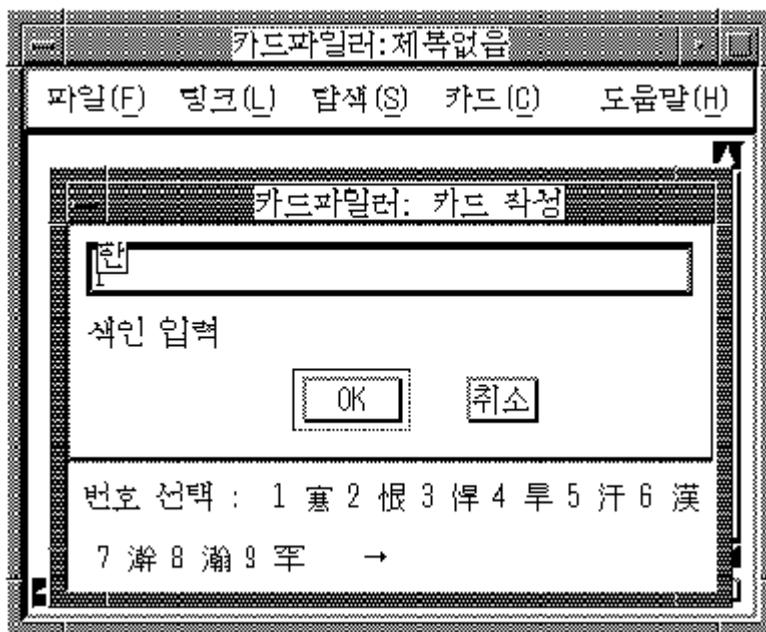


7.3.2.4 Over-The-Spot

Only the dxhanguLim input method server supports Over-the-Spot interaction style.

The Off-the-Spot interaction style allows you to perform Korean data input at the point of insertion. In this style, an input window is created when you invoke the Korean input mode; the window is placed over the current point of insertion. The preedit data entered is displayed in this window. The look and feel is similar to that of the On-the-Spot style, except that applications do not control the display attributes of the preedit data and no formatting is performed to accommodate the preedit. Therefore, there is less communication overhead between the Korean input server and applications. The performance of data entry through the Over-the-Spot interaction style is better. Figure 7-5 shows an example of Over-the-Spot interaction style.

Figure 7-5: Over-the-Spot Interaction Style



7.4 Operations of the Korean Input Server

When you start the Korean input server (`dxim` or `dxhangulim`), no application is connected to it and the string "No Connection" is displayed in the title bar to indicate the state.

If an application is internationalized, started in a Korean locale, and brought to the foreground, the string "영문:" is displayed in the status area to indicate that the application is connected to the Korean input server and the input mode is English. If you invoke a Korean input method, the input state displayed in the status area and the title bar is updated accordingly. If you bring a noninternationalized application window to the foreground, the title of the input window changes to "No Connection" again. (In some environments, bringing an application to the foreground is known as bringing it into focus.)

The input server can maintain individual states of composing for different input contexts or application windows.

In addition, under the `dxhangulim` input server running in the Root window interaction style, each application window can be associated with its own attributes, such as font size, font style, line spacing and foreground/background colors.

You can bring the internationalized application window to the foreground and compose a Korean character or customize the input window in the way that you prefer. The input server can memorize the composing state and input your window attributes. If this application window is put in the background and then, later, brought to the foreground, the input server restores the original composing state and attributes.

7.5 Customizing the Korean Input Server

The `dxim` and `dxhanguLim` Korean input servers have different levels and different methods of customization.

Under the `dxim` input server, the input window provides an options menu containing the following selections:

- Customize Class that displays a menu interface you use to customize the input methods
- Customize Window that displays a menu interface you use to customize the `dxim` input server window
- Help that displays online help for the `dxim` input server
- Exit

Under the `dxhanguLim` input server, the auxiliary area of the input window provides an options menu where you can customize the input server. You click on the Options button to view the customization pull-down menu.

The following sections describe the `dxim` and `dxhanguLim` customization menus. Keep in mind that each of these input servers has an extensive online help system that can provide you with details and examples of each option.

7.5.1 Customizing the `dxim` Input Server

If you select Customize Class from the `dxim` options menu, it displays the `dxim` Input Method Class and Module Customization menu. This series of menus enables you to customize the following attributes:

- Activate or deactivate one or more of the available input servers. The input servers you can activate include `dxim` and Phrase, which are discussed in this manual, and the traditional and simplified Chinese input servers discussed in the Tru64 UNIX Technical Reference for Using Chinese Features.
- For each active input server, activate or deactivate one or more input methods. For the Korean input server, there is only one selectable input method, Hangul. However, from this input method, you can also run the Hanja and Row-Column input methods. For the Phrase input server, the phrase input method is the only selectable input method. The traditional and simplified Chinese input server methods are described in the Tru64 UNIX Technical Reference for Using Chinese Features.

- For each active input server and input server method, you can establish a default input server for the system. You can also establish a default input server method that becomes active when its associated input server starts.
- For each active input server and input server method, you can redefine the default invocation key.

If you select `Customize Window` from the `dxim` options menu, it displays the `dxim` Input Method Window Customization menu. This series of menus enables you to customize the following attributes:

- Set font size for root preedit data.
- Set the foreground and background color.
- Set the line spacing for the preedit text lines.

If you log in as superuser to use the `dxim` input server customization menus, the changes you make are written to `/.dxim/DXim` and apply to root. If you log in as a non-root user, the changes you make are written to `~user/.dxim/DXim` and apply to that user ID.

The following sections provide an overview of these menus. For a complete description of the menu options, see the `dxim` online help system.

7.5.1.1 Input Method Class and Module Customization

The Input Method Class and Module Customization menus enable you to activate, deactivate, and customize the Korean and Phrase input method classes and the Hangeul input method module. Keep in mind that you must use either the `OK` or `Apply` button in conjunction with the `Save Current Settings` pull-down menu option to save a customized setting for use by the `dxim` input server.

The `Customize Class` menu is the primary input method customization menu. The following table briefly describes each of the `Customize Class` menu options. For a full description of the menu options, see the `dxim` input server online help.

Menu Field	Description
Active Class	Displays the input method classes that are currently active on the system. Select one or more of these classes to customize or delete.
Invocation Key	Displays the key sequence used to invoke the selected input method class. Use the checkboxes under the display to change the invocation key.
Bell Volume Slider	A bell rings when an error is made during character composition. Drag the slider to adjust the volume of the bell.
Options pull-down menu	Select Get System Default to reset the Customize Class menu. Select Save Current Settings to save values for use by the <code>dxim</code> input server.
Add...	Opens a dialog box that allows you to select and activate a currently inactive input method class.
Delete	Deactivates a selected input method class. The class and its methods are made inactive and not available to applications.
Customize...	Opens a dialog box that allows you to activate, deactivate, and customize the input method modules associated with a selected input method class. The Customize Input Method dialog box selections are similar to the Customize Class menu selections described in this table.
Set Default	Establishes the selected input method class as the default.
OK	Saves the customizations to become effective the next time you start <code>dxim</code> . Closes the menu.
Apply	Same as OK, except that the menu does not close.
Cancel	Closes the menu without making any changes.
Help	Displays help on this menu.

7.5.1.2 Input Method Window Customization

The Input Method Window Customization menus enable you to modify the `dxim` root input window characteristics. Keep in mind that you must use either the OK or Apply button in conjunction with the Save Settings as Defaults pull-down menu option to save a customized setting for use by the `dxim` input server.

The Customize Window menu is the primary input window customization menu. The following table briefly describes each of the Customize Window menu options. For a full description of the menu options, see the `dxim` input server online help.

Menu Field	Description
Big Font/Small Font	Select the font size for displaying preedit data in the <code>dxim</code> root input window.
Foreground Color/Background Color	Select either foreground or background. A color mixing dialog box opens that enables you to customize the foreground or background colors of the root input window.
Line Spacing Slider	Drag the slider to specify the line spacing, in pixels, between the preedit data text lines.
Options pull-down menu	Select Restore System Defaults to reset the Customize Window menu. Select Save Settings as Defaults to save values for use by the <code>dxim</code> input server.
OK	Saves the customizations to become effective the next time you start <code>dxim</code> . Closes the menu.
Apply	Same as OK, except that the menu does not close.
Cancel	Closes the menu without making any changes.
Help	Displays help on this menu.

7.5.2 Customizing the `dxhanguLim` Input Server

The `dxhanguLim` input server options menu enables you to customize the following attributes:

- Vertical Layout (수직 레이아웃)
- Horizontal Layout (수평 레이아웃)
- Select Phrase Input Class (구문 입력 등급 선)

- User Phrase Database (사용자 구문 데이터베이스)
- System Phrase Database (시스템 구문 데이터베이스)
- Current Window (현재 창)
- Input Method Customization (입력 방법 설정)
- Help (도움말)
- Quit (중지)

The following sections describe each of these dxhangulim menu options.

7.5.2.1 Vertical Layout

You can choose the vertical layout option (수직 레이아웃) only if the current layout is horizontal. When you choose this option, the input window and the layout of its contexts display in a vertical manner. The vertical input window remains at the same origin.

7.5.2.2 Horizontal Layout

You can choose the horizontal layout option (수평 레이아웃) only if the current layout is vertical. When you choose this option, the input window and the layout of its context display in a horizontal manner. The horizontal input window remains at the same origin.

7.5.2.3 Select Phrase Input Class

The select phrase input class option (구문 입력 등급 선택) is provided for customizing the phrase input mode. DECwindows Motif shares the same phrase databases created and managed by the Tru64 UNIX Phrase Utility. Once you have created a phrase database and defined your phrase definitions, both character-cell terminal applications and DECwindows Motif applications can use the data for phrase input. To use the phrase databases, the LANG environment variable must be set to reflect the required codeset, such as ko_KR.deckorean. For details about the Phrase Utility and phrase definition file, see the Tru64 UNIX *Using International Software* manual.

The Select Phrase Input Class option allows you to focus on a particular class of phrases during phrase input. When you choose this option, a dialog box pops up and you can choose the phrase class that you want to use.

If you want to choose all classes, enter the "*" option. If you do this, the phrase input method searches all classes of phrase definitions for the phrase code that you have entered. When there are multiple phrases that match the phrase definition, a list box pops up. You can choose the right phrase definition by double clicking on the item in the list box.

Note

The `dxim` input server uses a different Phrase input method and phrase database than the operating system Phrase Utility and phrase databases described in this section. See Section 7.9.1 for a description of the `dxim` Phrase input method.

7.5.2.4 User Phrase Database

The `dxhangulim` Phrase Input method allows you to access two phrase definition databases: the system phrase database and the user phrase database. You create and maintain your own private phrase database for storing your frequently used phrases. This is called the user phrase database.

For details about creating phrase database, see the Tru64 UNIX *Using International Software* manual.

If you choose the user phrase database option (사용자 구문 데이터베이스), your private user phrase database is used.

7.5.2.5 System Phrase Database

The system phrase database is for public access by all users using your system. It should be created and modified by your system administrator. If you choose the system phrase database option (시스템 구문 데이터 베이스), the system phrase database is used.

Note

The databases that you can access are the ones available on the system on which you start the `dxhangulim` input server.

7.5.2.6 Current Window

You can associate an application window with a set of input window attributes. The current window option (현재 창) allows you to customize the attributes of a specific application window.

Note

This option is available only if you have selected Root window as your interaction style and an internationalized application input area is in the foreground (that is, in focus). Otherwise, this option dims out. If you choose to use the Off-the-Spot, Over-the-Spot, or On-the-Spot interaction style, the application determines these attributes.

When you choose the current window option, a dialog box pops up and the following options are displayed:

- **Font Size** — This option allows you to choose the font size used to display preedit data. You may choose to use either big font or small font by clicking on one of the following toggle buttons:

큰 폰트 (Big Font)

작은 폰트 (Small Font)

Choosing Big Font results in a bigger input window, which occupies more screen space.

- **Font Typeface** — This option allows you to choose the font typeface to be used in the input window. Three typeface options are provided: Gothic, Myungcho or Screen. To choose the font typeface, click on one of the following toggle buttons:

고딕 (Gotic)

명조 (MyungCho)

화면 (Screen)

If you want to choose a typeface that is not on the options list, you can define it in the Korean input server resource file. This option will be shown beside the “ 기타 (Other):” , label in the customization window.

- **Line Spacing** — The Korean input server can display preedit data on multiple text lines. This may happen when a list of candidates is displayed for your selection. The Line Spacing option lets you adjust the spacing between these text lines. To adjust the line spacing, drag the Line Spacing slider (labeled as “ 행 띄기”) or move the pointer to the desired position on the slider and click MB1.
- **Foreground and Background Colors** — This option allows you to customize the foreground and background colors of the input window. For monochrome display, the following options are provided:

흰바탕에 검은색 (Dark Text, Light Background)

검은바탕에 흰색 (Light Text, Dark Background)

For color display, you can choose from a palette of colors to design a visually pleasing input window. To customize the foreground or background color, you should first select the color that you want to change by clicking one of the following toggle buttons:

전경색 색상 (Input Window Foreground Color)

배경색 색상 (Input Window Background Color)

A color mixing window pops up on top of the customization window. You can then mix the color using the three sliders which represent the intensities of the primary colors. The

modified color is displayed on the right-half of the color box while the left-half shows you the original color.

7.5.2.7 Input Method Customization

There are several customizable attributes that you can globally apply to all input windows with input method customization (입력 방법 설정). In the `dxhanguLim` input server, they are:

- Bell Volume

When you make an error during the composition of Korean characters, the bell rings to alert you. You can adjust the bell volume by dragging the Bell Volume slider (labeled as 벨 음량) or by moving the pointer to a desired position on the slider and clicking MB1.

- Invocation Key Sequences

By default, the key sequences for invoking Korean input methods are predefined. You can change these default key sequences to meet your preference or working style. This option allows you to customize the following key sequences:

Start Hangeul Input Method (한글 입력 시작)

End Hangeul Input Method (한글 입력 종료)

Start Hanja Conversion (한자 변환 시작)

Start Row-column Conversion (행렬 변환 시작)

Start Phrase Input (구문 입력 시작)

End Phrase Input (구문 입력 종료)

The bottom part of the dialog box provides an interface that you can use to customize a key sequence. It allows you to select a trigger key and to toggle the on/off state of the Ctrl, Alt and Shift modifiers. The trigger keys that you can choose include NoSymbol, [F1] - [F20], [Space], [Return], [Compose] and [A] through [Z]. If you choose NoSymbol, no invocation sequence is provided for the selected action.

Table 7-3 identifies the toggle buttons you use to select the on/off state for each modifier key.

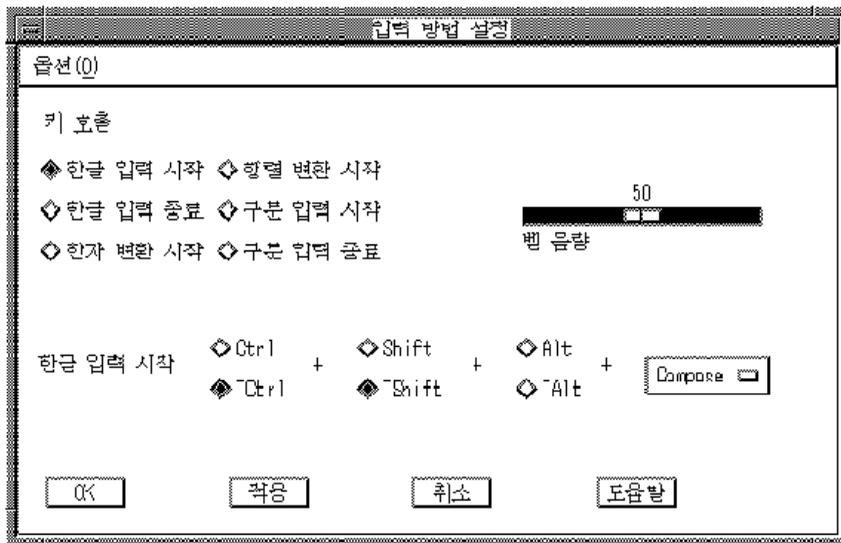
Table 7-3: Modifier State Customization

Modifier	On State	Off State
Ctrl	“Ctrl”	“~Ctrl”
Shift	“Shift”	“~Shift”
Alt	“Alt”	“~Alt”

The tilde (~) sign means that you should not press that modifier key when invoking the action. In addition to the on/off state, you can deselect both of the states for a modifier key, that is, neither state is selected. To do this, click the toggle button that is currently set on. If you deselected a modifier, the invocation key with or without holding the modifier key can be accepted by the input server.

When one of the invocation key sequences is selected, for example the “한글 입력 종료” (End Input Method) key sequence, the state of the toggle switches and the trigger key displayed at the bottom of the dialog box is updated to reflect the current value. The label at the bottom left-hand side of the window is changed to “한글 입력 종료”. Figure 7-6 shows an example of customized invocation key sequences.

Figure 7-6: Customization of Invocation Key Sequences



If you want to change the End Input Method key sequence to [Ctrl/Space], select the Ctrl, ~Alt, and ~Shift buttons.

7.5.2.8 Help

The help option (도움말) provides online information about the Korean input server.

7.5.2.9 Quit

You can use the quit option (중지) to terminate the input server. If you choose this option, a dialog box pops up to confirm that you really want to exit.

7.5.2.10 Saving Your New Settings

All attributes which can be customized with “ 현재 창 ” (Current Window) and “ 입력 방법 설정 ” (Input Method Customization) can be saved into a resource file. You can choose to save the current settings into a private resource file in your login directory. To reset or save the current settings, you can choose the options shown in Table 7-4 inside each customization window.

Table 7-4: Saving Customized Attributes

Function	Description
시스템 기본값 복원 (Restore system setting)	Restores all system default attributes
설정 사항을 기본값으로 저장 (Save Settings as Defaults)	Saves all current attributes as default values. These attributes are saved to a private resource file .DXHangul.im in your login directory.

7.6 Hangul Input Method

Hangul characters are the most commonly used characters in Korea today. Each Hangul character represents one syllable. It is made up of a number of phonetic symbols called "Jamo". Altogether, there are 22 Jamo symbols for composing Hangul characters and they can be entered through the keys on the main keyboard, as illustrated in Chapter 6.

The input sequence of Jamo symbols should follow that of the pronounced syllables. The first Jamo input should always be a consonant. To enter a Hangul character, invoke the Hangul input method by pressing the respective key sequence and then enter the phonemes of the desired Hangul character.

For example, the string “ 한글 ” can be input using the Hangul method as follows:

Hangul Character	Key Sequence	Composition
한	[G],[K],[S]	ㅎ,하,한
글	[R],[M],[F]	ㄱ,그,글

To enter these characters, invoke the Hangul input method and then press [G] to enter the element “ㅎ” for “한” .

\$ ㅎ
한 글

When you press [K] to enter the element “ㅏ” , the element is composed with “ㅎ” to form “하” .

\$ 하
한 글

When you press [S] to enter the element “ㄴ” , the element is composed with “하” to form “한” .

\$ 한

한 글

To enter “글” , press the elements [R], [M], [F].

\$ 한글

한 글

7.7 Hanja Input Method

The word "Hanja" is equivalent to "Chinese Character". To enter Hanja, you should first enter the corresponding Hangul characters which represent their pronunciation and then convert them to Hanja.

To enter a Hanja, invoke the Hangul input method and enter the Hangul character that represents its pronunciation. Before sending the character to the application, press the respective key sequence to invoke the Hanja input method. A list of Hanja corresponding to the pronunciation is displayed in the preedit area for selection. To select the desired character, press the numeric key associated with the character on the main keyboard.

For example, the string “ 韓國 ” can be input using the Hanja input method as follows:

Hanja	Pronunciation	Key Sequence	Composition
韓	한	[G],[K],[S]	ㅎ, 하, 한
國	국	[R],[N],[R]	ㄱ, 구, 국

To enter the Hanja “ 韓 ”, invoke the Hangul input method and enter the corresponding Hangul “ 한 ” by pressing [G], [K], [S].

\$ 한

한 글

Then, invoke the Hanja mode:

\$ 한

번호 선택 1.寒 2.恨 3.悍 4.旱 5.汗 6.漢 7.澣 8.瀚 9.罕 →

The right arrow sign (→) indicates that more candidates are available for selection. To view the candidates on the next row, press [Space] or the right arrow key.

\$ 한

번호 선택 1.翰 2.閑 3.閒 4.限 5.韓

To move backward, press [Shift/Space] or the left arrow key (←).

To select the character you want, press the numeric key associated with the character. In this example, while displaying the second group of candidates, press [5].

\$ 韓

한 글

Similarly, you can press [R], [N], [R] to compose “ 국 ” and then invoke the Hanja input method to convert “ 국 ” to “ 國 ”.

After you complete the input of a character, the Hanja input mode exits and returns to the original input mode.

7.8 Row-Column Input Method

As described in Chapter 1, each character in the KSC5601-1992 character set is assigned a position in the character plane and can be uniquely identified by this position. You can enter Korean characters by specifying the row number and the column number of the desired character.

When the row-column mode is invoked, the following message is displayed in the preedit area.

행렬코드 입력 : _

When you enter the row-column code, the input data is echoed in the preedit area. Only the numeric keys are valid for the row-column input method.

행렬코드 입력 : 0264_

The data can be in the following format where XX is the row number and YY is the column number:

Types of format	Format	Example	Remark
4 Digit	XXYY	0263	KS Code
5 Digit	0XXYY	00263	KS Code
5 Digit	1XXYY	10263	DEC Extension

The Korean character is sent to the application after you enter a valid four-digit or five-digit code and press [Return] or [Enter].

For example, the row-column code of “ 한 ” is 3949. To enter this character using the row-column input method, invoke the input method, then press [3] [9] [4] [9] and [Return].

\$

한런 코드 입력:

Alternatively, if you enter a two-digit row number and then press [Enter] or [Return], a list of characters assigned to that row is displayed. You can choose the character that you want from the list of candidates.

7.9 Phrase Input Method

The Phrase input method enables you to define a database of frequently used phrases and store that database in a user or systemwide directory. Each frequently used phrase is identified by a phrase code. To input a phrase, enter its phrase code. The Phrase input method converts the code to the respective phrase.

There are two Phrase input methods available on the Tru64 UNIX operating system; the `dxim` Phrase input method and the `dxhangulim` Phrase input method.

The `dxim` and `dxhangulim` Phrase input methods use different databases and different user interfaces, as described in the following sections.

7.9.1 dxim Phrase Input Method

The `dxim` Phrase input method allows you to define a database of frequently used phrases and store that database in a user or systemwide directory.

You associate each of the phrases in the phrase database with a unique phrase code. The phrase code can be any alphabetic label. The associated phrase can be any string of characters that is appropriate to the application's locale. You create the phrase database as a simple text file containing phrase codes and phrases and store it in a user directory or a system directory on a path that is locale dependent.

For example, if you create a phrase database file for use with applications running in the `ko_KO.UTF-8` locale, you copy the file to one of the following directories:

- For a systemwide database file that will be used with Korean applications using the Unicode codeset, copy the phrase database to `/usr/i18n/share/dxim/ko_KR.UTF-8/phrase_data.txt`.
- For a personal database file that will be used with Korean applications using the Unicode codeset, copy the phrase database to `$HOME/.dxim/ko_KR.UTF-8/phrase_data.txt`.

Use the following rules when populating the phrase database:

- Use a text editor to create and populate the Phrase input method database files.
- Enter the phrase code and its associated phrase on the same line. Separate the code and phrase with spaces. However, the phrase code itself cannot contain spaces. The associated phrase can contain spaces, but not in the first or last character position.
- A phrase code consists of alphabetic characters and underscores. The associated phrase can contain any character that is legal in the target locale.

To invoke the Phrase input method, you must use `dxim` to activate the input method and use the default key sequence (or an invocation key sequence that you have defined). For example, if the Phrase input method is active and the client application locale supports it, press the default invocation key, `[F12]`, or a redefined invocation key to invoke the Phrase input method.

When you use the Phrase input method and enter a phrase code as input to the application, `dxim` searches your personal database file, if it exists, and the systemwide database file along the locale-dependent path. If `dxim` finds the same phrase in both databases, it uses the definition in your personal database.

When you enter a phrase code, it appears in the preedit area. To correct erroneous input, use the `[Delete]` key and re-enter the code. Press the `[Return]` key to signal the end of phrase code input.

If you enter an incorrect code, the error bell rings. The message, “Requested phrase does not exist”, may also display. To correct the problem, make sure that the phrase is in the database file and that the file path and application locale are consistent.

For additional information on the `dxim` Phrase input method, see the online help for `dxim`.

7.9.2 dxhangulim Phrase Input Method

The Tru64 UNIX operating system provides a Phrase Utility that you use to create phrase databases. The Korean input server can directly access the phrase databases. In addition, you can choose the phrase database being used.

When you invoke the phrase input method, the string "PHRASE:" is displayed in the status area. You can enter the phrase by specifying the phrase code, for example:

```
$  
PHRASE: KOREA
```

If the phrase code has corresponding data in the phrase definition database, the data is sent to the application as shown below:

```
$ 韓國  
PHRASE:
```

To correct the phrase code while preediting, press the [Delete] key and re-enter the correct code.

The phrase code can consist of up to 8 English alphanumeric characters. The first character must be an English alphabet character, the remainder can be alphanumeric. If it has less than 8 characters, press [Return] or [Space] to signal the end of input. If it has exactly 8 characters, the respective phrase is automatically sent. You do not have to press [Return] after entering the last character.

For more information on creating phrase databases, see the Tru64 UNIX *Using International Software* manual and `phrase(1)`.

Korean Printing Support

This chapter introduces the Korean printing support provided by the Tru64 UNIX operating system software. It describes the supported printers, the print file formats, features, and the maintenance procedures for supporting Korean printing.

8.1 Supported Printers

Tru64 UNIX supports text and PostScript printers.

8.1.1 Text Printers

Tru64 UNIX supports text printers with built-in Korean fonts.

8.1.2 PostScript Printers

Tru64 UNIX supports Korean printing on PostScript printers in the following ways:

- Using the built-in or downloaded fonts installed in the printers
- Using the generic `wwps` PostScript print filter

For details about the supported printer types and print filters, see Chapter 4.

8.2 Print File Formats

Tru64 UNIX supports the printing of mixed ASCII and Korean characters in the following print file formats:

- Plain text files on text and PostScript printers
- Files with the `nroff` control sequences (for printing with underline, superscript, subscript and bold attributes) on text and PostScript printers
- PostScript files on PostScript printers

The print filters for PostScript printers automatically detect the format of a print file and convert it to the proper format for printing.

8.3 Printing Features

Tru64 UNIX supports the following printing features:

- Software On-Demand Font Loading
- Codeset Conversion
- Outline Fonts

8.3.1 Software On-Demand Font Loading (SoftODL)

Software On-Demand Font Loading (SoftODL) is a mechanism through which a terminal or a bitmap printer downloads the relevant bitmap font information for a user-defined character (UDC) at the time the character is displayed or printed. The Korean bitmap printers that support this feature include:

- LA380-K
- DL510-KA

8.3.2 Codeset Conversion

Tru64 UNIX includes a codeset conversion mechanism to print text files that have a codeset different from the one used by the printer. For printers with built-in or downloaded Korean fonts, the codeset of the printer should be defined to match the codeset of the built-in fonts. For printers using the font faulting mechanism, the codeset of the printer should be defined to match the codeset of the font to be loaded.

8.3.3 Outline Fonts

The operating system provides a large set of outline fonts for printing files in various languages. Depending on the number of local language support subsets installed on your system, more than 150 outline fonts may be available.

The outline font for Korean printing is:

- Munjo

This font is encoded in DEC Korean codeset.

8.4 Korean Printing Setup

8.4.1 Dot Matrix Printers

When configuring the LA380-K and DL510-KA dot matrix printers, the only special consideration is whether ODL printing should or should not be enabled. If enabled, you must specify the default ODL database path and style.

To configure a Korean dot matrix printer:

1. Use the `lprsetup` command to add the `la380k` or `dl510ka` printer.
2. At the following prompt, enter `y` if you want to enable ODL printing, and `n` if you do not.

```
Do you want to enable ODL? [n]
```

If you enter `y`, the default ODL database and style is enabled.

3. If you want to change the defaults, modify the `ya` capability after the following prompt:

```
Enter symbol name:
```

The following prompt is displayed:

```
Enter a new value for symbol 'ya'?  
["plocale=ko_KR.deckorean"]
```

Enter the following command to specify the ODL database path and style:

```
"plocale=ko_KR.deckorean odldb=<default ODL database path>  
odlstyle=<default ODL style>"
```

Be sure to include the double quotes around the parameters, to replace `plocale` with the value displayed in the previous prompt, and to replace the default ODL path and style with the suitable one.

To print Korean text files to print queues connected to dot matrix printers, use the `lpr` command. You can either set the `LANG` environment variable or use the `-A` option to denote the codeset of the text files. For example, enter the following command to print the file prepared in Korean EUC codeset:

```
% lpr -A "flocale=ko_KR.eucKR" my.file1
```

You can override the default ODL path by including the `odldb` and `odlstyle` options in the `-A` option of the `lpr` command. For example, enter the following command to use the ODL database in the `/usr/priv/odl` directory.

```
% lpr -A "odldb=/usr/priv odlstyle=normal-24x24" my.file2
```

8.4.2 The `wpsof` PostScript Filter

This generic PostScript print filter supports the printing of Korean characters on printers that support PostScript level 2 or level 1 with composite font extension. The Munjo outline font must be installed for this filter to properly print Korean characters. No special configuration is needed when you set up a print queue using the `wpsof` filter. However, when sending a Korean text file to that print queue you should be running in a Korean locale, or, you should specify the correct locale by using the `-O` option as follows:

```
%lpr -Olocale=ko_KR.eucKR my.file
```

See `wpsof(8)` for more information about the use of this print filter.

Other Korean Features

This chapter describes features specific to the Korean locale in Tru64 UNIX that are not described elsewhere.

9.1 Hangul DECterm

Hangul DECterm is a VT382-K terminal emulator. This section describes the Korean features that are specific to Hangul DECterm. For details about the common internationalized features provided by DECterm, see *Writing Software for the International Market*.

9.1.1 Creating a Hangul DECterm Window

The terminal type that DECterm emulates is sensitive to the session language.

To create a Hangul DECterm window using the Session Manager:

1. Set the session language to one of the Korean locales.
2. Select DECterm from the Session Manager Applications menu.

Alternatively, you can use the `-xnllanguage` qualifier to specify the terminal type of the DECterm window to create. For example, you can use `ko_KR.deckorean` as the value for `-xnllanguage` to create a Hangul DECterm window:

```
% /usr/bin/X11/dxterm -xnllanguage \  
ko_KR.deckorean
```

If you specify an unknown value for `-xnllanguage`, then ISO Latin-1 DECterm (Western European) is assumed. If no Korean font exists, the value defaults back to ISO Latin-1 DECterm.

The user interface language of Hangul DECterm always follows the terminal type. The language is independent of the language selection.

9.1.2 Customizing a DECterm Window

You can apply to your Hangul DECterm windows any customization features currently applicable to the ISO Latin-1 DECterm window except for the customization of the NRCS character sets.

You can save and restore customized features in the same way as in ISO Latin-1 DECterm.

9.1.3 Font Sizes

You can choose the 24x24, or 16x18 Korean fonts by selecting Big Font or Little Font from the Window... item of the Options menu selection box.

9.1.4 Terminal ID

Choosing the General... item from the Options menu allows you to change the general features, such as the terminal type, of the Hangul DECterm from the dialog box displayed. You can also choose VT382 ID from the dialog box.

9.1.5 Interaction Style

Choosing the Input Method... item from the Options menu allows you to select the interaction style for Hangul DECterm. For example, to select the Root window interaction style, click on the Root window button and then apply the change. If you click on the ISO Latin-1 Input button, Hangul DECterm disables the input of Korean data until another style is selected.

9.1.6 Input Server

Choosing the Input Method... item from the Options menu allows you to switch to use another input server for Hangul DECterm. By default, the Korean input server is used. To select another input server, click on the Other button and enter the input server name in the input field.

9.1.7 Copying Information

You can use the Edit menu option to copy information within or between DECterm windows. The cut-and-paste operation is enhanced to handle mixed ASCII and Korean characters.

9.1.8 Default Character Set

Korean DECterm supports KSC5601-1992 and all characters that the ISO Latin-1 DECterm supports.

The ISO Latin-1 DECterm uses the ISO 8859-1 character set as the default character set. You can change the default by choosing other options from the General... pull down menu on the Options menu. For Hangul DECterm, the default character set is KSC5601-1992.

In general, Hangul DECterm cannot display mixed MCS (or ISO Latin-1 Supplemental Graphic Characters) and Hangul characters. To achieve this function, you can output the data together with the designated character set escape sequences.

9.1.9 Korean Character Input/Output

You can enter Korean characters in Hangul DECterm by invoking any of the Korean input modes as described in Chapter 7. Mixed ASCII and Korean characters can be displayed properly in Hangul DECterm without any special settings.

9.1.10 Reconnecting the Input Server

The Hangul input server provides the Hangul character input capability. If this process does not exist or terminates for some reason, the following message is displayed:

```
The Hangul input method does not exist
```

You can restart the input server and use the Reset Terminal option from the Commands menu to reconnect the Hangul DECterm to the input server.

9.1.11 Other VT382–K Functionality

The following VT382-K functionality is implemented in the Hangul DECterm terminal emulator:

- Display characteristics and capabilities
- Text capabilities
 - Compatibility with 3 terminals:
 - * VT300 mode
 - * VT100 mode
 - * VT52 mode
 - ANSI-compatible control functions
- Support for Terminal State Interrogation (TSI)
- All of the Korean input methods

To justify the right margin of a paragraph, the nroff utility inserts space characters at proper break points. For English, space characters are usually inserted at word breaks. For Korean, space characters are inserted only at the following places:

—Before one of the following can-space-before characters if it is not placed at the beginning of a text line.

、 〇 ' " } > 《 》 「 」 【 ! " ') , >] ? }

—After one of the following can-space-after characters if it is not placed at the end of a text line.

‘ “ { < 《 「 『 【 (< [{