

# Tru64 UNIX

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## Technical Reference for Using Thai Features

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This guide provides the Thai-specific information and describes the Thai features supported on the Tru64 UNIX system.

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This manual replaces the previous version.

**Product Version:**

Version 5.1B and higher

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## **Preface**

This guide provides Thai-specific information, such as character sets and locales, for end users and programmers so that they can use and develop internationalized applications in Thai locales on the Tru64 UNIX operating system. The details of the Thai features are also documented in this guide.

## **Intended Audience**

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

## **Structure of This Guide**

This guide consists of nine chapters:

- Chapter 1 Describes the Thai character sets supported in the Tru64 UNIX operating system software.
- Chapter 2 Describes the Thai codesets.
- Chapter 3 Describes the Thai locales.
- Chapter 4 Describes the hardware devices that support the Thai locales.

- Chapter 5 Provides information on Thai fonts.
- Chapter 6 Provides information on Thai keyboards.
- Chapter 7 Describes how to input Thai characters.
- Chapter 8 Introduces the Thai printing support.
- Chapter 9 Describes other Thai features.

## Related Documents

*Writing Software for the International Market*

*Programming for the World: A Guide to Internationalization*, Sandra Martin O'Donnell, Prentice Hall, 1994

*OSF/Motif User's Guide Revision 1.2*, Open Software Foundation, Prentice Hall, Englewood Cliffs, New Jersey 07632

*OSF/Motif Style Guide Revision 1.2*, Open Software Foundation, Prentice Hall, Englewood Cliffs, New Jersey 07632

*X Window System*, Third Edition, Robert W. Scheifler and James Gettys, Digital Press

*Programmer's Supplement for Release 5 of the X Window System, Version 11*, David Flanagan, O'Reilly & Associates, Inc.

*Draft Industrial Standard - Thai Language Software Standard WTT2.0*

## Conventions

The following typographical conventions are used in this manual:

- % A percent sign represents the C shell system prompt. A dollar
- \$ the system prompt for the Bourne and Korn shell.
- # A number sign represents the superuser prompt.
- % **cat** Boldface type in interactive examples indicates typed user inp
- file* Italic (slanted) type indicates variable values, placeholders, an argument names.
- [ | ] In syntax definitions, brackets indicate items that are optional
- { | } indicate items that are required. Vertical bars separating items or braces indicate that you choose one item from among those

...	In syntax definitions, a horizontal ellipsis indicates that the pre be repeated one or more times.
cat (1)	A cross-reference to a reference page includes the appropriate in parentheses. For example, <code>cat(1)</code> indicates that you can find on the <code>cat</code> command in Section 1 of the reference pages.
[RETURN]	In an example, a key name enclosed in a box indicates that you
Ctrl/x	This symbol indicates that you hold down the first named key the key or mouse button that follows the slash. In examples, the combination is enclosed in a box (for example [Ctrl/C]).



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# Character Sets

The Tru64 UNIX operating system software supports the Thai Industrial Standard (TIS) character set TIS 620-2533. The TIS 620 character set is a national standard for a primary set of graphic characters for Thai information interchange. It was first published by the Thai Industrial Standards Institute, Ministry of Industry, Thailand in 1986 (Buddhist year 2529) and was revised in 1990 (Buddhist year 2533). It defines 89 characters.

## 1.1 Consonants

The TIS 620 character set contains 44 consonants, as shown in the following figure and table.

	8	9	A	B	C	D	E	F
0				ฐ	ภ	ะ	เ	๐
1			ก	ท	ม	๓	แ	๑
2			ข	ฅ	ย	า	โ	๒
3			ช	ณ	ร	ำ	ใ	๓
4			ค	ด	ถ	๔	ไ	๔
5			ค	ต	ล	๕	า	๕
6			ฆ	ถ	ภ	๖	า	๖
7			ง	ท	ว	๗	๘	๗
8			จ	ธ	ศ	๘	๙	๘
9			ฉ	น	ษ	๙	๐	๙
A			ช	บ	ส	๐	๑	๐
B			ช	ป	ห		๑	๑
C			ฅ	ผ	พ	word sep.	๑	
D			ญ	ฝ	อ		๑	
E			ฎ	พ	ฮ		๑	
F			ฏ	ฟ	า	฿	๑	

<b>Decimal</b>	<b>Hexadecimal</b>	<b>Character Name</b>
161	A1	KO KAI
162	A2	KHO KHAI
163	A3	KHO KHUAT
164	A4	KHO KHWAI
165	A5	KHO KHON
166	A6	KHO RAKHANG
167	A7	NGO NGU
168	A8	CHO CHAN
169	A9	CHO CHING
170	AA	CHO CHANG
171	AB	SO SO
172	AC	CHO CHOE
173	AD	YO YING
174	AE	DO CHADA

<b>Decimal</b>	<b>Hexadecimal</b>	<b>Character Name</b>
175	AF	TO PATAK
176	B0	THO THOTHAN
177	B1	THO NANGMONTHO
178	B2	THO PHOO THAO
179	B3	NOR NANE
180	B4	DOR DEK
181	B5	TO TAO
182	B6	THO THUNG
183	B7	THO THAHAN
184	B8	THO THONG
185	B9	NO NU
186	BA	BO BAIMAI
187	BB	PO PLA
188	BC	PHO PERNG
189	BD	FO FA
190	BE	PO PAN
191	BF	FO FAN
192	C0	PO SAMPOW
193	C1	MO MA
194	C2	YO YAK
195	C3	RO RUA
197	C5	LO LING
199	C7	WO WAEN
200	C8	SO SALA
201	C9	SO RUSI
202	CA	SO SUA
203	CB	HO HEEP
204	CC	LO CHULA
205	CD	O ANG
206	CE	HO NOKHUK

## 1.2 Vowels

The TIS 620 character set contains 18 vowels, divided into four groups.

Five leading vowels; these vowels are placed before consonants:

<b>Decimal</b>	<b>Hexadecimal</b>	<b>Character Name</b>
224	E0	SARA E
225	E1	SARA AE
226	E2	SARA O
227	E3	SARA AI MAIMUAN
228	E4	SARA AI MAIMALAI

Six following vowels; these vowels are placed after consonants. The six following vowels are further divided into two groups.

Normal following vowels:

<b>Decimal</b>	<b>Hexadecimal</b>	<b>Character Name</b>
208	D0	SARA A
210	D2	SARA AA
211	D3	SARA AM
229	E5	LAKKHANGYAO

Special following vowels:

<b>Decimal</b>	<b>Hexadecimal</b>	<b>Character Name</b>
196	C4	RU
198	C6	LU

Two below vowels; these vowels are placed below consonants:

<b>Decimal</b>	<b>Hexadecimal</b>	<b>Character Name</b>
216	D8	SARA U
217	D9	SARA UU

Five above vowels; these vowels are placed above consonants:

Decimal	Hexadecimal	Character Name
209	D1	MAI HAN-AKAT
212	D4	SARA E
213	D5	SARA EE
214	D6	SARA UR
215	D7	SARA UUR

### 1.3 Tone Marks

The TIS 620 character set contains four tone marks:

Decimal	Hexadecimal	Character Name
232	E8	MAI EK
233	E9	MAI THO
234	EA	MAI TRIE
235	EB	MAI CHATTAWA

### 1.4 Diacritics

The TIS 620 character set contains five diacritics divided into two groups.

Four above diacritics; these diacritics are placed above initial or final consonants:

Decimal	Hexadecimal	Character Name
231	E7	MAITAIKHU
236	EC	THANTHAKHAT
237	ED	NIKHAHIT
238	EE	YAMAKKAN

One below diacritic; this diacritic is placed below final or clustered consonants:

Decimal	Hexadecimal	Character Name
218	DA	PHINTHU

## 1.5 Noncomposable Characters

The TIS 620 character set contains 18 noncomposable characters. These characters cannot be composed with above vowels, below vowels, tone marks, above diacritics and below diacritic. Noncomposable characters are divided into four groups.

One no-break space:

<b>Decimal</b>	<b>Hexadecimal</b>	<b>Character Name</b>
160	A0	NO-BREAK SPACE

Ten Thai digits:

<b>Decimal</b>	<b>Hexadecimal</b>	<b>Character Name</b>
240	F0	THAI ZERO
241	F1	THAI ONE
242	F2	THAI TWO
243	F3	THAI THREE
244	F4	THAI FOUR
245	F5	THAI FIVE
246	F6	THAI SIX
247	F7	THAI SEVEN
248	F8	THAI EIGHT
249	F9	THAI NINE

Six Thai special characters:

<b>Decimal</b>	<b>Hexadecimal</b>	<b>Character Name</b>
207	CF	PAYANGNOI
223	DF	BAHT (Thai currency sign)
230	E6	MAIYAMOK
239	EF	FONGMAN
250	FA	ANGKHANKHU
251	FB	KHOMUT

One word separator; a nonprintable character.

<b>Decimal</b>	<b>Hexadecimal</b>	<b>Character Name</b>
220	DC	WORD SEPARATOR



---

## Codesets

The Tru64 UNIX operating system software supports the following Thai codeset:

- TACTIS (Thai API Consortium/Thai Industrial Standard)

The TACTIS codeset, shown in Figure 2-1, is composed of the ASCII (ISO 646-1991) character set and the TIS 620-2533 character set. This is an 8-bit codeset with characters assigned values from 0x0 to 0xFF.

Figure 2-1: TACTIS Codeset

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL DLE	SP	0	@	P	`	p				ฐ	ภ	ะ	เ	อ	
1	SOH DC1	!	1	A	Q	a	q				ก	ท	ม	๓	แ	๑
2	STX DC2	"	2	B	R	b	r				ข	ฒ	ย	า	โ	๒
3	ETX DC3	#	3	C	S	c	s				ช	ณ	ร	ำ	ใ	๓
4	EOT DC4	\$	4	D	T	d	t				ค	ต	ถ	๓	ไ	๔
5	ENQ NAK	%	5	E	U	e	u				ค	ต	ล	๓	า	๕
6	ACK SYN	&	6	F	V	f	v				ฆ	ถ	ภ	๓	า	๖
7	BEL ETB	'	7	G	W	g	w				ง	ท	ว	๓	๓	๗
8	BS CAN	(	8	H	X	h	x				จ	ธ	ศ	๓	๓	๘
9	HT EM	)	9	I	Y	i	y				ฉ	น	ษ	๓	๓	๙
A	LF SUB	*	:	J	Z	j	z				ช	บ	ส	๓	๓	๑๑
B	VT ESC	+	;	K	[	k	{				ช	ป	ท	๓	๓	๑๒
C	FF FS	,	<	L	\	l					ฌ	ผ	พ	word sep.	๓	
D	CR GS	-	=	M	]	m	}				ญ	ฝ	อ	๓		
E	SO RS	.	>	N	^	n	~				ฎ	พ	ฮ	๓		
F	SI US	/	?	O	_	o	DEL				ฎ	ฟ	า	฿	©	

word sep. = word separator character

## 2.1 Character Classification

To facilitate the processing of characters encoded in the TACTIS codeset, such as displaying Thai characters and input-sequence checking, characters are classified into several categories:

- Control Characters (CTRL). Nondisplayable control characters can be used to control output or for data communication. The 66 control characters are: 00-1F, 7F, 80-9F and FF.
- Consonants (CONS). The 44 Thai consonants defined in TIS 620-2533.
- Vowels (-V)
  - Leading vowels (LV). The five leading vowels defined in TIS 620-2533.
  - Following vowels (FV). The six following vowels defined in TIS 620-2533.
  - Below vowels (BV). The two below vowels defined in TIS 620-2533.
  - Above vowels (AV). The five above vowels defined in TIS 620-2533.
  - Tone marks (TONE). The four tone marks defined in TIS 620-2533.
- Diacritics (-D)
  - Above diacritics (AD). The four above diacritics defined in TIS 620-2533.
  - Below diacritic (BD). The below diacritic defined in TIS 620-2533.
- Noncomposables (NON). Those characters that do not fit into the other four character classes. This group of characters cannot be composed with above vowels, below vowels, tone marks, above diacritics, and below diacritic. There are 119 noncomposable characters divided into seven groups:
  - Graphic characters. The 94 graphic characters defined in ISO 646-1991. They include:
    - \* 52 English alphabetic characters (A-Z, a-z)
    - \* 10 digits (0-9)
    - \* 32 special characters: 21-2F, 3A-3F and 7B-7E
  - Space. The character code is 20.
  - No-Break space. The character code is A0.
  - Thai digits. The ten Thai digits defined in TIS 620-2533.
  - Thai special characters. The six Thai special characters defined in TIS 620-2533.

- Word separator. The word separator defined in TIS 620-2533.
- Reserved code points. Six code points are reserved for future use.

To meet some special requirements of Thai input and output, some character classes, such as FV, BV, AV, and AD, are further divided into subclasses. For details, see Table 2–.

**Table 2–1: Thai Character Classification**

<b>Class</b>	<b>Number</b>	<b>Description</b>
CTRL	66	ISO 646-1983 control codes: 00-1F, 7F, 80-9F, FF
NON	119	<ul style="list-style-type: none"> <li>• ISO 646-1991 character codes: 20-7E</li> <li>• TIS 620-2533 character codes: A0, CF, DC, DF, E6, EF, F0-F9, FA, FB</li> <li>• Reserved code points: DB, DD, DE, FC, FD, FE.</li> </ul>
CONS	44	A1-C3, C5, C7-CE
LV	5	E0, E1, E2, E3, E4
FV1	3	D0, D2, D3
FV2	2	E5
FV3	2	C4 and C6 (These two characters also behave as LV in the case of LV+CONS)
BV1	1	D8
BV2	1	D9
BD	1	DA
TONE	4	E8, E9, EA, EB
AD1	2	ED, EC
AD2	1	E7
AD3	1	EE
AV1	1	D4
AV2	2	D1, D6
AV3	2	D5, D7

## 2.2 Character Levels

Characters defined in the TACTIS codeset can also be classified according to character levels. There are five character levels:

- Nondisplayable level includes all control characters in the CTRL category.
- Base level includes all characters in the NON, CONS, FV and LV categories. Characters at this level are drawn on baseline.
- Above level includes all characters in the AD3, AV1, AV2 and AV3 categories. Characters at this level are drawn directly above final consonants.
- Below level includes all characters in the BV1, BV2 and BD categories. Characters at this level are drawn directly below final consonants.
- Top level includes all characters in the TONE, AD1 and AD2 categories. Characters at this level are drawn on top of above characters. If above level characters do not exist, top level characters can be drawn at the above level. Characters at this level also indicate the end of character cells.



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## Locales

The Tru64 UNIX operating system software supports a single Thai locale that has two names:

- th\_TH
- th\_TH.TACTIS

If you are using DECwindows Motif, you can choose the locale from the Language menu of the Session Manager. If you are using CDE, you can choose the locale from the language menu on the CDE login screen.



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# Local Language Devices

## 4.1 Terminals

The Tru64 UNIX operating system software supports the VT382-T Thai terminal. Thai DECterm is the emulation of the VT382-T Thai terminal, which provides compatible functionalities for running Thai character-cell terminal applications. For the details of Thai DECterm, see Chapter 9, Other Thai Features.

Character-cell terminal applications can process the Thai locale properly through Tru64 UNIX run-time libraries, such as the C library and the curses library, with the information defined in the terminfo and termcap databases. To set up the environment to process in the Thai locale, you should set the TERM environment variable to vt382t by entering the following command:

```
% setenv TERM vt382t
```

## 4.2 Printers

The Tru64 UNIX operating system software supports the following dot matrix Thai printer:

- Epson LQ1050+

The following PostScript printers can be configured for Thai printing:

- DEClaser 1152
- DEClaser 5100 with font disk (LN09X-HD)
- PrintServer 17

The generic `wpsof` filter can be used to print Thai characters on any PostScript printer.

The print filters in Table 4-1 are provided to support Thai printers.

**Table 4–1: Thai Print Filters**

<b>Filter Name</b>	<b>Printer Name</b>
Thailpof	Epson LQ1050+
dl1152wrof	DEClaser 1152
dl5100wrof	DEClaser 5100
Lpsof	PrintServer 17
Wwpsof	All PostScript printers

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**Note**

To use PrintServer 17, the PrintServer Software V5.0 or later for Tru64 UNIX, is also required.

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For the details about setting up Thai printer queues, see Chapter 8, Thai Printing Support.

## 5.1 DECwindows Fonts

The Tru64 UNIX operating system software provides the Thai DECwindows fonts described in Table 5-1 in various sizes for 75 dpi (dot-per-inch) display devices.

**Table 5–1: Thai Screen Fonts**

<b>Typefaces</b>	<b>Bounding Box</b>	<b>Remarks</b>
Screen	7 x 14	Mandatory font
	8 x 18	Mandatory font
	12 x 24	Mandatory font

These mandatory fonts are available when you install the Thai variant. In addition to these Thai fonts, several miscellaneous screen fonts are provided in the Thai DECterm and toolkit.

No 100 dpi Thai fonts are provided in the kit. To allow you to use the Thai 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.

### 5.1.1 XLFD Font Names

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

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* or *100* in the X- and Y-resolution fields, that is, the asterisks in the following XLFD names.

Screen family font names in XLFD format:

-ADECW-Screen-Medium-R-Normal--18-180-\*\*-P-80-TIS620.2533-1  
 -ADECW-Screen-Medium-R-Normal--14-140-\*\*-P-70-TIS620.2533-1  
 -ADECW-Screen-Medium-R-Normal--24-240-\*\*-P-120-TIS620.2533-1

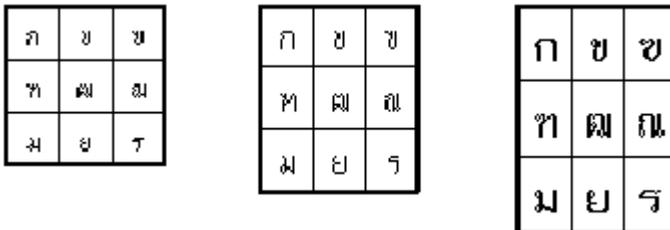
XLFD of miscellaneous Thai screen fonts:

XLFD-Font Name	Character Set
-ADECW-Screen-Medium-R-Normal--18-180-**-M-80-iso8859-1	ISO Latin-1
-ADECW-Screen-Medium-R-Normal--18-180-**-M-80-DEC-DECctrl	DEC Display Control
-ADECW-Screen-Medium-R-Normal--18-180-**-M-80-DEC-DECsuppl	DEC Supplemental
-ADECW-Screen-Medium-R-Normal--18-180-**-M-80-DEC-DECtech	DEC Technical
-ADECW-Screen-Medium-R-Normal--24-240-**-M-120-iso8859-1	ISO Latin-1
-ADECW-Screen-Medium-R-Normal--24-240-**-M-120-DEC-DECctrl	DEC Display Control
-ADECW-Screen-Medium-R-Normal--24-240-**-M-120-DEC-DECsuppl	DEC Supplemental
-ADECW-Screen-Medium-R-Normal--24-240-**-M-120-DEC-DECtech	DEC Technical

## 5.1.2 Bitmap Font Samples

Figure 5–1 shows samples of the screen family of Thai fonts.

**Figure 5–1: Screen Font Sample**



### 5.1.3 Specifying Fonts in DECwindows Applications

Table 5-2 shows the default font list used in the Motif Toolkit.

**Table 5–2: Thai Default Font List**

XLFD Font Name	Character Set
-ADECW-Screen-Medium-R-Normal--*-180-*-*M-80-iso8859-1	iso8859-1
-ADECW-Screen-Medium-R-Normal--*-180-*-*P-80-TIS620.2533-1	TIS620.2533-1
-ADECW-Screen-Medium-R-Normal--*-180-*-*-*_*_*	Fontset

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

### 5.1.4 Outline Fonts

The Tru64 UNIX operating system software provides the Thai outline fonts shown in Table 5-3.

**Table 5–3: Thai Outline Fonts**

Font Family	Font Name
AngsanaUPC Family	AngsanaUPC-Light
	AngsanaUPC-Italic
	AngsanaUPC-Bold
	AngsanaUPC-BoldItalic
CordiaUPC Family	CordiaUPC-Light
	CordiaUPC-Italic
	CordiaUPC-Bold
	CordiaUPC-BoldItalic
EucrosiaUPC Family	EucrosiaUPC-Light
	EucrosiaUPC-Italic
	EucrosiaUPC-Bold
	EucrosiaUPC-BoldItalic
FreesiaUPC Family	FreesiaUPC-Light
	FreesiaUPC-Italic
	FreesiaUPC-Bold
	FreesiaUPC-BoldItalic
IrisUPC Family	IrisUPC-Light
	IrisUPC-Italic
	IrisUPC-Bold
	IrisUPC-BoldItalic

JasmineUPC Family	JasmineUPC-Light JasmineUPC-Italic JasmineUPC-Bold JasmineUPC-BoldItalic
KodchiangUPC Family	KodchiangUPC-Light KodchiangUPC-Italic KodchiangUPC-Bold KodchiangUPC-BoldItalic
LilyUPC Family	LilyUPC-Light LilyUPC-Italic LilyUPC-Bold LilyUPC-BoldItalic
WaterlilyUPC Family	WaterlilyUPC-Light WaterlilyUPC-Italic WaterlilyUPC-Bold WaterlilyUPC-BoldItalic
YuccaUPC Family	YuccaUPC-Light YuccaUPC-Italic YuccaUPC-Bold YuccaUPC-BoldItalic

---

These Thai outline fonts can be used for:

- Printing on PostScript printers. For details see Chapter 8, Thai Printing Support.
- Displaying through the R6 X Windows System Type 1 rasterizer. To use these outline fonts, you must add the `$I18NPATH/usr/lib/X11/fonts/Type1UPC` directory to your font path with the following command:
 

```
% xset +fp $I18NPATH/usr/lib/X11/fonts/Type1UPC
```
- Displaying through Display PostScript. You can view PostScript files with Thai characters using the CDA Viewer or through the Display PostScript extension.

## 5.2 XLFD Font Names of Thai Outline Fonts

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

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

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

4. Field 5 — The average font width in point size. Usually, an asterisk is put in this field.

For example, if you want to use a 48 point font of the AngsanaUPC family in bold-italic style for a 100 dpi display device, you would specify:

```
-upc-angsana-bold-i-normal--*-480-100-100-p-*-tis620.2533-1
```

**Table 5–4: XLFD of Thai Outline Fonts**

<b>Outline Font</b>	<b>XLFD Font Name</b>
AngsanaUPC-Bold	-upc-angsana-bold-r-normal--0-0-0-0-p-0-tis620.2533-1
AngsanaUPC-BoldItalic	-upc-angsana-bold-i-normal--0-0-0-0-p-0-tis620.2533-1
AngsanaUPC-Italic	-upc-angsana-medium-i-normal--0-0-0-0-p-0-tis620.2533-1
AngsanaUPC-Light	-upc-angsana-medium-r-normal--0-0-0-0-p-0-tis620.2533-1
CordiaUPC-Bold	-upc-cordia-bold-r-normal--0-0-0-0-p-0-tis620.2533-1
CordiaUPC-BoldItalic	-upc-cordia-bold-i-normal--0-0-0-0-p-0-tis620.2533-1
CordiaUPC-Italic	-upc-cordia-medium-i-normal--0-0-0-0-p-0-tis620.2533-1
CordiaUPC-Light	-upc-cordia-medium-r-normal--0-0-0-0-p-0-tis620.2533-1
EucrosiaUPC-Bold	-upc-eucrosia-bold-r-normal--0-0-0-0-p-0-tis620.2533-1
EucrosiaUPC-BoldItalic	-upc-eucrosia-bold-i-normal--0-0-0-0-p-0-tis620.2533-1
EucrosiaUPC-Italic	-upc-eucrosia-medium-i-normal--0-0-0-0-p-0-tis620.2533-1
EucrosiaUPC-Light	-upc-eucrosia-medium-r-normal--0-0-0-0-p-0-tis620.2533-1
FreesiaUPC-Bold	-upc-freesia-bold-r-normal--0-0-0-0-p-0-tis620.2533-1
FreesiaUPC-BoldItalic	-upc-freesia-bold-i-normal--0-0-0-0-p-0-tis620.2533-1
FreesiaUPC-Italic	-upc-freesia-medium-i-normal--0-0-0-0-p-0-tis620.2533-1
FreesiaUPC-Light	-upc-freesia-medium-r-normal--0-0-0-0-p-0-tis620.2533-1
IrisUPC-Bold	-upc-iris-bold-r-normal--0-0-0-0-p-0-tis620.2533-1
IrisUPC-BoldItalic	-upc-iris-bold-i-normal--0-0-0-0-p-0-tis620.2533-1
IrisUPC-Italic	-upc-iris-medium-i-normal--0-0-0-0-p-0-tis620.2533-1
IrisUPC-Light	-upc-iris-medium-r-normal--0-0-0-0-p-0-tis620.2533-1
JasmineUPC-Bold	-upc-jasmine-bold-r-normal--0-0-0-0-p-0-tis620.2533-1
JasmineUPC-BoldItalic	-upc-jasmine-bold-i-normal--0-0-0-0-p-0-tis620.2533-1
JasmineUPC-Italic	-upc-jasmine-medium-i-normal--0-0-0-0-p-0-tis620.2533-1
JasmineUPC-Light	-upc-jasmine-medium-r-normal--0-0-0-0-p-0-tis620.2533-1
KodchiangUPC-Bold	-upc-kodchiang-bold-r-normal--0-0-0-0-p-0-tis620.2533-1
KodchiangUPC-BoldItalic	-upc-kodchiang-bold-i-normal--0-0-0-0-p-0-tis620.2533-1
KodchiangUPC-Italic	-upc-kodchiang-medium-i-normal--0-0-0-0-p-0-tis620.2533-1
KodchiangUPC-Light	-upc-kodchiang-medium-r-normal--0-0-0-0-p-0-tis620.2533-1
LilyUPC-Bold	-upc-lily-bold-r-normal--0-0-0-0-p-0-tis620.2533-1

LilyUPC-BoldItalic	-upc-lily-bold-i-normal--0-0-0-0-p-0-tis620.2533-1
LilyUPC-Italic	-upc-lily-medium-i-normal--0-0-0-0-p-0-tis620.2533-1
LilyUPC-Light	-upc-lily-medium-r-normal--0-0-0-0-p-0-tis620.2533-1
WaterlilyUPC-Bold	-upc-waterlily-bold-r-normal--0-0-0-0-p-0-tis620.2533-1
WaterlilyUPC-BoldItalic	-upc-waterlily-bold-i-normal--0-0-0-0-p-0-tis620.2533-1
WaterlilyUPC-Italic	-upc-waterlily-medium-i-normal--0-0-0-0-p-0-tis620.2533-1
WaterlilyUPC-Light	-upc-waterlily-medium-r-normal--0-0-0-0-p-0-tis620.2533-1
YuccaUPC-Bold	-upc-yucca-bold-r-normal--0-0-0-0-p-0-tis620.2533-1
YuccaUPC-BoldItalic	-upc-yucca-bold-i-normal--0-0-0-0-p-0-tis620.2533-1
YuccaUPC-Italic	-upc-yucca-medium-i-normal--0-0-0-0-p-0-tis620.2533-1
YuccaUPC-Light	-upc-yucca-medium-r-normal--0-0-0-0-p-0-tis620.2533-1

---

## 5.3 Outline Font Samples

Figures 5-2 through 5-11 illustrate samples of Thai outline fonts.

**Figure 5–2: AngsanaUPC Font Sample**

### Family AngsanaUPC

**Light:**           แบบฟอนต์ภาษาไทย AngsanaUPC ตัวธรรมดา  
**Italic:**           แบบฟอนต์ภาษาไทย AngsanaUPC ตัวเอน  
**Bold:**            แบบฟอนต์ภาษาไทย AngsanaUPC ตัวหนา  
**Bold Italic:**   แบบฟอนต์ภาษาไทย AngsanaUPC ตัวหนาเอน

**Figure 5–3: CordiaUPC Font Sample**

### Family CordiaUPC

**Light:**           แบบฟอนต์ภาษาไทย CordiaUPC ตัวธรรมดา  
**Italic:**           แบบฟอนต์ภาษาไทย CordiaUPC ตัวเอน  
**Bold:**            แบบฟอนต์ภาษาไทย CordiaUPC ตัวหนา  
**Bold Italic:**   แบบฟอนต์ภาษาไทย CordiaUPC ตัวหนาเอน

Figure 5–4: EucrosiaUPC Font Sample

**Family EucrosiaUPC**

**Light:**           แบบฟอนท์ภาษาไทย EucrosiaUPC ตัวธรรมดา  
**Italic:**           แบบฟอนท์ภาษาไทย *EucrosiaUPC* ตัวเอน  
**Bold:**            แบบฟอนท์ภาษาไทย EucrosiaUPC ตัวหนา  
**Bold Italic:**   แบบฟอนท์ภาษาไทย *EucrosiaUPC* ตัวหนาเอน

Figure 5–5: FreesiaUPC Font Sample

**Family FreesiaUPC**

**Light:**           แบบฟอนท์ภาษาไทย FreesiaUPC ตัวธรรมดา  
**Italic:**           แบบฟอนท์ภาษาไทย *FreesiaUPC* ตัวเอน  
**Bold:**            แบบฟอนท์ภาษาไทย **FreesiaUPC** ตัวหนา  
**Bold Italic:**   แบบฟอนท์ภาษาไทย *FreesiaUPC* ตัวหนาเอน

Figure 5–6: IrisUPC Font Sample

**Family IrisUPC**

**Light:**           แบบฟอนท์ภาษาไทย IrisUPC ตัวธรรมดา  
**Italic:**           แบบฟอนท์ภาษาไทย *IrisUPC* ตัวเอน  
**Bold:**            แบบฟอนท์ภาษาไทย **IrisUPC** ตัวหนา  
**Bold Italic:**   แบบฟอนท์ภาษาไทย *IrisUPC* ตัวหนาเอน

Figure 5–7: JasmineUPC Font Sample

**Family JasmineUPC**

**Light:**           แบบฟอนต์ภาษาไทย JasmineUPC ตัวธรรมดา  
*Italic:*           แบบฟอนต์ภาษาไทย JasmineUPC ตัวเอ่น  
**Bold:**           แบบฟอนต์ภาษาไทย JasmineUPC ตัวหนา  
**Bold Italic:**   แบบฟอนต์ภาษาไทย JasmineUPC ตัวหนาเอ่น

Figure 5–8: KodchiangUPC Font Sample

**Family KodchiangUPC**

**Light:**           แบบฟอนต์ภาษาไทย KodchiangUPC ตัวธรรมดา  
*Italic:*           แบบฟอนต์ภาษาไทย KodchiangUPC ตัวเอ่น  
**Bold:**           แบบฟอนต์ภาษาไทย KodchiangUPC ตัวหนา  
**Bold Italic:**   แบบฟอนต์ภาษาไทย KodchiangUPC ตัวหนาเอ่น

Figure 5–9: LilyUPC Font Sample

**Family LilyUPC**

**Light:**           แบบฟอนต์ภาษาไทย LilyUPC ตัวธรรมดา  
*Italic:*           แบบฟอนต์ภาษาไทย LilyUPC ตัวเอ่น  
**Bold:**           แบบฟอนต์ภาษาไทย LilyUPC ตัวหนา  
**Bold Italic:**   แบบฟอนต์ภาษาไทย LilyUPC ตัวหนาเอ่น

**Figure 5–10: WaterlilyUPC Font Sample**

Family WaterlilyUPC

*Light:*           แบบฟอนท์ภาษาไทย WaterlilyUPC ตัวธรรมดา

*Italic:*           แบบฟอนท์ภาษาไทย WaterlilyUPC ตัวเอน

**Bold:**           แบบฟอนท์ภาษาไทย WaterlilyUPC ตัวหนา

***Bold Italic:***   แบบฟอนท์ภาษาไทย WaterlilyUPC ตัวหนาเอน

**Figure 5–11: YuccaUPC Font Sample**

Family YuccaUPC

*Light:*           แบบฟอนท์ภาษาไทย YuccaUPC ตัวธรรมดา

*Italic:*           แบบฟอนท์ภาษาไทย YuccaUPC ตัวเอน

**Bold:**           แบบฟอนท์ภาษาไทย YuccaUPC ตัวหนา

***Bold Italic:***   แบบฟอนท์ภาษาไทย YuccaUPC ตัวหนาเอน



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# Keyboards

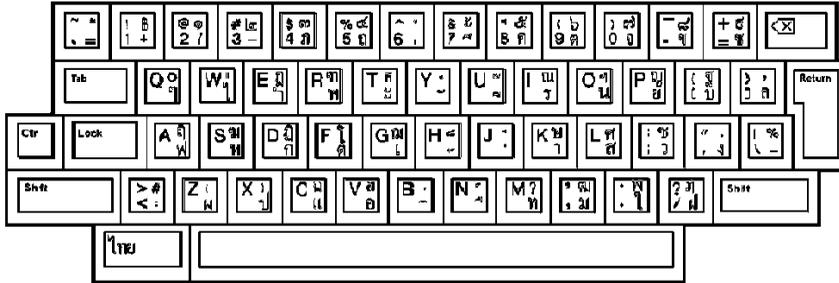
The Tru64 UNIX operating system software supports the following Thai keyboard types:

- LK201-T
- LK401-T
- LK443-T
- PCXAL

## 6.1 Keyboard Layout

The figures in this chapter show the keyboard layouts for the Thai input methods. You can find online copies of these figures at the locations specified. These figures are in .ddif format.

**Figure 6-1: LK201-T Keyboard Layout**

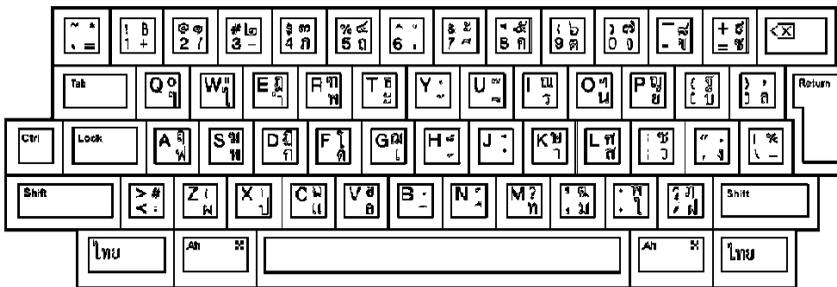


**Required Keymap:** thai lk201t

**Mode:** Thai Mode (Gatemanee keyboard used in VT382-T)

**Location of File:** /usr/lib/cda/thai-lk201t-100.ddif

**Figure 6-2: LK401-T Keyboard Layout**

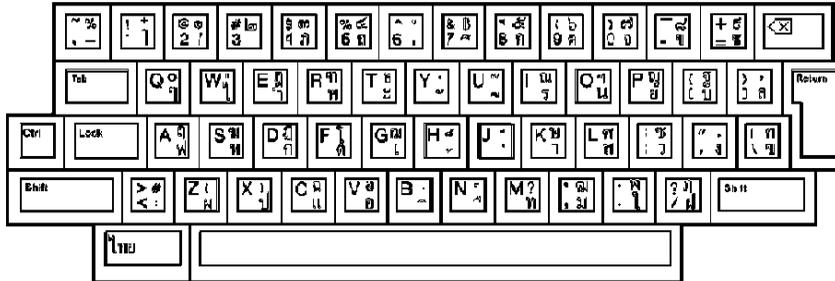


**Required Keymap:** thai lk201wt

**Mode:** Thai Mode (Gatemanee keyboard used in VT382-T)

**Location of File:** /usr/lib/cda/thai-lk401t-100.ddif

**Figure 6-3: LK201-WTT Keymap Layout**

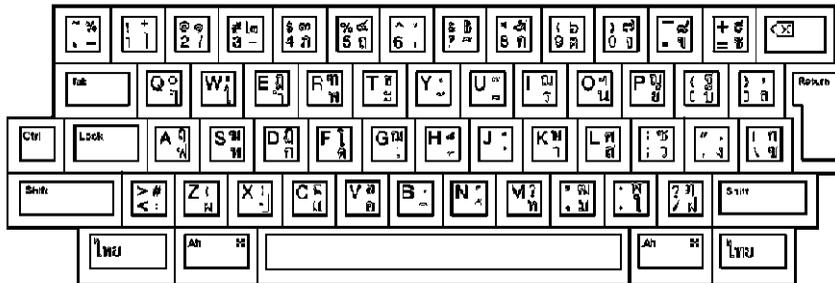


**Required Keymap:** thai lk201wtt

**Mode:** Thai Mode (defined in WTT V2.0)

**Location of File:** /usr/lib/cda/thai-lk201wtt-100.ddif

**Figure 6-4: LK401-WTT Keymap Layout**



**Required Keymap:** thai lk401wtt

**Mode:** Thai Mode (defined in WTT V2.0)

**Location of File:** /usr/cda/thai-lk401wtt-100.ddif

## 6.2 Keyboard Indicator

If you are using XDM, the keyboard indicator (`kb_indicator`) is automatically activated by the session manager and controls the compose lamp of the Thai keyboards. To start the keyboard indicator, the following command has been added to Automatic Startup menu of Session Manager:

```
"/usr/bin/X11/kb_indicator -map"
```

Compose status is displayed in the keyboard indicator window. A button in the keyboard indicator window controls the compose mode like the compose key on the keyboard.

If you are using CDE, you can manually execute the preceding command, or add it to your personal profile.

---

## Thai Input Methods

This chapter explains how to implement Thai input methods with different types of applications, introduces the different input methods, and describes the input sequence checking modes that are provided with the Tru64 UNIX operating system software.

The input methods for entering Thai characters include:

- Thai input mode
- Hexadecimal input
- Special Thai character input

The input sequence checking modes provided with the Tru64 UNIX operating system are:

- No input sequence check (NISC) mode/passthrough mode
- VT382-T input sequence check (ISC) mode
- WTT basic mode (mode 1)
- WTT strict mode (mode 2)

### 7.1 Character–Cell Terminal Applications

For character-cell terminal applications, Thai input methods are implemented by the firmware of the VT382-T Thai terminal or incorporated in the terminal emulation software, such as Thai DECterm. Applications need not provide code to handle the input of Thai characters; they can rely on the VT382-T terminal or Thai DECterm to provide the input method services.

Thai DECterm can be regarded as one of the DECwindows Motif applications. Therefore, the activating and deactivating methods follow those of DECwindows Motif, as discussed in Section 7.2.

For VT382-T terminals, the input mode can be selected using the [Thai] key, which is equivalent to the [Compose] key on a standard LK201 keyboard or the [Left-Compose] key on a standard LK401 keyboard. On the Thai version of the LK201 or LK401 keyboard (LK201-T or LK401-T) the [Thai] key is labeled in Thai.

After the Thai input mode is activated, the firmware of the VT382-T terminal or the input methods incorporated in Thai DECterm allow for entering Thai characters and return the input data as appropriate.

## 7.2 DECwindows Motif and CDE Applications

The X Window System provides a mechanism for associating encodings of symbols which are usually printed on keycaps (called KeySyms) with physical or logical keys. Each key is associated with a list of KeySyms. Depending on the Shift/Lock state, different KeySyms are obtained by pressing the same key. For instance, in the case of U.S. English keyboard, the input of "3" or "#" is switched by the shift state. The standard mechanism for supporting two KeySyms per key was established in Release 3 of the X Window System.

This support is insufficient for some languages, such as Hebrew and Thai, which require more KeySyms in order to support the native languages. In Release 4, the Mode Switch mechanism was introduced to allow switching of Group 1 and Group 2 characters, where Group 1 is ASCII KeySyms and Group 2 is native language characters. The Mode Switch mechanism works as a Group Shift key for these languages.

In addition, you can input different sets of characters through the same keyboard by changing the associated KeySyms.

In the X Consortium's release of X Window System, the Mode Switch On state is effective only for entering one single character. After the character is entered, the Mode Switch state is reset. In the Tru64 UNIX implementation, the Mode Switch mechanism is enhanced to support both single-shot switching and locking-shift switching, depending on the keymap definition. In the latter case, when the Mode Switch state is set, it remains unchanged until the Mode Switch key is pressed again to modify the state.

---

### Note

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On Tru64 UNIX operating system servers, a locking "mode switch" mechanism is used to switch between the Thai and English input modes. On servers where the locking "mode switch" is absent, the Thai input mode can still be entered by pressing the key corresponding to the `XK_Multi_key` KeySym. In contrast to the locking "mode switch" mechanism, the `XK_Multi_key` affects one input context only.

---

For setting Thai KeySyms, DECwindows Motif provides the keymaps shown in Table 7-1.

**Table 7–1: Thai Keymaps**

<b>Keymap</b>	<b>Keyboard</b>
thai lk201t	LK201-T
thai lk201wtt	LK201-T
thai lk401t	LK401-T
thai lk401wtt	LK401-T
thai lk443t	LK443-T
thai lk443wtt	LK443-T
thai pcxalt	PCXAL-T
thai pcxalwtt	PCXAL-T

The keymaps in Table 7-1 support locking-shift mode switching. With these keymaps, you can enter English characters in the Mode Switch Off state and Thai characters in the Mode Switch On state.

The effect of setting the Mode Switch on is similar to that of entering the Thai input mode on the VT382-T terminal.

### 7.2.1 Loading Keymaps

The procedures for activating the Thai input mode on VT terminals, DECwindows Motif, or CDE are similar. You need to load a Thai keymap in order to input Thai characters on DECwindows Motif and CDE; for VT terminals, you can skip this step.

If you are using XDM to load a Thai keymap, choose the Keyboard... menu item from the Customize menu of the Session Manager. The Keyboard dialog box is displayed and you can choose the Thai keymap associated with the keyboard connected to your workstation. For instance, if you have a Thai LK401-T keyboard and you want to use the Gatemanee layout, you would choose "thai lk401t".

If you are using CDE, you can load the Thai keymaps by clicking the keyboard options in Application Manager.

The keymap is a global attribute to a display device. After you select a keymap, the keymap is effective to all client applications running on your display device. If you plan to run applications in different languages, you should check to determine if there are conflicts between the keymap that you are using and the keymap required by those languages.

## 7.3 Input Methods

### 7.3.1 Thai Character Input

To input Thai characters, switch the input mode to Thai. In this mode, you can input Thai characters by pressing keys on the main keyboard. On a Thai keyboard, the Thai characters are printed on the right-hand side of the keycaps. See Chapter 6 for illustrations of the Thai Keyboard layouts.

The key sequences for activating the Thai input mode are shown in Table 7-2.

**Table 7–2: Thai Input Invocation Key**

Keyboard Types	Thai Key Sequence
VT Terminals	[Thai]
DECwindows Motif	
LK201-T	[Thai/Space]
LK401-T	[Thai]

You can press the appropriate Thai key sequence to toggle between the English input mode and the Thai input mode.

### 7.3.2 Special Thai Characters Input

Most Thai characters defined in Thai Industrial Standard (TIS) 620-2533 are found on the keycaps of the main keyboard; you enter them directly by pressing the respective keys. However, there are 7 Thai characters which do not appear on the supported keyboard layouts. To enter these characters, you can use Special Thai character input method or hexadecimal input method.

#### 7.3.2.1 Special Thai Character Input Method

You can enter the special characters in Thai input mode by pressing designated keys while holding down the [Shift/Thai] key on a LK201-T keyboard or the [Shift/Alt] key on a LK401-T keyboard. The special characters, designated keys, and keyboards are listed in Table 7-3.

**Table 7-3: Special Thai Characters Input Method**

<b>Character</b>	<b>Hex Code</b>	<b>Designated Key</b>	<b>LK201</b>	<b>LK401</b>
KHO KHUAT	A3	KHO KHAI	[Shift/Thai/-]	[Shift/Alt/-]
KHO KHON	A5	KHO KHWAI	[Shift/Thai/8]	[Shift/Alt/8]
LAKKHANGYAO	E5	SARA AA	[Shift/Thai/K]	[Shift/Alt/K]
YAMAKKAN	EE	SARA AM	[Shift/Thai/E]	[Shift/Alt/E]
FONGMAN	EF	MAIYAMOK	[Shift/Thai/Q]	[Shift/Alt/Q]
ANGKHANKHU	FA	NO NU	[Shift/Thai/O]	[Shift/Alt/O]
KHOMUT	FB	PHO PHUNG	[Shift/Thai/Z]	[Shift/Alt/Z]

---

**Note**

---

The Special Thai Character Input method cannot be used in English input mode.

---

### 7.3.2.2 Hexadecimal Input Method

You can enter special Thai characters by specifying their hexadecimal (Hex) codes.

On a VT382-T Thai terminal, you invoke the Hex input mode by pressing [Ctrl/Thai], then releasing it.

For DECwindows Motif, you invoke the Hex input mode by pressing and releasing [Ctrl/Thai] on an LK201-T keyboard or [Ctrl/Alt] on an LK401-T keyboard.

---

**Note**

---

You can invoke Hex input mode either from English input mode or Thai input mode.

---

Once in Hex input mode, you input a two-digit hexadecimal code to enter a special character. For example, if you want to enter the Thai character FONGMAN (EF), press:

[Ctrl/Thai] [E] [F]

After the hexadecimal code is entered, you exit Hex input mode. You must reactivate Hex input mode to enter another hexadecimal code.

Hexadecimal codes for special Thai characters are shown in Table 7-3.

### 7.3.3 English Character Input

To input English characters, set Thai mode to off. In this mode, you can input English letters, numeric characters, and punctuation marks by pressing keys on the main keyboard. On a Thai keyboard, the characters or symbols are printed on the left side of the keycaps.

## 7.4 Input Sequence Check Modes

The Tru64 UNIX operating system software supports the following Thai input sequence check modes:

- NISC Mode/Passthrough mode
- VT382-T Input Sequence Check (ISC) mode
- WTT Basic mode (Mode 1)
- WTT Strict mode (Mode 2)

### 7.4.1 Selecting Input Sequence Check Mode

The way you select input sequence check mode depends on whether you are using DECwindows Motif or running character-cell terminal applications.

#### 7.4.1.1 DECwindows Motif

In DECwindows Motif, you can select an input sequence check mode in one of two ways:

- Setting the XMODIFIERS environment variable
- Specifying the parameter in the R6 Xlib XsetLocaleModifiers function

Table 7-4 shows the value of the XMODIFIERS parameter that you set for the various input sequence check modes.

**Table 7–4: Thai Input Sequence Check Modes**

<b>Input Sequence Check Mode</b>	<b>XMODIFIERS</b>
NISC/Passthrough	@im=Passthrough
VT382-T ISC	@im=VT382T
WTT Basic	@im=BasicCheck
WTT Strict	@im=Strict

By default, the input mode is WTT Basic mode.

For example, you can start Cardfiler in WTT Strict mode and Calendar in Passthrough mode with the following script:

```
#!/usr/bin/sh
#
# Please uncomment the following lines to
# make sure the session is in proper
# language.
#
# echo "*xnllanguage:\tth_TH.TACTIS" | \
#     /usr/bin/X11/xrdb -merge
#
XMODIFIERS=@im=Strict
export XMODIFIERS
/usr/bin/X11/dxcardfiler &
#
#
XMODIFIERS=@im=Passthrough
export XMODIFIERS
/usr/bin/X11/dxcalendar &
#
#
```

#### 7.4.1.2 Character-Cell Terminal Applications

For Thai DECterm, you can select the Thai input sequence mode through the General Option... dialog box. For details, see Chapter 9.

For VT382-T Thai terminal, the Passthrough mode and the VT382-T Input Sequence Check mode are supported by the terminal itself. You can select one of these input modes through the terminal's Setup menu. The other two input sequence check modes, WTT Basic and WTT Strict, can be supported through the Thai terminal driver. By default, the input sequence check mode is set to WTT Basic mode. To switch the input sequence check mode, you can use the following command:

```
% stty isc <mode>
```

The *<mode>* variable can be:

- 0 for Passthrough mode
- 1 for WTT Basic mode
- 2 for WTT Strict mode

For the details about the Thai terminal driver, see Chapter 9.

---

**Note**

---

The input sequence checking mechanism supported by the Thai terminal driver is disabled in the CBREAK or RAW mode. For details, see the `cbreak` and `raw` reference pages.

---

### 7.4.2 NISC Mode/Passthrough Mode

In this mode, Thai characters can be entered in arbitrary order. No checking is performed on the sequence of input data.

This input mode provides more freedom for applications to handle input data by themselves. However, data can be entered in invalid order and applications need to handle it properly.

### 7.4.3 VT382-T ISC Mode

Thai characters of different display levels can be combined in six valid patterns, as shown in Figure 7-1.

**Figure 7-1: Valid Patterns of Thai Character Composition**

Level \ Pattern	1	2	3	4	5	6
1 - Top Level						
2 - Upper Level						
3 - Base Level						
4 - Lower Level						

Entering combinations other than these patterns will not produce correct Thai script writing syntax, and a warning bell will ring to signify possible typographical errors.

The VT382-T ISC algorithm checks only the combination of Thai characters; not their order. The following data sequences represent the same character sequence and their appearance on screen is identical:

**Sequence 1**

<b>B7</b>
-----------

<b>D5</b>
-----------

<b>E8</b>
-----------

  
                  Level 3      Level 2      Level 1

**Sequence 2**

<b>B7</b>
-----------

<b>E8</b>
-----------

<b>D5</b>
-----------

  
                  Level 3      Level 1      Level 2

The rule is that base level characters are entered first. They are used as delimiters for character columns. The order of other characters in the same column does not matter.

To simplify the implementation, a lookup table, Table 7-5, is used to determine the valid combinations of Thai characters.

**Table 7-5: VT382-T ISC Mode Lookup Table**

	C						C	T										
	N	O	F	F	F	T		B	B	O	A	A	A	A	A	A		
	N	S	V	1	2	3		L	1	2	D	E	1	2	3	1	2	3
<b>NON</b>	A	A	A	A	A	A	X	R	R	R	R	R	R	R	R	R	R	R
<b>CONS</b>	A	A	A	A	A	A	X	C	C	C	C	C	C	C	C	C	C	C
<b>LV</b>	A	A	A	A	A	A	X	R	R	R	R	R	R	R	R	R	R	R
<b>FV1</b>	A	A	A	A	A	A	X	R	R	R	R	R	R	R	R	R	R	R
<b>FV2</b>	A	A	A	A	A	A	X	R	R	R	R	R	R	R	R	R	R	R
<b>FV3</b>	A	A	A	A	A	A	X	R	R	R	R	R	R	R	R	R	R	R
<b>CTRL</b>	A	A	A	A	A	A	X	R	R	R	R	R	R	R	R	R	R	R
<b>BV1</b>	A	A	A	A	A	A	X	R	R	R	C	C	R	R	R	R	R	R
<b>BV2</b>	A	A	A	A	A	A	X	R	R	R	C	R	R	R	R	R	R	R
<b>BD</b>	A	A	A	A	A	A	X	R	R	R	R	R	R	R	R	R	R	R
<b>TONE</b>	A	A	A	A	A	A	X	C	C	R	R	R	R	R	C	C	C	C
<b>AD1</b>	A	A	A	A	A	A	X	C	R	R	R	R	R	R	C	R	R	R
<b>AD2</b>	A	A	A	A	A	A	X	R	R	R	R	R	R	R	R	R	R	C
<b>AD3</b>	A	A	A	A	A	A	X	R	R	R	R	R	R	R	R	R	R	R
<b>AV1</b>	A	A	A	A	A	A	X	R	R	R	C	C	R	R	R	R	R	R
<b>AV2</b>	A	A	A	A	A	A	X	R	R	R	C	R	R	R	R	R	R	R
<b>AV3</b>	A	A	A	A	A	A	X	R	R	R	C	R	C	R	R	R	R	R

\* Vertical - leading byte  
Horizontal - following byte

Value	Meaning	Where to display
A	Accept	Next display cell
C	Accept & Compose	Same display cell
R	Reject	—
X	Accept but not Display	—

---

**Note**

---

The VT382-T Thai terminal supports an older version of TIS 620, namely TIS 620-2529. In TIS 620-2529, the character YAMAKKAN is classified as a base level character and its behavior is different from that described in this table.

---

#### **7.4.4 WTT Basic Mode**

The WTT Basic mode is similar to the VT382-T ISC mode, but it is stricter. It accepts Thai data entered in only the following sequences:

- L3L2L1 (base level, upper level and then top level)
- L3L4L1 (base level, lower level and then top level)

Data in the following sequences is not allowed:

- L3L1L2 (base level, top level and then upper level)
- L3L1L4 (base level, top level and then lower level)

In the Tru64 UNIX operating system, WTT Basic is the default input sequence check mode.

For details, see Table 7–6.

#### **7.4.5 WTT Strict Mode**

In addition to the combinations rejected by the WTT Basic mode, the WTT Strict mode adds more conditions to eliminate illegal input sequences. The WTT Strict mode can further improve the correctness of input data.

For details, see Table 7–6.

**Table 7-6: WTT ISC Mode Lookup Table**

	C						C	T										
	N	O	F	F	F	T		B	B	O	A	A	A	A	A	A		
	N	N	L	V	V	V		R	V	V	B	N	D	D	D	V	V	V
	S	V	1	2	3	L	1	2	D	E	1	2	3	1	2	3		
<b>NON</b>	A	A	A	S	S	A	X	R	R	R	R	R	R	R	R	R	R	R
<b>CONS</b>	A	A	A	A	S	A	X	C	C	C	C	C	C	C	C	C	C	C
<b>LV</b>	S	A	S	S	S	S	X	R	R	R	R	R	R	R	R	R	R	R
<b>FV1</b>	A	A	A	A	S	A	X	R	R	R	R	R	R	R	R	R	R	R
<b>FV2</b>	A	A	A	A	S	A	X	R	R	R	R	R	R	R	R	R	R	R
<b>FV3</b>	A	A	A	S	A	S	X	R	R	R	R	R	R	R	R	R	R	R
<b>CTRL</b>	A	A	A	A	A	A	X	R	R	R	R	R	R	R	R	R	R	R
<b>BV1</b>	A	A	A	A	S	A	X	R	R	R	C	C	R	R	R	R	R	R
<b>BV2</b>	A	A	A	S	S	A	X	R	R	R	C	R	R	R	R	R	R	R
<b>BD</b>	A	A	A	S	S	A	X	R	R	R	R	R	R	R	R	R	R	R
<b>TONE</b>	A	A	A	A	A	A	X	R	R	R	R	R	R	R	R	R	R	R
<b>AD1</b>	A	A	A	S	S	A	X	R	R	R	R	R	R	R	R	R	R	R
<b>AD2</b>	A	A	A	S	S	A	X	R	R	R	R	R	R	R	R	R	R	R
<b>AD3</b>	A	A	A	S	S	A	X	R	R	R	R	R	R	R	R	R	R	R
<b>AV1</b>	A	A	A	S	S	A	X	R	R	R	C	C	R	R	R	R	R	R
<b>AV2</b>	A	A	A	S	S	A	X	R	R	R	C	R	R	R	R	R	R	R
<b>AV3</b>	A	A	A	S	S	A	X	R	R	R	C	R	C	R	R	R	R	R

\* Vertical - leading byte  
Horizontal - Following byte

**Note**

The values highlighted in Table 7-6 have been modified since the original WTT input sequence checking table.

<b>Value</b>	<b>Meaning</b>	<b>Basic</b>	<b>Strict</b>	<b>Where to display</b>
A	Accept	Accept	Accept	Next display cell
C	Accept & Compose	Accept	Accept	Same display cell
S	Strict Mode Reject	Accept	Reject	Next display cell
R	Reject	Reject	Reject	—
X	Accept but not display	Accept	Accept	—



---

# Thai Printing Support

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

## 8.1 Supported Printers

The Tru64 UNIX operating system supports text printers with built-in Thai fonts. The Thai text printing support follows the Wototo (WTT) specification.

The Tru64 UNIX operating system supports Thai printing on PostScript printers in three ways:

- Using the built-in or downloaded fonts installed in printers
- Using the font faulting mechanism for certain PostScript printers, which is explained in Section 8.3
- Using the `wwpsmf` print filter.

For information on the supported printer types and print filters, see Chapter 4, Local Language Devices.

## 8.2 Print File Formats

The Tru64 UNIX operating system supports printing of mixed ASCII and Thai characters in the following print file formats:

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

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

## 8.3 Printing Features

The Tru64 UNIX operating system supports the printing features described in the following sections.

### 8.3.1 Font Faulting

Font faulting is a mechanism for saving memory required by fonts. With font faulting, font information is stored in either:

- The secondary storage of a supporting host machine, called a font-faulting server
- An internal font disk

The font information is loaded into the printer on demand, thus conserving printer memory.

The font-faulting mechanism is useful in a desktop printing environment, where a large number of different fonts is required. In this case, simultaneously storing all the fonts reduces the available memory, and therefore speed, of the printer. It is also possible that the number of required fonts is so large that all fonts cannot be stored in memory at the same time.

Font faulting for single-byte fonts is done on a per font basis. Single-byte fonts are small and relatively simple, so loading the whole font is efficient.

The font-faulting mechanism can be used with the following printers:

- DEClaser 1152
- DEClaser 5100
- PrintServer 17

See Section 8.5, Setting Up Thai Printing, for information about configuring these printers.

### 8.3.2 Font Preloading

The generic `wppsof` PostScript print filter preloads the font data required by a print job, along with the print job itself, to the printer. Therefore, a job printed with the `wppsof` print filter might consume more printer memory and print slower than a job printed using the font faulting mechanism. However, using the `wppsof` printer allows you to print Thai characters on all available PostScript printers rather than just a few. See Section 8.5, Setting Up Thai Printing, for information about configuring the `wppsof` filter.

### 8.3.3 Outline Fonts

The Tru64 UNIX operating system provides a large set of outline fonts for printing files in various languages. Depending on how many local language support subsets are installed on your system, more than 150 outline fonts may be available.

The outline font for Thai printing is described in detail in Chapter 5.

### 8.3.4 Printer ID for DOT Matrix Printers

Different Thai dot matrix printers may support different internal codes for Thai printing. To ensure the internal code of a printer can be set up correctly, you must specify the printer ID (that is, the model and brand registration ID) through the `yp` parameter in the `/etc/printcap` file. The format of printer ID follows the WTT specification:

```
[bb] [mm] [nn]
```

where

*bb* is the Brand ID representing the brand name of the printer

*mm* is the Model ID representing its model number

*nn* is the Printer Code ID specifying the internal character code

The details of the registered printer ID can be found in the WTT specification.

For each supported printer code, a mapping table is provided to convert the print file code to the printer codes. The code conversion tables are stored in the following location:

```
/usr/lbin/tac_data/tac11xnn.cod
```

where *nn* is one of the valid Printer Code IDs.

### 8.3.5 Control Sequence for Dot Matrix Printers

To support the printing of text files with `nroff` control sequences on a Thai dot matrix printer, the generic text print filter, `thailpof`, reads the printer description table of the printer and generates the appropriate control sequences. Printer description tables are stored in the following location:

```
/usr/lbin/tac_data/bbmm.tab
```

where *bb* is the Brand ID and *mm* is the Model ID.

Alternatively, you can specify other character code tables by passing the `tacdata=<tac data path>` option to the `lpr` command through the `-A` flag.

A printer description table describes the escape sequences used by the printer for printing with the underline, superscript, and subscript attributes. Each line in this table contains an escape sequence name, as defined in Table 8-1, and its escape sequence code (in

hexadecimal). Comments can be added to the table by entering an exclamation mark (!) as the first character in the line.

```
!++
! printer table : /usr/lbin/tac_data/epb4.tab
! description :escape sequences table for Epson LQ1050+
!-
subscript      1B 53 31 ! ESC S 1
x_subscript    1B 54      ! ESC T
superscript    1B 53 30 ! ESC S 0
x_superscript  1B 54      ! ESC T
underline      1B 31      ! ESC 1
x_underline    1B 30      ! ESC 0
reset          1B 40      ! ESC @
```

**Table 8–1: Escape Sequence Names**

Escape Sequence Name	Meaning
subscript	Subscript starts
x_subscript	Subscript ends
superscript	Superscript starts
x_superscript	Superscript ends
underline	Underline starts
x_underline	Underline ends
reset	Reset printing attributes

### 8.3.6 Printing Enhancement Rules (Text Morphing)

Under certain circumstances, when standard above vowels or tone marks are combined with other Thai characters, they may overlap each other or there may be too much space between them.

To support the printing of high quality Thai documents, the Thai outline fonts are specially encoded to include a supplementary set of above vowels and tone marks, in addition to those defined in TIS 620-2533. The printing position of these additional characters is slightly adjusted to handle the spacing problems of certain combinations of Thai characters. During printing, the above vowels or tone marks defined in TIS 620-2533 are mapped, according to rules, to appropriate characters in the supplementary set, resulting in better print quality. This technology is called **text morphing**.

To enable the text morphing capability, you specify the `tm` option to the `lpr` command through the `-A` flag.

As there is currently no standard way of text morphing, the set of rules supported by the Tru64 UNIX operating system applies only to Thai fonts shipped by HP. If you use Thai fonts from other vendors, carefully verify the output from the print queue with text morphing before making the printer available to all users.

### 8.3.7 Space Compensating

Many English character-cell terminal applications cannot properly handle non-spaced Thai characters. The problem is severe when Thai text needs to be aligned in columns with spaces between them. The space compensating mode addresses this problem. For details, see section 9.2.8, Thai Character Output.

The Tru64 UNIX operating system supports space compensating mode for printing Thai text files. By default, the space compensating mode is disabled.

To enable the space compensating mode for printing, you can specify the `spcom` option to the `lpr` command by using the `-A` flag.

### 8.3.8 Half-Height Printing

For those Thai text printers which support three-pass printing, Thai characters of different display levels are printed on three separate lines. The Tru64 UNIX operating system allows you to print the three output levels in a more compact region, occupying only 1.5 lines. This is called half-height printing.

To enable the half-height printing capability, you can specify the `onehalf` option to the `lpr` command by using the `-A` flag.

## 8.4 Commands and Daemons

Before you configure printers to utilize the printing features supported by the Tru64 UNIX operating system, you should understand some commands and daemons used in print configuration. This section discusses them in detail; the next section illustrates how they are used for configuration.

### 8.4.1 Country-Specific Options to the `lpr` command

In addition to the usual options to the `lpr` command, the `-A` option is added to pass the country-specific parameters. You can also use `ya` to set these parameters in the `/etc/printcap` file. For example, the parameters can be specified with the `-A` option as:

```
% lpr -A "flocale=th_TH font=LilyUPC-Light plocale=th_TH" <file>
```

The same set of parameters, when defined in the `/etc/printcap` file appear as follows:

```
:ya="flocale=th_TH font=LilyUPC-Light plocale=th_TH":\
```

If you supply parameters using the `-A` option to the `lpr` command, they override the corresponding default values in the `/etc/printcap` file.

The following parameters are applicable to Thai printing:

- `flocale=<any valid locale>`

Specifies the locale for the source text file. The printer filters use this locale to validate the characters inside the source text file. If this value is not set properly, the text will be interpreted using the current locale. In the Thai printing environment, this value is particularly important in order for the `lpr` command to correctly interpret the characters.
- `plocale=<any valid locale>`

Specifies the locale for the printer. If the printer has built-in fonts, the `plocale` value should match the codeset of the built-in fonts. If the printer uses the font faulting mechanism, the value of `plocale` should match the font used to print the text file.
- `font=<supported outline font>`

Specifies the font name for printing the source text files in a PostScript printer. This is valid for printing text files only; PostScript files are tagged with the required font name.
- `spcom`

Enables space-compensation mode. In Thai, nonspacing characters can combine with other characters for display and therefore do not occupy space. Many of the tools for text alignment do not properly handle nonspacing characters. If you want to print Thai output from such utilities, you must enable space compensation mode to ensure proper text alignment.

Space compensation is done line by line. The print filter counts the number of nonspacing characters found in a line. When two or more consecutive spaces are encountered, the print filter inserts the appropriate number of spaces, thereby compensating for spaces added by the nonspacing characters.
- `tm`

Enables text morphing for Thai printing. Text morphing replaces some characters with others to produce better output in desktop publishing environments. Text morphing rules are proprietary to fonts. Therefore, text morphing is supported only by Tru64 Thai outline fonts and is available only for PostScript printing.

- `onehalf`  
Enables half-height printing. When enabled, Thai characters are printed on one and a half lines, rather than on three lines, to produce more compressed and natural-looking output. This option, however, slows down the printing speed. The `onehalf` option works only with the `thailpof` print filter.
- `tacdata=<tac data path>`  
Specifies where the character code and control sequence tables for the printer are located. The printer ID that follows the Wototo specification specifies the table to be used. The `yp` value in the `/etc/printcap` file defines the printer ID. The default path is `/usr/lbin/tac_data`.
- `line=<number of lines>`  
Specifies the number of lines per page. When used with the `-w` command, this option can be used to control the font size and orientation of the output.

## 8.4.2 PostScript Font Management Utility (`pfsetup`)

A PostScript font management utility, `pfsetup`, is provided for setting up print queues to use the font faulting mechanism. This utility has the following syntax:

```
pfsetup [-s] [-d] [queue_name...]
```

The options to the `pfsetup` command are defined as follows:

- The `-s` (setup mode) option allows you to setup lists of fonts to be downloaded.
- The `-d` (download mode) option downloads fonts to printers according to the lists prepared with the `-s` option.

If you do not specify an option, `pfsetup` displays the information about the print queues that have been set up with this utility. If you do not specify a particular queue name, `pfsetup` processes every applicable queue.

In setup mode, `pfsetup` displays all PostScript printer fonts available on the system and prompts you to select the fonts or font headers to be downloaded onto individual print queues. For example:

```
% /usr/sbin/pfsetup -s
```

```
=====
```

```
Printer queue: lp1 | 1 | d11152W
```

```
No font has been setup for downloading in queue lp1
```

These are fonts available in your system for downloading. Fonts chosen for downloading are marked with \*

- |                           |                       |
|---------------------------|-----------------------|
| 1 Hei-Light-CNS11643      | 2 Sung-Light-CNS11643 |
| 3 Hei-GB2312-80           | 4 XiSong-GB2312-80    |
| 5 Munjo                   | 6 AngsanaUPC-Bold@    |
| 7 AngsanaUPC-BoldItalic@  | 8 AngsanaUPC-Italic   |
| 9 AngsanaUPC-Light        | 10 CordiaUPC-Bold     |
| 11 CordiaUPC-BoldItalic   | 12 CordiaUPC-Italic   |
| 13 CordiaUPC-Light        | 14 EucrosiaUPC-Bold   |
| 15 EucrosiaUPC-BoldItalic | 16 EucrosiaUPC-Italic |
| 17 EucrosiaUPC-Light      | 18 FreesiaUPC-Bold    |
| 19 FreesiaUPC-BoldItalic  | 20 FreesiaUPC-Italic  |
| 21 FreesiaUPC-Light       | 22 IrisUPC-Bold       |
| 23 IrisUPC-BoldItalic     | 24 IrisUPC-Italic     |
| 25 IrisUPC-Light          | 26 JasmineUPC-Bold    |

[C]ontinue | [S]etup | [L]ist fonts | [Q]uit | [N]ext queue <C>

In this example, the action keys are defined as follows:

Key	Action
[C]ontinue	Display a further font listing
[S]etup	Proceed to setup
[L]ist fonts	List fonts again
[Q]uit	Quit pfsetup
[N]ext queue	Proceed to the next queue

If you choose the s option, the following prompt is displayed:

[A]dd fonts | [R]emove fonts | [L]ist fonts | [Q]uit |  
[N]ext queue <N>

In response to the prompt, you can enter a to add fonts to or r to delete fonts from the list for a print queue. The fonts that you select will be highlighted with an asterisk (\*) at the end of the font names.

---

#### Note

---

The fonts on this list vary according to the language variants that are installed on your system.

---

To download the fonts selected in `setup` mode, you can use the `pfsetup` utility with the `-d` option.

### 8.4.3 Font Faulting Daemon (ffd)

Font faulting requests from a PostScript printer with the two channel approach, such as a DEClaser 1152, require that the font faulting daemon, `ffd`, be running on your system. When the `ffd` daemon receives a font data request, it extracts the required font glyph data from the specified font and sends it to the printer through the secondary channel. The `ffd` daemon ensures that all fonts in the font faulting server are available to the printer.

If you configure a print queue that makes use of the two channel approach, or if you modify the secondary channel of a print queue, you must restart the font faulting daemon.

To restart the font faulting daemon, you must log in as root and stop the existing font faulting daemon by entering the following command:

```
% /sbin/init.d/ffserver stop
```

To start the font faulting daemon, you can enter:

```
% /sbin/init.d/ffserver
```

### 8.4.4 PrintServer Printing Command (wwlpspr)

To fully utilize the features of PrintServer 17 such as two-sided printing and multiple pages per side, it is necessary to use the `lpspr` command provided by the PrintServer Software Version 5.0 or higher for Tru64 UNIX. This command, however, does not provide features such as locales and fonts for printing text files. To facilitate printing files to PrintServer 17, a unified `wwlpspr` command is provided in the Tru64 UNIX operating system.

The `wwlpspr` command is a front end program to parse the parameters passed by users and then call different commands such as `print filter`, `lpr`, and `lpspr` with the appropriate command, thus provides a unified interface.

For detailed information on the `wwlpspr` command, refer to `wwlpspr(1)`.

## 8.5 Setting Up Thai Printing

This section describes how to set up the following printers:

- Thai Epson LQ1050+
- Declaser 1152
- DEClaser 5100
- Printserver 17
- PostScript printers using `wwpsf` filter

## 8.5.1 Thai Epson LQ1050+

To configure the Thai Epson LQ1050+ dot matrix printer:

1. Invoke `lpsetup` and select the `ep1050+` printer.

```
lprsetup ep1050+
```

The following prompt is displayed:

```
Do you print nonAscii characters on the
flag pages? [n]
```

2. Answer **y** if you want to print Thai characters on the flag page and **n** if you do not. The data printed on the flag page includes the file names, user login name, date, and so on. If you are using Thai characters in these values, you should answer **y**. In this case, the flag page is printed in more than one page, because every character will occupy 1.5 or 3 lines depending on whether or not half-height printing is enabled.

The following prompt is displayed:

```
Do you want to print every Thai character
in 1.5 lines spacing instead of 3
lines in 3 pass mode? [n]
```

3. Answer **y** if you want to enable half-height printing and **n** if you do not.
4. To change other default settings, modify the `ya` capability after the prompt:

```
Enter symbol name:
```

In response to the prompt:

```
Enter a new value for symbol 'ya'?
["plocale=th_TH"]
```

input the new values. Please do not forget the double quote around the parameters, and copy the values found in the previous prompt

5. You can modify the following options:
  - `spcom --` You can define the queue always enable space compensation mode. This is not advisable, however, because users cannot disable it.
  - `tacdata --` If you want to define your own control sequence or internal code for this printer, you can use this option to point to your own path.

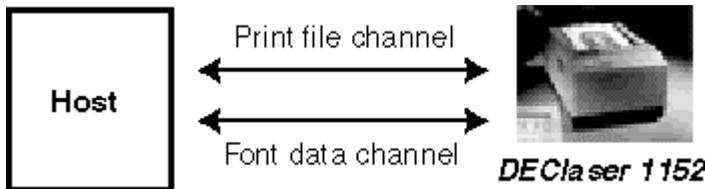
To print Thai text files on this printer, use the `lpr` command.

The `thailpof` printer filter is generic enough for most dot matrix printers. You can use the preceding procedure to configure another dot matrix printer by defining the appropriate `yp` value. For advanced tuning, refer to the previous sections on how to define the control sequences and internal codes.

## 8.5.2 DEClaser 1152

The DEClaser 1152 printer can be used to print Thai characters by using the font faulting mechanism with two communications channels. One channel is for normal data and the second channel is for font faulting data. See Figure 8-1.

**Figure 8-1: Two-channel Communication of the Font Faulting Mechanism**



Font faulting requires 4M bytes of printer memory. If your DEClaser 1152 printer has only 2M bytes of memory, you must install the LN07X-UF memory board to provide the additional 2M bytes of memory. Refer to the printer manual for installing the LN07X-UF memory board.

You also need to establish one and only one system to be the **font-faulting server** for the printer. This server sends font information to the printer through a secondary communication interface, or channel. The printer's secondary channel connection to the font-faulting server can be made through either a local port or a Local Area Transport (LAT) port. If the connection is through a LAT port, make sure that no other applications or hosts are using that port.

An 8 pin Din to 6 Pos MMJ Adapter (part number: -H8584-AB) is needed to convert the Apple-talk interface to the printer to be the secondary channel used by the font-faulting mechanism. The baud rate of the secondary interface should match the value of the `$BAUD` parameter in the `/sbin/init.d/ffserver` file. By default, this value is 9600.

To configure the DEClaser 1152 printer to print Thai files:

1. Add a printer by using the `lprsetup` command and select `dl1152w` as the printer type.
2. If this machine is the font faulting server for the printer, answer **y** to the following question:

```
Do you want to configure this machine as
font faulting server for the DEClaser
1152 printer? One and only one font
faulting server should be configured for
every DEClaser 1152 employing font
faulting mechanism. [n]
```

Then, enter the full path name of the port used to connect the secondary channel for the `ya` capability.

3. Answer **y** in response to the following question:

```
Do you want to set up the printer
codeset or default font for printing
non-Ascii text? If your answer is 'y',
please consult printcap.4 for the
parameters. *** Remember to enclose the
parameters with a pair of double quotes. [n]
```

Then, type the following:

```
"plocale=th_TH font=<any Thai font>"
```

Refer to Chapter 5 for list of Thai outline fonts.

4. If you want to change other default values, modify the `ya` capability after the following prompt:

```
Enter symbol name:
```

Input the new values in response to the following prompt:

```
Enter a new value for symbol 'ya'?
["plocale=th_TH font=LilyUPC-Light"]
```

Remember to include the double quotation marks around the parameters, and use the same values you entered at the previous prompt.

5. You can modify the following options:
  - `spcom` -- You can define that the queue always enable space compensation mode. This is not advisable, however, because users cannot disable it.
  - `tm` -- You can define that the queue always enable text morphing. This is not advisable, however, because users cannot disable it.
6. Use the `pfsetup` command to download the fonts. For greatest efficiency, download the Thai font you specified in Step 3, plus any other frequently used single-byte fonts. The printer can access the fonts that are not manually downloaded, but there is overhead for dynamically downloading fonts.
7. If this machine is configured as the font-faulting host, issue the following commands to notify the font-faulting daemon about the new printer:

```
% /sbin/init.d/ffserver stop
% /sbin/init.d/ffserver start
```

You need to enter these commands only after adding or modifying the printer queue. The next time the server is rebooted, the font-faulting daemon will locate the printer automatically.

8. Everytime the font-faulting server or the DEClaser 1152 is restarted, you should use the `pfsetup` command to download the fonts again.

For the details of the font-faulting daemon and the `pfsetup` utility, see Section 8.4, Commands and Daemons.

To print Thai text files to print queues connected to a DEClaser 1152 printer, use the `lpr` command. You can override the default `font` setting in the `/etc/printcap` file by using the `-A` option to the `lpr` command.

### 8.5.3 DEClaser 5100

The DEClaser 5100 printer can be used to print Thai characters using the font-faulting mechanism with built-in hard disk. The model that supports the font faulting-mechanism is the LN90X-HD, which includes the 128 MB hard disk option. The printer also must have at least 6 MB of memory.

To configure the DEClaser 5100 printer to print Thai files:

1. Add a printer by using the `lprsetup` command and select `dl5100w` as the printer type.
2. Answer **y** in response to the following question:

```
Do you want to set up the printer
codeset or default font for printing
non-Ascii text? If your answer is 'y',
please consult printcap.4 for the
parameters. *** Remember to enclose the
parameters with a pair of double quotes
[n]
```

Then, type the following:

```
"plocale=th_TH font=<any Thai font>"
```

Refer to Chapter 5 for list of Thai outline fonts.

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

```
Enter symbol name:
```

Input the new values in response to the following prompt:

```
Enter a new value for symbol 'ya'? ["plocale=th_TH
font=LilyUPC-Light"]
```

Remember to include the double quotation marks around the parameters, and to use the same values you entered at the previous prompt.

4. You can modify the following options:
  - `spcom` -- You can define that the queue always enable space compensation mode. This is not advisable, however, because users cannot disable it.
  - `tm` -- You can define that the queue always enable text morphing. This is not advisable, however, because users cannot disable it.

5. Use the `pfsetup` command to download the fonts. Download all fonts that you expect the printer to need, because any fonts not manually downloaded are not accessible to the printer.
6. Downloading a font is done only once, until the font is removed or the hard disk is reformatted.

For the details of the `pfsetup` utility, see section 8.4, Commands and Daemons.

To print Thai text files to print queues connected to a DEClaser 5100 printer, use the `lpr` command. You can override the default `font` setting in the `/etc/printcap` file by using the `-A` option to the `lpr` command.

### 8.5.4 PrintServer 17

The PrintServer 17 printer can be used to print Thai characters by using the font-faulting mechanism through the network. There are no special hardware requirements.

To configure the PrintServer 17 printer to print Thai files:

1. Install the PrintServer Software Version 5.0 or later for Tru64 UNIX. This is a layered product that must be purchased separately. Refer to the corresponding installation guide for installing and configuring the PrintServer software.
2. If you want to define a default printer codeset or default font to print Thai text, use the `lprsetup` command or manually update the `/etc/printcap` file to include the `ya` option by adding the following:

```
:ya="plocale=th_TH font=<any Thai font>":\
```

Refer to Chapter 5 for list of Thai outline fonts.

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

```
Enter symbol name:
```

Input the new values in response to the following prompt:

```
Enter a new value for symbol 'ya'? ["plocale=th_TH  
font=LilyUPC-Light"]
```

Remember to include the double quotation marks around the parameters, and use the same values you entered at the previous prompt.

4. You can modify the following options:
  - `spcom` -- You can define that the queue always enable space compensation mode. This is not advisable, however, because users cannot disable it.
  - `tm` -- You can define that the queue always enable text morphing. This is not advisable, however, because users cannot disable it.
5. Use the `pfsetup` command to define the fonts to be downloaded. For greatest efficiency, download the Thai font specified in Step 3, plus other frequently used fonts. The printer can access the fonts that are not manually downloaded, but there is overhead for dynamically downloading fonts.

Note that the `pfsetup` command should be executed in the Configuration Host of the PrintServer printer. After executing the `pfsetup` command, restart the Management Client to enable the new configuration. Refer to the document on PrintServer Software Version 5.0 or later for Tru64 UNIX for further details.

6. To automatically download the fonts defined in Step 5, turn off the PrintServer 17 printer and then turn it on.
7. When the PrintServer 17 is restarted, the fonts will be downloaded automatically. Hence, the `pfsetup` command is executed once only as long as the configuration is not modified.

For the details of the `pfsetup` utility, see Section 8.4, Commands and Daemons.

To print Thai text files to print queues connected to a PrintServer 17 printer, use the `wlpspr` command. You can override the default `font` setting in the `/etc/printcap` file by using the `-A` option to the `wlpspr` command.

## 8.5.5 Using the `wwpsof` Filter with PostScript Printers

To configure a PostScript printer to use the `wwpsof` filter:

1. Invoke `lprsetup` or `printconfig` and select the `wwpsof` print filter.
2. Enter the printer configuration data needed to set up the print queue.
3. Define the "ya" symbol. The "plocale" option is not required unless the print queue must be configured to print only Thai data files.
4. Optionally, turn on the "spcom" and "tm" options to enable space compensation and text morphing.

---

## Other Thai Features

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

### 9.1 Thai Terminal Driver

Tru64 UNIX provides a Thai terminal driver to handle Thai character processing in character cell terminal applications. The following features are supported:

- Input sequence checking
- Thai character reordering
- History line editing mechanism

To activate the Thai terminal driver, enter the following command:

```
% stty tdec
```

#### 9.1.1 Input Sequence Checking

The Thai terminal driver supports the following input sequence check modes:

- Passthrough Mode (Mode 0)
- WTT Basic Mode (Mode 1)
- WTT Strict Mode (Mode 2)

To switch the input sequence check mode, you can use the following command:

```
% stty isc <mode>
```

In this example, <mode> can name one of the following values:

- 0 for Passthrough Mode
- 1 for WTT Basic Mode
- 2 for WTT Strict Mode

For details, see Chapter 7.

## 9.1.2 Thai Character Reordering

The WTT input sequence check modes can only accept Thai data in the following sequences:

- L3L2L1 (base level, upper level, and then top level)
- L3L4L1 (base level, lower level, and then top level)

To provide more freedom to enter Thai data in different orders, such as entering top level (L1) characters before upper level (L2) or lower level (L4) characters, the Thai terminal driver provides a Thai character reordering mechanism. Through this mechanism, you can enter data in arbitrary order and the terminal driver will reorder the data stream before sending it to applications.

To activate the Thai character reordering mechanism, enter the following command:

```
% stty reorder
```

To deactivate it, enter the following command:

```
% stty -reorder
```

---

### Note

---

This feature is not available in the History mode described in the following section.

---

## 9.1.3 History Mode

The Thai terminal driver provides a history mechanism for you to recall and edit a previously entered command.

You can use the `stty` command to activate the history mode and define a hot key (usually a control key sequence) for invoking the history mode. For example, the following command defines the hot key to be [Ctrl/P]:

```
% stty thistory ^P
```

Once the hot key is defined, the Thai terminal driver will keep the history of up to 32 command lines. To invoke the history mode, you can press [Ctrl/P].

In the history mode, you can use the following control key sequences or arrow keys for editing:

Key Sequence	Function
[Ctrl/A]	Moves to the beginning of command line
[Ctrl/E]	Moves to the end of command line
[Ctrl/D]	Deletes the whole cell under the cursor
[erase]	Deletes the character before the cursor
[werase]	Deletes the word before the cursor
↑ [up arrow]	Recalls the previous command line
↓ [down arrow]	Recalls the next command line
←[left arrow]	Moves the cursor left by one cell
⇒[right arrow]	Moves the cursor right by one cell

By default, the designated key sequences for the [erase] and [werase] functions are:

- [erase] - Delete
- [werase] - [Ctrl/W]

---

#### Note

The history mode is available only when character echoing is turned on. For details, see the `stty` reference pages.

---

## 9.2 Thai DECterm

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

This section describes the following Thai DECterm features:

- How to create a Thai DECterm session
- Terminal emulator features
- Thai character input and output
- Other VT382-T functionalities

### 9.2.1 Creating a Thai DECterm Window

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

To create a Thai DECterm window through the Session Manager, you can set the session language to Thai, and then select DECterm from the Applications menu of the Session Manager.

Alternatively, you can use the `-xnllanguage` qualifier to specify the terminal type of the DECterm window to create. To get the Thai DECterm window, enter the following command:

```
% /usr/bin/X11/dxterm -xnllanguage th_TH
```

If you specify an unknown value for the `-xnllanguage` qualifier, then ISO Latin-1 DECterm is assumed. If no Thai font exists, it defaults to ISO Latin-1 DECterm.

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

## 9.2.2 Customizing a Thai DECterm Window

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

Customized features can be saved and restored in the same way as in ISO Latin-1 DECterm.

## 9.2.3 Font Sizes

By selecting the Big Font, Little Font, or Fine Font option from the Window Options dialog box, you can use the 12x24, 8x18, or 7x14 Thai fonts.

## 9.2.4 Terminal ID

You can select the following terminal identifier for Thai DECterm from the General Options dialog box:

- VT382 ID

## 9.2.5 Copying Information

You can use the Edit menu to copy information within or between Thai DECterm windows. The Cut-and-Paste operation is enhanced to handle mixed ASCII and Thai characters.

## 9.2.6 Default Character Set

Thai DECterm supports TIS 620-2533 and all character sets supported by ISO Latin-1 DECterm.

ISO Latin-1 DECterm uses ISO 8859-1 as the default character set. ISO 8859-1 contains ASCII characters, Latin-letters-with-diacritics, and other symbols used in Western European languages. This can be overridden by other options in the General Options dialog box. For Thai DECterm, the default character set for 8-bit data is TIS 620-2533.

In general, Thai DECterm cannot display a mixture of ISO Latin-1 and Thai characters. If you really want to achieve this function, you can output the data together with the designated character set escape sequences.

## 9.2.7 Thai Character Input

When a Thai DECterm window is created, it is in the English input mode.

You can enter Thai characters in Thai DECterm by invoking the Thai input mode as described in Chapter 7. Mixed ASCII and Thai characters can be displayed properly on the Thai DECterm window without any special settings.

You can select your desired Input Sequence Check Mode from the General Options dialog box:

### Input Sequence Check Mode

- Passthrough Mode
- VT382 ISC Mode
- WTT Basic ISC Mode
- WTT Strict ISC Mode

For the details about input sequence check modes, see Chapter 7.

## 9.2.8 Thai Character Output

Thai DECterm supports two display modes. You can select one of the following display modes from the General Options dialog box:

- Normal Operation Mode

The normal operation mode displays whatever is received from the host.

- Space Compensating Mode

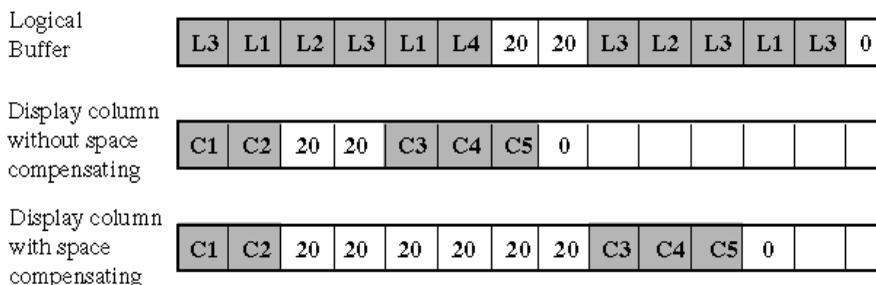
The design philosophy of the VT382-T Thai terminal is to build more knowledge about Thai processing into the terminal. Most software packages, as long as they are 8-bit clean, can have Thai language features without reengineering.

One of the features is Space Compensating Mode.

When VT382-T receives two consecutive space characters followed by a nonspace<sup>1</sup> or an escape sequence, it will:

- Calculate the new update position of the screen buffer which is equal to the total number of characters in the logical buffer.
- Fill the contents of the screen buffer by inserting spaces between the nonspace cell on the left and the newly calculated screen buffer position, exclusively, such that the length of the logical buffer is equal to that of the screen buffer.
- Reformat the current line.

**Figure 9-1: Space Compensation Mode**



This output method allows output lines formatted in a tabular fashion to be displayed correctly without software (for example, spreadsheet and database management packages) taking too much care about the spacing of table columns.

Thai DECterm also emulates the space compensating mode supported by VT382-T. In addition to the behavior described above, two enhancements have been added:

- Users can select any control character in place of the space character for display compensation. For example, if an application formats a table by dividing columns with vertical bars (|), users can specify the control character to be | so that space compensation can be evaluated with respect to the vertical bar characters.
- Users can specify the number of control characters to be counted for space compensation.

By default, the space compensation control character is the space character (0x20) and the number of control characters is 2. You can modify this parameter from the General Options dialog box.

---

<sup>1</sup> Non-space characters refer to all characters other than the space character (0x20). Do not confuse them with non-spaced characters which refer to top level, upper level and lower level Thai characters.

## Thai Display Mode

- ◆ Normal Operation
- ✓ Space Compensating

Control Character "

Number of Control Characters 2

### 9.2.9 Cursor Movement

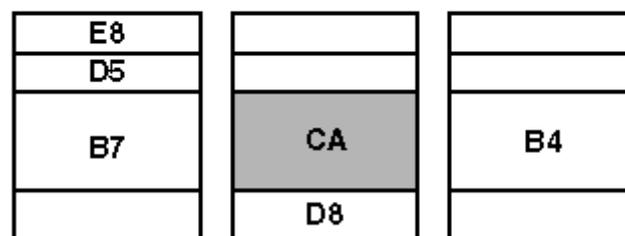
In Thai DECterm, the actual cursor position on the screen is calculated from the logical buffer pointer. The column number specified by the cursor positioning command is the offset from the beginning of the specified line in the logical buffer. Actual cursor position on the screen will be the corresponding screen position to the character pointed to by the logical buffer pointer.

Figure 9–2: Internal Cursor Mode

Logical Buffer:



Physical Buffer:



*Internal cursor position for 0xCA is 4*

### 9.2.10 Other VT382–T Functionalities

The following functionalities of VT382-T are also implemented in Thai DECterm:

- Display characteristics and capabilities
- Text capabilities

- Level 3 terminal compatibility:
  - VT300 mode
  - VT100 mode
  - VT52 mode
- ANSI-compatible control functions
- Support for Terminal State Interrogation (TSI)
- All Thai input methods
- Support for the following character sets:
  - DEC Special Graphics Character Set (line drawing)
  - DEC Supplemental Character Set
  - DEC Technical Character Set
  - ISO Latin-1 Supplemental Character Set
  - IS 620-2533
- Control Representation mode
- Support for sixel graphics
- UDK editing function
- Thai character display attributes: reverse, underline, bold, blink, double height/width

For the details about the VT382-T functionalities, refer to *VT382-T Programming Reference Manual* and *VT382-T User's Manual*.

### 9.2.11 CStext Widget

This section describes the CStext editing functions that are specific to Thai. For details about other features of the CStext widget, refer to *Writing Software for the International Market*.

### 9.2.12 Cursor Movement

CStext supports cursor movement by display cell. When the cursor-left or cursor-right key is pressed, the cursor moves one cell to the left or right. Thus, it may move past 1, 2, or 3 character positions, depending on the number of nonspaced characters at the cursor position.

When the cursor position is changed by a call to either `DXmCStextSetInsertionPosition` or `DXmCStextSetCursorPosition`, the cursor position is specified in number of characters from the beginning of the widget. The widget may adjust this position to ensure that the new cursor position is located on a display cell boundary. Users should not assume that the cursor

is set to exactly the position specified. The `DXmCSTextGetInsertionPosition` function can be called after the cursor is set to get the actual cursor position.

### **9.2.13 Delete Character Operation**

When the delete key is pressed, the previous character is deleted. If a display cell contains three Thai characters, you must press the [Delete] key three times to delete the whole cell.