

# Layout Engine

RICOH's Layout Engine can correctly display Thai, Arabic, Vietnamese and Hindi with complex grammar rules.

■ Arabic

لوحات Ricoh الإعلانية مضاءة بالطاقة الطبيعية الصرفة  
100% ومنصوبة في نيويورك ولندن والآن في سيدني

Reading in this direction ←

■ Hebrew

שלטי החוצות של חברת Ricoh - המוארים באמצעות 100% אנר  
גיה טבעית - כבר מותקנים בניו-יורק, בלונדון, ועכשיו גם בסידני

Reading in this direction ←

■ Thai

ป้ายโฆษณาของ Ricoh ใช้พลังงานแสงอาทิตย์ 100%  
ติดตั้งในนิวยอร์ก ลอนดอน และปัจจุบันในซิดนีย์

→ Reading in this direction

■ Vietnamese

Bảng Quảng Cáo Ricoh, Chiếu Sáng 100%  
Bằng Năng Lượng Tự Nhiên, Đã Được Lắp Đặt  
Ở New York, London, và Giờ Đây Ở Sydney

→ Reading in this direction

■ Hindi

Ricoh बिलबोर्ड, 100 प्रतिशत प्राकृतिक ऊर्जा द्वारा प्रज्वलित,  
न्यू यॉर्क में, लन्दन में संस्थापित, और अब सिडनी में

→ Reading in this direction

# Functions

## ◇ Display in a Language that Requires Combination

In case of display in a language that requires combination, such as Arabic, Thai and so on, the text in such a language cannot be displayed correctly by simply aligning characters like Japanese. For such a language to be displayed correctly, the following is required:

- Some consecutive characters must be displayed in the same location as necessary
- Some character form must be transformed in accordance with the combination of consecutive characters
- Character alignment must be changed appropriately

These process must be required in accordance with each language rules.  
Ricoh Layout Engine carries out such complicated notation rules.

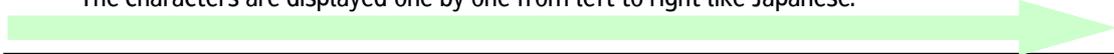
### Using Arabic as an Example

Arabic is written from right to left. In addition, the same character changes in form depending on its position in a text or word. The following two examples use the same set of Arabic characters; one is presented using the Layout Engine and the other without.

#### Without using the Layout Engine

Even though the character forms of each of the character are represented correctly, the text cannot be read as they are not composed in a proper manner.

The characters are displayed one by one from left to right like Japanese.



ةي عيب ط ل ا ة ق ا ط ل ا ب ة ء ا م ر م ة ي ن ا ل ع ا ل ا Ricoh ت ا ح و ل  
ن ا ل ا و ن د ن ل و ك ر و ي و ي ن ي ف ة ب و ص ر ن م و 100% ة ف ر ص ل ا  
ي ن د ي س ي ف

#### Using the Layout Engine

Conforming to grammar rules, the same character set is laid out properly from left to right, with appropriate character form changes and other modifications to convey the content of the message. As seen here, the Layout Engine is an indispensable tool for properly communicating text content.

Appropriate spelling from right to left.



ل و ح ا ت Ricoh ا ل ا ع ل ا ن ي ة م ض ا ة ب ا ل ط ا ق ة ا ل ط ب ي ع ي ة ا ل ص ر ف ة  
100% و م ن ص و ب ة ف ي ن ي و ي و ر ك و ل ن د ن و ا ل ا ن ف ي س ي د ن ي

#### (Alphanumerical Reversal)

In a text mixes with alphanumerical characters , only alphanumerical part is spelled from left to right to display the layout. correctly.

Alphanumerical characters are spelled from left to right.



آ خ ر ت ح د ي ث : ا ل ث ل ا ث ا 05 ا غ س ط س 2008 12:47 GMT

# Functions

## ◇ Effective Display in Drawing Domain

In accordance with the following items specified by the customer application, characters are laid out automatically. Japanese, simplified Chinese characters, traditional Chinese characters, and Hangeul characters can be laid out vertically.

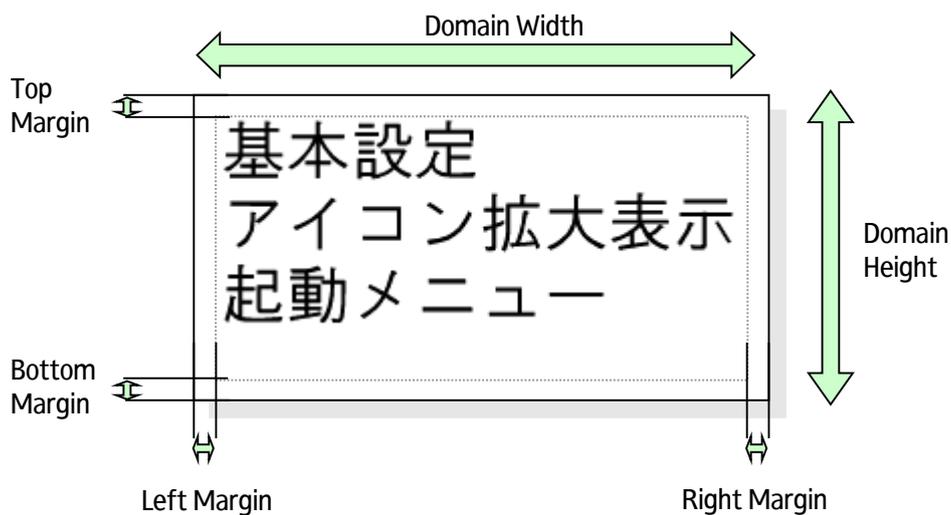
[Items]

- A top, bottom, right, left margin
- Space between the characters and the lines
- Domain width, height

Customer application can display the layout as intended without recognizing each character location.

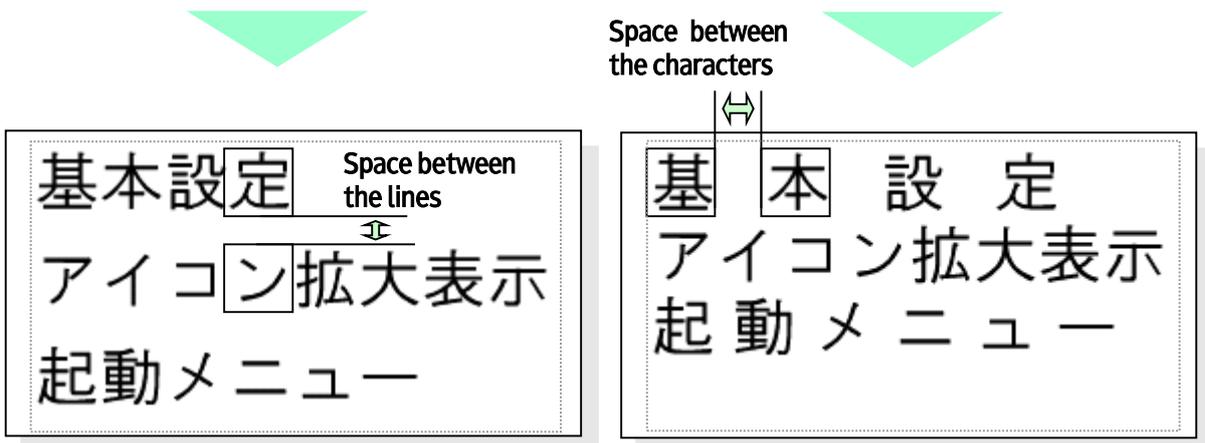
### Layout Function Example

When the basic setting (both space between the characters and the lines: 0) is applied, space may be created at the bottom and the right areas.



By adjusting "space between the lines", characters are displayed effectively to the bottom.

By adjusting "space between the characters", Characters are displayed effectively to the right.



\* Space between the characters must be set for each line.

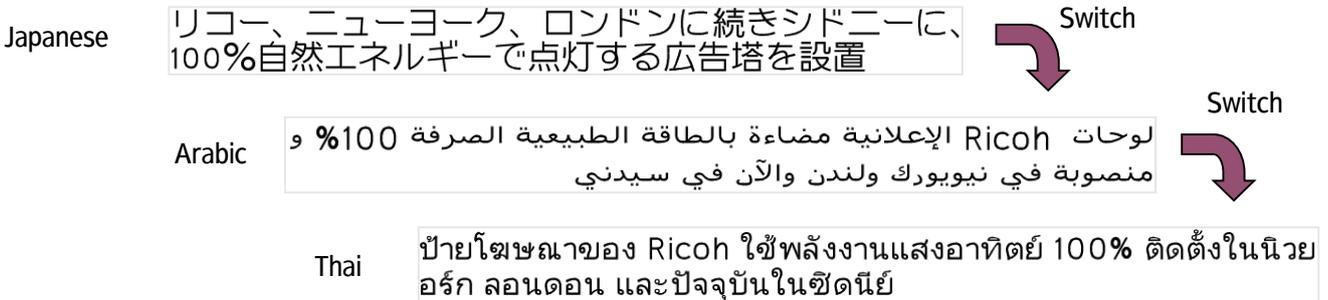
# Functions

## ◇ Multi-languages Mixture Processing

Text mixed with multi-languages can be displayed simultaneously without switching languages.

- Multi-languages mixture processing is conformable to Bidi , bidirectional algorithm specified by the Unicode® standard.
- Bidi is adopted to Microsoft® Windows® OS.

[Conventional Processing] Switching the language



Multi-languages Mixture Processing

The diagram shows a single box containing text in four languages: Japanese, Arabic, Thai, and English. The text is: "リコー、ニューヨーク、ロンドンに続きシドニーに、100%自然エネルギーで点灯する広告塔を設置", "لوحات Ricoh الإعلانية مضاءة بالطاقة الطبيعية الصرفة 100% و منصوبة في نيويورك ولندن والآن في سيدني", "ป้ายโฆษณาของ Ricoh ใช้พลังงานแสงอาทิตย์ 100% ติดตั้งในนิวยอร์ก ลอนดอน และปัจจุบันในซิดนีย์", and "Ricoh Billboards, Lit by 100% Natural Energy, Installed in New York, in London, and now in Sydney".

\*CJK Unified Ideographs

When more than two out of four languages such as Japanese, Simplified Chinese characters, Traditional Chinese characters and Korean at once are used, different character forms are allocated in spite of the same Unicode encoding.

You can select the highest-priority character form.

[Example: same UCS-2 (Unicode encoding) between two languages]

Japanese Character Form

将径殖刃浅層邸包冒粉弥勇与

Simplified Chinese Character Form

将径殖刃浅层邸包冒粉弥勇与

## ◇ Direction Change

When the language with the left-to-right and right-to-left are mixed, it is possible to select the direction.

[Example: File name at the mixed languages]



# Functions

## ◇ Word Wrapping

Allows automatic line breaking with or without word wrap.

### Word Wrap "OFF" (break by character unit)



Thank you for your special friendship.

Exceeding the text line limit, "special" is split across two lines.

### Word Wrap "ON" (break by word unit)



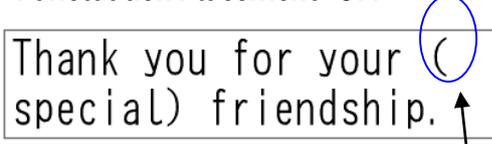
Thank you for your special friendship.

Exceeding the text line limit, "special" is moved the following line.

## ◇ Punctuation Placement

Adjusts the location of punctuation marks in accordance with the punctuation placement rules of each language.

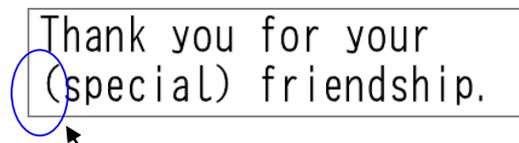
### Punctuation Placement "OFF"



Thank you for your (special) friendship.

Open parenthesis remains on the first line as the symbol is displayed within the text line limit.

### Punctuation Placement "ON"



Thank you for your (special) friendship.

Open parenthesis is sent to the following line.

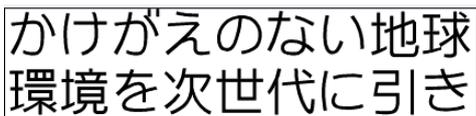
## ◇ Ellipsis Display

Ellipsis display can be switched ON or OFF.

NOTE: Ellipsis display is a function that uses the "..." symbol to signify the continuation of a text string.

When unable to fully display the content of a text string, an ellipsis is displayed at the end of displayed portion of the string.

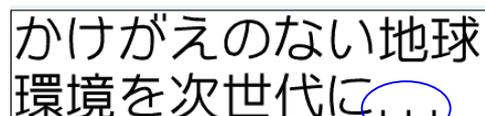
### Ellipsis "OFF"



かけがえのない地球  
環境を次世代に引き

Text characters of a string are shown to the limit of the display area.

### Ellipsis "ON"



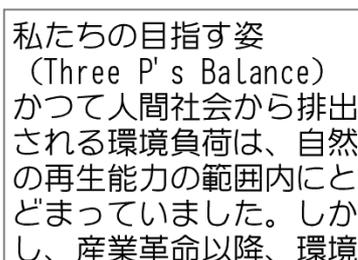
かけがえのない地球  
環境を次世代に...

Ellipsis is automatically inserted to indicate that the text string continues.

## ◇ Text Display Area Rotation

The entire text display area can be rotated 360 degrees in increments of one degree.

### No Rotation



私たちの目指す姿  
(Three P's Balance)  
かつて人間社会から排出  
される環境負荷は、自然  
の再生能力の範囲内にと  
どまっていた。しか  
し、産業革命以降、環境

### 45-degree Rotation

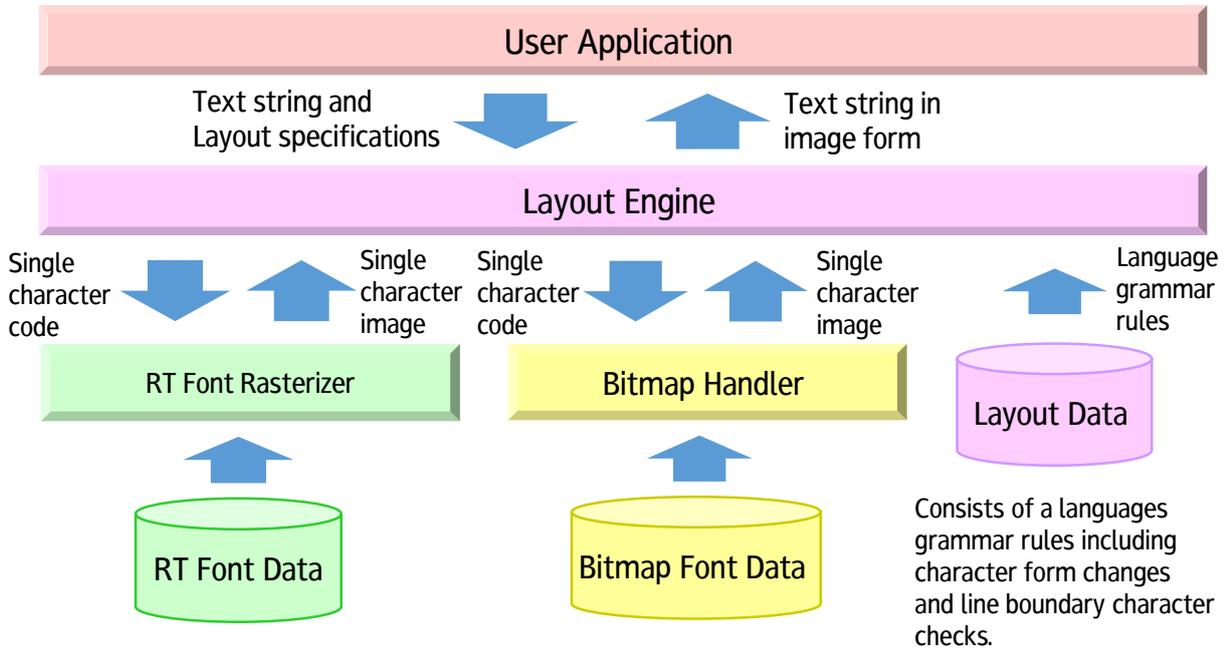


私たちの目指す姿  
(Three P's Balance)  
かつて人間社会から排出  
される環境負荷は、自然  
の再生能力の範囲内にと  
どまっていた。しか  
し、産業革命以降、環境

# How the Layout Engine Works

## ◇ Composition

The user specifies items regarding the text string and layout from the user's application. According to those specifications, the Layout Engine returns the properly laid out text in image form.



## ◇ Features

### ■ High Speed Processing

RICOH's light and compact method makes process speedy.

The program volume is approximately **30KB**.

(NOTE: The speed may differ according to the customer's compile situations.)

### ■ Multi-languages Compatibility

Layout Engine supports Arabic, Hebrew, Thai and Vietnamese.

In addition, an optimal text image can be displayed even for Japanese and European languages.

### ■ Multi-fonts Compatibility

Layout Engine supports RT Font and bitmap font.

### ■ Simple Interface

By specifying character string and drawing domain by an application, a user can obtain a text image laid out accurately.

### ■ Rich Functions

Layout Engine can set detailed specifications such as margin and character space on layout to get an optimal display.

# Language Spelling Rules by Layout Engine

## ◇ In the Case of Arabic

Arabic is expressed by 28 Arabic characters and 4 Arabic unique characters.  
(Arabic is not same as Arabic characters.)

The whole or a part of four character forms below is defined for each character.  
These different character forms are used according to the location and the definition of the character form.

- (1) "Independent character form": Character form has meaning by itself. Or, this character form is allocated at the end of a sentence without following character.
- (2) "Beginning word character form": Character form is used at the beginning of a word.
- (3) "Middle word character form": Character form is used from the second before the last character of a word.
- (4) "Ending word character form": Character form is allocated at the end of a word.

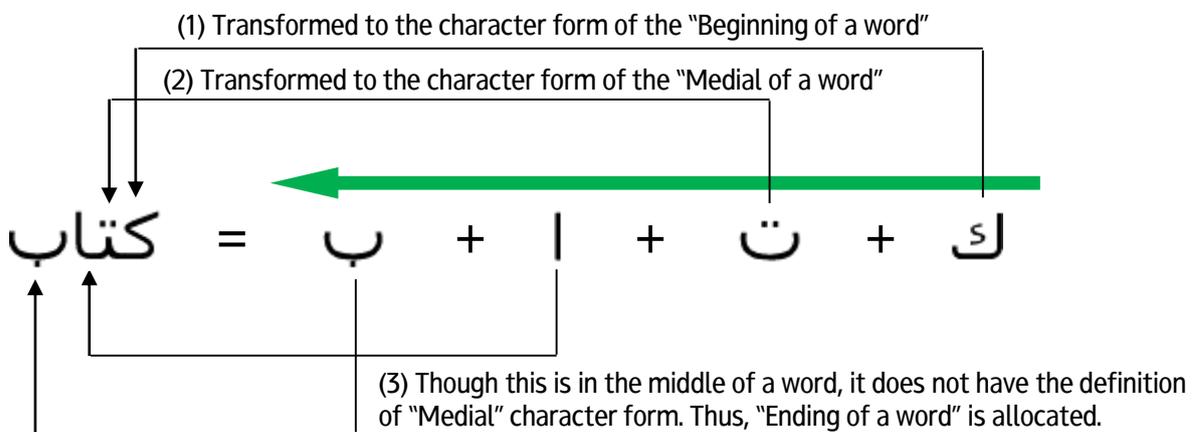
(m)  
A word is basically written in one string. When characters are not defined as "Beginning word character form" or "Middle word character form", "Ending word character form" or "Independent character form" is used even in the middle of a word (a word is broken there), and the next character starts with "Beginning word character form".

While the Arabic characters are aligned from right to left, alphabet and numbers are aligned from left to right.  
(Both writing directions are mixed.)

## Processing Sample

Layout Engine recognizes "Beginning of a word", "Medial" and "Ending of a word" accurately, and displays correctly strung words.

(Example: Arabic "book" Right side of =: Listing of independent character forms Left side of =: Correct word display)



## Accurate Display for Special Character Form Transformation

When specific characters are aligned consecutively, some characters are transformed into completely different character forms not by the basic rule. The Layout Engine can display these character forms accurately, because RICOH's Arabic font has special character form,



# Language Spelling Rules by Layout Engine

## ◇ In the Case of Thai

Thai language is phonogramic like English and has no meaning by itself. Thai characters have roughly four types as follow:

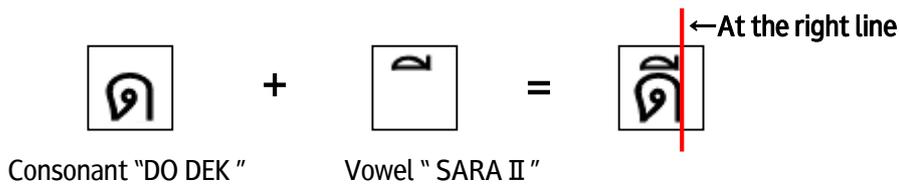
1. Vowel
2. Consonant
3. Tone code
4. Number / symbol

Even though character alignment is from left to right, a vowel may be written not only on the right of a consonant, but also on the left, top and bottom of that. On the other hand English is written only according to a vowel on the right of a consonant.

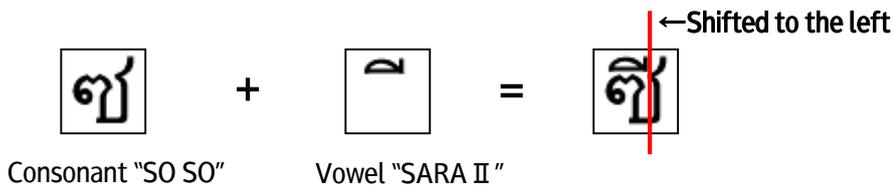
In addition, Thai language may be written in "a consonant + a vowel + a consonant" (using two consonants) as well. There are complex grammar rules.

## Processing Sample

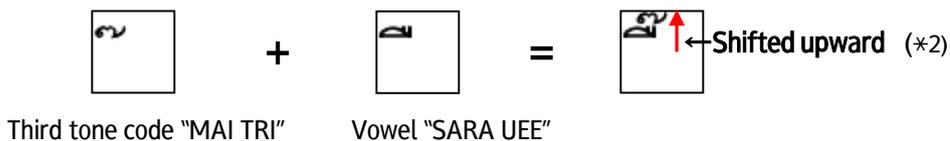
Adjusting a vowel and a tone code at the right line, it impresses us clear and sharp.



In case of overlapping between a vowel and a consonant at the right line, their locations are adjusted to avoid it by shifting to the left.



In case of rendering plural vowels with tone codes, their heights are adjusted to avoid overlapping. (\*1)  
(Combined character forms are stored in advance in the date, and replaced as necessary)



- \*1 There are overlapping rules. For example, "SARA UEE" is supposed to be allocated downward
- \*2 There are location rules for left and right. For example, around the center of the third tone code is shifted upward at the right of "SARA UEE".

# Font

## Fonts Working with Layout Engine

(Please refer to each font catalogue for details such as data volume, character number, etc.)

Font Type	Language	Character Set	Layout Data Volume
RT Font	Japanese	CP932 ARIB STD-B24	12KB
		CP932 + JIS X 0213	15KB
	European Language	CP1250,1251,1252,1253,1254,1257 ISO 8859-1,2,3,4,5,7,9,10,13,14,15,16	21KB
	Simplified Chinese Characters	GB18030-2005 Mandatory part (Certified by the Chinese Government )	12KB
		<b>NEW</b> GB2312-80 (Certified by the Chinese Government )	12KB
	Traditional Chinese Characters	Big5-1984 + E-TEN	12KB
	Korean	KS X 1001:2002 (Without hanja) + KS X 1003-1993	12KB
	Arabic	CP1256 + 137 characters	54KB
	Hebrew	CP1255 + 82 characters	29KB
	Thai	CP874	53KB
	Vietnamese	CP1258 + 104 characters	20KB
	Hindi	Unicode Devanagari defined characters	176KB
Bitmap Font with RT Font Format.	Japanese	CP932 ARIB STD-B24	12KB
		CP932 + JIS X 0213	15KB
	European Language	CP1250,1251,1252,1253,1254,1257 ISO 8859-1,2,3,4,5,7,9,10,13,14,15,16	21KB
	Traditional Chinese Characters	Big5-1984 + E-TEN	12KB
	Korean	KS X 1001:2002 (Without hanja) + KS X 1003-1993	12KB
	Arabic	CP1256 + 137 characters	54KB
	Hebrew	CP1255 + 82 characters	29KB
	Thai	CP874	53KB
	Vietnamese	CP1258 + 104 characters	20KB
	Hindi	Unicode Devanagari defined characters	176KB

Layout data volume may be different according to versions.

# Option : Text String Width Acquisition Tool

RICOH's tool makes it possible to verify whether the display can fall within the designated range or not by simulating the text width (dot numbers) on PC, not actual device.

**Product development period can be shortened without extra man hours for UI design in the multi-language support.**

※The tool will be provided with DLL.

The example of DLL use

実機用フォントのdot数(幅) **30**

(1) input the designed dot number

日本語	翻訳した用語		実機用フォントの文字列幅[dot]
	上限[dot]	英語訳 (表示はTrueType)	
表示設定	200	Display Settings	204
初期設定	200	Default Settings	207
状態表示	200	Display Status	182
コントラスト	200	Contrast	108
明るさ	200	Brightness	132
メインFWバージョン	200	Main FW Version	218
検索中です。	500	Searching...	152
登録が完了しました。	500	Registration has completed.	350
設定を有効にするために、再起動しますか？	500	Do you want to restart to enable the settings?	580
ファームウェア更新が完了しました。	500	The firmware update has completed.	463

Red indicates in case of the oversize

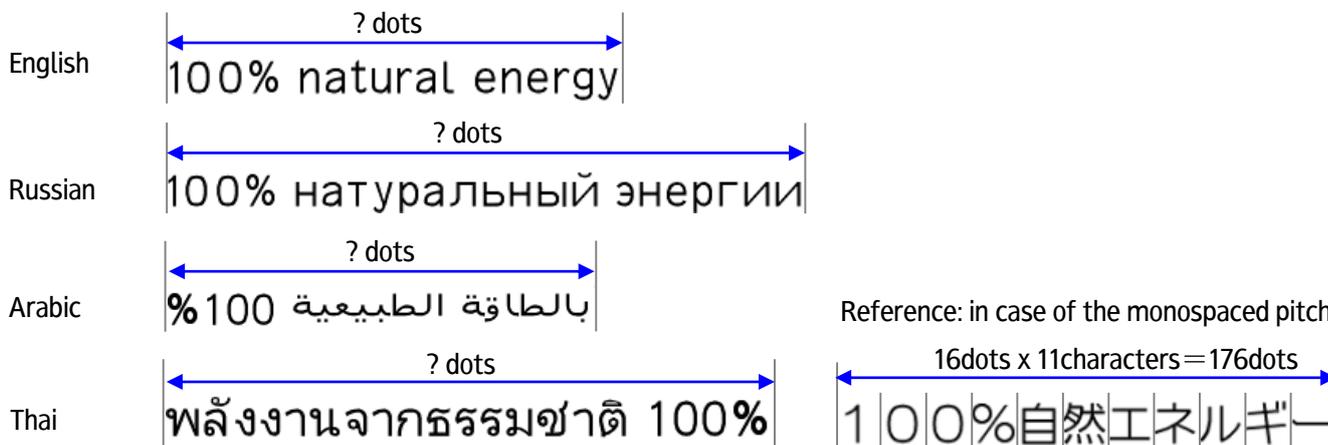
(2) upper limit number

(3) translate to fit below the upper limit

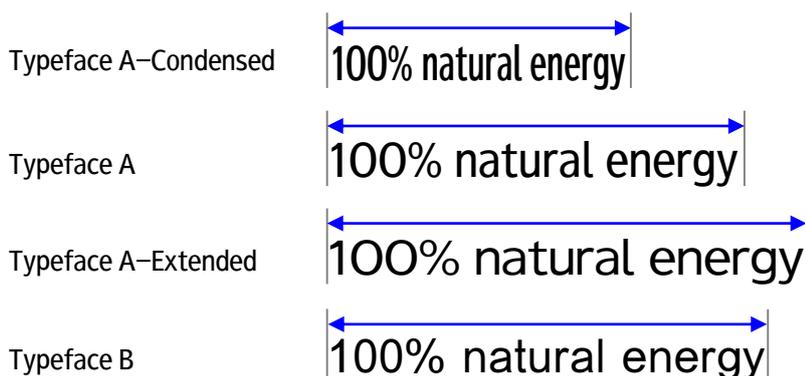
**Strong recommendation for UI designer who usually needs many man hours in the multi-language support.**



To person who faces to the difficulties for the multi-language expression such as the display check including the translation to fit a proper text at the designated size or area on the installed device.



In addition, to person who checks the result on the device every time, because the text string is changeable by font even at the same text in the same language shown below.



# Appraisal Agreement

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We offer an opportunity to evaluate our RT Font on an actual device prior to entering into a purchase agreement.

## ◇ Business Flow

Inquiries

### Contact

- TTW Information Center
- Mail: font-info@nts.rioh.co.jp

Computer-based  
Appraisal  
(free)

### Contents

- Layout Engine Viewer
- Font data (sample)
- Acquisition tool of the width of text interface specifications
- Acquisition tool of the width of text (DLL)

Appraisal with the  
Use of an Actual  
Device  
(cost incurred)

An appraisal agreement is signed

### Contents

- Layout Engine source code
- RT Font Rasterizer source code (when using RT Font)
- Interface specifications
- Layout data
- Layout data specifications
- Font data
- Font data specifications

Typeface Agreement

- Typeface agreement is signed
- Delivery
- Payment



**RICOH Industrial Solutions Inc.**  
**Font Section**

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<http://industry.ricoh.com/font/>

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