

# Layout Engine

Software for handling  
languages with complex  
writing rules  
(Arabic, Thai, etc.)

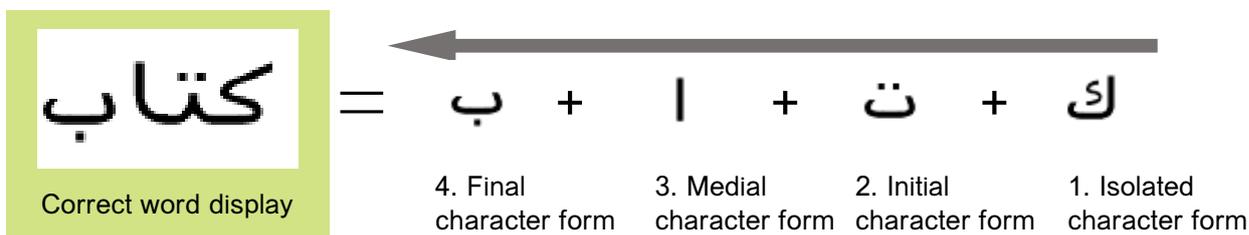
# What is a layout engine?

The Layout Engine puts individual character images in character strings. It can also do a variety of processing such as adjusting character and line spacing and rotating character strings. This software is necessary to correctly display languages with complex writing rules (Arabic, Thai, etc.).

<Arabic grammar rule processing example>

Input text character code string { 0643, 062A, 0627, 0628 }

		Final character form	Medial character form	Initial character form	Isolated character form
1. 0643	Convert to initial character form	ك	ك	ك	ك
2. 062A	Convert to medial character form	ت	ت	ت	ت
3. 0627	It is a medial position, but there is no medial character form definition, so allocate the final form	ا			ا
4. 0628	Since the previous character is final character form, next would be an initial-form character, but since there are no following characters, allocated character form	ب	ب	ب	ب



Ricoh's layout engine equips with Bidi (Bidirectional) Algorithm. It is a bidirectional algorithm.

When characters written left to right and characters written right to left are mixed together, there are ambiguities in the direction in which the characters should be displayed. For such cases, an algorithm defined in Unicode® is used to decide the display direction.

<Example mixing Arabic and English characters>

The writing direction of the text as a whole is the direction used by Arabic (right to left), but the numbers are written left to right.



The writing direction of the text as a whole is the direction used by European languages (left to right), but the portion containing Arabic characters is written right to left.



Ricoh's rasterizer and layout engine:

Since this is totally internally developed software, you do not have to worry about open-source license problems or quality assurance.

Since the source code is provided, you don't have to be concerned about the development environment or execution environment.

## Layout samples

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Arabic

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

Reading in this direction ←

Thai

ป้ายโฆษณาของ Ricoh ใช้พลังงานแสงอาทิตย์ 100%  
ติดตั้งในนิวยอร์ก ลอนดอน และปัจจุบันในซิดนีย์

→ 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 ←

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

# TrueType Font use

There is a possibility that third-party font files can be used with rasterizers and layout engines for TrueType Fonts. For more information, please use the free consultation. [zjc\\_font@jp.ricoh.com](mailto:zjc_font@jp.ricoh.com)

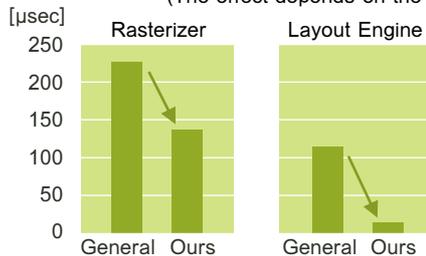
## Program size

Rasterizer	36 [KB]
Layout engine	77 [KB]

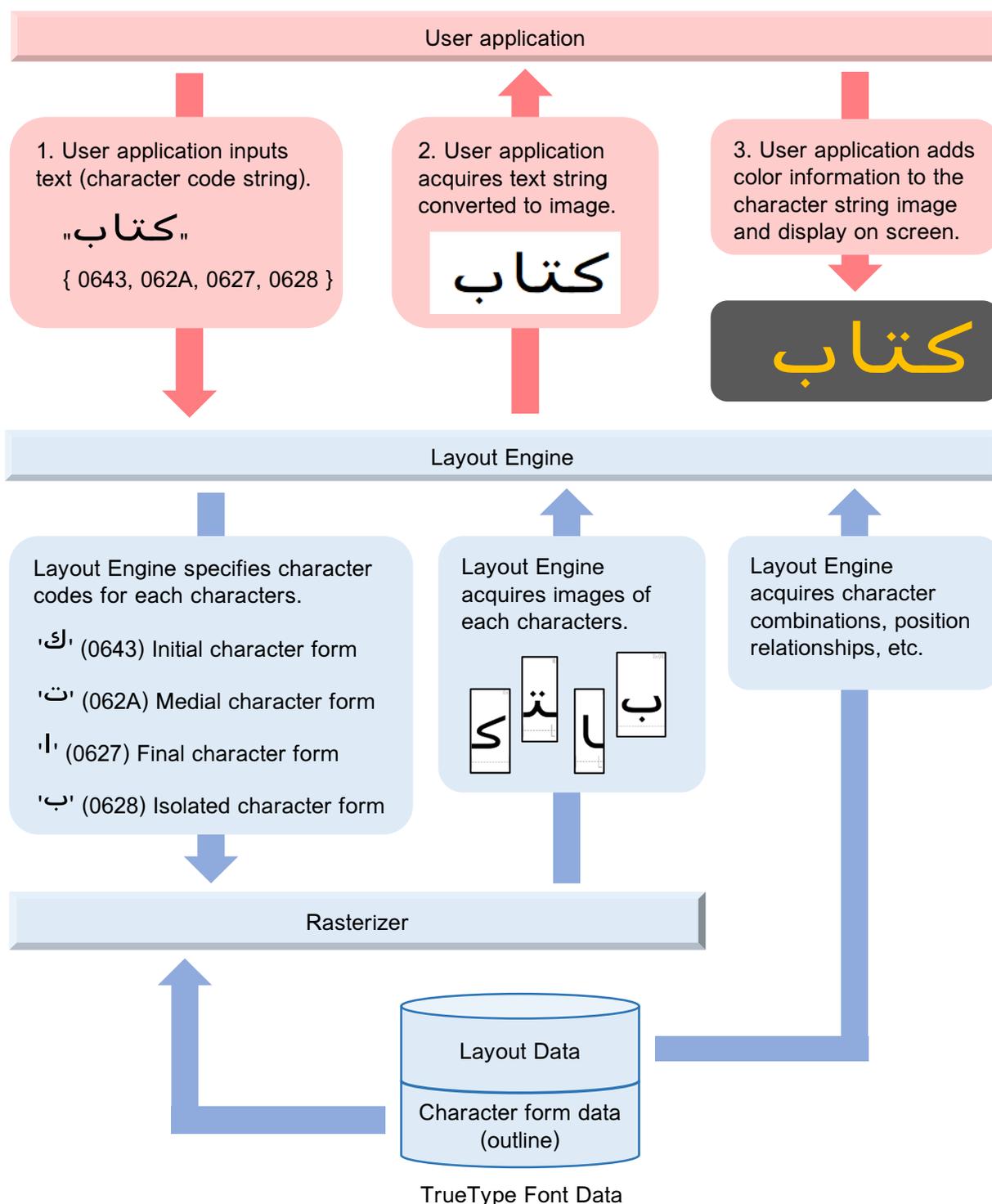
Note: Varies depending on the environment where compiled.

## Difference from general software

(The effect depends on the environment.)



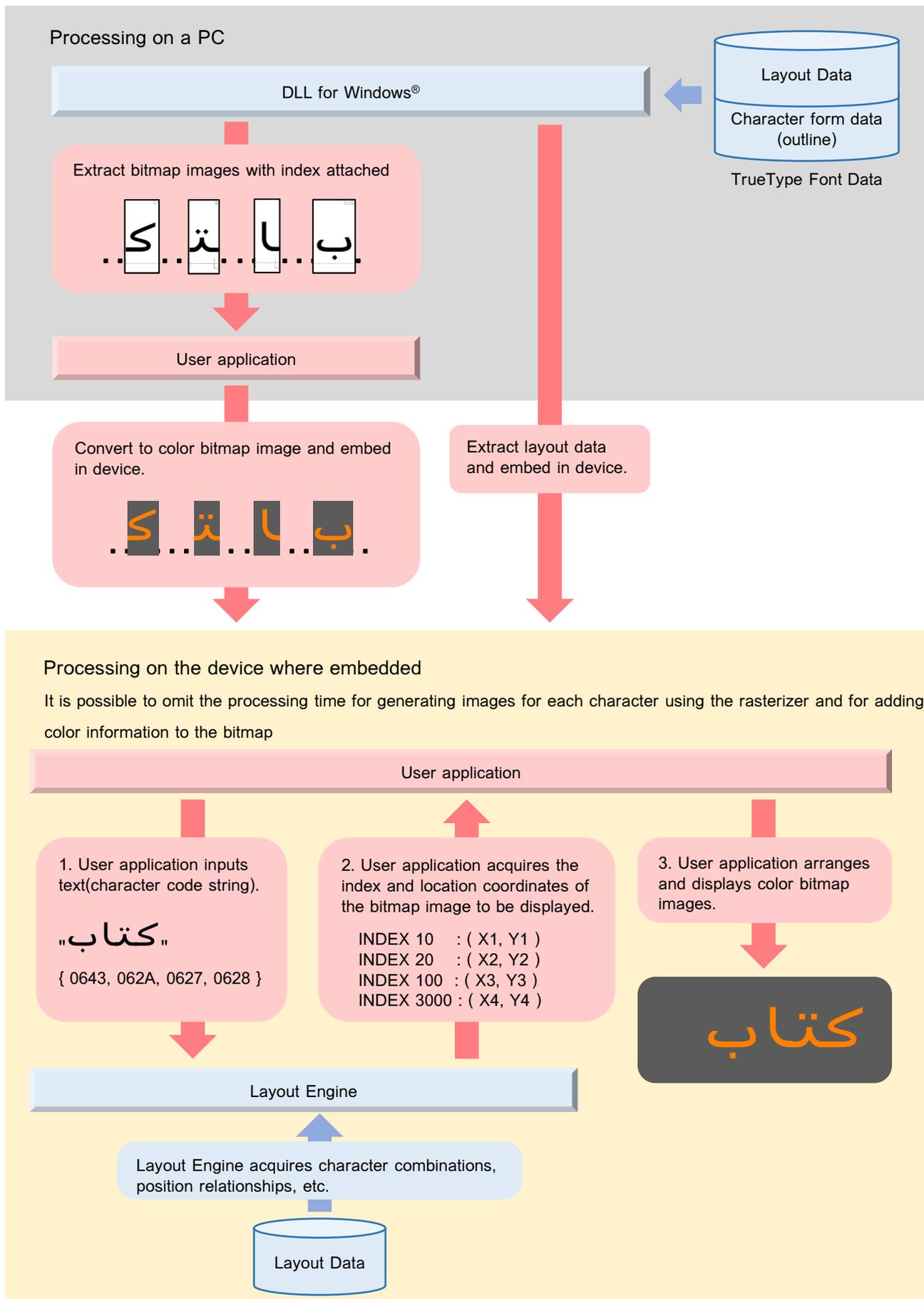
Processing speed per character (Thai)



# TrueType Font use

A configuration tailored for further increases in processing speed

The layout engine and a Windows®-use DLL are both available in configurations like those shown below. For more information, please use the free consultation. [zjc\\_font@jp.rioh.com](mailto:zjc_font@jp.rioh.com)

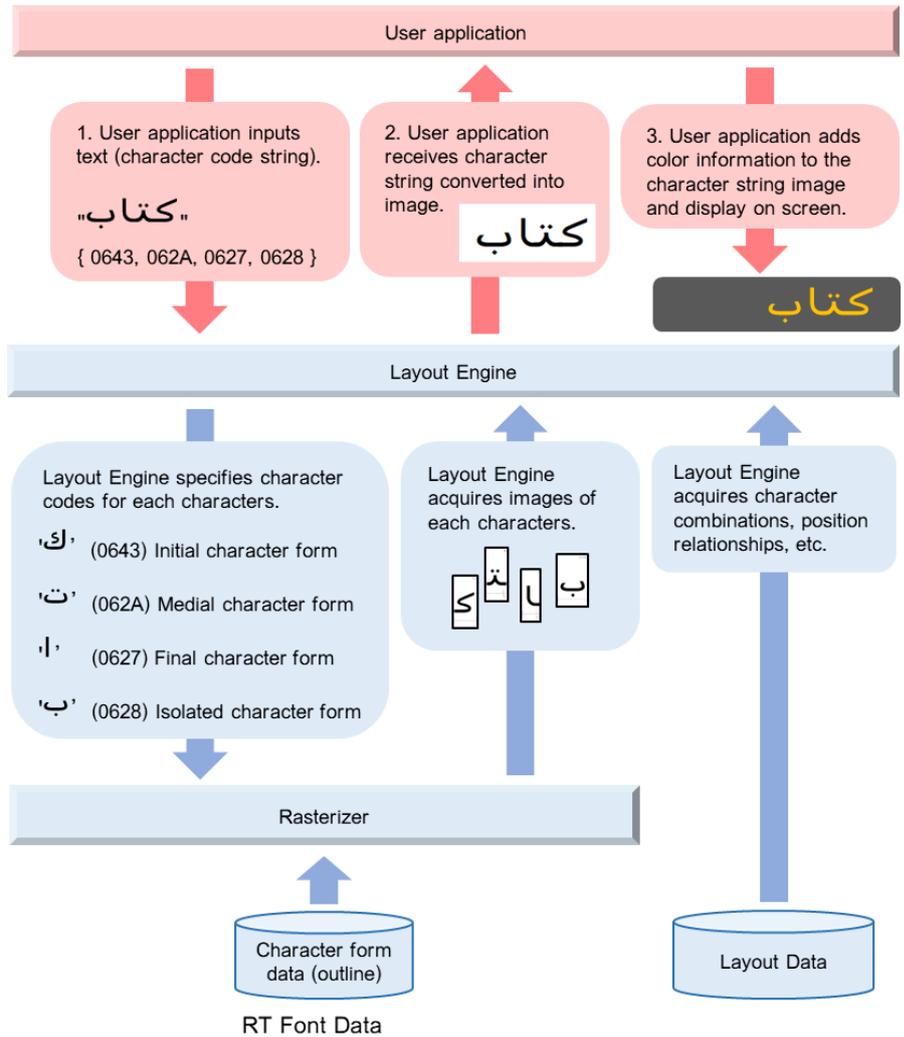


# RT Font use

## Program size

Rasterizer		52 [KB]
Layout engine		30 [KB]
Layout data	Japanese	15 [KB]
	European languages	21 [KB]
	Simplified Chinese characters	12 [KB]
	Traditional Chinese characters	12 [KB]
	Korean	12 [KB]
	Arabic	54 [KB]
	Thai	20 [KB]
	Hebrew	29 [KB]
	Vietnamese	20 [KB]
	Hindi	176 [KB]

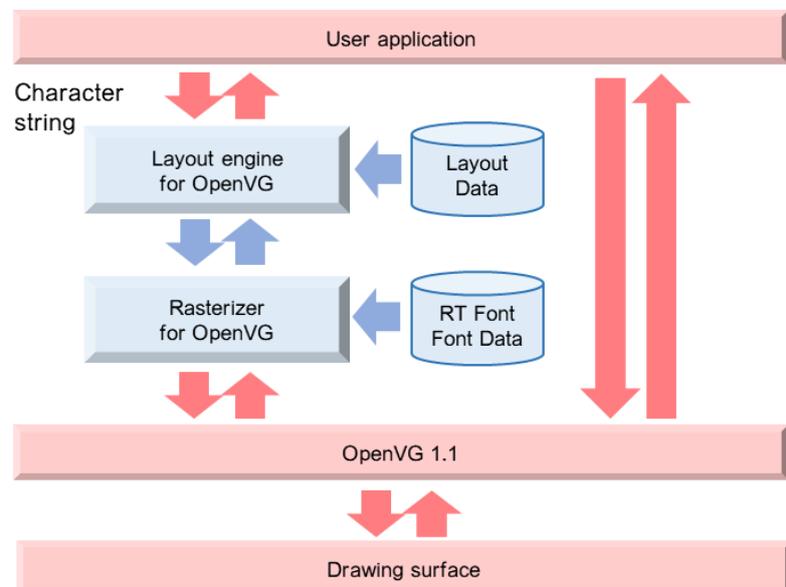
Note: Varies depending on the environment where compiled.



## OpenVG support

We can provide a rasterizer and Layout Engine that support the OpenVG1.1 API (Application Programming Interface).

For more information, please use the free consultation. [zjc\\_font@jp.ricoh.com](mailto:zjc_font@jp.ricoh.com)



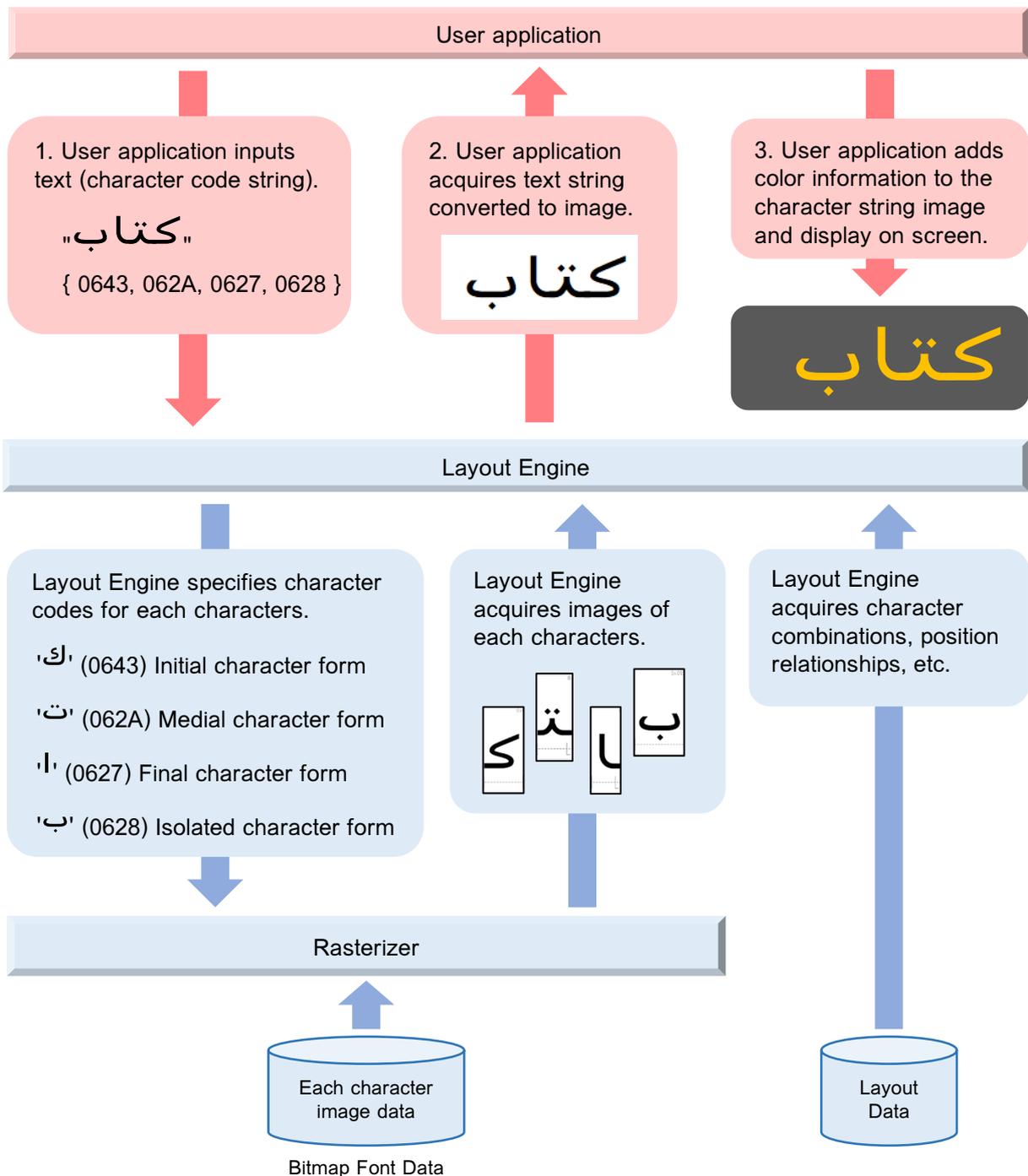
# Bitmap Font use

There is a possibility that third-party font files can be used if they are converted to our format. For more information, please use the free consultation. [zjc\\_font@jp.ricoh.com](mailto:zjc_font@jp.ricoh.com)

Program size

Bitmap font handler		30 [KB]
Layout engine		30 [KB]
Layout data	Japanese	15 [KB]
	European languages	21 [KB]
	Traditional Chinese characters	12 [KB]
	Korean	12 [KB]
	Arabic	54 [KB]
	Thai	53 [KB]
	Vietnamese	20 [KB]

Note:  
Varies depending on the environment where compiled.

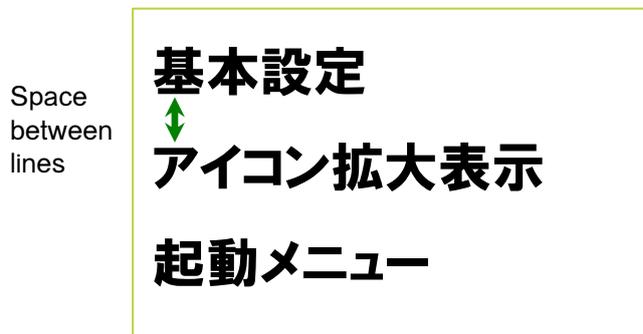


# Layout functions

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## Adjustment of space between lines and characters

It is possible to adjust the space between lines and characters.



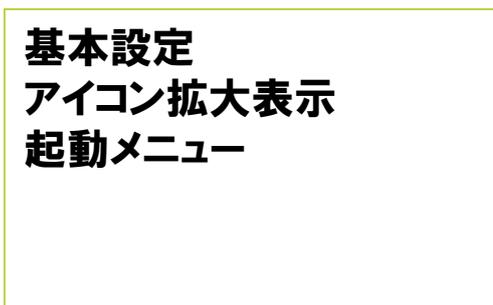
Space between characters



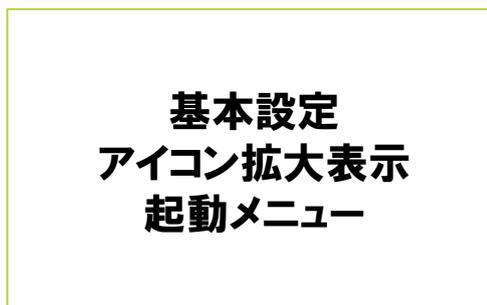
## Character alignment

It is possible to specify right/left and top/bottom character alignment.

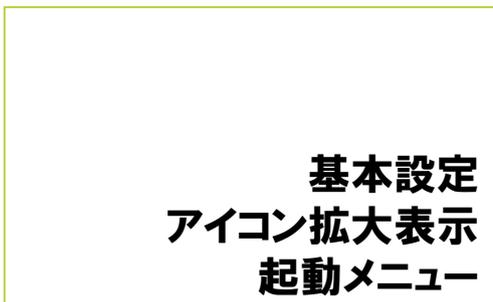
Left top alignment



Top/bottom left/right center alignment



Right bottom alignment



# Layout functions

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## Word wrapping

Allows automatic line breaking with or without word wrap.

Word Wrap OFF (break by character unit)

A rectangular box containing the text "Thank you for your special friendship." The word "special" is split across two lines: "spe" on the first line and "cial" on the second line. A blue circle highlights the "spe" part of the word.

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

Word Wrap ON (break by word unit)

A rectangular box containing the text "Thank you for your special friendship." The word "special" is entirely on the second line, while "Thank you for your" is on the first line. A blue circle highlights the word "special" on the second line.

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

## Punctuation Placement

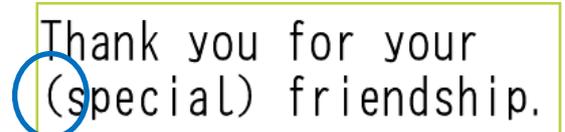
Adjusts the location of punctuation marks in accordance with the punctuation placement rules of each language.

Punctuation Placement OFF

A rectangular box containing the text "Thank you for your (special) friendship." The opening parenthesis "(" is on the first line, and the closing parenthesis ")" is on the second line. A blue circle highlights the opening parenthesis on the first line.

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

Punctuation Placement ON

A rectangular box containing the text "Thank you for your (special) friendship." The opening parenthesis "(" is on the second line, and the closing parenthesis ")" is on the first line. A blue circle highlights the opening parenthesis on the second line.

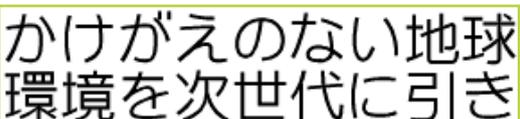
Open parenthesis is sent to the following line.

## 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

A rectangular box containing the Japanese text "かけがえのない地球環境を次世代に引き". The text is truncated at the end of the second line.

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

Ellipsis ON

A rectangular box containing the Japanese text "かけがえのない地球環境を次世代に...". The text is truncated at the end of the second line, and an ellipsis "..." is displayed. A blue circle highlights the ellipsis.

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

# Layout functions

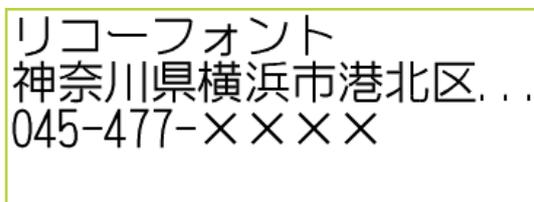
## Automatic line break

The function for automatic line breaks based on the width of the display area (layout area) can be set ON/OFF.

(Where the input text is as shown below)

"リコーフロント"line break"神奈川県横浜市港北区新横浜3-2-3"line break"045-477-XXXX"

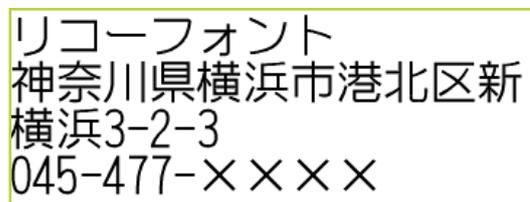
Automatic line break OFF



リコーフロント  
神奈川県横浜市港北区...  
045-477-XXXX

When the character has reached the end of the line, Layout engine displays ellipsis and does not display the continuation until the next line feed code comes.

Automatic line break ON



リコーフロント  
神奈川県横浜市港北区新  
横浜3-2-3  
045-477-XXXX

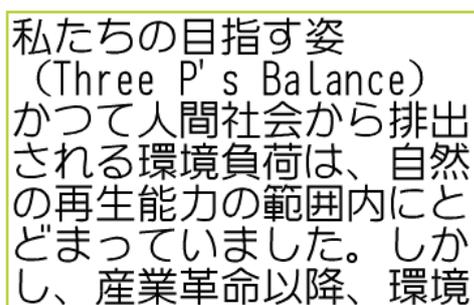
When the character has reached the end of the line, the next line starts with the next character.

## Text Display Area Rotation

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

**Note:** This is only supported for RT fonts.

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

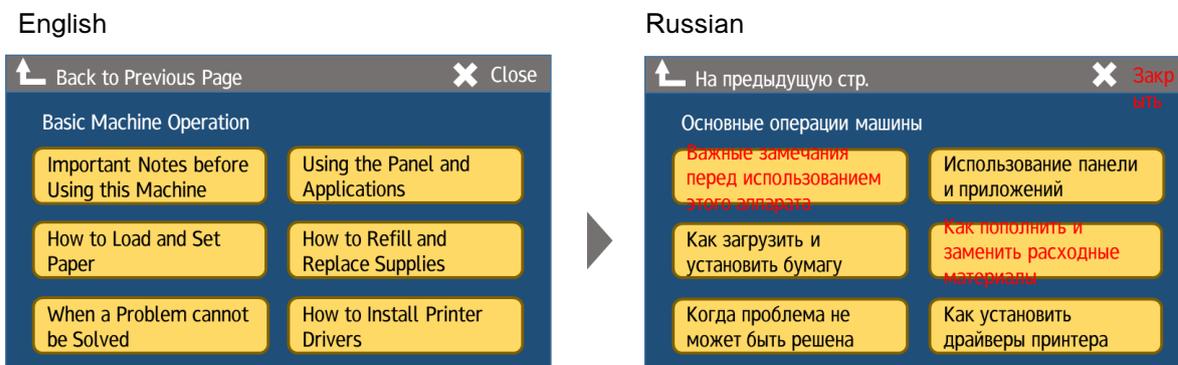
45-degree  
Rotation



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

## For persons facing difficulties with translation (option)

For persons who face difficulties in the fitting of the optimum text in the designated area (size) of actual devices when expressions are in multiple languages requiring confirmation of the display each time for translation, etc.



### Text string width calculation

Easy with monospaced pitch

64dot x 11characters = 704dot  
 1 | 0 | 0 | % | 自 | 然 | エ | ネ | ル | ギ | ー

Difficult with proportional pitch

? dot  
 English 100% natural energy  
 Russian 100% натуральная энергия  
 Arabic %100 بالطاقة الطبيعية  
 Thai ใช้พลังงานแสงอาทิตย์ 100%

Since the fonts of the actual device and the PC are different, the text string width differs even for the same language and text. Our goal is for this to be useful to persons who have to check the text on the actual device each time.

100% natural energy  
 100% natural energy  
**100% natural energy**  
 100% natural energy

We offer as an option a DLL with which you can acquire text string width on a PC (even without the actual device) and easily confirm whether the text string fits in the designated size. This makes it possible to shorten product development time since you will not have to spend many workhours on UI design for handling multiple languages.

For more information, please use the free consultation. [zjc\\_font@jp.ricoh.com](mailto:zjc_font@jp.ricoh.com)



RICOH Industrial Solutions Inc.  
Font Section

Free consultation

[zjc\\_font@jp.ricoh.com](mailto:zjc_font@jp.ricoh.com)

Web site

<https://industry.ricoh.com/en/font/>

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