# RT Font

Low-data-volume font

appropriate for embedding

(approx. 1/3 of TrueType Font)

# What is RT Font?

Among scalable fonts, in contrast to TrueType Fonts, RT Font features low data volume, making it suitable for embedding.

RT Font is in our company's own original format so there isn't compatibility with the fonts of other companies.
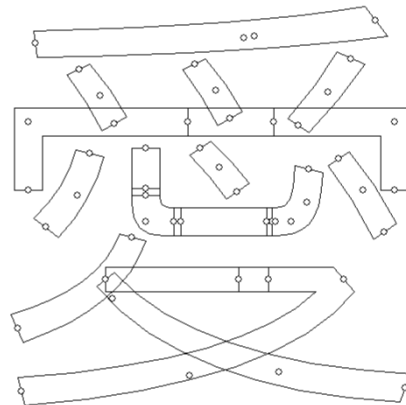
## Low data volume structure

TrueType Fonts use the full outline of characters, but RT Font characters are configured with elements (parts).



With TrueType Font
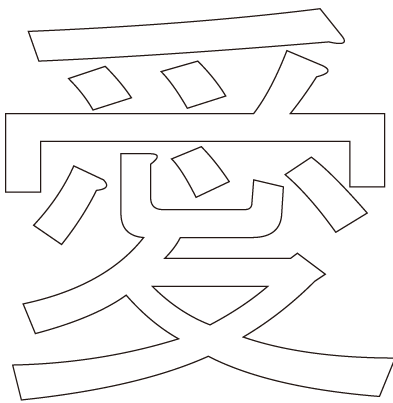
With RT Font
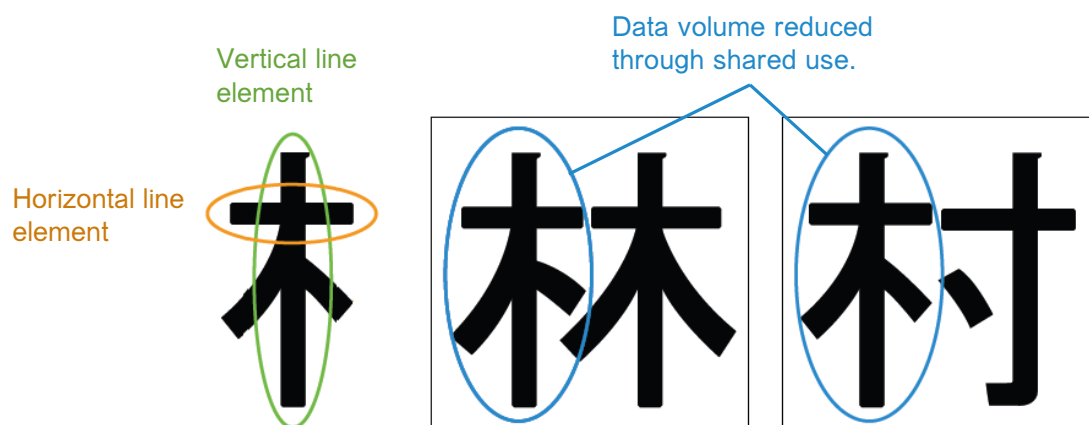
1 character exists independently as 1 unit of data.

Character are configured with elements (parts).

Since the elements (vertical lines, horizontal lines, "migiharai strokes," etc.) are used in all characters, data volume can be held down through the common use of kanji radicals, etc.



Vertical line element

Data volume reduced through shared use.

Horizontal line element

# Differences with TrueType Fonts

## Weight adjustment

Using just the data for a single font, the thickness of the line (weight value) can be adjusted.

Weight value can be selected from a scale of 1 to 9.

美しい
文字

Weight 1

美しい
文字

Weight 5

美しい
文字

Weight 9
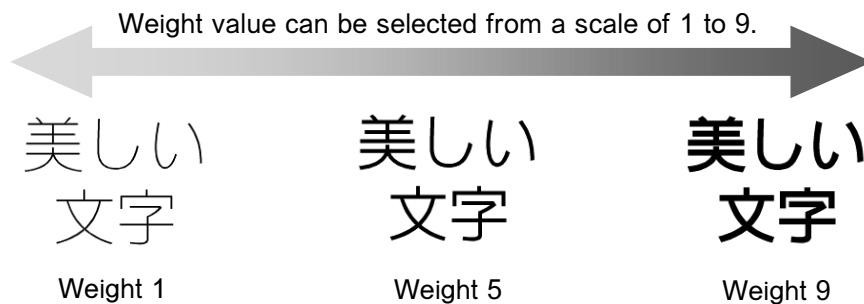
## Borders

A border may be added to the rasterized image of a character to enhance its affinity with the background color (image). Border widths can also be adjusted.

縁取り
袋文字

Border width: 1dot

縁取り
袋文字

Border width: 2dot

縁取り
袋文字

Border width: 3dot
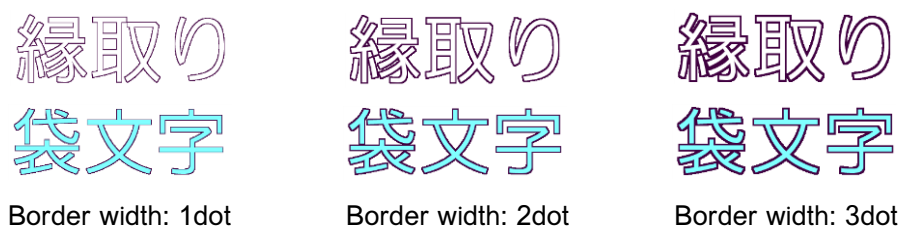
## Rendering mode selection

For straight lines, you can select "Sharp Mode" for non-grayscale rendering and "Smooth Mode" for grayscale rendering.

Sharp mode

ABCあ亜草012

Smooth mode

ABCあ亜草012

## Vertical/horizontal arbitrary multiplication (Sharp Mode only)

This ensures the design consistency of characters by maintaining the width balance of horizontal and vertical lines whether a character is displayed wide or narrow.

華 → 華

Generally

Vertical lines become thinner, resulting in a poorly balanced character.

→ 華

RT Font

Line widths are maintained, resulting in a balanced character.
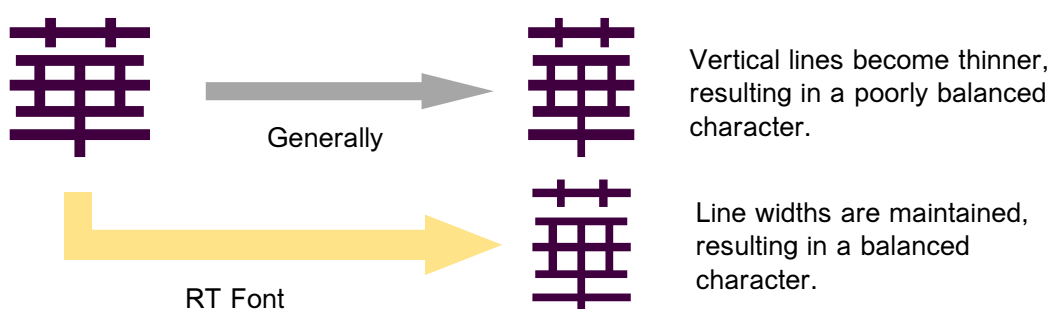
# Other functions

## Anti-aliasing (grayscale)

Characters can be represented more smoothly with the use of four- and sixteen-level grayscale display. Processing is faster with fewer levels.

Four-level grayscale　綺麗な文字

Sixteen-level grayscale　綺麗な文字

## Rotation

The rasterized image of a character can be rotated in increments of one degree.

あ ぁ ✿ ✿ ✿ ✿

## Oblique

The upper part of the rasterized image of a character may be slanted in 1 dot increments.

あ あ あ あ あ

## Cache

High-speed rendering is possible by holding the rendered character (rasterized image) in memory, and calling the character directly from memory (without rasterizing) the next time it is rendered.

# Other functions

## Bitmap Font replacement

The inclusion of Bitmap Font with characters forms optimized for each size makes it possible to display even small characters, such as those of 10 or 12 dots, without loss of readability.

Note: Use of the bitmap replacement function increases file size by the data volume of the bitmap font.

Scalable font

Replaced bitmap font

綺麗な文字

綺麗な文字

綺麗な文字

綺麗な文字

# Rasterizer

With outline fonts (RT Fonts, etc.), characters cannot be displayed using the font file alone.

It is necessary to have rasterizer software that rasterizes the font data into character images.

User application

1. User application inputs character codes

リ 0x838A
コ 0x8352
ー 0x815B

2. User application receives images of each character

リ ー
コ

Rasterizer

Element Data
(vertical lines, horizontal lines, etc.)

RT Font File
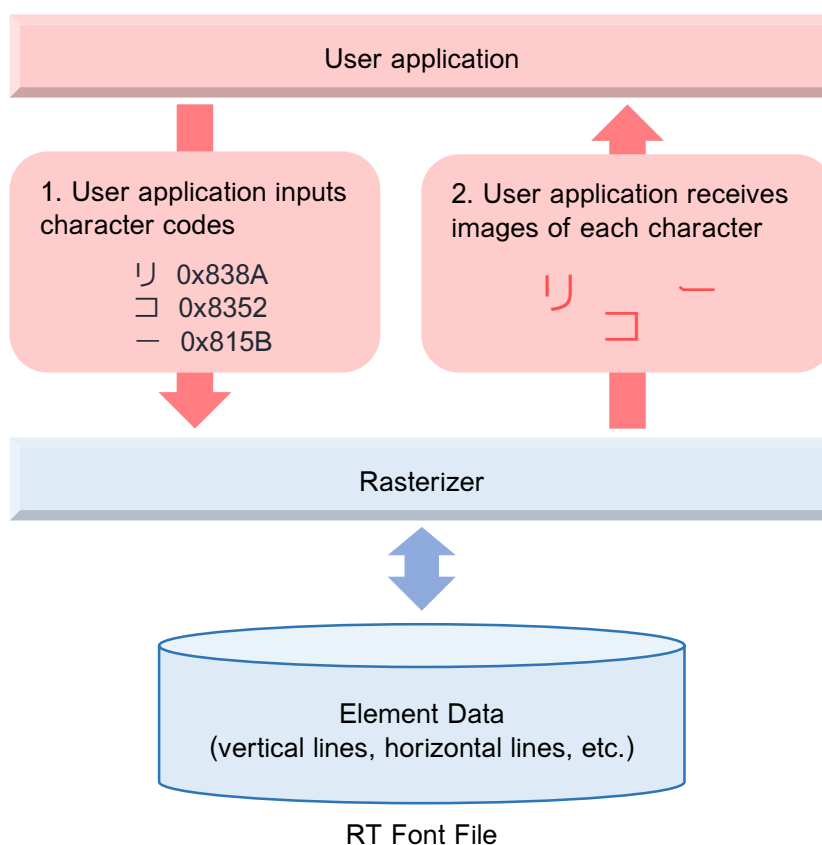
# Layout Engine (option)

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 | | | ⭕ | |
| 2. | 062A | Convert to medial character form | | ⭕ | | |
| 3. | 0627 | It is a medial position, but there is no medial character form definition, so allocate the final form | ⭕ | | | |
| 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 | | | | ⭕ |



**كتاب** = ب + ا + ت + ك

Correct word display

4. Final character form | 3. Medial character form | 2. Initial character form | 1. Isolated character form

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.

إنجاز : 100%

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.

إنجاز.jpg

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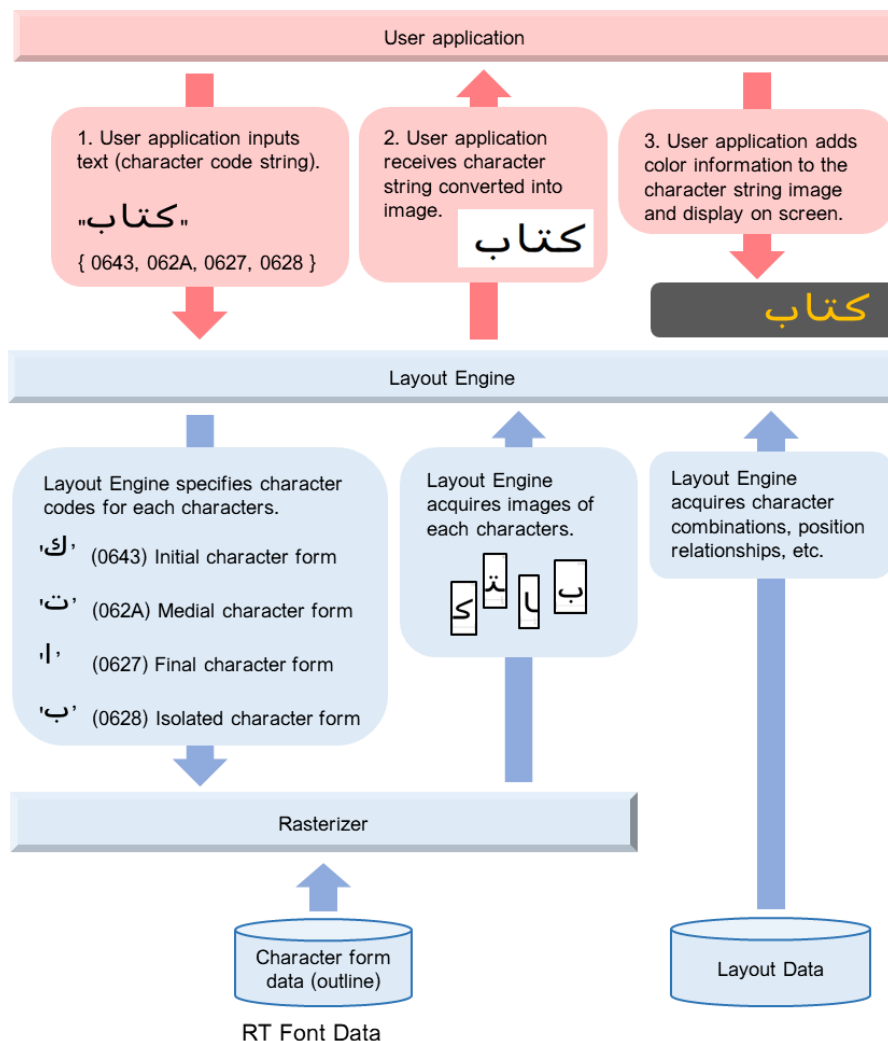Since the source code is provided, you don't have to be concerned about the development environment or execution environment.

# Layout Engine  (option)

## 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.

**User application**

1. User application inputs text (character code string).

كتاب „

{ 0643, 062A, 0627, 0628 }

2. User application receives character string converted into image.

كتاب

3. User application adds color information to the character string image and display on screen.

كتاب

**Layout Engine**

Layout Engine specifies character codes for each characters.

'ك' (0643) Initial character form

'ت' (062A) Medial character form

'ا' (0627) Final character form

'ب' (0628) Isolated character form

Layout Engine acquires images of each characters.

ك ت ا ب

Layout Engine acquires character combinations, position relationships, etc.

**Rasterizer**

Character form data (outline)

RT Font Data

Layout Data

## 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

**User application**

Character string

Layout engine for OpenVG

Layout Data

Rasterizer for OpenVG

RT Font Font Data

OpenVG 1.1

Drawing surface

# Character Set

| Language | Character Set | Total Characters | Encoding (Character Code) | Typeface File size [KB] |
|---|---|---|---|---|
| Japanese | **CP932**<br><br>JIS X 0201 Half-width (158 characters)<br><br>JIS X 0208 Non-Kanji (524 characters)<br><br>JIS X 0208 Kanji Level 1 (2,965 characters)<br><br>JIS X 0208 Kanji Level 2 (3,390 characters)<br><br>NEC special (83 characters)<br><br>NEC special IBM® extension (374 characters)<br><br>IBM extension (388 characters)<br><br>Characters for vertical writing (108 characters) | 7,990 (Including overlapping) | Shift_JIS Unicode® encoding (UTF-16) | New Gothic          632[KB]<br>New Round Gothic 686[KB] |
| | **CP932 + JIS X 0213:2004**<br><br>CP932 (7,990 characters : Including overlapping)<br><br>JIS X 0213:2004 Non-Kanji (575 characters)<br>   *Of 659, addition from CP932<br><br>JIS X 0213:2004 Kanji Level 3 (1,071 characters)<br>   *Of 1,259, addition from CP932<br><br>JIS X 0213:2004 Kanji Level 4 (2,348 characters)<br>   *Of 2,436, addition from CP932 | 11, 984 (Including overlapping) | Shift_JIS Unicode encoding (UTF-16)<br><br>In Shift_JIS, character set for CP932 only can be used. | New Gothic          850[KB]<br>New Round Gothic 908[KB] |
| | **ARIB STD-B24**<br><br>JIS X 0201 Half-width (158 characters)<br><br>JIS X 0208 Non-Kanji (524 characters)<br><br>JIS X 0208 Kanji Level 1 (2,965 characters)<br><br>JIS X 0208 Kanji Level 2 (3,390 characters)<br><br>ARIB Additional code (394 characters)<br><br>ARIB Additional Kanji (137 characters)<br><br>Characters for vertical writing (58 characters) | 7,626 | Shift_JIS Unicode encoding (UTF-16) | New Gothic          641[KB]<br>New Round Gothic 701[KB] |

[Note]
- All files shown at the above are for monospaced pitch.
- JIS X 0213
  Both character forms of JIS X 0212:2000 and JIS X 0213:2004 are loaded in Font data and either can be selected by rasterizer.
- ARIB STD-B24 set
  16 character forms of both JIS and ARIB are overlapped and either can be selected by rasterizer.

# Character Set

| Language | Character Set | Total Characters | Encoding (Character Code) | Typeface File size [KB] |
|---|---|---|---|---|
| European | CP1250<br>CP1251<br>CP1252<br>CP1253<br>CP1254<br>CP1257<br>ISO 8859-1,2,3,4,5,<br>7,9,10,13,14,15,16 | 527 | Unicode encoding (UTF-16)<br><br>In the case of CP1252, ISO 8859-1, etc., Local code can be used. | New Gothic   53[KB]<br>Proportional |
| Simplified Chinese characters<br><br>(Chinese government certification received) | GB2312-80 | 7,540 | GB<br>Unicode encoding (UTF-16) | New Gothic   609[KB]<br>Monospaced |
|  | GB18030-2005<br>Mandatory part | 28,522 |  | New Gothic   1,780[KB]<br>Monospaced |
| Traditional Chinese characters | Big5-1984 + E-TEN | 13,563<br>(Including overlapping) | Big5<br>Unicode encoding (UTF-16) | New Gothic   996[KB]<br>Monospaced |
| Korean | KS X 1001:2004<br>(Without hanja)<br>+ KS X 1003-1993 | 3,434 | KS (EUC-KR)<br>Unicode encoding (UTF-16) | New Gothic   235[KB]<br>Monospaced |
| Arabic | CP1256 | 223 | CP1256 | Sans Serif   47[KB]<br>Proportional |
|  | CP1256 + 137 characters<br>(Supports Persian) | 360 | Unicode encoding (UTF-16) |  |
| Hebrew | CP1255 | 200 | CP1255 | Sans Serif   52[KB]<br>Proportional |
|  | CP1255 + 82 characters | 282 | Unicode encoding (UTF-16) |  |
| Thai | CP874 | 192 | CP874<br>Unicode encoding (UTF-16) | PhSansThai_RT   120[KB]<br>Proportional |
| Vietnamese | CP1258 | 214 | CP1258 | Sans Serif   37[KB]<br>Proportional |
|  | CP1258 + 110 characters | 324 | Unicode encoding (UTF-16) |  |
| Hindi | Unicode Devanagari defined characters | 155 | Unicode encoding (UTF-16) | Sans Serif   74[KB]<br>Proportional |

## Japanese

New Gothic    UD font

愛の広がる美しいフォント

New Round Gothic   UD font

愛の広がる美しいフォント

## European languages

New Gothic    UD font

Beautiful typeface

## Simplified Chinese characters  Chinese government certification received

New Gothic    UD font

美丽的字体

## Traditional Chinese characters

New Gothic    UD font

美麗的字體

## Korean

New Gothic    UD font

아름다운 서체

## Arabic    (Layout Engine required)

Sans Serif

محرف جميل

## Thai    (Layout Engine required)

PhSansThai_RT

แบบอักษรที่สวยงาม

## Hebrew    (Layout Engine required)

Sans Serif

גופן יפה

## Vietnamese    (Layout Engine required)

Sans Serif

Kiểu chữ đẹp

## Hindi    (Layout Engine required)

Sans Serif

सुंदर टाइपफेस

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| --- | --- |
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