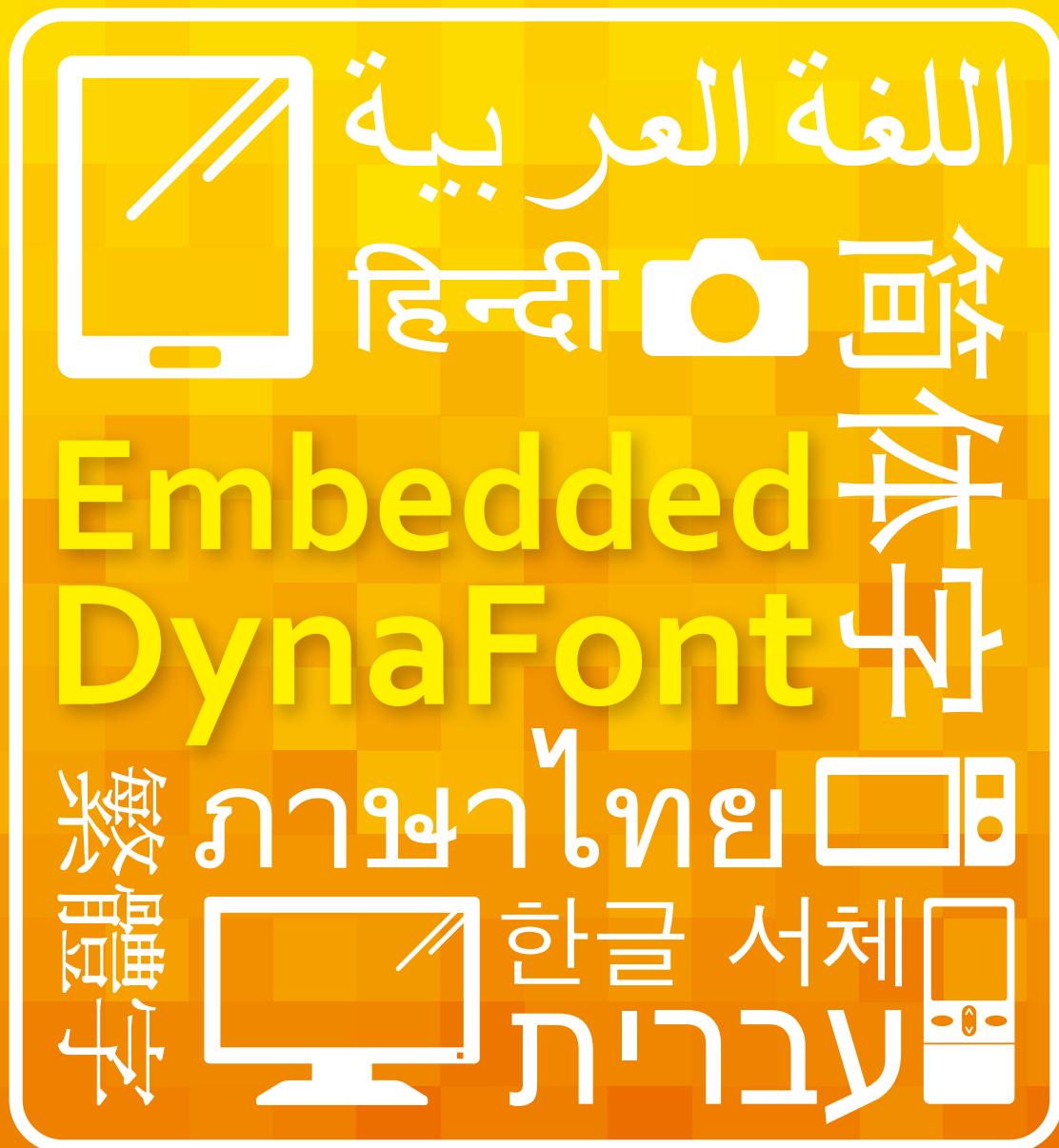




DynaFont

## Embedded DynaFont General Catalog



Scalable Outline Font For Embedded Devices

- DigiType Font

Versatile Font For Embedded Devices

- Bitmap Font
- Gray Bitmap Font
- TrueType Font

Multilingual Font

- DigiType Font
- Bitmap Font
- TrueType Font

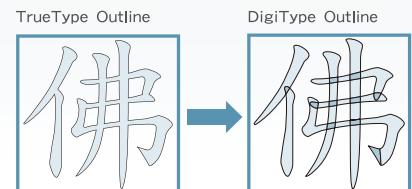
# DigiType Font

DigiType is a proprietary scalable font that was developed particularly for embedded systems to optimize drawing quality and speed.

## Introduction

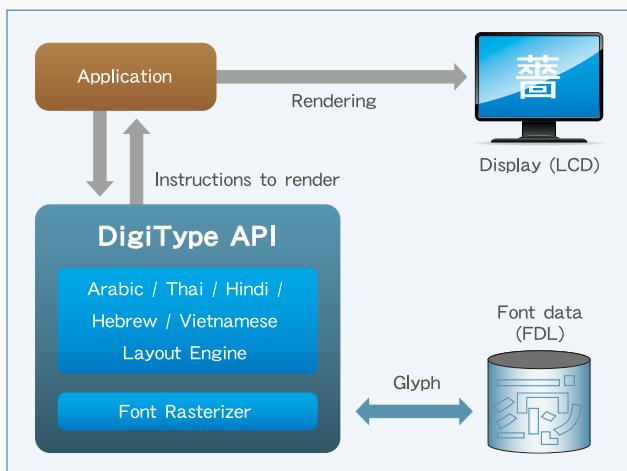
### ■ Stroke-Based Font

DigiType Font is developed from the patented Stroke-Based technology, which can significantly minimize font data size while maintaining high quality scalable outline. DigiType is most suitable for high resolution, multi-functional devices with limited memory space.

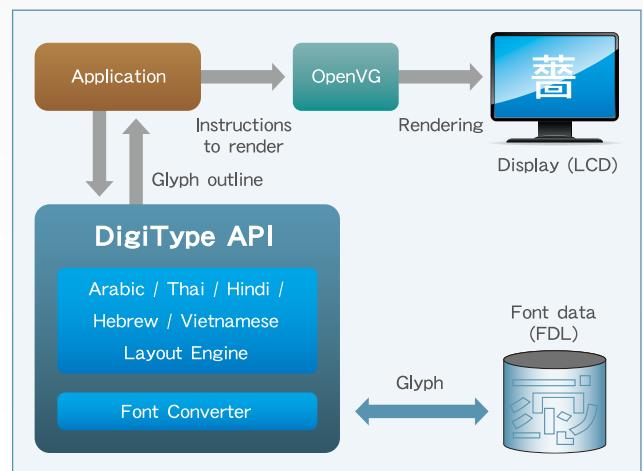


## Rendering Image

### ■ Software Rasterizing (rendering)



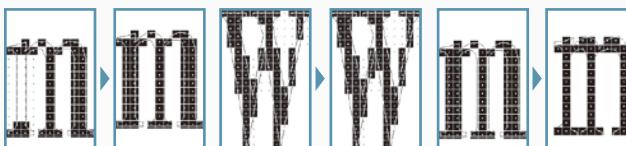
### ■ Hardware Rasterizing (by OpenVG)



## Revising Function · Decorative Function

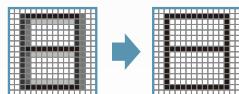
### ■ Hinting Function

- Stem Loss Hinting
- Dropout Control Hinting
- Grid Fitting Hinting



### ■ Rasterizer Revising Function

- Reduce shades of gradation
- Adjust stroke positions
- Adjust stroke colors



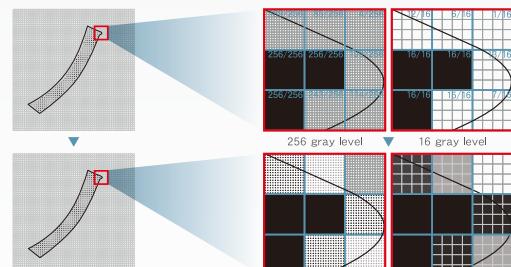
### ■ Small Size Revising Function (option)

- Strokes Reducing Hinting Technology

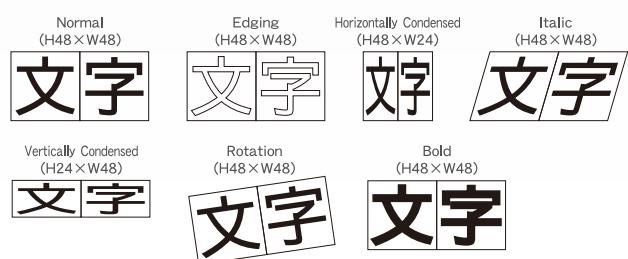


### ■ Anti-Alias Function (Smoothing Function)

- 4, 16, and 256 shades of gray



### ■ Decorative Function



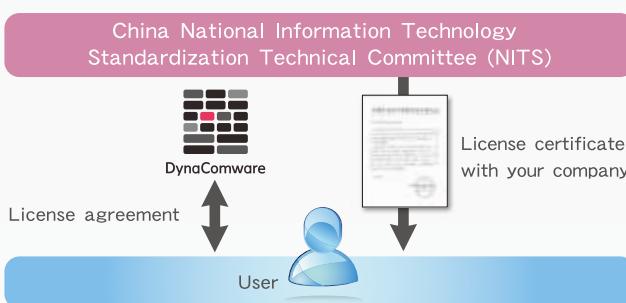
The Strokes Reducing Hinting technology developed by DynaComware reduces or moves the appropriate strokes when rendering Chinese characters with complex strokes, which makes small print clearly readable.

By this technology, the legibility of the small print is enhanced without affecting character recognition.

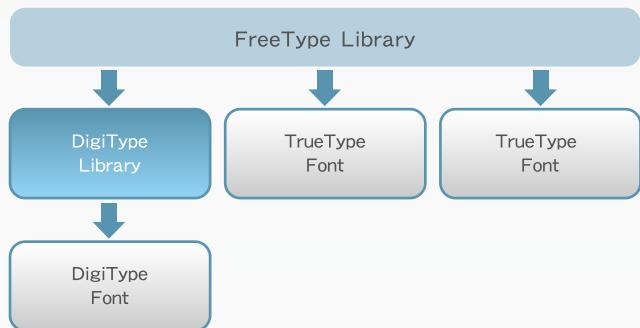


## Other Features and Functions

- Chinese national character standard, or GB18030  
(License certificate will be issued by NITS)



- DigiType Plug-In for FreeType Engine



- Universal Design Font

組込み機器に最適な読みやすいフォント

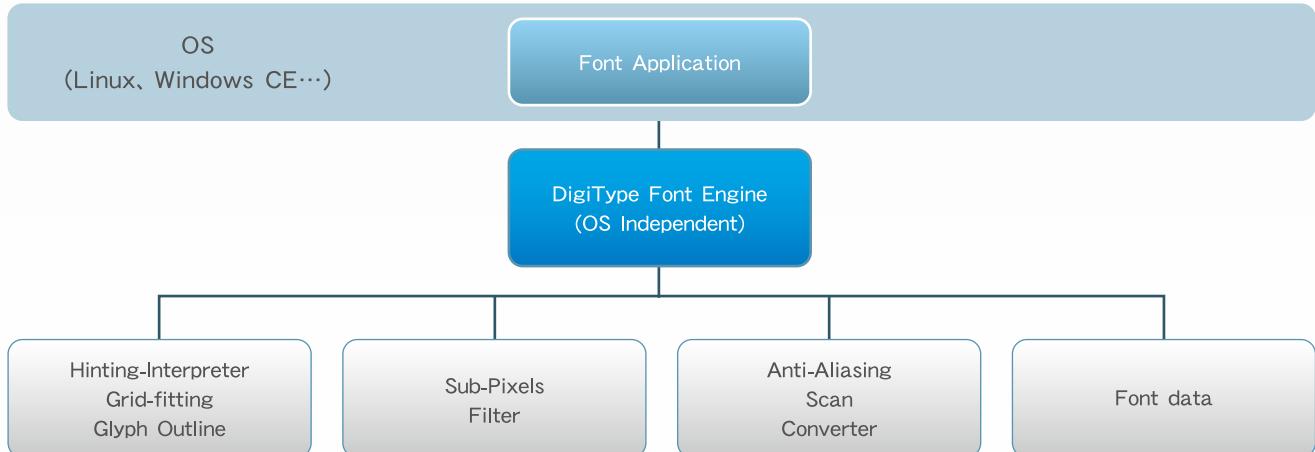
- Screen Font

組込み機器に最適な読みやすいフォント

## Font Description Language (FDL)

To embed DigiType Font into your environment, both font data and rasterizer (renderer) are needed. We will provide rasterizer compiled library according to the CPU. DigiType Font can be used in various embedded devices with high clock rate CPU such as appliances (DTV, STB, Digital camera, video camera), automotive products (car navigation, car audio, instrument panel), and multi-function printer.

- Structure of DigiType Font



- Standard Work Flow



# DigiType Font

DigiType  
Font

## Font Specification

CPU	Independent
OS	Independent
Programming Language	C
Library Size	[Shared library] 260KB [Basic library] 150KB
Working Memory	[Shared library] 256KB [Basic library] 120KB

- [\[Advanced Library\]](#)

Support 41 languages  
Support hardware acceleration  
Support Layout Engine

- [\[Basic Library\]](#)

Support software rendering only

## Font Data Size

Language	Standard	Font Data Size (DigiType)	Font Data Size (TrueType)
Japanese	JIS-X0208, X0201	~ 650KB	~ 2,300KB
Chinese (Simplified)	GB18030	~ 2,400KB	~ 8,000KB
Chinese (Traditional)	Big5	~ 1,100KB	~ 7,300KB
Chinese (Hong Kong)	Big5+HKSCS	~ 1,500KB	~ 9,700KB
Korean	KSX1001	~ 740KB	~ 2,300KB

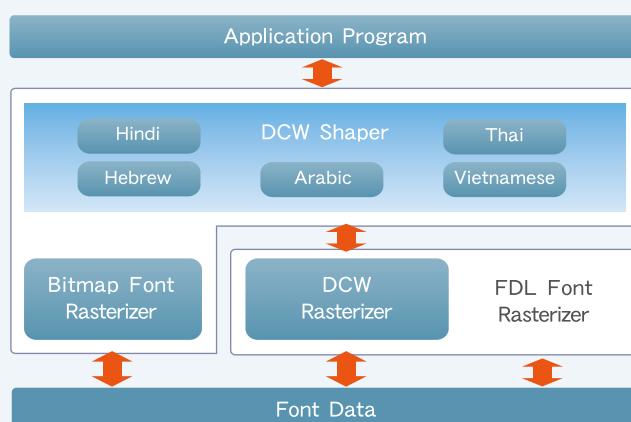
Language	Standard	Font Data Size (DigiType)	Font Data Size (TrueType)
European	Unicode	~ 190KB	~ 250KB
Arabic	Unicode	~ 380KB	~ 500KB
Thai	Unicode	~ 30KB	~ 40KB
Vietnamese	Unicode	~ 210KB	~ 280KB
Hindi	Unicode	~ 300KB	~ 400KB
Hebrew	Unicode	~ 30KB	~ 40KB

\* Data Size can be reduced depending on user environment

03

## Font Layout Engine Specification

### Font Layout Engine



### Common API Specification of Font Layout Engine

CPU	Independent
OS	Independent
Programming language	C
Library size	Appx. 260KB (Common in Arabic / Thai / Hindi)
Working Memory	Appx. 256KB (Common in Arabic / Thai / Hindi)

\* Shared in both DigiType and Bitmap

### Font Data Size

	Arabic	Thai	Vietnamese	Hindi	Hebrew
Bitmap	100KB~	22KB~	40KB~	44KB~	30KB~
DigiType	420KB	67KB	120KB~	200KB	70KB~
Standard font	Unicode				

\* Bitmap Font size varies with each pixel size family.

\* Bitmap Font is compatible only with BDF data as of now

### Deliverables

#### Bitmap Font

- Layout engine library
- Font data
- Layout porting / specification guides

#### DigiType Font

- |   |                                  |
|---|----------------------------------|
| ● Layout engine library                 | ● Rasterizer library             |
| ● Font data                             | ● Rasterizer specification guide |
| ● Layout porting / specification guides |                                  |

# Bitmap Font, Gray Bitmap Font

Bitmap  
FontGray  
Bitmap  
Font

Bitmap Font is recommended for devices with low CPU power.

## Bitmap Font

Bitmap  
Font

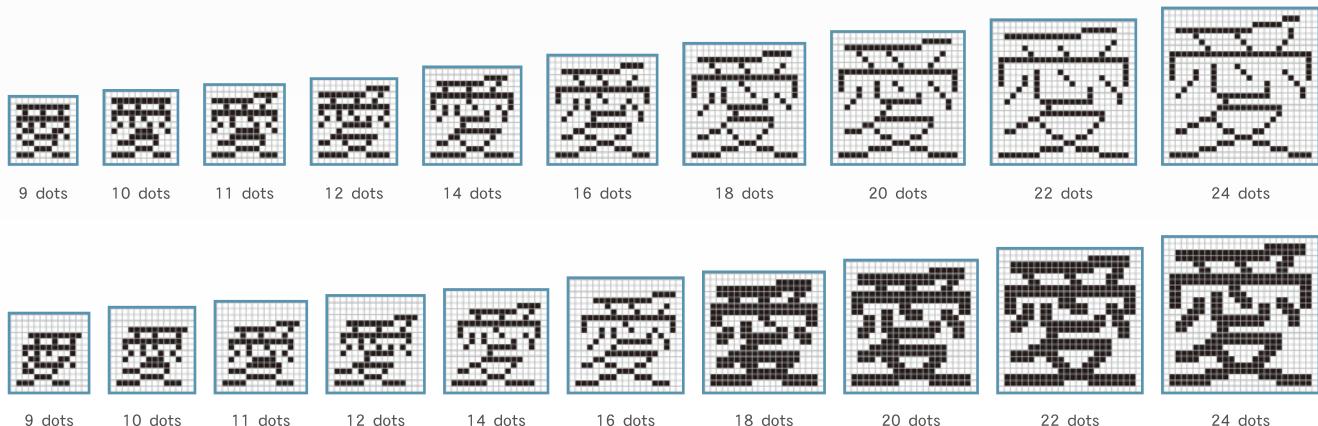
- Bitmap Font is composed of pixel dots, and is suitable for small display and low-spec device.

### Formats

- Raw scan binary data
- BDF format
- Embedded in TTF
- Bitmap image per character
- Programming source

Monochrome bitmap (1 bit per pixel) : Capacity of one character =  $[(W+7)/8] \times H$

W : width, H : height [a] is an integral number which does not exceed the real number "a".



## Gray Bitmap Font

Gray  
Bitmap  
Font

- Gray level Bitmap Font can display character line smoothly even in small sizes.

16 gradation gray bitmap(4 bit per pixel) : Capacity of one character =  $[(W+7)/8] \times 4 \times H$

W : width, H : height [a] is an integral number which does not exceed the real number "a".



TrueType  
Font

## TrueType Font

TrueType  
Font

## ■ Brief Intro

DynaComware developed a unique radical-based TrueType using “radicals” instead of strokes to minimize the volume of components required in an Asian Font set, making the memory size extremely small. The memory size for Radical-based TrueType is less than 2.5MB, only one fourth of the original 10MB.

Gothic Font

Design Font

Maru-Gothic Font

## Basic Specification

	Bitmap Font	Gray Bitmap Font	TrueType Font
Japanese JIS-X0201, JIS-X0208 ● Symbols                          ● Alphanumeric Characters ● Hiragana                        ● Katakana ● Greek                            ● Cyrillic alphabet ● Kanji (JIS : first level)    ● Kanji (JIS : second level) ● Half-width : Alphanumeric characters, Katakana 7,468 characters	Bitmap (24 dots) (Character only) Binary (ex) 525KB BDF (ex) 2,237KB	Gray Bitmap (24 dots) (Character only) Binary (ex) 2,100KB	Gothic W2 : 2.1MB Gothic W5 : 1.9MB Maru gothic : 3.5MB Mincho : 4.2MB Maru : 4.3MB
Chinese (Simplified Chinese character) GB18030 27,484 characters	1,933KB	—	Gothic : 8MB Mincho : 16.6MB Song : 13.3MB Kaisho : 21.8MB
Chinese (Traditional Chinese character) Big5-2000 13,963 characters	950KB	3,797KB	Gothic : 4.6MB Maru gothic : 3.5MB Mincho : 8.1MB
Korean KSX1001 8,322 characters	585KB	2,340KB	Gothic : 2.2KB Mincho : 3.7KB
European Language Latin set 1 Unicode (Basic Latin, Latin-1 assistance, addition) 245 characters	18KB	72KB	Gothic
European Language Latin set 2 Unicode (Basic Latin, Latin-1 assistance, Latin ext (A+B), addition) 343 characters	24KB	96KB	Gothic
Cyrillic (Greek : Copts) 256 characters	18KB	56KB	Gothic
Greek (Cyrillic, assistance) 144 characters	10KB	68KB	Gothic

## Characters

	Latin set 1	Latin set 2	Cyrillic	Greek		Latin set 1	Latin set 2	Cyrillic	Greek
ISO 8859-1	○	○	—	—	ISO 8859-7	—	—	—	○
ISO 8859-2	—	○	—	—	ISO 8859-9	○	○	—	—
ISO 8859-3	—	○	—	—	ISO 8859-10	—	○	—	—
ISO 8859-4	—	○	—	—	ISO 8859-15	○	○	—	—
ISO 8859-5	—	—	○	—	ISO 8859-16	—	○	—	—

Languages which need layout engine (Arabic / Thai / Vietnamese / Hindi / Hebrew)  
Layout engine + font Layout engine is not provided for TrueType Font.

## TrueType Font Typeface Samples – Basic Typefaces –

DFUDGothic-W2

**表示機器に適したフォント**  
0123456789ABCDEabcde!?@

DFUDGothic-W4

**表示機器に適したフォント**  
0123456789ABCDEabcde!?@

DFUDGothic-W6

**表示機器に適したフォント**  
0123456789ABCDEabcde!?@

DFUDMaruGothic-W2

**表示機器に適したフォント**  
0123456789ABCDEabcde!?@

DFUDMaruGothic-W4

**表示機器に適したフォント**  
0123456789ABCDEabcde!?@

DFUDMaruGothic-W6

**表示機器に適したフォント**  
0123456789ABCDEabcde!?@

DFA GothicP-W2

**表示機器に適したフォント**  
0123456789ABCDEabcde!?@

DFA GothicP-W3

**表示機器に適したフォント**  
0123456789ABCDEabcde!?@

DFGothicP-W5

**表示機器に適したフォント**  
0123456789ABCDEabcde!?@

DFMinchoP-W3

**表示機器に適したフォント**  
0123456789ABCDEabcde!?@

DFMinchoP-W5

**表示機器に適したフォント**  
0123456789ABCDEabcde!?@

DFHSGothic-W3

**表示機器に適したフォント**  
0123456789ABCDEabcde!?@

DFHSGothic-W5

**表示機器に適したフォント**  
0123456789ABCDEabcde!?@

DFHSGothic-W7

**表示機器に適したフォント**  
0123456789ABCDEabcde!?@

DFHSGothic-W9

**表示機器に適したフォント**  
0123456789ABCDEabcde!?@

DFHSMincho-W5

**表示機器に適したフォント**  
0123456789ABCDEabcde!?@

DFHSMincho-W7

**表示機器に適したフォント**  
0123456789ABCDEabcde!?@

DFHSMincho-W9

**表示機器に適したフォント**  
0123456789ABCDEabcde!?@

DFSMarugothic-Lt

**表示機器に適したフォント**  
0123456789ABCDEabcde!?@

DFMaruGothic-Md

**表示機器に適したフォント**  
0123456789ABCDEabcde!?@

DFMaruGothic-SB

**表示機器に適したフォント**  
0123456789ABCDEabcde!?@

DFMincho-UB

**表示機器に適したフォント**  
0123456789ABCDEabcde!?@

DFMincho-SU

**表示機器に適したフォント**  
0123456789ABCDEabcde!?@

## TrueType Font Typeface Samples – Decorative Typefaces –

DFHanziPen-W3

**表示機器に適したフォント**  
0123456789ABCDEabcde!?@

DFHanziPen-W5

**表示機器に適したフォント**  
0123456789ABCDEabcde!?@

DFHannotate-W5

**表示機器に適したフォント**  
0123456789ABCDEabcde!?@

DFHannotate-W7

**表示機器に適したフォント**  
0123456789ABCDEabcde!?@

DFKanTeiRyu-W11

**表示機器に適したフォント**  
0123456789ABCDEabcde!?@

DFGanKaiSho-W9

**表示機器に適したフォント**  
0123456789ABCDEabcde!?@

DFKyoKaSho-W3

**表示機器に適したフォント**  
0123456789ABCDEabcde!?@

DFKyoKaSho-W4

**表示機器に適したフォント**  
0123456789ABCDEabcde!?@

DFKinBun-W5

**表示機器に適したフォント**  
0123456789ABCDEabcde!?@

DFFuun-W12

**表示機器に適したフォント**  
0123456789ABCDEabcde!?@

DFYuGaSo-W7

**表示機器に適したフォント**  
0123456789ABCDEabcde!?@

DFRyuSeki-W9

**表示機器に適したフォント**  
0123456789ABCDEabcde!?@

# Multilingual Character Set

DigiType  
FontTrueType  
FontBitmap  
FontGray  
Bitmap  
Font

Features of Embedded Dynafont include a wide range of language availability and environment compatibility. We have the most suitable multilingual font solution for each country.

Asia



Asia



Japanese

JIS-X0201

JIS-0208



Chinese (Simplified Chinese character)

GB2312



Korean

KSX1001



Chinese (Traditional Chinese character)

Big5

CNS



Chinese (Hong Kong)

HKSCS



Latin Set

1



Latin set-1

Unicode Basic Latin, Latin-1 Supplement,etc.



English



French



Spanish



German



Italian



Portuguese



Indonesian



Swedish



Dutch



Danish



Norwegian



Finnish



Icelandic



Faroe



Latin Set

2



Latin set-2

Unicode Basic Latin, Latin-1 Supplement, Latin Extended-A, Latin Extended-B, etc.



English



French



Spanish



German



Italian



Portuguese



Indonesian



Swedish



Dutch



Danish



Norwegian



Finnish



Icelandic



Faroe



Croatia



Czech



Hungarian



Polish



Romanian



Slovakian



Slovenian



Sorbia



Esperanto



Maltese



Turkish



Estonian



Latvian



Lithuanian



● Eskimo ● Nordic



	Latin set 1	Latin set 2	Cyrillic	Greek
ISO 8859-1	○	○	—	—
ISO 8859-2	—	○	—	—
ISO 8859-3	—	○	—	—
ISO 8859-4	—	○	—	—
ISO 8859-5	—	—	○	—
ISO 8859-7	—	—	—	○
ISO 8859-9	○	○	—	—
ISO 8859-10	—	○	—	—
ISO 8859-15	○	○	—	—
ISO 8859-16	—	○	—	—

### Insufficient letters in Latin set-1 :

- Dutch.....Lack of [IJ, ij]
- Estonian .....Lack of [Š, š, Ž, ž]
- French.....Lack of [Œ, œ] and [Ÿ]
- Finnish.....Lack of [Š, š, Ž, ž]

## Multilingual Layout Engine

Arabic



Arabic script is written from right to left, and similar to cursive writing in Latin alphabet, thus letter forms changes depending on next character. Arabic Layout Engine change letter forms and connect them from right to left. When left to right languages such as English are detected, the layout engine will line up the letters correctly.

میلاد  
سعید

Thai



Thai character is composed of phonogram and vowel. Vowels are located on four sides of the phonogram (above, below, right, and left), and combination of phonogram and vowel present a letter. Thai layout engine adds vowel on the phonogram and displays characters in real time. This can save considerable memory space compared to pre-combining all of the characters.

ສຸຂສັນຕິວັນເກີດ  
ສ + ຖ + ຂ + ສ + ແ + ນ + ຕ + ດ  
+ ອ + ດ + ນ + ຕ + ປ + ວ + ດ

Vietnamese



Vietnamese used to be written in Chinese character, now it is written by Roman alphabet, called “Quốc ngữ”. It has six tones, alphabet and diagram display vowel, consonant and tone diagram. Vietnamese Layout engine combines alphabet and diagram correctly.

Chúc mừng  
C+h+ú+c m+ư+ò+n+g  
sinh nhật  
s+j+n+h n+h+a+ò+t

Hindi



Hindi script (Devanagari) is written from left to right. Each word is connected by a horizontal line that runs along the top of full letters. Supplementary vowel letters are added from side to side and up and down. The Hindi layout engine displays them in real time, and optimizes the locations of supplementary letters depending on the word.

जन्मदिन  
ज + न + म + द + ि + न  
मुबारक हो  
म + ० + ब + ० + र + क ह + ०

Hebrew



Hebrew script is written from right to left. Vowel signs are added below consonant letters to describe its pronunciation. The Hebrew layout engine adds vowel to consonant and displays in real time.

יום הולדת שמח



This character set conforms to the standard for digital broadcasting in Japan regulated on SDT-B24 by Association of Radio Industries and Business (ARIB). It contains extended character set for Vehicle Information and Communication System (VICS). Bitmap (Maru Gothic, Kaku Gothic), TrueType, and DigiType are available.



Radio Data System (RDS) is a communications protocol standard for embedding small amounts of digital information in conventional FM radio broadcasts.  
IEC62106 (Latin, Cyrillic, Greek, Arabic, and Hebrew) is available in Bitmap (Serif&San-serif), TrueType, and DigiType Font.

X	♪	!	へ	♪	☺	⊗	∩	×	P	R	◆	◆	◆
〒	S	二	図	解	ss	B	N	天	交	映	無	料	?
再	新	初	終	生	販	唐	吹	門	秘	ほ	方	干	前
文	幼	山	光	星	太陽	船	火	空	カ	ジ	ト	ハ	後
→	←	↑	↓	年	月	日	円	①	vn	(ab)	(cb)	ice	mb
(sa	(x)	(sy)	(n)	(or)	(g)	(pe)	(n)	(n)	DJ	演	Fax	No.	Tel
中	右	指	走	打	%	½	¼	¼	8	白	黑	口	盾
炎	波	渦	渦	渦	<	多	≤	≥	△	(A)	(B)	(C)	(D)

# Multilingual Character Set

## TrueType Font Typeface Samples

### Chinese GB18030

DFHeiW5-A

品质精美设计创新全球风行  
0 1 2 3 4 5 6 7 8 9 A B C D E a b c d e ! ? @

DFKaiW5-A

品质精美设计创新全球风行  
0 1 2 3 4 5 6 7 8 9 A B C D E a b c d e ! ? @

DFSongW3-A

品质精美设计创新全球风行  
0 1 2 3 4 5 6 7 8 9 A B C D E a b c d e ! ? @

DFFangSongW3-A

品质精美设计创新全球风行  
0 1 2 3 4 5 6 7 8 9 A B C D E a b c d e ! ? @

### Chinese Big 5

DFHeiMedium-B5

品質精美設計創新全球風行  
0 1 2 3 4 5 6 7 8 9 A B C D E a b c d e ! ? @

DFMingMedium-B5

品質精美設計創新全球風行  
0 1 2 3 4 5 6 7 8 9 A B C D E a b c d e ! ? @

DFHeiBold-B5

品質精美設計創新全球風行  
0 1 2 3 4 5 6 7 8 9 A B C D E a b c d e ! ? @

DFMingBold-B5

品質精美設計創新全球風行  
0 1 2 3 4 5 6 7 8 9 A B C D E a b c d e ! ? @

### Korean

DFKGothic-Md

생일축하합니다  
0 1 2 3 4 5 6 7 8 9 A B C D E a b c d e ! ? @

DFKMincho-Md

생일축하합니다  
0 1 2 3 4 5 6 7 8 9 A B C D E a b c d e ! ? @

DFKGothic-Bd

생일축하합니다  
0 1 2 3 4 5 6 7 8 9 A B C D E a b c d e ! ? @

DFKMincho-Bd

생일축하합니다  
0 1 2 3 4 5 6 7 8 9 A B C D E a b c d e ! ? @

### Thai

DFP-Thai

ສູນສັນຕິວິນເກີດ  
0 1 2 3 4 5 6 7 8 9 A B C D E a b c d e ! ? @

### Hindi

DFP-Hindi

जन्मदिन मुबारक  
0 1 2 3 4 5 6 7 8 9 A B C D E a b c d e ! ? @

### Arabic

DFP-Arabic

عيد ميلاد سعيد  
0 1 2 3 4 5 6 7 8 9 A B C D E a b c d e ! ? @

### Hebrew

DFP-Hebrew

יום הולדת שמח  
0 1 2 3 4 5 6 7 8 9 A B C D E a b c d e ! ? @

### Vietnamese

DFP-LATIN-W5

Chúc mừng sinh nhật  
0 1 2 3 4 5 6 7 8 9 A B C D E a b c d e ! ? @

### Latin set-1,2

DFP-LATIN-W5

Pójźże, kiń tę chmurność w  
głęb flaszy! ÁBÇÖŞÜŽ159?@

### Western Languages

DFStyle1-1

The five boxing wizards  
jump quickly. ALIS159!?

DFStyle1-2

The five boxing wizards  
jump quickly. ALIS159!?

DFStyle1-3

The five boxing wizards  
jump quickly. ALIS159!?

DFStyle2-1

**The five boxing wizards  
jump quickly. ALIS159!?**

DFStyle2-2

The five boxing wizards  
jump quickly. ALIS159!?

DFStyle2-3

The five boxing wizards  
jump quickly. ALIS159!?

DFStyle3-1

**The five boxing wizards  
jump quickly. ALIS159!?**

DFStyle3-2

**The five boxing wizards  
jump quickly. ALIS159!?**

DFStyle4-1

**The five boxing wizards  
jump quickly. ALIS159!?**

DFStyle4-2

**The five boxing wizards  
jump quickly. ALIS159!?**

DFStyle4-3

The five boxing wizards  
jump quickly. ALIS159!?

DFStyle5-1

The five boxing wizards  
jump quickly. ALIS159!?

DFStyle5-2

The five boxing wizards  
jump quickly. ALIS159!?

DFStyle5-3

**The five boxing wizards  
jump quickly. ALIS159!?**

DFStyle5-4

**The five boxing wizards  
jump quickly. ALIS159!?**

DFStyle6-1

The five boxing wizards  
jump quickly. ALIS159!?

DFStyle6-2

The five boxing wizards  
jump quickly. ALIS159!?

DFStyle6-3

The five boxing wizards  
jump quickly. ALIS159!?

DFStyle7-1

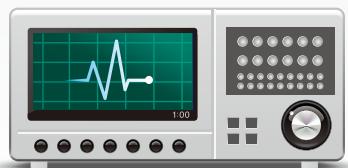
**THE FIVE BOXING WIZARDS  
JUMP QUICKLY. ALIS159!?**

# Font Solutions for Every Operating System

## Non OS

### Bitmap Font

Bitmap Font is suitable for equipments with small or monochrome LCD, as well as low end microcomputer or small capacity equipment which is unnecessary real time.



Measuring instrument



Hot-water system



Refrigerator



Washing machine



Blu-ray disc recorder



Microwave



Air conditioner

## Windows and Other OS

### Bitmap Font

### TrueType Font

### DigiType Font

DynaFont is used for digital camera medical instruments, tablet and ATM terminals.



TV



Tablet



Digital camera



Navigation system



Medical instruments



ATM terminal

## Linux OS

### Bitmap Font

### TrueType Font

### DigiType Font

You can use embedded DynaFont for a equipments variety of, such as tablet, MFP, automotive product, TV, etc.



Tablet, smart phone



MultiFunction Printer



Car navigation



TV

# Embedded DynaFont General Catalog



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