

# WorldType®

Layout Engine



Talk to your customers in a language they'll understand.

## NO MATTER WHAT THE LANGUAGE.

*Companies face many challenges when designing mobile phones, PDAs, set-top boxes, control panels, digital TVs and other devices that are both feature-rich and targeted to a variety of geographic markets — whether international, regional or*

### AMONG THESE CHALLENGES:

1. Products must adhere to the local writing conventions for text display in selected markets.
2. Text must work within graphically oriented environments such as Web browsers and other rich media applications.
3. Functionality and performance must meet users' expectations, despite an environment's small memory size and processing capacity.
4. Products must be able to support languages that may be added later.

These challenges are solved efficiently and cost-effectively with Monotype Imaging's WorldType Layout Engine, a modular software library for composing, positioning and rendering text in multiple languages.

Small code size, selectable build options, a modular architecture, an ANSI-standard C implementation and a robust demo kit — plus expertise from Monotype Imaging's worldwide customer support organization — all make the WorldType Layout Engine a logical choice for developers looking to gain time-to-market advantage.





## WHY LAYOUT IS IMPORTANT

*Users want the same attention to detail in their handhelds and other embedded devices that they get when using desktop computers. Text should be properly formatted for both language and function. Monotype Imaging's WorldType Layout Engine handles the various intricacies of layout requirements, including:*

### LIGATURES

In some writing systems, two or more adjacent letters may combine to form a glyph known as a ligature (or grapheme cluster). The ligature may appear to contain components from the original characters, or it may have a completely different appearance. Examples include the conjunct consonants which are required for Indic scripts such as Bengali.

### CONTEXTUAL SUBSTITUTIONS

In addition to ligatures, some scripts require that a letter take different forms depending on context. For example, an Arabic letter may take an initial, medial, final or isolated form depending on the characters adjacent to it.

### BIDIRECTIONAL TEXT FLOW

While most scripts are written from left to right, some scripts (such as Arabic and Hebrew) are written from right to left (though numbers are still written left to right).

### LINE BREAKING

Line breaks may be explicit (such as a carriage return) or may be determined by rules regarding word boundaries and punctuation (such as a line break after a

close parenthesis or before an open parenthesis) and other language-specific considerations. Thai words, for example, do not have spaces between them.

### CURSOR POSITIONING

Whether the cursor moves right or left to go forward depends on whether the text flows left or right.

### PARAGRAPH STYLING ATTRIBUTES

These include how text is aligned (left, right or center) and whether paragraphs are indented from the left or right side.

### WRAPPING

Text may flow around an inline graphic object or irregular shape.

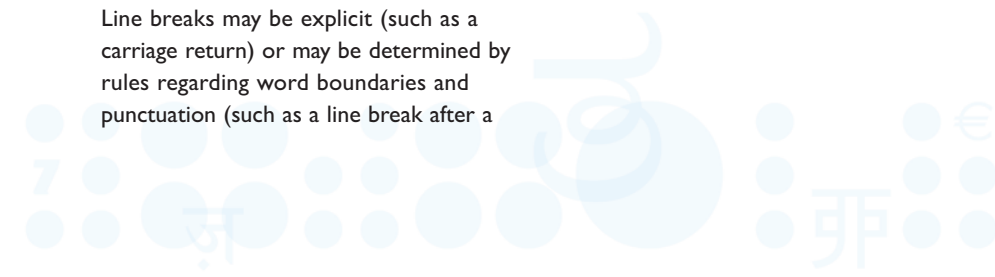
### SPECIAL EFFECTS

Users may want to apply color or effects to text, such as drop shadows, edge effects, outlined text, underlines and strike-through effects. Special character combinations may also be used to display graphic icons or emoticons.

## LANGUAGES SUPPORTED

*In addition to supporting all languages that require Latin- and Cyrillic-based scripts, Monotype Imaging's WorldType Layout Engine supports most major languages of the world, including the ones listed here.*

Arabic  
Armenian  
Assamese  
Bengali  
Chinese, Simplified  
Chinese, Traditional  
Farsi (Persian)  
Greek  
Gujarati  
Hebrew  
Hindi (Devanagari)  
Japanese  
Kannada  
Korean  
Malayalam  
Marathi (Devanagari)  
Oriya  
Panjabi (Gurmukhi)  
Sinhala  
Syriac  
Tamil  
Telugu  
Thai  
Urdu  
Vietnamese (Latin + diacritics)



## SEE FOR YOURSELF

*WorldType Layout Engine includes a Windows®-based demo application that helps you become familiar with the product's many layout features and the process of building applications that include those features.*

### LATIN SCRIPT WITH SAMPLE ATTRIBUTES APPLIED


WorldType® Layout Engine supports many text attributes including **underline**, **strikeout**, **boldness**, **italics**, **edge effects** and **colors**.

Text may be left aligned, right aligned, or justified. Paragraph and line spacing options are supported.

Users may define substitution dictionaries for displaying emoticon characters ☺ and images 🍌.

### PROGRAM SHOWING TEXT FLOW WITHIN CONTAINERS AND AROUND OBJECTS

*Users define one or more "text containers". Text flows from one container to the next. This allows for both simple and complex text layout scenarios. Two containers can be used to define columns. Text will flow around objects that are anchored*



*with the containers. In this example, text flows in two columns around an image anchored on the "page". The image straddles the two columns. Multiple objects may be defined. Users may also choose to directly define how text flows using line-based layout.*

## Performance-driven layout

*The WorldType Layout Engine is designed to be highly portable and efficient in its use of resources — both yours and your product's.*

The engine deploys as a layer between a client application and the font engine. WorldType Layout Engine performs several tasks:

- Receives text from the client
- Identifies the proper layout rules that apply to this text
- Formulates the appropriate rendering instructions
- Passes those instructions to the rendering engine

A highly componentized architecture combined with the ability to selectively include or exclude certain functionality in the build (such as bidirectional text flow) means deployments are easier to manage, easier to port and more highly optimized for both resource usage and performance.

In addition, code that is likely to be modified is isolated to a port module, making the code easier to identify and manipulate. Common functions required by the engine's other modules are provided in a single base module, reducing the size of the port and making the software easier to manage.

## WORLDTYPE LAYOUT ENGINE BLOCKS

### LAYOUT

*Provides core text layout API and implementation:*

- Describes rich text
- Composes and displays text
- Sets up layout data
- Sets layout options
- Supports UI functions such as caret and selection

### DISPLAY

- Renders glyphs to device or image buffer
- Defines base class context object that abstracts a device
- Defines image buffer objects

### UNICODE™

*Provides Unicode API and implementation:*

- Character properties (e.g., nonbreaking, new paragraph)
- Bidirectional algorithms
- Normalization algorithms
- Implements string object
- Stores character properties

### FONT SERVICES BLOCK

- Manages font engines, fonts and font styles
- Communicates with font engine (iType®, UFST® or other)
- Manages implementation of glyphs
- Gets OpenType® tables from fonts

### OPENTYPE

- Receives font table info from Font Services
- Interprets font table info
- Hands off interpretation to Layout

### BASE SERVICES BLOCK

- Basic types — abstracts all data types for all modules
- Fixed-point math
- File location abstraction, tags, print statement abstraction
- 2D – 2D graphics routines
- Allocates and frees memory based on application need
- Configures target system (e.g., allocates memory)

### FONT ENGINE

*(iType, UFST or other)*

- Loads fonts and font tables
- Scales and rasterizes glyphs
- Returns glyph metrics

*Notes: WorldType Layout Engine has an internal abstraction of the font engine within the font services layer, but the font engine itself (iType, UFST or other) is not part of the layout engine.*

# Your built-in advantages

## PROVEN RELIABILITY

Monotype Imaging is a proven leader in embedded text technology. We are committed to developing fonts and font technologies that best meet customer needs — whether for global, regional or local distribution — now and into the future.

## SUPERIOR QUALITY

WorldType Layout Engine delivers sophisticated script layout capabilities. In conjunction with Monotype Imaging's fonts and iType font engine, the result is exceptional on-screen quality, legibility and multilingual capability.

## EASY LOCALIZATION

Developers are able to use one layout engine for enabling devices to meet international, regional or local language requirements — now and as products are updated.

## AUTOMATIC TEXT LAYOUT AND POSITIONING

WorldType Layout Engine handles the layout, positioning and display of rasterized glyphs, including those from complex scripts. This powerful capability allows companies to freely move forward to meet product schedules, lower costs and gain time-to-market advantages.

## EXTENSIBILITY

New or additional scripts can be incorporated easily into a product. Developers no longer must dedicate valuable time to rework hard-coded tables and logic to support a new script.

## UNICODE COMPLIANCE

WorldType Layout Engine complies with the Unicode universal character encoding specification, an industry standard that enables electronic text to convey all the world's written languages and symbols.

## SMALL, PORTABLE AND MEMORY-EFFICIENT

Written in ANSI C and designed for memory-constrained environments, WorldType Layout Engine is quickly and easily ported to any hardware platform or real-time operating system. The technology streamlines implementation requirements and costs.

## EASY INTEGRATION WITH ITYPE FONT ENGINE

WorldType Layout Engine builds on top of Monotype Imaging's iType font engine, providing a simple, tested solution that encompasses both the rasterizer and the layout engine.

## STANDARDS LEVERAGE YOUR INVESTMENT

*A great solution does not translate into a profitable business if it must be reinvented each time it is transferred to another device. That's why Monotype Imaging's WorldType Layout Engine supports key standards in the embedded space — and why we work closely with standards leaders.*



*Our relationship with QUALCOMM, for example, means that adopters of the BREW® solution, which includes a development platform and content-delivery system for deploying graphically rich content across a broad range of low- to high-end mobile phones, can leverage the layout capabilities supported by the WorldType Layout Engine.*



More than rich media

*Our partnership with Ikivo, a leading provider of industry-standard Mobile SVG (Scalable Vector Graphics) solutions, is bringing the benefits of multilingual, stylistic, scalable text to the SVG environment for creating rich media applications and content.*

*Other platforms compatible with the WorldType Layout Engine include the Linux®, Java™, HTML/CSS and MHP® platforms. We also work with key standards-setting organizations such as the Java Community Project, the Khronos Group, MPEG, Unicode and the DVB® (Digital Video Broadcasting) Project.*

# Specifications

## SUPPORTED FEATURES

- Unicode encodings (UTF8, 16 and 32)
- OpenType layout table processing (GSUB and GPOS)
- Abstracted data types (for easy porting to your run-time)
- No static or global variables (for deployment flexibility)
- Build-time configuration options (reduces build size)
- Low memory usage
- Data sharing and data caching
- Multithreading and multiprocessing
- CSS (cascading style sheets)
- Abstracted data types

## TECHNICAL OVERVIEW

- Supports most platforms, operating systems and browsers
- Delivered as ANSI C source code (object-oriented approach)
- 66–122KB code size depending on build options and other variables

## WORLDTYPE LAYOUT ENGINE SDK CONTENTS

- WorldType Layout Engine source code
- iType source code (licensed separately)
- Sample program source code
- Test and tools code
- Sample font and text data for several languages/scripts
- API reference guide
- WorldType Layout Engine and iType user guides (PDF)

## WORLDTYPE LAYOUT ENGINE DEMO KIT CONTENTS

- Windows demo application
- WorldType Layout Engine library
- iType library
- Unicode data
- Sample font data
- Sample text data
- API reference guide
- WorldType Layout Engine user guide (PDF)

### Monotype Imaging Inc.

500 Unicorn Park Drive  
Woburn, MA 01801  
phone 781 970 6000  
fax 781 970 6001

### Monotype Imaging Ltd.

Unit 2, Perrywood Business Park  
Salfords, Redhill, Surrey RH1 5DZ  
England  
phone 44 (0)1737 765959  
fax 44 (0)1737 769243

### Monotype Imaging K.K.

Level 32, Shinjuku Nomura Building  
1-26-2 Nishi-Shinjuku  
Shinjuku-ku, Tokyo, Japan 163-0532  
phone 81 3 5322 1377  
fax 81 3 5322 2929

### Linotype GmbH

Du-Pont-Straße 1  
61352 Bad Homburg  
Germany  
phone 49 (0) 6172 484-418  
fax 49 (0) 6172 484-429

### China Type Design Ltd.

2403-4, Yardley Commercial Building,  
3 Connaught Road West, Sheung Wan,  
Hong Kong  
phone 852 2575 6789  
fax 852 2591 9232

### [www.monotypeimaging.com](http://www.monotypeimaging.com)

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