

## *L&H™ RealSpeak™ Compact SDK for Mobile Applications on Microsoft® Windows® CE*

### Product Description

Based on the award-winning and state-of-the-art L&H™ RealSpeak™ technology, the L&H™ RealSpeak™ Compact SDK is able to read, understand and convert any text into the most natural sounding voice available today, specifically for mobile applications running on Microsoft® Windows® CE platforms.

The new L&H™ RealSpeak™ Compact SDK is part of the product range of L&H Mobile Speech Solutions that support a unique interface common to L&H's Speech Recognition and Text-to-Speech Mobile engines. Application developers and system integrators can easily and rapidly integrate speech interaction into their applications. The SDK is delivered with a full set of development tools, sample programs and extensive documentation.

L&H™ RealSpeak™ Compact is compliant with the L&H™ Speech API (LHAPI) and supports Windows® CE on different processors used in a Windows® CE environment: MIPS, StrongArm and SH-3. The speech output is 16-bit linear PCM and a sampling rate of 11 kHz.

### Applications

L&H™ RealSpeak™ Compact resides on the embedded device, bringing to mobile applications the same high quality sound, inflection, tone and pace previously available only on high-powered servers at telecommunication centres. Any information such as news, traffic, or SMS, to be accessed while on the move, can be fed directly to L&H™ RealSpeak™ Compact and read by a human-sounding voice.

Using L&H™ RealSpeak™ Compact can bring significant value to virtually any mobile application:

**Enterprise:** voice-enable applications for the mobile workforce to access business-critical information from any location

**Automotive:** provide hands-free and eyes-free access to information from the car. The high quality of L&H™ RealSpeak™ Compact can be fully exploited by a car's high quality audio system.

**Mobile learning:** learning from any device and in any location

**Mobile gaming:** gamers are no longer tied to the PC or games console

**Healthcare:** doctors can download a patient's record and have it read aloud by a high quality voice

**Industrial:** send and retrieve data directly from the factory shop floor to and from the information management system

### Key Features

**Superior quality** — the natural sounding voice of L&H™ RealSpeak™ is now available on compact platforms.

**Highly intelligible** — using advanced linguistic processing and pre-processors.

**Multilingual** — available in a variety of languages.

**Unlimited vocabulary** — based on in-depth linguistic and phonetic rules that support any type of input text (e-mail, currencies, dates, Web pages).

**Fully customizable** — runtime control of parameters including volume, speech-rate, spelling, exception pronunciations (via user specified dictionaries).

**Special text pre-processors** — e-mail pre-processors are available as optional plug-ins to L&H™ RealSpeak™ Compact; for example, L&H's e-mail pre-processor, generates accurate pronunciation of e-mail addresses headers, URLs, date and time formats.

**Different read-out modes** — options available to set the computer to speak letter-by-letter, word-by-word, line-by-line, or sentence-by-sentence.

**Runtime flexibility** — change/retrieve information on the L&H™ RealSpeak™ system and various parameters (languages, text parameters, speech parameters, notification type, etc.).

**Easy integration** — thanks to the new Application Programming Interface (API).

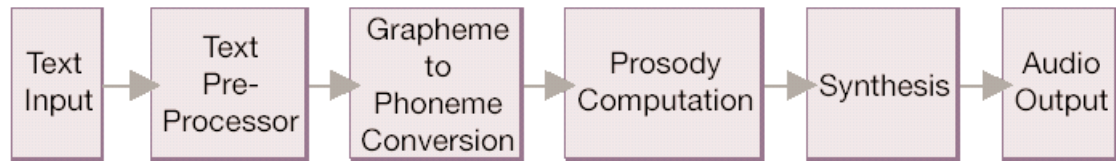
**Compatible with TTS3000** — both engines use the same API allowing for easy upgrade of existing applications using TTS3000.

**Development tools** — the SDK is delivered with a full set of development tools to facilitate application design, implementation, evaluation, and testing. Including the Text-to-Speech demonstrator and the L&H™ User Dictionary Editor available as off-line tools on the development host PC.

**Extensive documentation** — the SDK is delivered with the API help file, detailed sample programs, and an extensive documentation set including user's guide and programmer's reference as well as a full Function Reference Appendix and full Guidelines Resources Management for typical Windows® CE devices.

**Functional description**

The following diagram shows the data flow of the L&H™ RealSpeak™:

**Benefits**

**Improved customer satisfaction** —

L&H™ RealSpeak™ Compact provides the most natural sounding and intelligible voice on the market today.

**Enhanced user experience** — deliver natural sounding content on a continuous to users in any location and on any device.

**New business opportunities** — adding a speech dimension to your mobile application opens up new markets.

**Extensive language coverage** — ensures that customers can reach their worldwide markets.

**Easy integration** — L&H native API (LHAPI) enables fast and easy integration into mobile applications and with solutions using other L&H speech technologies.

**Highly customizable** — L&H™ RealSpeak™ Compact allows full control of the way in which a text will be spoken.

**Functional Components**

The L&H™ RealSpeak™ Compact SDK for Microsoft® Windows® CE contains the following functional components:

1. The L&H™ Application Programming Interface (API) to access the functionality of L&H™ RealSpeak™ Compact SDK for Microsoft® Windows® CE.
2. Development tools: The L&H™ User Dictionary Editor Optional Modules to expand functionality: E-mail pre-processor (EMPP)
3. A set of sample programs illustrating the usage of API functions and the L&H™ RealSpeak™ Compact SDK for Microsoft® Windows® CE application programming
4. Extensive documentation.

**Support for Application Programming Interfaces**

**The native L&H™ Application Programming Interface (API)**

The L&H™ RealSpeak™ Compact SDK provides application developers with a well-defined function library to ensure that all the functionality of the L&H™ RealSpeak™ engine is easily accessible. The new API not only allows the highest level of control, but also has fewer overheads due to the limited number of layers. The common L&H API enables scaling across different operating systems and allows the creation of a unique speech interface to applications using different L&H Speech Solutions, thus optimizing programming effort and time-to-market.

The L&H API for L&H™ RealSpeak™ Compact SDK supports synchronous programming. Synchronous means that an API function call will not return to the application until the task initiated is completed.

As a standard on Windows® CE, the L&H™ RealSpeak™ Compact SDK is fully UNICODE compliant.

**Supported Processors**

The L&H™ RealSpeak™ Compact SDK for Microsoft® Windows® CE supports any mobile device supporting a StrongARM, SH3 or MIPS processor. Support for other processors can be delivered upon request.

**Supported Operating System Versions**

The L&H™ RealSpeak™ Compact SDK for Microsoft® Windows® CE supports Microsoft® Windows® CE greater than or equal to Microsoft® Windows® CE Version 2.11. Microsoft® Windows® CE Version 3.0 is preferred.

**Programming Languages**

The L&H™ RealSpeak™ Compact SDK for Microsoft® Windows® CE is a professional software development kit for common programming languages (such as C/C++), providing application developers with a suite of development tools to easily and rapidly configure speech synthesis interfaces for their Microsoft® Windows® CE applications.

**Application Development**

The L&H™ RealSpeak™ Compact SDK for Microsoft® Windows® CE benefits from a modular structure allowing multiple languages and versions to be installed.

**Implementation of the L&H™ RealSpeak™ Compact SDK**

For application development the following set of files is needed: language independent files (TTS core control module), the language specific DLLs, and DLLs from other optional modules if relevant.

Application development with the L&H™ RealSpeak™ Compact SDK for Microsoft® Windows® CE uses the native L&H™ API. Using the Microsoft® development tools for Windows® CE, e.g. the 'Embedded Visual Tool' (or EDS) allows the developer to build an application on the development host PC. A download or install process puts the application onto the target Windows™ CE device, together with the required L&H™ RealSpeak™ Compact engine parts.

Although the pronunciation of the text is automatically generated, the L&H™ RealSpeak™ Compact SDK allows full control of the way in which a text will be spoken. The application developer is offered several ways to intervene in the

automatic pronunciation process of the text by means of control sequences specified within the input text, the L&H™ User Dictionary, or simply by entering the phonetic input. The speech output can be customized for volume (low - high), input mode (orthographic vs. phonetic), and read mode (spelling, word-by-word, sentence-by-sentence, terminator based).

## Redistribution of the application

Once developed, the application has to be installed on the end-user's platform. Different parts of the L&H™ RealSpeak™ Compact SDK for Microsoft® Windows® CE have to accompany your application software. The language, user, and engine-related DLL's and data need to be included. The L&H Setup program will install the runtime components and the language models in a shared directory, used by all speech-enabled applications. These components can be embedded into the Microsoft® Windows® CE image or can be installed together with the custom application.

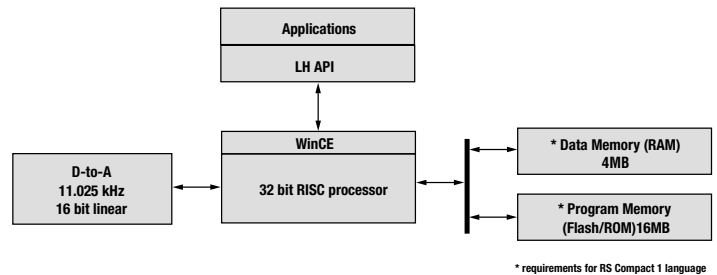
## Microsoft® Windows® CE Porting Considerations

**UNICODE:** The Microsoft® Windows® CE operating system is UNICODE-string based. Therefore, the Microsoft® Windows® CE version of the L&H™ API only supports the UNICODE implementation.

**Modularity:** Microsoft® Windows® CE is a compact, multi-platform operating system basically used for embedded devices which typically have limited hardware resources (e.g. limited memory and CPU power). Some non-pure runtime components of the L&H™ RealSpeak Compact SDK can be omitted in order to maintain a small footprint of the engine on the target device. This depends on the application needs.

Platform limitations related to the use of the API and parameters are clearly explained in the documentation.

## Sample Implementation of L&H™ RealSpeak™ Compact



## SYSTEM REQUIREMENTS:

For Application Development

- Intel® Pentium® based PC 266 MHz or higher
- Microsoft® Windows NT®4/2000 (Intel® platform only)
- Microsoft® Visual Studio 6 and Embedded Visual Tools for Microsoft® Windows® CE.
- Active Sync V3.0
- The L&H PCMM TTS3000 V7 (for tools, manuals and language independent parts)

For Target Device

- A SH3, StrongARM or MIPS -based Microsoft® Windows® CE device with the Operating System version greater than or equal to than Microsoft® Windows® CE 2.11. Microsoft® Windows® CE 3.0 is preferred.
- Adequate audio hardware (DA + speaker) on the device in order to obtain high-quality speech synthesis. Recommended specifications are 11Khz, 16-bit linear PCM.
- Typical memory requirements (e.g. StrongARM) around 16 MB of ROM, 4MB of RAM.

**For more information visit us on the web at [www.lhsl.com](http://www.lhsl.com)**

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