



FONIX

VoicelN

4.1 Standard Edition

SDK

**VoicelN 4.1** — a significant leap forward in speech recognition technology

### Voice Interfaces

Conversational technologies are in demand. Speech interfaces are a natural way to control and navigate devices with small screens and keyboards for improved safety and ease of use. Using the Fonix VoicelN SDK, developers can quickly and easily integrate Automatic Speech Recognition (ASR) into applications or onto devices. Most applications are likely to need a voice interface soon. Fonix has it now!

### Fonix VoicelN 4.1

VoicelN ASR is based on Fonix proprietary neural network technology. It provides accurate speaker-independent ASR in noisy environments. This new release represents a significant leap forward in ASR technology. Fonix's newly developed neural network phoneme localization technology employs significantly more phonetic, linguistic and prosodic information about the speech signal, which improves recognition rates in noisy environments.

### VoicelN 4.1 Improvements

In addition to the operating systems previously supported, Fonix VoicelN 4.1 now supports the new Microsoft Windows Mobile 5.0. This includes support for the .NET Compact Framework and new programming interfaces C#.NET and VB.NET. These new interfaces enable developers to quickly develop and deploy speech applications.

Previous versions of Fonix VoicelN have performed well in noisy environments using a 'push-to-talk' paradigm. The new Fonix neural network phoneme localization technology utilizes additional prosodic and linguistic information provided by the neural net. It also processes prosodic and linguistic information in the speech to better frame speech onset in high-noise conditions to more accurately estimate phonetic probabilities. These advances provide higher recognition accuracies in very noisy environments.

New Features	Benefits
Phonetics pronunciation analysis	Helps users learn correct language pronunciations
Java support on Windows CE, Analog devices Blackfin	Additional platforms – more developer flexibility
Improved phoneme estimates	Better recognition accuracy
Improved speech detection and speech framing	
Improved rejection of non-speech sounds	Better rejection of background noises

### An efficient, scalable, low-cost solution

With Fonix VoicelN, the software components and architecture operate directly on the main processor, eliminating the need for an additional CPU or DSP. The flexible, self-contained modules allow developers to design systems that operate within application memory and MIPS constraints, and are highly portable across many processor and operating system platforms.

With multiple OS and hardware platform support, plus over 10 Languages, Fonix VoicelN offers developers the best solution to meet their needs as well as the needs of end users. Fonix VoicelN is a state-of-the-art ASR SDK that is flexible and simple to use, and provides the highest accuracy for applications to deploy on devices. This is truly a "write-once, deploy many times" solution, saving developers and manufacturers time and money.



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## New Fonix Voiceln Features

- Phonetic Localization
  - Improved phoneme estimates for better recognition and language acquisition applications
  - Improved rejection of non-speech sounds
  - Improved speech detection and speech framing
- Improved demo applications
- New platforms: Blackfin, Java-WinCE

## Accurate

- Noise-tolerant
- Insensitive to environment acoustics (no training necessary)
- Performs with background speech and music
- Multi-pass recognition
- Optimized letter (spelling) and digit recognition (voice dialing)

## Efficient

- Compact neural networks/small memory footprint
- Small computing requirements (starts at 20 MIPS)
- Dynamic optimization, minimize memory and MIPS
- Recognition time – 100 ms after end-of-speech detection
- Proprietary optimized memory manager for fileless OS support

## Flexible

- Speaker-independent, continuous speech
- Word spotting / Finite-state grammars
- Dynamic word spotter and grammar creation during run-time
- Create grammars/words lists from unlimited vocabulary
- N-best support for word spotting, grammars, and spelling
- Adjustable out-of-vocabulary rejection
- Normalized confidence scoring for phonemes, words or phrases
- Speaker pronunciation modeling
- Speaker dependent phonetic voice tags
- Far-field microphone capabilities
- Offline grammar and runtime compilers
- User data association with recognition words
- Wide character support

## Vocabulary

- Active vocabulary size is only limited by memory and MIPS
- Customizable user dictionary
- Supports spelling greater than 65 K words

## Languages

- UK/US English, Canadian/European French, German, Italian, Japanese, Castilian/Latin American Spanish, Swedish, Korean
- Mandarin Chinese (in development)

## Fonix Embedded Programming Interface

- OS Commands Pushed into FNX API

	Win32	QNX	WinCE	Palm	Linux	Symbian
C/C++	•	•	•	•	•	•
Java	•	•	•	•	•	•
VB	•					
eVB			•			
.Net	•		•			

Future ports – • contact Fonix sales

## Memory Usage

- Base Engine: 352 KB ROM
- Dictionary: 0 – 2,323 KB ROM
- Neural Networks: 50 – 225 KB ROM
- 200 KB - 1 MB RAM based on number of words or grammar size (approximately 1.2 KB per word ROM/RAM)

## MIPS

- Word spotting: 10 words – 25 MIPS (can vary based on the CPU architecture)
- Finite state grammar for continuous speech (not dictation): 20 words – 70 MIPS (can vary based on the CPU architecture)

## Audio Requirements

- Microphone-in, speaker-out support
- 8 KHz – 8 bit µlaw/alaw (mono channel)
- 8 KHz, 11 KHz, 16 KHz 10-16 bit linear, mono-channel
- Bandwidth: 100 Hz to sample frequency/2 -- LPF 3dB skirt
- Spectral Flatness: +/- 6dB
- Total Harmonic Distortion (THD) < 2%
- Signal-to-noise (SNR) > 0dB for best results

## Platform Support Packages

	Win32	WinCE 3.0/4.x	WinCE 5.0	Smartphone 2003/05 PCC/PE 2003/05	QNX 6.3	Linux 2.2/2.4/2.6.5	Symbian-Nokia Series 60 and UIQ	No OS
Hardware Platform								
Analog Devices								
Blackfin 531/533/535/537								•
ARM								
ARM 7		•	•	•				*
ARM 9/V4/V4i		•	•	•	•	•	•	*
Epson								
S1C33 Family, GNU33								•
Freescale (Motorola)								
i.MXL		•	•	•	•	•	•	*
PowerPC 5100/5200					•	*		
Intel								
SA-1110		•	•	•	•	•	•	*
XScale		•	•	•	•	•	•	
X86	•	•	•	•	•	•		
MIPS								
R4xxx		•	*					
NeoMagic								
MiMagic 3		•	•	•				*
MiMagic 5		•	•	•	•	•	•	*
Renesas (Hitachi)								
SH3		•						*
SH4		•	*		•	•		
Samsung								
S3C ARM Family		•	•	•	•	•	•	*
Texas Instruments								
OMAP 710 / 720		•	•	•				*
OMAP 5910		•	•	•	•	•	•	*

\* Contact sales

Developer Support Program: SDK training, application development.

Call Fonix at 801.553.6600 and say "Sales" for information and support pricing, or visit [www.fonix.com](http://www.fonix.com).