dsPIC30F Speech Recognition Library

Summary

The dsPIC30F Speech Recognition Library provides voice control of embedded applications that require an alternative user interface. With a vocabulary of up to 100 words, the Speech Recognition Library allows users to control their application vocally. The Speech Recognition Library is an ideal front end for hands-free products such as modern appliances, security panels and cellphones. The Speech Recognition Library has very modest memory and processing requirements and is targeted for the dsPIC30F5011, dsPIC30F5013, dsPIC30F6012 and dsPIC30F6014 processors.

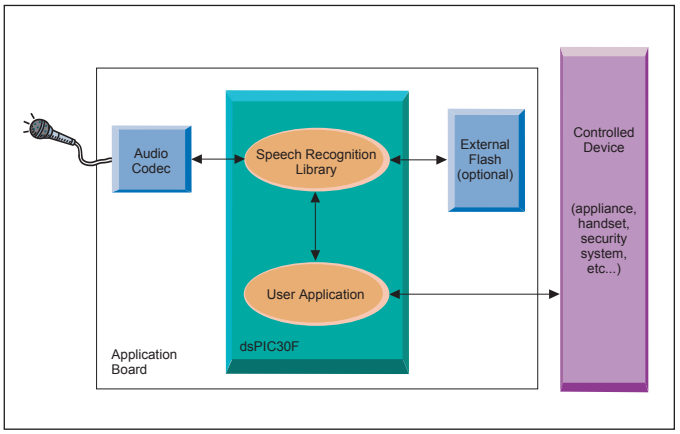
Description

The Speech Recognition Library provides isolated, speaker-independent word recognition of US English. It allows a user to control an application through a set of fixed, voice commands. The library has already been pre-trained by a demographic cross-section of male and female US English speakers. Conveniently, no training is required for end-users of the product.

The library samples speech data from a voice codec connected to the dsPIC30F's Data Converter Interface. The data is processed a frame at a time, and when a word ending is detected, the received word is identified using Hidden Markov Model processing. After the library identifies the word, your application may then take some pre-defined action.

The Speech Recognition algorithm is written in assembly language to optimize performance and minimize RAM usage. A well defined API makes it easy to integrate the Speech Recognition Library with your application. Library functions let your application easily disable and enable speech recognition. The library lets your other system processing operations take place without disrupting speech recognition.

A PC-based Word Library Builder program allows you to build a custom library from a Master Library of 100 common words. A noise profile is selected that suits your operating environment. The noise profile consists of a noise type and a signal-to-noise ratio (SNR). The noise type can be any combination of 3 different noise sources (automobile, office and white noise), and the SNR may be as low as 15 dB. The Word Library Builder program generates source files that you then use to build your application. These files contain data tables that the library uses to perform speech recognition.



Features

Key features of the dsPIC Speech Recognition Library include:

- US English language support
- Speaker-independent recognition of isolated words
- No speaker training is required
- Hidden-Markov Model based recognition system
- Recognition time < 500 msec
- Master Library of 100 common words (available in *dsPIC30F Speech Recognition Library User's Guide*)
- Windows® based utility allows you create a custom library from the master library
- Additional words can be added to the master library (fee based)
- Data tables can be stored in external memory
- Optional Keyword Activation and Silence Detection
- Optional system self-test using a predefined keyword
- Flexible API
- Full compliance with Microchip MPLAB® C30 Language Tools
- *dsPIC30F Speech Recognition Library User's Guide*
- Designed to run on dsPICDEM™ 1.1 General Purpose Development Board (DM300014)

Devices Supported

- dsPIC30F5011
- dsPIC30F5013
- dsPIC30F6012
- dsPIC30F6014

Resource Requirements

Sampling Interface: Si-3000 Audio Codec operating at 12.0 kHz
System Operating Frequency: 12.288, 18.432 or 24.576 MHz
Computational Power: 8 MIPs
Program Flash Memory: 18 KB + 1.5 KB for each library word
RAM: <3.0 KB

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Development Systems

Host System Requirements

- PC-compatible system with an Intel Pentium® class or higher processor, or equivalent
- A minimum of 16 MB RAM
- A minimum of 16 MB available for hard drive space
- CD-ROM drive
- One available standard serial port with a matching COM port available through the operating system
- Microsoft Windows 98, Windows NT® 4.0, Windows 2000 or Windows XP

Part Numbers and Ordering Information:

dsPIC30F Speech Recognition Library

Part Number	Description	Availability
SW300010-EVAL	dsPIC30F Speech Recognition Library Software License (Evaluation Only)(1)	Now
SW300010	dsPIC30F Speech Recognition Library Software License (Up to 5K units)(2)	Now
SW300011	dsPIC30F Speech Recognition Library Software License (5K+ to 25K units)(2)	Now
SW300012	dsPIC30F Speech Recognition Library Software License (25K+ to 100K units)(2)	Now
AC300031	Accessory Kit – Fixed 10-word Demo (includes: microphone, headset and 6.144 MHz clock oscillator)	Now

Note 1: The evaluation version offers the same functions and features as the other versions. The evaluation period is one year.
2: Quantities are per project, payable as a one-time license fee based on estimated lifetime volume for products resulting from the project. Please consult the factory for quantities above 100K.

dsPIC® Development Tools from Microchip

MPLAB® IDE MPLAB® Visual Device Initializer (included in MPLAB® IDE)	Free
MPLAB® C30 C Compiler	SW006012
MPLAB® ICD 2 In-Circuit Debugger/Programmer	DV164005, DV164007
MPLAB® ICE 4000	ICE4000
MPLAB® PM3 Universal Device Programmer	DV007004
dsPIC30F Math Library (included in download of MPLAB® C30 C Compiler)	Free
dsPIC30F DSP Library	Free
dsPIC30F Peripheral Library	Free
dsPICworks™ Data Analysis and DSP Software	Free
dsPIC® Digital Filter Design	SW300001
dsPIC30F Soft-Modem Library	SW300002/3/4/5
dsPIC® Speech Recognition Library	SW300010/11/12
dsPIC® Symmetric Key Embedded Encryption Library	SW300050
dsPIC® Asymmetric Key Embedded Encryption Library	SW300055
dsPIC30F Acoustic Echo Cancellation Library	SW300060
dsPIC30F Noise Suppression Library	SW300040
CMX-RTX™ for dsPIC30F	SW300031
CMX-Tiny+™ for dsPIC30F	SW300032
CMX-Scheduler™ for dsPIC® Devices	Free at www.cmx.com
dsPICDEM™ Starter Demonstration Board	DM300016
dsPICDEM™ 28-pin Starter Demonstration Board	DM300017
dsPICDEM™ 1.1 General Purpose Development Board	DM300014
dsPICDEM™ MC1 Motor Control Development System	DM300020
dsPICDEM.net™ 1 Connectivity Development Boards	DM300004-1
dsPICDEM.net™ 2 Connectivity Development Boards	DM300004-2

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