

EasyAEC

Technical Document
Version 2.0— Revision 2006-1-11

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Introduction

EasyAEC is an implementation of AEC (Acoustics Echo Cancellation). EasyAEC support multiple channels concurrent. There is no limit on concurrent channels and it can up to thousands channels.

The binary library of EasyAEC only support 8kHz samples. If you want to support samples other than 8kHz, you need buy the source code of EasyAEC.

EasyAEC specifications	
Speech sampling rate(Hz)	8000
Samples in one Frame	480

EasyAEC has a binary release version on Windows and Linux. The source code of EasyAEC is written by C/C++, so you can easily port it to UNIX, PPC,DSP, Vxworks or other operation system that support C/C++.

PACKAGE CONTENTS

EasyAEC.pdf	This document
EasyAEC.lib	Win32 statically linkable library of AEC for Pentium and compatible processors.
libAEC.a	Linux statically linkable library of AEC for Pentium and compatible processors.
EasyAEC.h	API prototypes and constants declarations required by the sample programs.
test_aec directory	Microsoft VC6.0 sample application and Linux GCC sample application. Demonstrating how to use AEC API calls.

The input requires raw 16-bit mono PCM speech data sampled at 8000 Hz as input, i.e., without any header information. For every speech frame, consisting of any number samples

ALGORITHM COMPLEXITY

The complexity of AEC is represented as percentage of CPU usage, and is as follows when tested on an Intel 800 MHz Celeron-MMX:

AEC less than 20% CPU time

ABOUT THE SAMPLE PROGRAMS

The sample programs under test_aec directory are used to simulate the AEC and demonstrate how to initialize and call the AEC process. The program is run as follows (where **infile1**,**infile2** and **outfile** are raw 16 bit PCM files sampled at 8 kHz):

```
test_aec infile1 infile2 outfile
```

To build the AEC sample programs on Windows, you can open test_aec.dsw with VC6.0 or later version. After compiler and link, it will create the execute program of test_aec.exe, you can test it with following command.

```
test_aec inputFromPeer.pcm inputToPeer.pcm out.pcm
```

To build the AEC sample programs on Linux, you only need run **make** command. After you successfully finished make command, you can run **make run** to test AEC.

EasyAEC API FUNCTIONS

EasyAEC_init

Description	Initializes the memory needed by the AEC process. This function must be called prior to opening or re-opening a channel.
Syntax	#include "EasyAEC.h" AEC_HANDLE EasyAEC_init();
Arguments	none
Returned value	Return a handle that represent an AEC channel, this value will used at EasyAEC_SaveSampleFromPeer, EasyAEC_FilterSampleToPeer and EasyAEC_release

EasyAEC_SaveSampleFromPeer

Description	Save the samples that received from peer into AEC buffer. They are the samples that will write to sound buffer. The AEC algorithm need them as the reference.
Syntax	#include "EasyAEC.h" bool EasyAEC_SaveSampleFromPeer(AEC_HANDLE hAEC, short *SampleFromPeer);
Arguments	hAEC The handle returned by EasyAEC_init SampleFromPeer The input speech buffer containing 16-bit PCM speech data that received from peer. The buffer length must equal 480.
Returned value	Return true if successful, return false if failed.

EasyAEC_FilterSampleToPeer

Description	Remove the echo before send the speech to peer. They are the samples that will read from sound buffer.
Syntax	#include "EasyAEC.h" bool EasyAEC_FilterSampleToPeer(AEC_HANDLE hAEC, short

*SampleToPeer);

Arguments	hAEC	The handle returned by EasyAEC_init
	SampleToPeer	The input speech buffer containing 16-bit PCM speech data that will send to peer. The buffer length must equal 480.
Returned value		Return true if successful, return false if failed.

EasyAEC_release

Description	release the memory allocated by the AEC process. This function must be called before you quit your program. If not, it will cause the memory leak.
Syntax	#include "EasyAEC.h" bool EasyAEC_release(AEC_HANDLE hAEC);
Arguments	hAEC The AEC handle returned by EasyAEC_init
Returned value	Return true if successful, return false if failed.

FAQs

Here are some frequently asked questions about the EasyAEC.

Q — What type of speech input format is required?

A — Raw 16-bit mono PCM sampled at 8000Hz. Do not use .WAV files. They contain a header that will produce distortion at the start of a decoded audio sample because the encoder interprets the header as speech data.

Q — How can I convert my .WAV files to raw 16 bit mono PCM sampled at 8000 Hz?

A — Use an audio editing tool such as SoX - Sound eXchange. See home.sprynet.com/~cbagwell/sox.html for more information

Q — Can I get link on platforms other than Pentium or compatible?

A — The object code provided in this package is Microsoft Win32 and Linux x86 compatible. It is compiled for the Pentium family of processors. If you want to use EasyAEC on other platforms, you should buy the source code of EasyAEC. Then you can compile and link.

Q — Is the EasyAEC able to handle multiple channels?

A — Yes, It can handle multiple channels. There is no limited.

Q — Is the EasyAEC codec free to use?

A — No, The version you get freely is a version only for test. If you want to use it in commercial, you must buy it from www.imtelephone.com. This version has the same function with the formal release version, but It can only run less than 6 hours continuously.

Q — How much does the EasyAGC codec cost?

A — The object code of Windows or Linux is \$2000/year. The source code is \$50000/year. You can buy it from www.imtelephone.com.