

GETTING STARTED

With FMOD Ex Programmer's API for Windows



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CONTENTS

Contents

Introduction	4
Support Resources	5
API documentation	5
Forums	5
Email.....	5
Wiki	5
Installation	6
Which dll to use	6
Which library to link to	6
Recommended startup sequence (IMPORTANT!)	7
Important issue with certain compilers and FMOD's C++ interface.....	9
Troubleshooting.....	10
Stuttering/skipping sound.....	10

Introduction

Welcome to the FMOD Ex Programmer's API for Windows, the quickest and easiest way to get great sound and music into your Microsoft Windows games. This document will show you how to get started implementing FMOD Ex in your game by pointing you in the direction of detailed API documentation and support resources. While the FMOD Ex Programmer's API presents the same interface on all platforms, each platform does have its own unique features and limitations - Windows-specific features/limitations will be listed here along with any hints and tips for getting the most out of FMOD Ex on Windows.

Have fun implementing great audio and drop us a line some time,

The FMOD Team
Melbourne, Australia
www.fmod.org

Support Resources

API documentation

Detailed API documentation can be found in the “documentation” directory/folder of your FMOD Ex Programmer’s API installation. This documentation is your main reference for information on FMOD Ex API classes and functions.

Forums

<http://www.fmod.org/forum>

This should be your first port of call for further FMOD information and questions on implementation. If you have a question related to FMOD, chances are someone else has already asked it. The FMOD forums are free for all FMOD users and are monitored by the FMOD team as well as being home to a strong community of FMOD developers, from student first-timers to top-level professionals working on games that are household names.

Email

support@fmod.org

This is our main technical support line. It’s monitored directly by the FMOD team and we aim to answer all emails within 24 hours. It’s free for all FMOD users and your issues will be addressed directly by the guys who wrote the code. If you can’t find an answer to your problem on the FMOD forums, shoot us an email and we’ll get right onto it.

Wiki

<http://www.fmod.org/wiki>

The FMOD Wiki contains a wealth of reference material related to FMOD. It includes common issues and solutions, a how-to section for cool techniques and also a package of learning materials that educators can use to teach FMOD to students.

Installation

Which dll to use

Use **api/fmodex.dll** to use FMOD Ex with all plugins statically compiled into the DLL. This means you can use all the features of FMOD without needing extra plugins accompanying your application. The DLL is bigger because of this.

Use **api/fmodexp.dll** to use FMOD Ex with plugins external. This DLL needs plugins to function, which you can find in the plugins directory. Plugins in the plugins/ directory need to be used to support all of FMOD Ex's features. Use this if you want a smaller distribution and only need one file format support for example (ie .WAV). The DLL is smaller because of this.

Which library to link to

Compiler	fmodex.dll	fmodexp.dll
Visual Studio	fmodex_vc.lib	fmodexp_vc.lib
Metrowerks Codewarrior	fmodex_vc.lib	fmodexp_vc.lib
Intel compiler	fmodex_vc.lib	fmodexp_vc.lib
Borland	fmodex_bc.lib	fmodexp_bc.lib
LCC-Win32	fmodex_lcc.lib	fmodexp_lcc.lib
Dev-C++, MinGW, Cygwin	libfmodex.a	libfmodexp.a

Recommended startup sequence (IMPORTANT!)

Due to configuration issues on Windows user's machines, this following code fixes the following issues:

- Speaker configuration in Windows being ignored and just defaulting to stereo. (see use of **System::getDriverCaps** and '**controlpanelspeakermode**' parameter, which is then passed to **System::setSpeakerMode**)
- Stuttering audio due to the user having their 'Hardware acceleration' slider set to 'off' in XP. (see check for **FMOD_CAPS_HARDWARE_EMULATED**, which then increases the FMOD DSP buffersize to over 200ms with **System::setDSPBufferSize**)
- Speaker configuration being set to a setting that the soundcard *doesn't actually support* (See check for **FMOD_ERR_OUTPUT_CREATEBUFFER**, which then triggers a re-initialization with **FMOD_SPEAKERMODE_STEREO**)

Note: The following code must be used for shipping games! Do not ship a game without a startup sequence based on this code!

Use the following code as a basis for your Windows start up sequence:

```
FMOD::System      *system;
FMOD_RESULT        result;
unsigned int       version;
int               numdrivers;
FMOD_SPEAKERMODE   speakermode;
FMOD_CAPS          caps;
char              name[256];

/*
   Create a System object and initialize.
*/
result = FMOD::System_Create(&system);
ERRCHECK(result);

result = system->getVersion(&version);
ERRCHECK(result);

if (version < FMOD_VERSION)
{
    printf("Error!  You are using an old version of FMOD %08x.  This program requires %08x\n",
        version, FMOD_VERSION);
    return 0;
}

result = system->getNumDrivers(&numdrivers);
ERRCHECK(result);

if (numdrivers == 0)
{
    result = system->setOutput(FMOD_OUTPUTTYPE_NOSOUND);
    ERRCHECK(result);
}
else
{

```

```
result = system->getDriverCaps(0, &caps, 0, 0, &speakermode);
ERRCHECK(result);

/*
    Set the user selected speaker mode.
*/
result = system->setSpeakerMode(speakermode);
ERRCHECK(result);

if (caps & FMOD_CAPS_HARDWARE_EMULATED)
{
    /*
        The user has the 'Acceleration' slider set to off! This is really bad
        for latency! You might want to warn the user about this.
    */
    result = system->setDSPBufferSize(1024, 10);
    ERRCHECK(result);
}

result = system->getDriverInfo(0, name, 256, 0);
ERRCHECK(result);

if (strstr(name, "SigmaTel"))
{
    /*
        Sigmatel sound devices crackle for some reason if the format is PCM 16bit.
        PCM floating point output seems to solve it.
    */
    result = system->setSoftwareFormat(48000, FMOD_SOUND_FORMAT_PCMFLOAT, 0, 0,
FMOD_DSP_RESAMPLER_LINEAR);
    ERRCHECK(result);
}
}

result = system->init(100, FMOD_INIT_NORMAL, 0);
if (result == FMOD_ERR_OUTPUT_CREATEBUFFER)
{
    /*
        Ok, the speaker mode selected isn't supported by this soundcard. Switch it
        back to stereo...
    */
    result = system->setSpeakerMode(FMOD_SPEAKERMODE_STEREO);
    ERRCHECK(result);

    /*
        ... and re-init.
    */
    result = system->init(100, FMOD_INIT_NORMAL, 0);
    ERRCHECK(result);
}
```


Important issue with certain compilers and FMOD's C++ interface

Due to incompatible linking standards with C++ symbols in libraries across different compilers, you will not be able to use the C++ interface of FMOD Ex with the following compilers:

- Borland
- LCC-Win32
- Dev-C++
- MinGW
- Cygwin

You can only use the FMOD Ex C interface with these compilers, as at least that has a compatible standard (i.e. stdcall symbols are always the same format). Each C++ compiler generates its own version of mangled symbols, and the above-mentioned compilers are not compatible with the symbols that MSVC produces, which is what FMOD is compiled in, and is the most popular compiler for commercial development at this stage.

Note that the Intel compiler and Codewarrior do not have this problem, they can resolve MSVC style symbols.

Troubleshooting

Stuttering/skipping sound

This is most common when using software mixed sounds or when streaming sounds from disk. Commonly known as buffer underrun/overrun, this problem can be caused by one or more factors:

Bad soundcard drivers

This may be solved by upgrading your soundcard drivers. (Note: it is recommended you get the latest drivers anyway).

CPU issues

Machine too slow, or whatever you are trying to do with FMOD is too cpu intensive! (i.e. playing 100 MP3s at once will most likely bring FMOD to its knees, or maybe a user stream callback or DSP callback is spending too much time executing).

Mixer buffersize is set too small

You can increase stability to combat these issues, by increasing FMOD's internal mixing buffer size. This will lead to greater stability but also larger latency on issuing commands to hearing the result. Call **System::setDSPBufferSize** to alter this. See documentation for **System::setDSPBufferSize** for more information.

Stream buffersize is set too small

If you are using the FMOD Ex streamer, you might be streaming from a slow media, such as CDROM or over network, or even a fragmented harddisk, therefore FMOD needs more time to fill its streaming buffer before it runs out. See **System::setStreamBufferSize** to adjust the file read buffer size for the streamer. If the stream is starving because the codec is an expensive codec (and the file media is not to blame) then the problem could be the FMOD stream decode buffer size. You can adjust this using the 'decodebuffersize' member of the **FMOD_CREATEINDEXINFO** structure.

Output type

FMOD_OUTPUTTYPE_DSOUND will provide more solid output than **FMOD_OUTPUTTYPE_WINMM** in anything except Windows NT. This is a problem with Windows Multimedia Services not being as realtime as it should be. Under NT, **FMOD_OUTPUTTYPE_WINMM** is more stable, as DirectSound in NT is just emulated by using WINMM itself and is actually slower and has longer latency! **Note!** Please don't feel the need to use **System::setOutput** if you don't need to. FMOD auto-detects the best output mode based on the operating system.