

# How to build Gem in Microsoft Windows

## Preamble

As I'm French, I have a French version of Visual C++ 2010 Express. I translated menu titles here myself and the translation may differ from the official one. I apologized for that.

## Requirement

### **Visual C++**

You need a Visual C++ environment to build Gem. You can download and install Visual C++ 2010 Express. A serial number is needed but you can get one for free from Microsoft.

### **Puredata**

You need the puredata sources to build Gem, the Vanilla or Extended version. The easiest way is to download a zip for Windows from <http://puredata.info/downloads>. Then unpack it.

### **Pthread**

Download the latest release from here : <http://sourceforge.net/projects/pthreads4w/> and unpack it.

### **FTGL and Freetype**

You also need FTGL and Freetype libraries. There are binaries for Freetype on the web but I can't find any for FTGL.

1. Download Freetype developer files from <http://gnuwin32.sourceforge.net/packages/freetype.htm>  
NOTE : please choose *Developer files* zip which contains everything you need.
2. Extract the zip file in a place you know and you may remember easily (e.g. I put it in :  
C:\Users\win7\Bibliothèques\freetype-2.3.5-1-lib\  
You should have at least an "include" and a "lib" directories in this folder.
3. Download FTGL from <http://sourceforge.net/projects/ftgl/>
4. Extract the tar.gz file (you may need a good archive extractor to do that, 7zip is a good candidate <http://www.7-zip.org/>) (again in a place you know and you may remember easily)
5. Then open the `ftgl-2.1.3~rc5\msvc\vc8\ftgl.sln` file in Visual C++. If you are not using VC8 the project should be converted automatically and please follow the wizard.
6. Open the *Properties manager (Gestionnaire de propriétés)* under the View (Affichage) menu. If you have the Express edition, it is hidden... Click on *Tools > Parameters > Advanced parameters (Outils > Paramètres > Paramètres avancés)* to see it.
7. In the *Properties manager* window, double click on a `Microsoft.Cpp.Win32.user` file to open its properties sheet.
8. Under the *Commun property > User Macro (Propriétés communes > Macros utilisateur)* add a macro (or redefine it) called "FREETYPE" and with the path where you put the files

in step 2 (e.g. C:\Users\win7\Bibliothèques\freetype-2.3.5-1-lib).

9. Then in the same property sheet, go to *Commun propriétés > C/C++ > Général (Propriétés communes > C/C++ > Général)* and modify the *Other include directory (Autres répertoires Include)* to add this value : \$(FREETYPE)\include\freetype2. Then apply and close the sheet.
10. And under the *Commun propriétés > Link editor > Général (Propriétés communes > Editeur de liens > Général)* modify the “Additional library folders” to add “\$(FREETYPE)/lib”
11. Then open the *ftgl\_dll* property sheet and go to “Commun propriétés > Link editor > entrée” (*Propriétés communes > Editeur de liens > entrée*) and change the *freetype235.lib* to *freetype.lib*
12. Now you can build the solution by pressing “F7”

Well, there are other ways to quickly change the properties for one project. I detailed here the way to change the properties for several projects at the same, which could avoid to repeat the same changes in all projects. This will be very useful to configure Gem.

## Getting GEM sources

If you just want to build the last version of Gem but you do not planned to make modifications in the code, let's get a tarball from sourceforge or github of a fresh snapshot.

“Download a zip” here : <https://github.com/umlaeute/Gem>

or “Download snapshot” here : <http://sourceforge.net/p/pd-gem/gem/ci/master/tree/>

If you planned to make some improvement on Gem (and I encourage you to do that) then it's better to clone the Git repository. Here I quote Iohannes<sup>1</sup> who explains his preferred way to contribute (and this is not Windows specific) :

- - go to <http://github.com/> and get yourself an account (e.g. "rybn"), then log in.
- - go to <http://github.com/umlaeute/Gem>, and click on the "Fork" button in the upper-right corner.
- - this will fork the repository into <http://github.com/rybn/Gem>, go there and follow the instructions to clone the repository to your local machine.
- - do work (add new abstractions/,...) and commit them to your local copy
- - push them to github
- - go back to <http://github.com/rybn/Gem> and click on "Pull Request" and follow the instructions there.
- - i will get a notification that i should merge in your changes and can do so (after reviewing them)

Then you have a folder containing all the sources files, I will call it “Gem\_root” in the next.

## Configuring Gem solution in Visual C++

In the *Gem\build\win-vc2010e* folder, you will find a *Gem.sln* file. Some conversion may be needed if you are using another version of Visual C++.

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<sup>1</sup> The original message is here : <http://lists.puredata.info/pipermail/gem-dev/2013-09/006564.html>

Once the project imported, open the *Properties manager*<sup>2</sup> window and find the Puredata configuration. Open it and adjust the PD\_DIR macro under the *User macro* page to point to your Pd folder.

In the pthread properties sheet change the PTHREAD\_DIR macro to point to the pthread directory (for me it's C:\Users\win7\Bibliothèques\pthreads-w32-2-9-1-release\Pre-built.2).

In the FTGL properties sheet, under the FTGL Release or the FTGL Debug configuration, adjust the FREETYPE and the FTGL paths (e.g. C:\Users\win7\Bibliothèques\freetype-2.3.5-1-lib and C:\Users\win7\Bibliothèques\ftgl-2.1.3~rc5).

Now you will be able to generate at least the Gem project.

## Building plugins and addons

To build plug-ins, you will need several additional libraries.

### ***filmAVI – play films with Video for Windows***

This plug-in should build without any additional library.

### ***filmDS – play films with Direct Show***

You need the Microsoft Windows SDK : <http://msdn.microsoft.com/en-US/windows/desktop/bb980924>. Some files lack in the one that comes with Visual C++ 2010 Express.

You need the Windows Driver Kit for ATL support : <http://msdn.microsoft.com/en-us/windows/hardware/hh852365>. Get the one compatible with your IDE (7.1,0 for me)

Update the macros in the DirectShow properties sheet.

### ***filmQT – play films with QuickTime***

You need the QuickTime SDK for Windows : <https://developer.apple.com/quicktime/> (you need an Apple Developer account to download it...).

If you install it in the default location ("C:\Program Files") you don't need to adjust any path.

### ***imageJPEG – load still image with libjpeg***

You need libjpeg : <http://gnuwin32.sourceforge.net/packages/jpeg.htm>

Download the *Developer files* and extract it. Adjust the LIBJPEG\_DIR macro in the JPEG properties sheet to point where you extracted the files (e.g. C:\Users\win7\Bibliothèques\jpeg-6b-4-lib).

### ***imageTIFF – load still image with libtiff***

You need the libtiff for Windows. Choose the *Developer files* here : <http://gnuwin32.sourceforge.net/packages/tiff.htm>. Then adjust the LIBTIFF\_DIR macro in the TIFF properties sheet.

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<sup>2</sup> See FTGL and Freetype 6 on page 1 if you can't find it.

## ***pix\_artoolkit – detect ARToolkit tag with Gem***

You need the ARToolkit library for Windows :

<http://sourceforge.net/projects/artoolkit/files/artoolkit/>. The Windows binary release contains all what you need. Adjust the ARTOOLKIT\_DIR variable in `pix_artoolkit` properties sheet.