

## Open CASCADE Technology

### Guide for building third-party products on Windows

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## 1. INTRODUCTION

This document presents guidelines for building third-party products used by Open CASCADE Technology (OCCT) and samples on Windows platform.

In order to understand these guidelines, you need to be familiar with MS Visual Studio / Visual C++.

You need to use the same version of MS Visual Studio for building all the third-party products and OCCT itself, in order to receive a consistent set of run-time binaries.

The links for downloading the third-party products are available on the web site of OPEN CASCADE SAS at <http://www.opencascade.org/getocc/require/>.

There are two types of third-party products which are used by OCCT:

- 1) Mandatory products: Tcl 8.5, Tk 8.5, TclX 8.4, FreeType 2.3.7, Ftlg 2.1.2
- 2) Optional products: TBB 3.0-018, gl2ps 1.3.5, FreeImage 3.14.1

It is recommended to create a separate new folder on your workstation where you will unpack the downloaded archives of the third-party products, and where you will build these products (for example, **c:\occt3rdparty**).

Further in this document, this folder is referred to as **<3rdparty>**.

## 2. BUILDING MANDATORY THIRD-PARTY PRODUCTS

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### 2.1. Tcl/Tk 8.5

Tcl/Tk is required for DRAW test harness.

We recommend installing binary distribution that could be downloaded from <http://www.activestate.com/activetcl>. Go to "Free Downloads" and pick the version of the Install Wizard that matches your target platform – 32 bit (x86) or 64 bit (x64). The version of Visual Studio you use is irrelevant when choosing the Install Wizard.

Run the Install Wizard you downloaded, and install Tcl / Tk products to **<3rdparty>\tcltk-win32** folder (for 32-bit platform) or to **<3rdparty>\tcltk-win64** folder (for 64-bit platform).

Further in this document, this folder is referred to as **<tcltk>**.

### 2.2. FreeType 2.3.7

FreeType is required for Ftlg which links it as static library.

You can download its sources from <http://sourceforge.net/projects/freetype/files/>

The building process is the following:

1. Unpack the downloaded archive of FreeType 2.3.7 product (**ft237.zip**) into **<3rdparty>** folder.

As a result, you should have **<3rdparty>\freetype-2.3.7** folder. Rename it according to the rule: freetype-<platform>-<compiler>-<building mode>, where

<platform> - win32 or win64;

<compiler> - vc8 or vc9 or vc10;

<building mode> - opt (for release) or deb (for debug)

Further in this document, this folder is referred to as <*freetype*>.

2. Open the solution file <*freetype*>\builds\win32\visualc\freetype.sln in Visual Studio.

If the version of Visual Studio you use is different to the version of the solution file, apply conversion of the solution. If needed, such conversion should be suggested automatically by Visual Studio.

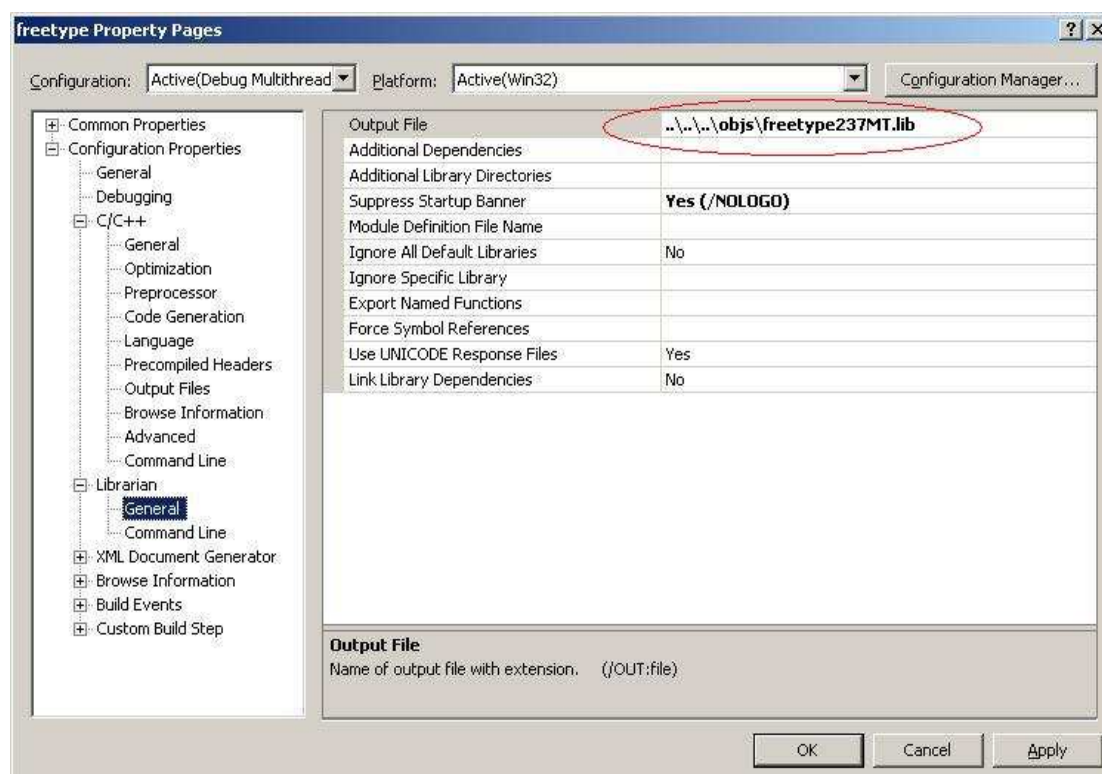
3. Select configuration to build.

Choose “**Release Multithreaded**” if you are building Release binaries.

Choose “**Debug Multithreaded**” if you are building Debug binaries.

#### Note:

If you want to build debug version of FreeType binaries then you must replace output file name (Project->Properties->Configuration Properties->Librarian->General->Output File) from freetype237MT\_D.lib to freetype237MT.lib

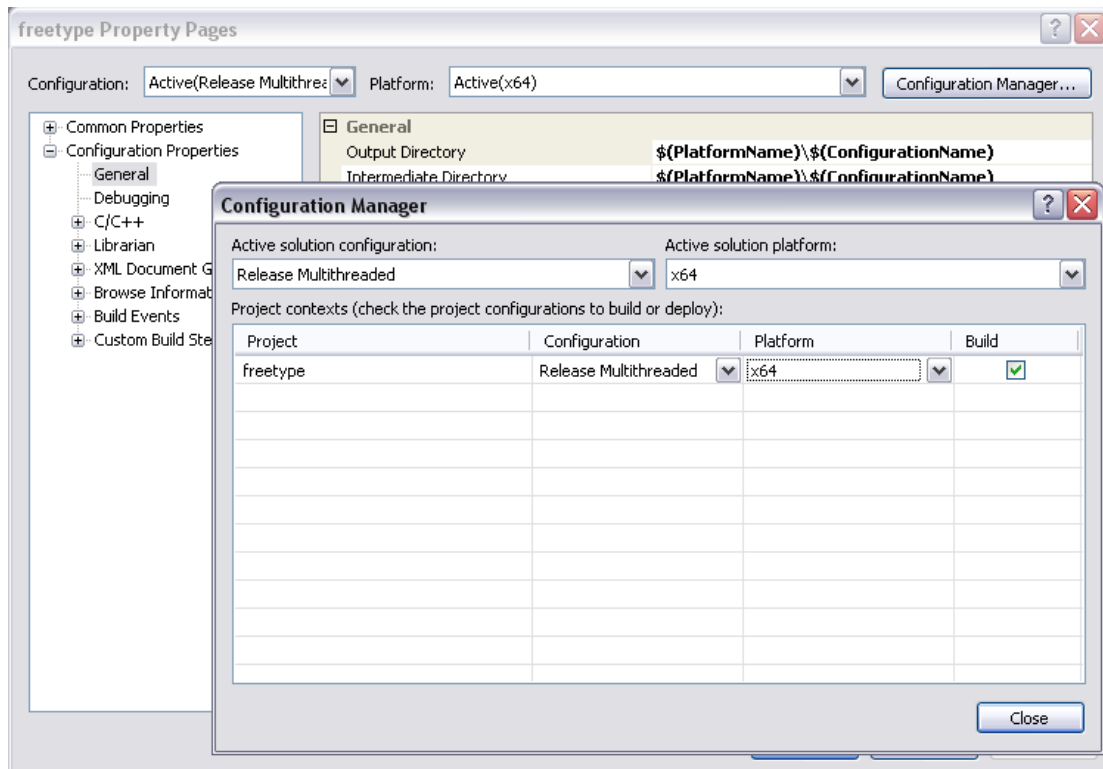


4. Select platform to build.

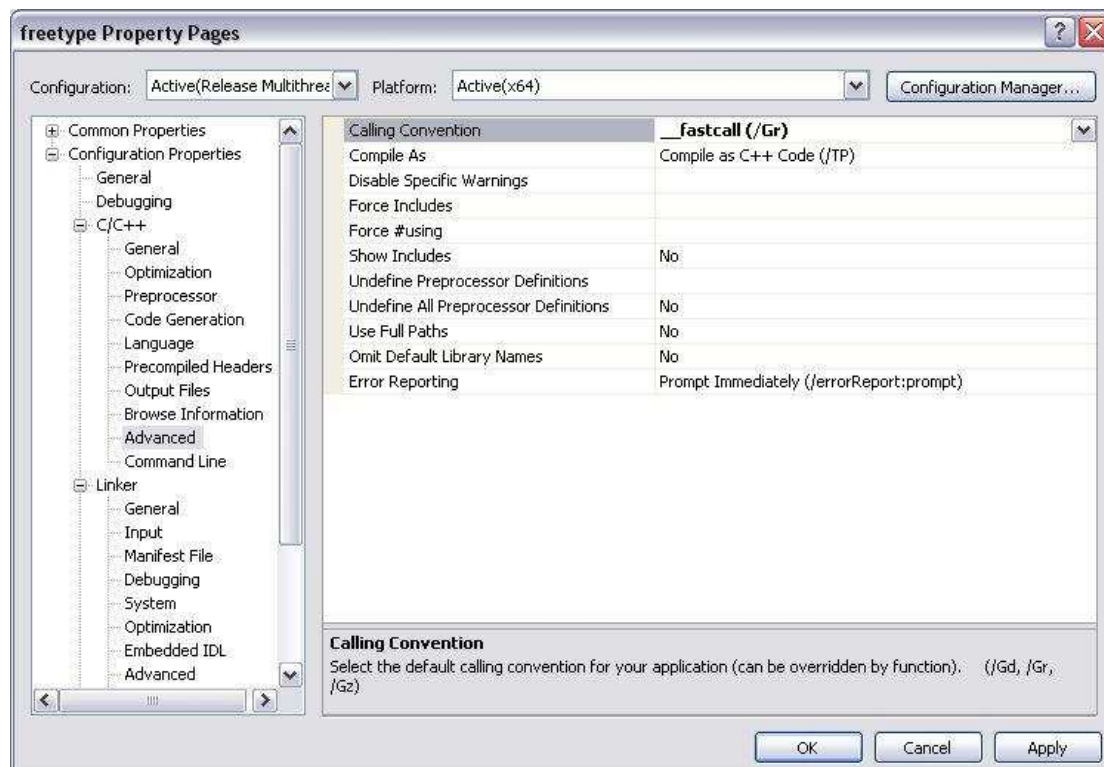
Choose “**Win32**” if you are building for 32 bit platform.

If you are building for 64 bit platform, then:

a) Using the Configuration Manager (Build -> Configuration Manager), add **x64** platform to the solution configuration chosen in step 3, by copying the settings from Win32 platform.



b) Set Project->Properties->Configuration Properties->C/C++->Advanced->Calling Convention. Set this option to “***\_\_fastcall (/Gr)***”.



**Attention:** If you use Visual Studio 2005, please make sure that Visual Studio directories (see Tools->Options->Projects and Solutions->VC++ Directories) are set up for 64 bit configuration.

c) Finally, choose “***x64***” platform to build.

5. Start building process.

As a result, you should have the static library file named and located according to the parameter Project->Properties->Configuration Properties->Librarian->General->Output File.

## 2.3. Ftgl 2.1.2

Ftgl is required for OCCT Visualization libraries.

This third-party product should be built as dynamically loadable library (dll file). You can download its sources from <http://sourceforge.net/projects/ftgl/files/>

The building process is the following:

1. Unpack the downloaded archive of Ftgl 2.1.2 product (*ftgl-2.1.2.tar.gz*) into *<3rdparty>* folder.

As a result, you should have *<3rdparty>|FTGL* folder.

Rename it according to the rule: ftgl-<platform>-<compiler>-<building mode>, where

<platform> - win32 or win64;

<compiler> - vc8 or vc9 or vc10;

<building mode> - opt (for release) or deb (for debug)

Further in this document, this folder is referred to as *<ftgl>*.

2. Open workspace file *<ftgl>|win32\_vc9|ftgl.dsw* in Visual Studio.

Since the version of Visual Studio you use is higher than 6, apply conversion of the workspace. Such conversion should be suggested automatically by Visual Studio.

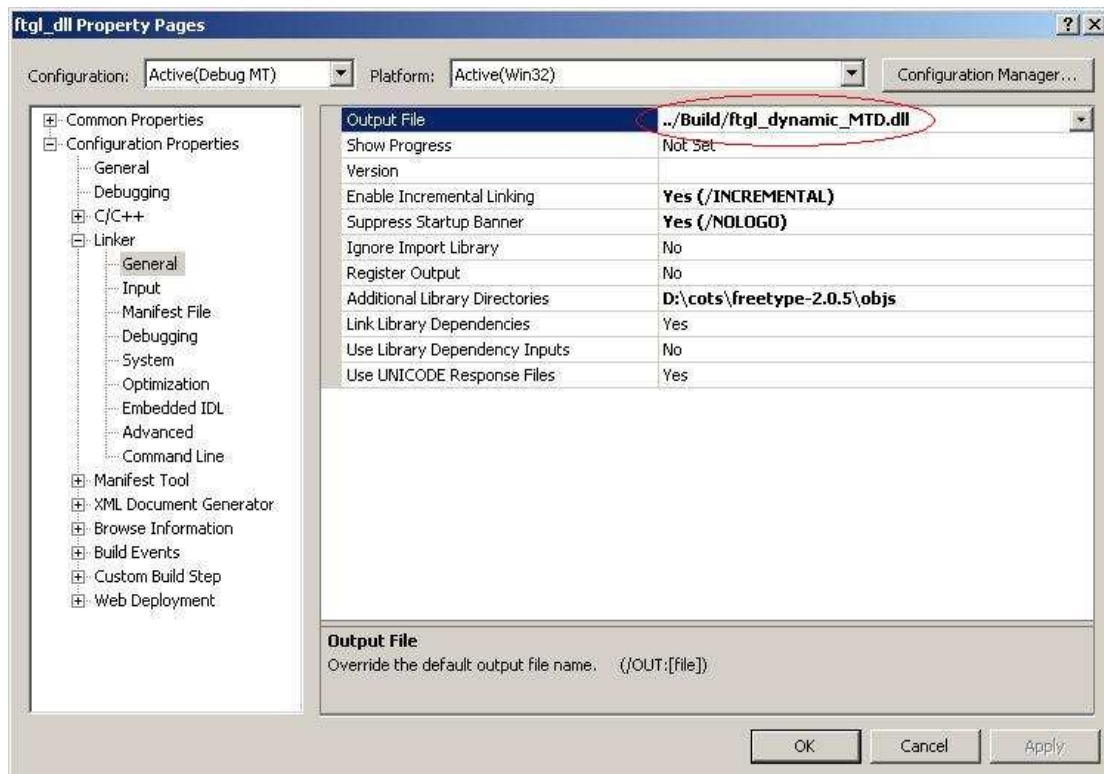
3. Select configuration to build.

Choose “**Release MT**” if you are building Release binaries.

Choose “**Debug MT**” if you are building Debug binaries.

### Note:

If you want to build debug version of Ftgl binaries then you must replace output file name (Project->Properties->Configuration Properties->Linker->General->Output File) from ftgl\_dynamic\_MTD\_d.dll to ftgl\_dynamic\_MTD.dll



By the same way, replace:

Project->Properties->Configuration Properties->Linker->Debugging->Generate Program Database File

from ftgl\_dynamic\_MTD\_d.pdb to ftgl\_dynamic\_MTD.pdb

Project->Properties->Configuration Properties->Linker->Advanced->Import Library

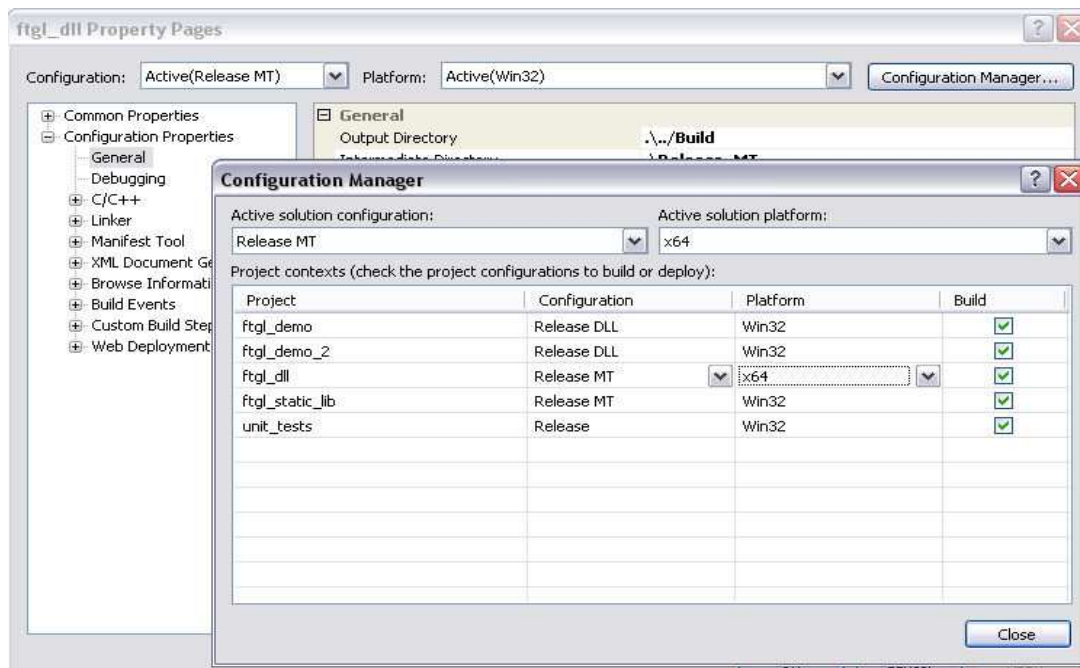
from ftgl\_dynamic\_MTD\_d.lib to ftgl\_dynamic\_MTD.lib

#### 4. Select platform to build.

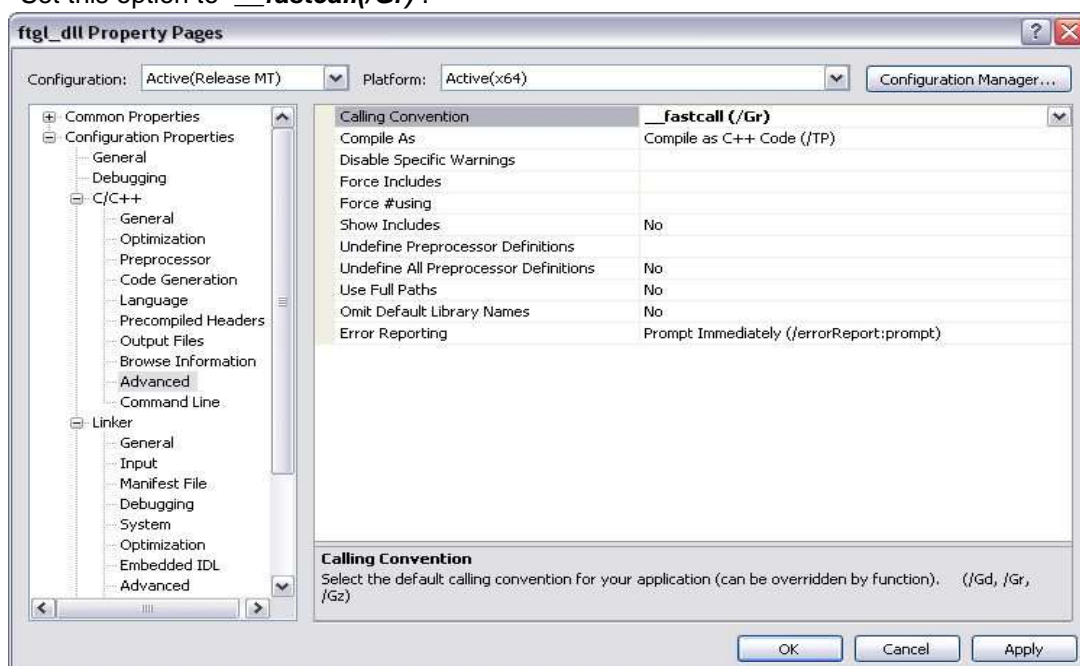
Choose “**Win32**” if you are building for 32 bit platform.

If you are building for 64 bit platform:

a) Using the Configuration Manager (Build -> Configuration Manager), add **x64** platform to the solution configuration chosen in step 3, by copying the settings from Win32 platform.



- b) Set Project->Properties->Configuration Properties->C/C++->Advanced->Calling Convention  
Set this option to “***\_\_fastcall (/Gr)***”.



**Attention:** If you use Visual Studio 2005, please make sure that Visual Studio directories (see Tools->Options->Projects and Solutions->VC++ Directories) are set up for 64 bit configuration.

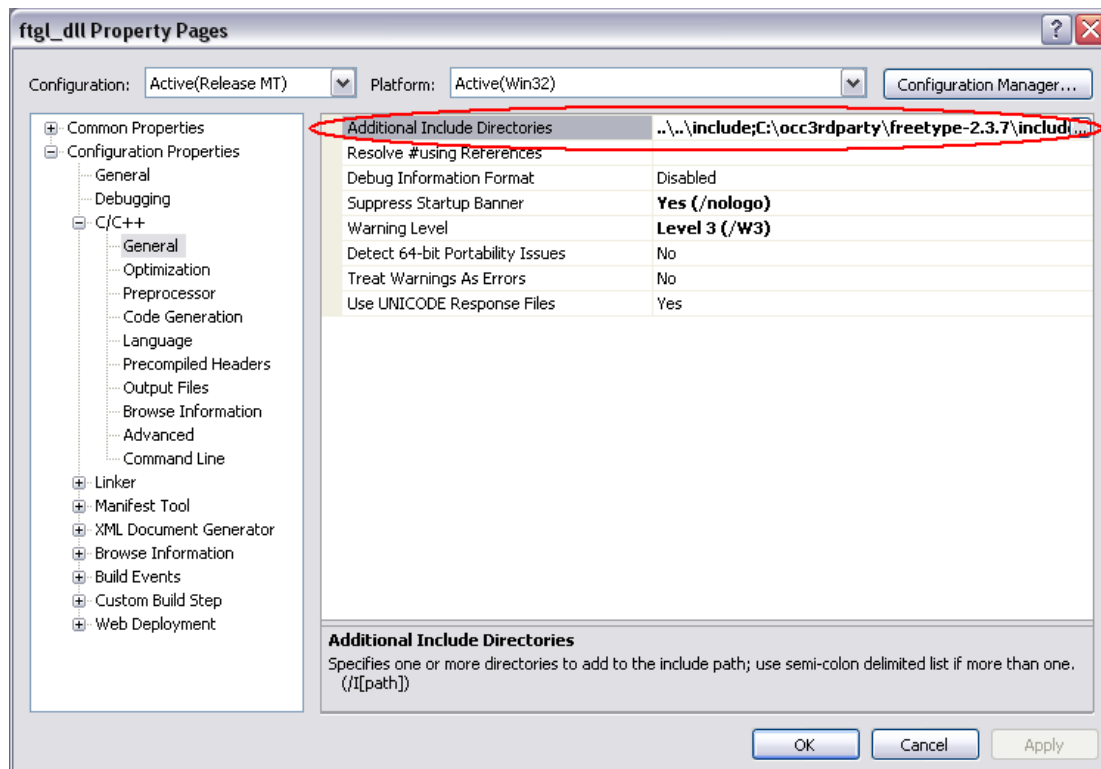
- c) Finally, choose “***x64***” platform to build.

5. In Solution Explorer, set ***ftgl\_dll*** as the StartUp project.

6. Set Project->Properties->Configuration Properties->C/C++->General->Additional Include Directories.

This list of paths should contain paths to header files of ftgl and freetype products, and should look like the following:

**`..\..\include;<freetype>\include`**

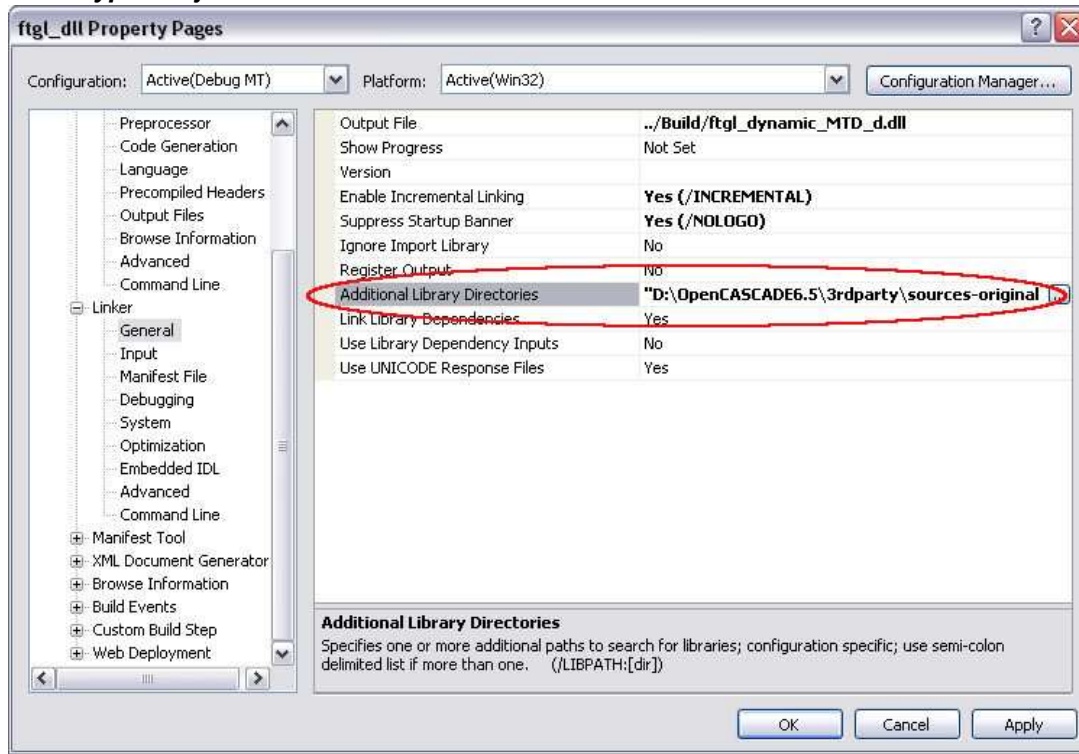




## 7. Set Project->Properties->Configuration Properties->Linker->General->Additional Library Directories.

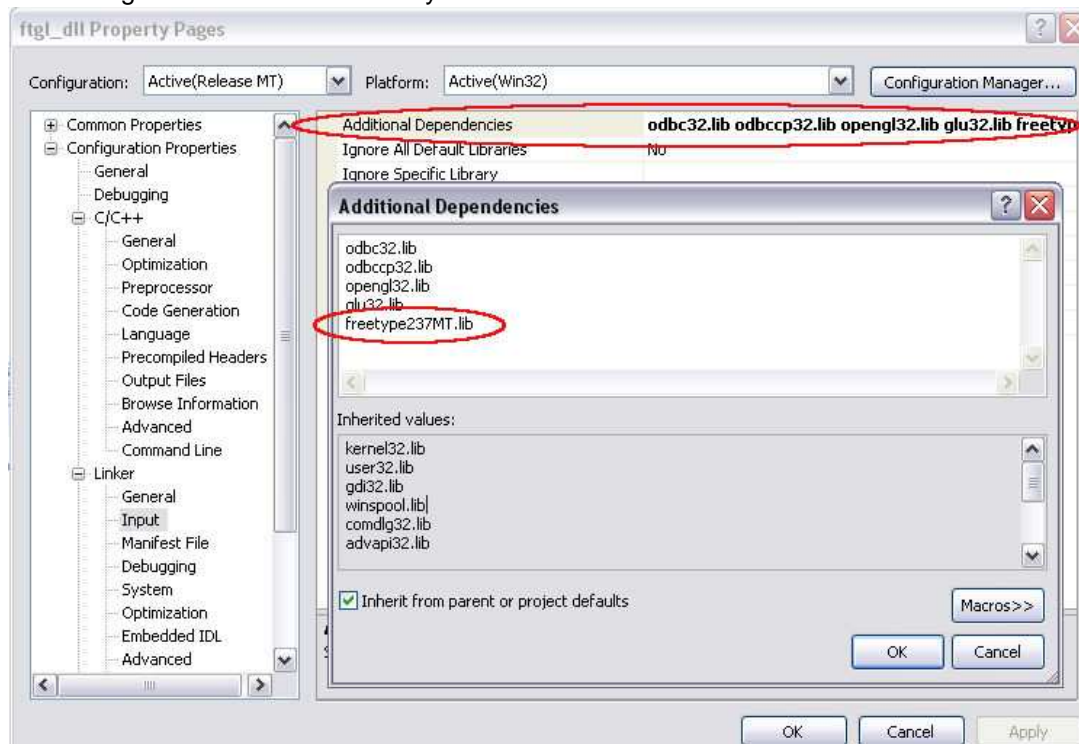
This list of paths should contain path to the library file of freetype product built earlier, and should look like the following:

**<freetype>objs**



## 8. Set Project->Properties->Configuration Properties->Linker->Input-> Additional Dependencies.

Update the name of the static library file of freetype in the end of the list of additional libraries according to the name of the library built in 2.1.1.3.



9. Start building process of `ftgl_dll` project.

As a result, you should have the import library and dynamic library files named and located according to the parameters `Project->Properties->Configuration Properties->Linker->Advanced->Import Library` and `Project->Properties->Configuration Properties->Linker->General->Output File` respectively.

### 3. BUILDING OPTIONAL THIRD-PARTY PRODUCTS

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#### 3.1. TBB 3.0-018

This third-party product is installed with binaries from the archive that could be downloaded from <http://threadingbuildingblocks.org/>. Go to “Downloads / Commercial Aligned Release“, find the needed release version (`tbb30_018oss`) and pick the archive for Windows platform.

Unpack the downloaded archive of TBB 3.0 product (`tbb30_018oss_win.zip`) into `<3rdparty>` folder.

As a result, you should have `<3rdparty>\tbb30_018oss` folder. Further in this document, this folder is referred to as `<tbb>`.

#### 3.2. gl2ps 1.3.5

This third-party product should be built as dynamically loadable library (dll file). You can download its sources from <http://geuz.org/gl2ps/src/>

The building process is the following:

1. Unpack the downloaded archive of gl2ps 1.3.5 product (`gl2ps-1.3.5.tgz`) into `<3rdparty>` folder.

As a result, you should have `<3rdparty>\gl2ps-1.3.5-source` folder.

Rename it according to the rule: `gl2ps-<platform>-<compiler>-<building mode>`, where

`<platform>` - win32 or win64;

`<compiler>` - vc8 or vc9 or vc10;

`<building mode>` - opt (for release) or deb (for debug)

Further in this document, this folder is referred to as `<gl2ps>`.

2. Download (from <http://www.cmake.org/cmake/resources/software.html>) and install **CMake** build system.

3. Edit the file `<gl2ps>\CMakeLists.txt`.

After line 113 in `CMakeLists.txt`:

```
set_target_properties(shared PROPERTIES COMPILE_FLAGS "-DGL2PSDLL -  
DGL2PSDLL_EXPORTS")
```

add the following line:

```
add_definitions(-D_USE_MATH_DEFINES)
```

4. Launch CMake (cmake-gui.exe) using Program menu.

5. In CMake:

a) Define where is the source code.

This path must point to **<gl2ps>** folder.

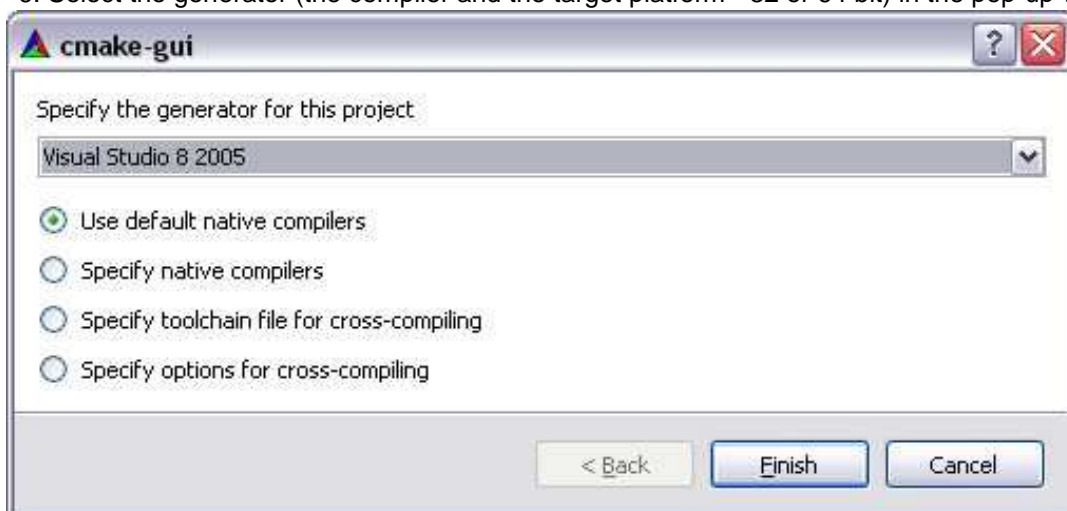
b) Define where to build the binaries.

This path must point to the folder where generated gl2ps project binaries will be placed (for example, **<gl2ps>\bin**). Further in this document, this folder is referred to as **<gl2ps\_bin>**.

c) Press “Configure” button.

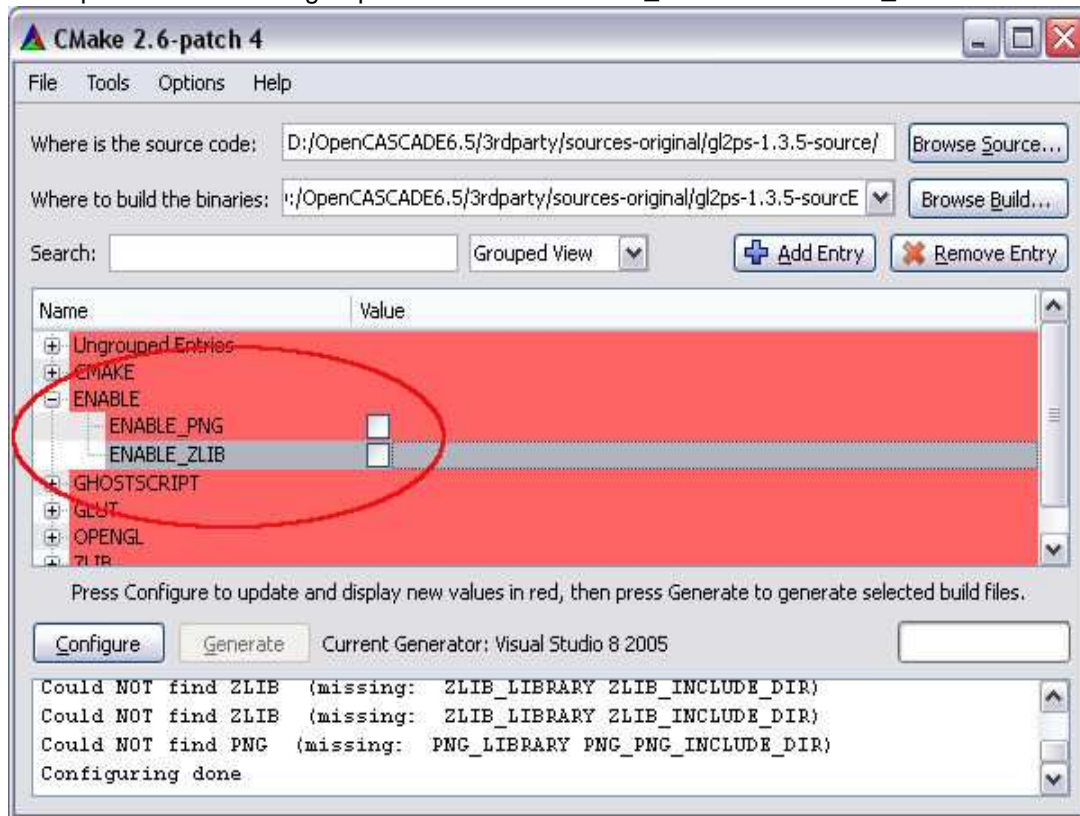


6. Select the generator (the compiler and the target platform - 32 or 64 bit) in the pop-up window.

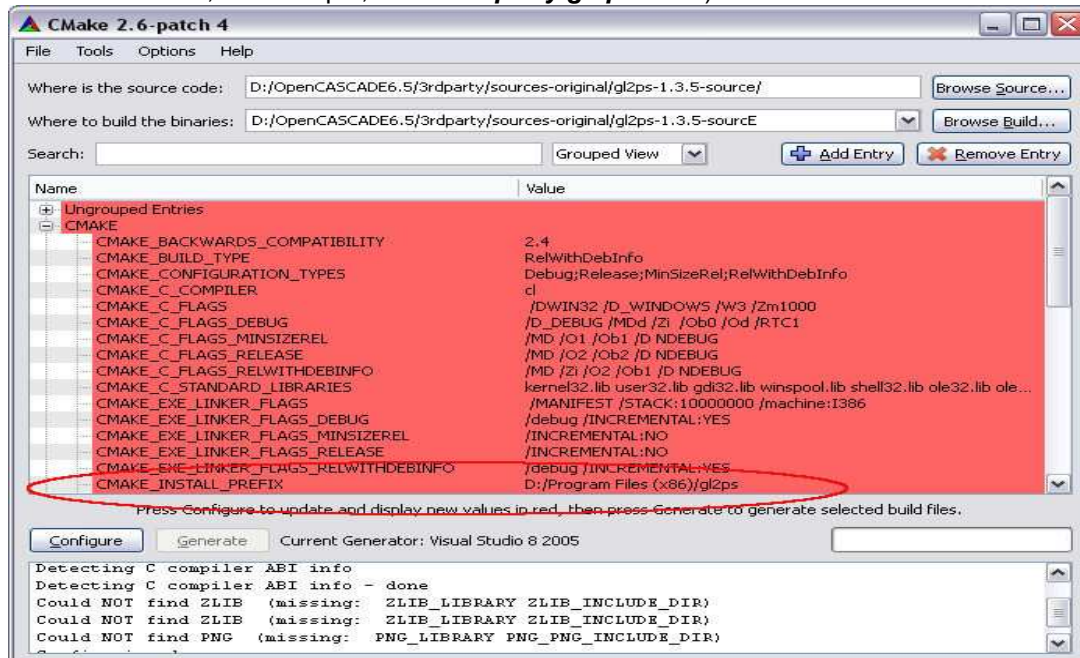


Then press “Finish” button to return to the main CMake window.

6. Expand the ENABLE group and uncheck ENABLE\_PNG and ENABLE\_ZLIB check boxes.



7. Expand the CMAKE group and define CMAKE\_INSTALL\_PREFIX (path where you want to install the build results, for example, *c:\occt3rdparty\gl2ps-1.3.5*).



8. Press “Configure” button again, and then “Generate” button in order to generate Visual Studio projects. After completion, close CMake application.

9. Open solution file *<gl2ps\_bin>gl2ps.sln* in Visual Studio.

#### 10. Select configuration to build.

Choose “**Release**” if you are building Release binaries.

Choose “**Debug**” if you are building Debug binaries.

#### 11. Select platform to build.

Choose “**Win32**” if you are building for 32 bit platform.

Choose “**x64**” if you are building for 64 bit platform.

12. Build the solution.

13. Build the **INSTALL** project.

As a result, you should have the installed gl2ps product in the CMAKE\_INSTALL\_PREFIX path.

### 3.3. FreeImage 3.14.1

This third-party product should be built as dynamically loadable library (dll file). You can download its sources from <http://sourceforge.net/projects/freeimage/files/Source%20Distribution/>

The building process is the following:

1. Unpack the downloaded archive of FreeImage 3.14.1 product (**FreeImage3141.zip**) into **<3rdparty>** folder.

As a result, you should have **<3rdparty>\FreeImage** folder.

Rename it according to the rule: freeimage-<platform>-<compiler>-<building mode>, where

<platform> - win32 or win64;

<compiler> - vc8 or vc9 or vc10;

<building mode> - opt (for release) or deb (for debug)

Further in this document, this folder is referred to as **<freeimage>**.

2. Open the solution file **<freeimage>\FreeImage.\*.sln** in Visual Studio. Choose the file that corresponds to the version of Visual Studio you use.

Since the version of Visual Studio you use is higher than 6, apply conversion of the workspace. Such conversion should be suggested automatically by Visual Studio.

If there is no solution file matching the version of Visual Studio you use, choose the solution file for the highest version of Visual Studio, then apply conversion. Such conversion should be suggested automatically by Visual Studio.

#### 3. Select configuration to build.

Choose “**Release**” if you are building Release binaries.

Choose “**Debug**” if you are building Debug binaries.



**Note:**

If you want to build debug version of FreeImage binaries then you must replace following parameters for projects FreeImage and FreeimagePlus:

Project->Properties->Configuration Properties->Linker->General->Output File

from FreeImaged.dll to FreeImage.dll

from FreeImagePlusd.dll to FreeImagePlus.dll

Project->Properties->Configuration Properties->Linker->Debugging->Generate Program Database File

from FreeImaged.pdb to FreeImage.pdb

from FreeImagePlusd.pdb to FreeImagePlus.pdb

Project->Properties->Configuration Properties->Linker->Advanced->Import Library

from FreeImaged.lib to FreeImage.lib

from FreeImagePlusd.lib to FreeImagePlus.lib

Project->Properties->Configuration Properties->Build Events->Post-Build Event->Comand Line

from FreeImaged.dll to FreeImage.dll

from FreeImaged.lib to FreeImage.lib

from FreeImagePlusd.dll to FreeImagePlus.dll

from FreeImagePlusd.lib to FreeImagePlus.lib

Additionally, for project FreeImagePlus replace:

Project->Properties->Configuration Properties->Linker->Input->Additional Dependencies

from FreeImaged.lib to FreeImage.lib

**4. Select platform to build.**

Choose “**Win32**” if you are building for 32 bit platform.

Choose “**x64**” if you are building for 64 bit platform.

5. Start building process.

As a result, you should have the library files of FreeImage product in **<freeimage>\Dist** folder (FreeImage.dll and FreeImage.lib files) and in **<freeimage>\Wrapper\FreeImagePlus\dist** folder (FreeImagePlus.dll and FreeImagePlus.lib files).

## 4. REFERENCES

- [1] Open CASCADE Technology web site: <http://www.opencascade.org>