



DDS Utilities Libraries User Guide

nvDXTLib Compression /
Decompression Library

Introduction

The compression library accepts uncompressed data and writes out compressed MIP maps either to the function call *WriteDTXnFile* or an app supplied callback.

The formats supported are:

- RGBA – red, green, blue, alpha. 8 bits per color channel. 4 color channels
- RGB – red, green, blue. 8 bits per color channel. 3 color channels
- BGRA – blue, green, red, alpha. 8 bits per color channel, 4 color channels
- BGR – blue, green, red. 8 bits per color channel. 3 color channels
- RGBALmage structure. Defined in tPixel.h
- fplmage structure tPixel.h. 32 bit per color channel, floating point

Depending on your compile options, DDS Utilities includes different libraries for your use. DDS Utilities includes the debug and release configurations of nvDXTLib in Visual Studio 7 and Visual Studio 8 versions.

nvDXTLib.vc7.lib – Release

nvDXTLibd.vc7.lib – Debug

nvDXTLibMT.vc#.lib – Release Multi-threaded

nvDXTLibMTd.vc#.lib – Debug Multi-threaded

nvDXTLibMTDLL.vc#.lib – Release Multi-threaded DLL

nvDXTLibMTDLLd.vc#.lib – Debug Multi-threaded DLL

Note following definitions.

nvDXTcompressRGBA, nvDXTcompressBGRA (Image compression)

Pass unsigned char * parameter in RGBA or BGRA order.

plane == 3 indicates no alpha is present.

```
HRESULT nvDXTcompressRGBA(unsigned char * src_data, // pointer to data (24 or
32 bit)
    unsigned long w, // width in texels
    unsigned long h, // height in texels
    DWORD byte_pitch,
    CompressionOptions * options,
    DWORD planes, // 3 or 4 color channels
    MIPcallback callback = NULL, // callback for generated levels
    RECT * rect = NULL); // subrect to operate on, NULL is whole image

// define color order
HRESULT nvDXTcompressBGRA(unsigned char * src_data,
    unsigned long w, // width in texels
    unsigned long h, // height in texels
    DWORD byte_pitch,
    CompressionOptions * options,
    DWORD planes, // 3 or 4 color channels
    MIPcallback callback = NULL, // callback for generated levels
    RECT * rect = NULL);
```

nvDXTcompressVolumeRGBA, nvDXTcompressVolumeBGRA (Volume texture creation)

```
HRESULT nvDXTcompressVolumeRGBA(unsigned char * src_data,
    unsigned long w, // width in texels
    unsigned long h, // height in texels
    unsigned long depth, // depth of volume texture
    DWORD byte_pitch,
    CompressionOptions * options,
    DWORD planes, // 3 or 4
    MIPcallback callback = NULL, // callback for generated levels
    RECT * rect = NULL); // subrect to operate on, NULL is whole image

HRESULT nvDXTcompressVolumeBGRA(unsigned char * src_data,
    unsigned long w, // width in texels
    unsigned long h, // height in texels
    unsigned long depth, // depth of volume texture
    DWORD byte_pitch,
    CompressionOptions * options,
    DWORD planes, // 3 or 4
    MIPcallback callback = NULL, // callback for generated levels
    RECT * rect = NULL); // subrect to operate on, NULL is whole image
```

nvDXTcompress32F (floating point input)

```
// floating point input
HRESULT nvDXTcompress32F(fpImage & srcImage,
    CompressionOptions * options,
    MIPcallback callback = NULL, // callback for generated levels
    RECT * rect = NULL); // subrect to operate on, NULL is whole image
```

nvDXTcompress (RGBAImage struct input)

```
HRESULT nvDXTcompress(RGBAImage & image,
    CompressionOptions * options,
    MIPcallback callback,
    RECT * rect);
```

If callback is == 0 (or not specified), then WriteDTXnFile is called with all file info instead of your callback

```
typedef HRESULT (*MIPcallback)(
    void * data, // pointer to the data to compressed data
    int miplevel, // what MIP level this is
    DWORD size, // size of the data
    int width, // width of MIP map
    int height, // height of MIP map
    void * user_data); // user pointer

// You must write the routines (or provide stubs) for
WriteDTXnFile and ReadDTXnFile

void WriteDTXnFile(DWORD count, void * buffer, void * userData);

void ReadDTXnFile(DWORD count, void * buffer, void * userData);
```

See the file nvdxt_options.h for the definition of
[CompressionOptions](#)

```
// error return codes
#define DX TERR_INPUT_POINTER_ZERO -1
#define DX TERR_DEPTH_IS_NOT_3_OR_4 -2
#define DX TERR_NON_POWER_2 -3
```

Example: Callback to store compressed image in a Direct3D texture

```
HRESULT LoadAllMipSurfaces(void * data, int iLevel, DWORD size,
    int Width, int Height, void * user)
```

```

{
    HRESULT hr;
    LPDIRECT3DSURFACE9 psurf;
    D3DSURFACE_DESC sd;
    D3DLOCKED_RECT lr;

    hr = pCurrentTexture->GetSurfaceLevel(iLevel, &psurf);

    if (FAILED(hr))
        return hr;
    psurf->GetDesc(&sd);

    hr = pCurrentTexture->LockRect(iLevel, &lr, NULL, 0);

    if (FAILED(hr)) return hr;

    memcpy(lr.pBits, data, size);

    current_size += size;

    hr = pCurrentTexture->UnlockRect(iLevel);

    ReleasePpo(&psurf);

    mips_completed++;

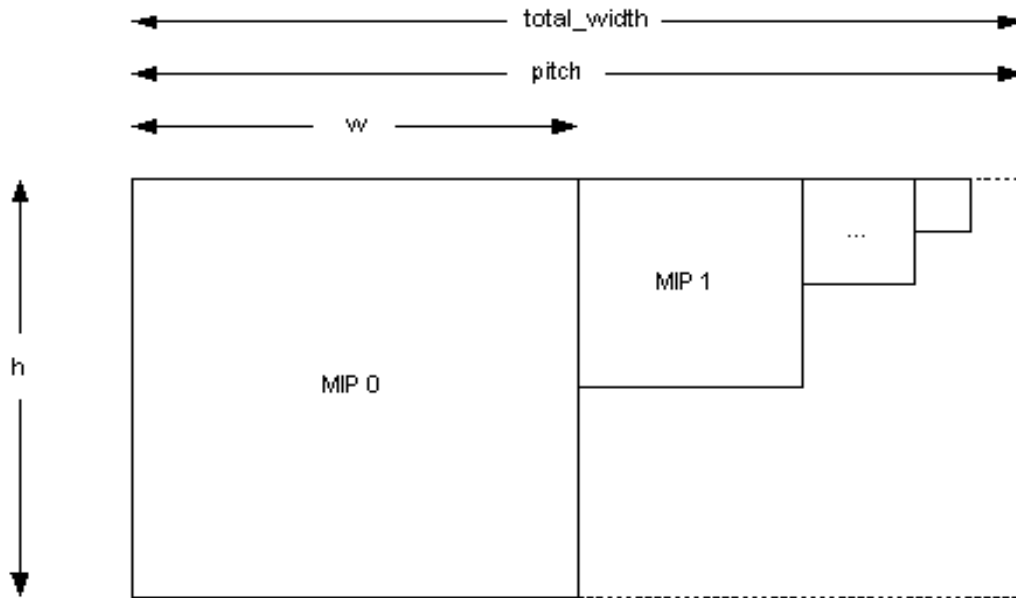
    if(g_d3d) {
        g_d3d->Render3DEnvironment();
    }

    return 0;
}

```

Compression/Decompression (MIP Maps)

If you have existing MIP maps, you must combine them so each MIP level is followed by its next MIP level. Conceptually, it looks like this:



Compression Options

[CompressionOptions](#) is the structure where you pass the compression options to the compressor. See *nvDxt_options.h* for details about this structure.

```
MipMapType = dUseExistingMipMaps;
```

You specify how map MIP levels to write out

```
nvDXTcompress((unsigned char *)raw_data, width, height, pitch,  
&options, depth, 0);
```

Decompression

To decompress an image use the *nvDXTdecompress* call to read all MIP chains into one buffer:

```
unsigned char * nvDXTdecompress(int & w, int & h, int & depth,  
int & total_width, int & rowBytes, int & src_format,  
int SpecifiedMipMaps = 0);
```

Returns:

pointer to image data

w : image width

h : image height

depth : number of bytes per pixel, 3 or 4

row_bytes: pitch of main image

The first image starts at 0, the next MIP map image starts at base + row_bytes, next one starts at base + row_bytes / 2, etc.

src_format: format of the file


SpecifiedMipMaps.

Load in only this number of MIP maps. zero means read all MIP levels

Note: pitch = row_bytes * 2

Contact

Please send comments, feature requests, and bug reports to texturetools@nvidia.com.



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