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# 1 Overview

GFL SDK is a powerfull library for developers who would like to support graphics image formats easily.

- Support more than 100 graphics formats.
- 8 or 16 bits per component
- Color depth conversion
- LUT transforms
- Filters
- Multi-page creation
- JPEG lossless rotation
- EXIF/IPTC reading
- IPTC writing
- Multithreading
- C++, VB, Delphi wrapper
- Windows, Linux, MacOS X, Irix, Solaris, FreeBSD, BeOS
- ...

## 2 History

**GFL v2.54 (LIBFORMAT v4.57) 15/03/2006:**

Fixed : Many bugs & improved

Added : in GFL\_LOAD\_PARAMS, PNGComposeWithAlpha & WMFHighResolution

Added : gflReduceNoise

Added : gflSetTransparentColor

Fixed : Many bugs & improved speed

## 3 License

Installing and using this library (GFL SDK/GflAx) signifies acceptance of these terms and conditions of the license.

- "GFL SDK/GFLAx" is provided as Freeware for private non-commercial or educational use (including non-profit organization). You must contact me for commercial use and distribution. [webmaster@xnview.com](mailto:webmaster@xnview.com)
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- Important For JPEG-2000 & JBIG use, see corresponding licenses in Plugins folder of the GFL SDK package

Any suggestions, feedback and comments are welcome.

# 4 Structures

## 4.1 GFL\_BITMAP

The GFL\_BITMAP structure contains all informations about picture in memory.

```
struct GFL_BITMAP (  
    GFL_BITMAP_TYPE Type  
    GFL_ORIGIN Origin  
    GFL_INT32 Width  
    GFL_INT32 Height  
    GFL_UINT32 BytesPerLine  
    GFL_INT16 LinePadding  
    GFL_UINT16 BitsPerComponent  
    GFL_UINT16 ComponentsPerPixel  
    GFL_UINT16 BytesPerPixel  
    GFL_UINT16 Xdpi  
    GFL_UINT16 Ydpi  
    GFL_INT16 TransparentIndex  
    GFL_INT16 Reserved  
    GFL_INT32 ColorUsed  
    GFL_COLOMAP* ColorMap  
    GFL_UINT8* Data  
    char* Comment  
    void* MetaData  
    GFL_INT32 XOffset  
    GFL_INT32 YOffset  
    char* Name  
)
```

### Members

#### Type

Type of the picture

GFL_BINARY	0x0001	Binary
GFL_GREY	0x0002	Grey scale
GFL_COLORS	0x0004	Colors with colormap
GFL_RGB	0x0010	TrueColors - Red/Green/Blue
GFL_RGBA	0x0020	TrueColors - Red/Green/Blue/Alpha
GFL_BGR	0x0040	TrueColors - Blue/Green/Red
GFL_ABGR	0x0080	TrueColors - Alpha/Blue/Green/Red
GFL_BGRA	0x0100	TrueColors - Blue/Green/Red/Alpha
GFL_ARGB	0x0200	TrueColors - Alpha/Red/Green/Blue
GFL_CMYK	0x0400	TrueColors - Cyan/Magenta/Yellow/Black

#### Origin

Origin of the picture.

GFL_TOP_LEFT	0	Top left (default)
GFL_BOTTOM_LEFT	2	Bottom left
GFL_TOP_RIGHT	1	Top right
GFL_BOTTOM_RIGHT	3	Bottom right

#### Width

Width in pixels of the picture.

Height  
Height in pixels of the picture.

BytesPerLine  
Bytes per line of pixels.

LinePadding  
Internal use, do not modify.

BitsPerComponent  
Bits per component, can be 1, 8, 16

ComponentsPerPixel  
Component per pixel, can be 1, 3 or 4

BytesPerPixel  
Bytes per pixel (For example: 1, 3 or 4).

Xdpi  
Pixels per inch in X axis.

Ydpi  
Pixels per inch in Y axis.

TransparentIndex  
Index of transparency (only for GFL\_COLORS & GFL\_GREY type).

ColorUsed  
Number of color used in the picture (only for GFL\_COLORS & GFL\_GREY type).

ColorMap  
Address of a [GFL\\_COLORMAP](#) structure for the colormap (only for GFL\_COLORS type).

Data  
Pointer of the picture data.

Comment  
Address of a string used by the comment. You must use `gflSetComment` to change the comment.

MetaData  
Pointer of Metadata. You must use `gflBitmapGetIPTC` & `gflBitmapGetEXIF` to obtain readable data.

## 4.2 GFL\_COLORMAP

The `GFL_COLORMAP` structure is used for colormap.

```
struct GFL_COLORMAP (
    GFL_UINT8 Red[256]
    GFL_UINT8 Green[256]
    GFL_UINT8 Blue[256]
)
```

### Members

Red  
Array of red components.

Green  
Array of green components.

Blue  
Array of blue components.

## 4.3 GFL\_FORMAT\_INFORMATION

The `GFL_FORMAT_INFORMATION` structure contains informations about a format available in GFL.

```
struct GFL_FORMAT_INFORMATION (
    GFL_INT32 Index
    GFL_ORIGIN Name[8]
    char Description[64]
    GFL_UINT32 Status
```

```

    GFL_UINT32 NumberOfExtension
    char Extension[16][8]
}

```

## Members

### Index

Index of the format.

### Name

Null-terminated string that contains the name of the format. For example, "jpeg" is for JPEG format.

### Description

Null-terminated string that contains the label of the format.

### Status

Format status.

GFL\_READ Reading support

GFL\_WRITE Writing support

### NumberOfExtension

Number of extension known by this format.

### Extension

Array of Null-terminated string that contains the extension.

## 4.4 GFL\_FILE\_INFORMATION

The GFL\_FILE\_INFORMATION structure contains informations about a picture's file.

```

struct GFL_FILE_INFORMATION (
    GFL_BITMAP_TYPE Type
    GFL_ORIGIN Origin
    GFL_INT32 Width
    GFL_INT32 Height
    GFL_INT32 FormatIndex
    char FormatName[8]
    char Description[64]
    GFL_UINT16 Xdpi
    GFL_UINT16 Ydpi
    GFL_UINT16 BitsPerComponent
    GFL_UINT16 ComponentsPerPixel
    GFL_INT32 NumberOfImages
    GFL_UINT32 FileSize
    GFL_COLORMODEL ColorModel
    GFL_COMPRESSION Compression
    char CompressionDescription[64]
    GFL_INT32 XOffset
    GFL_INT32 YOffset
    void* ExtraInfos
}

```

## Members

### Type

Not used

### Origin

Origin of the picture.

GFL\_TOP\_LEFT 0 Top left (default)

GFL\_BOTTOM\_LEFT 2 Bottom left

GFL\_TOP\_RIGHT 1 Top right

GFL\_BOTTOM\_RIGHT 3 Bottom right

Width

Width in pixels of the picture.

Height

Height in pixels of the picture.

FormatIndex

Index of picture's format.

FormatName

Name of picture's format.

Description

File label.

Xdpi

Pixels per inch in the X axis.

Ydpi

Pixels per inch in the Y axis.

BitsPerComponent

Bits per component, can be 1, 8, 16

ComponentsPerPixel

Component per pixel, can be 1, 3 or 4

NumberOfImages

Number of picture in the file.

FileSize

Size of the file.

ColorModel

Color model.

GFL_CM_RGB	0	Red-Green-Blue
GFL_CM_GREY	1	Greyscale
GFL_CM_CMY	2	Cyan-Magenta-Yellow
GFL_CM_CMYK	3	Cyan-Magenta-Yellow-Black
GFL_CM_YCBCR	4	YCbCr
GFL_CM_YUV16	5	YUV 16bits
GFL_CM_LAB	6	Lab
GFL_CM_LOGLUV	7	Log Luv
GFL_CM_LOGL	8	Log L

Compression

GFL_NO_COMPRESSION	0	No compression
GFL_RLE	1	Packbits
GFL_LZW	2	LZW
GFL_JPEG	3	JPEG
GFL_ZIP	4	ZIP
GFL_SGI_RLE	5	SGI Packbits
GFL_CCITT_RLE	6	CCITT RLE
GFL_CCITT_FAX3	7	Fax Group 3
GFL_CCITT_FAX3_2D	8	Fax Group 3-2D
GFL_CCITT_FAX4	9	Fax Group 4
GFL_WAVELET	10	Wavelet
GFL_UNKNOWN_COMPRESSION	255	Other compression

CompressionDescription



Pointer to a buffer that contains the full compression description.

## Remarks

gflFreeFileInformation must be used for freeing the allocated memory.

## 4.5 GFL\_LOAD\_PARAMS

The GFL\_LOAD\_PARAMS structure contains options for picture loading.

```
struct GFL_LOAD_PARAMS (  
    GFL_UINT32 Flags  
    GFL_INT32 FormatIndex  
    GFL_INT32 ImageWanted  
    GFL_ORIGIN Origin  
    GFL_BITMAP_TYPE ColorModel  
    GFL_UINT32 LinePadding  
    GFL_UINT8 DefaultAlpha  
    GFL_UINT8 PsdNoAlphaForNonLayer  
    GFL_UINT8 PngComposeWithAlpha  
    GFL_UINT8 WMFHighResolution  
    GFL_INT32 Width  
    GFL_INT32 Height  
    GFL_UINT32 Offset  
    GFL_CORDER ChannelOrder  
    GFL_CTYPE ChannelType  
    GFL_UINT16 PcdBase  
    GFL_UINT16 EpsDpi  
    GFL_INT32 EpsWidth  
    GFL_INT32 EpsHeight  
    GFL_LUT_TYPE LutType  
    GFL_UINT16 Reserved  
    GFL_UINT16* LutData  
    const char* LutFilename  
    GFL_UINT8 CameraRawUseAutomaticBalance  
    GFL_UINT8 CameraRawUseCameraBalance  
    GFL_UINT8 CameraRawHighlight  
    GFL_UINT8 CameraRawAutoBright  
    float CameraRawGamma  
    float CameraRawBrightness  
    float CameraRawRedScaling  
    float CameraRawBlueScaling  
    GFL_LOAD_CALLBACKS Callbacks  
    void* UserParams  
)
```

## Members

### Flags

#### Options

GFL_LOAD_SKIP_ALPHA	If the picture has an alpha channel, it is ignored
GFL_LOAD_IGNORE_READ_ERROR	Ignore all read errors
GFL_LOAD_BY_EXTENSION_ONLY	Use only extension to recognize the filetype
GFL_LOAD_READ_ALL_COMMENT	Read all comment in the file
GFL_LOAD_FORCE_COLOR_MODEL	ColorModel is used for the picture type
GFL_LOAD_PREVIEW_NO_CANVAS_RESIZE	Keep the ratio for the preview
GFL_LOAD_BINARY_AS_GREY	Load a binary file in 8bits
GFL_LOAD_ORIGINAL_COLORMODEL	If the color model of the file is CMYK, so the picture loaded will be in CMYK
GFL_LOAD_ONLY_FIRST_FRAME	If the color model of the file is CMYK, so the picture loaded will be in CMYK

GFL_LOAD_ORIGINAL_DEPTH	If the file has more than 8 bits per component, keep it
GFL_LOAD_METADATA	Read all metadata (IPTC & EXIF)
GFL_LOAD_COMMENT	Read comment
GFL_LOAD_HIGH_QUALITY_THUMBNAIL	Use high quality for gflLoadThumbnail

#### FormatIndex

Index of the format used to load.  
 Default value : -1 (for an automatic recognition).

#### ImageWanted

For a multi-page file, identifies the image number.  
 Default value : 0

#### Origin

Origin wanted.

GFL_TOP_LEFT	Top left
GFL_BOTTOM_LEFT	Bottom left
GFL_TOP_RIGHT	Top right
GFL_BOTTOM_RIGHT	Bottom right

Default value : GFL\_TOP\_LEFT

#### ColorModel

Color Model wanted.

GFL_RGB	True colors - Red/Green/Blue (24 bits)
GFL_BGR	True colors - Blue/Green/Red (24 bits)
GFL_RGBA	True colors - Red/Green/Blue/Alpha (32 bits)
GFL_ABGR	True colors - Alpha/Blue/Green/Red (32 bits)
GFL_BGRA	True colors - Blue/Green/Red/Alpha (32 bits)
GFL_ARGB	True colors - Red/Green/Blue/Alpha (32 bits)

Default value : GFL\_RGB

#### LinePadding

Pad for a pixels line (For example, a value of 4 allow a line padding on 32bits).  
 Default value : 1

#### DefaultAlpha

Alpha value to use when the picture is loaded in 32bits, but the original file doesn't have an alpha.  
 Default value: Black

#### Width

For RAW or YUV format, width of picture.

#### Height

For RAW or YUV format, height of picture.

#### Offset

For RAW or YUV format, offset of the picture in the file.

#### ChannelOrder

For RAW format, channel order of the components. GFL\_CORDER\_INTERLEAVED :Interleaved

GFL_CORDER_SEQUENTIAL	Sequential
GFL_CORDER_SEPARATE	Separate

#### ChannelType

For RAW format, channel type of the components.

GFL_CTYPE_GREYSCALE	Greyscale
---------------------	-----------

GFL_CTYPE_RGB	Red-Green-Blue
GFL_CTYPE_BGR	Blue-Green-Red
GFL_CTYPE_RGBA	Red-Green-Blue-Alpha
GFL_CTYPE_ABGR	Alpha-Blue-Green-Red
GFL_CTYPE_CMY	Cyan-Magenta-Yellow
GFL_CTYPE_CMYK	Cyan-Magenta-Yellow-Black

#### PcdBase

For PCD format, it's the base used.

0	192x144
1	384x288
2	768x576

#### EpsDpi

For PS/EPS format, dpi to be used for loading.

#### EpsWidth

For PS/EPS format, width to be used for loading.

#### EpsHeight

For PS/EPS format, height to be used for loading.

#### Callbacks

A [GFL\\_LOAD\\_CALLBACKS](#) structure

## 4.6 GFL\_SAVE\_PARAMS

The GFL\_SAVE\_PARAMS structure contains options for the save of picture.

```

struct GFL_SAVE_PARAMS (
    GFL_UINT32 Flags
    GFL_INT32 FormatIndex
    GFL_COMPRESSION Compression
    GFL_INT16 Quality
    GFL_INT16 CompressionLevel
    GFL_BOOL Interlaced
    GFL_BOOL Progressive
    GFL_BOOL OptimizeHuffmanTable
    GFL_BOOL InAscii
    GFL_LUT_TYPE LutType
    GFL_UINT8 DpxByteOrder
    GFL_UINT8 CompressRatio
    GFL_UINT32 MaxFileSize
    GFL_UINT16* LutData
    const char* LutFilename
    GFL_UINT32 Offset
    GFL_CORDER ChannelOrder
    GFL_CTYPE ChannelType
    GFL_WRITE_CALLBACK Write
    GFL_TELL_CALLBACK Tell
    GFL_SEEK_CALLBACK Seek
    GFL_VIRTUAL_SAVE_CALLBACK GetLine
    void* GetLineParams
    void* UserParams
)

```

### Members

#### Flags

## Options

GFL\_SAVE\_REPLACE\_EXTENSION Replace extension by the default format extension

GFL\_SAVE\_ANYWAY Convert picture if colormode can be saved in this format (For example, RGB picture must be converted in 256 colors to save it in GIF)

## FormatIndex

Index of format to be used.

## Compression

GFL\_NO\_COMPRESSION No compression

GFL\_RLE Packbits

GFL\_LZW LZW (tiff only)

GFL\_CCITT\_FAX3 Fax Group 3 (tiff only)

GFL\_CCITT\_FAX3\_2D Fax Group 3-2D (tiff only)

GFL\_CCITT\_FAX4 Fax Group 4 (tiff only)

## Quality

Quality of the compression (JPEG)

0: the worst, 100: the best

## CompressionLevel

Level of compression (PNG).

1: minimum, 7: maximum

## Interlaced

Interlaced mode (GIF).

## Progressive

Progressive mode (JPEG).

## OptimizeHuffmanTable

Optimize the Huffman table (JPEG).

## InAscii

Use the ascii mode (PNM)

## Offset

For RAW or YUV format, offset of the data start.

## ChannelOrder

For RAW format, channel order of components.

GFL\_CORDER\_INTERLEAVED Interleaved

GFL\_CORDER\_SEQUENTIAL Sequential

GFL\_CORDER\_SEPARATE Separate

## ChannelType

For RAW format, channel type of components.

GFL\_CTYPE\_GREYSCALE Greyscale

GFL\_CTYPE\_RGB Red-Green-Blue

GFL\_CTYPE\_BGR Bleu-Green-Red

GFL\_CTYPE\_RGBA Red-Green-Bleu-Alpha

GFL\_CTYPE\_ABGR Alpha-Bleu-Green-Red

GFL\_CTYPE\_CMY Cyan-Magenta-Yellow

GFL\_CTYPE\_CMYK Cyan-Magenta-Yellow-Black

## Write

Tell            Pointer to a write user function.  
Seek            Pointer to a tell user function.  
Seek            Pointer to a seek user function.

## 4.7 GFL\_RECT

The GFL\_RECT structure define a rectangle.

```
struct GFL_RECT (  
    GFL_INT32 x  
    GFL_INT32 y  
    GFL_INT32 w  
    GFL_INT32 h  
)
```

### Members

x  
    X position.  
y  
    Y position.  
w  
    Width.  
h  
    Height.

## 4.8 GFL\_COLOR

The GFL\_COLOR structure allow to define a color.

```
struct GFL_COLOR (  
    GFL_UINT16 Red  
    GFL_UINT16 Green  
    GFL_UINT16 Blue  
    GFL_UINT16 Alpha  
)
```

### Members

Red  
    Define the red component.  
Green  
    Define the green component.  
Blue  
    Define the blue component.  
Alpha  
    Define the alpha component.

## 4.9 GFL\_POINT

The GFL\_POINT structure allows to define a point.

```
struct GFL_POINT (  
    GFL_INT32 x  
    GFL_INT32 y  
)
```

### Members

x	
	X position.
y	
	Y position.

## 4.10 GFL\_FILTER

The GFL\_FILTER structure allows to define a matrix for convolution (maximum 7x7).

```
struct GFL_FILTER(  
    GFL_INT16 Size  
    GFL_INT16 Matrix[7*7]  
    GFL_INT16 Divisor  
    GFL_INT16 Bias  
)
```

### Members

Size	
	Define the width of the matrix (maximum 7).
Matrix	
	Define each values fo the matrix.
Divisor	
	Define the divisor to apply.
Bias	
	Define the bias to apply.

### Example

A "blur" matrix is defined like this:

```
Size = 3  
Matrix = (1 2 1 2 4 2 1 2 1)  
Divisor = 16  
Bias = 0
```

## 4.11 GFL\_IPTC\_DATA

```
struct GFL_IPTC_ENTRY {  
    GFL_UINT32 Id  
    const char* Name  
    const char* Value  
}
```

## Members

Id  
ID of the field

Name  
Pointer to a null-terminated string of the field's name

Value  
Pointer to a null-terminated string of the field's value

```
struct GFL_IPTC_DATA {
    GFL_UINT32    NumberOfItems
    GFL_IPTC_ENTRY* ItemsList
}
```

## Members

NumberOfItems  
Number of iptc fields

ItemsList  
List of iptc fields

## 4.12 GFL\_EXIF\_DATA

### IFD

GFL_EXIF_IFD_0	0x0001
GFL_EXIF_MAIN_IFD	0x0002
GFL_EXIF_INTEROPERABILITY_IFD	0x0004
GFL_EXIF_IFD_THUMBNAIL	0x0008
GFL_EXIF_GPS_IFD	0x0010
GFL_EXIF_MAKERNOTE_IFD	0x0020

### Some tags

GFL_EXIF_MAKER	0x010F
GFL_EXIF_MODEL	0x0110
GFL_EXIF_ORIENTATION	0x0112
GFL_EXIF_EXPOSURETIME	0x829A
GFL_EXIF_FNUMBER	0x829D
GFL_EXIF_DATETIME_ORIGINAL	0x9003
GFL_EXIF_SHUTTERSPEED	0x9201
GFL_EXIF_APERTURE	0x9202
GFL_EXIF_MAXAPERTURE	0x9205
GFL_EXIF_FOCALLENGTH	0x920A

```
struct GFL_EXIF_ENTRY {
    GFL_UINT32  Flag /* EXIF_...IFD */
    GFL_UINT32  Tag
    const char* Name
    const char* Value
}
```

```
struct GFL_EXIF_DATA {
```

```

    GFL_UINT32      NumberOfItems
    GFL_EXIF_ENTRY* ItemsList
}

```

## 4.13 GFL\_LOAD\_CALLBACKS

```

struct GFL_LOAD_CALLBACKS {
    GFL_READ_CALLBACK Read
    GFL_TELL_CALLBACK Tell
    GFL_SEEK_CALLBACK Seek
    GFL_ALLOCATEBITMAP_CALLBACK AllocateBitmap
    void* AllocateBitmapParams
    GFL_PROGRESS_CALLBACK Progress
    void* ProgressParams
    GFL_WANTCANCEL_CALLBACK WantCancel
    void* WantCancelParams
    GFL_VIRTUAL_LOAD_CALLBACK SetLine
    void* SetLineParams
}

```

## 4.14 GFL\_EXIF\_DATAEX

### Tag format

GFL_EXIF_BYTE	1
GFL_EXIF_STRING	2
GFL_EXIF_USHORT	3
GFL_EXIF_ULONG	4
GFL_EXIF_URATIONAL	5
GFL_EXIF_SBYTE	6
GFL_EXIF_UNDEFINED	7
GFL_EXIF_SSHORT	8
GFL_EXIF_SLONG	9
GFL_EXIF_SRATIONAL	10
GFL_EXIF_SINGLEF	11
GFL_EXIF_DOUBLE	12

```

struct GFL_EXIF_ENTRYEX {
    GFL_UINT16 Tag
    GFL_UINT16 Format
    GFL_INT32 Ifd
    GFL_INT32 NumberOfComponents
    GFL_UINT32 Value
    GFL_INT32 DataLength
    char* Data
    GFL_EXIF_ENTRYEX* Next
}

```

```

struct GFL_EXIF_DATAEX {
    GFL_ENTRYEX* Root
    GFL_INT32 UseMsbf
}

```