

BITMAPFILEHEADER Structure

The **BITMAPFILEHEADER** structure contains information about the type, size, and layout of a file that contains a DIB.

Syntax

```
typedef struct tagBITMAPFILEHEADER {  
    WORD    bfType;  
    DWORD   bfSize;  
    WORD    bfReserved1;  
    WORD    bfReserved2;  
    DWORD   bfOffBits;  
} BITMAPFILEHEADER, *PBITMAPFILEHEADER;
```

Members

bfType

The file type; must be BM.

bfSize

The size, in bytes, of the bitmap file.

bfReserved1

Reserved; must be zero.

bfReserved2

Reserved; must be zero.

bfOffBits

The offset, in bytes, from the beginning of the **BITMAPFILEHEADER** structure to the bitmap bits.

Remarks

A [BITMAPINFO](#) or [BITMAPCOREINFO](#) structure immediately follows the **BITMAPFILEHEADER** structure in the DIB file. For more information, see [Bitmap Storage](#).

Requirements

Minimum supported client Windows 2000 Professional

Minimum supported server Windows 2000 Server

Header Wingdi.h (include Windows.h)

BITMAPINFOHEADER Structure

The **BITMAPINFOHEADER** structure contains information about the dimensions and color format of a DIB.

Syntax

```
typedef struct tagBITMAPINFOHEADER {  
    DWORD biSize;  
    LONG   biWidth;  
    LONG   biHeight;  
    WORD   biPlanes;  
    WORD   biBitCount;  
    DWORD  biCompression;  
    DWORD  biSizeImage;  
    LONG   biXPelsPerMeter;  
    LONG   biYPelsPerMeter;  
    DWORD  biClrUsed;  
    DWORD  biClrImportant;  
} BITMAPINFOHEADER, *PBITMAPINFOHEADER;
```

Members

biSize

The number of bytes required by the structure.

biWidth

The width of the bitmap, in pixels.

If **biCompression** is BI_JPEG or BI_PNG, the **biWidth** member specifies the width of the decompressed JPEG or PNG image file, respectively.

biHeight

The height of the bitmap, in pixels. If **biHeight** is positive, the bitmap is a bottom-up DIB and its origin is the lower-left corner. If **biHeight** is negative, the bitmap is a top-down DIB and its origin is the upper-left corner.

If **biHeight** is negative, indicating a top-down DIB, **biCompression** must be either BI_RGB or BI_BITFIELDS. Top-down DIBs cannot be compressed.

If **biCompression** is BI_JPEG or BI_PNG, the **biHeight** member specifies the height of the decompressed JPEG or PNG image file, respectively.

biPlanes

The number of planes for the target device. This value must be set to 1.

biBitCount

The number of bits-per-pixel. The **biBitCount** member of the **BITMAPINFOHEADER** structure determines the number of bits that define each pixel and the maximum number of colors in the bitmap. This member must be one of the following values.

| Value | Meaning |
|-------|--|
| 0 | The number of bits-per-pixel is specified or is implied by the JPEG or PNG format. |
| 1 | The bitmap is monochrome, and the bmiColors member of BITMAPINFO contains two entries. Each bit in the bitmap array represents a pixel. If the bit is clear, the pixel is displayed with the color of the first entry in the bmiColors table; if the bit is set, the pixel has the color of the second entry in the table. |
| 4 | The bitmap has a maximum of 16 colors, and the bmiColors member of BITMAPINFO contains up to 16 entries. Each pixel in the bitmap is represented by a 4-bit index into the color table. For example, if the first byte in the bitmap is 0x1F, the byte represents two pixels. The first pixel contains the color in the second table entry, and the second pixel contains the color in the sixteenth table entry. |
| 8 | The bitmap has a maximum of 256 colors, and the bmiColors member of BITMAPINFO contains up to 256 entries. In this case, each byte in the array represents a single pixel. |
| 16 | The bitmap has a maximum of 2^{16} colors. If the biCompression member of the BITMAPINFOHEADER is BI_RGB, the bmiColors member of BITMAPINFO is NULL. Each WORD in the bitmap array represents a single pixel. The relative intensities of red, green, and blue are represented with five bits for each color component. The value for blue is in the least significant five bits, followed by five bits each for green and red. The most significant bit is not used. The bmiColors color table is used for optimizing colors used on palette-based devices, and must contain the number of entries specified by the biClrUsed member of the BITMAPINFOHEADER . |
| 24 | If the biCompression member of the BITMAPINFOHEADER is BI_BITFIELDS, the bmiColors member contains three DWORD color masks that specify the red, green, and blue components, respectively, of each pixel. Each WORD in the bitmap array represents a single pixel. |
| | When the biCompression member is BI_BITFIELDS, bits set in each DWORD mask must be contiguous and should not overlap the bits of another mask. All the bits in the pixel do not have to be used. |
| | The bitmap has a maximum of 2^{24} colors, and the bmiColors member of BITMAPINFO is NULL. Each 3-byte triplet in the bitmap array represents the relative intensities of blue, green, and red, respectively, for a pixel. The |

bmiColors color table is used for optimizing colors used on palette-based devices, and must contain the number of entries specified by the **biClrUsed** member of the **BITMAPINFOHEADER**.

The bitmap has a maximum of 2^{32} colors. If the **biCompression** member of the **BITMAPINFOHEADER** is **BI_RGB**, the **bmiColors** member of **BITMAPINFO** is **NULL**. Each **DWORD** in the bitmap array represents the relative intensities of blue, green, and red, respectively, for a pixel. The high byte in each **DWORD** is not used. The **bmiColors** color table is used for optimizing colors used on palette-based devices, and must contain the number of entries specified by the **biClrUsed** member of the **BITMAPINFOHEADER**.

- 32 If the **biCompression** member of the **BITMAPINFOHEADER** is **BI_BITFIELDS**, the **bmiColors** member contains three **DWORD** color masks that specify the red, green, and blue components, respectively, of each pixel. Each **DWORD** in the bitmap array represents a single pixel.

When the **biCompression** member is **BI_BITFIELDS**, bits set in each **DWORD** mask must be contiguous and should not overlap the bits of another mask. All the bits in the pixel do not need to be used.

biCompression

The type of compression for a compressed bottom-up bitmap (top-down DIBs cannot be compressed). This member can be one of the following values.

| Value | Description |
|---------------------|---|
| BI_RGB | An uncompressed format. |
| BI_RLE8 | A run-length encoded (RLE) format for bitmaps with 8 bpp. The compression format is a 2-byte format consisting of a count byte followed by a byte containing a color index. For more information, see Bitmap Compression . |
| BI_RLE4 | An RLE format for bitmaps with 4 bpp. The compression format is a 2-byte format consisting of a count byte followed by two word-length color indexes. For more information, see Bitmap Compression . |
| BI_BITFIELDS | Specifies that the bitmap is not compressed and that the color table consists of three DWORD color masks that specify the red, green, and blue components, respectively, of each pixel. This is valid when used with 16- and 32-bpp bitmaps. |
| BI_JPEG | Indicates that the image is a JPEG image. |
| BI_PNG | Indicates that the image is a PNG image. |

biSizeImage

The size, in bytes, of the image. This may be set to zero for BI_RGB bitmaps.

If **biCompression** is BI_JPEG or BI_PNG, **biSizeImage** indicates the size of the JPEG or PNG image buffer, respectively.

biXPelsPerMeter

The horizontal resolution, in pixels-per-meter, of the target device for the bitmap. An application can use this value to select a bitmap from a resource group that best matches the characteristics of the current device.

biYPelsPerMeter

The vertical resolution, in pixels-per-meter, of the target device for the bitmap.

biClrUsed

The number of color indexes in the color table that are actually used by the bitmap. If this value is zero, the bitmap uses the maximum number of colors corresponding to the value of the **biBitCount** member for the compression mode specified by **biCompression**.

If **biClrUsed** is nonzero and the **biBitCount** member is less than 16, the **biClrUsed** member specifies the actual number of colors the graphics engine or device driver accesses. If **biBitCount** is 16 or greater, the **biClrUsed** member specifies the size of the color table used to optimize performance of the system color palettes. If **biBitCount** equals 16 or 32, the optimal color palette starts immediately following the three **DWORD** masks.

When the bitmap array immediately follows the **BITMAPINFO** structure, it is a packed bitmap. Packed bitmaps are referenced by a single pointer. Packed bitmaps require that the **biClrUsed** member must be either zero or the actual size of the color table.

biClrImportant

The number of color indexes that are required for displaying the bitmap. If this value is zero, all colors are required.

Remarks

The **BITMAPINFO** structure combines the **BITMAPINFOHEADER** structure and a color table to provide a complete definition of the dimensions and colors of a DIB. For more information about DIBs, see [Device-Independent Bitmaps](#) and **BITMAPINFO**.

An application should use the information stored in the **biSize** member to locate the color table in a **BITMAPINFO** structure, as follows:

```
pColor = ((LPSTR)pBitmapInfo + (WORD)(pBitmapInfo->bmiHeader.biSize));
```

The **BITMAPINFOHEADER** structure is extended to allow a JPEG or PNG image to be passed as the source image to [StretchDIBits](#).

Requirements

Minimum supported client Windows 2000 Professional

Minimum supported server Windows 2000 Server

Header Wingdi.h (include Windows.h)

BITMAPV4HEADER Structure

The **BITMAPV4HEADER** structure is the bitmap information header file. It is an extended version of the [**BITMAPINFOHEADER**](#) structure.

Applications can use the [**BITMAPV5HEADER**](#) structure for added functionality.

Syntax

```
typedef struct {
    DWORD      bV4Size;
    LONG       bV4Width;
    LONG       bV4Height;
    WORD       bV4Planes;
    WORD       bV4BitCount;
    DWORD      bV4V4Compression;
    DWORD      bV4SizeImage;
    LONG       bV4XPelsPerMeter;
    LONG       bV4YPelsPerMeter;
    DWORD      bV4ClrUsed;
    DWORD      bV4ClrImportant;
    DWORD      bV4RedMask;
    DWORD      bV4GreenMask;
    DWORD      bV4BlueMask;
    DWORD      bV4AlphaMask;
    DWORD      bV4CSType;
    CIEXYZTRIPLE bV4Endpoints;
    DWORD      bV4GammaRed;
    DWORD      bV4GammaGreen;
    DWORD      bV4GammaBlue;
} BITMAPV4HEADER, *PBITMAPV4HEADER;
```

Members

bV4Size

The number of bytes required by the structure. Applications should use this member to determine which bitmap information header structure is being used.

bV4Width

The width of the bitmap, in pixels.

If **bV4Compression** is BI_JPEG or BI_PNG, **bV4Width** specifies the width of the JPEG or PNG image in pixels.

bV4Height

The height of the bitmap, in pixels. If **bV4Height** is positive, the bitmap is a bottom-up DIB and its origin is the lower-left corner. If **bV4Height** is negative, the bitmap is a top-down DIB and its origin is the upper-left corner.

If **bV4Height** is negative, indicating a top-down DIB, **bV4Compression** must be either BI_RGB or BI_BITFIELDS. Top-down DIBs cannot be compressed.

If **bV4Compression** is BI_JPEG or BI_PNG, **bV4Height** specifies the height of the JPEG or PNG image in pixels.

bV4Planes

The number of planes for the target device. This value must be set to 1.

bV4BitCount

The number of bits-per-pixel. The **bV4BitCount** member of the **BITMAPV4HEADER** structure determines the number of bits that define each pixel and the maximum number of colors in the bitmap. This member must be one of the following values.

| Value | Meaning |
|-------|---|
| 0 | The number of bits-per-pixel is specified or is implied by the JPEG or PNG file format. |
| 1 | The bitmap is monochrome, and the bmiColors member of BITMAPINFO contains two entries. Each bit in the bitmap array represents a pixel. If the bit is clear, the pixel is displayed with the color of the first entry in the bmiColors table; if the bit is set, the pixel has the color of the second entry in the table. |
| 4 | The bitmap has a maximum of 16 colors, and the bmiColors member of BITMAPINFO contains up to 16 entries. Each pixel in the bitmap is represented by a 4-bit index into the color table. For example, if the first byte in the bitmap is 0x1F, the byte represents two pixels. The first pixel contains the color in the second table entry, and the second pixel contains the color in the sixteenth table entry. |
| 8 | The bitmap has a maximum of 256 colors, and the bmiColors member of BITMAPINFO contains up to 256 entries. In this case, each byte in the array represents a single pixel. |
| 16 | The bitmap has a maximum of 2 ¹⁶ colors. If the bV4Compression member of the BITMAPV4HEADER structure is BI_RGB, the bmiColors member of BITMAPINFO is NULL. Each WORD in the bitmap array represents a single pixel. The relative intensities of red, green, and blue are represented with five bits for each color component. The value for blue is in the least significant five bits, followed by five bits each for green and red, respectively. The most significant bit is not used. The bmiColors color table is used for optimizing colors used on palette-based devices, and must contain the number of entries specified by the bV4ClrUsed member of the BITMAPV4HEADER . |

If the **bV4Compression** member of the **BITMAPV4HEADER** is **BI_BITFIELDS**, the **bmiColors** member contains three **DWORD** color masks that specify the red, green, and blue components of each pixel. Each **WORD** in the bitmap array represents a single pixel.

24 The bitmap has a maximum of 2^{24} colors, and the **bmiColors** member of **BITMAPINFO** is **NULL**. Each 3-byte triplet in the bitmap array represents the relative intensities of blue, green, and red for a pixel. The **bmiColors** color table is used for optimizing colors used on palette-based devices, and must contain the number of entries specified by the **bV4ClrUsed** member of the **BITMAPV4HEADER**.

32 The bitmap has a maximum of 2^{32} colors. If the **bV4Compression** member of the **BITMAPV4HEADER** is **BI_RGB**, the **bmiColors** member of **BITMAPINFO** is **NULL**. Each **DWORD** in the bitmap array represents the relative intensities of blue, green, and red for a pixel. The high byte in each **DWORD** is not used. The **bmiColors** color table is used for optimizing colors used on palette-based devices, and must contain the number of entries specified by the **bV4ClrUsed** member of the **BITMAPV4HEADER**.

If the **bV4Compression** member of the **BITMAPV4HEADER** is **BI_BITFIELDS**, the **bmiColors** member contains three **DWORD** color masks that specify the red, green, and blue components of each pixel. Each **DWORD** in the bitmap array represents a single pixel.

bV4V4Compression

The type of compression for a compressed bottom-up bitmap (top-down DIBs cannot be compressed). This member can be one of the following values.

| Value | Description |
|---------------------|--|
| BI_RGB | An uncompressed format. |
| BI_RLE8 | A run-length encoded (RLE) format for bitmaps with 8 bpp. The compression format is a 2-byte format consisting of a count byte followed by a byte containing a color index. For more information, see Bitmap Compression . |
| BI_RLE4 | An RLE format for bitmaps with 4 bpp. The compression format is a 2-byte format consisting of a count byte followed by two word-length color indexes. For more information, see Bitmap Compression . |
| BI_BITFIELDS | Specifies that the bitmap is not compressed. The members bV4RedMask , bV4GreenMask , and bV4BlueMask specify the red, green, and blue components for each pixel. This is valid when used with 16- and 32-bpp bitmaps. |

| | |
|---------|--|
| BI_JPEG | Specifies that the image is compressed using the JPEG file interchange format. JPEG compression trades off compression against loss; it can achieve a compression ratio of 20:1 with little noticeable loss. |
| BI_PNG | Specifies that the image is compressed using the PNG file interchange format. |

bV4SizeImage

The size, in bytes, of the image. This may be set to zero for BI_RGB bitmaps.

If **bV4Compression** is BI_JPEG or BI_PNG, **bV4SizeImage** is the size of the JPEG or PNG image buffer.

bV4XPelsPerMeter

The horizontal resolution, in pixels-per-meter, of the target device for the bitmap. An application can use this value to select a bitmap from a resource group that best matches the characteristics of the current device.

bV4YPelsPerMeter

The vertical resolution, in pixels-per-meter, of the target device for the bitmap.

bV4ClrUsed

The number of color indexes in the color table that are actually used by the bitmap. If this value is zero, the bitmap uses the maximum number of colors corresponding to the value of the **bV4BitCount** member for the compression mode specified by **bV4Compression**.

If **bV4ClrUsed** is nonzero and the **bV4BitCount** member is less than 16, the **bV4ClrUsed** member specifies the actual number of colors the graphics engine or device driver accesses. If **bV4BitCount** is 16 or greater, the **bV4ClrUsed** member specifies the size of the color table used to optimize performance of the system color palettes. If **bV4BitCount** equals 16 or 32, the optimal color palette starts immediately following the **BITMAPV4HEADER**.

bV4ClrImportant

The number of color indexes that are required for displaying the bitmap. If this value is zero, all colors are important.

bV4RedMask

Color mask that specifies the red component of each pixel, valid only if **bV4Compression** is set to BI_BITFIELDS.

bV4GreenMask

Color mask that specifies the green component of each pixel, valid only if **bV4Compression** is set to BI_BITFIELDS.

bV4BlueMask

Color mask that specifies the blue component of each pixel, valid only if **bV4Compression** is set to BI_BITFIELDS.

bV4AlphaMask

Color mask that specifies the alpha component of each pixel.

bV4CSType

The color space of the DIB. The following table lists the value for **bV4CSType**.

| Value | Meaning |
|--------------------|---|
| LCS_CALIBRATED_RGB | This value indicates that endpoints and gamma values are given in the appropriate fields. |

See the [LOGCOLORSPACE](#) structure for information that defines a logical color space.

bV4Endpoints

A [CIEXYZTRIPLE](#) structure that specifies the x, y, and z coordinates of the three colors that correspond to the red, green, and blue endpoints for the logical color space associated with the bitmap. This member is ignored unless the **bV4CSType** member specifies LCS_CALIBRATED_RGB.

Note A *color space* is a model for representing color numerically in terms of three or more coordinates. For example, the RGB color space represents colors in terms of the red, green, and blue coordinates.

bV4GammaRed

Tone response curve for red. This member is ignored unless color values are calibrated RGB values and **bV4CSType** is set to LCS_CALIBRATED_RGB. Specified in 16¹⁶ format.

bV4GammaGreen

Tone response curve for green. Used if **bV4CSType** is set to LCS_CALIBRATED_RGB. Specified as 16^16 format.

bV4GammaBlue

Tone response curve for blue. Used if **bV4CSType** is set to LCS_CALIBRATED_RGB. Specified as 16^16 format.

Remarks

The **BITMAPV4HEADER** structure is extended to allow a JPEG or PNG image to be passed as the source image to [StretchDIBits](#).

Requirements

Minimum supported client Windows 2000 Professional

Minimum supported server Windows 2000 Server

Header Wingdi.h (include Windows.h)

BITMAPV5HEADER Structure

The **BITMAPV5HEADER** structure is the bitmap information header file. It is an extended version of the [BITMAPINFOHEADER](#) structure.

Syntax

```
typedef struct {
    DWORD      bV5Size;
    LONG       bV5Width;
    LONG       bV5Height;
    WORD       bV5Planes;
    WORD       bV5BitCount;
    DWORD      bV5Compression;
    DWORD      bV5SizeImage;
    LONG       bV5XPelsPerMeter;
    LONG       bV5YPelsPerMeter;
    DWORD      bV5ClrUsed;
    DWORD      bV5ClrImportant;
    DWORD      bV5RedMask;
    DWORD      bV5GreenMask;
    DWORD      bV5BlueMask;
    DWORD      bV5AlphaMask;
    DWORD      bV5CSType;
    CIEXYZTRIPLE bV5Endpoints;
    DWORD      bV5GammaRed;
    DWORD      bV5GammaGreen;
    DWORD      bV5GammaBlue;
    DWORD      bV5Intent;
    DWORD      bV5ProfileData;
    DWORD      bV5ProfileSize;
    DWORD      bV5Reserved;
} BITMAPV5HEADER, *PBITMAPV5HEADER;
```

Members

bV5Size

The number of bytes required by the structure. Applications should use this member to determine which bitmap information header structure is being used.

bV5Width

The width of the bitmap, in pixels.

If **bV5Compression** is BI_JPEG or BI_PNG, the **bV5Width** member specifies the width of the decompressed JPEG or PNG image in pixels.

bV5Height

The height of the bitmap, in pixels. If the value of **bV5Height** is positive, the bitmap is a bottom-up DIB and its origin is the lower-left corner. If **bV5Height** value is negative, the bitmap is a top-down DIB and its origin is the upper-left corner.

If **bV5Height** is negative, indicating a top-down DIB, **bV5Compression** must be either BI_RGB or BI_BITFIELDS. Top-down DIBs cannot be compressed.

If **bV5Compression** is BI_JPEG or BI_PNG, the **bV5Height** member specifies the height of the decompressed JPEG or PNG image in pixels.

bV5Planes

The number of planes for the target device. This value must be set to 1.

bV5BitCount

The number of bits that define each pixel and the maximum number of colors in the bitmap.

This member can be one of the following values.

| Value | Meaning |
|-------|--|
| 0 | The number of bits per pixel is specified or is implied by the JPEG or PNG file format. |
| 1 | The bitmap is monochrome, and the bmiColors member of BITMAPINFO contains two entries. Each bit in the bitmap array represents a pixel. If the bit is clear, the pixel is displayed with the color of the first entry in the bmiColors color table. If the bit is set, the pixel has the color of the second entry in the table. |
| 4 | The bitmap has a maximum of 16 colors, and the bmiColors member of BITMAPINFO contains up to 16 entries. Each pixel in the bitmap is represented by a 4-bit index into the color table. For example, if the first byte in the bitmap is 0x1F, the byte represents two pixels. The first pixel contains the color in the second table entry, and the second pixel contains the color in the sixteenth table entry. |
| 8 | The bitmap has a maximum of 256 colors, and the bmiColors member of BITMAPINFO contains up to 256 entries. In this case, each byte in the array represents a single pixel. |
| 16 | The bitmap has a maximum of 2^{16} colors. If the bV5Compression member of the BITMAPV5HEADER structure is BI_RGB, the bmiColors member of BITMAPINFO is NULL. Each WORD in the bitmap array represents a single pixel. The relative intensities of red, green, and blue are represented with five bits for each color component. The value for blue is in the least significant five bits, followed by five bits each for green and red. The most significant bit is not used. The bmiColors color table is used for optimizing colors used on palette-based devices, and must contain the number of entries specified by the bV5ClrUsed |

member of the **BITMAPV5HEADER**.

If the **bV5Compression** member of the **BITMAPV5HEADER** is **BI_BITFIELDS**, the **bmiColors** member contains three **DWORD** color masks that specify the red, green, and blue components, respectively, of each pixel. Each **WORD** in the bitmap array represents a single pixel.

When the **bV5Compression** member is **BI_BITFIELDS**, bits set in each **DWORD** mask must be contiguous and should not overlap the bits of another mask. All the bits in the pixel do not need to be used.

24 The bitmap has a maximum of 2^{24} colors, and the **bmiColors** member of **BITMAPINFO** is **NULL**. Each 3-byte triplet in the bitmap array represents the relative intensities of blue, green, and red, respectively, for a pixel. The **bmiColors** color table is used for optimizing colors used on palette-based devices, and must contain the number of entries specified by the **bV5ClrUsed** member of the **BITMAPV5HEADER** structure.

32 The bitmap has a maximum of 2^{32} colors. If the **bV5Compression** member of the **BITMAPV5HEADER** is **BI_RGB**, the **bmiColors** member of **BITMAPINFO** is **NULL**. Each **DWORD** in the bitmap array represents the relative intensities of blue, green, and red, respectively, for a pixel. The high byte in each **DWORD** is not used. The **bmiColors** color table is used for optimizing colors used on palette-based devices, and must contain the number of entries specified by the **bV5ClrUsed** member of the **BITMAPV5HEADER**.

If the **bV5Compression** member of the **BITMAPV5HEADER** is **BI_BITFIELDS**, the **bmiColors** member contains three **DWORD** color masks that specify the red, green, and blue components of each pixel. Each **DWORD** in the bitmap array represents a single pixel.

bV5Compression

Specifies that the bitmap is not compressed. The **bV5RedMask**, **bV5GreenMask**, and **bV5BlueMask** members specify the red, green, and blue components of each pixel. This is valid when used with 16- and 32-bpp bitmaps. This member can be one of the following values.

| Value | Meaning |
|----------------|---|
| BI_RGB | An uncompressed format. |
| BI_RLE8 | A run-length encoded (RLE) format for bitmaps with 8 bpp. The compression format is a two-byte format consisting of a count byte followed by a byte containing a color index. If bV5Compression is BI_RGB and the bV5BitCount member is 16, 24, or 32, the bitmap array specifies the actual intensities of blue, green, and red rather than |

| | |
|--------------|--|
| | using color table indexes. For more information, see Bitmap Compression . |
| BI_RLE4 | An RLE format for bitmaps with 4 bpp. The compression format is a two-byte format consisting of a count byte followed by two word-length color indexes. For more information, see Bitmap Compression. |
| BI_BITFIELDS | Specifies that the bitmap is not compressed and that the color table consists of three DWORD color masks that specify the red, green, and blue components of each pixel. Valid when used with 16- and 32-bpp bitmaps. |
| BI_JPEG | Specifies that the image is compressed using the JPEG file Interchange Format. JPEG compression trades off compression against loss; it can achieve a compression ratio of 20:1 with little noticeable loss. |
| BI_PNG | Specifies that the image is compressed using the PNG file Interchange Format. |

bV5SizeImage

The size, in bytes, of the image. This may be set to zero for BI_RGB bitmaps.

If **bV5Compression** is BI_JPEG or BI_PNG, **bV5SizeImage** is the size of the JPEG or PNG image buffer.

bV5XPelsPerMeter

The horizontal resolution, in pixels-per-meter, of the target device for the bitmap. An application can use this value to select a bitmap from a resource group that best matches the characteristics of the current device.

bV5YPelsPerMeter

The vertical resolution, in pixels-per-meter, of the target device for the bitmap.

bV5ClrUsed

The number of color indexes in the color table that are actually used by the bitmap. If this value is zero, the bitmap uses the maximum number of colors corresponding to the value of the **bV5BitCount** member for the compression mode specified by **bV5Compression**.

If **bV5ClrUsed** is nonzero and **bV5BitCount** is less than 16, the **bV5ClrUsed** member specifies the actual number of colors the graphics engine or device driver accesses. If **bV5BitCount** is 16 or greater, the **bV5ClrUsed** member specifies the size of the color table used to optimize performance of the system color palettes. If **bV5BitCount** equals 16 or 32, the optimal color palette starts immediately following the

BITMAPV5HEADER. If **bV5ClrUsed** is nonzero, the color table is used on palettized devices, and **bV5ClrUsed** specifies the number of entries.

bV5ClrImportant

The number of color indexes that are required for displaying the bitmap. If this value is zero, all colors are required.

bV5RedMask

Color mask that specifies the red component of each pixel, valid only if **bV5Compression** is set to BI_BITFIELDS.

bV5GreenMask

Color mask that specifies the green component of each pixel, valid only if **bV5Compression** is set to BI_BITFIELDS.

bV5BlueMask

Color mask that specifies the blue component of each pixel, valid only if **bV5Compression** is set to BI_BITFIELDS.

bV5AlphaMask

Color mask that specifies the alpha component of each pixel.

bV5CSType

The color space of the DIB.

The following table specifies the values for **bV5CSType**.

| Value | Meaning |
|-------------------------|--|
| LCS_CALIBRATED_RGB | This value implies that endpoints and gamma values are given in the appropriate fields. |
| LCS_sRGB | Specifies that the bitmap is in sRGB color space. |
| LCS_WINDOWS_COLOR_SPACE | This value indicates that the bitmap is in the system default color space, sRGB. |
| PROFILE_LINKED | This value indicates that bV5ProfileData points to the file name of the profile to use (gamma and endpoints values are ignored). |
| PROFILE_EMBEDDED | This value indicates that bV5ProfileData points to a memory buffer that contains the profile to be used (gamma and endpoints values are ignored). |

See the [LOGCOLORSPACE](#) structure for information that defines a logical color space.

bV5Endpoints

A [CIEXYZTRIPLE](#) structure that specifies the x, y, and z coordinates of the three colors that correspond to the red, green, and blue endpoints for the logical color space associated with the bitmap. This member is ignored unless the **bV5CSType** member specifies LCS_CALIBRATED_RGB.

bV5GammaRed

Toned response curve for red. Used if **bV5CSType** is set to LCS_CALIBRATED_RGB. Specified in 16^16 format.

bV5GammaGreen

Toned response curve for green. Used if **bV5CSType** is set to LCS_CALIBRATED_RGB. Specified in 16^16 format.

bV5GammaBlue

Toned response curve for blue. Used if **bV5CSType** is set to LCS_CALIBRATED_RGB. Specified in 16^16 format.

bV5Intent

Rendering intent for bitmap. This can be one of the following values.

| Value | Intent | ICC name | Meaning |
|-------------------------|---------|-----------------------|--|
| LCS_GM_ABS_COLORIMETRIC | Match | Absolute Colorimetric | Maintains the white point. Matches the colors to their nearest color in the destination gamut. |
| LCS_GM_BUSINESS | Graphic | Saturation | Maintains saturation. Used for business charts and other situations in which undithered colors are required. |
| LCS_GM_GRAPHICS | Proof | Relative Colorimetric | Maintains colorimetric match. Used for graphic designs and named colors. |
| LCS_GM_IMAGES | Picture | Perceptual | Maintains contrast. Used for |

photographs and natural images.

bV5ProfileData

The offset, in bytes, from the beginning of the **BITMAPV5HEADER** structure to the start of the profile data. If the profile is embedded, profile data is the actual profile, and it is linked. (The profile data is the null-terminated file name of the profile.) This cannot be a Unicode string. It must be composed exclusively of characters from the Windows character set (code page 1252). These profile members are ignored unless the **bV5CSType** member specifies **PROFILE_LINKED** or **PROFILE_EMBEDDED**.

bV5ProfileSize

Size, in bytes, of embedded profile data.

bV5Reserved

This member has been reserved. Its value should be set to zero.

Remarks

If **bV5Height** is negative, indicating a top-down DIB, **bV5Compression** must be either **BI_RGB** or **BI_BITFIELDS**. Top-down DIBs cannot be compressed.

The Independent Color Management interface (ICM) 2.0 allows International Color Consortium (ICC) color profiles to be linked or embedded in DIBs (DIBs). See [Using Structures](#) for more information.

When a DIB is loaded into memory, the profile data (if present) should follow the color table, and the **bV5ProfileData** should provide the offset of the profile data from the beginning of the **BITMAPV5HEADER** structure. The value stored in **bV5ProfileData** will be different from the value returned by the **sizeof** operator given the **BITMAPV5HEADER** argument, because **bV5ProfileData** is the offset in bytes from the beginning of the **BITMAPV5HEADER** structure to the start of the profile data. (Bitmap bits do not follow the color table in memory). Applications should modify the **bV5ProfileData** member after loading the DIB into memory.

For packed DIBs, the profile data should follow the bitmap bits similar to the file format. The **bV5ProfileData** member should still give the offset of the profile data from the beginning of the **BITMAPV5HEADER**.

Applications should access the profile data only when **bV5Size** equals the size of the **BITMAPV5HEADER** and **bV5CSType** equals **PROFILE_EMBEDDED** or **PROFILE_LINKED**.

If a profile is linked, the path of the profile can be any fully qualified name (including a network path) that can be opened using the [CreateFile](#) function.

Requirements

Minimum supported client Windows 2000 Professional

Minimum supported server Windows 2000 Server

Header Wingdi.h (include Windows.h)