

Adobe Photoshop

File Formats

Specification

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Preface

Welcome to the Adobe Photoshop® File Format Specification!

This document is the detailed specification of the Adobe Photoshop file format and other pertinent file formats that Adobe Photoshop reads and writes.

Audience

This document is provided for 3rd parties to read and write the Photoshop native file format. This document does not explain how to interpret the data. This document describes the format of the data only.

What Is In This Document

This document has three chapters:

[The Photoshop File Format](#) describes the Photoshop **PSD** and **PSB** native file format in detail.

[Other Document File Formats](#) discusses Photoshop's handling of the **EPS** and **TIFF** file formats, which Photoshop can also create and read.

[Additional File Formats](#) describes the formats of other files used by Photoshop to store information about such items as colors, contours, curves, levels and so forth.

For more information about file formats, you may wish to consult the *Encyclopedia of Graphics File Formats* by James D. Murray & William vanRyper (1994, O'Reilly & Associates, Inc., Sebastopol, CA, ISBN 1-56592-058-9).

What Is NOT In This Document

This document does not have any information regarding the PSDC (Photoshop Cloud Document) that was introduced in November of 2019. That format, at this time, is private. This link will give you more information about [Photoshop Cloud Documents](#).

SDK User to User Forum

The Adobe forums web page, <http://www.adobe.com/support/forums>, is also available for discussion of SDK issues. From the page above follow the Photoshop link and then the Adobe Photoshop Developers link.

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The Photoshop File Format

Introduction

This chapter discusses the Photoshop native file format

Photoshop file types

| OS | Filetype/extension |
|---------|--------------------|
| Mac OS | 8BPS |
| Windows | .PSD |

Large Document Format

The Large Document Format (8BPB/PSB) supports documents up to 300,000 pixels in any dimension. All Photoshop features, such as layers, effects, and filters, are supported by the PSB format. The PSB format is identical to the Photoshop native format in many ways. This document will cover the differences found in the PSB format by donating a ****PSB**** marker.

Windows

All data is stored in big endian byte order. On the Windows platform, you must byte swap short and long integers when reading or writing.

Mac OS

For cross-platform compatibility, all information needed by Photoshop is stored in the data fork. For interoperability with other Macintosh applications, however, some information is duplicated in resources stored in the resource fork of the file:

For compatibility with image cataloging applications, the 'pnot' resource id 0 contains references to thumbnail, keywords, and caption information stored in other resources.

The thumbnail picture is stored in a 'PICT' resource, the keywords are stored in 'STR#' resource 128 and the caption text is stored in 'TEXT' resource 128. For more information on the format of these resources see *Inside Macintosh: QuickTime Components* and the *Extensis Fetch Awareness Developer's Toolkit*.

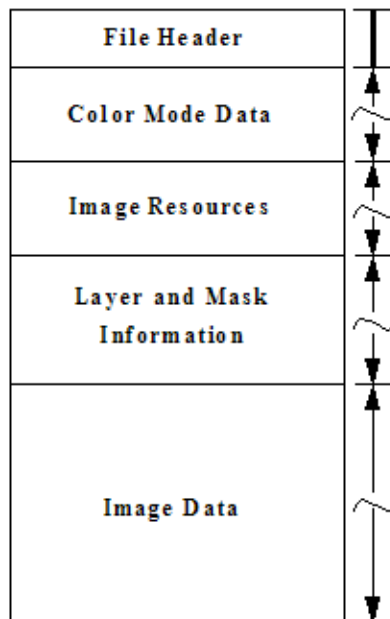
Photoshop also creates 'ic18' -16455 and 'ICN#' -16455 resources containing thumbnail images which will be shown in the Mac OS Finder.

All of the data from Photoshop's File Info dialog is stored in 'ANPA' resource 10000. The data in this resource is stored as an IPTC-NAA record 2. For more information on the format of this resource, see the documents in the IPTC folder of the Documentation folder.

Photoshop File Format

The Photoshop file format is divided into five major parts, as shown in the [Photoshop file structure](#). The Photoshop file format has many length markers. Use these length markers to move from one section to the next. The length markers are usually padded with bytes to round to the nearest 2 or 4 byte interval.

Photoshop file structure



File header ([File Header Section](#)).

Color mode data ([Color Mode Data Section](#))

Image resources ([Image Resources Section](#))

Layer and mask information ([Layer and Mask Information Section](#))

Image data ([Image Data Section](#)).

The file header has a fixed length; the other four sections are variable in length.

When writing one of these sections, you should write all fields in the section, as Photoshop may try to read the entire section. Whenever writing a file and skipping bytes, you should explicitly write zeros for the skipped fields.

When reading one of the length-delimited sections, use the length field to decide when you should stop reading. In most cases, the length field indicates the number of bytes, not records, following.

The values in "Length" column in all tables are in bytes.

All values defined as **Unicode string** consist of:

A 4-byte length field, representing the number of UTF-16 code units in the string (not bytes).

The string of Unicode values, two bytes per character and a two byte null for the end of the string.

File Header Section

The file header contains the basic properties of the image.

File header section

| Length | Description |
|--------|---------------------------------------------------------------------------------------------------------------------------|
| 4 | Signature: always equal to '8BPS' . Do not try to read the file if the signature does not match this value. |
| 2 | Version: always equal to 1. Do not try to read the file if the version does not match this value. (**PSB** version is 2.) |
| 6 | Reserved: must be zero. |
| 2 | The number of channels in the image, including any alpha channels. Supported range is 1 to 56. |
| 4 | The height of the image in pixels. Supported range is 1 to 30,000. |

| | |
|---|------------------------------------------------------------------------------------------------------------------------------------------------------|
| | (**PSB** max of 300,000.) |
| 4 | The width of the image in pixels. Supported range is 1 to 30,000. (*PSB** max of 300,000) |
| 2 | Depth: the number of bits per channel. Supported values are 1, 8, 16 and 32. |
| 2 | The color mode of the file. Supported values are: Bitmap = 0; Grayscale = 1; Indexed = 2; RGB = 3; CMYK = 4; Multichannel = 7; Duotone = 8; Lab = 9. |

Color Mode Data Section

The color mode data section is structured as follows:

Color mode data section

| Length | Description |
|----------|-----------------------------------------|
| 4 | The length of the following color data. |
| Variable | The color data. |

Only indexed color and duotone (see the mode field in the [File header section](#)) have color mode data. For all other modes, this section is just the 4-byte length field, which is set to zero.

Indexed color images: length is 768; color data contains the color table for the image, in non-interleaved order.

Duotone images: color data contains the duotone specification (the format of which is not documented). Other applications that read Photoshop files can treat a duotone image as a gray image, and just preserve the contents of the duotone information when reading and writing the file.

Image Resources Section

The third section of the file contains image resources. It starts with a length field, followed by a series of resource blocks.

Image resources section

| Length | Description |
|----------|------------------------------------------------------------|
| 4 | Length of image resource section. The length may be zero. |
| Variable | Image resources (Image Resource Blocks). |

Image Resource Blocks

Image resource blocks are the basic building unit of several file formats, including Photoshop's native file format, JPEG, and TIFF. Image resources are used to store non-pixel data associated with images, such as pen tool paths.

They are referred to as resource blocks because they hold data that was stored in the Macintosh's resource fork in early versions of Photoshop.

The basic structure of image resource blocks is shown in the [Image resource block](#). The last field is the data area, which varies by resource type. The makeup of each resource type is described in the following sections.

Image resource block

| Length | Description |
|----------|---------------------------------------------------------------------------------------------------------------------------|
| 4 | Signature: '8BIM' |
| 2 | Unique identifier for the resource. Image resource IDs contains a list of resource IDs used by Photoshop. |
| Variable | Name: Pascal string, padded to make the size even (a null name consists of two bytes of 0) |
| 4 | Actual size of resource data that follows |
| Variable | The resource data, described in the sections on the individual resource types. It is padded to make the size even. |

Image Resource IDs

Image resources use several standard ID numbers, as shown in the [Image resource IDs](#). Not all file formats use all ID's. Some information may be stored in other sections of the file.

For those resource IDs that have been added since Photoshop 3.0. the entry indicates the version in which they were introduced, e.g. (*Photoshop 6.0*).

Image resource IDs

| ID | | Description |
|--------|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Hex | Decimal | |
| 0x03E8 | 1000 | (<i>Obsolete--Photoshop 2.0 only</i>) Contains five 2-byte values: number of channels, rows, columns, depth, and mode |
| 0x03E9 | 1001 | Macintosh print manager print info record |
| 0x03EA | 1002 | Macintosh page format information. No longer read by Photoshop. (<i>Obsolete</i>) |
| 0x03EB | 1003 | (<i>Obsolete--Photoshop 2.0 only</i>) Indexed color table |
| 0x03ED | 1005 | ResolutionInfo structure. See Appendix A in Photoshop API Guide.pdf. |
| 0x03EE | 1006 | Names of the alpha channels as a series of Pascal strings. |
| 0x03EF | 1007 | (<i>Obsolete</i>) See ID 1077DisplayInfo structure. See Appendix A in Photoshop API Guide.pdf. |
| 0x03F0 | 1008 | The caption as a Pascal string. |
| 0x03F1 | 1009 | Border information. Contains a fixed number (2 bytes real, 2 bytes fraction) for the border width, and 2 bytes for border units (1 = inches, 2 = cm, 3 = points, 4 = picas, 5 = columns). |
| 0x03F2 | 1010 | Background color. See See Color structure . |
| 0x03F3 | 1011 | Print flags. A series of one-byte boolean values (see Page Setup dialog): labels, crop marks, color bars, registration marks, negative, flip, interpolate, caption, print flags. |
| 0x03F4 | 1012 | Grayscale and multichannel halftoning information |
| 0x03F5 | 1013 | Color halftoning information |
| 0x03F6 | 1014 | Duotone halftoning information |
| 0x03F7 | 1015 | Grayscale and multichannel transfer function |
| 0x03F8 | 1016 | Color transfer functions |
| 0x03F9 | 1017 | Duotone transfer functions |
| 0x03FA | 1018 | Duotone image information |
| 0x03FB | 1019 | Two bytes for the effective black and white values for the dot range |
| 0x03FC | 1020 | (<i>Obsolete</i>) |
| 0x03FD | 1021 | EPS options |
| 0x03FE | 1022 | Quick Mask information. 2 bytes containing Quick Mask channel ID; 1- byte boolean indicating whether the mask was initially empty. |
| 0x03FF | 1023 | (<i>Obsolete</i>) |
| 0x0400 | 1024 | Layer state information. 2 bytes containing the index of target layer (0 = bottom layer). |
| 0x0401 | 1025 | Working path (not saved). See See Path resource format . |
| 0x0402 | 1026 | Layers group information. 2 bytes per layer containing a group ID for the dragging groups. Layers in a group have the same group ID. |
| 0x0403 | 1027 | (<i>Obsolete</i>) |
| 0x0404 | 1028 | IPTC-NAA record. Contains the File Info... information. See the documentation in the IPTC folder of the Documentation folder. |
| 0x0405 | 1029 | Image mode for raw format files |
| 0x0406 | 1030 | JPEG quality. Private. |

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|--------|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0x0408 | 1032 | (Photoshop 4.0) Grid and guides information. See See Grid and guides resource format . |
| 0x0409 | 1033 | (Photoshop 4.0) Thumbnail resource for Photoshop 4.0 only. See See Thumbnail resource format . |
| 0x040A | 1034 | (Photoshop 4.0) Copyright flag. Boolean indicating whether image is copyrighted. Can be set via Property suite or by user in File Info... |
| 0x040B | 1035 | (Photoshop 4.0) URL. Handle of a text string with uniform resource locator. Can be set via Property suite or by user in File Info... |
| 0x040C | 1036 | (Photoshop 5.0) Thumbnail resource (supersedes resource 1033). See See Thumbnail resource format . |
| 0x040D | 1037 | (Photoshop 5.0) Global Angle. 4 bytes that contain an integer between 0 and 359, which is the global lighting angle for effects layer. If not present, assumed to be 30. |
| 0x040E | 1038 | (Obsolete) See ID 1073 below. (Photoshop 5.0) Color samplers resource. See See Color samplers resource format . |
| 0x040F | 1039 | (Photoshop 5.0) ICC Profile. The raw bytes of an ICC (International Color Consortium) format profile. See ICC1v42_2006-05.pdf in the Documentation folder and icProfileHeader.h in Sample Code\Common\Includes. |
| 0x0410 | 1040 | (Photoshop 5.0) Watermark. One byte. |
| 0x0411 | 1041 | (Photoshop 5.0) ICC Untagged Profile. 1 byte that disables any assumed profile handling when opening the file. 1 = intentionally untagged. |
| 0x0412 | 1042 | (Photoshop 5.0) Effects visible. 1-byte global flag to show/hide all the effects layer. Only present when they are hidden. |
| 0x0413 | 1043 | (Photoshop 5.0) Spot Halftone. 4 bytes for version, 4 bytes for length, and the variable length data. |
| 0x0414 | 1044 | (Photoshop 5.0) Document-specific IDs seed number. 4 bytes: Base value, starting at which layer IDs will be generated (or a greater value if existing IDs already exceed it). Its purpose is to avoid the case where we add layers, flatten, save, open, and then add more layers that end up with the same IDs as the first set. |
| 0x0415 | 1045 | (Photoshop 5.0) Unicode Alpha Names. Unicode string |
| 0x0416 | 1046 | (Photoshop 6.0) Indexed Color Table Count. 2 bytes for the number of colors in table that are actually defined |
| 0x0417 | 1047 | (Photoshop 6.0) Transparency Index. 2 bytes for the index of transparent color, if any. |
| 0x0419 | 1049 | (Photoshop 6.0) Global Altitude. 4 byte entry for altitude |
| 0x041A | 1050 | (Photoshop 6.0) Slices. See See Slices resource format . |
| 0x041B | 1051 | (Photoshop 6.0) Workflow URL. Unicode string |
| 0x041C | 1052 | (Photoshop 6.0) Jump To XPEP. 2 bytes major version, 2 bytes minor version, 4 bytes count. Following is repeated for count: 4 bytes block size, 4 bytes key, if key = 'j tDd', then next is a Boolean for the dirty flag; otherwise it's a 4 byte entry for the mod date. |
| 0x041D | 1053 | (Photoshop 6.0) Alpha Identifiers. 4 bytes of length, followed by 4 bytes each for every alpha identifier. |
| 0x041E | 1054 | (Photoshop 6.0) URL List. 4 byte count of URLs, followed by 4 byte long, 4 byte ID, and Unicode string for each count. |
| 0x0421 | 1057 | (Photoshop 6.0) Version Info. 4 bytes version, 1 byte hasRealMergedData, Unicode string ; writer name, Unicode string ; reader name, 4 bytes file version. |
| 0x0422 | 1058 | (Photoshop 7.0) EXIF data 1. See http://www.kodak.com/global/plugins/acrobat/en/service/digCam/exifStandard2.pdf |
| 0x0423 | 1059 | (Photoshop 7.0) EXIF data 3. See http://www.kodak.com/global/plugins/acrobat/en/service/digCam/exifStandard2.pdf |

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| 0x0424 | 1060 | (Photoshop 7.0) XMP metadata. File info as XML description. See http://www.adobe.com/devnet/xmp/ |
| 0x0425 | 1061 | (Photoshop 7.0) Caption digest. 16 bytes: RSA Data Security, MD5 message-digest algorithm |
| 0x0426 | 1062 | (Photoshop 7.0) Print scale. 2 bytes style (0 = centered, 1 = size to fit, 2 = user defined). 4 bytes x location (floating point). 4 bytes y location (floating point). 4 bytes scale (floating point) |
| 0x0428 | 1064 | (Photoshop CS) Pixel Aspect Ratio. 4 bytes (version = 1 or 2), 8 bytes double, x / y of a pixel. Version 2, attempting to correct values for NTSC and PAL, previously off by a factor of approx. 5%. |
| 0x0429 | 1065 | (Photoshop CS) Layer Comps. 4 bytes (descriptor version = 16), Descriptor (see See Descriptor structure) |
| 0x042A | 1066 | (Photoshop CS) Alternate Duotone Colors. 2 bytes (version = 1), 2 bytes count, following is repeated for each count: [Color: 2 bytes for space followed by 4 * 2 byte color component], following this is another 2 byte count, usually 256, followed by Lab colors one byte each for L, a, b. This resource is not read or used by Photoshop. |
| 0x042B | 1067 | (Photoshop CS) Alternate Spot Colors. 2 bytes (version = 1), 2 bytes channel count, following is repeated for each count: 4 bytes channel ID, Color: 2 bytes for space followed by 4 * 2 byte color component. This resource is not read or used by Photoshop. |
| 0x042D | 1069 | (Photoshop CS2) Layer Selection ID(s). 2 bytes count, following is repeated for each count: 4 bytes layer ID |
| 0x042E | 1070 | (Photoshop CS2) HDR Toning information |
| 0x042F | 1071 | (Photoshop CS2) Print info |
| 0x0430 | 1072 | (Photoshop CS2) Layer Group(s) Enabled ID. 1 byte for each layer in the document, repeated by length of the resource. NOTE: Layer groups have start and end markers |
| 0x0431 | 1073 | (Photoshop CS3) Color samplers resource. Also see ID 1038 for old format. See See Color samplers resource format . |
| 0x0432 | 1074 | (Photoshop CS3) Measurement Scale. 4 bytes (descriptor version = 16), Descriptor (see See Descriptor structure) |
| 0x0433 | 1075 | (Photoshop CS3) Timeline Information. 4 bytes (descriptor version = 16), Descriptor (see See Descriptor structure) |
| 0x0434 | 1076 | (Photoshop CS3) Sheet Disclosure. 4 bytes (descriptor version = 16), Descriptor (see See Descriptor structure) |
| 0x0435 | 1077 | (Photoshop CS3) DisplayInfo structure to support floating point clors. Also see ID 1007. See Appendix A in Photoshop API Guide.pdf . |
| 0x0436 | 1078 | (Photoshop CS3) Onion Skins. 4 bytes (descriptor version = 16), Descriptor (see See Descriptor structure) |
| 0x0438 | 1080 | (Photoshop CS4) Count Information. 4 bytes (descriptor version = 16), Descriptor (see See Descriptor structure) Information about the count in the document. See the Count Tool. |
| 0x043A | 1082 | (Photoshop CS5) Print Information. 4 bytes (descriptor version = 16), Descriptor (see See Descriptor structure) Information about the current print settings in the document. The color management options. |
| 0x043B | 1083 | (Photoshop CS5) Print Style. 4 bytes (descriptor version = 16), Descriptor (see See Descriptor structure) Information about the current print style in the document. The printing marks, labels, ornaments, etc. |
| 0x043C | 1084 | (Photoshop CS5) Macintosh NSPrintInfo. Variable OS specific info for Macintosh. NSPrintInfo. It is recommended that you do not interpret or use this data. |
| 0x043D | 1085 | (Photoshop CS5) Windows DEVMODE. Variable OS specific info for Windows. DEVMODE. It is recommended that you do not interpret or use this data. |
| 0x043E | 1086 | (Photoshop CS6) Auto Save File Path. Unicode string . It is recommended that you do not interpret or use this data. |

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| 0x043F | 1087 | (<i>Photoshop CS6</i>) Auto Save Format. Unicode string . It is recommended that you do not interpret or use this data. |
| 0x0440 | 1088 | (<i>Photoshop CC</i>) Path Selection State. 4 bytes (descriptor version = 16), Descriptor (see See Descriptor structure) Information about the current path selection state. |
| 0x07D0-0x0BB6 | 2000-2997 | Path Information (saved paths). See See Path resource format . |
| 0x0BB7 | 2999 | Name of clipping path. See See Path resource format . |
| 0x0BB8 | 3000 | (<i>Photoshop CC</i>) Origin Path Info. 4 bytes (descriptor version = 16), Descriptor (see See Descriptor structure) Information about the origin path data. |
| 0x0FA0-0x1387 | 4000-4999 | Plug-In resource(s). Resources added by a plug-in. See the plug-in API found in the SDK documentation |
| 0x1B58 | 7000 | Image Ready variables. XML representation of variables definition |
| 0x1B59 | 7001 | Image Ready data sets |
| 0x1B5A | 7002 | Image Ready default selected state |
| 0x1B5B | 7003 | Image Ready 7 rollover expanded state |
| 0x1B5C | 7004 | Image Ready rollover expanded state |
| 0x1B5D | 7005 | Image Ready save layer settings |
| 0x1B5E | 7006 | Image Ready version |
| 0x1F40 | 8000 | (<i>Photoshop CS3</i>) Lightroom workflow, if present the document is in the middle of a Lightroom workflow. |
| 0x2710 | 10000 | Print flags information. 2 bytes version (= 1), 1 byte center crop marks, 1 byte (= 0), 4 bytes bleed width value, 2 bytes bleed width scale. |

The following sections describe some of the resource formats in more detail.

Grid and guides resource format

Photoshop stores grid and guides information for an image in an image resource block. Each of these resource blocks consists of an initial 16-byte grid and guide header, which is always present, followed by 5-byte blocks of specific guide information for guide direction and location, which are present if there are guides (`fGuideCount > 0`).

Grid and guide header

| Length | Description |
|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4 | Version (= 1) |
| 8 | Future implementation of document-specific grids (4 bytes horizontal, 4 bytes vertical). Currently, sets the grid cycle to every quarter inch, i.e. 576 for both horizontal & vertical (at 72 dpi, that is $18 * 32 = 576$) |
| 4 | fGuideCount : Number of guide resource blocks (can be 0). |

Guide resource block

| Length | Description |
|--------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| 4 | Location of guide in document coordinates. Since the guide is either vertical or horizontal, this only has to be one component of the coordinate. |
| 1 | Direction of guide. VHSelect is a system type of unsigned char where 0 = vertical, 1 = horizontal. |

Grid and guide information may be modified using the Property suite. See the Callbacks chapter in *Photoshop API Guide.pdf* for more information.

Thumbnail resource format

Adobe Photoshop (version 5.0 and later) stores thumbnail information for preview display in an image resource block that consists of an initial 28-byte header, followed by a JFIF thumbnail in RGB (red, green, blue) order for both Macintosh and Windows.

Adobe Photoshop 4.0 stored the thumbnail information in the same format except the data section is BGR (blue, green, red). The 4.0 format is at resource ID 1033 and the 5.0 format is at resource ID 1036.

Thumbnail resource header

| Length | Description |
|----------|-----------------------------------------------------------------------------|
| 4 | Format. 1 = kJpegRGB . Also supports kRawRGB (0). |
| 4 | Width of thumbnail in pixels. |
| 4 | Height of thumbnail in pixels. |
| 4 | Widthbytes: Padded row bytes = (width * bits per pixel + 31) / 32 * 4. |
| 4 | Total size = widthbytes * height * planes |
| 4 | Size after compression. Used for consistency check. |
| 2 | Bits per pixel. = 24 |
| 2 | Number of planes. = 1 |
| Variable | JFIF data in RGB format. For resource ID 1033 the data is in BGR format. |

Color samplers resource format

Adobe Photoshop (version 5.0 and later) stores color samplers information for an image in an image resource block that consists of an initial 8-byte color samplers header followed by a variable length block of specific color samplers information.

Color Samplers header

| Length | Description |
|--------|--------------------------------------------------------------------------------------------|
| 4 | Version (= 1, 2 or 3) |
| 4 | Number of color samplers to follow. See See Color Samplers resource block. |

Color Samplers resource block

| Length | Description |
|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4 | Version of color samplers, 1 for version 3. (Version 3 only) . |
| 8 | The horizontal and vertical position of the point (4 bytes each). Version 1 is a fixed value. Version 2 is a float value. |
| 2 | Color Space: enum { colorCodeDummy = -1, RGB, HSB, CMYK, Pantone, Focoltone, Trumatch, Toyo, Lab, Gray, WideCMYK, HKS, DIC, TotalInk, MonitorRGB, Duotone, Opacity, Web, GrayFloat, RGBFloat, OpacityFloat}; |
| 2 | Depth (Version 2 only) |

Path resource format

Photoshop stores the paths saved with an image in an image resource block. These resource blocks consist of a series of 26-byte path point records, so the resource length should always be a multiple of 26.

Photoshop stores its paths as resources of type 8BIM , with IDs in the range 2000 through 2997. These numbers should be reserved for Photoshop. The name of the resource is the name given to the path when it was saved.

If the file contains a resource of type 8BIM with an ID of 2999, then this resource contains a Pascal-style string containing the name of the clipping path to use with this image when saving it as an EPS file. 4 byte fixed value for flatness and 2 byte fill rule. 0 = same fill rule, 1 = even odd fill rule, 2 = non zero winding fill rule. The fill rule is ignored by Photoshop.

The path format returned by GetProperty() call is identical to what is described below. Refer to the `IllustratorExport` sample plug-in code to see how this resource data is constructed.

Path points

All points used in defining a path are stored in eight bytes as a pair of 32-bit components, vertical component first.

The two components are signed, fixed point numbers with 8 bits before the binary point and 24 bits after the binary point. Three guard bits are reserved in the points to eliminate most concerns over arithmetic overflow. Hence, the range for each component is 0xF0000000 to 0xFFFFFFFF representing a range of -16 to 16. The lower bound is included, but not the upper bound.

This limited range is used because the points are expressed relative to the image size. The vertical component is given with respect to the image height, and the horizontal component is given with respect to the image width. [0, 0] represents the top-left corner of the image; [1, 1] ([0x01000000, 0x01000000]) represents the bottom-right.

In Windows, the byte order of the path point components are reversed; you should swap the bytes when accessing each 32-bit value.

Path records

The data in a path resource consists of one or more 26-byte records. The first two bytes of each record is a selector to indicate what kind of path it is. For Windows, you should swap the bytes before accessing it as a short.

Path data record types

| Selector | Description |
|----------|--------------------------------------|
| 0 | Closed subpath length record |
| 1 | Closed subpath Bezier knot, linked |
| 2 | Closed subpath Bezier knot, unlinked |
| 3 | Open subpath length record |
| 4 | Open subpath Bezier knot, linked |
| 5 | Open subpath Bezier knot, unlinked |
| 6 | Path fill rule record |
| 7 | Clipboard record |
| 8 | Initial fill rule record |

The first 26-byte path record contains a selector value of 6, path fill rule record. The remaining 24 bytes of the first record are zeroes. Paths use even/odd ruling. Subpath length records, selector value 0 or 3, contain the number of Bezier knot records in bytes 2 and 3. The remaining 22 bytes are unused, and should be zeroes. Each length record is then immediately followed by the Bezier knot records describing the knots of the subpath.

In Bezier knot records, the 24 bytes following the selector field contain three path points (described above) for:

the control point for the Bezier segment preceding the knot,

the anchor point for the knot, and

the control point for the Bezier segment leaving the knot.

Linked knots have their control points linked. Editing one point modifies the other to preserve collinearity. Knots should only be marked as having linked controls if their control points are collinear with their anchor. The control points on unlinked knots are independent of each other. Refer to the *Adobe Photoshop User Guide* for more information.

Clipboard records, selector=7, contain four fixed-point numbers for the bounding rectangle (top, left, bottom, right), and a single fixed-point number indicating the resolution.

Initial fill records, selector=8, contain one two byte record. A value of 1 means that the fill starts with all pixels. The value will be either 0 or 1.

Slices resource format

Adobe Photoshop 6.0 stores slices information for an image in an image resource block.

Adobe Photoshop 7.0 added a descriptor at the end of the block for the individual slice info.

Adobe Photoshop CS and later changed to version 7 or 8 and uses a Descriptor to defined the Slices data.

Slices header for version 7 or 8

| Length | Description |
|----------|------------------------------------------------------------|
| 4 | Version (= 7 and 8) |
| 4 | Descriptor version (= 16 for Photoshop 6.0). |
| Variable | Descriptor (see See Descriptor structure) |

Slices header for version 6

| Length | Description |
|--------|-------------|
|--------|-------------|

| | |
|----------|--------------------------------------------------------------------------------------|
| 4 | Version (= 6) |
| 4 * 4 | Bounding rectangle for all of the slices: top, left, bottom, right of all the slices |
| Variable | Name of group of slices: Unicode string |
| 4 | Number of slices to follow. See Slices resource block in the next table. |

Slices resource block

| Length | Description |
|------------------------------------------------------|------------------------------------------------------------|
| 4 | ID |
| 4 | Group ID |
| 4 | Origin |
| 4 | Associated Layer ID Only present if Origin = 1 |
| Variable | Name: Unicode string |
| 4 | Type |
| 4 * 4 | Left, top, right, bottom positions |
| Variable | URL: Unicode string |
| Variable | Target: Unicode string |
| Variable | Message: Unicode string |
| Variable | Alt Tag: Unicode string |
| 1 | Cell text is HTML: Boolean |
| Variable | Cell text: Unicode string |
| 4 | Horizontal alignment |
| 4 | Vertical alignment |
| 1 | Alpha color |
| 1 | Red |
| 1 | Green |
| 1 | Blue |
| Additional data as length allows. See comment above. | |
| 4 | Descriptor version (= 16 for Photoshop 6.0). |
| Variable | Descriptor (see See Descriptor structure) |

Vanishing point resource format

Adobe Photoshop CS2 (9.0) and later stores vanishing point information for an image in an image resource block. The entire resource is a string with an id of 'tnaF' on Windows and 'FaNt' on the Macintosh. The structure of the resource is as follows:

Vocabulary:

Relation - a set of related planes.

Root Plane - the first plane in a relation.

Calibration Order - an ordering of the planes in a relation starting with the root plane, depth first, recursive traversal of the planes that are attached to the given plane.

Basics:

A planes area is represented as a clipped area of vanish rays. A Ray defines one of the virtual sides of the plane's area. A Ray's structure keeps track of information needed for tearing off and orientation issues. Parallel rays must point at the same VPID. A Primary ray's origin represents the point on the plane that is farthest from both VPs. The two primary rays share an origin.

```

version = 101
number of relations to follow.
-- for each relation--

```

```

grid resolution for the root plane
number of planes to follow
-- for each plane in calibration order--
ID of the plane
ID of the plane that calibrates this plane 0 if none
-- for 4 rays --
origin position of the ray. Point
VP location - must be consistent across all planes in the relation unless it is
an endpoint. Point
true if the VP location is an endpoint
ID that this ray points at.
Ray DI (see below)

```

```

+++++

```

```

I/O appendix

```

```

Point - two doubles; h endl, v endl

```

```

VPID - int (enum value) 0,1,2 identifying 1 of 3 possible VPs

```

```

RayID - 1, One of the primary rays directly connected to the shared origin

```

```

3, a non-primary ray parallel to 7

```

```

5, a non-primary ray parallel to 1

```

```

7, One of the primary rays directly connected to the shared origin .

```

Layer and Mask Information Section

The fourth section of a Photoshop file contains information about layers and masks. This section of the document describes the formats of layer and mask records.

The complete merged image data is not stored here. The complete merged/composite image resides in the last section of the file. See [See Image Data Section](#). If maximize compatibility is unchecked then the merged/composite is not created and the layer data must be read to reproduce the final image.

[See Layer and mask information section](#) shows the overall structure of this section. If there are no layers or masks, this section is just 4 bytes: the length field, which is set to zero. (**PSB** length is 8 bytes)

'Layr', 'Lr16' and 'Lr32' start at [See Layer info](#). NOTE: The length of the section may already be known.)

When parsing this section pay close attention to the length of sections.

Layer and mask information section

| Length | Description |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4 | Length of the layer and mask information section. (**PSB** length is 8 bytes.) |
| Variable | Layer info (see See Layer info for details). |
| Variable | Global layer mask info (see See Global layer mask info for details). |
| Variable | (Photoshop 4.0 and later) Series of tagged blocks containing various types of data. See See Additional Layer Information for the list of the types of data that can be included here. |

[See Layer info](#) shows the high-level organization of the layer information.

Layer info

| Length | Description |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4 | Length of the layers info section, rounded up to a multiple of 2. (**PSB** length is 8 bytes.) |
| 2 | Layer count. If it is a negative number, its absolute value is the number of layers and the first alpha channel contains the transparency data for the merged result. |
| Variable | Information about each layer. See Layer records describes the structure of this information for each layer. |
| Variable | Channel image data. Contains one or more image data records (see See Channel image data for structure) for each layer. The layers are in the same order as in the layer information (previous row of this table). |

Layer records

| Length | Description |
|--------|-------------|
|--------|-------------|

| | |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4 * 4 | Rectangle containing the contents of the layer. Specified as top, left, bottom, right coordinates |
| 2 | Number of channels in the layer |
| 6 * number of channels | Channel information. Six bytes per channel, consisting of: 2 bytes for Channel ID: 0 = red, 1 = green, etc.; -1 = transparency mask; -2 = user supplied layer mask, -3 real user supplied layer mask (when both a user mask and a vector mask are present) 4 bytes for length of corresponding channel data. (**PSB** 8 bytes for length of corresponding channel data.) See See Channel image data for structure of channel data. |
| 4 | Blend mode signature: '8BIM' |
| 4 | Blend mode key: 'pass' = pass through, 'norm' = normal, 'diss' = dissolve, 'dark' = darken, 'mul' = multiply, 'idiv' = color burn, 'lbrn' = linear burn, 'dkCl' = darker color, 'lite' = lighten, 'scrn' = screen, 'div' = color dodge, 'lddg' = linear dodge, 'lgCl' = lighter color, 'over' = overlay, 'sLit' = soft light, 'hLit' = hard light, 'vLit' = vivid light, 'lLit' = linear light, 'pLit' = pin light, 'hMix' = hard mix, 'diff' = difference, 'smud' = exclusion, 'fsub' = subtract, 'fddiv' = divide 'hue' = hue, 'sat' = saturation, 'colr' = color, 'lum' = luminosity, |
| 1 | Opacity. 0 = transparent ... 255 = opaque |
| 1 | Clipping: 0 = base, 1 = non-base |
| 1 | Flags: bit 0 = transparency protected; bit 1 = visible; bit 2 = obsolete; bit 3 = 1 for Photoshop 5.0 and later, tells if bit 4 has useful information; bit 4 = pixel data irrelevant to appearance of document |
| 1 | Filler (zero) |
| 4 | Length of the extra data field (= the total length of the next five fields). |
| Variable | Layer mask data: See See Layer mask / adjustment layer data for structure. Can be 40 bytes, 24 bytes, or 4 bytes if no layer mask. |
| Variable | Layer blending ranges: See See Layer blending ranges data . |
| Variable | Layer name: Pascal string, padded to a multiple of 4 bytes. |

Layer mask / adjustment layer data

| Length | Name |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4 | Size of the data: Check the size and flags to determine what is or is not present. If zero, the following fields are not present |
| 4 * 4 | Rectangle enclosing layer mask: Top, left, bottom, right |
| 1 | Default color. 0 or 255 |
| 1 | Flags. bit 0 = position relative to layer bit 1 = layer mask disabled bit 2 = invert layer mask when blending (Obsolete) bit 3 = indicates that the user mask actually came from rendering other data bit 4 = indicates that the user and/or vector masks have parameters applied to them |
| 1 | Mask Parameters. Only present if bit 4 of Flags set above. |
| Variable | Mask Parameters bit flags present as follows: bit 0 = user mask density, 1 byte bit 1 = user mask feather, 8 byte, double bit 2 = vector mask density, 1 byte bit 3 = vector mask feather, 8 bytes, double |
| 2 | Padding. Only present if size = 20. Otherwise the following is present |
| 1 | Real Flags. Same as Flags information above. |
| 1 | Real user mask background. 0 or 255. |
| 4 * 4 | Rectangle enclosing layer mask: Top, left, bottom, right. |

Layer blending ranges data

| Length | Name |
|--------|------------------------------------------------------------------------------------------------------------------------------|
| 4 | Length of layer blending ranges data |
| 4 | Composite gray blend source. Contains 2 black values followed by 2 white values. Present but irrelevant for Lab & Grayscale. |
| 4 | Composite gray blend destination range |
| 4 | First channel source range |
| 4 | First channel destination range |
| 4 | Second channel source range |
| 4 | Second channel destination range |
| ... | ... |
| 4 | Nth channel source range |
| 4 | Nth channel destination range |

Channel image data

| Length | Description |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2 | Compression. 0 = Raw Data, 1 = RLE compressed, 2 = ZIP without prediction, 3 = ZIP with prediction. |
| Variable | <p>Image data.</p> <p>If the compression code is 0, the image data is just the raw image data, whose size is calculated as (LayerBottom-LayerTop) * (LayerRight-LayerLeft) (from the first field in See Layer records).</p> <p>If the compression code is 1, the image data starts with the byte counts for all the scan lines in the channel (LayerBottom-LayerTop), with each count stored as a two-byte value. (**PSB** each count stored as a four-byte value.) The RLE compressed data follows, with each scan line compressed separately. The RLE compression is the same compression algorithm used by the Macintosh ROM routine PackBits, and the TIFF standard.</p> <p>If the layer's size, and therefore the data, is odd, a pad byte will be inserted at the end of the row.</p> <p>If the layer is an adjustment layer, the channel data is undefined (probably all white.)</p> |

Global layer mask info

| Length | Description |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4 | Length of global layer mask info section. |
| 2 | Overlay color space (undocumented). |
| 8 | 4 * 2 byte color components |
| 2 | Opacity. 0 = transparent, 100 = opaque. |
| 1 | Kind. 0 = Color selected--i.e. inverted; 1 = Color protected; 128 = use value stored per layer. This value is preferred. The others are for backward compatibility with beta versions. |
| Variable | Filler: zeros |

Additional Layer Information

There are several types of layer information that have been added in Photoshop 4.0 and later. These exist at the end of the layer records structure (see the last row of [See Layer records](#)). They have the following structure:

Additional layer information

| Length | Description |
|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4 | Signature: '8BIM' or '8B64' |
| 4 | Key: a 4-character code (See individual sections) |
| 4 | <p>Length data below, rounded up to an even byte count.</p> <p>(**PSB**, the following keys have a length count of 8 bytes: LMask, Lr16, Lr32, Layer, Mt16, Mt32, Mtrn, Alph, FMask, Ink2, FEid, FXid, PxSD.</p> |

| Variable | Data (See individual sections) |
|----------|--------------------------------|
|----------|--------------------------------|

The following sections describe the different types of data available, their keys and their format.

Adjustment layer (*Photoshop 4.0*)

Adjustment layers can have one of the following keys:

'SoCo' = Solid Color
 'GdFl' = Gradient
 'PtFl' = Pattern
 'brit' = Brightness/Contrast
 'levl' = Levels
 'curv' = Curves
 'expA' = Exposure
 'vibA' = Vibrance
 'hue ' = Old Hue/saturation, Photoshop 4.0
 'hue2' = New Hue/saturation, Photoshop 5.0
 'blnc' = Color Balance
 'blwh' = Black and White
 'phf1' = Photo Filter
 'mixr' = Channel Mixer
 'clrL' = Color Lookup
 'nvrt' = Invert
 'post' = Posterize
 'thrs' = Threshold
 'grdm' = Gradient Map
 'se1c' = Selective color

The data for the adjustment layer is the same as the load file formats for each format. See [See Additional File Formats](#) for information.

Effects Layer (*Photoshop 5.0*)

The key for the effects layer is '1rFX' . The data has the following format:

Effects Layer info

| Length | Description |
|------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2 | Version: 0 |
| 2 | Effects count: may be 6 (for the 6 effects in Photoshop 5 and 6) or 7 (for Photoshop 7.0) |
| The next three items are repeated for each of the effects. | |
| 4 | Signature: '8BIM' |
| 4 | Effects signatures: OSType key for which effects type to use: 'cmnS' = common state (see See Effects layer, common state info) 'dsdw' = drop shadow (see See Effects layer, drop shadow and inner shadow info) 'isdw' = inner shadow (see See Effects layer, drop shadow and inner shadow info) 'oglw' = outer glow (see See Effects layer, outer glow info) 'iglw' = inner glow (see See Effects layer, inner glow info) 'bevl' = bevel (see See Effects layer, bevel info) 'sofi' = solid fill (<i>Photoshop 7.0</i>) (see See Effects layer, solid fill (added in Photoshop 7.0)) |
| Variable | See appropriate tables. |

Effects layer, common state info

| Length | Description |
|--------|-----------------------------|
| 4 | Size of next three items: 7 |

| | |
|---|----------------------|
| 4 | Version: 0 |
| 1 | Visible: always true |
| 2 | Unused: always 0 |

Effects layer, drop shadow and inner shadow info

| Length | Description |
|--------|------------------------------------------------------------------------|
| 4 | Size of the remaining items: 41 or 51 (depending on version) |
| 4 | Version: 0 (<i>Photoshop 5.0</i>) or 2 (<i>Photoshop 5.5</i>) |
| 4 | Blur value in pixels |
| 4 | Intensity as a percent |
| 4 | Angle in degrees |
| 4 | Distance in pixels |
| 10 | Color: 2 bytes for space followed by 4 * 2 byte color component |
| 8 | Blend mode: 4 bytes for signature and 4 bytes for key |
| 1 | Effect enabled |
| 1 | Use this angle in all of the layer effects |
| 1 | Opacity as a percent |
| 10 | Native color: 2 bytes for space followed by 4 * 2 byte color component |

Effects layer, outer glow info

| Length | Description |
|--------|--------------------------------------------------------------------------------------------------------|
| 4 | Size of the remaining items: 32 for Photoshop 5.0; 42 for 5.5 |
| 4 | Version: 0 for Photoshop 5.0; 2 for 5.5 |
| 4 | Blur value in pixels. |
| 4 | Intensity as a percent |
| 10 | Color: 2 bytes for space followed by 4 * 2 byte color component |
| 8 | Blend mode: 4 bytes for signature and 4 bytes for the key |
| 1 | Effect enabled |
| 1 | Opacity as a percent |
| 10 | (<i>Version 2 only</i>) Native color space. 2 bytes for space followed by 4 * 2 byte color component |

Effects layer, inner glow info

| Length | Description |
|--------------------------------------------|--------------------------------------------------------------------------------------------------------|
| 4 | Size of the remaining items: 33 for Photoshop 5.0; 43 for 5.5 |
| 4 | Version: 0 for Photoshop 5.0; 2 for 5.5. |
| 4 | Blur value in pixels. |
| 4 | Intensity as a percent |
| 10 | Color: 2 bytes for space followed by 4 * 2 byte color component |
| 8 | Blend mode: 4 bytes for signature and 4 bytes for the key |
| 1 | Effect enabled |
| 1 | Opacity as a percent |
| Remaining fields present only in version 2 | |
| 1 | Invert |
| 10 | (<i>Version 2 only</i>) Native color space. 2 bytes for space followed by 4 * 2 byte color component |

Effects layer, bevel info

| Length | Description |
|--------|-------------|
|--------|-------------|

| | |
|---------------------------------------------|---------------------------------------------------------------------------|
| 4 | Size of the remaining items (58 for version 0, 78 for version 20) |
| 4 | Version: 0 for Photoshop 5.0; 2 for 5.5 |
| 4 | Angle in degrees |
| 4 | Strength. Depth in pixels |
| 4 | Blur value in pixels. |
| 8 | Highlight blend mode: 4 bytes for signature and 4 bytes for the key |
| 8 | Shadow blend mode: 4 bytes for signature and 4 bytes for the key |
| 10 | Highlight color: 2 bytes for space followed by 4 * 2 byte color component |
| 10 | Shadow color: 2 bytes for space followed by 4 * 2 byte color component |
| 1 | Bevel style |
| 1 | Highlight opacity as a percent |
| 1 | Shadow opacity as a percent |
| 1 | Effect enabled |
| 1 | Use this angle in all of the layer effects |
| 1 | Up or down |
| The following are present in version 2 only | |
| 10 | Real highlight color: 2 bytes for space; 4 * 2 byte color component |
| 10 | Real shadow color: 2 bytes for space; 4 * 2 byte color component |

Effects layer, solid fill (added in Photoshop 7.0)

| Length | Description |
|--------|--------------------|
| 4 | Size: 34 |
| 4 | Version: 2 |
| 4 | Key for blend mode |
| 10 | Color space |
| 1 | Opacity |
| 1 | Enabled |
| 10 | Native color space |

Type Tool Info (Photoshop 5.0 and 5.5 only)

Has been superseded in Photoshop 6.0 and beyond by a different structure with the key 'TySh' (see [See Type tool object setting \(Photoshop 6.0\)](#). [See Type tool object setting](#)).

Key is 'tySh' . Data is as follows:

Type tool Info

| Length | Description |
|---------------------------------------------------------------|--------------------------------------------------------------|
| 2 | Version (= 1) |
| 48 | 6 * 8 double precision numbers for the transform information |
| <i>Font information</i> | |
| 2 | Version (= 6) |
| 2 | Count of faces |
| The next 8 fields are repeated for each count specified above | |
| 2 | Mark value |
| 4 | Font type data |
| Variable | Pascal string of font name |
| Variable | Pascal string of font family name |
| Variable | Pascal string of font style name |

| | |
|----------------------------------------------------------------|-------------------------------------------------|
| 2 | Script value |
| 4 | Number of design axes vector to follow |
| 4 | Design vector value |
| <i>Style information</i> | |
| 2 | Count of styles |
| The next 10 fields are repeated for each count specified above | |
| 2 | Mark value |
| 2 | Face mark value |
| 4 | Size value |
| 4 | Tracking value |
| 4 | Kerning value |
| 4 | Leading value |
| 4 | Base shift value |
| 1 | Auto kern on/off |
| 1 | Only present in version <= 5 |
| 1 | Rotate up/down |
| <i>Text information</i> | |
| 2 | Type value |
| 4 | Scaling factor value |
| 4 | Sharacter count value |
| 4 | Horizontal placement |
| 4 | Vertical placement |
| 4 | Select start value |
| 4 | Select end value |
| 2 | Line count, i.e. the number of items to follow. |
| The next 5 fields are repeated for each item in line count. | |
| 4 | Character count value |
| 2 | Orientation value |
| 2 | Alignment value |
| 2 | Actual character as a double byte character |
| 2 | Style value |
| <i>Color information</i> | |
| 2 | Color space value |
| 8 | 4 * 2 byte color component |
| 1 | Anti alias on/off |

Unicode layer name (Photoshop 5.0)

Key is 'luni' . Data is as follows:

Unicode Layer name

| Length | Description |
|----------|--------------------------------|
| Variable | Unicode string |

Layer ID (Photoshop 5.0)

Key is 'lyid' .

Layer ID

| | |
|--|--|
| | |
|--|--|

| Length | Description |
|--------|-------------------|
| 4 | Signature: '8BIM' |
| 4 | Key: 'lyid' |
| 4 | Length: 4 |
| 4 | ID. |

Object-based effects layer info (*Photoshop 6.0*)

Key is 'lfx2' . Data is as follows:

Object Based Effects Layer info

| Length | Description |
|----------|------------------------------------------------------------|
| 4 | Object effects version: 0 |
| 4 | Descriptor version (= 16 for Photoshop 6.0). |
| Variable | Descriptor (see See Descriptor structure) |

Patterns (*Photoshop 6.0 and CS (8.0)*)

This is a list of patterns. Key is 'Patt', 'Pat2' or 'Pat3' . Data is as follows:

Patterns

| Length | Description |
|---------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| The following is repeated for each pattern. | |
| 4 | Length of this pattern |
| 4 | Version (=1) |
| 4 | The image mode of the file. Supported values are: Bitmap = 0; Grayscale = 1; Indexed = 2; RGB = 3; CMYK = 4; Multichannel = 7; Duotone = 8; Lab = 9. |
| 4 | Point: vertical, 2 bytes and horizontal, 2 bytes |
| Variable | Name: Unicode string |
| Variable | Unique ID for this pattern: Pascal string |
| Variable | Index color table (256 * 3 RGB values): only present when image mode is indexed color |
| Variable | Pattern data as Virtual Memory Array List |

Virtual Memory Array List

| Length | Description |
|------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|
| 4 | Version (=3) |
| 4 | Length |
| 16 | Rectangle: top, left, bottom, right |
| 4 | Number of channels |
| The following is a <i>virtual memory array</i> , repeated for the number of channels + one for a user mask + one for a sheet mask. | |
| 4 | Boolean indicating whether array is written, skip following data if 0. |
| 4 | Length, skip following data if 0. |
| 4 | Pixel depth: 1, 8, 16 or 32 |
| 16 | Rectangle: top, left, bottom, right |
| 2 | Pixel depth: 1, 8, 16 or 32 |
| 1 | Compression mode of data to follow. 1 is zip. |
| Variable | Actual data based on parameters and compression |

Annotations (*Photoshop 6.0*)

Key is 'Anno' . Data is as follows:

Annotations

| Length | Description |
|-------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2 | Major version (= 2) |
| 2 | Minor version. (= 1) |
| 4 | Count of annotations to follow |
| Following is repeated for each annotation | |
| 4 | Length of this annotation |
| 4 | Annotation type: either text('txtA') or sound ('sndA'). |
| 1 | Is the annotation open |
| 1 | Flags. |
| 2 | Optional blocks. (=1 for Photoshop 6.0) |
| 16 | Rectangle of icon location: top, left, bottom and right. |
| 16 | Rectangle of popup locations: top, left, bottom and right |
| 10 | 2 bytes for space followed by 4 * 2 byte color component |
| Variable | Pascal string of author's name aligned to 2 bytes |
| Variable | Pascal string of name aligned to 2 bytes |
| Variable | Pascal string of the mod Date aligned to 2 bytes |
| 4 | Length of the following 3 fields including this field |
| 4 | ' txtC ' or ' sndM '. Either text or sound |
| 4 | Length of the next field |
| Variable | Actual data for this annotation. The text is an ASCII or Unicode string ; the sound annotation is documented in the <i>PDF Reference</i> , available at http://Partners.adobe.com/asn/developer/acrosdk/docs.html#filefmtspecs |
| Variable | Padding to align to multiple of 4 bytes |

Blend clipping elements (*Photoshop 6.0*)

Key is 'c1b1' . Data is as follows:

Blend clipping elements

| Length | Description |
|--------|---------------------------------|
| 1 | Blend clipped elements: boolean |
| 3 | Padding |

Blend interior elements (*Photoshop 6.0*)

Key is 'infx' . Data is as follows:

Blend interior elements

| Length | Description |
|--------|----------------------------------|
| 1 | Blend interior elements: boolean |
| 3 | Padding |

Knockout setting (*Photoshop 6.0*)

Key is 'knko' . Data is as follows:

Knockout setting

| Length | Description |
|--------|-------------------|
| 1 | Knockout: boolean |
| 3 | Padding |

Protected setting (Photoshop 6.0)

Key is 'lspf' . Data is as follows:

Protected setting

| Length | Description |
|--------|-------------------------------------------------------------------------------------------------------------|
| 4 | Protection flags: bits 0 - 2 are used for Photoshop 6.0. Transparency, composite and position respectively. |

Sheet color setting (Photoshop 6.0)

Key is 'lclr' . Data is as follows:

Sheet Color setting

| Length | Description |
|--------|-----------------------------------------------------------------------------------|
| 4 * 2 | Color. Only the first color setting is used for Photoshop 6.0; the rest are zeros |

Reference point (Photoshop 6.0)

Key is 'fxrp' . Data is as follows:

Reference point

| Length | Description |
|--------|-----------------------------------------|
| 2 * 8 | 2 double values for the reference point |

Gradient settings (Photoshop 6.0)

Key is 'grdm' . Data is as follows:

Gradient settings

| Length | Description |
|--------------------------------------------------|---------------------------------------------------------------|
| 2 | Version (=1 for Photoshop 6.0) |
| 1 | Is gradient reversed |
| 1 | Is gradient dithered |
| Variable | Name of the gradient: Unicode string , padded |
| 2 | Number of color stops to follow |
| Following is repeated for each color stop | |
| 4 | Location of color stop |
| 4 | Midpoint of color stop |
| 2 | Mode for the color to follow |
| 4 * 2 | Actual color for the stop |
| 2 | Number of transparency stops to follow |
| Following is repeated for each transparency stop | |
| 4 | Location of transparency stop |
| 4 | Midpoint of transparency stop |
| 2 | Opacity of transparency stop |
| 2 | Expansion count (= 2 for Photoshop 6.0) |
| 2 | Interpolation if length above is non-zero |
| 2 | Length (= 32 for Photoshop 6.0) |
| 2 | Mode for this gradient |
| 4 | Random number seed |
| 2 | Flag for showing transparency |
| 2 | Flag for using vector color |
| | |

| | |
|-------|----------------------------------|
| 4 | Roughness factor |
| 2 | Color model |
| 4 * 2 | Minimum color values |
| 4 * 2 | Maximum color values |
| 2 | Dummy: not used in Photoshop 6.0 |

Section divider setting (*Photoshop 6.0*)

Key is '1sct' . Data is as follows:

Section Divider setting

| Length | Description |
|-------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| 4 | Type. 4 possible values, 0 = any other type of layer, 1 = open "folder", 2 = closed "folder", 3 = bounding section divider, hidden in the UI |
| Following is only present if length >= 12 | |
| 4 | Signature: '8BIM' |
| 4 | Key. See blend mode keys in See Layer records . |
| Following is only present if length >= 16 | |
| 4 | Sub type. 0 = normal, 1 = scene group, affects the animation timeline. |

Channel blending restrictions setting (*Photoshop 6.0*)

Key is 'brst' . Data is as follows:

Channel blending restrictions setting

| Length | Description |
|-----------------------------------------|-----------------------------------|
| Following is repeated length / 4 times. | |
| 4 | Channel number that is restricted |

Solid color sheet setting (*Photoshop 6.0*)

Key is 'SoCo' . Data is as follows:

Solid color sheet setting

| Length | Description |
|----------|-------------------------------------------------------------------------------------------------------|
| 4 | Version (= 16 for Photoshop 6.0) |
| Variable | Descriptor. Based on the Action file format structure (see See Descriptor structure) |

Pattern fill setting (*Photoshop 6.0*)

Key is 'PtF1' . Data is as follows:

Pattern fill setting

| Length | Description |
|----------|-------------------------------------------------------------------------------------------------------|
| 4 | Version (=16 for Photoshop 6.0) |
| Variable | Descriptor. Based on the Action file format structure (see See Descriptor structure) |

Gradient fill setting (*Photoshop 6.0*)

Key is 'GdF1' . Data is as follows:

Gradient Fill Setting

| Length | Description |
|----------|-------------------------------------------------------------------------------------------------------|
| 4 bytes | Version (= 16 for Photoshop 6.0) |
| Variable | Descriptor. Based on the Action file format structure (see See Descriptor structure) |

Vector mask setting (Photoshop 6.0)

Key is 'vmsk' or 'vsms'. If key is 'vsms' then we are writing for (Photoshop CS6) and the document will have a 'vscg' key. Data is as follows:

Vector mask setting

| Length | Description |
|------------------------------------------------------------------------|----------------------------------------------------------|
| 4 | Version (= 3 for Photoshop 6.0) |
| 4 | Flags. bit 1 = invert, bit 2 = not link, bit 3 = disable |
| The rest of the data is path components, loop until end of the length. | |
| Variable | Paths. See See Path resource format |

Type tool object setting (Photoshop 6.0)

This supersedes the type tool info in Photoshop 5.0 (see [See Type tool Info](#)).

Key is 'TySh' . Data is as follows:

Type tool object setting

| Length | Description |
|----------|-----------------------------------------------------------|
| 2 | Version (=1 for Photoshop 6.0) |
| 6 * 8 | Transform: xx, xy, yx, yy, tx, and ty respectively. |
| 2 | Text version (= 50 for Photoshop 6.0) |
| 4 | Descriptor version (= 16 for Photoshop 6.0) |
| Variable | Text data (see See Descriptor structure) |
| 2 | Warp version (= 1 for Photoshop 6.0) |
| 4 | Descriptor version (= 16 for Photoshop 6.0) |
| Variable | Warp data (see See Descriptor structure) |
| 4 * 8 | left, top, right, bottom respectively. |

Foreign effect ID (Photoshop 6.0)

Key is 'ffxi' . Data is as follows:

Foreign effect ID

| Length | Description |
|--------|---------------------------|
| 4 | ID of the Foreign effect. |

Layer name source setting (Photoshop 6.0)

Key is 'lnsr' . Data is as follows:

Layer name source setting

| Length | Description |
|--------|-----------------------|
| 4 | ID for the layer name |

Pattern data (Photoshop 6.0)

Key is 'shpa' . Data is as follows:

Pattern data

| Length | Description |
|------------------------------------------------|----------------------------------|
| 4 | Version (= 0 for Photoshop 6.0) |
| 4 | Count of sets to follow |
| The following is repeated for the count above. | |

| | |
|------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
| 4 | Pattern signature |
| 4 | Pattern key |
| 4 | Count of patterns in this set |
| 1 | Copy on sheet duplication |
| 3 | Padding |
| The following is repeated for the count of patterns above. | |
| 4 | Color handling. Prefer convert = 'conv' , avoid conversion = 'avod' , luminance only = 'lumi' |
| Variable | Pascal string name of the pattern |
| Variable | Unicode string name of the pattern |
| Variable | Pascal string of the unique identifier for the pattern |

Metadata setting (Photoshop 6.0)

Key is 'shmd' . Data is as follows:

Metadata setting

| Length | Description |
|-----------------------------------------------------------------------------|-----------------------------------|
| 4 | Count of metadata items to follow |
| The following is repeated the number of times specified by the count above: | |
| 4 | Signature of the data |
| 4 | Key of the data |
| 1 | Copy on sheet duplication |
| 3 | Padding |
| 4 | Length of data to follow |
| Variable | Undocumented data |

Layer version (Photoshop 7.0)

Key is 'lyvr' . Data is as follows:

Layer version

| Length | Description |
|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4 | <p>A 32-bit number representing the version of Photoshop needed to read and interpret the layer without data loss. 70 = 7.0, 80 = 8.0, etc.</p> <p>The minimum value is 70, because just having the field present in 6.0 triggers a warning. For the future, Photoshop 7 checks to see whether this number is larger than the current version -- i.e., 70 -- and if so, warns that it is ignoring some data.</p> |

Transparency shapes layer (Photoshop 7.0)

Key is 'tsly' . Data is as follows:

Transparency shapes layer

| Length | Description |
|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | <p>1: the transparency of the layer is used in determining the shape of the effects. This is the default for behavior like previous versions.</p> <p>0: treated in the same way as fill opacity including modulating blend modes, rather than acting as strict transparency.</p> <p>Using this feature is useful for achieving effects that otherwise would require complex use of clipping groups.</p> |
| 3 | Padding |

Layer mask as global mask (Photoshop 7.0)

Key is 'lmgm' . Data is as follows:

Layer mask as global mask

| Length | Description |
|--------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | 1: the layer mask is used in a final crossfade masking the layer and effects rather than being used to shape the layer and its effects. This behavior was previously tied to the link status flag for the layer mask. (An unlinked mask acted like a flag value of 1, a linked mask like 0). For old files that lack this key, the link status is used in order to preserve compositing results. |
| 3 | Padding |

Vector mask as global mask (Photoshop 7.0)

Key is 'vmgm' . Data is as follows:

Vector mask as global mask

| Length | Description |
|--------|------------------------------------------------------------------------------------------|
| 1 | Same as in See Layer mask as global mask , but applying the vector mask. |
| 3 | Padding |

Brightness and Contrast

Key is 'brit' . Data is as follows:

Brightness and Contrast

| Length | Description |
|--------|----------------------------------------|
| 2 | Brightness |
| 2 | Contrast |
| 2 | Mean value for brightness and contrast |
| 1 | Lab color only |

Channel Mixer

Key is 'mixr' . Data is as follows:

Channel Mixer

| Length | Description |
|--------|--------------------------------------------------------------------------------------------------------|
| 2 | Version (= 1) |
| 2 | Monochrome |
| 20 | RGB or CMYK color plus constant for the mixer settings. 4 * 2 bytes of color with 2 bytes of constant. |

Color Lookup (Photoshop CS6)

Key is 'clrL' . Data is as follows:

Color Lookup

| Length | Description |
|----------|-------------------------------------------|
| 2 | Version (= 1) |
| 4 | Descriptor Version (= 16) |
| Variable | Descriptor of black and white information |

Placed Layer (replaced by SoLd in Photoshop CS3)

Key is 'p1Ld' . Data is as follows:

Placed Layer

| Length | Description |
|----------|-------------------------------------------------------------------------|
| 4 | Type (= 'plcL') |
| 4 | Version (= 3) |
| Variable | Unique ID as a pascal string |
| 4 | Page number |
| 4 | Total pages |
| 4 | Anit alias policy |
| 4 | Placed layer type: 0 = unknown, 1 = vector, 2 = raster, 3 = image stack |
| 4 * 8 | Transformation: 8 doubles for x,y location of transform points |
| 4 | Warp version (= 0) |
| 4 | Warp descriptor version (= 16) |
| Variable | Descriptor for warping information |

Linked Layer

Key is 'lnkD' . Also keys 'lnk2' and 'lnk3' . Data is as follows:

Linked Layer

| Length | Description |
|----------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
| The following is repeated for each linked file. | |
| 8 | Length of the data to follow |
| 4 | Type (= 'liFD' linked file data, 'liFE' linked file external or 'liFA' linked file alias) |
| 4 | Version (= 1 to 7) |
| Variable | Pascal string. Unique ID. |
| Variable | Unicode string of the original file name |
| 4 | File Type |
| 4 | File Creator |
| 8 | Length of the data to follow |
| 1 | File open descriptor |
| Variable | Descriptor of open parameters. Only present when above is true. |
| If the type is 'liFE' then a linked file Descriptor is next. | |
| Variable | Descriptor of linked file parameters. See comment above. |
| If the type is 'liFE' and the version is greater than 3 then the following is present. Year, Month, Day, Hour, Minute, Second is next. | |
| 4 | Year |
| 1 | Month |
| 1 | Day |
| 1 | Hour |
| 1 | Minute |
| 8 | Double for the seconds |
| If the type is 'liFE' then a file size is next. | |
| 8 | File size |
| If the type is 'liFA' then 4 zeros are next. | |
| 8 | All zeros |
| If the type is 'liFE' then they bytes of the file are next. | |
| | |

| | |
|--------------------------------------------------------------------------|-------------------------------------------|
| Variable | Raw bytes of the file. |
| If the version is greater than or equal to 5 then the following is next. | |
| UnicodeString | Child Document ID. |
| If the version is greater than or equal to 6 then the following is next. | |
| Double | Asset mod time. |
| If the version is greater than or equal to 7 then the following is next. | |
| 1 | Asset locked state, for Libraries assets. |
| If the type is 'liFE' and the version is 2 then the following is next. | |
| Variable | Raw bytes of the file. |

Photo Filter

Key is 'phf1' . Data is as follows:

Photo Filter

| Length | Description |
|--------|---------------------------------------------------------------------------------|
| 2 | Version (= 3) or (= 2) |
| 12 | 4 bytes each for XYZ color (Only in Version 3) |
| 10 | 2 bytes color space followed by 4 * 2 bytes color component (Only in Version 2) |
| 4 | Density |
| 1 | Preserve Luminosity |

Black White (Photoshop CS3)

Key is 'b1wh' . Data is as follows:

Black White

| Length | Description |
|----------|-------------------------------------------|
| 4 | Descriptor Version (= 16) |
| Variable | Descriptor of black and white information |

Content Generator Extra Data (Photoshop CS5)

Key is 'CgEd' . Data is as follows:

Content Generator Extra Data

| Length | Description |
|----------|-----------------------------|
| 4 | Descriptor Version (= 16) |
| Variable | Descriptor of extra data |

Text Engine Data (Photoshop CS3)

Key is 'Txt2' . Data is as follows:

Text Engine Data

| Length | Description |
|----------|---------------------------|
| 4 | Length of data to follow |
| Variable | Raw bytes for text engine |

Vibrance (Photoshop CS3)

Key is 'vibA' . Data is as follows:

Vibrance

| Length | Description |
|----------|------------------------------------|
| 4 | Descriptor Version (= 16) |
| Variable | Descriptor of vibrance information |

Unicode Path Name (*Photoshop CS6*)

Key is 'pths' . Data is as follows:

Unicode Path Name

| Length | Description |
|----------|----------------------------------------------------|
| 4 | Descriptor Version (= 16) |
| Variable | Descriptor containing a list of unicode path names |

Animation Effects (*Photoshop CS6*)

Key is 'anFX' . Data is as follows:

Animation Effects

| Length | Description |
|----------|-----------------------------------------|
| 4 | Descriptor Version (= 16) |
| Variable | Descriptor containing animation effects |

Filter Mask (*Photoshop CS3*)

Key is 'Fmsk' . Data is as follows:

Filter Mask

| Length | Description |
|--------|-------------|
| 10 | Color space |
| 2 | Opacity |

Placed Layer Data (*Photoshop CS3*)

Key is 'SoLd' . See also '**PILd**' key. Data is as follows:

Filter Mask

| Length | Description |
|----------|----------------------------------------|
| 4 | Identifier (= 'soLD') |
| 4 | Version (= 4) |
| 4 | Descriptor Version (= 16) |
| Variable | Descriptor of placed layer information |

Vector Stroke Data (*Photoshop CS6*)

Key is 'vstk' . Data is as follows:

Vector stroke setting

| Length | Description |
|----------|-------------------------------------------------------------------------------------------------------|
| 4 | Version (= 16) |
| Variable | Descriptor. Based on the Action file format structure (see See Descriptor structure) |

Vector Stroke Content Data (Photoshop CS6)

Key is 'vscg' . Data is as follows:

Vector stroke content setting

| Length | Description |
|----------|-------------------------------------------------------------------------------------------------------|
| 4 | Key for data |
| 4 | Version (= 16) |
| Variable | Descriptor. Based on the Action file format structure (see See Descriptor structure) |

Using Aligned Rendering (Photoshop CS6)

Key is 'sn2P' . Data is as follows:

Using Aligned Rendering

| Length | Description |
|--------|----------------------------------------------|
| 4 | Non zero is true for using aligned rendering |

Vector Origination Data (Photoshop CC)

Key is 'vogk' . Data is as follows:

Vector origination setting

| Length | Description |
|----------|-------------------------------------------------------------------------------------------------------|
| 4 | Version (= 1 for Photoshop CC) |
| 4 | Version (= 16) |
| Variable | Descriptor. Based on the Action file format structure (see See Descriptor structure) |

Pixel Source Data (Photoshop CC)

Key is 'PxSc' . Data is as follows:

Pixel Source info

| Length | Description |
|----------|-------------------------------------------------------------------------------------------------------|
| 4 | Version (= 16) |
| Variable | Descriptor. Based on the Action file format structure (see See Descriptor structure) |

Compositor Used (Photoshop 2020)

Key is 'cinf' . Data is as follows:

Compositor Used

| Length | Description |
|----------|-------------------------------------------------------------------------------------------------------|
| 4 | Version (= 16) |
| Variable | Descriptor. Based on the Action file format structure (see See Descriptor structure) |

Pixel Source Data (Photoshop CC 2015)

Key is 'PxSD' . Data is as follows:

Pixel Source info

| Length | Description |
|----------|----------------------------------|
| 8 | Length of data to follow |
| Variable | Raw data for 3D or video layers. |

Artboard Data (Photoshop CC 2015)

Key is 'artb' or 'artd' or 'abdd' . Data is as follows:

Artboard info

| Length | Description |
|--------|-------------|
|--------|-------------|

| Length | Description |
|----------|-------------------------------------------------------------------------------------------------------|
| 4 | Version (= 16) |
| Variable | Descriptor. Based on the Action file format structure (see See Descriptor structure) |

Smart Object Layer Data (*Photoshop CC 2015*)

Key is 'SoLE' . Data is as follows:

Smart Object info

| Length | Description |
|----------|-------------------------------------------------------------------------------------------------------|
| 4 | Type (= 'soLD') |
| 4 | Version (= 4 or 5) |
| Variable | Descriptor. Based on the Action file format structure (see See Descriptor structure) |

Saving Merged Transparency

Key is 'Mtrn', 'Mt16' or 'Mt32' . There is no data associated with these keys.

User Mask

Key is 'LMSk' .

User Mask

| Length | Description |
|--------|----------------|
| 10 | Color space |
| 2 | Opacity |
| 1 | Flag (= 128) |

Exposure

Key is 'expA' .

Exposure

| Length | Description |
|--------|-----------------|
| 2 | Version (= 1) |
| 4 | Exposure |
| 4 | Offset |
| 4 | Gamma |

Filter Effects

Key is 'FXid' or 'FEid' .

Filter Effects

| Length | Description |
|-------------------------------------------------|-----------------------------|
| 4 | Version (=1, 2 or 3) |
| 8 | Length of data to follow |
| The following is repeated for the given length. | |
| Variable | Pascal string as identifier |
| 4 | Version (= 1) |
| 8 | Length |

| | |
|--------------------------------------------------------------------------------|---------------------------------------------|
| 16 | Rectangle: top, left, bottom, right |
| 4 | Depth |
| 4 | Max channels |
| The following is repeated for number of channels + a user mask + a sheet mask. | |
| 4 | Boolean indicating whether array is written |
| 8 | Length |
| 2 | Compression mode of data to follow. |
| Variable | Actual data based on compression |
| End of repeating for channels | |
| 1 | Next two items present or not |
| 2 | Compression mode of data to follow |
| Variable | Actual data based on compression |

Image Data Section

The last section of a Photoshop file contains the image pixel data. Image data is stored in planar order: first all the red data, then all the green data, etc. Each plane is stored in scan-line order, with no pad bytes,

Image data section

| Length | Description |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2 | Compression method: 0 = Raw image data 1 = RLE compressed the image data starts with the byte counts for all the scan lines (rows * channels), with each count stored as a two-byte value. The RLE compressed data follows, with each scan line compressed separately. The RLE compression is the same compression algorithm used by the Macintosh ROM routine PackBits , and the TIFF standard. 2 = ZIP without prediction 3 = ZIP with prediction. |
| Variable | The image data. Planar order = RRR GGG BBB, etc. |

Other Document File Formats

Photoshop EPS files

The following summarizes the additional information Photoshop writes when creating EPS files:

Photoshop writes a high-resolution bounding box comment to the EPS file immediately following the traditional EPS bounding box comment. The comment begins with " %%HiResBoundingBox " and is followed by four numbers identical to those given for the bounding box except that they can have fractional components (i.e., a decimal point and digits after it). The traditional bounding box is written as the rounded version of the high resolution bounding box for compatibility.

Photoshop writes its image resources out to a block of data stored as follows:

%BeginPhotoshop: <length> <hex data>

EPS parameters for BeginPhotoshop

| Field | Definition |
|--------|------------------------------------|
| length | Length of the image resource data. |

||hex data||Image resource data in hexadecimal.||

Photoshop includes a comment in the EPS files it writes so that it is able to read them back in again.

Third party programs that write pixel-based EPS files may want to include this comment in their EPS files, so Photoshop can read their files.

The comment must follow immediately after the %% comment block at the start of the file. The comment is:

```
%ImageData: <columns> <rows> <depth> <mode> <pad channels> <block size>
<binary/hex> "<data start>"
```

EPS parameters for ImageData

| Field | Definition |
|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| columns | Width of the image in pixels. |
| rows | Height of the image in pixels. |
| depth | Number of bits per channel. Must be 1 or 8. |
| mode | Image mode. Bitmap/grayscale = 1; Lab = 2; RGB = 3; CMYK = 4. |
| pad channels | Number of other channels store in the file. Ignored when reading. Photoshop uses this to include a grayscale image that is printed on non-color PostScript printers. |
| block size | Number of bytes per row per channel. Will be either 1 or formula (below): 1 = Data is interleaved. (columns*depth+7)/8 =Data is stored in line-interleaved format, or there is only one channel. |
| binary/ascii | 1 = Data is in binary format. 2 = Data is in hex ascii format. |
| data start | Entire PostScript line immediately preceding the image data. This entire line should not occur elsewhere in the PostScript header code, but it may occur at part of a line. |

TIFF files

[See TIFF Tags](#) describes the standard TIFF (version 6) tags and tag values that Photoshop is able to read and write. Photoshop reads the first Image File Directory (IFD) and writes one IFD per file.

In addition, Photoshop uses a set of tags that are not defined in the TIFF v6 specification to store specific information. See [See Photoshop-specific TIFF Tags](#).

See [See TIFF Files on Mac OS](#) for information about how TIFF files are stored on Macintosh.

TIFF Tags

| Tag | Name | Photoshop reads | Photoshop writes |
|-----|---------------------------|---------------------------------------------------------------------------|----------------------------------------------------------------|
| 254 | NewSubFileType | Ignored | 0 |
| 256 | ImageWidth | 1 to 30000 | 1 to 30000 |
| 257 | ImageLength | 1 to 30000 | 1 to 30000 |
| 258 | BitsPerSample | 1, 2, 4, 8, 16 (all same) | 1, 8, 16 |
| 259 | Compression | 1 (uncompressed), 2 (CCITT), 5 (LZW), 7 (JPEG), 8 (ZIP), 32773 (PackBits) | 1, 5, 7, 8 |
| 262 | PhotometricInterpretation | 0, 1, 2, 3, 5, 8, 9 | 0 (1-bit), 1 (8-bit), 2, 3, 5, 8 |
| 266 | FillOrder | 1 | No |
| 270 | ImageDescription | Printing Caption | Printing Caption |
| 271 | EXIF: Make | | |
| 272 | EXIF: Model | | |
| 273 | StripOffsets | Yes | Yes |
| 277 | SamplesPerPixel | 1 to 24 | 1 to 24 |
| 278 | RowsPerStrip | Any | Single strip if not compressed, multiple strips if compressed. |

| | | | |
|-----|---------------------|---------------------------------|----------------------------------------------------------------------------------------------|
| 279 | StripByteCounts | Required if compressed | Yes |
| 282 | XResolution | Yes | Yes |
| 283 | YResolution | Ignored (square pixels assumed) | Yes |
| 284 | PlanarConfiguration | 1 or 2 | 1 |
| 296 | ResolutionUnit | 2 or 3 | 2 |
| 305 | EXIF: Software | | |
| 306 | EXIF: Date/time | | |
| 315 | EXIF: Artist | | |
| 317 | Predictor | 1 or 2 | 1 or 2 |
| 320 | ColorMap | Yes | Yes |
| 322 | TileWidth | Yes | No |
| 323 | TileLength | Yes | No |
| 324 | TileOffsets | Yes | No |
| 325 | TileByteCounts | Required if compressed | No |
| 332 | InkSet | 1 | No |
| 336 | DotRange | Yes, if CMYK | Yes |
| 338 | ExtraSamples | Ignored (except for count) | Photoshop 5.5 and earlier writes 0. Photoshop 6.0 and later writes 0 or 1 based on the spec. |

See Photoshop TIFF . pdf for additional information about tags 259 and 262.

Photoshop-specific TIFF Tags

Photoshop-specific TIFF tags

| Tag | Description |
|-------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 330 | tSubIFD . Documented in the TIFF - PM6 . pdf file as a PageMaker extension |
| 437 | JPEG tables. See Photoshop TIFF . pdf for more information. |
| 700 | XMP metadata. See http://www.adobe.com/devnet/xmp/ |
| 33723 | File information (IPTC-NAA record 2: see the documents in the IPTC folder of the Documentation folder). |
| 34377 | Photoshop image resources (see See Image Resources Section) |
| 34665 | EXIF IFD pointer. See http://www.kodak.com/global/plugins/acrobat/en/service/digCam/exifStandard2.pdf |
| 34675 | ICC Profiles (see the ICC1v42_2006-05 . pdf file from the International Color Consortium in the Documentation folder of the Photoshop SDK) |
| 34853 | EXIF GPS info. See http://www.kodak.com/global/plugins/acrobat/en/service/digCam/exifStandard2.pdf |
| 37724 | tImageSourceData . Begins with the null-terminated string " Adobe Photoshop Document Data Block ", (**PSB** " Adobe Photoshop Document Data V0002 "), followed by data of various types. See Photoshop TIFF . pdf for a list . |
| 50255 | tAnnotations . See See Annotations for details. |

TIFF Files on Mac OS

For cross-platform compatibility, all information in a Macintosh TIFF file is stored in the data fork. For interoperability with other Mac OS applications, however, some information is duplicated in resources stored in the resource fork of the file.

For compatibility with image cataloging applications, the 'pnot' resource id 0 contains references to thumbnail, keywords, and caption information stored in other resources.

The thumbnail picture is stored in a 'PICT' resource, the keywords are stored in 'STR#' resource 128 and the caption text is stored in 'TEXT' resource 128. For more information on the format of these resources see *Inside Macintosh: QuickTime Components* and the *Extensis Fetch Awareness Developer's Toolkit*.

All of the data from Photoshop's **File Info** dialog is stored in 'ANPA' resource 10000.

'STR' resource -16396 contains a string indicating the application that created the TIFF file.

Photoshop also creates 'ic18' -16455 and 'ICN#' -16455 resources containing thumbnail images which are shown in the Mac OS Finder.

Additional File Formats

In addition to documents that the user creates in Adobe Photoshop (discussed in [See The Photoshop File Format](#)), there are a number of additional files used by Photoshop to store information about such items as colors, contours, curves, levels and so forth. These are known as *load files*.

This chapter describes the format of each load file. Some of the files can be saved by the user; others are load only, as indicated in the sections.

Each file has a unique file type and file extension associated with it. Photoshop for Macintosh recognizes either, but does not require the use of the extension. In the file dialogs, Photoshop for Windows looks for files with the given file extension automatically; this can be overridden.

Under Mac OS, all information is stored in the data forks of Photoshop's load files. The files are completely interchangeable with Windows or any other platform.

Consistent byte ordering is required across platforms when reading and writing load files. Photoshop stores multi-byte values with the high-order bytes first, (big-endian), as on Mac OS., which is the opposite of Windows' standard byte order.. For more information, see "Macintosh and Windows development" in chapter 2 of *Photoshop API Guide.pdf*.

Actions

Actions are accessed by means of the Actions palette. The object effects use the actions mechanism to output information to the PSD file format.

Action file types

| OS | Filetype/extension |
|---------|--------------------|
| Mac OS | 8BAC |
| Windows | .ATN |

Each action file comprises an *action set*. The format of the action file is described in the table below:

Action file format

| Length | Description |
|------------------------------------------------------|-----------------------------------------------------------|
| 4 | Version (= 16) |
| Variable | Unicode string : action set name |
| 1 | Boolean: true if set is expanded for the Actions palette |
| 4 | Number of actions in action set |
| The following is repeated for each action in the set | |
| 2 | Index of action |
| 1 | Boolean: true if Shift key needed for keyboard shortcut |
| 1 | Boolean: true if Command key needed for keyboard shortcut |
| 2 | Color index information |

| | |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| Variable | Unicode string : action name |
| 1 | Boolean: true if action is expanded in the Actions palette |
| 4 | Number of items in action |
| The following is repeated for each item | |
| 1 | Boolean: true if action is expanded in the Actions palette |
| 1 | Boolean: true if action is enabled |
| 1 | Boolean: true if dialogs should be displayed |
| 1 | Options for displaying dialogs |
| 4 | Identifier: 'TEXT' or 'long' |
| Variable | Event: if identifier is 'TEXT' ,4 bytes of length followed by the string; if identifier is 'long' , 4 bytes of itemID |
| Variable | Dictionary name: 4 bytes of length followed by the string |
| 4 | -1 if a descriptor follows or 0 for none. |
| Variable | Descriptor: see Descriptor structure (See Descriptor structure) for details |

Descriptor structure

| Length | Description |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Variable | Unicode string : name from classID |
| Variable | classID: 4 bytes (length), followed either by string or (if length is zero) 4-byte classID |
| 4 | Number of items in descriptor |
| The following is repeated for each item in descriptor | |
| Variable | Key: 4 bytes (length) followed either by string or (if length is zero) 4-byte key |
| 4 | Type: OSType key 'obj' = Reference 'objc' = Descriptor 'VlIs' = List 'doub' = Double 'UntF' = Unit float 'TEXT' = String 'enum' = Enumerated 'long' = Integer 'comp' = Large Integer 'bool' = Boolean 'Glb0' = GlobalObject same as Descriptor 'type' = Class 'GlbC' = Class 'alis' = Alias 'tdta' = Raw Data |
| Variable | Item type: see the tables below for each possible type |

Reference Structure

| Length | Description |
|------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4 | Number of items |
| The following is repeated for each item in reference | |
| 4 | OSType key for type to use: 'prop' = Property 'Clss' = Class 'Enmr' = Enumerated Reference 'rele' = Offset 'Idnt' = Identifier 'indx' = Index 'name' =Name |
| Variable | Item type: see the tables below for each possible Reference type |

Property Structure

| Length | Description |
|----------|----------------------------------------------------|
| Variable | Unicode string : name from classID |

| | |
|----------|--------------------------------------------------------------------------------------------|
| Variable | classID: 4 bytes (length), followed either by string or (if length is zero) 4-byte classID |
| Variable | KeyID: 4 bytes (length), followed either by string or (if length is zero) 4-byte keyID |

'#Pnt' = points: tagged unit value

'#Mlm' = millimeters: tagged unit value

Unit float structure

| Length | Description |
|--------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4 | Units the following value is in. One of the following: '#Ang' = angle: base degrees '#Rsl' = density: base per inch '#Rlt' = distance: base 72ppi '#Nne' = none: coerced. '#Prc' = percent: unit value '#Px1' = pixels: tagged unit value |
| 8 | Actual value (double) |

Double structure

| Length | Description |
|--------|-----------------------|
| 8 | Actual value (double) |

Class structure

| Length | Description |
|----------|--------------------------------------------------------------------------------------------|
| Variable | Unicode string : name from classID |
| Variable | ClassID: 4 bytes (length), followed either by string or (if length is zero) 4-byte classID |

String structure

| Length | Description |
|----------|------------------------------------------------|
| Variable | String value as Unicode string |

Enumerated reference

| Length | Description |
|----------|--------------------------------------------------------------------------------------------|
| Variable | Unicode string : name from ClassID. |
| Variable | ClassID: 4 bytes (length), followed either by string or (if length is zero) 4-byte classID |
| Variable | TypeID: 4 bytes (length), followed either by string or (if length is zero) 4-byte typeID |
| Variable | enum: 4 bytes (length), followed either by string or (if length is zero) 4-byte enum |

Offset structure

| Length | Description |
|----------|--------------------------------------------------------------------------------------------|
| Variable | Unicode string : name from ClassID |
| Variable | ClassID: 4 bytes (length), followed either by string or (if length is zero) 4-byte classID |
| 4 | Value of the offset |

Boolean structure

| Length | Description |
|--------|---------------|
| 1 | Boolean value |

Alias structure

| Length | Description |
|----------|--------------------------------------------------------------------------|
| 4 | Length of data to follow |
| Variable | FSSpec for Macintosh or a handle to a string to the full path on Windows |

List structure

| Length | Description |
|-------------------------------------------------|-------------------------------------------------------------------------------------|
| 4 | Number of items in the list |
| The following is repeated for each item in list | |
| 4 | OSType key for type to use. See See Descriptor structure for types. |
| Variable | See the tables above for each possible type |

Large Integer

| Length | Description |
|--------|-------------|
|--------|-------------|

| | |
|---|-------|
| 8 | Value |
|---|-------|

Integer

| Length | Description |
|--------|-------------|
| 4 | Value |

Enumerated descriptor

| Length | Description |
|----------|----------------------------------------------------------------------------------------|
| Variable | Type: 4 bytes (length), followed either by string or (if length is zero) 4-byte typeID |
| Variable | Enum: 4 bytes (length), followed either by string or (if length is zero) 4-byte enum |

Raw Data

| Length | Description |
|----------|-------------|
| Variable | Value |

Arbitrary Map

Arbitrary Map files are accessed by means of the Curves dialog (*load only*).

Arbitrary map file types

| OS | Filetype/extension |
|---------|--------------------|
| Mac OS | 8BLT |
| Windows | .AMP |

There is no version number written in the file.

The files are an even multiple of 256 bytes long. Each 256 bytes is a lookup table, where:

The first byte of the table corresponds to byte zero of the image.

The last byte of the table corresponds to byte 255 of the image.

A NULL table that has no effect on an image is a linear table of bytes from 0 to 255.

If the file has one table, it is applied to the image's channels according to these priorities:

If the image has a master composite channel, the table is applied to it. If not, then:

If the image has a single active channel, the table is applied to it. If not, then:

If the image has no composite channel and more than one active channel, the table is not applied.

If the file has exactly three tables, it is applied to the image's channels according to these priorities:

The tables are assumed to represent RGB lookups. They are applied to the first three channels in the image, leaving the master composite untouched. Or:

If the image has a single active channel, the tables are converted to grayscale and the result is applied to the active channel. Or:

The first table is treated as a master. The remaining tables are applied to the image channels in turn (second table is applied to first channel, third table is applied to second channel, etc.).

Single active channels

Photoshop handles single active channels in a special fashion. When saving a map applied to a single channel, only one table is written to the file. Similarly, when reading a file for application to a single active channel, the master table is the one that will be used on that channel. This allows easy application of a single file to both composite and grayscale images.

CMYK Setup

CMYK settings files are accessed in Photoshop's Color Settings dialog (*load only*).

CMYK file types

| OS | Filetype/extension |
|--------|--------------------|
| Mac OS | 8BIC |

| | |
|---------|------|
| Windows | .API |
|---------|------|

CMYK setup file format

| Length | Description |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2 | Version (= 7) |
| 27*2 | Nine sets of three short integers specifying the xyY (CIE) values for the inks and their combinations. The inks are specified in the order cyan, magenta, yellow, magenta-yellow (red), cyan-yellow (green), cyan-magenta (blue), cyan-magenta-yellow, followed by the white and black points. Each set is written in the order xyY where: x = 0...10000, representing 0.0...1.0000. y = 1...10000, representing 0.0001...1.0000. Y = 0...20000, representing 0.00...200.00. |
| 2 | Dot gain. Short integer from -10...40, representing -10%...40%. |
| 1 | Use curves. = 1 if curves table present. |
| 1 | Filler: zero |
| 13*4*2 | Only present if "use curves" = 1. 4 sets of 13 short integers specifying the cyan, magenta, yellow, and black curve percentages from the Dot Gain Curves dialog. 0...1000, representing 0.0...100.0 % |
| Variable | Separation setup: see See Separation file format |

Separation file format

| Length | Description |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2 | Version (= 300) |
| 2 | Separation type. 0 = UCR separations; 1 = GCR separations |
| 2 | Blank ink limit (0...100) |
| 2 | Total ink limit (200...400) |
| 2 | Undercolor addition for GCR separations (0...100) |
| Variable | Black generation (spline) curve detailed in See Black generation curve data structure . See also the Curves data format in See Curves file format . |

Black generation curve data structure

| Length | Description |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2 | Number of points in curve (2...19) |
| 2* number of points | Each curve point is a pair of short integers where the first number is the output value (vertical coordinate on the Black Generation dialog graph) and the second is the input value. All coordinates have range 0 to 255. A NULL curve (no change to image data) is represented by the following five-number, ten-byte sequence in a file: 2 0 0 255 255. The black generation curve and the UCA limit must both be present even if the separation type is set to UCR (= 0). |

Color Books

Color book files (*Photoshop 7.0*) are automatically loaded by Photoshop; they cannot be saved or loaded via a menu item. You can place custom color books into the Presets\Color Books folder. Use the **Custom** button on the Adobe color picker to access them.

Color book file types

| OS | Filetype/extension |
|---------|--------------------|
| Mac OS | 8BCB |
| Windows | .ACB |

Color book file format

| Length | Description |
|--------|-----------------|
| 4 | Signature: 8BCB |
| 2 | Version (=1) |

| | |
|-----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2 | Book ID. Existing IDs: 3000 (ANPA), 3001 (Focoltone), 3002 (PantoneCoated), 3003 (PantoneProcess), 3004 (PantoneProSlim), 3005 (PantoneUncoated), 3006 (Toyo), 3007 (Trumatch), 3008 (HKSE), 3009 (HKS), 3010 (HKS), 3011 (HKSZ), 3012 (DIC), 3020 (PantonePastelCoated), 3021 (PantonePastelUncoated), 3022 (PantoneMetallic) |
| Variable | Unicode string : title |
| Variable | Unicode string : prefix |
| Variable | Unicode string : postfix |
| Variable | Unicode string : description |
| 2 | Number of colors (≤ 8000) |
| 2 | Colors per page (≤ 9) |
| 2 | Key color page; must be less than or equal to colors per page |
| 2 | Color type. 0 = RGB; 2 = CMYK; 7 = Lab |
| The following are repeated for the number of colors | |
| Variable | Unicode string : name |
| 6 | Unique key for the color |
| 4 | Color values: 4 bytes for CMYK; 3 bytes for RGB and Lab |

Color Table

Color Table files are accessed using the Colors palette (*load only*) .

Color table file types

| OS | Filetype/extension |
|---------|--------------------|
| Mac OS | 8BCT |
| Windows | .ACT |

There is no version number written in the file. The file is 768 or 772 bytes long and contains 256 RGB colors. The first color in the table is index zero. There are three bytes per color in the order red, green, blue. If the file is 772 bytes long there are 4 additional bytes remaining. Two bytes for the number of colors to use. Two bytes for the color index with the transparency color to use. If loaded into the Colors palette, the colors will be installed in the color swatch list as RGB colors.

Color Swatches

Color swatch files are loaded and saved in Photoshop's Color Swatches palette. These are typically stored in the Color Swatches sub-directory in the Presets directory.

Color swatches file types

| OS | Filetype/extension |
|---------|--------------------|
| Mac OS | 8BC0 |
| Windows | .ACO |

Color swatches file format

| Length | Description |
|--------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 2 | Version (=1) |
| 2 | Count of colors in the file. |
| count *10 | Colors. Each color is 10 bytes, as described in See Color structure . |
| At the end of a version 1 file is the version 2 information. | |
| 2 | Version (= 2) |
| 2 | Count of colors in the file. The next two fields are repeated for each count. |
| count *10 | Colors. Each color is 10 bytes, as described in See Color structure . |
| Variable | Unicode string : color name. |

Color structure

| Length | Description |
|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2 | The color space the color belongs to (see See Color space IDs). |
| 8 | Four short unsigned integers with the actual color data. If the color does not require four values, the extra values are undefined and should be written as zeros. See See Color space IDs . |

Color space IDs

| Color ID | Description |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0 | RGB. The first three values in the color data are <i>red</i> , <i>green</i> , and <i>blue</i> . They are full unsigned 16-bit values as in Apple's RGBColor data structure. Pure red = 65535, 0, 0. |
| 1 | HSB. The first three values in the color data are <i>hue</i> , <i>saturation</i> , and <i>brightness</i> . They are full unsigned 16-bit values as in Apple's HSVColor data structure. Pure red = 0,65535, 65535. |
| 2 | CMYK. The four values in the color data are <i>cyan</i> , <i>magenta</i> , <i>yellow</i> , and <i>black</i> . They are full unsigned 16-bit values. 0 = 100% ink. For example, pure cyan = 0,65535,65535,65535. |
| 7 | Lab. The first three values in the color data are <i>lightness</i> , <i>a chrominance</i> , and <i>b chrominance</i> . Lightness is a 16-bit value from 0...10000. Chrominance components are each 16-bit values from -12800...12700. Gray values are represented by chrominance components of 0. Pure white = 10000,0,0. |
| 8 | Grayscale. The first value in the color data is the gray value, from 0...10000. |

Photoshop allows the specification of custom colors, such as those colors that are defined in a set of custom inks provided by a printing ink manufacturer. These colors can be stored in the Colors palette and streamed to and from load files. The details of a custom color's color data fields are not public and should be treated as a black box.

[See Custom color spaces](#) gives the color space IDs currently defined by Photoshop for some custom color spaces.

Custom color spaces

| Color ID | Name |
|----------|--------------------------|
| 3 | Pantone matching system |
| 4 | Focoltone colour system |
| 5 | Trumatch color |
| 6 | Toyo 88 colorfinder 1050 |
| 10 | HKS colors |

Contours

Contour settings files (*Photoshop 6.0*) are loaded and saved in Photoshop's Layer Effects dialog.

Contour file types

| OS | Filetype/extension |
|---------|--------------------|
| Mac OS | 8BFS |
| Windows | .SHC |

Contour file format

| Length | Description |
|--------|-------------------|
| 4 | Type (= '8BFS') |
| 2 | Version (= 1) |

| | |
|--------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| 4 | Count of contours |
| The following is repeated for each contour | |
| 4 | Version (= 1 or 2) |
| Variable | Unicode string : contour name |
| Variable | version 1 or 2 data follows. See See Contours Version 1 for version 1 and See Contours Version 2 for version 2. |

Contours Version 1

| Length | Description |
|----------|------------------------------------------------------------------------------|
| 2 | Count of points |
| 4* count | For each point: 4 bytes of point data (2 bytes vertical, 2 bytes horizontal) |
| 4 | Minimum input range |
| 4 | Maximum input range |

Contours Version 2

| Length | Description |
|-----------|--------------------------------------------------------------------|
| 2 | Count of points |
| 4 * count | For each point: Point data (2 bytes vertical, 2 bytes horizontal) |
| 1 * count | For each point: boolean indicating whether the point is continuous |
| 4 | Min input range |
| 4 | Max input range |

Curves

Curves settings files are loaded in Photoshop's Curves dialog and Black Generation curve dialog (from within Separation Setup Preferences). Curves files can also be loaded into any of Photoshop's transfer function dialogs, such as the Duotone Curve dialog from within Duotone Options, and Print transfer dialog. Curves are saved as .ATF and .ACV files.

When loaded into a transfer function dialog, only the first curve in a Curves file is used.

Curves file types

| OS | Filetype/extension |
|---------|--------------------|
| Mac OS | 8BSC |
| Windows | .CRV |

Curves file format

| Length | Description |
|-------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2 | Version (= 1 or = 4) |
| 2 | Version 1 = bit map of curves in file Version 4 = count of curves in the file |
| The following is the data for each curve specified by count above | |
| 2 | Count of points in the curve (short integer from 2...19) |
| point count * 4 | Curve points. Each curve point is a pair of short integers where the first number is the output value (vertical coordinate on the Curves dialog graph) and the second is the input value. All coordinates have range 0 to 255. See also See Null curves below. |

Null curves

A NULL curve (no change to image data) is represented by the following five-number, ten-byte sequence in a file:

```
2 0 0 255 255
```

Displaying ink percentages

Photoshop allows the option of displaying ink percentages instead of pixel values; this is a display option only and the internal data is unchanged, with 100% ink equal to image data of 0 and 0% ink

equal to image data of 255.

Curves data order

The first curve is a master curve that applies to all the composite channels (RGB) when in composite image mode.

The remaining curves apply to the active channels in order: curve two applies to channel one, curve three applies to channel two, etc., up until curve 17, which applies to channel 16.

Indexed color

The exception to the normal order, and the reason there are up to 19 curves, is when the mode is Indexed color. In this case:

The first curve is a master curve.

The next three curves are created for the Red, Green, and Blue portions of the image's color table, and they are applied to the first channel.

The remaining curves apply to any remaining alpha channel that is active: for instance, if channel two is active, curve five applies to it; if channel three is active, curve six applies to it, etc., up until curve 19, which applies to channel 16.

Single active channels

Photoshop handles single active channels in a special fashion. When saving the curves applied to a single channel, the settings are stored into the master curve, at the beginning of the file. Similarly, when reading a curves file for application to a single active channel, the master curve is the one that will be used on that channel. This allows easy application of a single file to both RGB and grayscale images.

Additional information

At the end of the Version 1 file is the following information:

Extra level record info marker 'Crv '

Extra curves marker

| Length | Description |
|-------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4 | = 'Crv ' for extra curve information |
| 2 | Version (= 4) |
| 4 | Count of items to follow. |
| The following is the data for each curve specified by count above | |
| 2 | Before each curve is a channel index. |
| 2 | Count of points in the curve (short integer from 2...19) |
| point count * 4 | Curve points. Each curve point is a pair of short integers where the first number is the output value (vertical coordinate on the Curves dialog graph) and the second is the input value. All coordinates have range 0 to 255. See also See Null curves below. |

Custom Kernel

Kernel settings files are loaded and saved in Photoshop's Custom Filter dialog. .

Custom kernel file types

| OS | Filetype/extension |
|---------|--------------------|
| Mac OS | 8BCK |
| Windows | .ACF |

Custom filter structure

| Length | Description |
|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 50 | Weights. The first 25 values are the custom weights from -999...999, applied to pixels offset from each pixel by [-2,-2] to [2,2]. The values progress through horizontal offsets first, as follows: |

| | |
|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | {[-2, -2], [-1, -2], [0, -2], [1, -2], [2, -2], [-2, -1], [-1, -1], [0, -1], [1, -1], [2, -1], [-2, 0], [-1, 0], [0, 0], [1, 0], [2, 0], [-2, 1], [-1, 1], [0, 1], [1, 1], [2, 1], [-2, 2], [-1, 2], [0, 2], [1, 2], [2, 2]} |
| 27*2 | Ink colors. Nine sets of three short integers specifying the xyY (CIE) values for the inks and their combinations. The inks are specified in the order cyan, magenta, yellow, magenta-yellow (red), cyan-yellow (green), cyan-magenta (blue), cyan-magenta-yellow, followed by the white and black points. Each set is written in the order xyY where: x = 0...10000, representing 0.0...1.0000. y = 1...10000, representing 0.0001...1.0000. Y = 0...20000, representing 0.00...200.00. |
| 2 | Scale. Short integer from 1...9999. |
| 2 | Offset. Short integer from -9999...9999. |

Duotone Options

Duotone settings files are loaded and saved in the Duotone Options dialog..

Duotone file types

| OS | Filetype/extension |
|---------|--------------------|
| Mac OS | 8BDT |
| Windows | .ADO |

Duotone file format

| Length | Description |
|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2 | Version (= 1) |
| 2 | Count . Number of plates in duotone spec (short integer). 1 = Monotone; 2 = Duotone; 3 = Tritone; 4 = Quadtone. |
| 4*10 | Four ink colors, regardless of the number of plates. The contents of the colors beyond the last plate specified by Count are undefined. Each color is 10 bytes and described in See Duotone color structure . It is identical to the format in a Colors load file. |
| 4*64 | Four ink names, regardless of the number of plates. Each name is streamed as a Pascal-style string with a length byte followed by the string name. Names may not be more than 63 characters. Each name is padded to occupy 64 bytes, including the length byte. Any names beyond the last plate specified by Count should be empty, size = 0. |
| 4*28 | Four ink curves, regardless of the number of plates. Described in See Ink curves structure . |
| 2 | Dot gain (= 20). Kept for compatability with Photoshop 2.0. Ignored. |
| 11*10 | Eleven overprint colors, regardless of the number of plates. The number of defined overprints depends on Count . Monotones = no overprint colors. Duotones = one overprint color. Tritones = four overprint colors. Quadtones = 11 overprint colors. The contents of the colors beyond the last defined overprint are undefined. Each color is 10 bytes and described in See Duotone color structure . It is identical to the format in a Colors load file. |

Duotone color structure

| Length | Description |
|--------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2 | The color space the color belongs to (see See Color space IDs). |
| 8 | Four short unsigned integers with the actual color data. If the color does not require four values to specify, the extra values are undefined and should be written as zeros. |

Ink curves structure

| Length | Description |
|--------|-------------|
| | |

| | |
|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 26 | Transfer curve: Array of 13 short integers from 0...1000 representing 0.0...100.0. All but the first and last value may be -1, representing no point on the curve. Any curves beyond the last plate should be equal to the NULL curve. A NULL transfer curve looks like this: 0, -1, -1, -1, -1, -1, -1, -1, -1, -1, 1000. |
| 2 | Override (= 0). Short integer for compatibility. Ignored by Photoshop 3.0 and higher. |

Halftone Screens

Halftone Screens settings files are loaded and saved in Photoshop's Halftone Screens dialog (available from **Edit > Print with Preview** in Photoshop 7, or **Page Setup** or **Print Options** in previous versions).

Halftone screen file types

| OS | Filetype/extension |
|---------|--------------------|
| Mac OS | 8BHS |
| Windows | .AHS |

Halftone screens file format

| Length | Description |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2 | Version (= 5) |
| 4*18 | Four screen descriptions. See See Halftone screen parameter structure . |
| Variable | For every screen that has a custom spot function, the PostScript function text is written here, one after the other, with no header information, in the same order as the screen settings. The size of each custom spot is the absolute value of its negative shape code. |

Halftone screen parameter structure

| Length | Description |
|--------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4 | Ink's screen frequency, in lines per inch. Binary fixed point value ;16 bits representing the integer and fractional parts from 1.0...999.999. |
| 2 | Units for the screen frequency. Lines per inch = 1; lines per centimeter = 2. Only affects display, not screen frequency. |
| 4 | Angle for screen. Binary fixed point value with 16 bits representing the integer and fractional parts from -180.0000 ... 180.0000, measured in degrees. |
| 2 | Code representing the shape of the halftone dots. 0 = Round; 1 = Ellipse; 2 = Line; 3 = Square; 4 = Cross; 6 = Diamond. Negative numbers represent custom shapes; the absolute value is the size in bytes of the custom spot function described in See Halftone screens file format . |
| 4 | = 0. Not currently used by Photoshop. |
| 1 | Boolean. 1 = Use accurate screens; 0 = Use other. |
| 1 | Boolean. 1 = Use printer's default screens; 0 = Use other. |

Hue/Saturation

Hue/Saturation settings files are loaded and saved in Photoshop's Hue/Saturation dialog.

Hue/saturation file types

| OS | Filetype/extension |
|---------|--------------------|
| Mac OS | 8BHA |
| Windows | .AHU |

Hue/saturation file format

| Length | Description |
|--------|----------------|
| 2 | Version (= 2) |
| | |

| | |
|---------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | 0 = Use settings for hue-adjustment; 1 = Use settings for colorization. |
| 1 | Padding byte; must be present but is ignored by Photoshop. |
| 6 | Colorization. Photoshop 5.0: The actual values are stored for the new version. Hue is -180...180, Saturation is 0...100, and Lightness is -100...100. Photoshop 4.0: Three short integers Hue, Saturation, and Lightness from -100...100. The user interface represents hue as -180...180, saturation as 0...100, and Lightness as -100...100, as the traditional HSB color wheel, with red = 0. |
| 6 | Master hue, saturation and lightness values. |
| 6 sets of the following 14 bytes (4 range values followed by 3 settings values) | |
| 8: range values | For RGB and CMYK, those values apply to each of the six hexants in the HSB color wheel: those image pixels nearest to red, yellow, green, cyan, blue, or magenta. These numbers appear in the user interface from -60...60, however the slider will reflect each of the possible 201 values from -100...100. |
| 6: settings values | For Lab, the first four of the six values are applied to image pixels in the four Lab color quadrants, yellow, green, blue, and magenta. The other two values are ignored (= 0). The values appear in the user interface from -100 to 100. |

Levels

Levels settings files are loaded and saved in the Levels dialog.

Levels file types

| OS | Filetype/extension |
|---------|--------------------|
| Mac OS | 8BLS |
| Windows | .ALV |

Levels file format

| Length | Description |
|---------|---------------------------------------------------------------------------------------------------------------------|
| 2 | Version (= 2) |
| 29 * 10 | 29 sets of level records, each level containing 5 short integers (see See Level record structure). |

Level record structure

| Length | Description |
|--------|----------------------------------------------------------------------------------------|
| 2 | Input floor (0...253) |
| 2 | Input ceiling (2...255) |
| 2 | Output floor (0...255). Matched to input floor. |
| 2 | Output ceiling (0...255) |
| 2 | Gamma. Short integer from 10...999 representing 0.1...9.99. Applied to all image data. |

Level record sets order

The first set of levels is the master set that applies to all of the composite channels (RGB) when in composite image mode.

The remaining sets apply to the active channels individually; set two applies to channel one, the set three to channel two, etc., up until set 25, which applies to channel 24.

Sets 28 and 29 are reserved and should be set to zeros.

Indexed color

The exception to the normal order is when the mode is Indexed:

The first set is a master set.

The next three sets are created for the Red, Green, and Blue portions of the image's color table, and they are applied to the first channel.

The remaining sets apply to any remaining alpha channels that are active: for instance, if channel two is active, set five applies to it; if channel three is active, set six applies to it, etc., up until channel 27, which applies to channel 24.

Sets 28 and 29 are reserved and should be set to zeros.

Single active channels

Photoshop handles single active channels in a special fashion. When saving the levels applied to a single channel, the settings are stored into the master set, at the beginning of the file. Similarly, when reading a levels file for application to a single active channel, the master levels are the ones that will be used on that channel. This allows easy application of a single file to both RGB and grayscale images.

Photoshop CS (8.0) Additional information

At the end of the Version 2 file is the following information:

Extra level record info marker 'Lvls'

Extra levels marker

| Length | Description |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4 | = 'Lvls' for extra level information |
| 2 | Version (= 3) |
| 2 | Count of total level record structures. Subtract the legacy number of level record structures, 29, to determine how many are remaining in the file for reading. |
| Variable | Additonal level records according to count. See Level record structure |

Monitor Setup

This format has been superseded by ICC profiles. See ICC1v42_2006-05 . pdf for details.

Monitor settings files are accessed in Photoshop's Color Settings dialog, via the **Edit** menu (*load only*)

Monitor setup file types

| OS | Filetype/extension |
|---------|--------------------|
| Mac OS | 8BMS |
| Windows | .AMS |

Monitor setup file format

| Length | Description |
|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2 | Version (= 2.) |
| 2 | Gamma. Short integer from 75...300 representing 0.75...3.00. |
| 2*2 | White point. Two short integers as CIE chromaticity coordinates: x, y . x = 0...10000 representing 0.0...1.0000. y = 1...10000 representing 0.0001...1.0000. |
| 6*2 | Phosphors. Three sets of two integers giving x, y coordinates of the red, green, and blue phosphors. x = 0...10000 representing 0.0...1.0000. y = 1...10000 representing 0.0001...1.0000. In the order <i>red x</i> , <i>red y</i> ; <i>green x</i> , <i>green y</i> ; <i>blue x</i> , <i>blue y</i> . |

Replace Color/Color Range

Replace Color settings files are loaded and saved in the Color Range dialog (available via the **Select** menu).

Replace color/Color range file types

| OS | Filetype/extension |
|---------|--------------------|
| Mac OS | 8BXT |
| Windows | .AXT |

Replace color/Color range file format

| Length | Description |
|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2 | Version (= 1) |
| 2 | Short integer indicating what space the color components are in. 7 = Lab color, 8 = grayscale. No other values are supported. |
| 6 | Component ranges. Six unsigned byte values representing the range of colors within which a pixel's color must fall to be considered selected for color replacement, or color range selecting. Described in See Component range structure . |
| 2 | Fuzziness. Short integer from 0...200 controlling how colors close to selected colors are affected. |
| 6 | Transform settings. When used with Replace Color: Three short integers from -100...100. Described in See Replace color transform settings . When used with Color Range: Writes zeros into the three short integers and ignores. |

Component range structure

| Length | Description |
|--------|-----------------------------------------------------------------------------------------------------------------|
| 1 | if Lab (color space = 7): low endpoint of L value if grayscale (color space = 8): low endpoint of gray range |
| 1 | if Lab: high endpoint of L value if grayscale: 0 |
| 1 | if Lab: low endpoint of a chrominance value if grayscale: 0 |
| 1 | if Lab: high endpoint of a chrominance value if grayscale: 0 |
| 1 | if Lab: low endpoint of b chrominance value if grayscale: low endpoint of gray range |
| 1 | if Lab: high endpoint of b chrominance value if grayscale: high endpoint of gray range |

Replace color transform settings

| Length | Description |
|--------|---------------------------------------------------|
| 2 | Hue change. Short integer from -100...100. |
| 2 | Saturation change. Short integer from -100...100. |
| 2 | Lightness change Short integer from -100...100. . |

Selective Color

Selective Color settings files are loaded and saved in Photoshop's Selective Color dialog.

Selective color file types

| OS | Filetype/extension |
|---------|--------------------|
| Mac OS | 8BSV |
| Windows | .ASV |

Selective color file format

| Length | Description |
|--------|---------------------------------------------------------------------------------------------------------------|
| 2 | Version (= 1) |
| 2 | Correction method.. 0 = Apply color correction in relative mode; 1 = Apply color correction in absolute mode. |
| 80 | Ten eight-byte plate correction records, described in See Plate correction structure . |

The first record is ignored by Photoshop and is reserved for future use. It should be set to all zeroes.

The rest of the records apply to specific areas of colors or lightness values in the image, in the following order: reds, yellows, greens, cyans, blues, magentas, whites, neutrals, blacks.

Plate correction structure

| Length | Description |
|--------|--------------------------------------------------------------|
| 2 | Amount of cyan correction. Short integer from -100...100. |
| 2 | Amount of magenta correction. Short integer from -100...100. |
| 2 | Amount of yellow correction. Short integer from -100...100. |
| 2 | Amount of black correction. Short integer from -100...100. |

Separation Tables

This format has been superseded by ICC profiles. See ICC1v42_2006-05 . pdf for details.

Separation Table files are accessed in the Separation Tables dialog (*load only*) .

Separation table file types

| OS | Filetype/extension |
|---------|--------------------|
| Mac OS | 8BST |
| Windows | .AST |

Format:

If the size of the file is $33 * 33 * 33 * 4$, then the file consists only of a Lab->CMYK table as currently documented.

If the size of the file is $(33 * 33 * 33 + 256) * 3$, then the file consists only of a CMYK->Lab table as currently documented.

Otherwise, the file has the format listed in [See Separation table file format](#).

Separation table file format

| Length | Description |
|----------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2 | Version (= 300) |
| 1 | Boolean. True if contains Lab->CMYK table. |
| 1 | Boolean. True if contains CMYK->Lab table. |
| $33*33*33*4$ | If file contains Lab->CMYK table, this section contains CMYK colors for $33*33*33$ Lab colors. The CMYK colors are written in interleaved order, one byte each ink. 0 = 100%, 255 = 0%. See See Generating Lab source colors below. |
| $(33*33*33 + 256)*3$ | If file contains CMYK->Lab table, this section contains Lab colors for $33*33*33+256$ CMYK colors. The Lab colors are written in interleaved order, one byte per component. See See Generating CMYK source colors below. |
| 1 | Boolean. True if gamut table follows. |
| 1 | If entry above is false , this byte will not be present. If true, this byte should be set to 1 for compatibility. |
| $((33*33*33L)+7)>>3$ if gamut table present, zero otherwise | Gamut table, if present. The gamut table is a bit table indexed in the same way as the Lab->CMYK table with the high bit of the first byte at index 0. See See Testing for bits in the gamut table below. |

Generating Lab source colors

The Lab colors that are the source colors can be generated from the Lab->CMYK table with the following routine:

```
for (i = 0; i < 33; i++)
  for (j = 0; j < 33; j++)
```

```

for (n = 0; n < 33; n++)
{
    L = Min (i * 8, 255);
    a = Min (j * 8, 255);
    b = Min (n * 8, 255);
}

```

Generating CMYK source colors

The CMYK colors that are the source colors can be generated from the CMYK->Lab table with the following routine:

```

for (i = 0; i < 33; i++)
    for (j = 0; j < 33; j++)
        for (n = 0; n < 33; n++)
            {
                c = Min (i * 8, 255);
                m = Min (j * 8, 255);
                y = Min (n * 8, 255);
                k = 255;
            }
for (i = 0; i < 256; i++)
{
    c = 255;
    m = 255;
    y = 255;
    k = i;
}

```

Testing for bits in the gamut table

To test the bit at bitIndex , use table:

```

([bitIndex >> 3] & (0x0080 >> (bitIndex & 0x07))) != 0.

```

bitIndex itself is calculated in the same way you would calculate an index into the Lab->CMYK table.

A result of 1 indicates that the color is in gamut and 0 indicates that it is out of gamut.

Transfer Function

Transfer Function settings files are accessed (*load only*) in Photoshop's Duotone Curve dialog from within Duotone Options and Transfer Function dialogs (available from **Edit > Print with Preview** in Photoshop 7, or **Page Setup** or **Print Options** in previous versions). Transfer Function files can also be loaded into any of Photoshop's curves dialogs, such as the Curves color adjustment dialog.

Transfer function file types

| OS | Filetype/extension |
|---------|--------------------|
| Mac OS | 8BTF |
| Windows | .ATF |

Transfer function file format

| Length | Description |
|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2 | Version (= 4) |
| 112 (= 28*4) | Four transfer functions , described in See Transfer function structure . The file always contains four functions. When writing the printer transfer functions for grayscale images, for instance, Photoshop writes four copies of the single transfer function specified in the user interface. |

Transfer function structure

| Length | Description |
|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 26 | Curve. Array of 13 short integers from 0...1000 representing 0.0...100.0. All but the first and last value may be -1, representing no point on the curve. Any curves beyond the last plate should be equal to the NULL curve. A NULL transfer curve looks like this: 0, -1, -1, -1, -1, -1, -1, -1, -1, -1, -1, -1, 1000. |
| 2 | Boolean. 0 = Let printer supply curve; 1 = Override printer's default transfer curve. |

