Tech Info Library

TIFF (Tag Image File Format): Specifications (3 of 7)

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4. Definitions

The TIFF structure itself is not specific to imaging applications in any
way. It is only the definitions of the fields themselves that jointly
describe an image. Before we begin describing the fields, a few image
related definitions may be useful.

An image is defined to be a rectangular array of "pixels," each of which
consists of one or more "samples." With monochromatic data, we have one
sample per pixel, and "sample" and "pixel" can be used interchangeably.
Color data usually contains three samples per pixel, as in, for example,
an RGB scheme.

5. The Fields

The following fields are defined in this version of TIFF. More will be added
in future versions, if possible in such a way so as not to break old
software that encounters a newer TIFF file. An attempt has been made to
group related fields, although the grouping is necessarily somewhat
arbitrary.

The documentation for each field contains the name of the field (quite
arbitrary, but convenient), the Tag value, the field Type, the Number of
Values (N) expected (per IFD, in the case of multiple subfiles), comments
describing the field, and the default, if any. The default value is used if
the field does not exist.

A fairly large number of fields has already been defined, and the number
will grow. Please keep in mind that many common images can be described
using only a handful of these fields (see the Examples section).

General Description

SubfileType
Tag = 255 (FF)
Type = SHORT
N = 1

A general indication of the kind of data that is contained in this subfile.
Currently defined values are:
1 = full resolution image data - ImageWidth, ImageLength, and StripOffsets
    are required fields.
2 = reduced resolution image data - ImageWidth, ImageLength, and
    StripOffsets are required fields. It is further assumed that a reduced
    resolution image is a reduced version of the entire extent of the
    corresponding full resolution data.
3 = Single page of a multi-page image (see the PageNumber tag description).

If your kind of image data doesn't fit nicely into either description,
contact either Aldus or Microsoft to define an additional value. Note
that both image types can be found in a single TIFF file, with each subfile
described by its own IFD.
No default.

Data Architecture

ImageWidth
Tag = 256 (100)
Type = SHORT
N = 1

The image's width, in pixels (X: horizontal). The number of columns in the
image.
No default.

ImageLength
Tag = 257 (101)
Type = SHORT
N = 1

The image's length (height) in pixels (Y: vertical). The number of rows
(sometimes described as "scan lines") in the image. ImageLength and
ImageWidth refer only to how the pixels are stored in the file and do not
imply anything about where the visual "top" or "left side" of the image may
be. See Orientation for this information.
No default.

RowsPerStrip
Tag = 278 (116)
Type = SHORT or LONG
N = 1

The number of rows per strip. The image data is organized into strips for
fast access to individual rows when the data is compressed (though this
field is valid even if the data is not compressed).

Note that either SHORT or LONG values can be used to specify RowsPerStrip.
SHORT values may be used for small TIFF files. It should be noted, however,
that earlier TIFF specifications required LONG values and that some software
may not expect SHORT values.

Default is 2**32 - 1, which is effectively infinity. That is, the entire
image is one strip.

[StripsPerImage]
N = 1

The number of strips per image. This value is not a field, since it can be
computed from two other fields, but it is convenient to give it a name in
order to clarify the use of other fields. The equation to use is
StripsPerImage = (ImageLength + RowsPerStrip - 1) / RowsPerStrip, assuming
integer arithmetic.

StripOffsets
Tag = 273 (111)
Type = SHORT or LONG
N = StripsPerImage for PlanarConfiguration equal to 1.
= SamplesPerPixel * StripsPerImage for PlanarConfiguration equal to 2

For each strip, the byte offset of that strip. The offset is specified
with respect to the beginning of the TIFF file. Note that this implies
that each strip has a location independent of the locations of other strips.
This feature may be useful for certain editing applications. This field is
the only way for a reader to find the image data, and hence must exist.

Note that either SHORT or LONG values can be used to specify the strip
offsets. SHORT values may be used for small TIFF files. It should be noted,
however, that earlier TIFF specifications required LONG strip offsets and
that some software may not expect SHORT values.
No default.

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