TIFF (Tag Image File Format): Specifications (5 of 7)

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Security: Everyone

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5. The Fields, continued

Threshholding
Tag = 263 (107)
Type = SHORT
N = 1

1 = a bilevel "line art" scan. BitsPerSample must be 1.
2 = a "halftone" or "dithered" scan, usually of continuous tone data such as photographs. BitsPerSample must be 1.
3 = Error Diffused.
Default is Threshholding = 1.

CellWidth
Tag = 264 (108)
Type = SHORT
N = 1

The width, in 1-bit samples, of the dithering/halftoning matrix. Assumes that Threshholding = 2. That is, this field is only relevant if Threshholding = 2.
No default.

CellLength
Tag = 265 (109)
Type = SHORT
N = 1

The length, in 1-bit samples, of the dithering/halftoning matrix. Assumes that Threshholding = 2. This field and the previous field may be useful for converting from halftoned to true gray level data.

No default.

Photometrics

These fields are useful in determining the visual meaning of the sample data.

MinSampleValue
Tag = 280 (118)
Type = SHORT
N = SamplesPerPixel

The minimum valid sample value.
Default is 0.

MaxSampleValue
Tag = 281 (119)
Type = SHORT
N = SamplesPerPixel

The maximum valid sample value.
Default is 2**(BitsPerSample) - 1.

PhotometricInterpretation
Tag = 262 (106)
Type = SHORT
N = 1

0 = MinSampleValue should be imaged as white. MaxSampleValue should be imaged as black. If the bit-map represents gray scale, then the values between the minimum and maximum sample values should be interpreted according to either the gray scale response curve information (if included) or according to the result of some more arbitrary rule. See GrayResponseCurve.

1 = MinSampleValue should be imaged as black. MaxSampleValue should be imaged as white. If the bit-map represents gray scale, then the values between the minimum and maximum sample values should be interpreted according to either the gray scale response curve information (if included) or according to the result of some more arbitrary rule.

2 = RGB. In the RGB model, a color is described as a combination of the three primary colors of light (red, green, and blue) in particular concentrations. For each of the three samples, MinSampleValue represents minimum intensity, and MaxSampleValue represents maximum intensity. For PlanarConfiguration = 1, the samples are stored in the indicated order within a pixel: first Red, then Green, then Blue. For PlanarConfiguration = 2, the sample planes are stored in the indicated order: first the Red sample plane, then the Green plane, then the Blue

plane.

The Red, Green and Blue intensity values are defined according to the NTSC specifications for primary color chromaticity. These specifications assume the illumination to be CIE D6500. See the Red, Green and Blue color response curve tags.

Note: some compression schemes, such as the CCITT schemes, imply a particular PhotometricInterpretation. Therefore, when reading such data, TIFF readers should ignore PhotometricInterpretation. And, ideally, TIFF writers should not write out the field when using one of these schemes.

No default.

GrayResponseUnit
Tag = 290 (122)
Type = SHORT
N = 1

1 = number represents tenths of a unit.
2 = number represents hundredths of a unit.
3 = number represents thousandths of a unit.
4 = number represents ten-thousandths of a unit.
5 = number represents hundred-thousandths of a unit.
Default is 2.

GrayResponseCurve
Tag = 291 (123)
Type = SHORT
N = 2**BitsPerSample

The purpose of the gray response curve and the gray units is to further provide photometric interpretation information for gray scale image data. The gray response curve specifies for given levels of gray between the minimum and maximum sample values the actual photometric gray level of the value. It represents this gray level in terms of optical density.

The GrayScaleResponseUnits specifies the accuracy of the information contained in the curve. Since optical density is specified in terms of fractional numbers, this tag is necessary to know how to interpret the stored integer information. For example, if GrayScaleResponseUnits is set to 4 (ten-thousandths of a unit), and a GrayScaleResponseCurve number for gray level 4 is 3455, then the resulting actual value is 0.3455.

If the gray scale response curve is known for the data in the TIFF file, and if the gray scale response of the output device is known, then an intelligent conversion can be made between the input data and the output device. For example, the output can be made to look just like the input. In addition, if the input image lacks contrast (as can be seen from the response curve), then appropriate contrast enhancements can be made.

The purpose of the grey scale response curve is to act as a "lookup" table

mapping values from 0 to 2**BitsPerSample-1 into specific intensity values. Refer to the PhotometricInterpretation tag to determine how the mapping should be done.

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