



JHOVE2: Next-Generation Architecture for Format-Aware Characterization

TIFF Module Specification

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PORTICO



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Preface

JHOVE2 is a Java framework and application for next-generation format-aware characterization. Characterization is the process of examining a formatted digital object and automatically extracting or deriving representation information about that object that is indicative of its significant nature and useful for purposes of classification, analysis, and use. For more information, visit <http://jhove.org>.

(Description of this document)

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Version History

Version	Date	Notes
2.0.0	3/15/2011	Original Version

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1 Introduction

This is the specification for the JHOVE2 TIFF module. TIFF is a tag-based file format used for storing and interchanging raster images.

Important information for users of the JHOVE2 TIFF module

The authoritative specification for TIFF is *unambiguous*. A format specification is considered *unambiguous* if there is broad community consensus regarding the intention of *all* normative requirements of the format's authoritative specification; otherwise it is considered *ambiguous*, and areas of potential ambiguity will be documented below.

Validation of TIFF instances by this module is *selective*. A format specification is considered *comprehensive* if there is broad community consensus regarding the intention of *all* normative requirements of the format's authoritative specification; otherwise it is considered *selective*, and areas of potential ambiguity will be documented below.

TIFF Profiles not validated against are: Exif 2.0, 2.1 and 2.2 (JEITA CP-3451) ,TIFF-FX (RFC 2301), DNG (Adobe Digital Negative, and BigTIFF.

2 Identification

<i>Primary format or format family</i>	
Canonical format name	TIFF (Tagged Image File Format)
Alias format name(s)	Tagged Image File Format
Canonical format identifier	[JHOVE2] http://jhove2.org/terms/format/tiff
Alias format Identifier(s)	[PUID] fmt/7 [PUID] fmt/8 [PUID] fmt/9 [PUID] fmt/10 [MIME] image/Tiff
JHOVE2 module name	TiffModule
JHOVE2 module identifier	http://jhove2.org/terms/reportable/org/jhove2/module/format/tiff/ TiffModule
JHOVE2 module class	org.jhove2.module.format.icc.TiffModule.java

<i>Format profile</i>	
Canonical format name	Tiff Class B Profile
Alias format name(s)	Baseline bilevel (Class B)
Canonical format	JHOVE2 http://jhove2.org/terms/format/tiff-class-b-profile

identifier	
Alias format Identifier(s)	
JHOVE2 profile name	
	TiffClassBProfile
JHOVE2 profile identifier	http://jhove2.org/terms/reportable/org/jhove2/module/format/tiff/profile/TiffClassBIdentifier
JHOVE2 profile class	org.jhove2.module.format.tiff.profile.TiffClassBProfile.java

Format profile	
Canonical format name	Tiff Class G Profile
Alias format name(s)	Baseline grayscale (Class G)
Canonical format identifier	JHOVE2 http://jhove2.org/terms/format/tiff-class-g-profile
Alias format Identifier(s)	
JHOVE2 profile name	
	TiffClassGProfile
JHOVE2 profile identifier	http://jhove2.org/terms/reportable/org/jhove2/module/format/tiff/profile/TiffClassGIdentifier
JHOVE2 profile class	org.jhove2.module.format.tiff.profile.TiffClassBProfile.java

Format profile	
Canonical format name	Tiff Class P Profile
Alias format name(s)	Baseline pallete-color (Class P)
Canonical format identifier	JHOVE2 http://jhove2.org/terms/format/tiff-class-p-profile
Alias format Identifier(s)	
JHOVE2 profile name	
	TiffClassPProfile
JHOVE2 profile identifier	http://jhove2.org/terms/reportable/org/jhove2/module/format/tiff/profile/TiffClassPIdentifier
JHOVE2 profile class	org.jhove2.module.format.tiff.profile.TiffClassPProfile.java

Format profile	
Canonical format name	Tiff Class R Profile
Alias format name(s)	Baseline RGB (Class R)
Canonical format identifier	JHOVE2 http://jhove2.org/terms/format/tiff-class-r-profile
Alias format Identifier(s)	
JHOVE2 profile name	
JHOVE2 profile identifier	TiffClassRProfile http://jhove2.org/terms/reportable/org/jhove2/module/format/tiff/profile/TiffClassRIdentifier
JHOVE2 profile class	org.jhove2.module.format.tiff.profile.TiffClassRProfile.java

Format profile	
Canonical format name	Tiff Class Y Profile
Alias format name(s)	Extension YCbCr (Class Y)
Canonical format identifier	JHOVE2 http://jhove2.org/terms/format/tiff-class-y-profile
Alias format Identifier(s)	
JHOVE2 profile name	
JHOVE2 profile identifier	TiffClassYProfile http://jhove2.org/terms/reportable/org/jhove2/module/format/tiff/profile/TiffClassYIdentifier
JHOVE2 profile class	org.jhove2.module.format.tiff.profile.TiffClassYProfile.java

Format profile	
Canonical format name	Tiff DLF Profile
Alias format name(s)	
Canonical format identifier	JHOVE2 http://jhove2.org/terms/format/tiff-dlf
Alias format Identifier(s)	
JHOVE2 profile name	
JHOVE2 profile identifier	TiffDLFProfile http://jhove2.org/terms/reportable/org/jhove2/module/format/tiff/profile/

	TiffDLFIdentifier
JHOVE2 profile class	org.jhove2.module.format.tiff.profile.TiffDLFProfile.java

Format profile	
Canonical format name	Tiff DLF BW Profile
Alias format name(s)	DLF Black & White Profile
Canonical format identifier	JHOVE2 http://jhove2.org/terms/format/tiff-dlf-bw
Alias format Identifier(s)	
Format profile	
JHOVE2 profile name	TiffDLFBWProfile
JHOVE2 profile identifier	http://jhove2.org/terms/reportable/org/jhove2/module/format/tiff/profile/TiffDLFBWIdentifier
JHOVE2 profile class	org.jhove2.module.format.tiff.profile.TiffDLFBWProfile.java

Format profile	
Canonical format name	Tiff DLF Color Profile
Alias format name(s)	
Canonical format identifier	JHOVE2 http://jhove2.org/terms/format/tiff-dlf-color
Alias format Identifier(s)	
Format profile	
JHOVE2 profile name	TiffDLFColorProfile
JHOVE2 profile identifier	http://jhove2.org/terms/reportable/org/jhove2/module/format/tiff/profile/TiffDLFColorIdentifier
JHOVE2 profile class	org.jhove2.module.format.tiff.profile.TiffDLFColorProfile.java

Format profile	
Canonical format name	Tiff DLF Grayscale Profile
Alias format name(s)	DLF Grayscale Profile
Canonical format identifier	JHOVE2 http://jhove2.org/terms/format/tiff-dlf-gray

Alias format Identifier(s)	
JHOVE2 profile name	TiffDLFGrayProfile
JHOVE2 profile identifier	http://jhove2.org/terms/reportable/org/jhove2/module/format/tiff/profile/TiffDLFGrayIdentifier
JHOVE2 profile class	org.jhove2.module.format.tiff.profile. TiffDLFGrayProfile.java

<i>Format profile</i>	
Canonical format name	Tiff/EP Profile
Alias format name(s)	
Canonical format identifier	JHOVE2 http://jhove2.org/terms/format/tiff-ep
Alias format Identifier(s)	
JHOVE2 profile name	TiffEPPProfile
JHOVE2 profile identifier	http://jhove2.org/terms/reportable/org/jhove2/module/format/tiff/profile/TiffEPIdentifier
JHOVE2 profile class	org.jhove2.module.format.tiff.profile. TiffEPPProfile.java

<i>Format profile</i>	
Canonical format name	GeoTIFF Profile
Alias format name(s)	
Canonical format identifier	JHOVE2 http://jhove2.org/terms/format/tiff-geo-tiff
Alias format Identifier(s)	
JHOVE2 profile name	TiffGeoTIFFProfile
JHOVE2 profile identifier	http://jhove2.org/terms/reportable/org/jhove2/module/format/tiff/profile/TiffGeoTIFFIdentifier
JHOVE2 profile class	org.jhove2.module.format.tiff.profile. TiffGeoTIFFProfile.java

Format profile	
Canonical format name	Tiff/IT Profile
Alias format name(s)	TIFF/IT Tag Image File Format for Image Technology
Canonical format identifier	JHOVE2 http://jhove2.org/terms/format/tiff-it
Alias format Identifier(s)	
JHOVE2 profile name	
JHOVE2 profile identifier	TiffItProfile http://jhove2.org/terms/reportable/org/jhove2/module/format/tiff/profile/TiffItIdentifier
JHOVE2 profile class	org.jhove2.module.format.tiff.profile. TiffItProfile.java

Format profile	
Canonical format name	Tiff-IT BL Profile
Alias format name(s)	TIFF/IT-BL Binary line-art image data
Canonical format identifier	JHOVE2 http://jhove2.org/terms/format/tiff-it-bl
Alias format Identifier(s)	
JHOVE2 profile name	
JHOVE2 profile identifier	TiffITBLIdentifier http://jhove2.org/terms/reportable/org/jhove2/module/format/tiff/profile/TiffITBLIdentifier
JHOVE2 profile class	org.jhove2.module.format.tiff.profile. TiffBLProfile.java

Format profile	
Canonical format name	Tiff-IT BL P1 Profile
Alias format name(s)	TIFF/IT-BL/P1 Binary Line-art Image Data P1 Conformance
Canonical format identifier	JHOVE2 http://jhove2.org/terms/format/tiff-bl-p1
Alias format Identifier(s)	
JHOVE2 profile name	
JHOVE2 profile identifier	TiffBLP1Identifier http://jhove2.org/terms/reportable/org/jhove2/module/format/tiff/profile/TiffBLP1Identifier

JHOVE2 profile class	org.jhove2.module.format.tiff.profile. TiffBLP1Profiler.java

Format profile	
Canonical format name	Tiff-IT BP Profile
Alias format name(s)	TIFF/IT-BP Binary Picture image data
Canonical format identifier	JHOVE2 http://jhove2.org/terms/format/tiff-bp
Alias format Identifier(s)	
JHOVE2 profile name	TiffBPPProfile
JHOVE2 profile identifier	http://jhove2.org/terms/reportable/org/jhove2/module/format/tiff/profile/TiffBPIdentifier
JHOVE2 profile class	org.jhove2.module.format.tiff.profile. TiffBPPProfile.java

Format profile	
Canonical format name	Tiff-IT BP P1 Profile
Alias format name(s)	TIFF/IT-BP/P1 Binary Picture image data P1 Conformance
Canonical format identifier	JHOVE2 http://jhove2.org/terms/format/tiff-bp-p1
Alias format Identifier(s)	
JHOVE2 profile name	TiffBPP1Profile
JHOVE2 profile identifier	http://jhove2.org/terms/reportable/org/jhove2/module/format/tiff/profile/TiffBPP1Identifier
JHOVE2 profile class	org.jhove2.module.format.tiff.profile. TiffBPP1Profile.java

Format profile	
Canonical format name	Tiff-IT BP P2 Profile
Alias format name(s)	TIFF/IT-CP/P2 Binary Picture image data P2 Conformance
Canonical format identifier	JHOVE2 http://jhove2.org/terms/format/tiff-bp-p2
Alias format Identifier(s)	

JHOVE2 profile name	TiffBPP2Profile
JHOVE2 profile identifier	http://jhove2.org/terms/reportable/org/jhove2/module/format/tiff/profile/TiffBPP2Identifier
JHOVE2 profile class	org.jhove2.module.format.tiff.profile. TiffBPP2Profile.java

Format profile	
Canonical format name	Tiff-IT CT Profile
Alias format name(s)	TIFF/IT-CT Colour continuous-tone picture image data
Canonical format identifier	JHOVE2 http://jhove2.org/terms/format/tiff-ct
Alias format Identifier(s)	
JHOVE2 profile name	TiffCTProfile
JHOVE2 profile identifier	http://jhove2.org/terms/reportable/org/jhove2/module/format/tiff/profile/TiffCTIdentifier
JHOVE2 profile class	org.jhove2.module.format.tiff.profile. TiffCTProfile.java

Format profile	
Canonical format name	Tiff-IT CT P1 Profile
Alias format name(s)	TIFF/IT-CT/P1 Colour continuous-tone picture image data P1 Conformance
Canonical format identifier	JHOVE2 http://jhove2.org/terms/format/tiff-ct-p1
Alias format Identifier(s)	
JHOVE2 profile name	TiffCTP1Profile
JHOVE2 profile identifier	http://jhove2.org/terms/reportable/org/jhove2/module/format/tiff/profile/TiffCTP1Identifier
JHOVE2 profile class	org.jhove2.module.format.tiff.profile. TiffCTP1Profile.java

Format profile	
Canonical format name	Tiff-IT CT P2 Profile
Alias format name(s)	TIFF/IT-CT/P2 Colour continuous-tone picture image data P2 Conformance
Canonical format identifier	JHOVE2 http://jhove2.org/terms/format/tiff-ct-p2
Alias format Identifier(s)	
JHOVE2 profile name	
	TiffCTP2Profile
JHOVE2 profile identifier	http://jhove2.org/terms/reportable/org/jhove2/module/format/tiff/profile/TiffCTP2Identifier
JHOVE2 profile class	org.jhove2.module.format.tiff.profile. TiffCTP2Profile.java

Format profile	
Canonical format name	Tiff-IT FP Profile
Alias format name(s)	TIFF/IT-FP final page data
Canonical format identifier	JHOVE2 http://jhove2.org/terms/format/tiff-fp
Alias format Identifier(s)	
JHOVE2 profile name	
	TiffFPPProfile
JHOVE2 profile identifier	http://jhove2.org/terms/reportable/org/jhove2/module/format/tiff/profile/TiffFPIIdentifier
JHOVE2 profile class	org.jhove2.module.format.tiff.profile. TiffFPPProfile.java

Format profile	
Canonical format name	Tiff-IT FP P1 Profile
Alias format name(s)	TIFF/IT-FP/P1 final page data P1 Conformance
Canonical format identifier	JHOVE2 http://jhove2.org/terms/format/tiff-fp-p1
Alias format Identifier(s)	
JHOVE2 profile name	
	TiffFPP1Profile
JHOVE2 profile identifier	http://jhove2.org/terms/reportable/org/jhove2/module/format/tiff/profile/TiffFPP1Identifier

JHOVE2 profile class	org.jhove2.module.format.tiff.profile. TiffFPP1Profile.java

Format profile	
Canonical format name	Tiff-IT FP P2 Profile
Alias format name(s)	TIFF/IT-FP/P2 final page data P2 Conformance
Canonical format identifier	JHOVE2 http://jhove2.org/terms/format/tiff-fp-p2
Alias format Identifier(s)	
JHOVE2 profile name	TiffFPP2Profile
JHOVE2 profile identifier	http://jhove2.org/terms/reportable/org/jhove2/module/format/tiff/profile/TiffFPP2Identifier
JHOVE2 profile class	org.jhove2.module.format.tiff.profile. TiffFPP2Profile.java

Format profile	
Canonical format name	Tiff-IT HC Profile
Alias format name(s)	TIFF/IT-HC high-resolution continuous-tone image data
Canonical format identifier	JHOVE2 http://jhove2.org/terms/format/tiff-hc
Alias format Identifier(s)	
JHOVE2 profile name	TiffHCProfile
JHOVE2 profile identifier	http://jhove2.org/terms/reportable/org/jhove2/module/format/tiff/profile/TiffHCIdentifier
JHOVE2 profile class	org.jhove2.module.format.tiff.profile. TiffHCProfile.java

Format profile	
Canonical format name	Tiff-IT HC P1 Profile
Alias format name(s)	TIFF/IT-HC /P1 high-resolution continuous-tone image data P1 Conformance
Canonical format identifier	JHOVE2 http://jhove2.org/terms/format/tiff-hc-p1
Alias format Identifier(s)	

JHOVE2 profile name	TiffHCP1Profile
JHOVE2 profile identifier	http://jhove2.org/terms/reportable/org/jhove2/module/format/tiff/profile/TiffHCP1Identifier
JHOVE2 profile class	org.jhove2.module.format.tiff.profile. TiffHCP1Profile.java

Format profile	
Canonical format name	Tiff-IT HC P2 Profile
Alias format name(s)	TIFF/IT –HC/P2 high-resolution continuous-tone image data P2 Conformance
Canonical format identifier	JHOVE2 http://jhove2.org/terms/format/tiff-hc-p2
Alias format Identifier(s)	
JHOVE2 profile name	TiffHCP2Profile
JHOVE2 profile identifier	http://jhove2.org/terms/reportable/org/jhove2/module/format/tiff/profile/TiffHCP2Identifier
JHOVE2 profile class	org.jhove2.module.format.tiff.profile. TiffHCP2Profile.java

Format profile	
Canonical format name	Tiff-IT LW Profile
Alias format name(s)	TIFF/IT-LW Color line-art image data
Canonical format identifier	JHOVE2 http://jhove2.org/terms/format/tiff-lw
Alias format Identifier(s)	
JHOVE2 profile name	TiffLWProfile
JHOVE2 profile identifier	http://jhove2.org/terms/reportable/org/jhove2/module/format/tiff/profile/TiffLWIdentifier
JHOVE2 profile class	org.jhove2.module.format.tiff.profile. TiffLWProfile.java

Format profile	
Canonical format name	Tiff-IT LW P1 Profile

Alias format name(s)	TIFF/IT-LW/P1 Color line-art image data P1 Conformance
Canonical format identifier	JHOVE2 http://jhove2.org/terms/format/tiff-lw-p1
Alias format Identifier(s)	
JHOVE2 profile name	TiffLWP1Profile
JHOVE2 profile identifier	http://jhove2.org/terms/reportable/org/jhove2/module/format/tiff/profile/TiffLWP1Identifier
JHOVE2 profile class	org.jhove2.module.format.tiff.profile. TiffLWP1Profile.java

<i>Format profile</i>	
Canonical format name	Tiff-IT LW P2 Profile
Alias format name(s)	TIFF/IT-LW/P2 Color line-art image data P2 Conformance
Canonical format identifier	JHOVE2 http://jhove2.org/terms/format/tiff-lw-p2
Alias format Identifier(s)	
JHOVE2 profile name	TiffLWP2Profile
JHOVE2 profile identifier	http://jhove2.org/terms/reportable/org/jhove2/module/format/tiff/profile/TiffLWP2Identifier
JHOVE2 profile class	org.jhove2.module.format.tiff.profile. TiffLWP2Profile.java

<i>Format profile</i>	
Canonical format name	Tiff-IT MP Profile
Alias format name(s)	TIFF/IT-MP Monochrome continuous-tone picture image data
Canonical format identifier	JHOVE2 http://jhove2.org/terms/format/tiff-mp
Alias format Identifier(s)	
JHOVE2 profile name	TiffMPPProfile
JHOVE2 profile identifier	http://jhove2.org/terms/reportable/org/jhove2/module/format/tiff/profile/TiffMPPIdentifier
JHOVE2 profile class	org.jhove2.module.format.tiff.profile. TiffMPPProfile.java

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Format profile	
Canonical format name	Tiff-IT MP P1 Profile
Alias format name(s)	TIFF/IT-MP/P1 Monochrome continuous-tone picture image data P1 Conformance
Canonical format identifier	JHOVE2 http://jhove2.org/terms/format/tiff-mp-p1
Alias format Identifier(s)	
JHOVE2 profile name	TiffMPP1Profile
JHOVE2 profile identifier	http://jhove2.org/terms/reportable/org/jhove2/module/format/tiff/profile/TiffMPP1Identifier
JHOVE2 profile class	org.jhove2.module.format.tiff.profile. TiffMPP1Profile.java

Format profile	
Canonical format name	Tiff-IT MP P2 Profile
Alias format name(s)	TIFF/IT-MP/P2 Monochrome continuous-tone picture image data P2 Conformance
Canonical format identifier	JHOVE2 http://jhove2.org/terms/format/tiff-mp-p2
Alias format Identifier(s)	
JHOVE2 profile name	TiffMPP2Profile
JHOVE2 profile identifier	http://jhove2.org/terms/reportable/org/jhove2/module/format/tiff/profile/TiffMPP2Identifier
JHOVE2 profile class	org.jhove2.module.format.tiff.profile. TiffMPP2Profile.java

Format profile	
Canonical format name	Tiff-IT SD Profile
Alias format name(s)	TIFF/IT-SD screened data image data
Canonical format identifier	JHOVE2 http://jhove2.org/terms/format/tiff-sd
Alias format Identifier(s)	

JHOVE2 profile name	TiffSDProfile
JHOVE2 profile identifier	http://jhove2.org/terms/reportable/org/jhove2/module/format/tiff/profile/ TiffSDIdentifier
JHOVE2 profile class	org.jhove2.module.format.tiff.profile. TiffSDProfile.java

Format profile	
Canonical format name	Tiff-IT SD P2 Profile
Alias format name(s)	TIFF/IT-SD/P2 screened data image data P2 Conformance
Canonical format identifier	JHOVE2 http://jhove2.org/terms/format/tiff-sd-p2
Alias format Identifier(s)	
JHOVE2 profile name	TiffDSDP2Profile
JHOVE2 profile identifier	http://jhove2.org/terms/reportable/org/jhove2/module/format/tiff/profile/ TiffSDP2Identifier
JHOVE2 profile class	org.jhove2.module.format.tiff.profile. TiffSDP2Profile.java

3 References

For the purposes of the JHOVE2 TIFF module the authoritative specification is:

- [TIFF6] Adobe Systems, Inc., *TIFF Revision 6.0*, Final – June 3, 1992,
<http://partners.adobe.com/public/developer/en/tiff/TIFF6.pdf>
- [TTN1] Adobe PageMaker 6.0 *TIFF Technical Notes*, Sept. 14, 1995,
<http://partners.adobe.com/public/developer/en/tiff/TIFFPM6.pdf>
- [TTN2] Draft TIFF Technical Note 2, *Replacement TIFF/JPEG specification*, March 17, 1995,
<ftp://ftp.uu.net/graphics/jpeg/>

The following TIFF specifications are considered informative:

- [TIFF5] Aldus/Microsoft , *Tiff 5.0*, *Aldus/Microsoft Technical Memorandum*, August 8, 1988,
<http://cool.conservation-us.org/bytopic/imaging/std/tiff5.html>
- [TIFF4] Aldus/Microsoft , *Tag Image File Format 4.0*, April 31,1987,
<http://www.martinreddy.net/gfx/2d/TIFF-4.txt>

For purposes of the TIFF/EP profile the authoritative format specification is:

[TIFF/EP] ISO 12234-2:2001. *Electronic still-picture imaging – Removable memory – Part 2: TIFF/EP image data format*

For purposes of the TIFF/IT profile the authoritative format specification is:

[TIFF/IT] ISO 12639:2004. *Graphic Technology – Prepress digital data exchange – Tag image file format for image technology (TIFF/IT)*

For purposes of the Digital Negative (DNG) profile the authoritative format specification is:

[DNG1] Adobe Systems, Inc. *Digital Negative (DNG) Specification*, Version 1.0.0.0 -September 2004

[DNG2] Adobe Systems, Inc. *Digital Negative (DNG) Specification*, Version 1.3.0.0 -June 2009, http://www.adobe.com/products/dng/pdfs/dng_spec.pdf

[DLF] DLF *Benchmark for Faithful Digital Reproductions of Monographs and Serials*, Version 1, December 2002

[GEOTIFF] Niles Ritter and Mike Ruth, *GeoTIFF Format Specification: GeoTIFF Revision 1.0*, Version 1.8.2, December 28, 2000

[CLASSF] Cygnet Technologies, Inc., *TIFF-F Revised Specifications: The Spirit of TIFF Class F*, April 29, 1990

[RFC2306] G. Parsons and Rafferty, J., *Tag Image File Format (TIFF) - F Profile for Facsimile*, RFC 2306, March 1998

[RFC1314] A. Katz and D. Cohen, *A File Format for the Exchange of Images in the Internet*, RFC 1314, April 1992

For purposes of the **TIFF/FX profile** the authoritative format specification is:

[TIFF-FX1] TIFF for Internet Fax, RFC2301 – File Format for Internet Fax - March 1998
<http://www.ietf.org/rfc/rfc2301.txt>.

[TIFF-FX2] TIFF for Fax eXtended, RFC3949 – File Format for Internet Fax - February 2005
<http://www.fags.org/rfcs/rfc3949.html>.

[TIFF-EXIF1] Digital Still Camera Image File Format Standard (Exchangeable image file format for Digital Still cameras: Exif) Version 2.1, June 1998

[TIFF-EXIF2] Digital Still Camera Image File Format Standard (Exchangeable image file format for Digital Still cameras: Exif) Version 2.2, April 2002

4 Terminology and conventions

- IFD Image file directory
- IFH Image file header
- SPP Samples per pixel
- BPS BitsPerSample

5 Validity

A valid TIFF file must pass the following validation checks:

- Header with 0x4D4D002A (if big-endian) or 0x49492A00 (if little-endian) at offset 0
- At least one IFD
- All IFD offsets are 16-bit word aligned
- All IFDs have at least one entry
- All IFD entries are sorted in ascending order by tag number
- All IFD entries specify the correct type and count
- All value offsets are 16-bit word aligned
- All value offsets and their associated data block files need to exist within the boundaries of the TIFF file size
- TIFF Date Validation – ISO 8601 uses colon (:) not hyphen (-) in date format.
- The final IFD is followed by an offset of 0

6 Format profiles

The TIFF Module recognizes and validates the following public profiles:

- TIFF version 4.0, 5.0, and 6.0 [TIFF4, TIFF5, TIFF6]
- Baseline 6.0 Profiles [TIFF6]
 - bilevel (Class B)
 - grayscale (Class G)
 - palette-color (Class P)
 - RGB (Class R)
- 6.0 extension YCbCr (Class Y)
- TIFF/IT [TIFF/IT], including file types:
 - CT, LW, HC, MP, BP, BL, and FP, and conformance levels P1 and P2
- TIFF/EP [TIFF/EP]
- DLF Benchmark for Faithful Digital Reproductions of Monographs and Serials
- GeoTIFF 1.0 [GEOTIFF]
- Class F [CLASSF, RFC2306]
- RFC 1314 [RFC1314]

6.1 TIFF 4.0

A TIFF file is assumed to be version 4.0 until otherwise determined to be of a later version.

6.2 TIFF 5.0

The presence of the following tags indicates version 5.0:

- Artist (315)
- ColorMap (320)
- DateTime (306)
- HostComputer (316)
- NewSubfileType (254)
- Predictor (317)
- PrimaryChromaticities (319)
- Software (305)
- WhitePoint (318)
- PhotometricInterpretation (262) value of 3 (Palette color) or 4 (Transparency mask)
- Compression (259) value of 5 (LZW)

6.3 TIFF 6.0

The presence of the data type 6 (SBYTE), 7 (UNDEFINED), 8 (SSHORT), 9 (SLONG), 10 (SRATIONAL), 11 (FLOAT), or 12 (DOUBLE) indicate version 6.0.

The PhotometricInterpretation (262) tag is mandatory.

The presence of the following tags indicates version 6.0:

- Copyright
- DotRange (336)
- Extra Samples (338)
- HalftonHints (321)
- InkNames (333)
- InkSet (332)
- JPEGACTables (521)
- JPEGDCTables (520)
- JPEGInterchangeFormat (513)
- JPEGInterchangeFormatLength (514)
- JPEGLosslessPredictors (517)
- JPEGPointTransforms (518)
- JPEGProc (512)
- JPEGRestartInterval (515)
- JPEGQTables (519)
- NumberOfInks (334)
- ReferenceBlackWhite (532)
- SampleFormat (339)

- SMinSampleValue (340)
- SMaxSampleValue (341)
- TargetPrinter (337)
- TileLength (323)
- TileOffsets (324)
- TileWidth (322)
- TileByteCounts (325)
- TransferRange (342)
- YCbCrCoefficients (529)
- YCbCrPositioning (531)
- YCbCrSubSampling (530)
- Compression (259) value of 6 (JPEG)
- PhotometricInterpretation (262) value of 5 (CMYK), 6 (YCbCr), or 8 (CIE L*a*b*).

6.4 Baseline 6 Profiles

All baseline profiles are defined in [TIFF6].

- **Baseline bilevel (Class B)**

The bilevel profile is for black and white images. The following tags are mandatory and must have values as indicated:

Tag Name	Tag Number	Value
ImageWidth	256	
ImageLength	257	
Compression	259	1, 2, or 32773
PhotometricInterpretation	262	0 or 1
StripOffsets	273	
RowsPerStrip	278	
StripByteCounts	279	
XResolution	282	
YResolution	283	
ResolutionUnit	296	1, 2, or 3

- **Baseline grayscale (Class G)**

The grayscale profile is for grayscale images. The following tags are mandatory and must have values as indicated:

Tag Name	Tag Number	Value
ImageWidth	256	
ImageLength	257	

BitsPerSample	258	4 or 8
Compression	259	1 or 32773
PhotometricInterpretation	262	0 or 1
StripOffsets	273	
RowsPerStrip	278	
StripByteCounts	279	
XResolution	282	
YResolution	283	
ResolutionUnit	296	1, 2, or 3

- **Baseline palette-color (Class P)**

The palette-color profile is for images using a color map. The following tags are mandatory and must have values as indicated:

Tag Name	Tag Number	Value
ImageWidth	256	
ImageLength	257	
BitsPerSample	258	4 or 8
Compression	259	1 or 32773
PhotometricInterpretation	262	3
StripOffsets	273	
RowsPerStrip	278	
StripByteCounts	279	
XResolution	282	
YResolution	283	
ResolutionUnit	296	1, 2, or 3
ColorMap	320	

- **Baseline RGB (Class R)**

The RGB profile is for full-color RGB images.. The following tags are mandatory and must have values as indicated:

Tag Name	Tag Number	Value
ImageWidth	256	
ImageLength	257	
BitsPerSample	258	8,8, 8
Compression	259	1 or 32773
PhotometricInterpretation	262	2
StripOffsets	273	
SamplesPerPixel	277	>= 3

RowsPerStrip	278	
StripByteCounts	279	
XResolution	282	
YResolution	283	
ResolutionUnit	296	1, 2, or 3

6.5 Extension Profiles

All extension profiles are defined in [TIFF6]

- **Extension YCbCr (Class Y)**

The YCbCr profile is for images using the YCbCr color space. The following tags are mandatory and must have values as indicated:

Tag Name	Tag Number	Value
ImageWidth	256	
ImageLength	257	
BitsPerSample	258	8,8, 8
Compression	259	1, 5, or 6
PhotometricInterpretation	262	6
StripOffsets	273	
SamplesPerPixel	277	3
RowsPerStrip	278	
StripByteCounts	279	
XResolution	282	
YResolution	283	
ResolutionUnit	296	1, 2, or 3
ReferenceBlackWhite	532	

6.6 TIFF/IT

The TIFF/IT profile is for images used in pre-press data exchange [TIFF/IT].

Profiles are defined for file types (each at conformance levels full, P1 or P2):

- BL (binary line art), BP (binary picture),
- CT (color continuous tone),
- FP (final page)
- HC (high resolution continuous tone),
- LW (color line art), and
- MP (monochrome continuous tone)

For the specific values required for each profile see the TIFF/IT specification [TIFF/IT].

6.7 TIFF/EP

The TIFF/EP profile is for images created by digital camera [TIFF/EP]. The following tags are mandatory and must have values as indicated:

Tag Name	Tag Number	Value
NewSubFileType	254	0 or 1
ImageWidth	256	
ImageLength	257	
BitsPerSample	258	8,8, 8
Compression	259	1, 7, or > 32767
PhotometricInterpretation	262	1, 2, 6, or 32803 or > 32767
Make	271	
Model	272	
Orientation	274	1, 3, 6, 8, or 9
XResolution	282	
YResolution	283	
Planar Configuration	284	1 or 2
ResolutionUnit	296	1, 2, or 3
Software	305	
DateTime	306	
YCbCrCoefficients	529	defined if PhotometricInterpretation = 6
YCbCrSubSampling	530	defined if PhotometricInterpretation = 6
YCbCrPositioning	531	defined if PhotometricInterpretation = 6
ReferenceBlackWhite	532	defined if PhotometricInterpretation = 6
CFARRepeatPatternDim	33421	defined if PhotometricInterpretation = 32803
CFAPattern	33422	defined if PhotometricInterpretation = 32803
Copyright	33432	
DateTimeOriginal	36867	
TIFF/EPStandardID	37398	1,0,0,0
SensingMethod	37399	0, 1, 2, 3, 4, 5, 6, 7, or 8

Depending on whether stripped or tile organization is used, the following fields must be defined:

- StripOffsets (273), RowsPerStrip (278), and StripByteCounts (279); or
- TileWidth (322), TileLength (323), TileOffsets (324), and TileByteCounts (325)

6.8 DLF Benchmark for Faithful Digital Reproductions of Monographs and Serials

The DLF benchmarks [DLF] define the minimum characteristics for effective digital reproduction of monograph and serial pages.

- **Black and White**

The DLF black and white benchmark requires lossless compression, one 1-bit sample value per pixel, and a minimum resolution. The following tags are mandatory and must have values as indicated:

Tag Name	Tag Number	Value
BitsPerSample	258	1
Compression	259	1 (none) or 4 (T.6/Group 4)
PhotometricInterpretation	262	0 or 1
SamplesPerPixel	277	1
XResolution	282	>= 600 (in) or 1520 (cm)
YResolution	283	>= 600 (in) or 1520 (cm)

- **Grayscale**

The DLF grayscale benchmark requires lossless compression, one 8-bit sample value per pixel, and a minimum resolution. The following tags are mandatory and must have values as indicated:

Tag Name	Tag Number	Value
BitsPerSample	258	8
Compression	259	1 (none), 5 (LZW), 32773 (PackBits RLE)
PhotometricInterpretation	262	0 or 1
SamplesPerPixel	277	1
XResolution	282	>= 300 (in) or 760 (cm)
YResolution	283	>= 300 (in) or 760 (cm)

- **Color**

The DLF color benchmark requires lossless compression, three 8-bit sample values per pixel, and a minimum resolution. The following tags are mandatory and must have values as indicated:

Tag Name	Tag Number	Value
BitsPerSample	258	8, 8, 8
Compression	259	1 (none), 5 (LZW), 32773 (PackBits RLE)
PhotometricInterpretation	262	2 (RGB) or 6 (YCbCr)
SamplesPerPixel	277	3

XResolution	282	>= 300 (in) or 760 (cm)
YResolution	283	>= 300 (in) or 760 (cm)

6.9 GeoTiff

GeoTIFF defines an industry-standard tagset for the management of geo-referenced or geo-coded raster imagery [GeoTIFF]. The following tags are mandatory:

Tag Name	Tag Number	Value
PhotometricInterpretation	262	
GeoKeyDirectoryTag	34735	

6.10 Class F

TIFF Class F [Class F, RFC 2306] is a sub-class of Class B defined for representing CCITT Group 3 (G3) facsimile images. The MIME type for this profile is reported as: `image/ief`. The following tags are mandatory:

Tag Name	Tag Number	Value
NewSubFileType	254	2
ImageWidth	256	1728, 2048 2432, 2592, 3072, 3648, 3456, 4096, 4864
ImageLength	257	
BitsPerSample	258	1
Compression	259	3 or 4
PhotometricInterpretation	262	0 or 1
FillOrder	266	1 or 2
StripOffsets	273	
SamplesPerPixel	277	1
RowsPerStrip	278	
StripByteCounts	279	
XResolution	282	204, 200, 300, 400, 408 (inches)
YResolution	283	98, 196, 100, 200, 300, 391, 400 (inches)
Group3Options	292	0, 1, 4 or 5 (iff compression = 3)
Group4Options	293	2 (iff compression = 4)
ResolutionUnit	296	2 or 3
PageNumber	297	

Note: ImageWidths of 1728, 2048, and 2432 are permitted only if the X and YResolution is 204x98, 204x196, 204x391, 200x100, or 200x200.

ImageWidths of 2592, 3072, and 3648 are permitted only if the X and YResolution is 300x300.

ImageWidths of 3456, 4096, and 4864 are permitted only if the X and YResolution is 408x391 or 400x400.

6.11 RFC 1314

RFC 1314 [RFC 1314] is a sub-type of Class B proposed as a standard for representing FAX-like black and white images within the Internet. The following tags are mandatory:

Tag Name	Tag Number	Value
NewSubFileType	254	
ImageWidth	256	
ImageLength	257	
BitsPerSample	258	1
Compression	259	3 or 4
PhotometricInterpretation	262	0 or 1
StripOffsets	273	
SamplesPerPixel	277	1
RowsPerStrip	278	
StripByteCounts	279	
XResolution	282	
XResolution	283	
ResolutionUnit	296	2 or 3

7 Reportable Properties

Note that any particular reportable property may not be found in the JHOVE2 output if:

- Its value is null or uninitialized.
- Its value does not meet the visibility requirement of the property displayer directive. Displayer directives are specified in the “`config/properties/module/display/displayer/org/module/format/tiff`” directory hierarchy

7.1 TiffModule class

The following properties are reported regarding the entire TIFF Module class.

ByteOffsetNotWordAlignedMessage Message	
Identifier	http://jhove2.org/terms/message/org/jhove2/module/format/tiff/TiffModule/ByteOffsetNotWordAlignedMessage
Type	java.util.List<org.jhove2.core.Message>
Description	Byte Offset Not Word Aligned Message.
Reference	

Coverage Property	
Identifier	http://jhove2.org/terms/property/org/jhove2/module/format/Validator/Coverage
Type	org.jhove2.module.format.Validator.Coverage
Description	Format module validation coverage.
Reference	

Developers Property	
Identifier	http://jhove2.org/terms/property/org/jhove2/module/Module/Developers
Type	java.util.List<org.jhove2.core.Agent>
Description	Module developers.
Reference	

FailFast Message	
Identifier	http://jhove2.org/terms/message/org/jhove2/module/format/tiff/TiffModule/FailFast
Type	org.jhove2.core.Message
Description	Fail fast message.
Reference	

Format Property	
Identifier	http://jhove2.org/terms/property/org/jhove2/module/format/FormatModule/Format
Type	org.jhove2.core.format.Format
Description	Format module format.
Reference	

IFDs Property	
Identifier	http://jhove2.org/terms/property/org/jhove2/module/format/tiff/TiffModule/IFDs
Type	java.util.List<org.jhove2.module.format.tiff.IFD>
Description	IFDs.
Reference	

IFH Property	
Identifier	http://jhove2.org/terms/property/org/jhove2/module/format/tiff/TiffModule/IFH
Type	org.jhove2.module.format.tiff.IFH
Description	IFH
Reference	

InvalidFieldMessage Message	
Identifier	http://jhove2.org/terms/message/org/jhove2/module/format/tiff/TiffModule/InvalidFieldMessage
Type	java.util.List<org.jhove2.core.Message>
Description	Invalid Field Message.
Reference	

InvalidFirstTwoBytesMessage Message	
Identifier	http://jhove2.org/terms/message/org/jhove2/module/format/tiff/TiffModule/InvalidFirstTwoBytesMessage
Type	java.util.List<org.jhove2.core.Message>
Description	Invalid First Two Bytes Message.
Reference	

InvalidMagicNumberMessage Message	
Identifier	http://jhove2.org/terms/message/org/jhove2/module/format/tiff/TiffModule/InvalidMagicNumberMessage
Type	java.util.List<org.jhove2.core.Message>
Description	Invalid Magic Number Message.
Reference	

isValid Property	
Identifier	http://jhove2.org/terms/property/org/jhove2/module/format/Validator/isValid
Type	org.jhove2.module.format.Validator.Validity
Description	Validation status.
Reference	

ModuleDoesNotImplementValidatorInterfaceMessage Message	
Identifier	http://jhove2.org/terms/message/org/jhove2/module/format/BaseFormatModule/ModuleDoesNotImplementValidatorInterfaceMessage
Type	org.jhove2.core.Message
Description	Module does not implement the Validator interface message.
Reference	

ModuleNotFormatModuleMessage Message	
Identifier	http://jhove2.org/terms/message/org/jhove2/module/format/BaseFormatModule/ModuleNotFormatModuleMessage
Type	org.jhove2.core.Message
Description	Module is not format module.
Reference	

ModuleNotFoundMessage Message	
Identifier	http://jhove2.org/terms/message/org/jhove2/module/format/BaseFormatModule/ModuleNotFoundMessage
Type	org.jhove2.core.Message
Description	Format module not found message.
Reference	

Note Property	
Identifier	http://jhove2.org/terms/property/org/jhove2/module/Module/Note
Type	java.lang.String
Description	Module informative note.
Reference	

PrematureEOFMessage Message	
Identifier	http://jhove2.org/terms/message/org/jhove2/module/format/tiff/TiffModule/PrematureEOFMessage
Type	java.util.List<org.jhove2.core.Message>
Description	Premature EOF Message.
Reference	

Profiles Property	
Identifier	http://jhove2.org/terms/property/org/jhove2/module/format/FormatModule/Profiles
Type	java.util.List<org.jhove2.module.format.FormatProfile>
Description	Format modules format profiles.
Reference	

ReleaseDate Property	
Identifier	http://jhove2.org/terms/property/org/jhove2/module/Module/ReleaseDate
Type	java.lang.String
Description	Module release date.
Reference	

ReportableName Property	
Identifier	http://jhove2.org/terms/property/org/jhove2/core/reportable/Reportable/ReportableName
Type	java.lang.String
Description	Reportable name
Reference	

RightsStatement Property	
Identifier	http://jhove2.org/terms/property/org/jhove2/module/Module/RightsStatement
Type	java.lang.String
Description	Module rights statement.
Reference	

Scope Property	
Identifier	http://jhove2.org/terms/property/org/jhove2/module/Module/Scope
Type	org.jhove2.module.Module.Scope
Description	Module scope: generic or specific (to a source unit).
Reference	

TiffVersion Property	
Identifier	http://jhove2.org/terms/property/org/jhove2/module/format/tiff/TiffModule/TiffVersion
Type	int
Description	TIFF version.
Reference	

TimerInfo Property	
Identifier	http://jhove2.org/terms/property/org/jhove2/module/Module/TimerInfo
Type	org.jhove2.core.TimerInfo
Description	Timer info for this module.
Reference	

Version Property	
Identifier	http://jhove2.org/terms/property/org/jhove2/module/Module/Version
Type	java.lang.String
Description	Module version identifier.
Reference	

WrappedProduct Property	
Identifier	http://jhove2.org/terms/property/org/jhove2/module/Module/WrappedProduct
Type	org.jhove2.core.WrappedProduct
Description	External product wrapped by the module.
Reference	

7.2 IFH class

The following properties are reported regarding the entire IFH class.

ByteOffset Property	
Identifier	http://jhove2.org/terms/property/org/jhove2/module/format/tiff/IFH/ByteOffset
Type	long
Description	Byte offset of IFH.
Reference	

ByteOrdering Property	
Identifier	http://jhove2.org/terms/property/org/jhove2/module/format/tiff/IFH/ByteOrdering
Type	java.lang.String
Description	IFH byte order.
Reference	

FirstIFD Property	
Identifier	http://jhove2.org/terms/property/org/jhove2/module/format/tiff/IFH/FirstIFD
Type	long
Description	Offset of first IFD.
Reference	

MagicNumber Property	
Identifier	http://jhove2.org/terms/property/org/jhove2/module/format/tiff/IFH/MagicNumber
Type	int
Description	IFH magic number.
Reference	

xxx Property/Message	
Identifier	http://jhove2.org/...org.jhove2.module.format.tiff.IFH.firstIFD
Type	...
Description	...
Reference	

7.2 IFDEntry Class

ByteOffsetNotWordAlignedMessage Message	
Identifier	http://jhove2.org/terms/message/org/jhove2/module/format/tiff/IFDEntry/ByteOffsetNotWordAlignedMessage
Type	org.jhove2.core.Message
Description	Byte offset not word aligned message.
Reference	

Compression_descriptive Property	
Identifier	http://jhove2.org/terms/property/org/jhove2/module/format/tiff/IFDEntry/Compression_descriptive
Type	java.lang.String
Description	Compression Scheme in descriptive form.
Reference	

Count Property	
Identifier	http://jhove2.org/terms/property/org/jhove2/module/format/tiff/IFDEntry/Count
Type	long
Description	Entry cardinality, number of values.
Reference	

InvalidCountValueMessage Message	
Identifier	http://jhove2.org/terms/message/org/jhove2/module/format/tiff/IFDEntry/InvalidCountValueMessage
Type	org.jhove2.core.Message
Description	Invalid Count Value Message.
Reference	

InvalidDateTimeFormatMessage Message	
Identifier	http://jhove2.org/terms/message/org/jhove2/module/format/tiff/IFDEntry/InvalidDateTimeFormatMessage
Type	org.jhove2.core.Message
Description	Invalid Date Time Format Message.
Reference	

InvalidDateTimeMessage Message	
Identifier	http://jhove2.org/terms/message/org/jhove2/module/format/tiff/IFDEntry/InvalidDateTimeMessage
Type	org.jhove2.core.Message
Description	Invalid Date Time Message.
Reference	

isValid Property	
Identifier	http://jhove2.org/terms/property/org/jhove2/module/format/tiff/IFDEntry/isValid
Type	org.jhove2.module.format.Validator.Validity
Description	IFDEntry validity.
Reference	

Name Property	
Identifier	http://jhove2.org/terms/property/org/jhove2/module/format/tiff/IFDEntry/Name
Type	java.lang.String
Description	Entry tag name.
Reference	

ReportableName Property	
Identifier	http://jhove2.org/terms/property/org/jhove2/core/reportable/Reportable/ReportableName
Type	java.lang.String
Description	Reportable name
Reference	

Tag Property	
Identifier	http://jhove2.org/terms/property/org/jhove2/module/format/tiff/IFDEntry/Tag
Type	int
Description	Entry tag.
Reference	

TagSortOrderErrorMessage Message	
Identifier	http://jhove2.org/terms/message/org/jhove2/module/format/tiff/IFDEntry/TagSortOrderErrorMessage
Type	org.jhove2.core.Message
Description	tag sort order error message.
Reference	

TiffType Property	
Identifier	http://jhove2.org/terms/property/org/jhove2/module/format/tiff/IFDEntry/TiffType
Type	org.jhove2.module.format.tiff.TiffType
Description	Tag type.
Reference	

TileLengthNotMultipleOf16Message Message	
Identifier	http://jhove2.org/terms/message/org/jhove2/module/format/tiff/IFDEntry/TileLengthNotMultipleOf16Message
Type	org.jhove2.core.Message
Description	TileLength not multiple of 16 message.
Reference	

TileWidthNotMultipleOf16Message Message	
Identifier	http://jhove2.org/terms/message/org/jhove2/module/format/tiff/IFDEntry/TileWidthNotMultipleOf16Message
Type	org.jhove2.core.Message
Description	TileWidth not multiple of 16 message.
Reference	

Type Property	
Identifier	http://jhove2.org/terms/property/org/jhove2/module/format/tiff/IFDEntry/Type
Type	long
Description	Tag type.
Reference	

TypeMismatchMessage Message	
Identifier	http://jhove2.org/terms/message/org/jhove2/module/format/tiff/IFDEntry/TypeMismatchMessage
Type	org.jhove2.core.Message
Description	type mismatch message.
Reference	

UnknownTagMessage Message	
Identifier	http://jhove2.org/terms/message/org/jhove2/module/format/tiff/IFDEntry/UnknownTagMessage
Type	org.jhove2.core.Message
Description	unknown tag message.
Reference	

UnknownTypeMessages Message	
Identifier	http://jhove2.org/terms/message/org/jhove2/module/format/tiff/IFDEntry/UnknownTypeMessages
Type	java.util.List<org.jhove2.core.Message>
Description	Unknown Type Message.
Reference	

Value Property	
Identifier	http://jhove2.org/terms/property/org/jhove2/module/format/tiff/IFDEntry/Value
Type	java.lang.Object
Description	Tiff Tag Value.
Reference	

ValueOffset Property	
Identifier	http://jhove2.org/terms/property/org/jhove2/module/format/tiff/IFDEntry/ValueOffset
Type	long
Description	Entry value/offset.
Reference	

ValueOffsetReferenceLocationFileMessage Message	
Identifier	http://jhove2.org/terms/message/org/jhove2/module/format/tiff/IFDEntry/ValueOffsetReferenceLocationFileMessage
Type	org.jhove2.core.Message
Description	value offset reference location file message.
Reference	

7.3 IFD Class

IFDEntries Property	
Identifier	http://jhove2.org/terms/property/org/jhove2/module/format/tiff/IFD/IFDEntries
Type	java.util.List<org.jhove2.module.format.tiff.IFDEntry>
Description	IFD entries.
Reference	

NextIFD Property	
Identifier	http://jhove2.org/terms/property/org/jhove2/module/format/tiff/IFD/NextIFD
Type	long
Description	Offset of next IFD.
Reference	

NumEntries Property	
Identifier	http://jhove2.org/terms/property/org/jhove2/module/format/tiff/IFD/NumEntries
Type	int
Description	Number of IFD entries.
Reference	

Offset Property	
Identifier	http://jhove2.org/terms/property/org/jhove2/module/format/tiff/IFD/Offset
Type	long
Description	Byte offset of IFD.
Reference	

ReportableName Property	
Identifier	http://jhove2.org/terms/property/org/jhove2/core/reportable/Reportable/ReportableName
Type	java.lang.String
Description	Reportable name
Reference	

ZeroIFDEntriesMessage Message	
Identifier	http://jhove2.org/terms/message/org/jhove2/module/format/tiff/IFD/ZeroIFDEntriesMessage
Type	org.jhove2.core.Message
Description	Zero IFD Entries message.
Reference	

8 Configuration

The TIFF module relies on few configuration files to define TIFF tags, various property values and signatures. Having these values defined in external files provides for future extensibility without code-level changes.

All configuration files are structured as Java properties files and are found in the configuration directory `“config/properties/module/format/tiff”`.

<i>File</i>	<i>Values</i>	<i>Reference</i>
compression.properties	Compression scheme used on the image data	[TIFF6, TTN1, TTN2, TIFF-FX]
orientation.properties	Orientation of the image with respect to the rows and columns	[TIFF6, TIFF-EXIF1]
photometric.properties	Color space of the image data	[TIFF6, TIFF-FX1]

tifftags.properties	Tag attributes such as code, name, data type, count and default value	[TIFF6, DNG1]
---------------------	---	---------------

Each line in a Java properties files defines a name/value pair and has the general form:

name: value

Colons (" : "), meaningful spaces (" "), and non-printing characters in property names *must* be escaped in order for the file to be parsed correctly, e.g. "\ :", "\ ", "\000" (the NUL character, 0x00).

In the TIFF module properties files the name is a value following by its associated description text. For example:

1 = No compression

In the tifftags.properties file the tag information is stored for each defined tag following this syntax:

Tag:Name|Type[,Type...]|Cardinality|DefaultValue||

The Cardinality, Default Value and Version values are optional but a space must be left to note its absence. For tags which can be of more than one type, you may specify multiple types separated by commas. For example:

13:GPSSpeed|Rational|1||
273:StripOffsets|Short,Long|SPI|"None,MBS"

9 Implementation Notes

The TIFF Module parse method first exams and validates the Image File Header. Using the value offset to the 0th IFD. The IFD contains the number of IFD Entries, followed by a sequence of 12-byte field entries, followed by the offset to the next IFD. Each IFD must have at least one IFD Entry. The TiffModule reads the number of IFD Entries and parses each IFD Entry. During the parse of the IFD Entry, the tag value, tag type, tag count, and the value or value/offset are read for each IFD Entry.

The IFD Entry is validated and the value(s) for each tag entry is read from the TIFF File. Further validation may be performed for certain tags, feature extraction of particular reportable properties, such as TIFF version may be performed, or unique processing can occur such as creating and characterizing a new ByteStream Source for embedded file formats.

Post parsing will occur after IFD Entry validation which will extract and store particular tag values to be used in profile validation.

After parsing the entire TIFF File, the TIFF module is validated against the configured TIFF profiles to determine if the TIFF file meets that profile requirements. If not, it is considered invalid for that particular TIFF Profile.

The classes used to extract features from the TIFF file are:

- IFH – validates and reports Image File Header reportable properties
- IFD – validates and reports IFD reportable properties on each IFD.
- IFDEntry – validates and reports Image File Directory Entry reportable properties
- TiffIFD – validates and reports TIFF Versions 6.0 IFD Reportable Properties