

TIFF Metadata Recommended Elements and Format

Tagged Image File Format (TIFF) is a tag-based file format for the storage and interchange of raster images. It serves as a wrapper for a variety of encoded bit-mapped images, and is a popular format to serve as a sustainable master in cultural heritage digital imaging. TIFF was designed to be cross platform (Windows, Macintosh, UNIX, etc), backward compatible and, whenever possible, forward compatible. The most recent version of TIFF is 6.0, published in 1992. Adobe Systems controls the TIFF specification.

Metadata is an essential component of the TIFF format (many TIFF images dating back to the 1980s still can be displayed in modern TIFF readers through the interpretation of the tagged metadata set). The tag set is extensible through a system of “private tags” and a framework for new complete systems of tags. The Aware Systems [TIFF Tag Reference](#) lists 36 “Baseline” tags, 60 “Extension” tags, 74 “Private” tags, plus a set of 58 Exif tags standardized by the Japan Electronics and Information Technology Industries Association (JEITA), a large group of camera manufactures. Other large extension sets of tags have been developed for GPS, GeoReference, and medical informatics purposes, as well as for Adobe’s Digital Negative (DNG) specification.

While the tag system has been extremely successful, the proliferation of tags and tag sets complicates metadata extraction; most TIFF programs only locate and display the baseline, extension, and a few private tags. Only the Exif tag system is widely supported. A second difficulty is that the extracted data is difficult to use or store because of the different data types for the various tagged fields and the lack of any systematic data structures and formats.

One response to these TIFF metadata issues has been the development and adoption of Adobe’s XMP (Extensible Metadata Platform.) XMP extracts all standardized TIFF metadata and converts it to RDF-based XML. Dublin Core and IPTC (International Press Telecommunications) description sets, the Exif technical set, and any other formally defined metadata sets are also structured into RDF XML and the entire metadata package is embedded in a single TIFF tagged field.

The TIFF tag guideline submitted by the Still Image Working group represents a minimal set of recommended embedded metadata for historical and cultural heritage digital imaging. This is presented as an interim guideline. A new recommended guideline encompassing a richer metadata set in a more flexible format, with wider file format support, is expected to be developed by the [Embedded Metadata Sub-group](#).

Suggested Minimal TIFF Tag Set (draft)

Metadata Set	Tag or identifier	Name	Description	Sample Values	Note
TIF	256	ImageWidth	The number of pixels per row	3616	Typical scanner
	257	ImageLength	The number of rows of pixels in the image	4418	Typical
	258	BitsPerSample	Number of bits per component	8 8 8 8	Grayscale 24-bit color
	259	Compression	Compression scheme used on image data	1 = Uncompressed 4 = CCITT Group 4	
	277	SamplesPerPixel	The number of components per pixel	1 3	Grayscale 24-bit RGB color
	282	Xresolution	Horizontal pixel count per resolution unit (inches, centimeters)	2400000/10000	240 ppi: Rational data type - 240 pp(unit) is often displayed this way
	283	Yresolution	Vertical pixel count per resolution unit (inches, centimeters)	629145600/2097152	300 ppi: see above
	296	ResolutionUnit	Unit of measurement for X and Y Resolution (inches, centimeters)	1 2 3	None: pixel is irregularly shaped Inches Centimeters
	306	DateTime	Date and Time image was scanned	2008:07:23 17:45:21	Note the space between the date and time and the use of the 24 hour clock.
	315	Artist	Used for ImageProducer	Library of Congress; Datatrac	Image referenced: Institution; Contractor Document referenced: Document author
<i>One and/or both of these tags below shall be incorporated into the dataset:</i>					
	269	DocumentName	Document Name	path/filename	Image referenced: Constructed to uniquely identify the file Document referenced: Document title
	42016	ImageUniqueID	A unique file identifier	Uuid:01AF8BA45...	ASCII 128-bit UUID
<i>Additional tags are encouraged but not required by this standard.</i>					

Notes on Additional Metadata

Metadata Set	Tag or identifier	Name	Description	Sample Values	Note
Tiff tag, baseline	271	Make	The scanner manufacturer	Sinar	Simple ASCII text string
Tiff tag, baseline	272	Model	The scanner model name or number	54H	Simple ASCII text string
Tiff tag, baseline	305	Software	Name and version of the software package(s) used to create the image	Stokes Software Inc. IWS - Version 02.04.01.01	Simple ASCII text string
Tiff tag, baseline	33432	Copyright	Copyright notice	John Smith, 20xx. All rights reserved	
Exif	34665	Exif IFD	Pointer to collection of all Exif Metadata. Exif uses <i>field names</i> rather than tags to indicate the field content.	Scanners and cameras automatically capture and place significant technical metadata in Exif fields. Some software may duplicate <i>some, but not all</i> , Exif metadata into TIFF tags.	
Exif	40961	ColorSpace	sRGB specification	1 65535	sRGB uncalibrated
IPTC	33723	IPTC	IPTC metadata – descriptive		This does not have a tag series as Exif does. Data is usually written in BYTE format.
DC		Dublin Core	Descriptive metadata		Dublin Core data does not have a TIFF Tag location but may be written into XMP.
ICC	34675	ICC Profile	Color profile data		Undefined data type
XMP	700	XMP	Comprehensive metadata set	XML packet. Adobe products support “File Info” forms for Exif, IPTC, DC, and user defined metadata, which may be stored in the corresponding metadata fields and tags and in XMP.	