

PmtMetadataKeysForTIFF

Version 1.0, February 10, 2004

Authors:

**Katherine Miller-Mullins,
Robert Reisch and
Daniel Rupe
Eastman Kodak Company
343 State Street
Rochester, NY 14650 USA**

1 Introduction to PmtMetadataKeysForTIFF

The PmtMetadataKeysForTIFF document provides information about PMT metadata keys. This document is actually a combination of two other documents, or sections. Each section is discussed below.

2 Metadata Keys

The first section is the **Metadata Keys** section. The Metadata Keys section is a table of all the PMT metadata keys that are associated with the TIFF file format. Each row in the table provides helpful information associated with a particular metadata key. (If you are unfamiliar with the concept of metadata keys, please refer to the document entitled **PmtUserGuide.pdf**, which is available in the **doc** directory of a PMT distribution. PMT is available for download at: <http://www.sourceforge.net/projects/picturemetadata>.)

2.1 Columns in the Metadata Keys

The following paragraphs discuss the meanings of the columns in the Metadata Keys Section. The **C++** column is very important. Using the proper value from it ensures that a C++ application successfully manages the values in its PmtMetadata objects - it is discussed more below. Other columns may or may not be useful to you, depending on what it is you're doing. Specifically, the **TIFFFieldName**, **TIFFTag**, and **IFD#** columns will be useful if you know what metadata you want to use from a TIFF perspective. However, if you want to determine the metadata to use from the **Metadata Definition** column, the TIFF-specific columns of information will probably not be needed. If you are new to using metadata, or are not familiar with the TIFF file format, it is suggested that you ignore the TIFF-specific columns, and rely primarily on the other columns in the table, especially the **Metadata Definition** column.

The first column, the **MetadataName** column, contains the name of the metadata key as used in PMT. Specifically, the metadata key listed in the MetadataName column can be used in PMT's PmtMetadata class interface with methods such as **getMetadatum(...)**, **getMetadata(...)**, and **deleteMetadata(...)**. Please note the **MetadataName** column is sometimes preceded by a numeric footnote reference. Consult the footnotes at the end of the Metadata Keys Section for important additional information pertaining to the metadata object. It is imperative that footnote instructions are adhered to, to help keep metadata valid. Certain metadata objects currently have particular restrictions of use, or should not be used at all. Future changes in restriction of use are planned to be communicated in the **ReleaseNote.txt** file in the PMT distribution and/or in updates to this document.

The **Metadata Definition** column contains a definition, or an English description, of the key. This column can be particularly useful in determining which metadata items to use in your application. This column also contains other pertinent information associated

with a metadata item, such as its valid values. Invalid values should not be placed into a `PmtMetadata` object. (Placing values into, or reading values from `PmtMetadata` objects is discussed in **PmtUserGuide.pdf**)

The **C++ Type** column indicates the C++ type that's to be used for the key's associated `PmtMetadataT<TYPE>` object. That is, it shows the C++ template type that the `PmtMetadataT<TYPE>` object has been instantiated as. Specifically, when using dynamic casting in C++ with a `PmtMetadataT<TYPE>` object, in order to work with a `PmtMetadata` object's value, (via the `value()` methods), make sure you use the appropriate C++ Type. (Examples of working with values with dynamic casting and the `value()` methods can be seen in the **PmtUserGuide.pdf** file, and in the test programs distributed with PMT.)

The **PMT Type Table Index** is a number that refers to an entry in the second section of this document, the **PMT Type Table Section**. The PMT Type Table Index maps the metadata keys to an entry in the PMT Type Table. The details of the PMT Type Table are discussed below.

The **TIFFFieldName** column contains the TIFF field name, as used in the F Specification. The TIFF 6.0 Specification is available for web browsing at: <http://partners.adobe.com:80/asn/developer/pdfs/tn/TIFF6.pdf>.

The **TIFFTag** column contains the TIFF tag number, as used in the TIFF 6.0 Specification.

The **IFD#** indicates which TIFF IFD the metadata key is located in within a TIFF file.

3 PMT Type Table

The PMT Type Table Section is another table that gives multiple mappings of metadata type information. Most users will probably not need to be concerned with this table. If you are uninterested in additional TIFF-specific types, XML Schema types, or the types used by PMT in its implementation, then you can skip over the PMT Type Table Section.

However, for those interested in more type detail specific to TIFF, XML Schema, or PMT's implementation, this table may prove useful. For example, if you want to create your own XML Schema to extend PMT's capabilities, and/or want to write an additional `PmtAccessor` to support another file format, then understanding how PMT works with the various types for the currently supported binary image file formats (Exif and TIFF) can be helpful.

Please refer to the PMT Type Table Section for more.

Intentionally left blank

MetadataName	Metadata Definition	C++ Type	PMT Type Table Index	TIFFFieldName	TIFFTag	IFD#
CaptureConditions.Aperture	The unit of lens aperture. is the APEX (Additive System of Photographic Exposure) value.	float	8	ApertureValue	37378	IFD_MAIN
CaptureConditions.BatteryLevel	This metadata object preferably encodes the camera's battery level as a ratio of fullness at the time of image capture. For example, a full battery level is indicated by 1/1, half-full battery by 1/2, etc. Alternately, an ASCII string describing the battery level is allowed.	float	8	BatteryLevel	33423	IFD_MAIN
CaptureConditions.Brightness	The unit of brightness is the APEX value. Ordinarily it is given in the range of -99.99 to 99.99.	float	10	BrightnessValue	37379	IFD_MAIN
CaptureConditions.ExposureBias	The unit of exposure Bias is the APEX value. Ordinarily it is given in the range of -99.99 to 99.99.	float	10	ExposureBiasValue	37380	IFD_MAIN
4 CaptureConditions.ExposureIndex	The exposure index selected on the camera or input device at the time the image is captured.	float	8	ExposureIndex	37397	IFD_MAIN
CaptureConditions.ExposureProgram	Defines the class of the program used by the camera to set exposure when the picture is taken. The values are defined as follows: 0 = Not defined 1 = Manual 2 = Normal program 3 = Aperture priority 4 = Shutter priority 5 = Creative program (biased toward depth of field) 6 = Action program (biased toward fast shutter speed) 7 = Portrait mode (for closeup photos with the background out of focus) 8 = Landscape mode (for landscape photos with the background in focus) 9 to 255 = reserved	unsigned char	3	ExposureProgram	34850	IFD_MAIN
CaptureConditions.ExposureTime	Exposure time, given in seconds.	float	8	ExposureTime	33434	IFD_MAIN
5 CaptureConditions.Flash.Energy	Indicates the strobe energy at the time the image is captured, as measured in Beam Candle Power Seconds (BCPS).	float	8	FlashEnergy	37387	IFD_MAIN
5 CaptureConditions.Flash.Fired	Indicates that the camera activated the flash system.					
CaptureConditions.Flash.Flash	The 8 bit flash field has the following definition: 0x00 = Flash did not fire. 0x01 = Flash fired. 0x05 = Strobe return light not detected. 0x07 = Strobe return light detected. 0x0D = Flash fired, compulsory flash mode, return light not detected. 0x0F = Flash fired, compulsory flash mode, return light detected 0x10 = Flash did not fire, compulsory flash mode 0x18 = Flash did not fire, auto mode 0x19 = Flash fired, auto mode 0x1D = Flash fired, auto mode, return light not detected 0x1F = Flash fired, auto mode, return light detected 0x20 = No flash function 0x41 = Flash fired, red-eye reduction mode 0x45 = Flash fired, red-eye reduction mode, return light not detected 0x47 = Flash fired, red-eye reduction mode, return light detected 0x49 = Flash fired, compulsory flash mode, red-eye reduction mode 0x4D = Flash fired, compulsory flash mode, red-eye reduction mode, return light not detected 0x4F = Flash fired, compulsory flash mode, red-eye reduction mode, return light detected 0x59.H = Flash fired, auto mode, red-eye reduction mode 0x5D.H = Flash fired, auto mode, return light not detected, red-eye reduction mode 0x5F.H = Flash fired, auto mode, return light detected, red-eye reduction mode Other = reserved	unsigned char	3	Flash	37385	IFD_MAIN

MetadataName	Metadata Definition	C++ Type	PMT Type Table Index	TIFFFieldName	TIFFTag	IFD#
CaptureConditions.Fnumber	The F number.	float	8	FNumber	33437	IFD_MAIN
CaptureConditions.FocalLength	The actual focal length of the lens, in mm. Conversion is not made to the focal length of a 35 mm film camera.	float	8	FocalLength	37386	IFD_MAIN
CaptureConditions.ImageNumber	This metadata object encodes the number assigned to an image. This tag is useful when storing a burst of images which are "chained" together within the same TIFF/EP file.	unsigned long	7	ImageNumber	37393	IFD_MAIN
CaptureConditions.LightSource	The light source, defined as follows: 0 = unknown 1 = Daylight 2 = Fluorescent 3 = Tungsten (incandescent light) 4 = Flash 9 = Fine weather 10 = Cloudy weather 11 = Shade 12 = Daylight fluorescent (D 5700 – 7100K) 13 = Day white fluorescent (N 4600 – 5400K) 14 = Cool white fluorescent (W 3900 – 4500K) 15 = White fluorescent (WW 3200 – 3700K) 17 = Standard light A 18 = Standard light B 19 = Standard light C 20 = D55 21 = D65 22 = D75 23 = D50 24 = ISO studio tungsten 255 = other light source Other = reserved	unsigned char	3	LightSource	37384	IFD_MAIN
CaptureConditions.Magnification	Magnification is the ratio of the focal length divided by the subject distance	float	8	Magnification	50023	IFD_MAIN
CaptureConditions.MaxAperture	The smallest F number of the lens is the APEX value.	float	8	MaxApertureValue	37381	IFD_MAIN
CaptureConditions.MeteringMode	The metering mode, defined as follows: 0 = unknown 1 = Average 2 = CenterWeightedAverage 3 = Spot 4 = MultiSpot 5 = Pattern 6 = Partial 7 to 254 = reserved, 255 = other	unsigned char	3	MeteringMode	37383	IFD_MAIN
CaptureConditions.PAR	PAR, PrintAspectRatio, defines the desired print format of the current image. The PAR Flag has the following enumeration: 0 = the complete image area is displayed 1 = APS Print, H print (~16:9) 2 = APS Print, P print (~3:1) 3 = APS Print, C print (~3:2)	unsigned char	3	IntendedPrintArea	50002	IFD_EXIF
CaptureConditions.PrintQuantity	This field stores the number of prints requested for this image	unsigned short	6	PrintQuantity	50284	IFD_MAIN
CaptureConditions.SecurityClassification	This metadata object encodes the level of security classification assigned to the image. The tag value can either be a single ASCII character or an ASCII string.	string	4	SecurityClassification	37394	IFD_MAIN
CaptureConditions.SelfTimerMode	This metadata object encodes the number of seconds image capture was delayed from the time the "take picture button" was pressed by the camera operator. If the value is zero, this implies that the self-timer is off.	unsigned short	6	SelfTimerMode	34859	IFD_MAIN
CaptureConditions.ShutterSpeed	The unit of shutter speed. is the APEX (Additive System of Photographic Exposure) setting.	float	8	ShutterSpeedValue	37377	IFD_MAIN
CaptureConditions.SubjectDistance	The distance to the subject in meters.	float	10	SubjectDistance	37382	IFD_MAIN
CaptureDevice.CameraOwner.CameraOwner	A character string that identifies the name of the camera owner. Photographer or image creator.	string	4	Artist	315	IFD_MAIN
CaptureDevice.CameraOwner.EK	A character string that identifies the name of the camera owner. Photographer or image creator.	vector<unsigned char>	11	cameraOwnerID	50003	IFD_EXIF

MetadataName	Metadata Definition	C++ Type	PMT Type Table Index	TIFFFieldName	TIFFTag	IFD#
⁴ CaptureDevice.CFAPattern	CFAPattern indicates the color filter array (CFA) geometric pattern of the image sensor when a one-chip color area sensor is used.	vector<unsigned char>	12	CFAPattern	33422	IFD_MAIN
CaptureDevice.CFARepeatPatternDim	This metadata object encodes the number of pixels horizontally and vertically that are needed to uniquely define the repeat pattern of the color filter array (CFA) pattern used in the color image sensor. It is mandatory when PhotometricInterpretation = 32803, and there are no defaults allowed. It is optional when PhotometricInterpretation = 2 or 6 and SensingMethod = 2, where it can be used to indicate the original sensor sampling positions..	vector<unsigned short>	14	CFARepeatPatternDim	33421	IFD_MAIN
CaptureDevice.FID	This field contains a string which records information from the photo finisher that is used to identify an order. In the case of Advanced Photo System film, the FID will be written; for other film, the lab will use its own discretion.	vector<unsigned char>	11	OrderID	50007	IFD_MAIN
CaptureDevice.FilmCategory	FilmCategory defines the category of the film used. FilmCategory vales are defined as follows: 0 = Unidentified 1 = Negative B&W 2 = Negative Color 3 = Negative B&W 4 = Reversal Color 5 - 255 = Reserved	unsigned char	3	FilmCategory	50010	IFD_EXIF
CaptureDevice.FilmGencode	FilmGencode defines the film gencode.	string	4	FilmGencode	50011	IFD_EXIF
CaptureDevice.FilmProductCode	FilmProductCode defines the film product code	string	4	FilmProductCode	50000	IFD_EXIF
CaptureDevice.FilmSize	FilmSize defines the size of the film. Valid values : 0 = 135 (35mm) 1 = 124(APS) 2 - 254 = Reserved 255 = Unidentified	unsigned char	3	FilmSize	50013	IFD_EXIF
⁴ CaptureDevice.FocalPlaneResolutionUnit	Indicates the unit for measuring FocalPlaneXResolution and FocalPlaneYResolution. This value is the same as the ResolutionUnit. The values are defined as follows: 2 = inches 3 = centimeters, Others = reserved	unsigned char	3	FocalPlaneResolutionUnit	37392	IFD_MAIN
⁴ CaptureDevice.FocalPlaneResolutionUnit	Indicates the unit for measuring FocalPlaneXResolution and FocalPlaneYResolution. This value is the same as the ResolutionUnit. The values are defined as follows: 2 = inches 3 = centimeters, Others = reserved	unsigned char	3	FocalPlaneResolutionUnit	41488	IFD_EXIF
⁴ CaptureDevice.FocalPlaneXResolution	Indicates the number of pixels in the image width (X) direction per FocalPlaneResolutionUnit on the image device focal plane.	float	8	FocalPlaneXResolution	37390	IFD_MAIN
⁴ CaptureDevice.FocalPlaneXResolution	Indicates the number of pixels in the image width (X) direction per FocalPlaneResolutionUnit on the image device focal plane.	float	8	FocalPlaneXResolution	41486	IFD_EXIF
⁴ CaptureDevice.FocalPlaneYResolution	Indicates the number of pixels in the image height (Y) direction per FocalPlaneResolutionUnit on the image device focal plane.	float	8	FocalPlaneYResolution	41487	IFD_EXIF
⁴ CaptureDevice.FocalPlaneYResolution	Indicates the number of pixels in the image height (Y) direction per FocalPlaneResolutionUnit on the image device focal plane.	float	8	FocalPlaneYResolution	37391	IFD_MAIN
CaptureDevice.HostComputer	The computer and/or operating system in use at the time of image creation.	string	4	HostComputer	316	IFD_MAIN

MetadataName	Metadata Definition	C++ Type	PMT Type Table Index	TIFFFieldName	TIFFTag	IFD#
CaptureDevice.Interlace	This metadata object indicates the field number of multi-field images. The tag allows for both simple vertical interlace of between 2 and 255 interlace fields per frame, and for 2-dimensional interlace of up to 127 vertical x 127 horizontal spatial offset locations per frame. Another application of this interlace mechanism is to store images for progressive transmission. For 2:1 vertical interlace, as employed in many video systems, the first field (lines 1, 3, 5 from the frame image) is indicated with a tag value = 1, and the second field is indicated with a tag value = 2. For 2- dimensional interlace, the 7 least significant bits of the value indicate the vertical field number, and the next 7 bits indicate the horizontal field number. To store multiple interlace fields in one TIFF/EP file, the different fields shall use the IFD chaining mechanism.	unsigned short	6	Interlace	34857	IFD_MAIN
CaptureDevice.ISOSpeedRating	Indicates the ISO Speed and ISO Latitude of the camera or input device as specified in ISO 12232xiii.	unsigned short	6	ISOSpeedRatings	34855	IFD_MAIN
CaptureDevice.Make	The manufacturer of the recording equipment. This is the manufacturer of the DSC, scanner, video digitizer or other equipment that generated the image. When the field is left blank, it is treated as unknown.	string	4	Make	271	IFD_MAIN
CaptureDevice.MakerNotes	A character string that identifies from a manufacturers perspective, any desired information about the image writer or capture device.	vector<unsigned char>	11	MakerNote	37500	IFD_EXIF
CaptureDevice.Model	The model name or model number of the equipment. This is the model name of number of the DSC, scanner, video digitizer or other equipment that generated the image. When the field is left blank, it is treated as unknown.	string	4	Model	272	IFD_MAIN
CaptureDevice.NativePhysicalResolutionUnit	Indicates the unit for measuring NativePhysicalXResolution and NativePhysicalYResolution.	unsigned short	6	NativePhysicalResolutionUnit	50042	IFD_MAIN
CaptureDevice.NativePhysicalXResolution	Indicates the number of pixel sensors in the X direction per the NativePhysicalResolutionUnit on the image sensor focal plane.	float	8	NativePhysicalXResolution	50028	IFD_MAIN
CaptureDevice.NativePhysicalYResolution	Indicates the number of pixel sensors in the Y direction per the NativePhysicalResolutionUnit on the image sensor focal plane.	float	8	NativePhysicalYResolution	50029	IFD_MAIN
CaptureDevice.Noise	This metadata object encodes camera noise measurement values.	vector<unsigned char>	11	Noise	37389	IFD_MAIN
CaptureDevice.OECF	OECF the "Opto-Electronic Conversion Function" is the relationship between the optical input and the image file code value output of an electronic camera. It is expressed as a vector of floats. The first element m and subsequent elements m+4 is the Log Exposure (where m is equal to or greater then1). The second element n and subsequent elements n+4 is the RED output level (where n is equal to or greater than 2). The third element o and subsequent elements o+4 is the GREEN output level (where o is equal to or greater than 3). The fourth element is p and subsequent elements p+4 is the BLUE output level (where p is equal to or greater than 4).	vector<unsigned char>	11	OECF	34856	IFD_MAIN
CaptureDevice.Scanner.ModelAndVersion	A character string that identifies the model of the camera equipment. A character string that identifies the name and version of the scanner firmware that created the digital image file or raw sensor image data	string	4	ScannerSoftware	50012	IFD_MAIN

MetadataName	Metadata Definition	C++ Type	PMT Type Table Index	TIFFFieldName	TIFFTag	IFD#
⁴ CaptureDevice.SensingMethod	The image sensor type on the camera or input image device. The defined values are as follows: 1 = Not defined 2 = One-chip color area sensor 3 = Two-chip color area sensor 4 = Three-chip color area sensor 5 = Color sequential area sensor 7 = Trilinear sensor 8 = Color sequential linear sensor, Other = reserved	unsigned char	3	SensingMethod	37399	IFD_MAIN
⁴ CaptureDevice.SensingMethod	The image sensor type on the camera or input image device. The defined values are as follows: 1 = Not defined 2 = One-chip color area sensor 3 = Two-chip color area sensor 4 = Three-chip color area sensor 5 = Color sequential area sensor 7 = Trilinear sensor 8 = Color sequential linear sensor, Other = reserved	unsigned char	3	SensingMethod	41495	IFD_EXIF
CaptureDevice.SerialNumber.Camera	A character string that identifies the serial number of the camera	vector<unsigned char>	11	CameraSerialNum	50004	IFD_EXIF
CaptureDevice.Software	This metadata object records the name and version of the software or firmware of the camera or image input device used to generate the image. The detailed format is not specified, but it is recommended that the example shown below be followed. When the field is left blank, it is treated as unknown.	string	4	Software	305	IFD_MAIN
⁴ CaptureDevice.SpatialFrequencyResponse	The spatial frequency response(SFR) of a camera or image capture device as defined in ISO/TC42/WG18 work item [188] Working Draft 6.0, "Photography -Electronic Still Picture Cameras - Resolution Measurement" is represented as a vector of floats. The first element m and subsequent elements m+3 is the Spatial Frequency of the line widths per picture height(where m is greater than or equal to 1). The second element n and subsequent elements n+3 is the Horizontal SFR(where n is equal to or greater then 2). The third element o and subsequent elements o+3 is the Vertical SFR(where o is equal to or greater then 3). A non value entry will be identified by a -1.0.	vector<unsigned char>	11	SpatialFrequencyResponse	37388	IFD_MAIN
⁴ CaptureDevice.SpatialFrequencyResponse	The spatial frequency response(SFR) of a camera or image capture device as defined in ISO/TC42/WG18 work item [188] Working Draft 6.0, "Photography -Electronic Still Picture Cameras - Resolution Measurement" is represented as a vector of floats. The first element m and subsequent elements m+3 is the Spatial Frequency of the line widths per picture height(where m is greater than or equal to 1). The second element n and subsequent elements n+3 is the Horizontal SFR(where n is equal to or greater then 2). The third element o and subsequent elements o+3 is the Vertical SFR(where o is equal to or greater then 3). A non value entry will be identified by a -1.0.	vector<unsigned char>	11	SpatialFrequencyResponse	41484	IFD_EXIF
CaptureDevice.SpectralSensitivity	Indicates the spectral sensitivity of each channel of the camera used. The tag value is an ASCII string compatible with the standard developed by the ASTM Technical committee.	string	4	SpectralSensitivity	34852	IFD_MAIN
DigitalProcess.CellLength	The length of the dithering or halftoning matrix used to create a dithered or halftoned bilevel file.	unsigned short	6	CellLength	265	IFD_MAIN
DigitalProcess.CellWidth	The width of the dithering or halftoning matrix used to create a dithered or halftoned bilevel file.Tag = 264 (108.H)	unsigned short	6	CellWidth	264	IFD_MAIN

MetadataName	Metadata Definition	C++ Type	PMT Type Table Index	TIFFFieldName	TIFFTag	IFD#
DigitalProcess.EnhancementPathUtilized	This field indicates the Enhancement path used to create the primary image data stored within the file. The values of this field are enumerated as follows: 0 = Ansel Locked Beam for Digital and Color Negative Paths 1 = Ansel Enhanced for Digital and Color Negative Paths 2 = Ansel Balance Digital Path and Optical Color Negative Path 3 = Ansel Premium for Digital and Color Negative Paths 4 = EasyShare Shasta 5 = EasyShare Custom 6 = Restoration 7 = Auto Enhance; 4 - 65535 are reserved for future path definitions.	unsigned short	6	EnhancementPathUtilized	50287	IFD_MAIN
DigitalProcess.EnhancementPathVersionNumber	This field contains a string that records the version number of the enhancement path specified in the EnhancementPathUtilized tag (tag ID 50287) used to create the primary image data stored within this file. Example version numbers are "3.5b2", "3.6" and "4.0".	string	4	EnhancementPathVersionNumber	50027	IFD_MAIN
DigitalProcess.HalftoneHints	The purpose of the HalftoneHints field is to convey to the halftone function the range of gray levels within a colorimetrically-specified image that should retain tonal detail. The field contains two values of sixteen bits each and, therefore, is contained wholly within the field itself; no offset is required. The first word specifies the highlight gray level which should be halftoned at the lightest printable tint of the final output device. The second word specifies the shadow gray level which should be halftoned at the darkest printable tint of the final output device. Portions of the image which are whiter than the highlight gray level will quickly, if not immediately, fade to specular highlights. There is no default value specified, since the highlight and shadow gray levels are a function of the subject matter of a particular image. Appropriate values may be derived algorithmically or may be specified by the user, either directly or indirectly. The HalftoneHints field, as defined here, defines an achromatic function. It can be used just as effectively with color images as with monochrome images. When used with opponent color spaces such as CIE L*a*b* or YCbCr, it refers to the achromatic component only; L* in the case of CIELab, and Y in the case of YCbCr. When used with tri-stimulus spaces such as RGB, it suggests to retain tonal detail for all colors with an NTSC gray component within the bounds of the R=G=B=Highlight to R=G=B=Shadow range.	vector<unsigned short>	14	HalftoneHints	321	IFD_MAIN

MetadataName	Metadata Definition	C++ Type	PMT Type Table Index	TIFFFieldName	TIFFTag	IFD#
DigitalProcess.History.EditTagArray	From the Picture CD Appendix C specification: The Edit Tags are designed to help manage the maintenance issues associated with metadata as different operations that modify or edit an image are applied. The array contains a summary of the edit operations and therefore only one occurrence of each defined edit functions will be stored in the array. The values of the array are enumerated in the following manner: 1. Digital image created 2. Image cropped 3. Image rotated 4. Global tone/ color adjustment applied. e. g., color balance, contrast adjust, density adjust, etc. 5. Global spatial adjustment applied e. g., sharpening, extreme compression , substantial subsampling, blur, noise suppression, etc. 6. Image retouched e. g., redeye, scratch removal 7. Pixels edited extensively, significantly changing the captured scene content. e. g., object removal, image warping or morphing operations 8. Image composited with another image or background, or graphics and/ or text added 9. Regional tone/ color adjustment applied. e. g., digital "dodge & burn" operation, selective color adjustment, etc. 0, 10 - 65535 Reserved for future edit functional definitions	vector<unsigned short>	14	EditTagArray	50022	IFD_MAIN
DigitalProcess.History.SBAExposureRecord	SBAExposureRecord field contains the complete exposure record from the SBA algorithm. The purpose of this field is for use by the creation system in diagnostics mode. The count is the number of bytes in the data stream.If this information is available to the creation system this field shall be written, otherwise this field shall be omitted.	vector<unsigned char>	11	CompleteExposureRecord	50017	IFD_EXIF
DigitalProcess.History.SBAInputImageBitDepth	SBAInputImageBitDepth field indicates the bit depth of each channel of the RGB input image to the SBA algorithm. The first value is the bit depth of the red channel, the second value is the bit depth of the green channel, and the third value is the bit depth of the blue channel. If the creation system applied SBA adjustments to the primary image this field shall be written, otherwise this field shall be omitted.	vector<unsigned short>	14	SBAInputChannelDepth	50016	IFD_EXIF
DigitalProcess.History.SBAInputImageColor space	SBAInputImageColorspace defines the colorspace used as an input to the SBA. Defined vales are: 0 = Uncalibrated 1 = RIM 2 = ROM 3 = RPD 4= RLSE Others = reserved	unsigned short	6	SBAInputColorspace	50015	IFD_EXIF
DigitalProcess.History.SBARGBShifts	SBARGBShifts contains the scene balance shifts that were calculated by the SBA algorithm. The actual definition of the recorded shifts is dependent upon the color space of the input image to the SBA algorithm. It is assumed that the input image to the SBA is three channel and it's composition is an RGB representation. The first value of this field is the SBA shift for the Red channel, the second value is the SBA shift for the Green channel, and the third value if for the Green channel. If the input image color space is reference printing densities (RPD), then the SBA_RGB_Shifts field is defined as reference printing densities * 1000.	vector<long>	18	SBARGBShifts	50014	IFD_EXIF
DigitalProcess.History.UserAdjSBARGBShifts	UserAdjSBARGBShifts field contains the SBA shifts that were determined via user feedback while viewing (i.e. operator at the scan service) the image. It will be assumed that the image was viewed in a "SRGB" colorspace. The shifts are represented in pixel code values. The first value in the field is the shift for the red channel, the second value is the shift for the green channel, and the third value is the shift for the blue channel.	vector<long>	18	UserAdjSBARGBShifts	50018	IFD_EXIF

MetadataName	Metadata Definition	C++ Type	PMT Type Table Index	TIFFFieldName	TIFFTag	IFD#
DigitalProcess.ICCProfile	This metadata object encodes an embedded InterColor device profile relating to the camera color characterization.	vector<unsigned char>	11	InterColorProfile	34675	IFD_MAIN
³ DigitalProcess.ImageFileChangeDateTime	The date and time of the last change that has been made to the image file. The format is "YYYY:MM:DD HH:MM:SS.TH" with time shown in 24-hour format including fractions of a second, and the date and time separated by one blank character [20.H]. When the date and time are unknown, all the character spaces except colons (":") may be filled with blank characters, or else the entire field may be filled with blank characters. The character string length is 20 bytes including NULL for termination. When the field is left blank, it is treated as unknown. Note, at file creation this value is identical to ImageFileCreationDateTime.	string	4	DateTime	306	IFD_MAIN
³ DigitalProcess.ImageFileCreationDateTime	The date and time when the image was stored as a digital file. The format is "YYYY:MM:DD HH:MM:SS.TH" with time shown in 24-hour format including fractions of a second, and the date and time separated by one blank character [20.H]. When the date and time are unknown, all the character spaces except colons (":") may be filled with blank characters, or else the entire field may be filled with blank characters. The character string length is 20 bytes including NULL for termination. When the field is left blank, it is treated as unknown.	string	4	DateTimeDigitized	36868	IFD_EXIF
DigitalProcess.ImagePrintStatus	ImageRotationStatus field indicates the print status of the image as detected by the system that created the image. Defined values: 0 = Image may be printed, no detected problems 1 = Image not suitable for printing, REASON 2 = Image not suitable for printing, REASON 3 = Image not suitable for printing, REASON 4 = Image not suitable for printing, REASON 5 - 255 = Reserved	unsigned char	2	ImagePrintStatus	50286	IFD_MAIN
DigitalProcess.ImageRotationStatus	ImageRotationStatus field indicates what triggered the system to rotate the image from the orientation of the original scan. Defined values: 0 = mage not rotated 1 = rotated based off of user input (i. e. Scan operator) 2 = rotated based off of customer direction 3 = rotated based off of algorithm input 4 - 254 = Reserved 255 =	unsigned char	3	ImageRotationStatus	50019	IFD_EXIF
DigitalProcess.ImageSource	The image source indicating the source of the image. The values defined are as follows: 0 =unidentified 1 =film scanner 2 =reflection print scanner 3 =digital still camera 4 =still from video 5 =computer graphics Others = reserved	unsigned char	2	FileSource	41728	IFD_EXIF
DigitalProcess.ImageSourceEK	The image source indicating the source of the image. The values defined are as follows: 0 = unidentified 1 = film scanner 2 = reflection print scanner 3 = digital still camera 4 = still from video 5 = computer graphics Others = reserved	unsigned short	6	ImageSource	50001	IFD_EXIF
DigitalProcess.RollGuid	RollGuid is a unique identifier for a roll of film that was assigned during the digitization process. Further definition is TBD	vector<unsigned char>	11	RollGuid	50020	IFD_EXIF
DigitalProcess.ScanFrameSequenceNumber	This field contains the sequence number of the frame as it was scanned. For APS scans, this field will contain the frame number that is decoded from the latent image barcode.	unsigned short	6	ScanFramSeqNum	50009	IFD_MAIN

MetadataName	Metadata Definition	C++ Type	PMT Type Table Index	TIFFFieldName	TIFFTag	IFD#
DigitalProcess.Thresholding	For black and white TIFF files that represent shades of gray, the technique used to convert from gray to black and white pixels. 1 = No dithering or halftoning has been applied to the image data. 2 = An ordered dither or halftone technique has been applied to the image data. 3 = A randomized process such as error diffusion has been applied to the image data. Default is Thresholding = 1. See also CellWidth, CellLength.	unsigned short	6	Threshholding	263	IFD_MAIN
ImageContainer.ActualImageHeight	The compressed image height applies to compressed images and represents the valid height of the meaningful image. An uncompressed image will have no value for this field.	unsigned long	7	PixelYDimension	40963	IFD_EXIF
ImageContainer.ActualImageWidth	The compressed image width applies to compressed images and represents the valid width of the meaningful image. An uncompressed image will have no value for this field.	unsigned long	7	PixelXDimension	40962	IFD_EXIF
ImageContainer.BitsPerSample	The number of bits per image component(pixel).	vector<unsigned short>	14	BitsPerSample	258	IFD_MAIN
ImageContainer.ColorSpaceInformation	The color space information records the color space specified.	unsigned short	6	ColorSpace	40961	IFD_EXIF
ImageContainer.ComponentsConfiguration	The compressed image data channels of each component are arranged in order from the 1st component to the 4th. For uncompressed data, the data arrangement is given in the PhotometricInterpretation.	vector<unsigned char>	11	ComponentsConfiguration	37121	IFD_EXIF
ImageContainer.CompressedBitsPerPixel	The compressed image compression mode indicated in unit bits per pixel.	float	8	CompressedBitsPerPixel	37122	IFD_MAIN
ImageContainer.Compression	The compression scheme used for the image data.	unsigned short	6	Compression	259	IFD_MAIN
ImageContainer.DisplayResolutionUnit	The unit for measuring Xresolution and Yresolution. The values are defined as follows: 2 = inches 3 = centimeters Others = reserved	unsigned char	3	ResolutionUnit	296	IFD_MAIN
ImageContainer.DisplayXResolution	The number of pixels per ResolutionUnit in the Width direction.	float	8	XResolution	282	IFD_MAIN
ImageContainer.DisplayYResolution	The number of pixels per ResolutionUnit in the Height direction.	float	8	YResolution	283	IFD_MAIN
ImageContainer.ExifVersion	The version of Exif Standard	vector<unsigned char>	11	ExifVersion	36864	IFD_EXIF
ImageContainer.FlashpixVersion	The version of the Flashpix Specification	vector<unsigned char>	11	FlashPixVersion	40960	IFD_EXIF
ImageContainer.Height	The number of rows of image data.	unsigned long	7	ImageLength	257	IFD_MAIN
² ImageContainer.IPTC_NAA	This element encodes relevent information concerning the image that is useful for newspaper photographs. The information is defined in Application Record No. 2 of the IPTC-NAA (International Press Telecommunications Council-Newspaper Association of America) Information Interchange Model and Digital NewsphotoParameter Record, Version 2, April 14 1993. (Note: the record contains capture condition, intellectual property, scene content, etc. information) (See TIFF/EP spec)		No Mapping	IPTC/NAA	33723	IFD_MAIN

MetadataName	Metadata Definition	C++ Type	PMT Type Table Index	TIFFFieldName	TIFFTag	IFD#
ImageContainer.MetadataNumber	The version of the metadata in the APP3 segment.	vector<unsigned char>	11	MetadataVersionNum	50021	IFD_EXIF
ImageContainer.Orientation	The image orientation viewed in terms of rows and columns.	unsigned char	3	Orientation	274	IFD_MAIN
ImageContainer.PhotometricInterpretation	The pixel composition.(SRGB, YcbCr, etc.)	unsigned char	3	PhotometricInterpretation	262	IFD_MAIN
ImageContainer.PlanarConfiguration	Indicates whether pixel components are recorded in chunky or planar format.	unsigned char	3	PlanarConfiguration	284	IFD_MAIN
ImageContainer.PrimaryChromaticities	The chromaticity of the three primary colors of the image.	vector<float>	17	PrimaryChromaticities	319	IFD_MAIN
ImageContainer.ReferenceBlackWhite	The reference black point value and reference white point value	vector<float>	17	ReferenceBlackWhite	532	IFD_MAIN
ImageContainer.RowsPerStrip	The number of rows per strip when an image is divided into strips.	unsigned long	7	RowsPerStrip	278	IFD_MAIN
ImageContainer.SamplesPerPixel	The number of components per pixel.	unsigned short	6	SamplesPerPixel	277	IFD_MAIN
¹ ImageContainer.SoundType	0 = WAV	unsigned short	6	SoundType	258	IFD_SOUND
ImageContainer.SourceImageDirectory	This field contains a Unicode string which records the Sources Image Directory.	vector<unsigned char>	11	SourceImageDirectory	50200	IFD_MAIN
ImageContainer.SourceImageFileName	This field contains a Unicode string which records the Sources Image File Name.	vector<unsigned char>	11	SourceImageFileName	50201	IFD_MAIN
ImageContainer.SourceImageVolumeName	This field contains a Unicode string which records the Sources Image Volume Name.	vector<unsigned char>	11	SourceImageVolumeName	50202	IFD_MAIN
ImageContainer.StripByteCounts	The total number of bytes in each strip.	vector<unsigned long>	16	StripByteCounts	279	IFD_MAIN
ImageContainer.StripOffsets	For each strip, the byte offset of that strip.	vector<unsigned long>	16	StripOffsets	273	IFD_MAIN
ImageContainer.SubIfdPointers	This metadata object encodes the offsets from the beginning of the file to the location of IFDs that are “treeing” from the current IFD. This tag-value is used to point from the thumbnail IFD to the IFD containing the full resolution image. For a full description refer to the section entitled “Thumbnail Images using ‘SubIFDs’ Trees”.	vector<unsigned long>	16	SubIFDs	330	IFD_MAIN
¹ ImageContainer.Thumbnail.BitsPerSample	The number of bits per image component(pixel).	vector<unsigned short>	14	BitsPerSample	258	IFD_SUB
ImageContainer.Thumbnail.BytesOfJPEGD ata	This field contains the number of bytes of JPEG compressed thumbnail data.	unsigned long	7	JPEGInterchangeFormatLength	514	IFD_MAIN
¹ ImageContainer.Thumbnail.Compression	The compression scheme used for the image data.	unsigned short	6	Compression	259	IFD_SUB
¹ ImageContainer.Thumbnail.DisplayResolu tionUnit	The unit for measuring Xresolution and Yresolution. The values are defined as follows: 2 = inches 3 = centimeters Others = reserved	unsigned char	3	ResolutionUnit	296	IFD_SUB
¹ ImageContainer.Thumbnail.DisplayXResolu tion	The number of pixels per ResolutionUnit in the Width direction.	float	8	XResolution	282	IFD_SUB

MetadataName	Metadata Definition	C++ Type	PMT Type Table Index	TIFFFieldName	TIFFTag	IFD#
¹ ImageContainer.Thumbnail.DisplayYResolution	The number of pixels per ResolutionUnit in the Height direction.	float	8	YResolution	283	IFD_SUB
¹ ImageContainer.Thumbnail.Height	The number of rows of image data.	unsigned long	7	ImageLength	257	IFD_SUB
ImageContainer.Thumbnail.OffsetToJPEGsOI	This field contains the offset to the start byte (SOI) of JPEG compressed thumbnail data.	unsigned long	7	JPEGInterchangeFormat	513	IFD_MAIN
¹ ImageContainer.Thumbnail.Orientation	The image orientation viewed in terms of rows and columns.	unsigned char	3	Orientation	274	IFD_SUB
¹ ImageContainer.Thumbnail.PhotometricInterpretation	The pixel composition.(SRGB, YcbCr, etc.)	unsigned char	3	PhotometricInterpretation	262	IFD_SUB
¹ ImageContainer.Thumbnail.PlanarConfiguration	Indicates whether pixel components are recorded in chunky or planar format.	unsigned char	3	PlanarConfiguration	284	IFD_SUB
¹ ImageContainer.Thumbnail.RowsPerStrip	The number of rows per strip when an image is divided into strips.	unsigned long	7	RowsPerStrip	278	IFD_SUB
¹ ImageContainer.Thumbnail.SamplesPerPixel	The number of components per pixel.	unsigned short	6	SamplesPerPixel	277	IFD_SUB
ImageContainer.Thumbnail.StripByteCounts	The total number of bytes in each strip.	vector<unsigned long>	16	StripByteCounts	279	IFD_SUB
ImageContainer.Thumbnail.StripOffsets	For each strip, the byte offset of that strip.	vector<unsigned long>	16	StripOffsets	273	IFD_SUB
¹ ImageContainer.Thumbnail.Width	The number of columns of image data, equal to the number of pixels per row.	unsigned long	7	ImageWidth	256	IFD_SUB
¹ ImageContainer.Thumbnail.YCbCrCoefficients	Same as ImageContainer.YCbCrCoefficients, but for the thumbnail.	vector<float>	17	YCbCrCoefficients	529	IFD_SUB
¹ ImageContainer.Thumbnail.YCbCrPositioning	Same as ImageContainer.YCbCrPositioning, but for the thumbnail.	unsigned char	3	YCbCrPositioning	531	IFD_SUB
¹ ImageContainer.Thumbnail.YCbCrSubSampling	Same as ImageContainer.YCbCrSubSampling, but for the thumbnail.	vector<unsigned short>	14	YCbCrSubSampling	530	IFD_SUB
ImageContainer.TiffepVersion	This metadata object encodes the version of this TIFF/EP file as a four tier revision number, for example 1.0.0.0. This revision number has the form of w.x.y.z where w=0-255, x=0-255, y=0-255, and z=0-255. The purpose of this tag is to allow a TIFF/EP compliant file to identify itself to a TIFF/EP aware reader.	vector<unsigned char>	12	TIFF/EPStandardID	37398	IFD_MAIN
ImageContainer.TransferFunction	A tabular style transfer function for the image.	vector<unsigned short>	14	TransferFunction	301	IFD_MAIN

MetadataName	Metadata Definition	C++ Type	PMT Type Table Index	TIFFFieldName	TIFFTag	IFD#
ImageContainer.TransferRange	Expands the range of the TransferFunction. The first value within a pair is associated with TransferBlack and the second is associated with TransferWhite. The ordering of pairs is the same as for pixel components of the PhotometricInterpretation type. By default, theTransferFunction is defined over a range from a minimum intensity, 0 or nominal black, to a maximum intensity,(1<< BitsPerSample) - 1 or nominal white. Kodak PhotoYCC uses an extended range TransferFunction in order to describe highlights, saturated colors and shadow detail beyond this range. The TransferRange expands the TransferFunction to support these values. It is defined only for RGB and YCbCr PhotometricInterpretations. For more details, see TIFF 6.0 Specification.	vector<unsigned short>	14	TransferRange	342	IFD_MAIN
ImageContainer.WhitePoint	The chromaticity of the white point of the image.	vector<float>	17	WhitePoint	318	IFD_MAIN
ImageContainer.Width	The number of columns of image data, equal to the number of pixels per row.	unsigned long	7	ImageWidth	256	IFD_MAIN
ImageContainer.YCbCrCoefficients	The matrix coefficients for transformation from RGB to YCbCr image data.	vector<float>	17	YCbCrCoefficients	529	IFD_MAIN
ImageContainer.YCbCrPositioning	The position of chrominance components in relation to the luminance component.	unsigned char	3	YCbCrPositioning	531	IFD_MAIN
ImageContainer.YCbCrSubSampling	The sampling ratio of chrominance components in relation to the luminance component.	vector<unsigned short>	14	YCbCrSubSampling	530	IFD_MAIN
IntellectualProperty.Copyright	A character string that identifies both the photographer and editor Copyright information.	string	4	Copyright	33432	IFD_MAIN
IntellectualProperty.ImageCreator	A character string that identifies the name of the image creator.	string	4	Artist	315	IFD_MAIN
IntellectualProperty.Photographer	A character string that identifies the name of the photographer.	string	4	Artist	315	IFD_MAIN
OutputOrder.Information.DealerIDNumber	The Dealer ID Number data item contents a Dealer ID Number assigned by the industry.	vector<unsigned char>	11	DealerID	50006	IFD_EXIF
OutputOrder.Information.EnvelopeNumber	The Envelope Number data item contains the 6 least significant digits of the number printed on the order envelope.	vector<unsigned char>	11	BagNum	50008	IFD_EXIF
OutputOrder.Information.VendorOrderNumber	Identification number of an order and unique to a vendor.	vector<unsigned char>	11	OrderID	50007	IFD_EXIF
OutputOrder.SimpleRenderInst.FrameNumber	The Frame Number data item contains the number of the current frame. Valid numbers are 01 through 40.	unsigned short	6	ScanFramSeqNum	50009	IFD_MAIN
⁶ SceneContent.Audio	This is the entry to special audio API of the EXIF toolkit. Needs to change.	vector<unsigned char>	No Mapping	audio API	70005	IFD_SOUND
SceneContent.GPS.Altitude	Altitude indicates the altitude based on the reference in AltitudeRef. Altitude is expressed as one RATIONAL value. The reference unit is meters.	float	8	GPSAltitude	6	IFD_GPS

MetadataName	Metadata Definition	C++ Type	PMT Type Table Index	TIFFFieldName	TIFFTag	IFD#
SceneContent.GPS.AltitudeRef	AltitudeRef indicates the altitude used as the reference altitude. The reference unit is meters. The defined values are: 0 = Sea level Others = reserved	unsigned char	1	GPSAltitudeRef	5	IFD_GPS
SceneContent.GPS.DateStamp	This field contains a character string recording date and time information relative to UTC (Coordinated Universal Time). The format is "YYYY:MM:DD."					
SceneContent.GPS.DestBearing	DestBearing indicates the bearing to the destination point. The range of values is from 0.00 to 359.99.	float	8	GPSDestBearing	24	IFD_GPS
SceneContent.GPS.DestBearingRef	DestBearingRef indicates the reference used for giving the bearing to the destination point. The defined values are: 'T' = True direction 'M' = Magnetic direction Others = reserved	string	4	GPSDestBearingRef	23	IFD_GPS
SceneContent.GPS.DestDistance	DestDistance indicates the distance to the destination point.	float	8	GPSDestDistance	26	IFD_GPS
SceneContent.GPS.DestDistanceRef	DestDistanceRef indicates the unit used to express the distance to the destination point. The defined values are: 'K' = Kilometers 'M' = Miles 'N' = Knots Others = reserved	string	4	GPSDestDistanceRef	25	IFD_GPS
SceneContent.GPS.DestLatitude	DestLatitude indicates the latitude of the destination point. The latitude is expressed as three RATIONAL values giving the degrees, minutes, and seconds, respectively. When degrees, minutes and seconds are expressed, the format is dd/1,mm/1,ss/1. When degrees and minutes are used and, for example, fractions of minutes are given up to two decimal places, the format is dd/1,mmmm/100,0/1.	vector<float>	17	GPSDestLatitude	20	IFD_GPS
SceneContent.GPS.DestLatitudeRef	DestLatitudeRef indicates whether the latitude of the destination point is north or south latitude. The defined values are: 'N' = North latitude 'S' = South latitude Others = reserved	string	4	GPSDestLatitudeRef	19	IFD_GPS
SceneContent.GPS.DestLongitude	DestLongitude indicates the longitude of the destination point. The longitude is expressed as three RATIONAL values giving the degrees, minutes, and seconds, respectively. When degrees, minutes and seconds are expressed, the format is ddd/1,mm/1,ss/1. When degrees and minutes are used and, for example, fractions of minutes are given up to two decimal places, the format is ddd/1,mmmm/100,0/1.	vector<float>	17	GPSDestLongitude	22	IFD_GPS
SceneContent.GPS.DestLongitudeRef	DestLongitudeRef Indicates whether the longitude of the destination point is east or west longitude. The defined values are: 'E' = East longitude 'W' = West longitude Others = reserved	string	4	GPSDestLongitudeRef	21	IFD_GPS
SceneContent.GPS.DOP	DOP indicates the GPS DOP (data degree of precision). An HDOP value is written during two-dimensional measurement and PDOP during three-dimensional measurement.	float	8	GPSDOP	11	IFD_GPS
SceneContent.GPS.ImgDirection	ImgDirection indicates the direction of the image when it was captured. The range of values is from 0.00 to 359.99.	float	8	GPSImgDirection	17	IFD_GPS
SceneContent.GPS.ImgDirectionRef	ImgDirectionRef indicates the reference for giving the direction of the image when it is captured. The defined values are: 'T' = True direction 'M' = Magnetic direction Others = reserved	string	4	GPSImgDirectionRef	16	IFD_GPS

MetadataName	Metadata Definition	C++ Type	PMT Type Table Index	TIFFFieldName	TIFFTag	IFD#
SceneContent.GPS.Latitude	Latitude indicates the latitude. The latitude is expressed as three RATIONAL values giving the degrees, minutes, and seconds, respectively. When degrees, minutes and seconds are expressed, the format is dd/1,mm/1,ss/1. When degrees and minutes are used and, for example, fractions of minutes are given up to two decimal places, the format is dd/1,mmmm/100,0/1.	vector<float>	17	GPSLatitude	2	IFD_GPS
SceneContent.GPS.LatitudeRef	LatitudeRef indicates whether the latitude is north or south latitude. The defined values are: 'N' = North latitude 'S' = South latitude Others = reserved	string	4	GPSLatitudeRef	1	IFD_GPS
SceneContent.GPS.Longitude	Longitude indicates the longitude. The longitude is expressed as three RATIONAL values giving the degrees, minutes, and seconds, respectively. When degrees, minutes and seconds are expressed, the format is dd/1,mm/1,ss/1. When degrees and minutes are used and, for example, fractions of minutes are given up to two decimal places, the format is dd/1,mmmm/100,0/1.	vector<float>	17	GPSLongitude	4	IFD_GPS
SceneContent.GPS.LongitudeRef	LongitudeRef indicates whether the longitude is east or west longitude. The defined values are: 'E' = East longitude 'W' = West longitude Others = reserved	string	4	GPSLongitudeRef	3	IFD_GPS
SceneContent.GPS.MapDatum	MapDatum indicates the geodetic survey data used by the GPS receiver. If the survey data is restricted to Japan, the value of this tag is 'TOKYO' or 'WGS-84'. If a GPS Info is recorded, it is strongly recommended that MapDatum be recorded.	string	4	GPSMapDatum	18	IFD_GPS
SceneContent.GPS.MeasureMode	MeasureMode Indicates the GPS measurement mode. '2' means two-dimensional measurement and '3' means three-dimensional measurement is in progress. Other values are reserved.	string	4	GPSMeasureMode	10	IFD_GPS
SceneContent.GPS.Satellites	Satellites indicates the GPS satellites used for measurements. This tag can be used to describe the number of satellites, their ID number, angle of elevation, azimuth, SNR and other information in ASCII notation.	string	4	GPSSatellites	8	IFD_GPS
SceneContent.GPS.Speed	Speed indicates the speed of GPS receiver movement.	float	8	GPSSpeed	13	IFD_GPS
SceneContent.GPS.SpeedRef	SpeedRef indicates the unit used to express the GPS receiver speed of movement. The defined values are: 'K' = Kilometers per hour 'M' = Miles per hour 'N' = Knots Others = reserved	string	4	GPSSpeedRef	12	IFD_GPS
SceneContent.GPS.Status	Status indicates the status of the GPS receiver when the image is recorded. 'A' means measurement is in progress, and 'V' means the measurement is interrupted. Other values are reserved.	string	4	GPSStatus	9	IFD_GPS
SceneContent.GPS.TimeStamp	TimeStamp indicates the time as UTC (Coordinated Universal Time). TimeStamp is expressed as three RATIONAL values giving the hour, minute, and second.	vector<float>	17	GPSTimeStamp	7	IFD_GPS
SceneContent.GPS.Track	Indicates the direction of GPS receiver movement. The range of values is from 0.00 to 359.99.	float	8	GPSTrack	15	IFD_GPS

MetadataName	Metadata Definition	C++ Type	PMT Type Table Index	TIFFFieldName	TIFFTag	IFD#
SceneContent.GPS.TrackRef	TrackRef indicates the reference for giving the direction of GPS receiver movement. The defined values are: 'T' = True direction 'M' = Magnetic direction Others = reserved	string	4	GPSTrackRef	14	IFD_GPS
5 SceneContent.GPS.VersionID	VersionID indicates the version of InfoIFD. The version is given as a string.	vector<unsigned char>	13	GPSVersionID	0	IFD_GPS
SceneContent.GroupCaption.UserSelectGroupTitle	This is a user selectable title for a group of images.	vector<unsigned char>	11	GroupCaption	50005	IFD_MAIN
3 SceneContent.ImageCaptureDateTime.ImageCaptureDateTime	The date and time of the original Image Scene. The format is "YYYY:MM:DD HH:MM:SS.TH" with time shown in 24-hour format including fractions of a second, and the date and time separated by one blank character [20.H]. When the date and time are unknown, all the character spaces except colons (":") may be filled with blank characters, or else the entire field may be filled with blank characters. The character string length is 20 bytes including NULL for termination. When the field is left blank, it is treated as unknown.	string	4	DateTimeOriginal	36867	IFD_MAIN
SceneContent.ImageCaptureDateTime.TimeZoneOffset	This metadata object encodes the time zone of the camera clock (relative to Greenwich Mean Time) used to create the DateTimeOriginal tag-value when the picture was taken. It may also contain the time zone offset of the clock used to create the DateTime tag-value when the image was modified.	vector<short>	15	TimeZoneOffset	34858	IFD_MAIN
SceneContent.ImageDescription	A character string giving the title of the image.	string	4	ImageDescription	270	IFD_MAIN
SceneContent.RelatedSoundFile	A character string that identifies an audio file that is related to the image data. The only relational information recorded here is the Exif audio file name and extension (an ASCII string consisting of 8 characters plus '.' plus 3 characters). The path is not recorded.	string	4	RelatedSoundFile	256	IFD_SOUND
SceneContent.SceneType	The SceneType indicates the type of scene. The values defined are as follows: 1 = A directly photographed image Others = reserved	unsigned char	2	SceneType	41729	IFD_EXIF
SceneContent.SoundCaptureDateTime	Same as the value of DateTime Original Tag. The date and time of the original Image Scene. The format is "YYYY:MM:DD HH:MM:SS.TH" with time shown in 24-hour format including fractions of a second, and the date and time separated by one blank character [20.H]. When the date and time are unknown, all the character spaces except colons (":") may be filled with blank characters, or else the entire field may be filled with blank characters. The character string length is 20 bytes including NULL for termination. When the field is left blank, it is treated as unknown.	string	4	SoundDateTime	257	IFD_SOUND
SceneContent.SubjectLocation	Subject Location indicates the location of the main subject in the scene. The value this item represents the pixel at the center of the main subject relative to the left edge, prior to rotation processing as per the Rotation tag. The first value is the X column number and second indicates the Y row number.	vector<unsigned short>	14	SubjectLocation	37396	IFD_MAIN

z

MetadataName	Metadata Definition	C++ Type	PMT Type Table Index	TIFFFieldName	TIFFTag	IFD#
	Footnotes:					
	1: Do not use this key. This key does not work for TIFF. This key may be supported in the future.					
	2: This metadata object does not support encoding of information using a LONG (32-bit) data type. (IPTC NAA)					
	3: Recording seconds in the time is not currently allowed. Recording seconds would result in an invalid file. Also, when reading these keys, no seconds will be returned, even if they exist in the file.					
	4: The TIFF 6.0 and TIFF/EP specifications specify that particular metadata items with the same metadata key can be located in different places in a TIFF file. The Metadata Keys section of this document has two entries for such keys: one contains the information for the metadata residing in the TIFF 6.0 specified location, and the other for its location in TIFF/EP. For example, note that the metadata key CaptureConditions.Aperture has two entries: one for TIFF 6.0 and the other for TIFF/EP. When reading TIFF files, PMT will always look in the TIFF 6.0 location for the metadata first, and if it's found there, the metadata will be returned. If the metadata is not found in the TIFF 6.0 location, then the TIFF/EP location will be inspected, and if the metadata is found there, it will be returned. For creating TIFF files, the TIFF 6.0 location is always where the metadata will be written to.					
	5: DO NOT USE THIS KEY UNDER ANY CIRCUMSTANCES. It may or may not be supported in the future. This key is not supported currently.					
	6: These tag ID's exceed 65535. They are metadata items that are not defined through the use of tags. The illegal tag ID has been assigned for mapping purposes only					

PMT Type Table Section:

The following table maps the Schema types used by PMT to the types used in other contexts within PMT.

The **Schema** column refers to either a XML Schema built-in type, or to a PMT derived data type as specified in PMT's default schema (PmtDefaultDefinitions.xsd).

The **TT Type** and **TT Translator** columns refer to entries in the default Translation Table (PmtTranslationTbl.h) or a Translation Table you create. (**TT** is an abbreviation for Translation Table.)

The **Exif/TIFF** column: For Exif file formats, it refers to the type taken from bytes 2-3 of the Exif IFD Structure, which is the type of data stored in an Exif file. For TIFF file formats, it refers to the type taken from bytes 2-3 of the TIFF IFD Entry, which is the type of data stored in a TIFF file.

The **C++** column refers to the type used in C++ code.

Notice that there is more than one possible mapping for a particular type. Only an entire row of types is unique. For example, notice that there are three entries for the Schema type **unsignedByte** below. Taking each of the other columns (types) into consideration makes each **unsignedByte** entire row entry unique.

Table 1. Mapping of XML Schema types to Translation Table types, Translation Table translators, Exif/TIFF, and C++ types.

<i>Index</i>	<i>Schema</i>	<i>TT Type</i>	<i>TT Translator</i>	<i>Exif/TIFF</i>	<i>C++</i>
1	unsignedByte	ubyte	builtin2uchar	BYTE	unsigned char
2	unsignedByte	undefined	builtin2undefined	UNDEFINED	unsigned char
3	unsignedByte	ushort	builtin2ushort	SHORT	unsigned char
4	string	ascii	builtin2ascii – for Exif builtin2string – for TIFF	ASCII	string
5	string	ascii	builtin2ascii	UNDEFINED	vector<unsigned char>
6	unsignedShort	ushort	builtin2ushort	SHORT	unsigned short
7	unsignedInt	ulong	builtin2ulong	LONG	unsigned long
8	float	urational	builtin2float	RATIONAL	float
9	int	long	builtin2long	SLONG	long
10	float	rational	builtin2float	SRATIONAL	float
11	pmt_vuint8	undefined	builtin2undefined	UNDEFINED	vector<unsigned char>
12	pmt_vuint8	undefined	builtin2undefined	BYTE (multiple)	vector<unsigned char>
13	pmt_vuint8	ubyte	builtin2uchar	BYTE (multiple)	vector<unsigned char>
14	pmt_vuint16	ushort	builtin2ushort	SHORT (multiple)	vector<unsigned short>
15	pmt_vint16	short	builtin2short	SSHORT (multiple)	vector<short>
16	pmt_vuint32	ulong	builtin2ulong	LONG (multiple)	vector<unsigned long>
17	pmt_vfloat	urational	builtin2float	RATIONAL (multiple)	vector<float>
18	pmt_vint32	long	builtin2long	SLONG (multiple)	vector<long>