Bio-Formats Documentation

Release 5.0.2

The Open Microscopy Environment

May 27, 2014
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The following documentation is split into four parts. *About Bio-Formats* explains the goal of the software, discusses how it processes metadata, and provides other useful information such as version history and how to report bugs. *User Information* focuses on how to use Bio-Formats as a plugin for ImageJ and Fiji, and also gives details of other software packages which can use Bio-Formats to read and write microscopy formats. *Developer Documentation* covers more indepth information on using Bio-Formats as a Java library and how to interface from non-Java codes. Finally, *Formats* is a guide to all the file formats currently supported by Bio-Formats.
Part I

About Bio-Formats
Bio-Formats is a standalone Java library for reading and writing life sciences image file formats. It is capable of parsing both pixels and metadata for a large number of formats, as well as writing to several formats.

The primary goal of Bio-Formats is to facilitate the exchange of microscopy data between different software packages and organizations. It achieves this by converting proprietary microscopy data into an open standard called the OME data model, particularly into the OME-TIFF file format.

We believe the standardization of microscopy metadata to a common structure is of vital importance to the community. A brief article on the benefits of standardization from thinkstandards.net provides an excellent summary. See also LOCI’s article on open source software in science.

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2. [http://www.openmicroscopy.org/site/support/ome-model/ome-tiff](http://www.openmicroscopy.org/site/support/ome-model/ome-tiff)
3. [http://www.thinkstandards.net/benefits.html](http://www.thinkstandards.net/benefits.html)
5. [http://loci.wisc.edu/software/oss](http://loci.wisc.edu/software/oss)
From a practical perspective, Bio-Formats is written in Java because it is cross-platform and widely used, with a vast array of libraries for handling common programming tasks. Java is one of the easiest languages from which to deploy cross-platform software. In contrast to C++, which has a large number of complex platform issues to consider, and Python, which leans heavily on C and C++ for many of its components (e.g., NumPy and SciPy), Java code is compiled one time into platform-independent byte code, which can be deployed as is to all supported platforms. And despite this enormous flexibility, Java manages to provide time performance nearly equal to C++, often better in the case of I/O operations (see further discussion on the comparative speed of Java on the LOCI site\(^1\)).

There are also historical reasons associated with the fact that the project grew out of work on the VisAD Java component library\(^2\). You can read more about the origins of Bio-Formats on the LOCI Bio-Formats homepage\(^3\).

\(^1\)http://loci.wisc.edu/faq/isnt-java-too-slow
\(^2\)http://visad.ssec.wisc.edu
\(^3\)http://loci.wisc.edu/software/bio-formats
CHAPTER TWO

BIO-FORMATS METADATA PROCESSING

Pixels in microscopy are almost always very straightforward, stored on evenly spaced rectangular grids. It is the metadata (details about the acquisition, experiment, user, and other information) that can be complex. Using the OME data model enables applications to support a single metadata format, rather than the multitude of proprietary formats available today.

Every file format has a distinct set of metadata, stored differently. Bio-Formats processes and converts each format’s metadata structures into a standard form called the OME data model\(^1\), according to the OME-XML\(^2\) specification. We have defined an open exchange format called OME-TIFF\(^3\) that stores its metadata as OME-XML. Any software package that supports OME-TIFF is also compatible with the dozens of formats listed on the Bio-Formats page, because Bio-Formats can convert your files to OME-TIFF format.

To facilitate support of OME-XML, we have created a library in Java\(^4\) for reading and writing OME-XML\(^5\) metadata.

There are three types of metadata in Bio-Formats, which we call core metadata, original metadata, and OME metadata.

1. **Core metadata** only includes things necessary to understand the basic structure of the pixels: image resolution; number of focal planes, time points, channels, and other dimensional axes; byte order; dimension order; color arrangement (RGB, indexed color or separate channels); and thumbnail resolution.

2. **Original metadata** is information specific to a particular file format. These fields are key/value pairs in the original format, with no guarantee of cross-format naming consistency or compatibility. Nomenclature often differs between formats, as each vendor is free to use their own terminology.

3. **OME metadata** is information from #1 and #2 converted by Bio-Formats into the OME data model. **Performing this conversion is the primary purpose of Bio-Formats.** Bio-Formats uses its ability to convert proprietary metadata into OME-XML as part of its integration with the OME and OMERO servers—essentially, they are able to populate their databases in a structured way because Bio-Formats sorts the metadata into the proper places. This conversion is nowhere near complete or bug free, but we are constantly working to improve it. We would greatly appreciate any and all input from users concerning missing or improperly converted metadata fields.

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\(^1\)http://genomebiology.com/2005/6/5/R47  
\(^2\)http://www.openmicroscopy.org/site/support/ome-model/ome-xml  
\(^3\)http://www.openmicroscopy.org/site/support/ome-model/ome-tiff  
\(^4\)http://www.openmicroscopy.org/site/support/ome-model/ome-xml/java-library.html  
\(^5\)http://www.openmicroscopy.org/site/support/ome-model/ome-xml
For help, see the Bio-Formats\(^1\), File Formats\(^2\) and OME-XML and OME-TIFF\(^3\) sections of the OME FAQ\(^4\) for answers to some common questions. Please contact us\(^5\) if you have any questions or problems with Bio-Formats. There is a guide for reporting bugs here\(^6\).

For advanced users and developers, further information is available on the troubleshooting page.

### 3.1 Reporting a bug

#### 3.1.1 Before filing a bug report

If you think you have found a bug in Bio-Formats, the first thing to do is update your version of Bio-Formats to the latest version to check if the problem has already been addressed. The Fiji updater will automatically do this for you, while in ImageJ you can select Plugins → Bio-Formats → Update Bio-Formats Plugins.

You can also download the latest version of Bio-Formats\(^6\). If you are not sure which version you need, select the latest build of the Bio-Formats package bundle from the components table.

#### 3.1.2 Sending a bug report

If you can still reproduce the bug after updating to the latest version of Bio-Formats, please send a bug report to the OME Users mailing list\(^7\). You can upload files to our QA system\(^8\) or for large files (>2 GB), we can provide you with an FTP server address if you write to the mailing list.

To ensure that any inquiries you make are resolved promptly, please include the following information:

- **Exact error message.** Copy and paste any error messages into the text of your email. Alternatively, attach a screenshot of the relevant windows.
- **Version information.** Indicate which release of Bio-Formats, which operating system, and which version of Java you are using.
- **Non-working data.** If possible, please send a non-working file. This helps us ensure that the problem is fixed for next release and will not reappear in later releases. Note that any data provided is used for internal testing only; we do not make images publicly available unless given explicit permission to do so.
- **Metadata and screenshots.** If possible, include any additional information about your data. We are especially interested in the expected dimensions (width, height, number of channels, Z slices, and timepoints). Screenshots of the image being successfully opened in other software are also useful.
- **Format details.** If you are requesting support for a new format, we ask that you send as much data as you have regarding this format (sample files, specifications, vendor/manufacturer information, etc.). This helps us to better support the format and ensures future versions of the format are also supported.

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\(^1\)http://www.openmicroscopy.org/site/support/faq/bio-formats
\(^2\)http://www.openmicroscopy.org/site/support/faq/file-formats
\(^3\)http://www.openmicroscopy.org/site/support/faq/ome-xml-and-ome-tiff
\(^4\)http://www.openmicroscopy.org/site/support/faq
\(^5\)http://www.openmicroscopy.org/site/community/mailing-lists
\(^6\)http://downloads.openmicroscopy.org/latest/bio-formats5/
\(^7\)http://lists.openmicroscopy.org.uk/mailman/listinfo/ome-users
\(^8\)http://qa.openmicroscopy.org.uk/qa/upload/
3.2 Troubleshooting

This page is aimed at anyone who is responsible for supporting Bio-Formats, but may also be useful for advanced users looking to troubleshoot their own problems. Eventually, it might be best to move some of this to the FAQ or other documentation.

3.2.1 General tips

- Make sure to read the FAQ, particularly the “File Formats”, “Bio-Formats”, and “OME-XML & OME-TIFF” sections.
- If this page doesn’t help, it is worth quickly checking the following places where questions are commonly asked and/or bugs are reported:
  - OME Trac
  - Fiji Bugzilla (for ImageJ/Fiji issues)11
  - ome-devel mailing list (searchable using google with ‘site:lists.openmicroscopy.org.uk’)
  - ome-users mailing list (searchable using google with ‘site:lists.openmicroscopy.org.uk’)
  - ImageJ mailing list (for ImageJ/Fiji issues)14
- Make sure to ask for a _specific_ error message or description of the unexpected behavior, if one is not provided (“it does not work” is obviously not adequate).
- “My (12, 14, 16)-bit images look all black when I open them” is a common issue. In ImageJ/Fiji, this is almost always fixable by checking the “Autoscale” option; with the command line tools, the “-autoscale -fast” options should work. The problem is typically that the pixel values are very, very small relative to the maximum possible pixel value (4095, 16383, and 65535, respectively), so when displayed the pixels are effectively black.
- If the file is very, very small (4096 bytes) and any exception is generated when reading the file, then make sure it is not a MacOSX resource fork. The ‘file’ command should tell you:

```
$ file /path/to/suspicious-file
suspicious-file: AppleDouble encoded Macintosh file
```

3.2.2 Tips for ImageJ/Fiji

- The Bio-Formats version being used can be found by selecting “Help > About Plugins > Bio-Formats Plugins”.
- “How do I make the options window go away?” is a common question. There are a few ways to do this:
  - To disable the options window only for files in a specific format, select “Plugins > Bio-Formats > Bio-Formats Plugins Configuration”, then pick the format from the list and make sure the “Windowless” option is checked.
  - To avoid the options window entirely, use the “Plugins > Bio-Formats > Bio-Formats Windowless Importer” menu item to import files.
  - Open files by calling the Bio-Formats importer plugin from a macro.

A not uncommon cause of problems is that the user has multiple copies of loci_tools.jar in their ImageJ plugins folder, or has a copy of loci_tools.jar and a copy of formats-gpl.jar. It is often difficult to determine for sure that this is the problem - the only error message that pretty much guarantees it is a “NoSuchMethodException”. If the user maintains that they downloaded the latest version and whatever error message/odd behavior they are seeing looks like it was fixed already, then it is worth suggesting that they remove all copies of loci_tools.jar and download a fresh version.
3.2.3 Tips for command line tools

- When run with no arguments, all of the command line tools will print information on usage.
- When run with the ‘-version’ argument, ‘showinf’ and ‘bfconvert’ will display the version of Bio-Formats that is being used (version number, build date, and Git commit reference).

3.2.4 Tips by format

3I/Olympus Slidebook (.sld)

- Slidebook support is generally not great, despite a lot of effort. This is the one format for which it is recommended to just export to OME-TIFF from the acquisition software and work with the exported files. Happily, there is free software from 3I which can do the export post-acquisition: https://www.slidebook.com/reader.php

DICOM

- Health care or institutional regulations often prevent users from sending problematic files, so often we have to solve the problem blind. In these cases, it is important to get the exact error message, and inform the user that fixing the problem may be an iterative process (i.e. they might have to try a couple of trunk builds before we can finally fix the problem).

ZVI

- If the ZVI reader plugin is installed in ImageJ/Fiji, then it will be used instead of Bio-Formats to read ZVI files. To check if this is the cause of the problem, make sure that the file opens correctly using “Plugins > Bio-Formats > Bio-Formats Importer”; if that works, then just remove ZVI_Reader.class from the plugins folder.
Bio-Formats is updated whenever a new version of OMERO\(^1\) is released. The version number is three numbers separated by dots; e.g., 4.0.0. See the version history for a list of major changes in each release.

4.1 Version history

4.1.1 5.0.2 (2014 May 28)

- Many bug fixes for Zeiss .czi files
- Several other bug fixes, including:
  - Gatan .dm3 units and step count parsing
  - Inspector .msr 5D image support
  - DICOM reading of nested tags
- Update native-lib-loader version (to 2.0.1)
- Updates and improvements to user documentation

4.1.2 5.0.1 (2014 Apr 7)

- Added image pyramid support for CellSens .vsi data
- Several bug fixes, including:
  - Woolz import into OMERO
  - Cellomics file name parsing (thanks to Lee Kamentsky)
  - Olympus FV1000 timestamp support (thanks to Lewis Kraft and Patrick Riley)
  - (A)PNG large image support
  - Zeiss .czi dimension detection for SPIM datasets
- Performance improvements for Becker & Hickl .sdt file reading (thanks to Ian Munro)
- Performance improvements to directory listing over NFS
- Update slf4j and logback versions (to 1.7.6 and 1.1.1 respectively)
- Update jgoodies-forms version (to 1.7.2)

4.1.3 5.0.0 (2014 Feb 25)

- New bundled ‘bioformats_package.jar’ for ImageJ
- Now uses logback as the slf4j binding by default
- Updated component names, .jar file names, and Maven artifact names

\(^1\)http://www.openmicroscopy.org/site/support/omero5/
• Fixed support for Becker & Hickl .sdt files with multiple blocks
• Fixed tiling support for TIFF, Hamamatsu .ndpi, JPEG, and Zeiss .czi files
• Improved continuous integration testing
• Updated command line documentation

4.1.4 5.0.0-RC1 (2013 Dec 19)
• Updated Maven build system and launched new Artifactory repository (http://artifacts.openmicroscopy.org)
• Added support for:
  – Bio-Rad SCN
  – Yokogawa CellVoyager (thanks to Jean-Yves Tinevez)
  – LaVision Imspector
  – PCORAW
  – Woolz (thanks to Bill Hill)
• Added support for populating and parsing ModuloAlong{Z, C, T} annotations for FLIM/SPIM data
• Updated netCDF and slf4j version requirements - netCDF 4.3.19 and slf4j 1.7.2 are now required
• Updated and improved MATLAB users and developers documentation
• Many bug fixes including for Nikon ND2, Zeiss CZI, and CellWorX formats

4.1.5 5.0.0-beta1 (2013 June 20)
• Updated to 2013-06 OME-XML schema\(^2\)
• Improved the performance in tiled formats
• Added caching of Reader metadata using http://code.google.com/p/kryo/
• Added support for:
  – Aperio AFI
  – Inveon
  – MPI-BPC Imspector
• Many bug fixes, including:
  – Add ZEN 2012/Lightsheet support to Zeiss CZI
  – Improved testing of autogenerated code
  – Moved OME-XML specification into Bio-Formats repository

4.1.6 4.4.10 (2014 Jan 15)
• Bug fixes including CellWorx, Metamorph and Zeiss CZI
• Updates to MATLAB documentation

4.1.7 4.4.9 (2013 Oct 16)
• Many bug fixes including improvements to support for ND2 format
• Java 1.6 is now the minimum supported version; Java 1.5 is no longer supported

\(^2\)http://www.openmicroscopy.org/site/support/ome-model/
4.1.8 4.4.8 (2013 May 2)

- No changes - release to keep version numbers in sync with OMERO

4.1.9 4.4.7 (2013 April 25)

- Many bug fixes to improve support for more than 20 formats
- Improved export to multi-file datasets
- Now uses slf4j for logging rather than using log4j directly, enabling other logging implementations to be used, for example when Bio-Formats is used as a component in other software using a different logging system.

4.1.10 4.4.6 (2013 February 11)

- Many bug fixes
- Further documentation improvements

4.1.11 4.4.5 (2012 November 13)

- Restructured and improved documentation
- Many bug fixes, including:
  - File grouping in many multi-file formats
  - Maven build fixes
  - ITK plugin fixes

4.1.12 4.4.4 (2012 September 24)

- Many bug fixes

4.1.13 4.4.2 (2012 August 22)

- Security fix for OMERO plugins for ImageJ

4.1.14 4.4.1 (2012 July 20)

- Fix a bug that prevented BigTIFF files from being read
- Fix a bug that prevented PerkinElmer .flex files from importing into OMERO

4.1.15 4.4.0 (2012 July 13)

- Many, many bug fixes
- Added support for:
  - .nd2 files from Nikon Elements version 4
  - PerkinElmer Operetta data
  - MJPEG-compressed AVIs
  - MicroManager datasets with multiple positions
  - Zeiss CZI data
  - IMOD data
4.1.16 4.3.3 (2011 October 18)

• Many bug fixes, including:
  – Speed improvements to HCImage/SimplePCI and Zeiss ZVI files
  – Reduce memory required by Leica LIF reader
  – More accurately populate metadata for Prairie TIFF datasets
  – Various fixes to improve the security of the OMERO plugin for ImageJ
  – Better dimension detection for Bruker MRI datasets
  – Better thumbnail generation for histology (SVS, NDPI) datasets
  – Fix stage position parsing for Metamorph TIFF datasets
  – Correctly populate the channel name for PerkinElmer Flex files

4.1.17 4.3.2 (2011 September 15)

• Many bug fixes, including:
  – Better support for Volocity datasets that contain compressed data
  – More accurate parsing of ICS metadata
  – More accurate parsing of cellSens .vsi files

• Added support for a few new formats
  – .inr
  – Canon DNG
  – Hitachi S-4800
  – Kodak .bip
  – JPX
  – Volocity Library Clipping (.acff)
  – Bruker MRI

• Updated Zeiss LSM reader to parse application tags

• Various performance improvements, particularly for reading/writing TIFFs

• Updated OMERO ImageJ plugin to work with OMERO 4.3.x

4.1.18 4.3.1 (2011 July 8)

• Several bug fixes, including:
  – Fixes for multi-position Deltavision files
  – Fixes for MicroManager 1.4 data
  – Fixes for 12 and 14-bit JPEG-2000 data
  – Various fixes for reading Volocity .mvd2 datasets

• Added various options to the ‘showinf’ and ‘bfconvert’ command line tools

• Added better tests for OME-XML backwards compatibility

• Added the ability to roughly stitch tiles in a multi-position dataset
4.1.19 4.3.0 (2011 June 14)

- Many bug fixes, including:
  - Many fixes for reading and writing sub-images
  - Fixes for stage position parsing in the Zeiss formats
  - File type detection fixes
- Updated JPEG-2000 reading and writing support to be more flexible
- **Added support for 9 new formats:**
  - InCell 3000
  - Trestle
  - Hamamatsu .ndpi
  - Hamamatsu VMS
  - SPIDER
  - Volocity .mvd2
  - Olympus SIS TIFF
  - IMAGIC
  - cellSens VSI
- Updated to 2011-06 OME-XML schema
- Minor speed improvements in many formats
- Switched version control system from SVN to Git
- Moved all Trac tickets into the OME Trac: [http://trac.openmicroscopy.org.uk](http://trac.openmicroscopy.org.uk)
- Improvements to testing frameworks
- Added Maven build system as an alternative to the existing Ant build system
- Added pre-compiled C++ bindings to the download page

4.1.20 4.2.2 (2010 December 6)

- Several bug fixes, notably:
  - Metadata parsing fixes for Zeiss LSM, Metamorph STK, and FV1000
  - Prevented leaked file handles when exporting to TIFF/OME-TIFF
  - Fixed how BufferedImages are converted to byte arrays
- Proper support for OME-XML XML annotations
- Added support for SCANCO Medical .aim files
- Minor improvements to ImageJ plugins
- Added support for reading JPEG-compressed AVI files

4.1.21 4.2.1 (2010 November 12)

- Many, many bug fixes
- **Added support for 7 new formats:**
  - CellWorX .pnl
  - ECAT7
  - Varian FDF

4.1. Version history
• Perkin Elmer Densitometer
• FEI TIFF
• Compix/SimplePCI TIFF
• Nikon Elements TIFF

• Updated Zeiss LSM metadata parsing, with generous assistance from Zeiss, FMI, and MPI-CBG
• Lots of work to ensure that converted OME-XML validates
• Improved file stitching functionality; non-numerical file patterns and limited regular expression-style patterns are now supported

4.1.22 4.2.0 (2010 July 9)

• Fixed many, many bugs in all aspects of Bio-Formats
• Reworked ImageJ plugins to be more user- and developer-friendly
• Added many new unit tests
• Added support for approximately 25 new file formats, primarily in the SPM domain
• Rewrote underlying I/O infrastructure to be thread-safe and based on Java NIO
• Rewrote OME-XML parsing/generation layer; OME-XML 2010-06 is now supported
• Improved support for exporting large images
• Improved support for exporting to multiple files
• Updated logging infrastructure to use slf4j and log4j

4.1.23 4.1.1 (2009 December 3)

• Fixed many bugs in popular file format readers

4.1 (2009 October 21):

• Fixed many bugs in most file format readers
• Significantly improved confocal and HCS metadata parsing
• Improved C++ bindings
• Eliminated references to Java AWT classes in core Bio-Formats packages
• Added support for reading Flex datasets from multiple servers
• Improved OME-XML generation; generated OME-XML is now valid
• Added support for Olympus ScanR data
• Added OSGi information to JARs
• Added support for Amira Mesh files
• Added support for LI-FLIM files
• Added more informative exceptions
• Added support for various types of ICS lifetime data
• Added support for Nikon EZ-C1 TIFFs
• Added support for Maia Scientific MIAS data
4.1.24 4.0.1 (2009 June 1)

- Lots of bug fixes in most format readers and writers
- Added support for Analyze 7.1 files
- Added support for Nifti files
- Added support for Cellomics .c01 files
- Refactored ImageJ plugins
- Bio-Formats, the common package, and the ImageJ plugins now require Java 1.5
- Eliminated native library dependency for reading lossless JPEGs
- Changed license from GPL v3 or later to GPL v2 or later
- Updated Olympus FV1000, Zeiss LSM, Zeiss ZVI and Nikon ND2 readers to parse ROI data
- Added option to ImageJ plugin for displaying ROIs parsed from the chosen dataset
- Fixed BufferedImage construction for signed data and unsigned int data

4.1.25 4.0.0 (2009 March 3)

- Improved OMIE data model population for Olympus FV1000, Nikon ND2, Metamorph STK, Leica LEI, Leica LIF, InCell 1000 and MicroManager
- Added TestNG tests for format writers
- Added option to ImageJ plugin to specify custom colors when customizing channels
- Added ability to upgrade the ImageJ plugin from within ImageJ
- Fixed bugs in Nikon ND2, Leica LIF, BioRad PIC, TIFF, PSD, and OME-TIFF
- Fixed bugs in Data Browser and Exporter plugins
- Added support for Axon Raw Format (ARF), courtesy of Johannes Schindelin
- Added preliminary support for IPLab-Mac file format

4.1.26 2008 December 29

- Improved metadata support for Deltavision, Zeiss LSM, MicroManager, and Leica LEI
- Restructured code base/build system to be component-driven
- Added support for JPEG and JPEG-2000 codecs within TIFF, OME-TIFF and OME-XML
- Added support for 16-bit compressed Flex files
- Added support for writing JPEG-2000 files
- Added support for Minolta MRW format
- Added support for the 2008-09 release of OME-XML
- Removed dependency on JMagick
- Re-added caching support to data browser plugin
- Updated loci.formats.Codec API to be more user-friendly
- Expanded loci.formats.MetadataStore API to better represent the OME-XML model
- Improved support for Nikon NEF
- Improved support for TillVision files
- Improved ImageJ import options dialog
- Fixed bugs with Zeiss LSM files larger than 4 GB
• Fixed minor bugs in most readers
• Fixed bugs with exporting from an Image5D window
• Fixed several problems with virtual stacks in ImageJ

4.1.27 2008 August 30

• Fixed bugs in many file format readers
• Fixed several bugs with swapping dimensions
• Added support for Olympus CellIR/APL files
• Added support for MINC MRI files
• Added support for Aperio SVS files compressed with JPEG 2000
• Added support for writing OME-XML files
• Added support for writing APNG files
• Added faster LZW codec
• Added drag and drop support to ImageJ shortcut window
• Re-integrated caching into the data browser plugin

4.1.28 2008 July 1

• Fixed bugs in most file format readers
• Fixed bugs in OME and OMERO download functionality
• Fixed bugs in OME server-side import
• Improved metadata storage/retrieval when uploading to and downloading from the OME Perl server
• Improved Bio-Formats ImageJ macro extensions
• Major updates to MetadataStore API
• Updated OME-XML generation to use 2008-02 schema by default
• Addressed time and memory performance issues in many readers
• Changed license from LGPL to GPL
• Added support for the FEI file format
• Added support for uncompressed Hamamatsu Aquacosmos NAF files
• Added support for Animated PNG files
• Added several new options to Bio-Formats ImageJ plugin
• Added support for writing ICS files

4.1.29 2008 April 17

• Fixed bugs in Slidebook, ND2, FV1000 OIB/OIF, Perkin Elmer, TIFF, Prairie, Openlab, Zeiss LSM, MNG, Molecular Dynamics GEL, and OME-TIFF
• Fixed bugs in OME and OMERO download functionality
• Fixed bugs in OME server-side import
• Fixed bugs in Data Browser
• Added support for downloading from OMERO 2.3 servers
• Added configuration plugin

4.1. Version history
• Updates to MetadataStore API
• Updates to OME-XML generation - 2007-06 schema used by default
• Added support for Li-Cor L2D format
• Major updates to TestNG testing framework
• Added support for writing multi-series OME-TIFF files
• Added support for writing BigTIFF files

4.1.30 2008 Feb 12

• Fixed bugs in QuickTime, SimplePCI and DICOM
• Fixed a bug in channel splitting logic

4.1.31 2008 Feb 8

• Many critical bugfixes in format readers and ImageJ plugins
• Newly reborn Data Browser for 5D image visualization
  – some combinations of import options do not work yet

4.1.32 2008 Feb 1

• Fixed bugs in Zeiss LSM, Metamorph STK, FV1000 OIB/OIF, Leica LEI, TIFF, Zeiss ZVI, ICS, Prairie, Openlab LII, Gatan, DICOM, QuickTime
• Fixed bug in OME-TIFF writer
• Major changes to MetadataStore API
• Added support for JPEG-compressed TIFF files
• Added basic support for Aperio SVS files
  – JPEG2000 compression is still not supported
• Improved “crop on import” functionality
• Improvements to bfconvert and bfview
• Improved OME-XML population for several formats
• Added support for JPEG2000-compressed DICOM files
• EXIF data is now parsed from TIFF files

4.1.33 2007 Dec 28

• Fixed bugs in Leica LEI, Leica TCS, SDT, Leica LIF, Visitech, DICOM, Imaris 5.5 (HDF), and Slidebook readers
• Better parsing of comments in TIFF files exported from ImageJ
• Fixed problem with exporting 48-bit RGB data
• Added logic to read multi-series datasets spread across multiple files
• Improved channel merging in ImageJ - requires ImageJ 1.39l
• Support for hyperstacks and virtual stacks in ImageJ - requires ImageJ 1.39l
• Added API for reading directly from a byte array or InputStream
• Metadata key/value pairs are now stored in ImageJ’s “Info” property
• Improved OMERO download plugin - it is now much faster
• Added “open all series” option to ImageJ importer
• ND2 reader based on Nikon’s SDK now uses our own native bindings
• Fixed metadata saving bug in ImageJ
• Added sub-channel labels to ImageJ windows
• Major updates to 4D Data Browser
• Minor updates to automated testing suite

4.1.34 2007 Dec 1

• Updated OME plugin for ImageJ to support downloading from OMERO
• Fixed bug with floating point TIFFs
• Fixed bugs in Visitech, Zeiss LSM, Imaris 5.5 (HDF)
• Added alternate ND2 reader that uses Nikon’s native libraries
• Fixed calibration and series name settings in importer
• Added basic support for InCell 1000 datasets

4.1.35 2007 Nov 21

• Fixed bugs in ND2, Leica LIF, DICOM, Zeiss ZVI, Zeiss LSM, FV1000 OIB, FV1000 OIF, BMP, Evotec Flex, BioRad PIC, Slidebook, TIFF
• Added new ImageJ plugins to slice stacks and do “smart” RGB merging
• Added “windowless” importer plugin
  – uses import parameters from IJ_Prefs.txt, without prompting the user
• Improved stack slicing and colorizing logic in importer plugin
• Added support for DICOM files compressed with lossless JPEG
  – requires native libraries
• Fixed bugs with signed pixel data
• Added support for Imaris 5.5 (HDF) files
• Added 4 channel merging to importer plugin
• Added API methods for reading subimages
• Major updates to the 4D Data Browser

4.1.36 2007 Oct 17

• Critical OME-TIFF bugfixes
• Fixed bugs in Leica LIF, Zeiss ZVI, TIFF, DICOM, and AVI readers
• Added support for JPEG-compressed ZVI images
• Added support for BigTIFF
• Added importer plugin option to open each plane in a new window
• Added MS Video 1 codec for AVI

4.1. Version history
4.1.37 2007 Oct 1

- Added support for compressed DICOM images
- Added support for uncompressed LIM files
- Added support for Adobe Photoshop PSD files
- Fixed bugs in DICOM, OME-TIFF, Leica LIF, Zeiss ZVI, Visitech, PerkinElmer and Metamorph
- Improved indexed color support
- Addressed several efficiency issues
- Fixed how multiple series are handled in 4D data browser
- Added option to reorder stacks in importer plugin
- Added option to turn off autoscaling in importer plugin
- Additional metadata convenience methods

4.1.38 2007 Sept 11

- Major improvements to ND2 support; lossless compression now supported
- Support for indexed color images
- Added support for Simple-PCI .cxd files
- Command-line OME-XML validation
- Bug fixes in most readers, especially Zeiss ZVI, Metamorph, PerkinElmer and Leica LEI
- Initial version of Bio-Formats macro extensions for ImageJ

4.1.39 2007 Aug 1

- Added support for latest version of Leica LIF
- Fixed several issues with Leica LIF, Zeiss ZVI
- Better metadata mapping for Zeiss ZVI
- Added OME-TIFF writer
- Added MetadataRetrieve API for retrieving data from a MetadataStore
- Miscellaneous bug fixes

4.1.40 2007 July 16

- Fixed several issues with ImageJ plugins
- Better support for Improvision and Leica TCS TIFF files
- Minor improvements to Leica LIF, ICS, QuickTime and Zeiss ZVI readers
- Added searchable metadata window to ImageJ importer

4.1.41 2007 July 2

- Fixed issues with ND2, Openlab LIFF and Slidebook
- Added support for Visitech XYS
- Added composite stack support to ImageJ importer
4.1.42 2007 June 18

- Fixed issues with ICS, ND2, MicroManager, Leica LEI, and FV1000 OIF
- Added support for large (> 2 GB) ND2 files
- Added support for new version of ND2
- Minor enhancements to ImageJ importer
- Implemented more flexible logging
- Updated automated testing framework to use TestNG
- Added package for caching images produced by Bio-Formats

4.1.43 2007 June 6

- Fixed OME upload/download bugs
- Fixed issues with ND2, EPS, Leica LIF, and OIF
- Added support for Khoros XV
- Minor improvements to the importer

4.1.44 2007 May 24

- Better Slidebook support
- Added support for Quicktime RPZA
- Better Leica LIF metadata parsing
- Added support for BioRad PIC companion files
- Added support for bzip2-compressed files
- Improved ImageJ plugins
- Native support for FITS and PGM

4.1.45 2007 May 2

- Added support for NRRD
- Added support for Evotec Flex (requires LuraWave Java SDK with license code)
- Added support for gzip-compressed files
- Added support for compressed QuickTime headers
- Fixed QuickTime Motion JPEG-B support
- Fixed some memory issues (repeated small array allocations)
- Fixed issues reading large (> 2 GB) files
- Removed “ignore color table” logic, and replaced with Leica-specific solution
- Added status event reporting to readers
- Added API to toggle metadata collection
- Support for multiple dimensions rasterized into channels
- Deprecated reader and writer methods that accept the ‘id’ parameter
- Deprecated IFormatWriter.save in favor of saveImage and saveBytes
- Moved dimension swapping and min/max calculation logic to delegates
- Separate GUI logic into isolated loci.formats.gui package

4.1. Version history
Bio-Formats Documentation, Release 5.0.2

- Miscellaneous bug fixes and tweaks in most readers and writers
- Many other bug fixes and improvements

4.1.46 2007 Mar 16

- Fixed calibration bugs in importer plugin
- Enhanced metadata support for additional formats
- Fixed LSM bug

4.1.47 2007 Mar 7

- Added support for Micro-Manager file format
- Fixed several bugs – Leica LIF, Leica LEI, ICS, ND2, and others
- Enhanced metadata support for several formats
- Load series preview thumbnails in the background
- Better implementation of openBytes(String, int, byte[]) for most readers
- Expanded unit testing framework

4.1.48 2007 Feb 28

- Better series preview thumbnails
- Fixed bugs with multi-channel Leica LEI
- Fixed bugs with “ignore color tables” option in ImageJ plugin

4.1.49 2007 Feb 26

- Many bug fixes: Leica LEI, ICS, FV1000 OIB, OME-XML and others
- Better metadata parsing for BioRad PIC files
- Enhanced API for calculating channel minimum and maximum values
- Expanded MetadataStore API to include more semantic types
- Added thumbnails to series chooser in ImageJ plugin
- Fixed plugins that upload and download from an OME server

4.1.50 2007 Feb 7

- Added plugin for downloading images from OME server
- Improved HTTP import functionality
- Added metadata filtering – unreadable metadata is no longer shown
- Better metadata table for multi-series datasets
- Added support for calibration information in Gatan DM3
- Eliminated need to install JAI Image I/O Tools to read ND2 files
- Fixed ZVI bugs: metadata truncation, and other problems
- Fixed bugs in Leica LIF: incorrect calibration, first series labeling
- Fixed memory bug in Zeiss LSM

4.1. Version history
• Many bugfixes: PerkinElmer, DeltaVision, Leica LEI, LSM, ND2, and others
• IFormatReader.close(boolean) method to close files temporarily
• Replaced Compression utility class with extensible Compressor interface
• Improved testing framework to use .bioformats configuration files

4.1.51 2007 Jan 5

• Added support for Prairie TIFF
• Fixed bugs in Zeiss LSM, OIB, OIF, and ND2
• Improved API for writing files
• Added feature to read files over HTTP
• Fixed bugs in automated testing framework
• Miscellaneous bugfixes

4.1.52 2006 Dec 22

• Expanded ImageJ plugin to optionally use Image5D or View5D
• Improved support for ND2 and JPEG-2000 files
• Added automated testing framework
• Fixed bugs in Zeiss ZVI reader
• Miscellaneous bugfixes

4.1.53 2006 Nov 30

• Added support for ND2/JPEG-2000
• Added support for MRC
• Added support for MNG
• Improved support for floating-point images
• Fixed problem with 2-channel Leica LIF data
• Minor tweaks and bugfixes in many readers
• Improved file stitching logic
• Allow ImageJ plugin to be called from a macro

4.1.54 2006 Nov 2

• Bugfixes and improvements for Leica LIF, Zeiss LSM, OIF and OIB
• Colorize channels when they are split into separate windows
• Fixed a bug with 4-channel datasets

4.1.55 2006 Oct 31

• Added support for Imaris 5 files
• Added support for RGB ICS images
4.1.56 2006 Oct 30

- Added support for tiled TIFFs
- Fixed bugs in ICS reader
- Fixed importer plugin deadlock on some systems

4.1.57 2006 Oct 27

- Multi-series support for Slidebook
- Added support for Alicona AL3D
- Fixed plane ordering issue with FV1000 OIB
- Enhanced dimension detection in FV1000 OIF
- Added preliminary support for reading NEF images
- Added option to ignore color tables
- Fixed ImageJ GUI problems
- Fixed spatial calibration problem in ImageJ
- Fixed some lingering bugs in Zeiss ZVI support
- Fixed bugs in OME-XML reader
- Tweaked ICS floating-point logic
- Fixed memory leaks in all readers
- Better file stitching logic

4.1.58 2006 Oct 6

- Support for 3i SlideBook format (single series only for now)
- Support for 16-bit RGB palette TIFF
- Fixed bug preventing import of certain Metamorph STK files
- Fixed some bugs in PerkinElmer UltraView support
- Fixed some bugs in Leica LEI support
- Fixed a bug in Zeiss ZVI support
- Fixed bugs in Zeiss LSM support
- Fixed a bug causing slow identification of Leica datasets
- Fixed bugs in the channel merging logic
- Fixed memory leak for OIB format
- Better scaling of 48-bit RGB data to 24-bit RGB
- Fixed duplicate channels bug in “open each channel in a separate window”
- Fixed a bug preventing PICT import into ImageJ
- Better integration with HandleExtraFileTypes
- Better virtual stack support in Data Browser plugin
- Fixed bug in native QuickTime random access
- Keep aspect ratio for computed thumbnails
- Much faster file stitching logic
4.1.59 2006 Sep 27

- PerkinElmer: support for PE UltraView
- Openlab LIFF: support for Openlab v5
- Leica LEI: bug fixes, and support for multiple series
- ZVI, OIB, IPW: more robust handling of these formats (eliminated custom OLE parsing logic in favor of Apache POI)
- OIB: better metadata parsing (but maybe still not perfect?)
- LSM: fixed a bug preventing import of certain LSMs
- Metamorph STK: fixed a bug resulting in duplicate image planes
- User interface: use of system look & feel for file chooser dialog when available
- Better notification when JAR libraries are missing

4.1.60 2006 Sep 6

- Leica LIF: multiple distinct image series within a single file
- Zeiss ZVI: fixes and improvements contributed by Michel Boudinot
- Zeiss LSM: fixed bugs preventing the import of certain LSM files
- TIFF: fixed a bug preventing import of TIFFs created with Bio-Rad software

4.1.61 2006 Mar 31

- First release
Part II

User Information
CHAPTER
FIVE

USING BIO-FORMATS WITH IMAGEJ AND FIJI

The following sections explain the features of Bio-Formats and how to use it within ImageJ and Fiji:

5.1 ImageJ overview

ImageJ\(^1\) is an image processing and analysis application written in Java, widely used in the life sciences fields, with an extensible plugin infrastructure. You can use Bio-Formats as a plugin for ImageJ to read and write images in the formats it supports.

5.1.1 Installation

Download bioformats\_package.jar\(^2\) and drop it into your ImageJ/plugins folder. Next time you run ImageJ, a new Bio-Formats submenu with several plugins will appear in the Plugins menu, including the Bio-Formats Importer and Bio-Formats Exporter.

5.1.2 Usage

The Bio-Formats Importer plugin can display image stacks in several ways:

- In a standard ImageJ window (including as a hyperstack)
- Using the LOCI Data Browser\(^3\) plugin (included)
- With Joachim Walter’s Image5D\(^4\) plugin (if installed)
- With Rainer Heintzmann’s View5D\(^5\) plugin (if installed)

ImageJ v1.37 and later automatically (via HandleExtraFileTypes) calls the Bio-Formats logic, if installed, as needed when a file is opened within ImageJ, i.e. when using File → Open instead of explicitly choosing Plugins → Bio-Formats → Bio-Formats Importer from the menu.

For a more detailed description of each plugin, see the Bio-Formats page\(^6\) of the Fiji wiki.

5.1.3 Upgrading

To upgrade, just overwrite the old bioformats\_package.jar with the latest one\(^7\).

You may want to download the latest version of ImageJ first, to take advantage of new features and bug-fixes.

As of the 4.0.0 release, you can also upgrade the Bio-Formats plugin directly from ImageJ. Select Plugins → Bio-Formats → Update Bio-Formats Plugins from the ImageJ menu, then select which release you would like to use. You will then need to restart ImageJ to complete the upgrade process.

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\(^1\)http://rsb.info.nih.gov/ij/
\(^2\)http://downloads.openmicroscopy.org/latest/bio-formats5/artifacts/bioformats\_package.jar
\(^3\)http://loci.wisc.edu/software/data-browser
\(^4\)http://developer.imagej.net/plugins/image5d
\(^5\)http://www.nanoimaging.de/View5D
\(^6\)http://fiji.sc/Bio-Formats
\(^7\)http://downloads.openmicroscopy.org/latest/bio-formats5/
### 5.1.4 Macros and plugins

Bio-Formats is fully scriptable in a macro, and callable from a plugin. To use in a macro, use the Macro Recorder to record a call to the Bio-Formats Importer with the desired options. You can also perform more targeted metadata queries using the Bio-Formats macro extensions.

Here are some example ImageJ macros and plugins that use Bio-Formats to get you started:

- **basicMetadata.txt**[^8] - A macro that uses the Bio-Formats macro extensions to print the chosen file’s basic dimensional parameters to the Log.

- **planeTimings.txt**[^9] - A macro that uses the Bio-Formats macro extensions to print the chosen file’s plane timings to the Log.


- **bfOpenAsHyperstack.txt**[^11] - This macro from Wayne Rasband opens a file as a hyperstack using only the Bio-Formats macro extensions (without calling the Bio-Formats Importer plugin).

- **zvi2HyperStack.txt**[^12] - This macro from Sebastien Huart reads in a ZVI file using Bio-Formats, synthesizes the LUT using emission wavelength metadata, and displays the result as a hyperstack.

- **dvSplitTimePoints.txt**[^13] - This macro from Sebastien Huart splits timepoints/channels on all DV files in a folder.

- **batchTiffConvert.txt**[^14] - This macro converts all files in a directory to TIFF using the Bio-Formats macro extensions.

- **Read_Image**[^15] - A simple plugin that demonstrates how to use Bio-Formats to read files into ImageJ.

- **Mass_Importer**[^16] - A simple plugin that demonstrates how to open all image files in a directory using Bio-Formats, grouping files with similar names to avoid opening the same dataset more than once.

### 5.2 Fiji overview

Fiji[^17] is an image processing package. It can be described as a distribution of ImageJ together with Java, Java 3D and a lot of plugins organized into a coherent menu structure[^18]. Fiji compares to ImageJ as Ubuntu compares to Linux.

Fiji works with Bio-Formats out of the box, because it comes bundled with the Bio-Formats ImageJ plugins.

For further details on Bio-Formats in Fiji, see the [Bio-Formats Fiji wiki page[^19]].

#### 5.2.1 Upgrading

Upgrading Bio-Formats within Fiji is as simple as invoking the “Update Fiji” command from the Help menu. By default, Fiji even automatically checks for updates every time it is launched, so you will always be notified when new versions of Bio-Formats (or any other bundled plugin) are available.

### 5.3 Bio-Formats features in ImageJ and Fiji

When you select Bio-Formats under the Plugin menu, you will see the following features:

- **The Bio-Formats Importer** is a plugin for loading images into ImageJ or Fiji. It can read over 100 proprietary life sciences formats and standardizes their acquisition metadata into the common OME data model. It will also extract and set basic metadata values such as spatial calibration[^20] if they are available in the file.

[^8]: https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/bio-formats-plugins/utils/macros/basicMetadata.txt
[^9]: https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/bio-formats-plugins/utils/macros/planeTimings.txt
[^10]: https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/bio-formats-plugins/utils/macros/recursiveTiffConvert.txt
[^11]: https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/bio-formats-plugins/utils/macros/bfOpenAsHyperstack.txt
[^12]: https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/bio-formats-plugins/utils/macros/zvi2HyperStack.txt
[^14]: https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/bio-formats-plugins/utils/macros/batchTiffConvert.txt
[^15]: http://fiji.sc/Mass_Importer.java
[^17]: http://fiji.sc/Plugins_Menu
[^19]: http://fiji.sc/Bio-Formats
[^20]: http://fiji.sc/SpatialCalibration
• The Bio-Formats Exporter is a plugin for exporting data to disk. It can save to the open OME-TIFF file format, as well as several movie formats (e.g. QuickTime, AVI) and graphics formats (e.g. PNG, JPEG).

• The Bio-Formats Remote Importer is a plugin for importing data from a remote URL. It is likely to be less robust than working with files on disk, so we recommend downloading your data to disk and using the regular Bio-Formats Importer whenever possible.

• The Bio-Formats Windowless Importer is a version of the Bio-Formats Importer plugin that runs with the last used settings to avoid any additional dialogs beyond the file chooser. If you always use the same import settings, you may wish to use the windowless importer to save time (Learn more here).

• The Bio-Formats Macro Extensions plugin prints out the set of commands that can be used to create macro extensions. The commands and the instructions for using them are printed to the ImageJ log window.

• The Stack Slicer plugin is a helper plugin used by the Bio-Formats Importer. It can also be used to split a stack across channels, focal planes or time points.

• The Bio-Formats Plugins Configuration dialog is a useful way to configure the behavior of each file format. The Formats tab lists supported file formats and toggles each format on or off, which is useful if your file is detected as the wrong format. It also toggles whether each format bypasses the importer options dialog through the “Windowless” checkbox. You can also configure any specific option for each format. The Libraries tab provides a list of available helper libraries used by Bio-Formats.

• The Bio-Formats Plugins Shortcut Window opens a small window with a quick-launch button for each plugin. Dragging and dropping files onto the shortcut window opens them quickly using the Bio-Formats Importer plugin.

• The Update Bio-Formats Plugins command will check for Bio-Formats Plugins updates. We recommend you update to the latest build as soon as you think you may have discovered a bug.

### 5.4 Installing Bio-Formats in ImageJ

Note: Since FIJI is essentially ImageJ with plugins like Bio-Formats already built in, people who install Fiji can skip this section. If you are also using the OMERO plugin for ImageJ, you may find the set-up guide on the new user help site useful for getting you started with both plugins at the same time.

Once you download and install ImageJ, you can install the Bio-Formats plugin by going to the Bio-Formats download page.

For most end-users, we recommend downloading the bioformats_package.jar complete bundle.

However, you must decide which version of it you want to install. There are three primary versions of Bio-Formats: the latest builds, the daily builds, and the release versions. Which version you should download depends on your needs:

• The latest build is automatically updated every time any change is made to the source code on the main “dev_5_0” branch in Git, Bio-Formats’ software version control system. This build has the latest bug fixes, but it is not well tested and may have also introduced new bugs.

• The daily build is a compilation of that day’s changes that occurs daily around midnight. It is not any better tested than the latest build; but if you download it multiple times in a day, you can be sure you will get the same version each time.

• The release is thoroughly tested and has documentation to match. The list of supported formats on the Bio-Formats site corresponds to the most recent release. We do not add new formats to the list until a release containing support for that format has been completed. The release is less likely to contain bugs.

The release version is also more useful to programmers because they can link their software to a known, fixed version of Bio-Formats. Bio-Formats’ behavior will not be changing “out from under them” as they continue developing their own programs.

Note: There are currently two release version of Bio-Formats as we are maintaining support for the 4.4.x series while only actively developing the new 5.x series. Unless you are using Bio-Formats with the OMERO ImageJ plugin and an OMERO 4.4.x server, we recommend you use Bio-Formats 5. A new 4.4.x version will only be released if a major bug fix is required.

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21http://www.openmicroscopy.org/site/support/ome-model/ome-tiff
22http://help.openmicroscopy.org/imagej.html
23http://rsweb.nih.gov/ij/download.html
24http://downloads.openmicroscopy.org/latest/bio-formats5/
We often **recommend that most people simply use the latest build** for two reasons. First, it may contain bug-fixes or new features you want anyway; secondly, you will have to reproduce any bug you encounter in Bio-Formats against the latest build before submitting a bug report. Rather than using the release until you find a bug that requires you to upgrade and reproduce it, why not just use the latest build to begin with?

Once you decide which version you need, go to the Bio-Formats [download page](http://downloads.openmicroscopy.org/latest/bio-formats5/) and save the appropriate `bioformats_package.jar` to the Plugins directory within ImageJ.

![Figure 5.1: Plugin Directory for ImageJ: Where in ImageJ's file structure you should place the file once you downloaded it.](image)

You may have to quit and restart ImageJ. Once you restart it, you will find Bio-Formats in the Bio-Formats option under the Plugins menu:

![ImageJ Plugins menu](image)

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5.4. Installing Bio-Formats in ImageJ
You are now ready to start using Bio-Formats.

5.5 Using Bio-Formats to load images into ImageJ

This section will explain how to use Bio-Formats to import files into ImageJ and how to use the settings on the Bio-Formats Import Options screen.

5.5.1 Opening files

There are three ways you can open a file using Bio-Formats:

1. Select the Bio-Formats Importer under the Bio-Formats plugins menu.
2. Drag and drop it onto the Bio-Formats Plugins Shortcut window.
3. Use the Open command in the File menu.

Unless you used the Bio-Formats Plugins Configuration dialog to open the file type windowlessly, you know you used Bio-Formats to open a file when you see a screen like this:

![Bio-Formats Import Options Screen](image)

If you used the File > Open command and did not see the Bio-Formats Import Options screen, ImageJ/Fiji probably used another plugin instead of Bio-Formats to open the file. If this happens and you want to open a file using Bio-Formats, use one of the other two methods instead.

5.5.2 Opening files windowlessly

When you open a file with Bio-Formats, the Import Options Screen automatically recalls the settings you last used to open a file with that specific format (e.g. JPG, TIF, LSM, etc.). If you always choose the same options whenever you open files in a specific file format, you can save yourself time by bypassing the Bio-Formats Import Options screen. You can accomplish this two ways:

1. You can select the **Bio-Formats Windowless Importer**, located in the Bio-Formats menu under ImageJ’s Plugin menu. When you select this option, Bio-Formats will import the file using the same settings you used the last time you imported a file with the same format.

2. If you invariably use the same settings when you open files in a specific format, you can always bypass the Import Options Screen by changing the settings in the **Bio-Formats Plugins Configuration** option, which is also located in the Bio-Formats menu under ImageJ’s Plugin menu.
Once you select this option, select the file format you are interested in from the list on the left side of the screen. Check both the **Enabled** and **Windowless** boxes. Once you do this, whenever you open a file using the **Bio-Formats Windowless Importer**, the **Bio-Formats Importer**, or the drag-and-drop method described in the previous section, the file will always open the same way using the last setting used.

Please note that if you want to change any of the import settings once you enable this windowless option, you will have to go back to the **Bio-Formats Plugins Configuration** screen, unselect the windowless option, open a file using the regular **Bio-Formats Importer**, select your settings, and re-select the windowless option.

### 5.5.3 Group files with similar names

One of the most important features of Bio-Formats is to combine multiple files from a data set into one coherent, multi-dimensional image.

To demonstrate how to use the **Group files with similar names** feature, you can use the dub\(^{26}\) data set available under LOCI’s [Sample Data]\(^{27}\) page. You will notice that it is a large dataset: each of the 85 files shows the specimen at 33 optical sections along the z-plane at a specific time.

If you open just one file in ImageJ/Fiji using the **Bio-Formats Importer**, you will get an image incorporating three dimensions (x, y, z). However, if you select **Group files with similar names** from the Bio-Formats Import Options screen, you will be able to create a 4-D image (x, y, z, and t) incorporating the 85 files.

After clicking OK, you will see a screen like this:

![Screen showing options to group files](image)

This screen allows you to select which files within the 85-file cluster to use to create that 4-D image. Some information will be pre-populated in the fields. Unless you want to change the settings in that field, there is no need to change or delete it. If you click OK at this point, you will load all 85 files.

However, you can specify which files you want to open by adjusting the “axis information”, the file “name contains”, or the “pattern” sections. Even though there are three options, you only need to need to make changes to one of them. Since Bio-Format’s precedence for processing data is from top to bottom, only the uppermost section that you made changes to will be used. If you change multiple boxes, any information you enter into lower boxes will be ignored.

To return to the example involving the dub data set, suppose you want to open the first image and only every fifth image afterwards (i.e. dub01, dub06, dub11 . . . dub81). This would give you 17 images. There are different ways to accomplish this:

You can use the **Axis Settings** only when your files are numbered in sequential order and you want to open only a subset of the files that have similar names. Since the dub data set is numbered sequentially, you can use this feature.

**Axis 1 number of images** refers to the total number of images you want to open. Since you want to view 17 images, enter 17. **Axis 1 axis first image** specifies which image in the set you want to be the first. Since you want to start with dub01, enter 1 in that box. You also want to view only every fifth image, so enter 5 in the **Axis 1 axis increment** box.

---

\(^{26}\)http://loci.wisc.edu/sample-data/dub

\(^{27}\)http://loci.wisc.edu/software/sample-data
The **File name contains** box should be used if all of the files that you want to open have common text. This is especially useful when the files are not numbered. For example, if you have “Image_Red.tif”, “Image_Green.tif”, and “Image_Blue.tif” you could enter “Image_” in the box to group them all.

To continue the example involving the dub data set, you cannot use the **file name contains** box to open every fifth image. However, if you only wanted to open dub10 thorough dub19, you could enter “dub1” in the **file name contains** box.

The **pattern** box can be used to do either of the options listed above or much more. This box can accept a single file name like “dub01.pic”. It can also contain a pattern that use “<” and “>” to specify what numbers or text the file names contain.

There are three basic forms to the “< >” blocks:

- **Text enumeration** - “Image_<Red,Green,Blue>.tif” is the pattern for Image_Red.tif, Image_Green.tif, Image_Blue.tif. (Note that the order you in which you enter the file names is the order in which they will be loaded.)
- **Number range** - “dub<1-85>.pic” is the pattern for “dub1.pic”, “dub2.pic”, “dub3.pic” . . . “dub85.pic”.
- **Number range with step** - “dub<1-85:5>.pic” is the pattern for “dub1.pic”, “dub6.pic”, “dub11.pic”, “dub11.pic” . . . “dub85.pic”.

It can also accept a [Java regular expression][28].

### 5.5.4 Autoscale

**Autoscale** helps increase the brightness and contrast of an image by adjusting the range of light intensity within an image to match the range of possible display values. Note that Autoscale does not change your data. It just changes how it is displayed.

Each pixel in an image has a numerical value ascribed to it to describe its intensity. The bit depth—the number of possible values—depends on the number of bits used in the image. Eight bits, for example, gives 256 values to express intensity where 0 is completely black, 255 is completely white, and 1 through 254 display increasingly lighter shades of grey.

ImageJ can collect the intensity information about each pixel from an image or stack and create a histogram (you can see it by selecting Histogram under the Analyze menu). Here is the histogram of a one particular image:

![Histogram of 15test.ome](image)

Notice that the histogram heavily skews right. Even though there are 256 possible values, only 0 through 125 are being used.

---

[28]:http://download.oracle.com/javase/1.5.0/docs/api/java/util/regex/Pattern.html
Autoscale adjusts the image so the smallest and largest number in that image or stack’s histogram become the darkest and brightest settings. For this image, pixels with the intensity of 125 will be displayed in pure white. The other values will be adjusted too to help show contrast between values that were too insignificant to see before.

Here is one image Bio-Formats imported with and without using Autoscale:

![Image](image.jpg)

Autoscale readjusts the image based on the highest value in the entire data set. This means if the highest value in your dataset is close to maximum display value, Autoscale’s adjusting may be undetectable to the eye.

ImageJ/Fiji also has its own tools for adjusting the image, which are available by selecting Brightness/Contrast, which is under the Adjust option in the Image menu.

### 5.6 Managing memory in ImageJ/Fiji using Bio-Formats

When dealing with a large stack of images, you may receive a warning like this:
This means the allotted memory is less than what Bio-Formats needs to load all the images. If you have a very large data set, you may have to:

- View your stack with Data Browser
- Crop the view area
- Open only a subset of images
- Use Virtual Stack
- Increase ImageJ/Fiji’s memory.

If your files contain JPEG or JPEG-2000 images, you may see this memory warning even if your file size is smaller than the amount of allocated memory. This is because compressed images like JPEG need to be decompressed into memory before being displayed and require more memory than their file size suggests. If you are having this issue, try utilizing one of the memory management tools below.

5.6.1 View your stack with Data Browser

Data Browser is another part of Bio-Formats that enables users to view large 3, 4, or 5-D datasets by caching a subset of all the images available. This enables users to view a stack that is bigger than the computer’s memory.

You can select Data Browser as an option for View stack with, the leftmost, uppermost option in the Bio-Formats Import Options screen.
Note that when you use Data Browser, other features like cropping and specifying range are not available. You can, however, adjust the size of the image cache in the Data Browser after you open the files. You can read more about it on LOCI’s Data Browser page.29

5.6.2 Cropping the view area

Crop on Import is useful if your images are very large and you are only interested in one specific section of the stack you are importing. If you select this feature, you will see a screen where you can enter the height and width (in pixels) of the part of image you want to see. Note that these measurements are from the top left corner of the image.

5.6.3 Opening only a subset of images

The Specify Range for Each Series option is useful for viewing a portion of a data set where all the plane images are encapsulated into one file (e.g. the Zeiss LSM format). If your file has a large quantity of images, you can specify which channels, Z-planes, and times you want to load.

5.6.4 Use Virtual Stack

Virtual Stack conserves memory by not loading specific images until necessary. Note that unlike Data Browser, Virtual Stack does not contain a buffer and may produce choppy animations.

5.6.5 Increasing ImageJ/Fiji’s memory

Finally, you can also increase the amount of the computer memory devoted to ImageJ/Fiji by selecting Memory & Threads under the Edit menu.

29http://loci.wisc.edu/software/data-browser
Generally, allocating more than 75% of the computer’s total memory will cause ImageJ/Fiji to become slow and unstable.

Please note that unlike the other three features, ImageJ/Fiji itself provides this feature and not Bio-Formats. You can find out more about this feature by looking at ImageJ’s documentation.\textsuperscript{30}

\textsuperscript{30}http://rsbweb.nih.gov/ij/docs/menus/edit.html#options
The Bio-Formats Command line tools (bftools.zip) provide a complete package for carrying out a variety of tasks:

## 6.1 Command line tools introduction

There are several scripts for using Bio-Formats on the command line.

### 6.1.1 Installation

Download bftools.zip\(^1\), unzip it into a new folder.

**Note:** As of Bio-Formats 5.0.0, this zip now contains the bundled jar and you no longer need to download loci_tools.jar or the new bioformats_package.jar separately.

The zip file contains both Unix scripts and Windows batch files.

### 6.1.2 Tools available

Currently available tools include:

- **showinf**  Prints information about a given image file to the console, and displays the image itself in the Bio-Formats image viewer (see Displaying images and metadata for more information).

- **ijview**  Displays the given image file in ImageJ using the Bio-Formats Importer plugin.

- **bfconvert**  Converts an image file from one format to another. Bio-Formats must support writing to the output file (see Converting a file to different format for more information).

- **formatlist**  Displays a list of supported file formats in HTML, plaintext or XML.

- **xmlindent**  A simple XML prettifier similar to xmllint --format but more robust in that it attempts to produce output regardless of syntax errors in the XML.

- **xmlvalid**  A command-line XML validation tool, useful for checking an OME-XML document for compliance with the OME-XML schema.

- **tiffcomment**  Dumps the comment from the given TIFF file’s first IFD entry; useful for examining the OME-XML block in an OME-TIFF file (also see Editing XML in an OME-TIFF).

Some of these tools also work in combination, for example Validating XML in an OME-TIFF uses both tiffcomment and xmlvalid.

Running any of these commands without any arguments will print usage information to help you.

\(^1\)http://downloads.openmicroscopy.org/latest/bio-formats5/artifacts/bftools.zip
6.1.3 Using the tools directly from source

If you have checked out the source from the Git repository you already have the command line tools in the tools directory. You can configure the scripts to use your source tree instead of bioformats_package.jar in the same directory by following these steps:

1. Point your CLASSPATH to the checked-out directory and the JAR files in the jar folder.
   - E.g. on Windows with Java 1.6 or later, if you have checked out the source at C:\code\bio-formats, set your CLASSPATH environment variable to the value C:\code\bio-formats\jar\*;C:\code\bio-formats.
   
   You can access the environment variable configuration area by right-clicking on My Computer, choosing Properties, Advanced tab, Environment Variables button.

2. Compile the source with ant compile.

3. Set the BF_DEVEL environment variable to any value (the variable just needs to be defined).

6.1.4 Version checker

If you run bttools outside of the OMERO environment, you may encounter an issue with the automatic version checker causing a tool to crash when trying to connect to upgrade.openmicroscopy.org.uk. The error message will look something like this:

```
Failed to compare version numbers
java.io.IOException: Server returned HTTP response code: 400 for URL:
http://upgrade.openmicroscopy.org.uk?version=4.4.8;os.name=Linux;os.version=2.6.32-358.6.2.el6.x86_64;os.arch=amd64;java.runtime.version=1.6.0_24-b24;java.vm.vendor=Sun+Microsystems+Inc.;bioformats.caller=Bio-Formats+utilities
```

To avoid this issue, call the tool with the -no-upgrade parameter.

6.2 Displaying images and metadata

The showinf command line tool can be used to show the images and metadata contained in a file.

If no options are specified, showinf displays a summary of available options.

To simply display images:

```
showinf /path/to/file
```

All of the images in the first ‘series’ (or 5 dimensional stack) will be opened and displayed in a simple image viewer. The number of series, image dimensions, and other basic metadata will be printed to the console.

To display a different series, for example the second one:

```
showinf -series 1 /path/to/file
```

Note that series numbers begin with 0.

To display the OME-XML metadata for a file on the console:

```
showinf -omexml /path/to/file
```

Image reading can be suppressed if only the metadata is needed:
showinf -nopix /path/to/file

A subset of images can also be opened instead of the entire stack, by specifying the start and end plane indices (inclusive):

showinf -range 0 0 /path/to/file

That opens only the first image in first series in the file.

For very large images, it may also be useful to open a small tile from the image instead of reading everything into memory. To open the upper-left-most 512x512 tile from the images:

showinf -crop 0,0,512,512 /path/to/file

The parameter to -crop is of the format x, y, width, height. The (x, y) coordinate (0, 0) is the upper-left corner of the image; x + width must be less than or equal to the image width and y + height must be less than or equal to the image height.

By default, showinf will check for a new version of Bio-Formats. This can take several seconds (especially on a slow internet connection); to save time, the update check can be disabled:

showinf -no-update /path/to/file

Similarly, if OME-XML is displayed then it will automatically be validated. On slow or missing internet connections, this can take some time, and so can be disabled:

showinf -novalid /path/to/file

6.3 Converting a file to different format

The bfconvert command line tool can be used to convert files between supported formats. bfconvert with no options displays a summary of available options.

To convert a file to single output file (e.g. TIFF):

bfconvert /path/to/input output.tiff

The output file format is determined by the extension of the output file, e.g. .tiff for TIFF files, .ome.tiff for OME-TIFF, .png for PNG.

All images in the input file are converted by default. To convert only one series:

bfconvert -series 0 /path/to/input output-first-series.tiff

To convert only one timepoint:

bfconvert -timepoint 0 /path/to/input output-first-timepoint.tiff

To convert only one channel:

bfconvert -channel 0 /path/to/input output-first-channel.tiff
To convert only one Z section:

```
bfconvert -z 0 /path/to/input output-first-z.tiff
```

To convert images between certain indices (inclusive):

```
bfconvert -range 0 2 /path/to/input output-first-3-images.tiff
```

Images can also be written to multiple files by specifying a pattern string in the output file. For example, to write one series, timepoint, channel, and Z section per file:

```
bfconvert /path/to/input output_series_%s_Z%z_C%c_T%t.tiff
```

%s is the series index, %z is the Z section index, %c is the channel index, and %t is the timepoint index (all indices begin at 0).

By default, all images will be written uncompressed. Supported compression modes vary based upon the output format, but when multiple modes are available the compression can be changed using the `-compression` option. For example, to use LZW compression in a TIFF file:

```
bfconvert -compression LZW /path/to/input output-lzw.tiff
```

### 6.4 Validating XML in an OME-TIFF

The XML stored in an OME-TIFF file can be validated using the `command line tools`.

Both the `tiffcomment` and `xmlvalid` commands are used; `tiffcomment` extracts the XML from the file and `xmlvalid` validates the XML and prints any errors to the console.

For example:

```
tiffcomment /path/to/file.ome.tiff | xmlvalid -
```

will perform the extraction and validation all at once.

Typical successful output is:

```
[~/Work/bftools]$ ./xmlvalid sample.ome
Parsing schema path
http://www.openmicroscopy.org/Schemas/OME/2010-06/ome.xsd
Validating sample.ome
No validation errors found.
[~/Work/bftools]$
```

If any errors are found they are reported. When correcting errors it is usually best to work from the top of the file as errors higher up can cause extra errors further down. In this example the output shows 3 errors but there are only 2 mistakes in the file:

```
[~/Work/bftools]$ ./xmlvalid broken.ome
Parsing schema path
http://www.openmicroscopy.org/Schemas/OME/2010-06/ome.xsd
Validating broken.ome
cvc-complex-type.4: Attribute 'SizeY' must appear on element 'Pixels'.
cvc-enumeration-valid: Value 'Non Zero' is not facet-valid with respect to enumeration '[EvenOdd, NonZero]'. It must be a value from the enumeration.
cvc-attribute.3: The value 'Non Zero' of attribute 'FillRule' on element 'ROI:Shape' is not valid with respect to its type, 'null'.
```

6.4. Validating XML in an OME-TIFF 40
Error validating document: 3 errors found
[~/Work/bftools]$

If the XML is found to have validation errors, the `tiffcomment` command can be used to overwrite the XML in the OME-TIFF file with corrected XML. The XML can be displayed in an editor window:

```
tiffcomment -edit /path/to/file.ome.tiff
```

or the new XML can be read from a file:

```
tiffcomment -set new-comment.xml /path/to/file.ome.tiff
```

## 6.5 Editing XML in an OME-TIFF

To edit the XML in an OME-TIFF file you can use `tiffcomment`, one of the Bio-Formats tools.

To use the built-in editor run:

```
tiffcomment -edit sample.ome.tif
```

To extract or view the XML run:

```
tiffcomment sample.ome.tif
```

To inject replacement XML into a file run:

```
tiffcomment -set 'newmetadata.xml' sample.ome.tif
```
OMERO 5 uses Bio-Formats to read original files from over 130 file formats. Please refer to the OMERO documentation\(^1\) for further information.

\(^1\)http://www.openmicroscopy.org/site/support/omero5/
8.1 BISQUE

The BISQUE\textsuperscript{1} (Bio-Image Semantic Query User Environment) Database, developed at the Center for Bio-Image Informatics at UCSB, was developed for the exchange and exploration of biological images. The Bisque system supports several areas useful for imaging researchers from image capture to image analysis and querying. The bisque system is centered around a database of images and metadata. Search and comparison of datasets by image data and content is supported. Novel semantic analyses are integrated into the system allowing high level semantic queries and comparison of image content.

Bisque integrates with Bio-Formats by calling the showinf command line tool.

8.2 OME Server

OME\textsuperscript{2} is a set of software that interacts with a database to manage images, image metadata, image analysis and analysis results. The OME system is capable of leveraging Bio-Formats to import files.

Please note - the OME server is no longer maintained and has now been superseded by the OMERO server\textsuperscript{3}. Support for the OME server has been entirely removed in the 5.0.0 version of Bio-Formats; the following instructions can still be used with the 4.4.x versions.

8.2.1 Installation

For OME Perl v2.6.1\textsuperscript{4} and later, the command line installer automatically downloads the latest loci_tools.jar and places it in the proper location. This location is configurable, but is /OME/java/loci_tools.jar by default.

For a list of what was recognized for a particular import into the OME server, go to the Image details page in the web interface, and click the “Image import” link in the upper right hand box.

Bio-Formats is capable of parsing original metadata for supported formats, and standardizes what it can into the OME data model. For the rest, it expresses the metadata in OME terms as key/value pairs using an OriginalMetadata custom semantic type. However, this latter method of metadata representation is of limited utility, as it is not a full conversion into the OME data model.

Bio-Formats is enabled in OME v2.6.1 for all formats except:

\begin{itemize}
  \item OME-TIFF
  \item Metamorph HTD
  \item Deltavision DV
  \item Metamorph STK
  \item Bio-Rad PIC
  \item Zeiss LSM
  \item TIFF
\end{itemize}

\textsuperscript{1}http://www.bioimage.ucsb.edu/bisque
\textsuperscript{2}http://openmicroscopy.org/site/support/legacy/ome-server
\textsuperscript{3}http://www.openmicroscopy.org/site/support/omero5/
\textsuperscript{4}http://downloads.openmicroscopy.org/ome/2.6.1/
The above formats have their own Perl importers that override Bio-Formats, meaning that Bio-Formats is not used to process them by default. However, you can override this behavior (except for Metamorph HTD, which Bio-Formats does not support) by editing an OME database configuration value:

% psql ome

To see the current file format reader list:

ome=# select value from configuration where name='import_formats';

value
------------------------------------------------------------------------------
["OME::ImportEngine::OMETIFFreader","OME::ImportEngine::MetamorphHTDFormat",
"OME::ImportEngine::DVreader","OME::ImportEngine::STKreader",
"OME::ImportEngine::BioradReader","OME::ImportEngine::LSMreader",
"OME::ImportEngine::TIFFreader","OME::ImportEngine::BMPreader",
"OME::ImportEngine::DICOMreader","OME::ImportEngine::XMLreader",
"OME::ImportEngine::BioFormats"]
(1 row)

To remove extraneous readers from the list:

ome=# update configuration set value='["OME::ImportEngine::MetamorphHTDFormat",
"OME::ImportEngine::XMLreader","OME::ImportEngine::BioFormats"]' where name='import_formats';

UPDATE 1
ome=# select value from configuration where name='import_formats';

value
------------------------------------------------------------------------------
["OME::ImportEngine::MetamorphHTDFormat","OME::ImportEngine::XMLreader",
"OME::ImportEngine::BioFormats"]
(1 row)

To reset things back to how they were:

ome=# update configuration set value='["OME::ImportEngine::OMETIFFreader",
"OME::ImportEngine::MetamorphHTDFormat",
"OME::ImportEngine::DVreader","OME::ImportEngine::STKreader",
"OME::ImportEngine::BioradReader","
"OME::ImportEngine::TIFFreader","
"OME::ImportEngine::BMPreader","
"OME::ImportEngine::DICOMreader","
"OME::ImportEngine::XMLreader","
"OME::ImportEngine::BioFormats"]' where name='import_formats';

Lastly, please note that Li-Cor L2D files cannot be imported into an OME server (see this Trac ticket\(^5\) for details). Since the OME perl server has been discontinued, we have no plans to fix this limitation.

8.2.2 Upgrading

You can upgrade your OME server installation to take advantage of a new Bio-Formats release\(^6\) by overwriting the old loci_tools.jar with the new one.

\(^5\)http://dev.loci.wisc.edu/trac/software/ticket/266
\(^6\)http://downloads.openmicroscopy.org/latest/bio-formats5/
8.2.3 Source Code

The source code for the Bio-Formats integration with OME server spans three languages, using piped system calls in both directions to communicate, with imported pixels written to OMEIS pixels files. The relevant source files are:

- **OmeisImporter.java**\(^7\) – omebf Java command line tool
- **BioFormats.pm**\(^8\) – Perl module for OME Bio-Formats importer
- **omeis.c**\(^9\) – OMEIS C functions for Bio-Formats (search for “bioformats” case insensitively to find relevant sections)

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\(^8\) [http://downloads.openmicroscopy.org/ome/code/BioFormats.pm](http://downloads.openmicroscopy.org/ome/code/BioFormats.pm)

\(^9\) [http://downloads.openmicroscopy.org/ome/code/omeis.c](http://downloads.openmicroscopy.org/ome/code/omeis.c)
9.1 FARSIGHT

FARSIGHT\(^1\) is a collection of modules for image analysis created by LOCI’s collaborators at the University of Houston\(^2\). These open source modules are built on the ITK library and thus can take advantage of ITK’s support for Bio-Formats to process otherwise unsupported image formats.

The principal FARSIGHT module that benefits from Bio-Formats is the Nucleus Editor\(^3\), though in principle any FARSIGHT-based code that reads image formats via the standard ITK mechanism will be able to leverage Bio-Formats.

See also:
FARSIGHT Downloads page\(^4\)
FARSIGHT HowToBuild tutorial\(^5\)

9.2 i3dcore

i3dcore\(^6\), also known as the CBIA 3D image representation library, is a 3D image processing library developed at the Centre for Biomedical Image Analysis\(^7\). Together with i3dalgo\(^8\) and i4dcore\(^9\), i3dcore forms a continuously developed templated cross-platform C++ suite of libraries for multidimensional image processing and analysis.

i3dcore is capable of reading images with Bio-Formats using Java for C++\(^10\) (java4cpp).

See also:
Download i3dcore\(^11\)
CBIA Software Development\(^12\)

9.3 ImgLib

ImgLib\(^2\) is a multidimensional image processing library. It provides a general mechanism for writing image analysis algorithms, without writing case logic for bit depth\(^13\), or worrying about the source of the pixel data (arrays in memory, files on disk, etc.).

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\(^1\)http://www.farsight-toolkit.org/
\(^2\)http://www.uh.edu/
\(^3\)http://www.farsight-toolkit.org/wiki/NucleusEditor
\(^4\)http://www.farsight-toolkit.org/wiki/FARSIGHT_Downloads
\(^5\)http://www.farsight-toolkit.org/wiki/FARSIGHT_HowToBuild
\(^6\)http://cbia.fi.muni.cz/user_dirs/i3dlib_doc/i3dcore/index.html
\(^7\)http://cbia.fi.muni.cz/software-development.html
\(^8\)http://cbia.fi.muni.cz/user_dirs/i3dlib_doc/i3dalgo/index.html
\(^10\)http://java4cpp.kapott.org/
\(^11\)http://cbia.fi.muni.cz/user_dirs/i3dlib_doc/i3dcore/index.html#download
\(^12\)http://cbia.fi.muni.cz/software-development.html
\(^13\)http://imglib2.net/
\(^14\)http://en.wikipedia.org/wiki/Color_depth
The SCIFIO\textsuperscript{15} project provides an ImgOpener\textsuperscript{16} utility class for reading data into ImgLib2 data structures using Bio-Formats.

## 9.4 ITK

The Insight Toolkit\textsuperscript{17} (ITK) is an open-source, cross-platform system that provides developers with an extensive suite of software tools for image analysis. Developed through extreme programming methodologies, ITK employs leading-edge algorithms for registering and segmenting multidimensional data.

ITK provides an ImageIO plug-in structure that works via discovery through a dependency injection scheme. This allows a program built on ITK to load plug-ins for reading and writing different image types without actually linking to the ImageIO libraries required for those types. Such encapsulation automatically grants two major boons: firstly, programs can be easily extended just by virtue of using ITK (developers do not have to specifically accommodate or anticipate what plug-ins may be used). Secondly, the architecture provides a distribution method for open source software, like Bio-Formats, which have licenses that might otherwise exclude them from being used with other software suites.

The SCIFIO ImageIO\textsuperscript{18} plugin provides an for ITK imageIO base that uses Bio-Formats\textsuperscript{19} to read and write supported life sciences file formats. This plugin allows any program built on ITK to read any of the image types supported by Bio-Formats.

### 9.4.1 Prerequisites

You should have CMake\textsuperscript{20} installed, to allow the configuration of ITK builds. If you want the latest ITK development build, you will need Git\textsuperscript{21} as well.

### 9.4.2 Installation

Simply download ITK from the Kitware software page\textsuperscript{22}. Using CMake, set the following configuration flag:

\begin{verbatim}
Module_SCIFIO = ON
\end{verbatim}

**Note:** This flag is only visible in “advanced” mode within CMake

If you would like to use the utility classes included with the SCIFIO imageIO, also set the flag:

\begin{verbatim}
BUILD_TESTING = ON
\end{verbatim}

Then build ITK as normal. It will automatically download and build the latest SCIFIO imageIO plugin.

### 9.4.3 Usage

Applications using the installed ITK should automatically defer to the SCIFIO ImageIO, and thus Bio-Formats, when reading or saving images not natively supported by ITK.

To use the SCIFIO test utility, run:

```
SCIFIOTestDriver
```

\textsuperscript{15}http://scif.io/
\textsuperscript{16}https://github.com/scifio/scifio/blob/master/scifio/src/main/java/io/scif/img/ImgOpener.java
\textsuperscript{17}http://itk.org/
\textsuperscript{18}https://github.com/scifio/scifio-imageio
\textsuperscript{19}http://farsight-toolkit.org/wiki/Bio-Formats
\textsuperscript{20}http://www.cmake.org/
\textsuperscript{21}http://git-scm.com/
\textsuperscript{22}http://www.itk.org/ITK/resources/software.html
from your ${ITK_BUILD}/bin directory. This program has four separate applications that can be directly invoked using the syntax:

```
SCIFIOTestDriver [Program to run] [Program arguments]
```

The programs are as follows:
- **itkSCIFIOImageInfoTest**  Displays basic information to verify the SCIFIO image IO works, using .fake images.
- **itkSCIFIOImageIOTest**    Reads an input image, and writes it out as a specified type
- **itkRGBSCIFIOImageIOTest** Same as itkSCIFIOImageIOTest but for RGB\(^{23}\) types
- **itkVectorImageSCIFIOImageIOTest** Same as itkSCIFIOImageIOTest but for VectorImage\(^{24}\) type

For example, to convert a .czi image to a .tif, you would use:

```
SCIFIOTestDriver itkSCIFIOImageIOTest in.czi out.tif
```

### 9.4.4 Troubleshooting

Please send any issues, suggestions or requests to the [insight users mailing list]\(^{25}\).

### 9.5 Qu for MATLAB

**Qu for MATLAB**\(^ {26} \) is a MATLAB toolbox for the visualization and analysis of N-dimensional datasets targeted to the field of biomedical imaging, developed by Aaron Ponti.

- Uses Bio-Formats to read files
- Open source software available under the Mozilla Public License

See also:
- [Qu for MATLAB download page]\(^ {27} \)

### 9.6 Subimager

**Subimager**\(^ {28} \), the SUBprocess IMAGE servER, is an HTTP server that uses Bio-Formats as a back-end to serve .TIF images. Subimager is designed to be run as a subprocess of CellProfiler to provide CellProfiler with the capability to read and write a variety of image formats. It can be used as a stand-alone image server. It was developed by the [Broad Institute]\(^ {29} \) to facilitate integration with their [CellProfiler]\(^ {30} \) image analysis application.

---

\(^{23}\)http://www.itk.org/Doxygen/html/classitk_1_1RGBPixel.html
\(^{24}\)http://www.itk.org/Doxygen/html/classitk_1_1VectorImage.html
\(^{25}\)http://www.itk.org/ITK/help/mailing.html
\(^{26}\)http://www.scs2.net/home/index.php?option=com_content&view=article&id=46%3Aqu-for-matlab&catid=34%3Aqu&Itemid=55
\(^{27}\)http://www.scs2.net/home/index.php?option=com_content&view=article&id=46%3Aqu-for-matlab&catid=34%3Aqu&Itemid=55&limitstart=3
\(^{28}\)https://github.com/CellProfiler/subimager
\(^{29}\)http://www.broadinstitute.org/
\(^{30}\)http://www.cellprofiler.org/
NUMERICAL DATA PROCESSING APPLICATIONS

10.1 IDL

IDL\(^1\) (Interactive Data Language) is a popular data visualization and analysis platform used for interactive processing of large amounts of data including images.

IDL possesses the ability to interact with Java applications via its IDL-Java bridge. Karsten Rodenacker has written a script that uses Bio-Formats to read in image files to IDL.

**10.1.1 Installation**

Download the `ij_read_bio_formats.pro`\(^2\) script from Karsten Rodenacker’s IDL goodies (?)\(^3\) web site. See the comments at the top of the script for installation instructions and caveats.

**10.1.2 Upgrading**

To use a newer version of Bio-Formats, overwrite the requisite JAR files with the newer version\(^4\) and restart IDL.

10.2 KNIME

KNIME\(^5\) (Konstanz Information Miner) is a user-friendly and comprehensive open-source data integration, processing, analysis, and exploration platform. KNIME supports image import using Bio-Formats using the KNIME Image Processing\(^6\) (a.k.a. KNIP) plugin.

10.3 MATLAB

MATLAB\(^7\) is a high-level language and interactive environment that facilitates rapid development of algorithms for performing computationally intensive tasks.

Calling Bio-Formats from MATLAB is fairly straightforward, since MATLAB has built-in interoperability with Java. We have created a set of scripts\(^8\) for reading image files. Note the minimum supported MATLAB version is R2007b (7.5).

---

\(^{1}\)http://www.exelisvis.com/ProductsServices/IDL.aspx
\(^{2}\)http://karo03.bplaced.net/karo/IDL_/pro/ij_read_bio_formats.pro
\(^{3}\)http://karo03.bplaced.net/karo/ro_embed.php?file=IDL/index.html
\(^{4}\)http://downloads.openmicroscopy.org/latest/bio-formats5/
\(^{5}\)http://www.knime.org/
\(^{6}\)http://tech.knime.org/community/image-processing
\(^{7}\)http://www.mathworks.com/products/matlab/
\(^{8}\)https://github.com/openmicroscopy/bioformats/tree/v5.0.2/components/formats-gpl/matlab
10.3.1 Installation

Download the MATLAB toolbox from the Bio-Formats downloads page. Unzip `bfmatlab.zip` and add the unzipped `bfmatlab` folder to your MATLAB path.

Note: As of Bio-Formats 5.0.0, this zip now contains the bundled jar and you no longer need to download `loci_tools.jar` or the new `bioformats_package.jar` separately.

10.3.2 Usage

Please see *Using Bio-Formats in MATLAB* for usage instructions. If you intend to extend the existing `.m` files, please also see the developer page for more information on how to use Bio-Formats in general.

10.3.3 Performance

In our tests (MATLAB R14 vs. java 1.6.0_20), the script executes at approximately half the speed of our `showinf` command line tool, due to overhead from copying arrays.

10.3.4 Upgrading

To use a newer version of Bio-Formats, overwrite the content of the `bfmatlab` folder with the newer version of the toolbox and restart MATLAB.

10.3.5 Alternative scripts

Several other groups have developed their own MATLAB scripts that use Bio-Formats, including the following:

- [https://github.com/prakatmac/bf-tools/](https://github.com/prakatmac/bf-tools/)
- [imread for multiple life science image file formats](https://www.mathworks.com/matlabcentral/fileexchange/32920-imread-for-multiple-life-science-image-file-formats)

10.4 VisAD

The VisAD visualization toolkit is a Java component library for interactive and collaborative visualization and analysis of numerical data. VisAD uses Bio-Formats to read many image formats, notably TIFF.

10.4.1 Installation

The `visad.jar` file has Bio-Formats bundled inside, so no further installation is necessary.

10.4.2 Upgrading

It should be possible to use a newer version of Bio-Formats by putting the latest `bioformats_package.jar` or `formats-gpl.jar` before `visad.jar` in the class path. Alternately, you can create a “VisAD Lite” using the `make lite` command from VisAD source, and use the resultant `visad-lite.jar`, which is a stripped down version of VisAD without sample applications or Bio-Formats bundled in.
11.1 Bitplane Imaris

Imaris\(^1\) is Bitplane’s core scientific software module that delivers all the necessary functionality for data visualization, analysis, segmentation and interpretation of 3D and 4D microscopy datasets. Combining speed, precision and ease-of-use, Imaris provides a complete set of features for working with three- and four-dimensional multi-channel images of any size, from a few megabytes to multiple gigabytes in size.

As of version 7.2\(^2\), Imaris integrates with Fiji overview, which includes Bio-Formats. See this page\(^3\) for a detailed list of Imaris’ features.

11.2 CellProfiler

CellProfiler\(^4\)—developed by the Broad Institute\(^5\)’s Imaging Platform\(^6\)—is free open-source software designed to enable biologists without training in computer vision or programming to quantitatively measure phenotypes from thousands of images automatically. CellProfiler uses Bio-Formats to read images from disk, as well as write movies.

11.2.1 Installation

The CellProfiler distribution comes with Bio-Formats included, so no further installation is necessary.

11.2.2 Upgrading

It should be possible to use a newer version of Bio-Formats by replacing the bundled loci_tools.jar with a newer version.

- For example, on Mac OS X, Ctrl+click the CellProfiler icon, choose Show Package Contents, and replace the following files:
  - Contents/Resources/bioformats/loci_tools.jar
  - Contents/Resources/lib/python2.5/bioformats/loci_tools.jar

See also:

CellProfiler web site\(^7\)

\(^1\)http://www.bitplane.com/
\(^2\)http://www.bitplane.com/releasenotes.aspx?product=Imaris&version=7.2&patch=0
\(^3\)http://www.bitplane.com/imaris/imaris
\(^4\)http://www.cellprofiler.org/
\(^5\)http://www.broadinstitute.org/
\(^6\)http://www.broadinstitute.org/science/platforms/imaging/imaging-platform
\(^7\)http://www.cellprofiler.org/
11.3 Comstat2

Comstat2 is a Java-based computer program for the analysis and treatment of biofilm images in 3D. It is the Master’s project of Martin Vorregaard.

Comstat2 uses the Bio-Formats Importer plugin for ImageJ to read files in TIFF and Leica LIF formats.

See also:
Comstat2 - a modern 3D image analysis environment for biofilms

11.4 Endrov

Endrov is a multi-purpose image analysis program developed by the Thomas Burglin group at Karolinska Institute, Department of Biosciences and Nutrition.

11.4.1 Installation

The EV distribution comes bundled with the core Bio-Formats library (bio-formats.jar), so no further installation is necessary.

11.4.2 Upgrading

It should be possible to use a newer version of Bio-Formats by downloading the latest formats-gpl.jar and putting it into the libs folder of the EV distribution, overwriting the old file.

You could also include some optional libraries to add support for additional formats, if desired.

11.5 FocalPoint

FocalPoint is an image browser, similar to Windows Explorer or other file manager application, specifically designed to work with more complex image types. FocalPoint uses Bio-Formats to generate thumbnails for some formats.

11.5.1 Installation

FocalPoint is bundled with Bio-Formats, so no further installation is necessary.

11.5.2 Upgrading

It should be possible to use a newer version of Bio-Formats by overwriting the old loci_tools.jar within the FocalPoint distribution. For Mac OS X, you will have to control click the FocalPoint program icon, choose “Show Package Contents” and navigate into Contents/Resources/Java to find the loci_tools.jar file.
11.6 Graphic Converter

Graphic Converter\(^{18}\) is a Mac OS application for opening, editing, and organizing photos. Versions 6.4.1 and later use Bio-Formats to open all file formats supported by Bio-Formats.

11.7 Icy

Icy\(^{19}\) is an open-source image analysis and visualization software package that combines a user-friendly graphical interface with the ability to write scripts and plugins that can be uploaded to a centralized website. It uses Bio-Formats internally to read images and acquisition metadata, so no further installation is necessary.

11.8 imago

Mayachitra imago\(^{20}\) is an advanced desktop image management package that enables scientists to easily store, manage, search, and analyze 3D biological images and their analysis results. imago integrates flexible annotation and metadata management with advanced image analysis tools.

imago uses Bio-Formats to read files in some formats, including Bio-Rad PIC, Image-Pro Workspace, Metamorph TIFF, Leica LCS LEI, Olympus FluoView FV1000, Nikon NIS-Elements ND2, and Zeiss LSM.

A free 30-day trial version of imago is available here\(^{21}\).

11.9 Iqm

Iqm\(^{22}\) is an image processing application written in Java. It is mainly constructed around the Java JAI library and furthermore it incorporates the functionality of the popular ImageJ image processing software.

Because iqm integrates with ImageJ, it can take advantage of the Bio-Formats ImageJ plugin to read image data.

11.10 Macnification

Macnification\(^{23}\) is a Mac OS X application for organizing, editing, analyzing and annotating microscopic images, designed for ease of use. It is being developed by Orbicule\(^{24}\).

Macnification uses Bio-Formats to read files in some formats, including Gatan DM3, ICS, ImagePro SEQ, ImagePro IPW, Meta-morph STK, OME-TIFF and Zeiss LSM.

See also:
Free trial download\(^{25}\)

11.11 MIPAV

The MIPAV\(^{26}\) (Medical Image Processing, Analysis, and Visualization) application—developed at the Center for Information Technology\(^{27}\) at the National Institutes of Health\(^{28}\)—enables quantitative analysis and visualization of medical images of numerous

---

\(^{18}\)http://www.lemkesoft.com
\(^{19}\)http://icy.bioimageanalysis.org/
\(^{20}\)http://mayachitra.com/imago/index.html
\(^{21}\)http://mayachitra.com/imago/download-trial.php
\(^{22}\)http://code.google.com/p/iqm/
\(^{23}\)http://www.orbicule.com/macnification/
\(^{24}\)http://www.orbicule.com
\(^{25}\)http://www.orbicule.com/macnification/download
\(^{26}\)http://mipav.cit.nih.gov/
\(^{27}\)http://cit.nih.gov/
\(^{28}\)http://nih.gov/
modalities such as PET, MRI, CT, or microscopy. You can use Bio-Formats as a plugin for MIPAV to read images in the formats it supports.

### 11.11.1 Installation

Follow these steps to install the Bio-Formats plugin for MIPAV:

1. Download `bioformats_package.jar` and drop it into your MIPAV folder.
2. Download the plugin source code into your user `mipav/plugins` folder.
3. From the command line, compile the plugin with:

   ```
   cd mipav/plugins
   javac -cp $MIPAV:$MIPAV/bioformats\_package.jar \ 
   PlugInBioFormatsImporter.java
   ```

4. where $MIPAV is the location of your MIPAV installation.
5. Add `bioformats_package.jar` to MIPAV’s class path:
   - How to do so depends on your platform.
   - E.g., in Mac OS X, edit the `mipav.app/Contents/Info.plist` file.

See the readme file for more information.

To upgrade, just overwrite the old `bioformats_package.jar` with the latest one. You may want to download the latest version of MIPAV first, to take advantage of new features and bug-fixes.

### 11.12 Vaa3D

Vaa3D, developed by the Peng Lab at the HHMI Janelia Farm Research Campus, is a handy, fast, and versatile 3D/4D/5D Image Visualization & Analysis System for Bioimages & Surface Objects.

Vaa3D can use Bio-Formats via the Bio-Formats C++ bindings to read images.

### 11.13 VisBio

VisBio is a biological visualization tool designed for easy visualization and analysis of multidimensional image data. VisBio uses Bio-Formats to import files as the Bio-Formats library originally grew out of our efforts to continually expand the file format support within VisBio.

#### 11.13.1 Installation

VisBio is bundled with Bio-Formats, so no further installation is necessary.

---

29http://downloads.openmicroscopy.org/latest/bio-formats5/artifacts/bioformats\_package.jar
30https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-bsd/utils/mipav/PlugInBioFormatsImporter.java
31https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-bsd/utils/mipav/readme.txt
32http://downloads.openmicroscopy.org/latest/bio-formats5/
33http://vaa3d.org
34http://penglab.janelia.org/
35http://www.hhmi.org/janelia/
37http://loci.wisc.edu/software/visbio
11.13.2 Upgrading

It should be possible to use a newer version of Bio-Formats\(^{38}\) by overwriting the old `bio-formats.jar` and optional libraries within the VisBio distribution. For Mac OS X, you’ll have to control click the VisBio program icon, choose “Show Package Contents” and navigate into Contents/Resources/Java to find the JAR files.

11.14 XuvTools

XuvTools\(^{39}\) is automated 3D stitching software for biomedical image data. As of release 1.8.0, XuvTools uses Bio-Formats to read image data.

\(^{38}\)http://downloads.openmicroscopy.org/latest/bio-formats5/
\(^{39}\)http://www.xuvtools.org
Part III

Developer Documentation
12.1 An in-depth guide to using Bio-Formats

12.1.1 Overview

This document describes various things that are useful to know when working with Bio-Formats. It is recommended that you obtain the Bio-Formats source by following the directions on the source code page, rather than using an official release. It is also recommended that you have a copy of the Javadocs nearby - the notes that follow will make more sense when you see the API. For a complete list of supported formats, see the Bio-Formats supported formats table. For a few working examples of how to use Bio-Formats, see these Github pages.

12.1.2 Basic file reading

Bio-Formats provides several methods for retrieving data from files in an arbitrary (supported) format. These methods fall into three categories: raw pixels, core metadata, and format-specific metadata. All methods described here are present and documented in loci.formats.IFormatReader - it is advised that you take a look at the source and/or the Javadocs. In general, it is recommended that you read files using an instance of ImageReader. While it is possible to work with readers for a specific format, ImageReader contains additional logic to automatically detect the format of a file and delegate subsequent calls to the appropriate reader.

Prior to retrieving pixels or metadata, it is necessary to call setId(String) on the reader instance, passing in the name of the file to read. Some formats allow multiple series (5D image stacks) per file; in this case you may wish to call setSeries(int) to change which series is being read.

Raw pixels are always retrieved one plane at a time. Planes are returned as raw byte arrays, using one of the openBytes methods.

Core metadata is the general term for anything that might be needed to work with the planes in a file. A list of core metadata fields is given below, with the appropriate accessor method in parentheses:

- image width (getSizeX())
- image height (getSizeY())
- number of series per file (getSeriesCount())
- total number of images per series (getImageCount())
- number of slices in the current series (getSizeZ())
- number of timepoints in the current series (getSizeT())
• number of actual channels in the current series (getSizeC()\textsuperscript{13})
• number of channels per image (getRGBChannelCount()\textsuperscript{14})
• the ordering of the images within the current series (getDimensionOrder()\textsuperscript{15})
• whether each image is RGB (isRGB()\textsuperscript{16})
• whether the pixel bytes are in little-endian order (isLittleEndian()\textsuperscript{17})
• whether the channels in an image are interleaved (isInterleaved()\textsuperscript{18})
• the type of pixel data in this file (getPixelType()\textsuperscript{19})

All file formats are guaranteed to accurately report core metadata.

Format-specific metadata refers to any other data specified in the file - this includes acquisition and hardware parameters, among other things. This data is stored internally in a \texttt{java.util.Hashtable}, and can be accessed in one of two ways: individual values can be retrieved by calling \texttt{getMetadataValue(String)}\textsuperscript{20}, which gets the value of the specified key. Note that the keys in this Hashtable are different for each format, hence the name “format-specific metadata”.

See \texttt{Bio-Formats metadata processing} for more information on the metadata capabilities that Bio-Formats provides.

12.1.3 File reading extras

The previous section described how to read pixels as they are stored in the file. However, the native format is not necessarily convenient, so Bio-Formats provides a few extras to make file reading more flexible.

• There are a few “wrapper” readers (that implement IFormatReader) that take a reader in the constructor, and manipulate the results somehow, for convenience. Using them is similar to the java.io InputStream/OutputStream model: just layer whichever functionality you need by nesting the wrappers.
  – \textbf{BufferedImageReader}\textsuperscript{21} extends IFormatReader, and allows pixel data to be returned as BufferedImages instead of raw byte arrays.
  – \textbf{FileStitcher}\textsuperscript{22} extends IFormatReader, and uses advanced pattern matching heuristics to group files that belong to the same dataset.
  – \textbf{ChannelSeparator}\textsuperscript{23} extends IFormatReader, and makes sure that all planes are grayscale - RGB images are split into 3 separate grayscale images.
  – \textbf{ChannelMerger}\textsuperscript{24} extends IFormatReader, and merges grayscale images to RGB if the number of channels is greater than 1.
  – \textbf{ChannelFiller}\textsuperscript{25} extends IFormatReader, and converts indexed color images to RGB images.
  – \textbf{MinMaxCalculator}\textsuperscript{26} extends IFormatReader, and provides an API for retrieving the minimum and maximum pixel values for each channel.
  – \textbf{DimensionSwapper}\textsuperscript{27} extends IFormatReader, and provides an API for changing the dimension order of a file.
• \textbf{ImageTools}\textsuperscript{28} and \texttt{loci.formats.gui.AWTImageTools}\textsuperscript{29} provide a number of methods for manipulating BufferedImages and primitive type arrays. In particular, there are methods to split and merge channels in a BufferedImage/array, as well as converting to a specific data type (e.g. convert short data to byte data).

\textsuperscript{13}\url{http://downloads.openmicroscopy.org/latest/bio-formats5/api/loci/formats/IFormatReader.html#getSizeC()}
\textsuperscript{14}\url{http://downloads.openmicroscopy.org/latest/bio-formats5/api/loci/formats/IFormatReader.html#getRGBChannelCount()}
\textsuperscript{15}\url{http://downloads.openmicroscopy.org/latest/bio-formats5/api/loci/formats/IFormatReader.html#getDimensionOrder()}
\textsuperscript{16}\url{http://downloads.openmicroscopy.org/latest/bio-formats5/api/loci/formats/IFormatReader.html#isRGB()}
\textsuperscript{17}\url{http://downloads.openmicroscopy.org/latest/bio-formats5/api/loci/formats/IFormatReader.html#isLittleEndian()}
\textsuperscript{18}\url{http://downloads.openmicroscopy.org/latest/bio-formats5/api/loci/formats/IFormatReader.html#isInterleaved()}
\textsuperscript{19}\url{http://downloads.openmicroscopy.org/latest/bio-formats5/api/loci/formats/IFormatReader.html#getPixelType()}
\textsuperscript{20}\url{http://downloads.openmicroscopy.org/latest/bio-formats5/api/loci/formats/IFormatReader.html#getMetadataValue(java.lang.String)}
\textsuperscript{21}\url{https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-bsd/src/loci/formats/gui/BufferedImageReader.java}
\textsuperscript{22}\url{https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-bsd/src/loci/formats/gui/FileStitcher.java}
\textsuperscript{23}\url{https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-bsd/src/loci/formats/ChannelSeparator.java}
\textsuperscript{24}\url{https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-bsd/src/loci/formats/ChannelMerger.java}
\textsuperscript{25}\url{https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-bsd/src/loci/formats/ChannelFiller.java}
\textsuperscript{26}\url{https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-bsd/src/loci/formats/MinMaxCalculator.java}
\textsuperscript{27}\url{https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-bsd/src/loci/formats/DimensionSwapper.java}
\textsuperscript{28}\url{https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-bsd/src/loci/formats/gui/ImageTools.java}
\textsuperscript{29}\url{https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-bsd/src/loci/formats/gui/AWTImageTools.java}

12.1. An in-depth guide to using Bio-Formats 58
12.1.4 Writing files

The following file formats can be written using Bio-Formats:

- TIFF (uncompressed, LZW, JPEG, or JPEG-2000)
- OME-TIFF (uncompressed, LZW, JPEG, or JPEG-2000)
- JPEG
- PNG
- AVI (uncompressed)
- QuickTime (uncompressed is supported natively; additional codecs use QTJava)
- Encapsulated PostScript (EPS)
- OME-XML (not recommended)

The writer API (see loci.formats.IFormatWriter\(^{30}\)) is very similar to the reader API, in that files are written one plane at time (rather than all at once).

All writers allow the output file to be changed before the last plane has been written. This allows you to write to any number of output files using the same writer and output settings (compression, frames per second, etc.), and is especially useful for formats that do not support multiple images per file.

Please see loci.formats.tools.ImageConverter\(^{31}\) and this guide to exporting to OME-TIFF files for examples of how to write files.

12.1.5 Arcane notes and implementation details

Known oddities:

- Importing multi-file formats (Leica LEI, PerkinElmer, FV1000 OIF, ICS, and Prairie TIFF, to name a few) can fail if any of the files are renamed. There are “best guess” heuristics in these readers, but they are not guaranteed to work in general. So please do not rename files in these formats.

- If you are working on a Macintosh, make sure that the data and resource forks of your image files are stored together. Bio-Formats does not handle separated forks (the native QuickTime reader tries, but usually fails).

12.2 Generating test images

Sometimes it is nice to have a file of a specific size or pixel type for testing. To generate a file (that contains gradient images):

```
touch "my-special-test-file&pixelType=uint8&sizeX=8192&sizeY=8192.fake"
```

Whatever is before the & is the image name; remaining key value pairs should be pretty self-explanatory. Just replace the values with whatever you need for testing.

There are a few other keys that can be added as well:

\(^{30}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-api/src/loci/formats/IFormatWriter.java

### Key

<table>
<thead>
<tr>
<th>Key</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>sizeZ</td>
<td>number of Z sections</td>
</tr>
<tr>
<td>sizeC</td>
<td>number of channels</td>
</tr>
<tr>
<td>sizeT</td>
<td>number of timepoints</td>
</tr>
<tr>
<td>bitsPerPixel</td>
<td>number of valid bits (&lt;= number of bits implied by pixel type)</td>
</tr>
<tr>
<td>rgb</td>
<td>number of channels that are merged together</td>
</tr>
<tr>
<td>dimOrder</td>
<td>dimension order (e.g. XYZCT)</td>
</tr>
<tr>
<td>little</td>
<td>whether or not the pixel data should be little-endian</td>
</tr>
<tr>
<td>interleaved</td>
<td>whether or not merged channels are interleaved</td>
</tr>
<tr>
<td>indexed</td>
<td>whether or not a color lookup table is present</td>
</tr>
<tr>
<td>falseColor</td>
<td>whether or not the color lookup table is just for making the image look pretty</td>
</tr>
<tr>
<td>series</td>
<td>number of series (Images)</td>
</tr>
<tr>
<td>lutLength</td>
<td>number of entries in the color lookup table</td>
</tr>
</tbody>
</table>

You can often work with the .fake file directly, but in some cases support for those files is disabled and so you will need to convert the file to something else. Make sure that you have Bio-Formats built and the JARs in your CLASSPATH (individual JARs or just bioformats_package.jar):

```
bfconvert test&pixelType=uint8&sizeX=8192&sizeY=8192.fake test.tiff
```

If you do not have the command line tools installed, substitute `lociformats.tools.ImageConverter` for `bfconvert`.

---

12.2. Generating test images

---

13.1 API documentation

13.1.1 Using Bio-Formats as a Java library

If you wish to make use of Bio-Formats within your own software, you can download formats-gpl.jar\(^1\) to use it as a library. Just add formats-gpl.jar to your CLASSPATH or build path. You will also need common.jar for common I/O functions, ome-xml.jar for metadata standardization, and SLF4J\(^2\) for logging.

There are also certain packages that if present will be utilized to provide additional functionality. To include one, just place it in the same folder.

<table>
<thead>
<tr>
<th>Package</th>
<th>Filename</th>
<th>License</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apache Jakarta POI library, OME fork</td>
<td>ome-poi.jar(^3)</td>
<td>Apache</td>
<td>For OLE-based formats (zvi, oib, ipw, cxd)</td>
</tr>
<tr>
<td>MDB Tools project(^4) Java port, OME fork</td>
<td>mdbtools-java.jar(^5)</td>
<td>LGPL</td>
<td>For Olympus CellR and Zeiss LSM metadata (mdb)</td>
</tr>
<tr>
<td>JAI Image I/O Tools(^6) pure Java implementation, OME fork</td>
<td>jai_imageio.jar(^7)</td>
<td>BSD</td>
<td>For JPEG2000-based formats (nd2, jp2)</td>
</tr>
<tr>
<td>NetCDF Java library(^8)</td>
<td>netcdf-4.3.19.jar(^9)</td>
<td>LGPL</td>
<td>For HDF5-based formats (Imaris 5.5, MINC MRI)</td>
</tr>
<tr>
<td>QuickTime for Java(^10)</td>
<td>QTJava.zip (^11)</td>
<td>Commercial</td>
<td>For additional QuickTime codecs</td>
</tr>
</tbody>
</table>

See the list in the Bio-Formats toplevel build file\(^12\) for a complete and up-to-date list of all optional libraries, which can all be found in our Git repository\(^13\).

Examples of usage

ImageConverter\(^14\) - A simple command line tool for converting between formats.

---

\(^1\)http://downloads.openmicroscopy.org/latest/bio-formats5/artifacts/formats-gpl.jar
\(^2\)http://slf4j.org/
\(^3\)http://jakarta.apache.org/poi/
\(^4\)http://downloads.openmicroscopy.org/latest/bio-formats5/artifacts/ome-poi.jar
\(^5\)http://sourceforge.net/projects/mdbtools
\(^6\)http://downloads.openmicroscopy.org/latest/bio-formats5/artifacts/mdbtools-java.jar
\(^7\)http://java.net/projects/jai-imageio
\(^8\)http://downloads.openmicroscopy.org/latest/bio-formats5/artifacts/jai_imageio.jar
\(^9\)http://www.unidata.ucar.edu/software/netcdf-java/
\(^10\)http://downloads.openmicroscopy.org/latest/bio-formats5/artifacts/netcdf-4.3.19.jar
\(^12\)http://jakarta.apache.org/poi/
\(^13\)http://downloads.openmicroscopy.org/latest/bio-formats5/artifacts/ome-poi.jar
\(^14\)http://sourceforge.net/projects/mdbtools
\(^15\)http://downloads.openmicroscopy.org/latest/bio-formats5/artifacts/mdbtools-java.jar
\(^16\)http://java.net/projects/jai-imageio
\(^17\)http://downloads.openmicroscopy.org/latest/bio-formats5/artifacts/jai_imageio.jar
\(^18\)http://www.unidata.ucar.edu/software/netcdf-java/
\(^19\)http://downloads.openmicroscopy.org/latest/bio-formats5/artifacts/netcdf-4.3.19.jar
\(^20\)http://www.apple.com/quicktime/download/standalone.html
\(^21\)https://github.com/openmicroscopy/bioformats/blob/v5.0.2/build.xml
\(^22\)https://github.com/openmicroscopy/bioformats/tree/v5.0.2/jar
\(^23\)https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/bio-formats-tools/src/loci/formats/tools/ImageConverter.java
ImageInfo - A more involved command line utility for thoroughly reading an input file, printing some information about it, and displaying the pixels onscreen using the Bio-Formats viewer.

MinimumWriter - A command line utility demonstrating the minimum amount of metadata needed to write a file.

PrintTimestamps - A command line example demonstrating how to extract timestamps from a file.

Simple_Read - A simple ImageJ plugin demonstrating how to use Bio-Formats to read files into ImageJ (see ImageJ overview).

Read_Image - An ImageJ plugin that uses Bio-Formats to build up an image stack, reading image planes one by one (see ImageJ overview).

Mass_Importer - A simple plugin for ImageJ that demonstrates how to open all image files in a directory using Bio-Formats, grouping files with similar names to avoid opening the same dataset more than once (see ImageJ overview).

A Note on Java Web Start (bioformats_package.jar vs. formats-gpl.jar)

To use Bio-Formats with your Java Web Start application, we recommend using formats-gpl.jar rather than bioformats_package.jar—the latter is merely a bundle of formats-gpl.jar plus all its optional dependencies.

The bioformats_package.jar bundle is intended as a convenience (e.g. to simplify installation as an ImageJ plugin), but is by no means the only solution for developers. We recommend using formats-gpl.jar as a separate entity depending on your needs as a developer.

The bundle is quite large because we have added support for several formats that need large helper libraries (e.g. Imaris’ HDF-based format). However, these additional libraries are optional; Bio-Formats has been coded using reflection so that it can both compile and run without them.

When deploying a JNLP-based application, using bioformats_package.jar directly is not the best approach, since every time Bio-Formats is updated, the server would need to feed another 15+ MB JAR file to the client. Rather, Web Start is a case where you should keep the JARs separate, since JNLP was designed to make management of JAR dependencies trivial for the end user. By keeping formats-gpl.jar and the optional dependencies separate, only a <1 MB JAR needs to be updated when formats-gpl.jar changes.

As a developer, you have the option of packaging formats-gpl.jar with as many or as few optional libraries as you wish, to cut down on file size as needed. You are free to make whatever kind of “stripped down” version you require. You could even build a custom formats-gpl.jar that excludes certain classes, if you like.

For an explicit enumeration of all the optional libraries included in bioformats_package.jar, see the package.libraries variable of the ant/toplevel.properties file of the distribution. You can also read our notes about each in the source distribution’s Ant build.xml script.

Also see Bio-Formats Javadocs.

13.2 Examples

13.2.1 Exporting files using Bio-Formats

This guide pertains to version 4.2 and later.

Basic conversion

The first thing we need to do is set up a reader:

```
https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/utils/MinimumWriter.java
https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/utils/PrintTimestamps.java
https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/bio-formats-plugins/utils/Simple_Read.java
https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/bio-formats-plugins/utils/Read_Image.java
https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/bio-formats-plugins/utils/Mass_Importer.java
https://github.com/openmicroscopy/bioformats/blob/v5.0.2/ant/toplevel.properties
https://github.com/openmicroscopy/bioformats/blob/v5.0.2/build.xml#L240
```

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// create a reader that will automatically handle any supported format
IFormatReader reader = new ImageReader();
// tell the reader where to store the metadata from the dataset
MetadataStore metadata;

try {
    ServiceFactory factory = new ServiceFactory();
    OMEXMLService service = factory.getInstance(OMEXMLService.class);
    metadata = service.createOMEXMLMetadata();
} catch (DependencyException exc) {
    throw new FormatException("Could not create OME-XML store.", exc);
} catch (ServiceException exc) {
    throw new FormatException("Could not create OME-XML store.", exc);
}

reader.setMetadataStore(metadata);
// initialize the dataset
reader.setId("/path/to/file");

Now, we set up our writer:

// create a writer that will automatically handle any supported output format
IFormatWriter writer = new ImageWriter();
// give the writer a MetadataRetrieve object, which encapsulates all of the
// dimension information for the dataset (among many other things)
writer.setMetadataRetrieve(MetadataTools.asRetrieve(reader.getMetadataStore()));
// initialize the writer
writer.setId("/path/to/output/file");

Note that the extension of the file name passed to ‘writer.setId(…)’ determines the file format of the exported file.

Now that everything is set up, we can start writing planes:

for (int series=0; series<reader.getSeriesCount(); series++) {
    reader.setSeries(series);
    writer.setSeries(series);

    for (int image=0; image<reader.getImageCount(); image++) {
        writer.saveBytes(image, reader.openBytes(image));
    }
}

Finally, make sure to close both the reader and the writer. Failure to do so can cause:

- file handle leaks
- memory leaks
- truncated output files

Fortunately, closing the files is very easy:

reader.close();
writer.close();

Converting large images

The flaw in the previous example is that it requires an image plane to be fully read into memory before it can be saved. In many cases this is fine, but if you are working with very large images (especially > 4 GB) this is problematic. The solution is to break
each image plane into a set of reasonably-sized tiles and save each tile separately - thus substantially reducing the amount of memory required for conversion.

For now, we’ll assume that your tile size is 1024 x 1024, though in practice you will likely want to adjust this. Assuming you have an IFormatReader and IFormatWriter set up as in the previous example, let’s start writing planes:

```java
int tileWidth = 1024;
int tileHeight = 1024;

for (int series=0; series<reader.getSeriesCount(); series++) {
    reader.setSeries(series);
    writer.setSeries(series);

    // determine how many tiles are in each image plane
    // for simplicity, we’ll assume that the image width and height are
    // multiples of 1024
    int tileRows = reader.getSizeY() / tileHeight;
    int tileColumns = reader.getSizeX() / tileWidth;

    for (int image=0; image<reader.getImageCount(); image++) {
        for (int row=0; row<tileRows; row++) {
            for (int col=0; col<tileColumns; col++) {
                // open a tile - in addition to the image index, we need to specify
                // the (x, y) coordinate of the upper left corner of the tile,
                // along with the width and height of the tile
                int xCoordinate = col * tileWidth;
                int yCoordinate = row * tileHeight;
                byte[] tile =
                    reader.openBytes(image, xCoordinate, yCoordinate, tileWidth, tileHeight);
                writer.saveBytes(
                    image, tile, xCoordinate, yCoordinate, tileWidth, tileHeight);
            }
        }
    }
}
```

As noted, the example assumes that the width and height of the image are multiples of the tile dimensions. Be careful, as this is not always the case: the last column and/or row may be smaller than preceding columns/rows. An exception will be thrown if you attempt to read or write a tile that is not completely contained by the original image plane. Most writers perform best if the tile width is equal to the image width, although specifying any valid width should work.

As before, you need to close the reader and writer.

**Converting to multiple files**

The recommended method of converting to multiple files is to use a single IFormatWriter, like so:

```java
// you should have set up a reader as in the first example
ImageWriter writer = new ImageWriter();
writer.setMetadataRetrieve(MetadataTools.asRetrieve(reader.getMetadataStore()));
// replace this with your own filename definitions
// in this example, we’re going to write half of the planes to one file
// and half of the planes to another file
String[] outputFiles =
    new String[] {"/path/to/file/1.tiff", "/path/to/file/2.tiff"};
writer.setId(outputFiles[0]);

int planesPerFile = reader.getImageCount() / outputFiles.length;
for (int file=0; file<outputFiles.length; file++) {
    writer.changeOutputFile(outputFiles[file]);
}
```

---

**13.2. Examples**
for (int image=0; image<planesPerFile; image++) {
    int index = file * planesPerFile + image;
    writer.saveBytes(image, reader.openBytes(index));
}

reader.close();
writer.close();

The advantage here is that the relationship between the files is preserved when converting to formats that support multi-file datasets internally (namely OME-TIFF). If you are only converting to graphics formats (e.g. JPEG, AVI, MOV), then you could also use a separate IFormatWriter for each file, like this:

```java
// again, you should have set up a reader already
String[] outputFiles = new String[] {"/path/to/file/1.avi", "/path/to/file/2.avi"};
int planesPerFile = reader.getImageCount() / outputFiles.length;
for (int file=0; file<outputFiles.length; file++) {
    ImageWriter writer = new ImageWriter();
    writer.setMetadataRetrieve(MetadataTools.asRetrieve(reader.getMetadataStore()));
    writer.setId(outputFiles[file]);
    for (int image=0; image<planesPerFile; image++) {
        int index = file * planesPerFile + image;
        writer.saveBytes(image, reader.openBytes(index));
    }
    writer.close();
}
```

**Known issues**

List of Trac tickets [33]

13.2.2 Further details on exporting raw pixel data to OME-TIFF files

This document explains how to export pixel data to OME-TIFF using Bio-Formats version 4.2 and later.

The first thing that must happen is we must create the object that stores OME-XML metadata. This is done as follows:

```java
ServiceFactory factory = new ServiceFactory();
OMEXMLService service = factory.getInstance(OMEXMLService.class);
IMetadata omexml = service.createOMEXMLMetadata();
```

The `omexml` object can now be used in our code to store OME-XML metadata, and by the file format writer to retrieve OME-XML metadata.

Now that we have somewhere to put metadata, we need to populate as much metadata as we can. The minimum amount of metadata required is:

- endianness of the pixel data
- the order in which dimensions are stored
- the bit depth of the pixel data
- the number of channels
- the number of timepoints
- the number of Z sections

---


13.2. Examples
• the width (in pixels) of an image
• the height (in pixels) of an image
• the number of samples per channel (3 for RGB images, 1 otherwise)

We populate that metadata as follows:

```java
omexml.setImageID("Image:0", 0);
omexml.setPixelsID("Pixels:0", 0);

// specify that the pixel data is stored in big-endian order
// replace 'TRUE' with 'FALSE' to specify little-endian order
omexml.setPixelsBinDataBigEndian(Boolean.TRUE, 0, 0);

omexml.setPixelsDimensionOrder(DimensionOrder.XYCZT, 0);
omexml.setPixelsType(PixelType.UINT16, 0);
omexml.setPixelsSizeX(new PositiveInteger(width), 0);
omexml.setPixelsSizeY(new PositiveInteger(height), 0);
omexml.setPixelsSizeZ(new PositiveInteger(zSectionCount), 0);
omexml.setPixelsSizeC(new PositiveInteger(channelCount * samplesPerChannel), 0);
omexml.setPixelsSizeT(new PositiveInteger(timepointCount), 0);

for (int channel=0; channel<channelCount; channel++) {
   omexml.setChannelID("Channel:0:" + channel, 0, channel);
   omexml.setChannelSamplesPerPixel(new PositiveInteger(samplesPerChannel), 0, channel);
}
```

There is much more metadata that can be stored; please see the Javadoc for loci.formats.meta.MetadataStore for a complete list.

Now that we have defined all of the metadata, we need to create a file writer:

```java
ImageWriter writer = new ImageWriter();
```

Now we must associate the ‘omexml’ object with the file writer:

```java
writer.setMetadataRetrieve(omexml);
```

The writer now knows to retrieve any metadata that it needs from ‘omexml’.

We now tell the writer which file it should write to:

```java
writer.setId("output-file.ome.tif");
```

It is critical that the file name given to the writer ends with ".ome.tif" or ".ome.tiff", as it is the file name extension that determines which format will be written.

Now that everything is set up, we can save the image data. This is done plane by plane, and we assume that the pixel data is stored in a 2D byte array ‘pixelData’:

```java
int sizeC = omexml.getPixelsSizeC(0).getValue();
int sizeZ = omexml.getPixelsSizeZ(0).getValue();
int sizeT = omexml.getPixelsSizeT(0).getValue();
int samplesPerChannel = omexml.getChannelSamplesPerPixel(0).getValue();
sizeC /= samplesPerChannel;

int imageCount = sizeC * sizeZ * sizeT;
for (int image=0; image<imageCount; image++) {
   // assume pixelData is 2D byte array
   // process pixel data...
}
```
Finally, we must tell the writer that we are finished, so that the output file can be properly closed:

```java
writer.close();
```

There should now be a complete OME-TIFF file at whichever path was specified above.

### 13.2.3 Converting files from FV1000 OIB/OIF to OME-TIFF

This document explains how to convert a file from FV1000 OIB/OIF to OME-TIFF using Bio-Formats version 4.2 and later. The first thing that must happen is we must create the object that stores OME-XML metadata. This is done as follows:

```java
ServiceFactory factory = new ServiceFactory();
OMEXMLService service = factory.getInstance(OMEXMLService.class);
IMetadata omexml = service.createOMEXMLMetadata();
```

The ‘omexml’ object can now be used by both a file format reader and a file format writer for storing and retrieving OME-XML metadata.

Now that have somewhere to put metadata, we need to create a file reader and writer:

```java
ImageReader reader = new ImageReader();
ImageWriter writer = new ImageWriter();
```

Now we must associate the ‘omexml’ object with the file reader and writer:

```java
reader.setMetadataStore(omexml);
writer.setMetadataRetrieve(omexml);
```

The reader now knows to store all of the metadata that it parses into ‘omexml’, and the writer knows to retrieve any metadata that it needs from ‘omexml’.

We now tell the reader and writer which files will be read from and written to, respectively:

```java
reader.setId("input-file.oib");
writer.setId("output-file.ome.tiff");
```

It is critical that the file name given to the writer ends with "".ome.tiff"" or "".ome.tif", as it is the file name extension that determines which format will be written.

Now that everything is set up, we can convert the image data. This is done plane by plane:

```java
for (int series=0; series<reader.getSeriesCount(); series++) {
    reader.setSeries(series);
    writer.setSeries(series);
    byte[] plane = new byte[FormatTools.getPlaneSize(reader)];
    for (int image=0; image<reader.getImageCount(); image++) {
        reader.openBytes(image, plane);
        writer.saveBytes(image, plane);
    }
}
```
The body of the outer ‘for’ loop may also be replaced with the following:

```java
reader.setSeries(series);
writer.setSeries(series);
for (int image=0; image<reader.getImageCount(); image++) {
    byte[] plane = reader.openBytes(image);
    writer.saveBytes(image, plane);
}
```

But note that this will be a little slower.

Finally, we must tell the reader and writer that we are finished, so that the input and output files can be properly closed:

```java
reader.close();
writer.close();
```

There should now be a complete OME-TIFF file at whichever path was specified above.

### 13.2.4 Using Bio-Formats in MATLAB

This section assumes that you have installed the MATLAB toolbox as instructed in the [MATLAB user information page](https://www.mathworks.com/products/matlab.html). Note the minimum supported MATLAB version is R2007b (7.5).

#### Increasing JVM memory settings

The default JVM settings in MATLAB can result in `java.lang.OutOfMemoryError: Java heap space` exceptions when opening large image files using Bio-Formats. Information about the Java heap space usage in MATLAB can be retrieved using:

```java
java.lang.Runtime.getRuntime.maxMemory
```

Default JVM settings can be increased by creating a `java.opts` file in the startup directory and overriding the default memory settings. We recommend using `-Xmx512m` in your `java.opts` file.

See also:

[http://www.mathworks.com/matlabcentral/answers/92813 How do I increase the heap space for the Java VM in MATLAB 6.0 (R12) and later versions?](http://www.mathworks.com/matlabcentral/answers/92813)

#### Opening an image file

The first thing to do is initialize a file with the `bfopen` function:

```java
data = bfopen('/path/to/data/file');
```

This function returns an n-by-4 cell array, where n is the number of series in the dataset. If s is the series index between 1 and n:

- The `data{s, 1}` element is an m-by-2 cell array, where m is the number of planes in the s-th series. If t is the plane index between 1 and m:
  - The `data{s, 1}{t, 1}` element contains the pixel data for the t-th plane in the s-th series.
  - The `data{s, 1}{t, 2}` element contains the label for the t-th plane in the s-th series.
- The `data{s, 2}` element contains original metadata key/value pairs that apply to the s-th series.
- The `data{s, 3}` element contains color lookup tables for each plane in the s-th series.

---

34[https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/matlab/bfopen.m](https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/matlab/bfopen.m)
• The data{s, 4} element contains a standardized OME metadata structure, which is the same regardless of the input file format, and contains common metadata values such as physical pixel sizes - see OME metadata below for examples.

### Accessing planes

Here is an example of how to unwrap specific image planes for easy access:

```matlab
data = bfopen('/path/to/data/file');
seriesCount = size(data, 1);
series1 = data{1, 1};
series2 = data{2, 1};
series3 = data{3, 1};
metadataList = data{1, 2};
% ...etc.
series1_planeCount = size(series1, 1);
series1_plane1 = series1{1, 1};
series1_label1 = series1{1, 2};
series1_plane2 = series1{2, 1};
series1_label2 = series1{2, 2};
series1_plane3 = series1{3, 1};
series1_label3 = series1{3, 2};
% ...etc.
```

### Displaying images

If you want to display one of the images, you can do so as follows:

```matlab
data = bfopen('/path/to/data/file');
% plot the 1st series’s 1st image plane in a new figure
series1 = data{1, 1};
series1_plane1 = series1{1, 1};
series1_label1 = series1{1, 2};
series1_colorMaps = data{1, 3};
figure('Name', series1_label1);
if (isempty(series1_colorMaps{1}))
    colormap(gray);
else
    colormap(series1_colorMaps{1});
end
imagesc(series1_plane1);
```

This will display the first image of the first series with its associated color map (if present). If you would prefer not to apply the color maps associated with each image, simply comment out the calls to colormap.

If you have the image processing toolbox, you could instead use:

```matlab
imshow(series1_plane1, []);
```

You can also create an animated movie (assumes 8-bit unsigned data):

```matlab
v = linspace(0, 1, 256)';
cmap = [v v v];
for p = 1 : size(series1, 1)
    M(p) = im2frame(uint8(series1{p, 1}), cmap);
end
movie(M);
```
Retrieving metadata

There are two kinds of metadata:

- **Original metadata** is a set of key/value pairs specific to the input format of the data. It is stored in the `data{s, 2}` element of the data structure returned by `bfopen`.

- **OME metadata** is a standardized metadata structure, which is the same regardless of input file format. It is stored in the `data{s, 4}` element of the data structure returned by `bfopen`, and contains common metadata values such as physical pixel sizes, instrument settings, and much more. See the OME Model and Formats\(^\text{35}\) documentation for full details.

**Original metadata**  To retrieve the metadata value for specific keys:

```matlab
data = bfopen('/path/to/data/file');
% Query some metadata fields (keys are format-dependent)
metadata = data{1, 2};
subject = metadata.get('Subject');
title = metadata.get('Title');
```

To print out all of the metadata key/value pairs for the first series:

```matlab
data = bfopen('/path/to/data/file');
metadata = data{1, 2};
metadataKeys = metadata.keySet().iterator();
for i=1:metadata.size()
    key = metadataKeys.nextElement();
    value = metadata.get(key);
    fprintf('%s = %s\n', key, value)
end
```

**OME metadata**  Conversion of metadata to the OME standard is one of Bio-Formats’ primary features. The OME metadata is always stored the same way, regardless of input file format.

To access physical voxel and stack sizes of the data:

```matlab
data = bfopen('/path/to/data/file');
omeMeta = data{1, 4};
stackSizeX = omeMeta.getPixelsSizeX(0).getValue(); % image width, pixels
stackSizeY = omeMeta.getPixelsSizeY(0).getValue(); % image height, pixels
stackSizeZ = omeMeta.getPixelsSizeZ(0).getValue(); % number of Z slices
voxelSizeX = omeMeta.getPixelsPhysicalSizeX(0).getValue(); % in µm
voxelSizeY = omeMeta.getPixelsPhysicalSizeY(0).getValue(); % in µm
voxelSizeZ = omeMeta.getPixelsPhysicalSizeZ(0).getValue(); % in µm
```

For more information about the methods to retrieve the metadata, see the MetadataRetrieve\(^\text{36}\) Javadoc page.

To convert the OME metadata into a string, use the `dumpXML()` method:

```matlab
omeXML = char(omeMeta.dumpXML());
```

Reading from an image file

The main inconvenience of the `bfopen.m\(^\text{37}\)` function is that it loads all the content of an image regardless of its size.

---

\(^{35}\)http://www.openmicroscopy.org/site/support/ome-model/

\(^{36}\)http://downloads.openmicroscopy.org/latest/bio-formats5/api/loci/formats/meta/MetadataRetrieve.html

\(^{37}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/matlab/bfopen.m
To access the file reader without loading all the data, use the low-level `bfGetReader.m` function:

```matlab
reader = bfGetReader('path/to/data/file');
```

You can then access the OME metadata using the `getMetadataStore()` method:

```matlab
omeMeta = reader.getMetadataStore();
```

Individual planes can be queried using the `bfGetPlane.m` function:

```matlab
series1_plane1 = bfGetPlane(reader, 1);
```

### Saving files

The basic code for saving a 5D array into an OME-TIFF file is located in the `bfsave.m` function.

For instance, the following code will save a single image of 64 pixels by 64 pixels with 8 unsigned bits per pixels:

```matlab
plane = zeros(64, 64, 'uint8');
bfsave(plane, 'my-file.ome.tiff');
```

And the following code snippet will produce an image of 64 pixels by 64 pixels with 2 channels and 2 timepoints:

```matlab
plane = zeros(64, 64, 1, 2, 2, 'uint8');
bfsave(plane, 'my-file.ome.tiff');
```

For more information about the methods to store the metadata, see the MetadataStore Javadoc page.

### 13.2.5 Source code

If you are interested in the latest Bio-Formats source code from our Git repository, you can access it using the repository path:

```
git@github.com:openmicroscopy/bioformats.git
```

You can also browse the Bio-Formats source on GitHub.

To build the code, you can use our Ant build script—try “`ant -p`” for a list of targets. In general, “ant jars” or “ant tools” is the correct command.

Lastly, you can browse the Bio-Formats Javadocs online, or generate them yourself using the “docs” Ant target.
14.1 Interfacing with Bio-Formats from non-Java code

Bio-Formats is written in Java, and is easiest to use with other Java code. However, it is possible to call Bio-Formats from a program written in another language. But how to do so depends on your program’s needs.

Technologically, there are two broad categories of solutions: in-process approaches, and inter-process communication.

For details, see LOCI’s article Interfacing from non-Java code.

Recommended in-process solution: Bio-Formats C++ bindings
Recommended inter-process solution: Subimager

14.2 Bio-Formats C++ bindings

To make Bio-Formats accessible to software written in C++, we have created a Bio-Formats C++ interface (BF-CPP for short). It uses LOCI’s jar2lib program to generate a C++ proxy class for each equivalent Bio-Formats Java class. The resulting proxies are then compiled into a library, which represents the actual interface from C++ to Bio-Formats. Using this library in your projects gives you access to the image support of Bio-Formats.

BF-CPP comes with some standalone examples which you can use as a starting point in your own project:

- showinf
- minimum_writer

Other projects using BF-CPP include:

- WiscScan which uses BF-CPP to write OME-TIFF files.
- XuvTools which uses an adapted version of BF-CPP called BlitzBioFormats.

See the build instructions (Windows, Mac OS X, Linux) for details on compiling BF-CPP from source. Once this is done, simply include it in your project as you would any other external library.

14.3 Build instructions for C++ bindings

This package provides language bindings for calling into the Bio-Formats Java library from C++ in a cross-platform manner. As of this writing the bindings are functional with GCC on Linux and Mac OS X systems, as well as with Visual C++ 2005 and Visual C++ 2008 on Windows.

---

1 http://loci.wisc.edu/software/interfacing-non-java-code
2 http://loci.wisc.edu/software/jar2lib
3 https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-bsd/cppwrap/showinf.cpp
4 https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-bsd/cppwrap/minimum_writer.cpp
5 http://loci.wisc.edu/software/wiscscan
6 http://www.openmicroscopy.org/site/support/ome-model/ome-tiff
7 http://www.xuvtools.org/devel/libblitzbioformats
14.3.1 Compile-time dependencies

To build the Bio-Formats C++ bindings from source, the following modules are required:

- **Apache Maven**\(^8\) Maven is a software project management and comprehension tool. Along with Ant, it is one of the supported build systems for the Bio-Formats Java library, and is used to generate the Bio-Formats C++ bindings.

- **CMake**\(^9\) CMake is a cross-platform, open source build system generator, commonly used to build C++ projects in a platform-independent manner. CMake supports GNU make as well as Microsoft Visual Studio, allowing the Bio-Formats C++ bindings to be compiled on Windows, Mac OS X, Linux and potentially other platforms.

- **Boost Thread**\(^10\) Boost is a project providing open source portable C++ source libraries. It has become a suite of de facto standard libraries for C++. The Bio-Formats C++ bindings require the Boost Thread module in order to handle C++ threads in a platform independent way.

- **Java Development Kit**\(^11\) At runtime, only the Java Runtime Environment (JRE) is necessary to execute the Bio-Formats code. However, the full J2SE development kit is required at compile time on some platforms (Windows in particular), since it comes bundled with the JVM shared library (jvm.lib) necessary to link with Java.

For information on installing these dependencies, refer to the page for your specific platform: *Windows*, *Mac OS X*, *Linux*.

14.3.2 How to build

The process of building the Bio-Formats C++ bindings is divided into two steps:

1. Generate a C++ project consisting of “proxies” which wrap the Java code. This step utilizes the Maven project management tool, specifically a Maven plugin called cppwrap.
2. Compile this generated C++ project. This step utilizes the cross-platform CMake build system.

For details on executing these build steps, refer to the page for your specific platform: *Windows*, *Mac OS X*, *Linux*.

14.3.3 Build results

If all goes well, the build system will:

1. Generate the Bio-Formats C++ proxy classes;
2. Build the Jace C++ library;
3. Build the Java Tools C++ library;
4. Build the Bio-Formats C++ shared library;
5. Build the showinf and minimum_writer command line tools, for testing the functionality.

Please be patient, as the build may require several minutes to complete.

Afterwards, the dist/formats-bsd subdirectory will contain the following files:

1. `libjace.so` / `libjace.jnilib` / `jace.dll` : Jace shared library
2. `libformats-bsd.so` / `libformats-bsd.dylib` / `formats-bsd.dll` : C++ shared library for BSD-licensed readers and writers
3. `jace-runtime.jar` : Jace Java classes needed at runtime
4. `bioformats_package.jar` : Bio-Formats Java library needed at runtime
5. `libjtools.so` / `libjtools.jnilib` / `jtools.dll` : Java Tools shared library
6. `showinf` / `showinf.exe` : Example command line application
7. `minimum_writer` / `minimum_writer.exe` : Example command line application

Items 1-4 are necessary and required to deploy Bio-Formats with your C++ application. Item 5 (jtools) is a useful helper library for managing the Java virtual machine from C++, but is not strictly necessary to use Bio-Formats. All other files, including the example programs and various build files generated by CMake, are not needed.

If you prefer, instead of using the bioformats_package.jar bundle, you can provide individual JAR files as appropriate for your application. For details, see *using Bio-Formats as a Java library*. 

14.3. Build instructions for C++ bindings 73
14.4 Building C++ bindings in Windows

14.4.1 Compile-time dependencies – Windows

Windows users will need to visit the appropriate web sites and download and install the relevant binaries for all the dependencies. To configure the tools, you will need to edit or create several environment variables on your system. Access them by clicking the “Environment Variables” button from Control Panel, System, Advanced tab. Use semicolons to separate multiple directories in the PATH variable.

14.4.2 Compile-time dependencies – Windows – Maven

Download Maven\(^\text{14}\). Unpack the Maven archive into your Program Files, then add the folder’s bin subdirectory to your PATH environment variable; e.g.:

C:\Program Files\apache-maven-3.0.4\bin

Once set, new Command Prompts will recognize “mvn” as a valid command.

14.4.3 Compile-time dependencies – Windows – CMake

Download and run the CMake installer\(^\text{15}\). During installation, select the “Add CMake to the system PATH for all users” option to ensure that Bio-Formats build system can find your CMake executable.

Once installed, new Command Prompts will recognize “cmake” and “cmake-gui” as valid commands.

14.4.4 Compile-time dependencies – Windows – Boost

The easiest way to install the Boost Thread library on Windows is to use the free installer from BoostPro\(^\text{16}\). When running the installer:

- Under “Compilers,” check the version of Visual C++ matching your system.
- Under “Variants,” check all eight boxes.
- When choosing components, check “Boost DateTime” and “Boost Thread.”

14.4.5 Compile-time dependencies – Windows – Java Development Kit

Download and install the JDK\(^\text{17}\). After the installation is complete, create a new environment variable called JAVA_HOME pointing to your Java installation; e.g.:

C:\Program Files\Java\jdk1.6.0_25

Setting JAVA_HOME is the easiest way to ensure that Maven can locate Java.

You will also need to append your JDK’s client or server VM folder to the PATH; e.g.:

%JAVA_HOME%\jre\bin\client

---

\(^\text{12}\)http://www.openmicroscopy.org/community/
\(^\text{13}\)http://lists.openmicroscopy.org.uk/mailman/listinfo/
\(^\text{14}\)http://maven.apache.org/
\(^\text{15}\)http://cmake.org/
\(^\text{16}\)http://www.boostpro.com/download/
\(^\text{17}\)http://www.oracle.com/technetwork/java/javase/downloads/
This step ensures that a directory containing jvm.dll is present in the PATH. If you do not perform this step, you will receive a runtime error when attempting to initialize a JVM from native code.

Optionally, you can add the bin subdirectory to the PATH; e.g.:

%JAVA_HOME%\bin

Once set, new Command Prompts will recognize (e.g.) “javac” as a valid command.

### 14.4.6 Compile-time dependencies – Windows – Visual C++

In addition to the other prerequisites, you will also need a working copy of Visual C++. We have tested compilation with Visual C++ 2005 Professional and Visual C++ 2008 Express; other versions may or may not work.

You can download Visual C++ Express for free\(^\text{18}\). You must launch the environment at least once before you will be able to compile the Bio-Formats C++ bindings.

#### 14.4.7 How to build - Windows

Run Command Prompt and change to your Bio-Formats working copy. Then run:

```bash
# generate the Bio-Formats C++ bindings
cd components|formats-bsd
mvn -DskipTests package dependency:copy-dependencies cppwrap:wrap

# build the Bio-Formats C++ bindings
cd target|cppwrap
mkdir build
cd build
cmake-gui ..
```

The CMake GUI will open. Click the Configure button, and a dialog will appear. Select your installed version of Visual Studio, and click Finish.

When configuring, you can use the J2L_WIN_BUILD_DEBUG flag to indicate if this will be a Debug or Release build. If the flag is checked it will build as Debug, unchecked will build as Release.

Once configuration is complete, click Configure again, repeating as necessary until the Generate button becomes available. Then click Generate. Once generation is complete, close the CMake window.

Back at the Command Prompt, type:

```
start jace.sln
```

The solution will then open in Visual Studio. Select Release or Debug as appropriate from the drop-down menu. Press F7 to compile (or select Build Solution from the Build menu).

### 14.5 Building C++ bindings in Mac OS X

#### 14.5.1 Compile-time dependencies – Mac OS X

To install dependencies on Mac OS X, we advise using Homebrew\(^\text{19}\):

```
brew install maven cmake boost
```

Unless otherwise configured, this will install binaries into /usr/local/.

---
\(^{18}\)http://www.microsoft.com/express/
\(^{19}\)https://github.com/mxcl/homebrew/
14.5.2 How to build – Mac OS X

The following commands will generate and build the Bio-Formats C++ bindings:

```bash
# generate the C++ bindings
cd components/formats-bsd
mvn -DskipTests package dependency:copy-dependencies cppwrap:wrap

# compile the C++ bindings
cd target/cppwrap
mkdir build
cd build
cmake ..
make
```

14.6 Building C++ bindings in Linux

14.6.1 Compile-time dependencies – Linux

The following directions are specific to Ubuntu Linux. Other Linux distributions may have similar packages available; check your package manager.

To install dependencies on Ubuntu Linux, execute:

```bash
# install code generation prerequisites
sudo aptitude install maven2

# install build prerequisites
sudo aptitude install build-essential cmake libboost-thread-dev

# install Java Development Kit
sudo aptitude install sun-java6-jdk
sudo update-alternatives --config java

Then select Sun’s Java implementation as the system default.

It may be possible to use a different Java compiler (i.e., omit the sun-java6-jdk package and update-alternatives step), but we have only tested the compilation process with Sun’s Java compiler.

14.6.2 How to build – Linux

The following commands will generate and build the Bio-Formats C++ bindings:

```bash
# generate the Bio-Formats C++ bindings
cd components/formats-bsd
mvn -DskipTests package dependency:copy-dependencies cppwrap:wrap

# build the Bio-Formats C++ bindings
cd target/cppwrap
mkdir build
cd build
cmake ..
make
```
WRITING NEW BIO-FORMATS FILE FORMAT READERS

15.1 Bio-Formats file format reader guide

This document is a brief guide to writing new Bio-Formats file format readers.

All format readers should extend either `loci.formats.FormatReader`¹ or a reader in `loci.formats.in`².

15.1.1 Methods to override

- `boolean isSingleFile(String id)`³ Whether or not the named file is expected to be the only file in the dataset. This only needs to be overridden for formats whose datasets can contain more than one file.

- `boolean isThisType(RandomAccessInputStream)`⁴ Check the first few bytes of a file to determine if the file can be read by this reader. You can assume that index 0 in the stream corresponds to the index 0 in the file. Return true if the file can be read; false if not (or if there is no way of checking).

- `int fileGroupOption(String id)`⁵ Returns an indication of whether or not the files in a multi-file dataset can be handled individually. The return value should be one of the following:
  - FormatTools.MUST_GROUP: the files cannot be handled separately
  - FormatTools.CAN_GROUP: the files may be handled separately or as a single unit
  - FormatTools.CANNOT_GROUP: the files must be handled separately

  This method only needs to be overridden for formats whose datasets can contain more than one file.

- `String[] getSeriesUsedFiles(boolean noPixels)`⁶ You only need to override this if your format uses multiple files in a single dataset. This method should return a list of all files associated with the given file name and the current series (i.e. every file needed to display the current series). If the noPixels flag is set, then none of the files returned should contain pixel data. For an example of how this works, see `loci.formats.in.PerkinElmerReader`⁷. It is recommended that the first line of this method be `FormatTools.assertId(currentId, true, 1)` - this ensures that the file name is non-null.

- `byte[] openBytes(int, byte[], int, int, int, int)`⁸ Returns a byte array containing the pixel data for a subimage specified image from the given file. The dimensions of the subimage (upper left X coordinate, upper left Y coordinate, width, and height) are specified in the final four int parameters. This should throw a `FormatException` if the image number is invalid (less than 0 or >= the number of images). The ordering of the array returned by openBytes should correspond to the values returned by `isLittleEndian()` and `isInterleaved()`. Also, the length of the byte array should be [image width * image height * bytes per pixel]. Extra bytes will generally be truncated. It is recommended that the first line of this method be `FormatTools.checkPlaneParameters(this, no, buf.length, x, y, w, h)` - this ensures that all of the parameters are valid.

---

¹https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-api/src/loci/formats/FormatReader.java
²https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/
⁴http://downloads.openmicroscopy.org/latest/bio-formats5/api/loci/formats/IFormatReader.html#isThisType(loci.common.RandomAccessInputStream)
⁶http://downloads.openmicroscopy.org/latest/bio-formats5/api/loci/formats/IFormatReader.html#getSeriesUsedFiles(boolean)
⁷https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/PerkinElmerReader.java
⁸http://downloads.openmicroscopy.org/latest/bio-formats5/api/loci/formats/IFormatReader.html#openBytes(int, byte[], int, int, int, int)
The majority of the file parsing logic should be placed in this method. The idea is to call this method once (and only once!) when the file is first opened. Generally, you will want to start by calling `super.initFile(String)`. You will also need to set up the stream for reading the file, as well as initializing any dimension information and metadata. Most of this logic is up to you; however, you should populate the ‘core’ variable (see `loci.formats.CoreMetadata`).

Note that each variable is initialized to 0 or null when `super.initFile(String)` is called. Also, `super.initFile(String)` constructs a Hashtable called “metadata” where you should store any relevant metadata.

`public void close(boolean fileOnly)` cleans up any resources used by the reader. Global variables should be reset to their initial state, and any open files or delegate readers should be closed.

If you read from a file using something other than `RandomAccessInputStream` or `Location`, you must use the file name returned by `Location.getMappedId(String)`, not the file name passed to the reader. Thus, a stub for `initFile(String)` might look like this:

```
protected void initFile(String id) throws FormatException, IOException {
    super.initFile(id);
    RandomAccessInputStream in = new RandomAccessInputStream(id);
    // alternatively,
    // FileInputStream in = new FileInputStream(Location.getMappedId(id));
    // read basic file structure and metadata from stream
}
```

For more details, see the Bio-Formats Javadocs for `Location.mapId(String, String)` and `Location.getMappedId(String)`.

### 15.1.2 Variables to populate

There are a number of global variables defined in `loci.formats.FormatReader` that should be populated in the constructor of any implemented reader.

These variables are:

- `boolean suffixNecessary` Indicates whether or not a file name suffix is required; true by default
- `boolean suffixSufficient` Indicates whether or not a specific file name suffix guarantees that this reader can open a particular file; true by default
- `boolean hasCompanionFiles` Indicates whether or not there is at least one file in a dataset of this format that contains only metadata (no images); false by default
- `String datasetDescription` A brief description of the layout of files in datasets of this format; only necessary for multi-file datasets
- `String[] domains` An array of imaging domains for which this format is used. Domains are defined in `loci.formats.FormatTools`.

---

10. [https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-api/src/loci/formats/CoreMetadata.java](https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-api/src/loci/formats/CoreMetadata.java)
13. [https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-api/src/loci/formats/CoreMetadata.java](https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-api/src/loci/formats/CoreMetadata.java)
15. [https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-common/src/loci/common/Location.java](https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-common/src/loci/common/Location.java)
17. [https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-api/src/loci/formats/FormatReader.java](https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-api/src/loci/formats/FormatReader.java)
15.1.3 Other useful things

- `loci.common.RandomAccessInputStream`\(^{19}\) is a hybrid `RandomAccessFile/InputStream` class that is generally more efficient than either `RandomAccessFile` or `InputStream`, and implements the `DataInput` interface. It is recommended that you use this for reading files.

- `loci.common.Location`\(^{20}\) provides an API similar to `java.io.File`, and supports File-like operations on URLs. It is highly recommended that you use this instead of `File`. See the Javadocs\(^{21}\) for additional information.

- `loci.common.DataTools`\(^{22}\) provides a number of methods for converting bytes to shorts, ints, longs, etc. It also supports reading most primitive types directly from a `RandomAccessInputStream` (or other `DataInput` implementation).

- `loci.formats.ImageTools`\(^{23}\) provides several methods for manipulating primitive type arrays that represent images. Consult the source or Javadocs for more information.

- If your reader relies on third-party code which may not be available to all users, it is strongly suggested that you make a corresponding service class that interfaces with the third-party code. Please see Bio-Formats service and dependency infrastructure for a description of the service infrastructure, as well as the `loci.formats.services` package\(^{24}\).

- Several common image compression types are supported through subclasses of `loci.formats.codec.BaseCodec`\(^{25}\). These include JPEG, LZW, LZO, Base64, ZIP and RLE (PackBits).

- If you wish to convert a file’s metadata to OME-XML (strongly encouraged), please see Bio-Formats metadata processing for further information.

- Utility methods for reading and writing individual bits from a byte array can be found in `loci.formats.codec.BitBuffer`\(^{26}\) and `loci.formats.codec.BitWriter`\(^{27}\).

- Once you have written your file format reader, add a line to the `readers.txt`\(^{28}\) file with the fully qualified name of the reader, followed by a “#” and the file extensions associated with the file format. Note that `ImageReader`\(^{29}\), the master file format reader, tries to identify which format reader to use according to the order given in `readers.txt`\(^{30}\), so be sure to place your reader in an appropriate position within the list.

- The easiest way to test your new reader is by calling “java loci.formats.tools.ImageInfo <file name>”. If all goes well, you should see all of the metadata and dimension information, along with a window showing the images in the file.

20. https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-common/src/loci/common/Location.java
<table>
<thead>
<tr>
<th>Argument</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>-version</td>
<td>print the library version and exit</td>
</tr>
<tr>
<td>file</td>
<td>the image file to read</td>
</tr>
<tr>
<td>-nopix</td>
<td>read metadata only, not pixels</td>
</tr>
<tr>
<td>-nocore</td>
<td>do not output core metadata</td>
</tr>
<tr>
<td>-nometa</td>
<td>do not parse format-specific metadata table</td>
</tr>
<tr>
<td>-nofilter</td>
<td>do not filter metadata fields</td>
</tr>
<tr>
<td>-thumbs</td>
<td>read thumbnails instead of normal pixels</td>
</tr>
<tr>
<td>-minmax</td>
<td>compute min/max statistics</td>
</tr>
<tr>
<td>-merge</td>
<td>combine separate channels into RGB image</td>
</tr>
<tr>
<td>-nogroup</td>
<td>force multi-file datasets to be read as individual files</td>
</tr>
<tr>
<td>-stitch</td>
<td>stitch files with similar names</td>
</tr>
<tr>
<td>-separate</td>
<td>split RGB image into separate channels</td>
</tr>
<tr>
<td>-expand</td>
<td>expand indexed color to RGB</td>
</tr>
<tr>
<td>-omexml</td>
<td>populate OME-XML metadata</td>
</tr>
<tr>
<td>-normalize</td>
<td>normalize floating point images*</td>
</tr>
<tr>
<td>-fast</td>
<td>paint RGB images as quickly as possible*</td>
</tr>
<tr>
<td>-debug</td>
<td>turn on debugging output</td>
</tr>
<tr>
<td>-range</td>
<td>specify range of planes to read (inclusive)</td>
</tr>
<tr>
<td>-series</td>
<td>specify which image series to read</td>
</tr>
<tr>
<td>-swap</td>
<td>override the default input dimension order</td>
</tr>
<tr>
<td>-shuffle</td>
<td>override the default output dimension order</td>
</tr>
<tr>
<td>-map</td>
<td>specify file on disk to which name should be mapped</td>
</tr>
<tr>
<td>-preload</td>
<td>pre-read entire file into a buffer; significantly reduces the time required to read the images, but requires more memory</td>
</tr>
<tr>
<td>-crop</td>
<td>crop images before displaying; argument is 'x,y,w,h'</td>
</tr>
<tr>
<td>-autoscale</td>
<td>used in combination with <code>-fast</code> to automatically adjust brightness and contrast</td>
</tr>
<tr>
<td>-novalid</td>
<td>do not perform validation of OME-XML</td>
</tr>
<tr>
<td>-omexml-only</td>
<td>only output the generated OME-XML</td>
</tr>
<tr>
<td>-format</td>
<td>read file with a particular reader (e.g., ZeissZVI)</td>
</tr>
</tbody>
</table>

* = may result in loss of precision

- If you wish to test using TestNG, `loci.tests.testng.FormatReaderTest` provides several basic tests that work with all Bio-Formats readers. See the FormatReaderTest source code for additional information.

- For more details, please look at the source code and Javadocs. Studying existing readers is probably the best way to get a feel for the API; we would recommend first looking at `loci.formats.in.ImarisReader` (this is the most straightforward one). `loci.formats.in.LIFReader` and `InCellReader` are also good references that show off some of the nicer features of Bio-Formats.

If you have questions about Bio-Formats, please contact the OME team.

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33 https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/test-suite/src/loci/tests/testng/FormatReaderTest.java
34 http://downloads.openmicroscopy.org/latest/bio-formats5/api/
35 https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/ImarisReader.java
36 https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/LIFReader.java
37 https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/InCellReader.java
38 http://www.openmicroscopy.org/site/community
16.1 Developing Bio-Formats

If you are interested in working on the Bio-Formats source code itself, you can load it into your favorite IDE, or develop with your favorite text editor.

The Bio-Formats code is divided into several projects. Core components are located in subfolders of the components\(^1\) folder, with some components further classified into components/forks\(^2\) or components/stubs\(^3\), depending on the nature of the project.

Each project has a corresponding Maven POM file, which can be used to work with the project in your favorite IDE, or from the command line, once you have cloned the source. Instructions for several popular options follow.

16.1.1 NetBeans

NetBeans comes with Maven support built in. To import the Bio-Formats source, perform the following steps:

1. Choose File → Open Project from the menu
2. Select the top-level folder of your Bio-Formats working copy
3. Expand the Modules folder and double-click desired project(s) to work with them

Alternately, you can clone the source directly from NetBeans into a project by selecting Team → Git → Clone Other... from the menu.

16.1.2 Eclipse

Eclipse uses the “Maven Integration for Eclipse” (m2e) plugin to work with Maven projects. It is more flexible than Eclipse’s built-in project management because m2e transparently converts between project dependencies and JAR dependencies (stored in the Maven repository in ~/.m2/repository) on the build path, depending on which projects are currently open.

We recommend using Eclipse 4.3 (Kepler), specifically - “Eclipse IDE for Java developers”. It comes with m2e installed (http://eclipse.org/downloads/compare.php?release=kepler).

You can then import the Bio-Formats source by choosing File → Import → Existing Maven Projects from the menu and browsing to the top-level folder of your Bio-Formats working copy.

16.1.3 Command line

If you prefer developing code with a text editor such as vim or emacs, you can use the Ant or Maven command line tools to compile Bio-Formats. The Bio-Formats source tree provides parallel build systems for both Ant and Maven, so you can use either one to build the code.

For a list of Ant targets, run:

```
ant -p
```

\(^1\)https://github.com/openmicroscopy/bioformats/tree/v5.0.2/components/

\(^2\)https://github.com/openmicroscopy/bioformats/tree/v5.0.2/components/forks/

\(^3\)https://github.com/openmicroscopy/bioformats/tree/v5.0.2/components/stubs/
When using Maven, Bio-Formats is configured to run the “install” target by default, so all JARs will be copied into your local Maven repository in ~/.m2/repository. Simply run:

mvn

With either Ant or Maven, you can use similar commands in any subproject folder to build just that component.

16.2 Testing individual commits (internal developers)

At the bottom of many commit messages in https://github.com/openmicroscopy/bioformats, you will find a few lines similar to this:

To test, please run:

ant -Dtestng.directory=$DATA/metamorph test-automated

This shows the command(s) necessary to run automated tests against the files likely to be affected by that commit. If you want to run these tests, you will need to do the following:

Clone bioformats.git and checkout the appropriate branch (by following the directions on the Git usage page). Run this command to build all of the JAR files:

$ ant clean jars

Switch to the test-suite component:

$ cd components/test-suite

Run the tests, where $DATA is the path to the full data repository:

$ ant -Dtestng.directory=$DATA/metamorph test-automated

By default, 512 MB of memory are allocated to the JVM. You can increase this by adding the `-Dtestng.memory=XXXm` option. You should now see output similar to this:

Buildfile: build.xml

init-title:
    [echo] ------------------------------ bio-formats-testing-framework ------------------------------

init-timestamp:

release-version:

init-manifest-cp:

init:

copy-source:

compile:

test-automated:
    [testng] [Parser] Running:
    [testng] Bio-Formats software test suite
    [testng]

---

http://www.openmicroscopy.org/site/support/contributing/using-git.html
Each of the dots represents a single passed test; a `.-` is a skipped test, and an `F` is a failed test. This is mostly just for your amusement if you happen to be staring at the console while the tests run, as a more detailed report is logged to bio-formats-software-test-$DATE.log (where `$DATE` is the date on which the tests started in “yyyyMMdd_HHmmss” format). If Ant reports that the build was successful, then there is nothing that you need to do. Otherwise, it is helpful if you can provide the command, branch name, number of failures at the bottom of the Ant output, and the bio-formats-software-test-*.log file.

### 16.3 Public test data

Most of the data-driven tests would benefit from having a comprehensive set of public sample data (see also [#4086](http://trac.openmicroscopy.org.uk/ome/ticket/4086)). Formats for which we already have public sample data:

A `*` indicates that we could generate more public data in this format.

- ICS (*)
- Leica LEI
- IPLab
- BMP (*)
- Image-Pro SEQ
- QuickTime (*)
- Bio-Rad PIC
- Image-Pro Workspace
- Fluoview/ABD TIFF (*)
- Perkin Elmer Ultraview
- Gatan DM3
- Zeiss LSM
- Openlab LIFF (*)
- Leica LIF (*)
- TIFF (*)
- MNG (Download*) (*)

---

5http://trac.openmicroscopy.org.uk/ome/ticket/4086
Formats for which we can definitely generate public sample data:

- PNG/APNG
- JPEG
- PGM
- FITS
- PCX
- GIF
- Openlab Raw
- OME-XM
- OME-TIFF
- AVI
- PICT
- LIM
- PSD
- Targa
- Bio-Rad Gel
- Fake
- ECAT-7 (minctoecat)
- NRRD
- JPEG-2000
- Micromanager
- Text
- DICOM
- MINC (rawtominc)
- NIFTI (dicomnifti)
- Analyze 7.5 (medcon)
- SDT
- FV1000 .oib/.oif
- Zeiss ZVI
- Leica TCS
- Aperio SVS
- Imaris (raw)

Formats for which I need to check whether or not we can generate public sample data:

- IPLab Mac (Ivision)
- Deltavision
- MRC
- Gatan DM2
- Imaris (HDF)
- EPS
- Alicona AL3D
- Visitech
• InCell
• L2D
• FEI
• NAF
• MRW
• ARF
• LI-FLIM
• Oxford Instruments
• VG-SAM
• Hamamatsu HIS
• WA-TOP
• Seiko
• TopoMetrix
• UBM
• Quesant
• RHK
• Molecular Imaging
• JEOL
• Amira
• Unisoku
• Perkin Elmer Densitometer
• Nikon ND2
• SimplePCI .cxd
• Imaris (TIFF)
• Molecular Devices Gel
• Imacon .iff
• LEO
• JPK
• Nikon NEF
• Nikon TIFF
• Prairie
• Metamorph TIFF/STK/ND
• Improvision TIFF
• Photoshop TIFF
• FEI TIFF
• SimplePCI TIFF
• Burleigh
• SM-Camera
• SBIG

Formats for which we definitely cannot generate public sample data:

• TillVision
16.4 Bio-Formats service and dependency infrastructure

16.4.1 Description

The Bio-Formats service infrastructure is an interface driven pattern for dealing with external and internal dependencies. The design goal was mainly to avoid the cumbersome usage of ReflectedUniverse where possible and to clearly define both service dependency and interface between components. This is generally referred to as dependency injection\(^7\), dependency inversion\(^8\) or component based design\(^9\).

It was decided, at this point, to forgo the usage of potentially more powerful but also more complicated solutions such as:

- Spring (http://spring.io)
- Guice (http://code.google.com/p/google-guice/)
- ...

The Wikipedia page for dependency injection\(^10\) contains many other implementations in many languages.

An added benefit is the potential code reuse possibilities as a result of decoupling of dependency and usage in Bio-Formats readers. Implementations of the initial Bio-Formats services were completed as part of BioFormatsCleanup and tickets \#463\(^11\) and \#464\(^12\).

16.4.2 Writing a service

- **Interface** – The basic form of a service is an interface which inherits from loci.common.services.Service\(^13\). Here is a very basic example using the (now removed) OMENotesService

```java
public interface OMENotesService extends Service {
    /**
     * Creates a new OME Notes instance.
     * @param filename Path to the file to create a Notes instance for.
     */
    public void newNotes(String filename);
}
```

- **Implementation** – This service then has an implementation, which is usually located in the Bio-Formats component or package which imports classes from an external, dynamic or other dependency. Again looking at the OMENotesService:

\(^7\)http://en.wikipedia.org/wiki/Dependency_injection
\(^8\)http://en.wikipedia.org/wiki/Dependency_inversion_principle
\(^9\)http://en.wikipedia.org/wiki/Component-based_software_engineering
\(^10\)http://en.wikipedia.org/wiki/Dependency_injection
\(^11\)http://trac.openmicroscopy.org.uk/ome/ticket/463
\(^12\)http://trac.openmicroscopy.org.uk/ome/ticket/464
\(^13\)https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-common/src/loci/common/services/Service.java
public class OMENotesServiceImpl extends AbstractService implements OMENotesService {
    /**
     * Default constructor.
     */
    public OMENotesServiceImpl() {
        checkClassDependency(Notes.class);
    }

    /* (non-Javadoc)
     * @see loci.formats.dependency.OMENotesService#newNotes()
     */
    public void newNotes(String filename) {
        new Notes(null, filename);
    }
}

• **Style**
  
  – Extension of AbstractService to enable uniform runtime dependency checking is recommended. Java does not check class dependencies until classes are first instantiated so if you do not do this, you may end up with ClassNotFound or the like exceptions being emitted from your service methods. This is to be strongly discouraged. If a service has unresolved classes on its CLASSPATH instantiation should fail, not service method invocation.

  – Service methods should not burden the implementer with numerous checked exceptions. Also external dependency exception instances should not be allowed to directly leak from a service interface. Please wrap these using a ServiceException.

  – By convention both the interface and implementation are expected to be in a package named loci.*.services. This is not a hard requirement but should be followed where possible.

• **Registration** – A service’s interface and implementation must finally be **registered** with the loci.common.services.ServiceFactory\(^\text{14}\) via the services.properties\(^\text{15}\) file. Following the OMENotesService again, here is an example registration:

```java
...
# OME notes service (implementation in legacy ome-notes component)
loci.common.services.OMENotesService=loci.ome.notes.services.OMENotesServiceImpl
...
```

### 16.4.3 Using a service

OMENotesService service = null;
try {
    ServiceFactory factory = new ServiceFactory();
    service = factory.getInstance(OMENotesService.class);
} catch (DependencyException de) {
    LOGGER.info("", de);
} ...
16.5 Code generation with xsd-fu

XSDFu is a Python application designed to digest OME XML schema and produce an object oriented Java infrastructure to ease work with an XML DOM tree.

Requirements:
- Python\(^{16}\) 2.4+
- Genshi\(^{17}\) 0.5
- Complete checkout of the Bio-Formats repository\(^{18}\)

Note: Genshi 0.5\(^{19}\) was released on June 9th 2008. You can either install from source or download a compatible .egg for your system on the Genshi download page\(^{20}\).

16.5.1 Checking out the source

This will get the entire source tree. xsd-fu is in components/xsd-fu

git clone https://github.com/openmicroscopy/bioformats

16.5.2 Running the code generator

If you do have Genshi already installed, you can run xsd-fu script with no arguments to examine the syntax:

```
$ ./xsd-fu -o ../../
Missing subcommand!
Usage: ./xsd-fu <subcommand> ...
Executes an OME-XML Schema definition parsing and code generation subcommand.
```

Available subcommands:
- java_classes
- omexml_metadata
- omero_metadata
- omero_model
- metadata_store
- metadata_retrieve
- metadata_aggregate
- dummy_metadata
- filter_metadata
- enum_types
- enum_handlers
- doc_gen
- tab_gen
- debug

Report bugs to OME Devel <ome-devel@lists.openmicroscopy.org.uk>

If you do not have Genshi installed you can use a downloaded Python .egg for your platform as follows:

```
$ export PYTHONPATH=Genshi-0.5-py2.4-linux-i686.egg
$ ./xsd-fu -o ../../
Missing subcommand!
Usage: ./xsd-fu <subcommand> ...
```

\(^{16}\)http://python.org
\(^{17}\)http://genshi.edgewall.org
\(^{18}\)https://github.com/openmicroscopy/bioformats
\(^{19}\)http://genshi.edgewall.org/milestone/0.5
\(^{20}\)http://genshi.edgewall.org/wiki/Download
Executes an OME-XML Schema definition parsing and code generation subcommand.

Available subcommands:
  java_classes
  omexml_metadata
  omero_metadata
  omero_model
  metadata_store
  metadata_retrieve
  metadata_aggregate
  dummy_metadata
  filter_metadata
  enum_types
  enum_handlers
  doc_gen
  tab_gen
  debug

Report bugs to OME Devel <ome-devel@lists.openmicroscopy.org.uk>

Note: XsdFu is now used for many different types of code generation tasks (mostly targeted at the OMERO and Bio-Formats 4.2.0 releases) as outlined by the subcommand structure above.

16.5.3 Generating the OME-XML Java toolchain

The following sections outline how to generate parts of the OME-XML Java toolchain which are composed of:

- OME model objects
- Enumerations for OME model properties
- Enumeration handlers for regular expression matching of enumeration strings
- Metadata store and Metadata retrieve interfaces for all OME model properties
- Various implementations of Metadata store and/or Metadata retrieve interfaces

All of the above can be generated by this Ant command:

$ cd components/ome-xml
$ ant generate-source

These commands internally call xsd-fu as follows:

Java classes for OME model objects

$ ./xsd-fu java_classes -p 'ome.xml.model' -o \
   ../ome-xml/target/generated-sources/ \
   ../specification/released-schema/2013-06/ome.xsd \
   ../specification/released-schema/2013-06/BinaryFile.xsd \
   ../specification/released-schema/2013-06/ROI.xsd \
   ../specification/released-schema/2013-06/SA.xsd \
   ../specification/released-schema/2013-06/SPW.xsd
### Enumeration classes for OME model properties

```bash
$ ./xsd-fu enum_types -p 'ome.xml.model.enums' -o \
  ../ome-xml/target/generated-sources/ \
  ../specification/released-schema/2013-06/ome.xsd \
  ../specification/released-schema/2013-06/BinaryFile.xsd \
  ../specification/released-schema/2013-06/ROI.xsd \
  ../specification/released-schema/2013-06/SA.xsd \
  ../specification/released-schema/2013-06/SPW.xsd
```

### Enumeration handlers for OME model properties

```bash
$ ./xsd-fu enum_handlers -p 'ome.xml.model.enums.handlers' -o \
  ../ome-xml/target/generated-sources/ \
  ../specification/released-schema/2013-06/ome.xsd \
  ../specification/released-schema/2013-06/BinaryFile.xsd \
  ../specification/released-schema/2013-06/ROI.xsd \
  ../specification/released-schema/2013-06/SA.xsd \
  ../specification/released-schema/2013-06/SPW.xsd
```

### Metadata store and Metadata retrieve interfaces

```bash
$ ./xsd-fu metadata -o ../ome-xml/target/generated-sources/ \
  ../specification/released-schema/2013-06/ome.xsd \
  ../specification/released-schema/2013-06/BinaryFile.xsd \
  ../specification/released-schema/2013-06/ROI.xsd \
  ../specification/released-schema/2013-06/SA.xsd \
  ../specification/released-schema/2013-06/SPW.xsd
```

**OMEXMLMetadataImpl Metadata store and Metadata retrieve implementation**

```bash
$ ./xsd-fu omexml_metadata -o ../ome-xml/target/generated-sources/ \
  ../specification/released-schema/2013-06/ome.xsd \
  ../specification/released-schema/2013-06/BinaryFile.xsd \
  ../specification/released-schema/2013-06/ROI.xsd \
  ../specification/released-schema/2013-06/SA.xsd \
  ../specification/released-schema/2013-06/SPW.xsd
```

### 16.5.4 Working with Enumerations and Enumeration Handlers

XsdFucode generates enumeration regular expressions using a flexible configuration file\(^2\).

Each enumeration has a key-value listing of regular expression to exact enumeration value matches. For example:

```bash
[Correction]
".*Pl.*Apo.*" = "PlanApo"
".*Pl.*Flu.*" = "PlanFluor"
"\s*Vio.*Corr.*" = "VioletCorrected"
".*S.*Flu.*" = "SuperFluor"
".*Neo.*flu.*" = "Neofluar"
```

\(^2\)https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/xsd-fu/cfg/enum_handler.cfg

---

16.5. Code generation with xsd-fu 90
16.5.5 Generate OMERO model specification files

This work was completed as part of the Update XsdFu (#8086) story.

```bash
$ cd components/xsd-fu
$ ./xsd-fu omero_model -o where/to/place/output/ \
   ../specification/inprogress/ome.xsd ../specification/inprogress/SPW.xsd \
   ../specification/inprogress/SA.xsd ../specification/inprogress/ROI.xsd
```

16.5.6 Special Thanks

A special thanks goes out to Dave Kuhlman for his fabulous work on generateDS which XSD Fu makes heavy use of internally. See open Trac tickets for Bio-Formats for information on work currently planned or in progress. For more general guidance about how to contribute to OME projects, see the Contributing developers documentation.

---

22http://trac.openmicroscopy.org.uk/ome/ticket/8086
23http://www.rexx.com/dkuhlman/
24http://www.rexx.com/dkuhlman/generateDS.html
26http://www.openmicroscopy.org/site/support/contributing/index.html
Part IV

Formats
Bio-Formats supports over 120 different file formats. The *Dataset Structure Table* explains the file extension you should choose to open/import a dataset in any of these formats, while the *Supported Formats* table lists all of the formats and gives an indication of how well they are supported and whether Bio-Formats can write, as well as read, each format. The *Summary of supported metadata fields* table shows an overview of the *OME data model* fields populated for each format.

**We are always looking for examples of files to help us provide better support for different formats.** If you would like to help, you can upload files using our QA system uploader\(^{27}\). If you have any questions, or would prefer not to use QA, please email the ome-users mailing list\(^{28}\). If your format is already supported, please refer to the ‘we would like to have’ section on the individual page for that format, to see if your dataset would be useful to us.

\(^{27}\)http://qa.openmicroscopy.org.uk/qa/upload/

\(^{28}\)http://www.openmicroscopy.org/site/community/mailing-lists
## DATASET STRUCTURE TABLE

This table shows the extension of the file that you should choose if you want to open/import a dataset in a particular format.

<table>
<thead>
<tr>
<th>Format name</th>
<th>File to choose</th>
<th>Structure of files</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIM</td>
<td>.aim</td>
<td>Single file</td>
</tr>
<tr>
<td>ARF</td>
<td>.arf</td>
<td>Single file</td>
</tr>
<tr>
<td>Adobe Photoshop</td>
<td>.psd</td>
<td>Single file</td>
</tr>
<tr>
<td>Adobe Photoshop TIFF</td>
<td>.tif, .tiff</td>
<td>Single file</td>
</tr>
<tr>
<td>Alcina AL3D</td>
<td>.al3d</td>
<td>Single file</td>
</tr>
<tr>
<td>Amersham Biosciences GEL</td>
<td>.gel</td>
<td>Single file</td>
</tr>
<tr>
<td>Amira</td>
<td>.am, .amiramesh, .grey, .hx, .labels</td>
<td>Single file</td>
</tr>
<tr>
<td>Analyze 7.5</td>
<td>.img, .hdr</td>
<td>One .img file and one similarly-named .hdr file</td>
</tr>
<tr>
<td>Andor SIF</td>
<td>.sif</td>
<td>Single file</td>
</tr>
<tr>
<td>Animated PNG</td>
<td>.png</td>
<td>Single file</td>
</tr>
<tr>
<td>Aperio SVS</td>
<td>.svs</td>
<td>Single file</td>
</tr>
<tr>
<td>Audio Video Interleave</td>
<td>.avi</td>
<td>Single file</td>
</tr>
<tr>
<td>BD Pathway</td>
<td>.exp, .tif</td>
<td>Multiple files (.exp, .dye, .ltp, ...) plus one or more directories containing .tif and .bmp files</td>
</tr>
<tr>
<td>Bio-Rad GEL</td>
<td>.1sc</td>
<td>Single file</td>
</tr>
<tr>
<td>Bio-Rad PIC</td>
<td>.pic, .xml, .raw</td>
<td>One or more .pic files and an optional lse.xml file</td>
</tr>
<tr>
<td>Bitplane Imaris</td>
<td>.ims</td>
<td>Single file</td>
</tr>
<tr>
<td>Bitplane Imaris 3 (TIFF)</td>
<td>.ims</td>
<td>Single file</td>
</tr>
<tr>
<td>Bitplane Imaris 5.5 (HDF)</td>
<td>.ims</td>
<td>Single file</td>
</tr>
<tr>
<td>Bruker</td>
<td>(no extension)</td>
<td>One ‘fid’ and one ‘acqp’ plus several other metadata files and a ‘pdata’ directory</td>
</tr>
<tr>
<td>Burleigh</td>
<td>.img</td>
<td>Single file</td>
</tr>
<tr>
<td>Canon RAW</td>
<td>.cr2, .crw, .jpg, .thm, .wav</td>
<td>Single file</td>
</tr>
<tr>
<td>CellSens VSI</td>
<td>.vsi, .ets</td>
<td>Single file</td>
</tr>
<tr>
<td>CellWorx</td>
<td>.pnl, .htd, .log</td>
<td>One .vsi file and an optional directory with a similar name that contains at least one subdirectory with .ets files</td>
</tr>
<tr>
<td>Cellomics C01</td>
<td>.c01, .dib</td>
<td>One or more .c01 files</td>
</tr>
<tr>
<td>Compix Simple-PCI</td>
<td>.cxd</td>
<td>Single file</td>
</tr>
<tr>
<td>DICOM</td>
<td>.dic, .dcm, .dicom, .jp2, .j2ki, .j2kr, .raw, .ima</td>
<td>One or more .dcm or .dicom files</td>
</tr>
<tr>
<td>DNG</td>
<td>.cr2, .crw, .jpg, .thm, .wav, .tif, .tiff</td>
<td>Single file</td>
</tr>
<tr>
<td>Deltavision</td>
<td>.dv, .r3d, .r3d_d3d, .dv.log, .r3d.log</td>
<td>One .dv, .r3d, or .d3d file and up to two optional .log files</td>
</tr>
<tr>
<td>ECAT7</td>
<td>.v</td>
<td>Single file</td>
</tr>
<tr>
<td>Encapsulated PostScript</td>
<td>.eps, .epsi, .ps</td>
<td>Single file</td>
</tr>
<tr>
<td>Format name</td>
<td>File to choose</td>
<td>Structure of files</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>----------------</td>
<td>------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Evotec Flex</td>
<td>.flex, .mea, .res</td>
<td>One directory containing one or more .flex files, and an optional directory containing an .mea and .res file. The .mea and .res files may also be in the same directory as the .flex file(s).</td>
</tr>
<tr>
<td>FEI TIFF</td>
<td>.tif, .tiff</td>
<td>Single file</td>
</tr>
<tr>
<td>FEI/Philips</td>
<td>.img</td>
<td>Single file</td>
</tr>
<tr>
<td>Flexible Image Transport</td>
<td>.fits, .fts</td>
<td>Single file</td>
</tr>
<tr>
<td>System</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fujif Film 3000</td>
<td>.img, .inf</td>
<td>Single file</td>
</tr>
<tr>
<td>Gatan DM2</td>
<td>.dm2</td>
<td>Single file</td>
</tr>
<tr>
<td>Gatan Digital Micrograph</td>
<td>.dm3</td>
<td>Single file</td>
</tr>
<tr>
<td>Graphics Interchange Format</td>
<td>.gif</td>
<td>Single file</td>
</tr>
<tr>
<td>Hamamatsu Aquacosmos</td>
<td>.naf</td>
<td>Single file</td>
</tr>
<tr>
<td>Hamamatsu HIS</td>
<td>.his</td>
<td>Single file</td>
</tr>
<tr>
<td>Hamamatsu NDPI</td>
<td>.ndpi</td>
<td>Single file</td>
</tr>
<tr>
<td>Hamamatsu NDPIS</td>
<td>.ndpis</td>
<td>Single file</td>
</tr>
<tr>
<td>Hamamatsu VMS</td>
<td>.vms</td>
<td>One .vms file plus several .jpg files</td>
</tr>
<tr>
<td>Hitachi</td>
<td>.txt</td>
<td>One .txt file plus one similarly-named .tiff, .bmp, or .jpg file</td>
</tr>
<tr>
<td>IMAGIC</td>
<td>.hed, .img</td>
<td>One .hed file plus one similarly-named .img file</td>
</tr>
<tr>
<td>IMOD</td>
<td>.mod</td>
<td>Single file</td>
</tr>
<tr>
<td>INR</td>
<td>.inr</td>
<td>Single file</td>
</tr>
<tr>
<td>IPLab</td>
<td>.ipl</td>
<td>Single file</td>
</tr>
<tr>
<td>IVision</td>
<td>.ipm</td>
<td>Single file</td>
</tr>
<tr>
<td>Imacon</td>
<td>.iff</td>
<td>Single file</td>
</tr>
<tr>
<td>Image Cytometry Standard</td>
<td>.ics, .ids</td>
<td>One .ics and possibly one .ids with a similar name</td>
</tr>
<tr>
<td>Image-Pro Sequence</td>
<td>.seq</td>
<td>Single file</td>
</tr>
<tr>
<td>Image-Pro Workspace</td>
<td>.ipw</td>
<td>Single file</td>
</tr>
<tr>
<td>Improvision TIFF</td>
<td>.tif, .tiff</td>
<td>Single file</td>
</tr>
<tr>
<td>InCell 1000/2000</td>
<td>.xdce, .xml, .tiff, .tif, .xlog</td>
<td>One .xdce file with at least one .tiff/.tif or .im file</td>
</tr>
<tr>
<td>InCell 3000</td>
<td>.frm</td>
<td>Single file</td>
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### 17.1 Flex Support

OMERO.importer supports importing analyzed Flex files from an Opera system.

Basic configuration is done via the `importer.ini`. Once the user has run the Importer once, this file will be in the following location:

- `C:\Documents and Settings\<username>\omero\importer.ini`

The user will need to modify or add the `[FlexReaderServerMaps]` section of the INI file as follows:

```
[FlexReaderServerMaps]
CIA-1 = \hostname1\mount;\\archivehost1\mount
CIA-2 = \hostname2\mount;\\archivehost2\mount
```

where the `key` of the INI file line is the value of the “Host” tag in the `.mea` measurement XML file (here: `<Host name="CIA-1">`) and the value is a semicolon-separated list of escaped UNC path names to the Opera workstations where the Flex files reside.

Once this resolution has been encoded in the configuration file and you have restarted the importer, you will be able to select the `.mea` measurement XML file from the Importer user interface as the import target.
### SUPPORTED FORMATS

**Ratings legend and definitions**

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<th>Pixels</th>
<th>Metadata</th>
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<th>Utility</th>
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<tr>
<td>Velocity Library Clipping</td>
<td>.acff</td>
<td></td>
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<td>WA-TOP</td>
<td>.wat</td>
<td></td>
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</tr>
<tr>
<td>Windows Bitmap</td>
<td>.bmp</td>
<td></td>
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<td></td>
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<tr>
<td>Woolz</td>
<td>.wlz</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Zeiss AxioVision TIFF</td>
<td>.xml, .tiff</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zeiss AxioVision ZVI (Zeiss Vision Image)</td>
<td>.zvi</td>
<td></td>
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<tr>
<td>Zeiss CZI</td>
<td>.czi</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Zeiss LSM (Laser Scanning Microscope) 510/710</td>
<td>.lsm, .mdb</td>
<td></td>
<td></td>
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<td></td>
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</table>

Bio-Formats currently supports 135 formats

<table>
<thead>
<tr>
<th></th>
<th>Outstanding</th>
<th>Very good</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
</tr>
</thead>
</table>

**Ratings legend and definitions**

**Pixels** Our estimation of Bio-Formats’ ability to reliably extract complete and accurate pixel values from files in that format. The better this score, the more confident we are that Bio-Formats will successfully read your file without displaying an error message or displaying an erroneous image.
**Metadata**  Our certainty in the thoroughness and correctness of Bio-Formats’ metadata extraction and conversion from files of that format into standard OME-XML. The better this score, the more confident we are that all meaningful metadata will be parsed and populated as OME-XML.

**Openness**  This is not a direct expression of Bio-Formats’ performance, but rather indicates the level of cooperation the format’s controlling interest has demonstrated toward the scientific community with respect to the format. The better this score, the more tools (specification documents, source code, sample files, etc.) have been made available.

**Presence**  This is also not directly related to Bio-Formats, but instead represents our understanding of the format’s popularity, and is also as a measure of compatibility between applications. The better this score, the more common the format and the more software packages include support for it.

**Utility**  Our opinion of the format’s suitability for storing metadata-rich microscopy image data. The better this score, the wider the variety of information that can be effectively stored in the format.

**Export**  This indicates whether Bio-Formats is capable of writing the format (Bio-Formats can read every format on this list).

**BSD**  This indicates whether format is BSD-licensed. By default, format readers and writers are GPL-licensed.

### 18.1 3i SlideBook

Extensions: .sld

Developer: Intelligent Imaging Innovations

Owner: Intelligent Imaging Innovations

**Support**

BSD-licensed: ✗

Export: ✗

Officially Supported Versions: 4.1, 4.2

Supported Metadata Fields: 3i SlideBook

We currently have:

- Numerous SlideBook datasets

We would like to have:

- A SlideBook specification document

- More SlideBook datasets (preferably acquired with the most recent SlideBook software)

**Ratings**

Pixels: 🟢

Metadata: 🟡

Openness: 🟡

Presence: 🟢

Utility: 🟡

**Additional Information**

Source Code: SlidebookReader.java

Notes:

We strongly encourage users to export their .sld files to OME-TIFF using the SlideBook software. Bio-Formats is not likely to support the full range of metadata that is included in .sld files, and so exporting to OME-TIFF from SlideBook is the best way to ensure that all metadata is preserved.

---

18.2 Andor Bio-Imaging Division (ABD) TIFF

Extensions: .tif
Developer: Andor Bioimaging Department
Owner: Andor Technology

Support
BSD-licensed: 
Export: 

Officially Supported Versions:
Supported Metadata Fields: *Andor Bio-Imaging Division (ABD) TIFF*

We currently have:
- an ABD-TIFF specification document (from 2005 November, in PDF)
- a few ABD-TIFF datasets

We would like to have:

Ratings
Pixels:
Metadata:
Openness:
Presence:
Utility:

Additional Information
Source Code: FluoviewReader.java

Notes:
Please note that while we have specification documents for this format, we are not able to distribute them to third parties.
With a few minor exceptions, the ABD-TIFF format is identical to the Fluoview TIFF format.

18.3 AIM

Extensions: .aim
Developer: SCANCO Medical AG

Support
BSD-licensed: 
Export: 

Officially Supported Versions:

---

4 https://www.slidebook.com
5 http://www.andor.com/
6 https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/FluoviewReader.java
7 http://www.scanco.ch
Supported Metadata Fields: \textit{AIM}

We currently have:

- one .aim file

We would like to have:

- an .aim specification document
- more .aim files

\textbf{Ratings}

Pixels: \includegraphics[width=0.05\textwidth]{graphics/pixel.png}
Metadata: \includegraphics[width=0.05\textwidth]{graphics/metadata.png}
Openness: \includegraphics[width=0.05\textwidth]{graphics/openness.png}
Presence: \includegraphics[width=0.05\textwidth]{graphics/presence.png}
Utility: \includegraphics[width=0.05\textwidth]{graphics/utility.png}

\textbf{Additional Information}

Source Code: AIMReader.java\textsuperscript{8}

Notes:

\section*{18.4 Alicona 3D}

Extensions: .al3d

Owner: Alicona Imaging\textsuperscript{9}

\textbf{Support}

BSD-licensed: \includegraphics[width=0.1\textwidth]{graphics/bad.png}
Export: \includegraphics[width=0.1\textwidth]{graphics/bad.png}

Officially Supported Versions: 1.0

Supported Metadata Fields: \textit{Alicona 3D}

We currently have:

- an AL3D specification document\textsuperscript{10} (v1.0, from 2003, in PDF)
- a few AL3D datasets

We would like to have:

- more AL3D datasets (Z series, T series, 16-bit)

\textbf{Ratings}

Pixels: \includegraphics[width=0.05\textwidth]{graphics/pixel.png}
Metadata: \includegraphics[width=0.05\textwidth]{graphics/metadata.png}
Openness: \includegraphics[width=0.05\textwidth]{graphics/openness.png}
Presence: \includegraphics[width=0.05\textwidth]{graphics/presence.png}
Utility: \includegraphics[width=0.05\textwidth]{graphics/utility.png}

\textbf{Additional Information}

\textsuperscript{8}https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/AIMReader.java

\textsuperscript{9}http://www.alicona.com/

\textsuperscript{10}http://www.alicona.com/home/fileadmin/alicona/downloads/AL3DFormat.pdf
Source Code: AliconaReader.java

Notes:

Known deficiencies:

• Support for 16-bit AL3D images is present, but has never been tested.
• Texture data is currently ignored.

18.5 Amersham Biosciences Gel

Extensions: .gel
Developer: Molecular Dynamics
Owner: GE Healthcare Life Sciences

Support
BSD-licensed: X
Export: X

Officially Supported Versions:
Supported Metadata Fields: Amersham Biosciences Gel

We currently have:

• a GEL specification document (Revision 2, from 2001 Mar 15, in PDF)
• a few GEL datasets

We would like to have:

Ratings
Pixels:
Metadata:
Openness:
Presence:
Utility:

Additional Information
Source Code: GelReader.java

Notes:

Please note that while we have specification documents for this format, we are not able to distribute them to third parties.

See also:
GEL Technical Overview

18.6 Amira Mesh

Extensions: .am, .amiramesh, .grey, .hx, .labels
Developer: Visage Imaging

11https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/AliconaReader.java
12http://www.gelifesciences.com/
13https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/GelReader.java
14http://www.awaresystems.be/imaging/tiff/tifftags/docs/gel.html
15http://www.amiravis.com/
Support

BSD-licensed: ✗
Export: ✗

Officially Supported Versions:

Supported Metadata Fields: Amira Mesh

We currently have:
  • a few Amira Mesh datasets

We would like to have:
  • more Amira Mesh datasets

Ratings

Pixels: ▲
Metadata: ◼
Openness: ◼
Presence: ◼
Utility: ◼

Additional Information

Source Code: AmiraReader.java

Notes:

18.7 Analyze 7.5

Extensions: .img, .hdr

Developer: Mayo Foundation Biomedical Imaging Resource

Support

BSD-licensed: ✗
Export: ✗

Officially Supported Versions:

Supported Metadata Fields: Analyze 7.5

We currently have:
  • an Analyze 7.5 specification document
  • several Analyze 7.5 datasets

We would like to have:

Ratings

Pixels: ▲
Metadata: ◼
Openness: ◼
Presence: ◼

16https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/AmiraReader.java
17http://www.mayo.edu/bir
18http://analyzedirect.com/support/10.0Documents/Analyze_Resource_01.pdf
Utility: ▼

Additional Information
Source Code: AnalyzeReader.java

Notes:

### 18.8 Animated PNG

Extensions: .png
Developer: The Animated PNG Project

**Support**

BSD-licensed: ✔
Export: ✔

**Officially Supported Versions:**

**Supported Metadata Fields:** Animated PNG

**Freely Available Software:**

- Firefox 3+\(^{21}\)
- Opera 9.5+\(^{22}\)
- KSquirrel\(^{23}\)

We currently have:

- a specification document\(^{24}\)
- several APNG files

We would like to have:

**Ratings**

Pixels: ▲
Metadata: ▲
Openness: ▲
Presence: ▲
Utility: ▼

**Additional Information**

Source Code: APNGReader.java

Notes:

---

\(^{19}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/AnalyzeReader.java

\(^{20}\)http://www.animatedpng.com/

\(^{21}\)http://www.mozilla.com/firefox

\(^{22}\)http://www.opera.com/download

\(^{23}\)http://ksquirrel.sourceforge.net/download.php

\(^{24}\)http://wiki.mozilla.org/APNG_Specification

\(^{25}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-bsd/src/loci/formats/in/APNGReader.java
18.9 Aperio AFI

Extensions: .afi, .svs
Owner: Aperio

Support

BSD-licensed: ✗
Export: ✗

Officially Supported Versions:
Supported Metadata Fields: Aperio AFI

We currently have:
  • several AFI datasets

We would like to have:

Ratings

Pixels: ▲
Metadata: ▲
Openness: ▲
Presence: □
Utility: □

Additional Information

Source Code: AFIReader.java
See also:
Aperio ImageScope

18.10 Aperio SVS TIFF

Extensions: .svs
Owner: Aperio

Support

BSD-licensed: ✗
Export: ✗

Officially Supported Versions: 8.0, 8.2, 9.0
Supported Metadata Fields: Aperio SVS TIFF

We currently have:
  • many SVS datasets
  • an SVS specification document
  • the ability to generate additional SVS datasets

26 http://www.aperio.com/
27 https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/AFIReader.java
29 http://www.aperio.com/
We would like to have:

**Ratings**

Pixels: ▲
Metadata: ▲
Openness: ▲
Presence: ▼
Utility: ▼

**Additional Information**

Source Code: *SVSReader.java*

Notes:

*Please note that while we have specification documents for this format, we are not able to distribute them to third parties.*

**See also:**

*Aperio ImageScope*

---

### 18.11 Applied Precision CellWorX

Extensions: .htd, .pnl

Developer: Applied Precision

**Support**

BSD-licensed: ❌
Export: ❌

Officially Supported Versions:

Supported Metadata Fields: *Applied Precision CellWorX*

We currently have:

- a few CellWorX datasets

We would like to have:

- a CellWorX specification document
- more CellWorX datasets

**Ratings**

Pixels: ▲
Metadata: ▼
Openness: ▼
Presence: ▼
Utility: ▼

**Additional Information**

Source Code: *CellWorxReader.java*

Notes:

---

30 https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/SVSReader.java
31 http://www.leicabiosystems.com/index.php?id=8991
32 http://www.api.com
33 https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/CellWorxReader.java
18.12 AVI (Audio Video Interleave)

Extensions: .avi
Developer: Microsoft

Support
BSD-licensed: ✓
Export: ✓

Officially Supported Versions:
Supported Metadata Fields: AVI (Audio Video Interleave)

Freely Available Software:
- AVI Reader plugin for ImageJ
- AVI Writer plugin for ImageJ

We currently have:
- several AVI datasets

We would like to have:
- more AVI datasets, including:
  - files with audio tracks and/or multiple video tracks
  - files compressed with a common unsupported codec
  - 2+ GB files

Ratings
Pixels: ▲
Metadata: ▲
Openness: ▼
Presence: ▲
Utility: ▼

Additional Information
Source Code: AVIReader.java

Notes:
- Bio-Formats can save image stacks as AVI (uncompressed).
- The following codecs are supported for reading:
  - Microsoft Run-Length Encoding (MSRLE)
  - Microsoft Video (MSV1)
  - Raw (uncompressed)
  - JPEG

See also:
AVI RIFF File Reference AVI on Wikipedia

34 http://www.microsoft.com/
37 https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-bsd/src/loci/formats/in/AVIReader.java
39 http://en.wikipedia.org/wiki/Audio_Video_Interleave
18.13 Axon Raw Format

Extensions: .arf
Owner: INDECBioSystems

Support
BSD-licensed: ✗
Export: ✗

Officially Supported Versions:
Supported Metadata Fields: Axon Raw Format

We currently have:
• one ARF dataset
• a specification document

We would like to have:
• more ARF datasets

Ratings
Pixels: ▲
Metadata: ▼
Openness: ▲
Presence: ▼
Utility: ▼

Additional Information
Source Code: ARFReader.java

Notes:

18.14 BD Pathway

Extensions: .exp, .tif
Owner: BD Biosciences

Support
BSD-licensed: ✗
Export: ✗

Officially Supported Versions:
Supported Metadata Fields: BD Pathway

We currently have:
• a few BD Pathway datasets

We would like to have:
• more BD Pathway datasets

40http://www.indecbiosystems.com/
42https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/ARFReader.java
43http://www.bdbiosciences.com
Ratings

Pixels: ▲
Metadata: ▲
Openness: ▼
Presence: ▼
Utility: ▼

Additional Information

Source Code: BDReader.java

Notes:

18.15 Becker & Hickl SPImage

Extensions: .sdt
Owner: Becker-Hickl

Support

BSD-licensed: ✗
Export: ✗

Officially Supported Versions:

Supported Metadata Fields: Becker & Hickl SPImage

We currently have:

• an SDT specification document (from 2008 April, in PDF)
• an SDT specification document (from 2006 June, in PDF)
• Becker & Hickl’s SPCImage software
• a large number of SDT datasets
• the ability to produce new datasets

We would like to have:

Ratings

Pixels: ▲
Metadata: ▲
Openness: ▼
Presence: ▼
Utility: ▼

Additional Information

Source Code: SDTReader.java

Notes:

Please note that while we have specification documents for this format, we are not able to distribute them to third parties.

---

44 https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/BDReader.java
45 http://www.becker-hickl.de/
46 http://www.becker-hickl.de/software/tcspc/softwaretcpcspecial.htm
47 https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/SDTReader.java
18.16 Bio-Rad Gel

Extensions: .1sc
Owner: Bio-Rad

Support

BSD-licensed: ❌
Export: ❌

Officially Supported Versions:
Supported Metadata Fields: *Bio-Rad Gel*

We currently have:

- software that can read Bio-Rad Gel files
- several Bio-Rad Gel files

We would like to have:

- a Bio-Rad Gel specification
- more Bio-Rad Gel files

Ratings

Pixels: ⬇️
Metadata: ⬇️
Openness: ⬇️
Presence: ⬇️
Utility: ⬇️

Additional Information

Source Code: BioRadGelReader.java

Notes:

18.17 Bio-Rad PIC

Extensions: .pic, .raw, .xml
Developer: Bio-Rad
Owner: Carl Zeiss, Inc.

Support

BSD-licensed: ❌
Export: ❌

Officially Supported Versions:
Supported Metadata Fields: *Bio-Rad PIC*

Freely Available Software:

- Bio-Rad PIC reader plugin for ImageJ

---

48http://www.bio-rad.com
49https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/BioRadGelReader.java
50http://www.zeiss.com/
We currently have:

- a PIC specification document (v4.5, in PDF)
- an older PIC specification document (v4.2, from 1996 December 16, in DOC)
- a large number of PIC datasets
- the ability to produce new datasets

We would like to have:

**Ratings**

Pixels: ▲
Metadata: ▲
Openness: ▲
Presence: ▲
Utility: ▲

**Additional Information**

Source Code: BioRadReader.java

Notes:

Please note that while we have specification documents for this format, we are not able to distribute them to third parties.

- Commercial applications that support this format include:
  - Bitplane Imaris
  - SVI Huygens

### 18.18 Bio-Rad SCN

Extensions: .scn
Developer: Bio-Rad
Owner: Bio-Rad

**Support**

BSD-licensed: ✗
Export: ✗

Officially Supported Versions:

Supported Metadata Fields: *Bio-Rad SCN*

We currently have:

- a few Bio-Rad .scn files

We would like to have:

**Ratings**

Pixels: ▲
Metadata: ▼
Openness: ▼

---

53[http://www.bitplane.com](http://www.bitplane.com)
54[http://svi.nl](http://svi.nl)
18.19 Bitplane Imaris

Extensions: .ims
Owner: Bitplane

Support
BSD-licensed: ❌
Export: ❌

Officially Supported Versions: 2.7, 3.0, 5.5

Supported Metadata Fields: Bitplane Imaris

We currently have:

- an Imaris (RAW) specification document (from no later than 1997 November 11, in HTML)
- an Imaris 5.5 (HDF) specification document
- Bitplane’s bfFileReaderImaris3N code (from no later than 2005, in C++)
- several older Imaris (RAW) datasets
- one Imaris 3 (TIFF) dataset
- several Imaris 5.5 (HDF) datasets

We would like to have:

- an Imaris 3 (TIFF) specification document
- more Imaris 3 (TIFF) datasets

Ratings
Pixels: ▲
Metadata: ▲
Openness: ▼
Presence: ▼
Utility: ▼

Additional Information

Source Code: ImarisHDFReader.java⁵⁹, ImarisTiffReader.java⁶⁰, ImarisReader.java⁶¹

Notes:

- There are three distinct Imaris formats:
  1. the old binary format (introduced in Imaris version 2.7)
2. Imaris 3, a TIFF variant (introduced in Imaris version 3.0)
3. Imaris 5.5, an HDF variant (introduced in Imaris version 5.5)

18.20 Bruker MRI

Developer: Bruker\textsuperscript{62}

Support

BSD-licensed: \(\times\)
Export: \(\times\)

Officially Supported Versions:
Supported Metadata Fields: \textit{Bruker MRI}

Freely Available Software:

\begin{itemize}
    \item Bruker plugin for ImageJ\textsuperscript{63}
\end{itemize}

We currently have:

\begin{itemize}
    \item a few Bruker MRI datasets
\end{itemize}

We would like to have:

\begin{itemize}
    \item an official specification document
\end{itemize}

Ratings

Pixels: \(\square\)
Metadata: \(\uparrow\)
Openness: \(\downarrow\)
Presence: \(\square\)
Utility: \(\downarrow\)

Additional Information

Source Code: BrukerReader.java\textsuperscript{64}

Notes:

18.21 Burleigh

Extensions: .img
Owner: Burleigh Instruments

Support

BSD-licensed: \(\times\)
Export: \(\times\)

Officially Supported Versions:
Supported Metadata Fields: \textit{Burleigh}

We currently have:

\begin{itemize}
    \item Pascal code that can read Burleigh files (from ImageSXM)
\end{itemize}

\textsuperscript{62}http://www.bruker.com/
\textsuperscript{63}http://rsbweb.nih.gov/ij/plugins/bruker.html
\textsuperscript{64}https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/BrukerReader.java
• a few Burleigh files

We would like to have:

• a Burleigh file format specification
• more Burleigh files

**Ratings**

Pixels: ▼
Metadata: ▼
Openness: ▼
Presence: ▼
Utility: ▼

**Additional Information**

Source Code: BurleighReader.java

Notes:

### 18.22 Canon DNG

Extensions: .cr2, .crw

Developer: Canon

**Support**

BSD-licensed: ☒

Export: ☒

Officially Supported Versions:

Supported Metadata Fields: *Canon DNG*

Freely Available Software:

• IrfanView

We currently have:

• a few example datasets

We would like to have:

• an official specification document

**Ratings**

Pixels: ▼
Metadata: ▼
Openness: ▼
Presence: ▼
Utility: ▼

**Additional Information**

Source Code: DNGReader.java

---

65 https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/BurleighReader.java

66 http://canon.com

67 http://www.irfanview.com/

68 https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/DNGReader.java
Notes:

### 18.23 Cellomics

Extensions: .c01
Developer: Thermo Fisher Scientific

**Support**

BSD-licensed: ❌
Export: ❌

Officially Supported Versions:

Supported Metadata Fields: *Cellomics*

We currently have:

- a few Cellomics .c01 datasets

We would like to have:

- a Cellomics .c01 specification document
- more Cellomics .c01 datasets

**Ratings**

Pixels: 
Metadata: 
Openness: 
Presence: 
Utility: ❌

**Additional Information**

Source Code: CellomicsReader.java

Notes:

---

### 18.24 cellSens VSI

Extensions: .vsi
Developer: Olympus

**Support**

BSD-licensed: ❌
Export: ❌

Officially Supported Versions:

Supported Metadata Fields: *cellSens VSI*

We currently have:

- a few example datasets

We would like to have:

---

69 http://www.thermofisher.com/
70 https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/CellomicsReader.java
71 http://www.olympus.com/
• an official specification document

Ratings

Pixels: ▼
Metadata: ▼
Openness: ▼
Presence: ▼
Utility: ▼

Additional Information

Source Code: CellSensReader.java

Notes:

18.25 CellVoyager

Extensions: .xml, .tif
Owner: Yokogawa

Support

BSD-licensed: ✗
Export: ✗

Officially Supported Versions:
Supported Metadata Fields: CellVoyager
We currently have:
• a few example datasets
We would like to have:

Ratings

Pixels: ▲
Metadata: ▼
Openness: ▼
Presence: ▼
Utility: ▼

Additional Information

Source Code: CellVoyagerReader.java

Notes:

18.26 DeltaVision

Extensions: .dv, .r3d
Owner: Applied Precision

Notes:

---

72https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/CellSensReader.java
73http://www.yokogawa.com/
74https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/CellVoyagerReader.java
75http://www.api.com/
Support

BSD-licensed: ✗
Export: ✗

Officially Supported Versions:

Supported Metadata Fields: DeltaVision

Freely Available Software:

- DeltaVision Opener plugin for ImageJ

Sample Datasets:

- Applied Precision Datasets

We currently have:

- a DV specification document (v2.10 or newer, in HTML)
- numerous DV datasets

We would like to have:

Ratings

Pixels: 🟢
Metadata: 🟩
Openness: 🟩
Presence: 🟩
Utility: 🟩

Additional Information

Source Code: DeltavisionReader.java

Notes:

Please note that while we have specification documents for this format, we are not able to distribute them to third parties.

- The DeltaVision format is based on the Medical Research Council (MRC) file format.
- Commercial applications that support DeltaVision include:
  - Bitplane Imaris
  - SVI Huygens
  - Image-Pro Plus

See also:

DeltaVision system description

18.27 DICOM

Extensions: .dcm, .dicom

Developer: National Electrical Manufacturers Association

---

80: [http://svi.nl/](http://svi.nl/)
83: [http://www.nema.org/](http://www.nema.org/)
Support

BSD-licensed: 
Export: 

Officially Supported Versions:
Supported Metadata Fields: DICOM

Freely Available Software:
  • OsiriX Medical Imaging Software84
  • ezDICOM85
  • Wikipedia’s list of freeware health software86

Sample Datasets:
  • MRI Chest from FreeVol-3D web site87
  • Medical Image Samples from Sebastien Barre’s Medical Imaging page88
  • DICOM sample image sets from OsiriX web site89

We currently have:
  • DICOM specification documents90 (PS 3 - 2007, from 2006 December 28, in DOC and PDF)
  • numerous DICOM datasets

We would like to have:

Ratings

Pixels: 
Metadata: 
Openness: 
Presence: 
Utility: 

Additional Information

Source Code: DicomReader.java91

Notes:
  • DICOM stands for “Digital Imaging and Communication in Medicine”.
  • Bio-Formats supports both compressed and uncompressed DICOM files.

See also:

DICOM homepage92

---

84 http://www.osirix-viewer.com/
85 http://www.sph.sc.edu/comd/rorden/ezdicom.html
86 http://en.wikipedia.org/wiki/List_of_freeware_health_software#Imaging/2FVisualization
87 http://members.tripod.com/~7Eclunis_immensus/free3d/hk-40.zip
88 http://www.barre.nom.fr/medical/samples/
89 http://osirix-viewer.com/datasets/
90 http://medical.nema.org/dicom/2007/
91 https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-bsd/src/loci/formats/in/DicomReader.java
92 http://medical.nema.org/
18.28 ECAT7

Extensions: 
Developer: Siemens

Support
BSD-licensed: 
Export: 

Officially Supported Versions:
Supported Metadata Fields: ECAT7
We currently have:
• a few ECAT7 files
We would like to have:
• an ECAT7 specification document
• more ECAT7 files

Ratings
Pixels: 
Metadata: 
Openness: 
Presence: 
Utility: 

Additional Information
Source Code: Ecat7Reader.java
Notes:

18.29 EPS (Encapsulated PostScript)

Extensions: .eps, .epsi, .ps
Developer: Adobe

Support
BSD-licensed: 
Export: 

Officially Supported Versions:
Supported Metadata Fields: EPS (Encapsulated PostScript)
Freely Available Software:
• EPS Writer plugin for ImageJ
We currently have:
• a few EPS datasets

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93http://www.siemens.com
94https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/Ecat7Reader.java
95http://www.adobe.com/
• the ability to produce new datasets

We would like to have:

**Ratings**

Pixels: 
Metadata: 
Openness: 
Presence: 
Utility: 

**Additional Information**


Notes:

• Bio-Formats can save individual planes as EPS.
• Certain types of compressed EPS files are not supported.

### 18.30 Evotec/PerkinElmer Opera Flex

**Extensions:** .flex, .mea, .res
**Developer:** Evotec Technologies, now PerkinElmer

**Support**

BSD-licensed: ✔
Export: ✗

**Officially Supported Versions:**

**Supported Metadata Fields:** *Evotec/PerkinElmer Opera Flex*

We currently have:

• many Flex datasets

We would like to have:

• a freely redistributable LuraWave LWF decoder

**Ratings**

Pixels: 
Metadata: 
Openness: 
Presence: 
Utility: 

**Additional Information**

Source Code: [FlexReader.java](https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/FlexReader.java)

Notes:

The LuraWave LWF decoder library (i.e. lwf.jsdk2.6.jar) with license code is required to decode wavelet-compressed Flex files.

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97 [https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-bsd/src/loci/formats/in/EPSReader.java](https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-bsd/src/loci/formats/in/EPSReader.java)
98 [https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-bsd/src/loci/formats/out/EPSWriter.java](https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-bsd/src/loci/formats/out/EPSWriter.java)
100 [https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/FlexReader.java](https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/FlexReader.java)
See also:
LuraTech (developers of the proprietary LuraWave LWF compression used for Flex image planes)\textsuperscript{101}

18.31 FEI

Extensions: .img
Developer: FEI\textsuperscript{102}

Support
BSD-licensed: 
Export: 

Officially Supported Versions:
Supported Metadata Fields: FEI
We currently have:
• a few FEI files
We would like to have:
• a specification document
• more FEI files

Ratings
Pixels: 
Metadata: 
Openness: 
Presence: 
Utility: 

Additional Information
Source Code: FEIReader.java\textsuperscript{103}
Notes:

18.32 FEI TIFF

Extensions: .tiff
Developer: FEI\textsuperscript{104}

Support
BSD-licensed: 
Export: 

Officially Supported Versions:
Supported Metadata Fields: FEI TIFF
We currently have:

\textsuperscript{101}http://www.luratech.com/
\textsuperscript{102}http://www.fei.com/
\textsuperscript{103}https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/FEIReader.java
\textsuperscript{104}http://www.fei.com
• a few FEI TIFF datasets

We would like to have:

**Ratings**

Pixels: ▲
Metadata: ▽
Openness: ▲
Presence: ▼
Utility: ▽

**Additional Information**

Source Code: FEITiffReader.java\(^{105}\)

Notes:

### 18.33 FITS (Flexible Image Transport System)

Extensions: .fits

Developer: National Radio Astronomy Observatory\(^{106}\)

**Support**

BSD-licensed: ✔
Export: ✗

Officially Supported Versions:

Supported Metadata Fields: **FITS (Flexible Image Transport System)**

We currently have:

- a FITS specification document\(^{107}\) (NOST 100-2.0, from 1999 March 29, in HTML)
- several FITS datasets

We would like to have:

**Ratings**

Pixels: ▲
Metadata: ▼
Openness: ▲
Presence: ▽
Utility: ▼

**Additional Information**

Source Code: FitsReader.java\(^{108}\)

Notes:

See also:

MAST/FITS homepage\(^{109}\)  FITS Support Office\(^{110}\)

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\(^{105}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/FEITiffReader.java

\(^{106}\)http://www.nrao.edu/

\(^{107}\)http://archive.stsci.edu/fits/fits_standard/

\(^{108}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-bsd/src/loci/formats/in/FitsReader.java

\(^{109}\)http://archive.stsci.edu/fits/

\(^{110}\)http://fits.gsfc.nasa.gov/
18.34 Gatan Digital Micrograph

Extensions: .dm3
Owner: Gatan

Support

BSD-licensed: 
Export: 

Officially Supported Versions: 3
Supported Metadata Fields: *Gatan Digital Micrograph*

Freely Available Software:

- DM3 Reader plugin for ImageJ
- EMAN

We currently have:

- Gatan’s ImageReader2003 code (from 2003, in C++)
- numerous DM3 datasets

We would like to have:

- a DM3 specification document

Ratings

Pixels: 
Metadata: 
Openness: 
Presence: 
Utility: 

Additional Information

Source Code: GatanReader.java

Notes:

Commercial applications that support .dm3 files include Datasqueeze.

18.35 Gatan Digital Micrograph 2

Extensions: .dm2
Developer: Gatan

Support

BSD-licensed: 
Export: 

Officially Supported Versions: 2

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111http://www.gatan.com/
113http://blake.bcm.edu/EMAN/
114https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/gn/GatanReader.java
115http://www.datasqueezesoftware.com/
116http://www.gatan.com
Supported Metadata Fields: *Gatan Digital Micrograph 2*

We currently have:

- Pascal code that can read DM2 files (from ImageSXM)
- a few DM2 files

We would like to have:

- an official DM2 specification document
- more DM2 files

**Ratings**

<table>
<thead>
<tr>
<th>Pixels</th>
<th>Metadata</th>
<th>Openness</th>
<th>Presence</th>
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</tbody>
</table>

**Additional Information**

Source Code: [GatanDM2Reader.java](https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/GatanDM2Reader.java)

Notes:

### 18.36 GIF (Graphics Interchange Format)

**Extensions:** .gif

**Developer:** CompuServe

**Owner:** Unisys

**Support**

BSD-licensed: 

Export: 

**Officially Supported Versions:**

**Supported Metadata Fields:** *GIF (Graphics Interchange Format)*

**Freely Available Software:**

- Animated GIF Reader plugin for ImageJ
- GIF Stack Writer plugin for ImageJ

We currently have:

- a GIF specification document (Version 89a, from 1990, in HTML)
- numerous GIF datasets
- the ability to produce new datasets

1[17](https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/GatanDM2Reader.java)

18[18](http://www.compuserve.com/)

19[19](http://www.unisys.com/)

20[20](http://rsb.info.nih.gov/ij/plugins/agr.html)

21[21](http://rsb.info.nih.gov/ij/plugins/gif-stack-writer.html)

22[22](http://tronche.com/computer-graphics/gif/)
We would like to have:

**Ratings**

Pixels: ▶
Metadata: ▶
Openness: ▼
Presence: ▶
Utility: ▼

**Additional Information**

Source Code: GIFReader.java

Notes:

### 18.37 Hamamatsu Aquacosmos NAF

**Extensions:** .naf

**Developer:** Hamamatsu

**Support**

BSD-licensed: ❌
Export: ❌

**Officially Supported Versions:**

**Supported Metadata Fields:** *Hamamatsu Aquacosmos NAF*

We currently have:

- a few NAF files

We would like to have:

- a specification document
- more NAF files

**Ratings**

Pixels: ▼
Metadata: ▼
Openness: ▼
Presence: ▼
Utility: ▼

**Additional Information**

Source Code: NAFReader.java

Notes:

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123 [https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-bsd/src/loci/formats/in/GIFReader.java](https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-bsd/src/loci/formats/in/GIFReader.java)
125 [https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/NAFReader.java](https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/NAFReader.java)
18.38 Hamamatsu HIS

Extensions: .his
Owner: Hamamatsu

Support
BSD-licensed: 
Export: 

Officially Supported Versions:
Supported Metadata Fields: Hamamatsu HIS

We currently have:
- Pascal code that can read HIS files (from ImageSXM)
- several HIS files

We would like to have:
- an HIS specification
- more HIS files

Ratings
Pixels: 
Metadata: 
Openness: 
Presence: 
Utility: 

Additional Information
Source Code: HISReader.java

Notes:

18.39 Hamamatsu ndpi

Extensions: .ndpi
Developer: Hamamatsu

Support
BSD-licensed: 
Export: 

Officially Supported Versions:
Supported Metadata Fields: Hamamatsu ndpi

Freely Available Software:
- NDP.view

Sample Datasets:

126 http://www.hamamatsu.com
127 https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/HISReader.java
128 http://www.hamamatsu.com
• OpenSlide\textsuperscript{130}

We currently have:
• many example datasets

We would like to have:
• an official specification document

\textbf{Ratings}

\begin{itemize}
  \item Pixels: ▼
  \item Metadata: \\
  \item Openness: \\
  \item Presence: ▼
  \item Utility: ▼
\end{itemize}

\textbf{Additional Information}

Source Code: NDPIReader.java\textsuperscript{131}

Notes:

\section*{18.40 Hamamatsu VMS}

Extensions: .vms

Developer: Hamamatsu\textsuperscript{132}

\textbf{Support}

BSD-licensed: ✗

Export: ✗

Officially Supported Versions:

Supported Metadata Fields: Hamamatsu VMS

Sample Datasets:
• OpenSlide\textsuperscript{133}

We currently have:
• a few example datasets
• developer documentation from the OpenSlide project\textsuperscript{134}

We would like to have:
• an official specification document
• more example datasets

\textbf{Ratings}

\begin{itemize}
  \item Pixels: \\
  \item Metadata: \\
  \item Openness: ▼
\end{itemize}

\begin{footnotes}
\footnote{http://openslide.cs.cmu.edu/download/openslide-testdata/Hamamatsu/}
\footnote{https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/NDPIReader.java}
\footnote{http://www.hamamatsu.com}
\footnote{http://openslide.cs.cmu.edu/download/openslide-testdata/Hamamatsu-vms/}
\footnote{http://openslide.org/Hamamatsu%20format/}
\end{footnotes}
18.41 Hitachi S-4800

Extensions: .txt, .tif, .bmp, .jpg
Developer: Hitachi

Support
BSD-licensed: ❌
Export: ❌

Officially Supported Versions:
Supported Metadata Fields: Hitachi S-4800
We currently have:
• several Hitachi S-4800 datasets
We would like to have:

Ratings
Pixels: ▲
Metadata: ▲
Openness: ▲
Presence: ▼
Utility: ▼

Additional Information
Source Code: HitachiReader.java

Notes:

18.42 ICS (Image Cytometry Standard)

Extensions: .ics, .ids
Developer: P. Dean et al.

Support
BSD-licensed: ✔
Export: ✔

Officially Supported Versions: 1.0, 2.0
Supported Metadata Fields: ICS (Image Cytometry Standard)

Freely Available Software:

135 https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/HamamatsuVMSReader.java
137 https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/HitachiReader.java
• Libics (ICS reference library)\textsuperscript{138}
• ICS Opener plugin for ImageJ\textsuperscript{139}
• IrfanView\textsuperscript{140}

We currently have:
• numerous ICS datasets

We would like to have:

\textbf{Ratings}

<table>
<thead>
<tr>
<th>Pixels:</th>
<th>Metadata:</th>
<th>Openness:</th>
<th>Presence:</th>
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</table>

\textbf{Additional Information}

Source Code: ICSReader.java\textsuperscript{141} Source Code: ICSWriter.java\textsuperscript{142}

Notes:
• ICS version 1.0 datasets have two files - an .ics file that contains all of the metadata in plain-text format, and an .ids file that contains all of the pixel data.
• ICS version 2.0 datasets are a single .ics file that contains both pixels and metadata.

Commercial applications that can support ICS include:
• Bitplane Imaris\textsuperscript{143}
• SVI Huygens\textsuperscript{144}

\textbf{18.43 Imacon}

Extensions: .fff
Owner: Hasselblad\textsuperscript{145}

\textbf{Support}

BSD-licensed: \xmark
Export: \xmark

Officially Supported Versions:

Supported Metadata Fields: Imacon

We currently have:
• one Imacon file

We would like to have:
• more Imacon files

\textsuperscript{138}http://libics.sourceforge.net/
\textsuperscript{139}http://valelab.ucsf.edu/%7Enstuurman/IJplugins/Ics_Opener.html
\textsuperscript{140}http://www.irfanview.com/
\textsuperscript{141}https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-bsd/src/loci/formats/in/ICSReader.java
\textsuperscript{142}https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-bsd/src/loci/formats/out/ICSWriter.java
\textsuperscript{143}http://www.bitplane.com/
\textsuperscript{144}http://svi.nl/
\textsuperscript{145}http://www.hasselbladusa.com/
18.44 ImagePro Sequence

Extensions: .seq

Owner: Media Cybernetics

Support

BSD-licensed: 

Export: 

Officially Supported Versions:

Supported Metadata Fields: ImagePro Sequence

We currently have:

• the Image-Pro Plus software
• a few SEQ datasets
• the ability to produce more datasets

We would like to have:

• an official SEQ specification document

Ratings

Pixels: 

Metadata: 

Openness: 

Presence: 

Utility: 

Additional Information

Source Code: ImaconReader.java

Notes:

146 https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/ImaconReader.java
147 http://www.mediacy.com/
149 https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/SEQReader.java
18.45 ImagePro Workspace

Extensions: .ipw
Owner: Media Cybernetics

Support
BSD-licensed: ×
Export: ×

Officially Supported Versions:
Supported Metadata Fields: ImagePro Workspace

We currently have:
- the Image-Pro Plus software
- a few IPW datasets
- the ability to produce more datasets

We would like to have:
- an official IPW specification document
- more IPW datasets:
  - multiple datasets in one file
  - 2+ GB files

Ratings
Pixels: ▲
Metadata: ▲
Openness:▼
Presence:▼
Utility:▼

Additional Information
Source Code: IPWReader.java

Notes:
Bio-Formats uses a modified version of the Apache Jakarta POI library to read IPW files.

18.46 IMAGIC

Extensions: .hed, .img
Developer: Image Science

Support
BSD-licensed: ×
Export: ×

Officially Supported Versions:

---

150http://www.mediacy.com/
152https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/IPWReader.java
153http://jakarta.apache.org/poi/
154http://www.imagescience.de
Supported Metadata Fields: *IMAGIC*

Freely Available Software:

- em2em\(^{155}\)

We currently have:

- one example dataset
- official file format documentation

We would like to have:

- more example datasets

**Ratings**

Pixels: ▲

Metadata: ▲

Openness: ▲

Presence: ☐

Utility: ☐

**Additional Information**

Source Code: ImagicReader.java\(^{156}\)

Notes:

**See also:**

IMAGIC specification\(^{157}\)

---

### 18.47 IMOD

Extensions: .mod

Developer: Boulder Laboratory for 3-Dimensional Electron Microscopy of Cells\(^{158}\)

Owner: Boulder Laboratory for 3-Dimensional Electron Microscopy of Cells\(^{159}\)

**Support**

BSD-licensed: ✗

Export: ✗

Officially Supported Versions:

Supported Metadata Fields: *IMOD*

Freely Available Software:

- IMOD\(^{160}\)

We currently have:

- a few sample datasets
- official documentation\(^{161}\)

---

\(^{155}\)http://www.imagescience.de/em2em.html

\(^{156}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/ImagicReader.java

\(^{157}\)http://www.imagescience.de/em2em.html

\(^{158}\)http://bio3d.colorado.edu

\(^{159}\)http://bio3d.colorado.edu

\(^{160}\)http://bio3d.colorado.edu/imod/

\(^{161}\)http://bio3d.colorado.edu/imod/doc/binspec.html
We would like to have:

**Ratings**

- Pixels: 
- Metadata: 
- Openness: 
- Presence: 
- Utility: 

**Additional Information**

Source Code: IMODReader.java\(^{162}\)

Notes:

### 18.48 Improvision Openlab LIFF

**Extensions:** .liff

**Developer:** Improvision\(^{163}\)

**Owner:** PerkinElmer\(^{164}\)

**Support**

- BSD-licensed: 
- Export: 

**Officially Supported Versions:** 2.0, 5.0

**Supported Metadata Fields:** Improvision Openlab LIFF

We currently have:

- an Openlab specification document (from 2000 February 8, in DOC)
- Improvision’s XLIFFFileImporter code for reading Openlab LIFF v5 files (from 2006, in C++)
- several Openlab datasets

We would like to have:

- more Openlab datasets (preferably with 32-bit integer data)

**Ratings**

- Pixels: 
- Metadata: 
- Openness: 
- Presence: 
- Utility: 

**Additional Information**

Source Code: OpenlabReader.java\(^{165}\)

Notes:

Please note that while we have specification documents for this format, we are not able to distribute them to third parties.

\(^{162}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/IMODReader.java

\(^{163}\)http://www.improvision.com/

\(^{164}\)http://www.perkinelmer.com/

\(^{165}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/OpenlabReader.java
See also:
Openlab software review\(^{166}\)

### 18.49 Improvision Openlab Raw

Extensions: .raw

Developer: Improvision\(^{167}\)

Owner: PerkinElmer\(^{168}\)

**Support**

BSD-licensed: ✗

Export: ✗

Officially Supported Versions:

Supported Metadata Fields: *Improvision Openlab Raw*

We currently have:

- an Openlab Raw specification document\(^{169}\) (from 2004 November 09, in HTML)
- a few Openlab Raw datasets

We would like to have:

**Ratings**

Pixels: ⬆

Metadata: ⬆

Openness: ⬆

Presence: ⬇️

Utility: ⬇️

**Additional Information**

Source Code: OpenlabRawReader.java\(^{170}\)

Notes:

See also:
Openlab software review\(^{171}\)

### 18.50 Improvision TIFF

Extensions: .tif

Developer: Improvision\(^{172}\)

Owner: PerkinElmer\(^{173}\)

**Support**

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\(^{166}\)http://www.improvision.com/products/openlab/

\(^{167}\)http://www.improvision.com/

\(^{168}\)http://www.perkinelmer.com/

\(^{169}\)http://cellularimaging.perkinelmer.com/support/technical_notes/detail.php?id=344

\(^{170}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/OpenlabRawReader.java

\(^{171}\)http://www.improvision.com/products/openlab/

\(^{172}\)http://www.improvision.com/

\(^{173}\)http://www.perkinelmer.com/
BSD-licensed: ✗
Export: ✗

Officially Supported Versions:

Supported Metadata Fields: Improvision TIFF

We currently have:
  • an Improvision TIFF specification document
  • a few Improvision TIFF datasets

We would like to have:

Ratings

Pixels: ▲
Metadata: ▲
Openness: ▲
Presence: ◼
Utility: ◼

Additional Information

Source Code: ImprovisionTiffReader.java

Notes:

Please note that while we have specification documents for this format, we are not able to distribute them to third parties.

See also:

Openlab software overview

18.51 Imspector OBF

Extensions: .obf, .msr

Developer: Department of NanoBiophotonics, MPI-BPC

Owner: MPI-BPC

Support

BSD-licensed: ✓
Export: ✗

Officially Supported Versions:

Supported Metadata Fields: Inspector OBF

We currently have:
  • a few .msr datasets
  • a specification document

174 https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/ImprovisionTiffReader.java
175 http://www.improvision.com/products/openlab/
176 https://imspector.mpibpc.mpg.de/index.html
177 http://www.mpibpc.mpg.de/
178 https://imspector.mpibpc.mpg.de/documentation/fileformat.html
We would like to have:

**Ratings**

Pixels: ▲
Metadata: ▲
Openness: ▲
Presence: ▼
Utility: ▼

**Additional Information**

Source Code: OBFReader.java\(^{179}\)

Notes:

### 18.52 InCell 1000

Extensions: .xdce, .tif

Developer: GE\(^{180}\)

**Support**

BSD-licensed: ✗
Export: ✗

Officially Supported Versions:

Supported Metadata Fields: *InCell 1000*

We currently have:

- a few InCell 1000 datasets

We would like to have:

- an InCell 1000 specification document
- more InCell 1000 datasets

**Ratings**

Pixels: ▲
Metadata: ▲
Openness: ▲
Presence: ▼
Utility: ▼

**Additional Information**

Source Code: InCellReader.java\(^{181}\)

Notes:

[^179]: [https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-bsd/src/loci/formats/in/OBFReader.java](https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-bsd/src/loci/formats/in/OBFReader.java)


18.53 InCell 3000

Extensions: .frm
Developer: GE

Support

BSD-licensed: ❌
Export: ❌

Officially Supported Versions:
Supported Metadata Fields: InCell 3000
Sample Datasets:
  • Broad Bioimage Benchmark Collection
We currently have:
  • a few example datasets
We would like to have:
  • an official specification document

Ratings

Pixels:
Metadata:
Openness:
Presence:
Utility:

Additional Information

Source Code: InCell3000Reader.java

Notes:

18.54 INR

Extensions: .inr

Support

BSD-licensed: ❌
Export: ❌

Officially Supported Versions:
Supported Metadata Fields: INR
We currently have:
  • several sample .inr datasets
We would like to have:

Ratings

Pixels:

---

182 http://gelifesciences.com/
183 http://www.broadinstitute.org/bbbc/BBBC013/
184 https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/InCell3000Reader.java
18.55 Inveon

Extensions: .hdr

Support

BSD-licensed: ✗

Export: ✗

Officially Supported Versions:

Supported Metadata Fields: **Inveon**

We currently have:

a few Inveon datasets

We would like to have:

**Ratings**

Pixels: 🔹

Metadata: 🔹

Openness: 🅱

Presence: 🔹

Utility: 🔹

**Additional Information**

Source Code: **INRReader.java**

Notes:
Officially Supported Versions:

Supported Metadata Fields: IPLab

Freely Available Software:

- IPLab Reader plugin for ImageJ

We currently have:

- an IPLab specification document (v3.6.5, from 2004 December 1, in PDF)
- several IPLab datasets

We would like to have:

- more IPLab datasets (preferably with 32-bit integer or floating point data)

Ratings

Pixels: ▲
Metadata: ▲
Openness: ▲
Presence: ◼
Utility: ◼

Additional Information

Source Code: IPLabReader.java

Notes:

Please note that while we have specification documents for this format, we are not able to distribute them to third parties.

Commercial applications that support IPLab include:

- Bitplane Imaris
- SVI Huygens

See also:

IPLab software review

18.57 IPLab-Mac

Extensions: .ipm

Owner: BioVision Technologies

Support

BSD-licensed: ❌
Export: ❌

Officially Supported Versions:

Supported Metadata Fields: IPLab-Mac

We currently have:

- a few IPLab-Mac datasets

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18.57. IPLab-Mac 143
• a specification document

We would like to have:

• more IPLab-Mac datasets

Ratings

Pixels: ▲
Metadata: ▼
Openness: ▲
Presence: ▼
Utility: ▼

Additional Information

Source Code: IvisionReader.java\textsuperscript{195}

Notes:

Please note that while we have specification documents for this format, we are not able to distribute them to third parties.

18.58 JEOL

Extensions: .dat, .img, .par
Owner: JEOL\textsuperscript{196}

Support

BSD-licensed: 
Export: 

Officially Supported Versions:

Supported Metadata Fields: JEOL

We currently have:

• Pascal code that reads JEOL files (from ImageSXM)
• a few JEOL files

We would like to have:

• an official specification document
• more JEOL files

Ratings

Pixels: ▼
Metadata: ▼
Openness: ▼
Presence: ▼
Utility: ▼

Additional Information

Source Code: JEOLReader.java\textsuperscript{197}

\textsuperscript{195}https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/IVisionReader.java
\textsuperscript{196}http://www.jeol.com
\textsuperscript{197}https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/JEOLReader.java
Notes:

### 18.59 JPEG

Extensions: .jpg

Developer: Independent JPEG Group

**Support**

- BSD-licensed: ✅
- Export: ✅

**Officially Supported Versions:**

**Supported Metadata Fields:** JPEG

We currently have:

- a JPEG specification document (v1.04, from 1992 September 1, in PDF)
- numerous JPEG datasets
- the ability to produce more datasets

We would like to have:

**Ratings**

- Pixels: 🔺
- Metadata: 🔻
- Openness: 🔺
- Presence: 🔺
- Utility: 🔻

**Additional Information**

Source Code: JPEGReader.java

Source Code: JPEGWriter.java

Notes:

Bio-Formats can save individual planes as JPEG. Bio-Formats uses the Java Image I/O API to read and write JPEG files. JPEG stands for “Joint Photographic Experts Group”.

**See also:**

JPEG homepage

### 18.60 JPEG 2000

Extensions: .jp2

Developer: Independent JPEG Group

**Support**

- BSD-licensed: ✅

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189 http://www.ijg.org/
199 http://www.w3.org/Graphics/JPEG/jfif3.pdf
200 https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-bsd/src/loci/formats/in/JPEGReader.java
201 https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-bsd/src/loci/formats/out/JPEGWriter.java
202 http://docs.oracle.com/javase/6/docs/technotes/guides/imageio/
203 http://www.jpeg.org/jpeg/index.html
204 http://www.ijg.org/
Export: ✔

Officially Supported Versions:

Supported Metadata Fields: **JPEG 2000**

Freely Available Software:

- **JJ2000** (JPEG 2000 library for Java)²⁰⁵

We currently have:

- a JPEG 2000 specification document²⁰⁶ (final draft, from 2000, in PDF)
- a few .jp2 files

We would like to have:

**Ratings**

Pixels: ▲

Metadata: ▼

Openness: ▲

Presence: ▼

Utility: ▼

**Additional Information**


Notes:

Bio-Formats uses the [JAI Image I/O Tools]²⁰⁹ library to read JP2 files. JPEG stands for “Joint Photographic Experts Group”.

### 18.61 JPK

Extensions: .jpk

Developer: [JPK Instruments]²¹⁰

**Support**

BSD-licensed: ✗

Export: ✗

Officially Supported Versions:

Supported Metadata Fields: **JPK**

We currently have:

- Pascal code that can read JPK files (from ImageSXM)
- a few JPK files

We would like to have:

- an official specification document
- more JPK files

²⁰⁵ [http://code.google.com/p/jj2000/]
²⁰⁶ [http://www.jpeg.org/jpeg2000/Cds15444.html]
²⁰⁷ [https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-bsd/src/loci/formats/in/JPEG2000Reader.java]
²⁰⁸ [https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-bsd/src/loci/formats/out/JPEG2000Writer.java]
²⁰⁹ [https://java.net/projects/jai-imageio]
²¹⁰ [http://www.jpk.com]
Ratings

Pixels: ▼
Metadata: ▼
Openness: ▼
Presence: ▼
Utility: ▼

Additional Information

Source Code: JPKReader.java^{211}

Notes:

18.62 JPX

Extensions: .jpx
Developer: JPEG Committee^{212}

Support

BSD-licensed: ❌
Export: ❌

Officially Supported Versions:

Supported Metadata Fields: JPX

We currently have:

• a few .jpx files

We would like to have:

Ratings

Pixels: ▲
Metadata: ▲
Openness: ▲
Presence: ▼
Utility: ▼

Additional Information

Source Code: JPXReader.java^{213}

Notes:

18.63 Khoros VIFF (Visualization Image File Format) Bitmap

Extensions: .xv
Developer: Khoral^{214}

Owner: AccuSoft^{215}

---
^{211} https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/JPKReader.java
^{212} http://www.jpeg.org/jpeg2000/
^{213} https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/JPXReader.java
^{214} http://www.khoral.com/company/
^{215} http://www.accusoft.com/company/
Support

BSD-licensed: ×
Export: ×

Officially Supported Versions:

Supported Metadata Fields: *Khoros VIFF (Visualization Image File Format) Bitmap*

Sample Datasets:
- **VIFF Images**

We currently have:
- several VIFF datasets

We would like to have:

Ratings

Pixels: ▼
Metadata: ▼
Openness: ▼
Presence: ▼
Utility: ▼

Additional Information

Source Code: [KhorosReader.java](https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/KhorosReader.java)

Notes:

See also:

VisiQuest software overview (formerly known as KhorosPro)

### 18.64 Kodak BIP

Extensions: `.bip`

Developer: Kodak/Carestream

Support

BSD-licensed: ×
Export: ×

Officially Supported Versions:

Supported Metadata Fields: *Kodak BIP*

We currently have:
- a few `.bip` datasets

We would like to have:
- an official specification document

---

219 [http://carestream.com](http://carestream.com)
Ratings

Pixels: ▲
Metadata: ▼
Openness: ▼
Presence: ▼
Utility: ▼

Additional Information

Source Code: KodakReader.java

Notes:

See also:

Information on Image Station systems

18.65 Lambert Instruments FLIM

Extensions: .fli

Developer: Lambert Instruments

Support

BSD-licensed: ✗
Export: ✗

Officially Supported Versions:

Supported Metadata Fields: Lambert Instruments FLIM

We currently have:

• an LI-FLIM specification document
• several example LI-FLIM datasets

We would like to have:

Ratings

Pixels: ▲
Metadata: ▲
Openness: ▲
Presence: ▼
Utility: ▼

Additional Information

Source Code: LiFlimReader.java

Notes:

Please note that while we have specification documents for this format, we are not able to distribute them to third parties.

220 https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/KodakReader.java
221 http://carestream.com/PublicContent.aspx?langType=1033&id=448953
222 http://www.lambert-instruments.com
223 https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/LiFlimReader.java
18.66 LaVision Imspector

Extensions: .msr
Developer: LaVision BioTec\(^{224}\)

Support
- BSD-licensed: \(\times\)
- Export: \(\times\)

Officially Supported Versions:
- Supported Metadata Fields: *LaVision Imspector*

We currently have:
- a few .msr files

We would like to have:

**Ratings**

- Pixels: \(\downarrow\)
- Metadata: \(\downarrow\)
- Openness: \(\downarrow\)
- Presence: \(\downarrow\)
- Utility: \(\downarrow\)

**Additional Information**

- Source Code: *ImspectorReader.java*\(^{225}\)

Notes:

18.67 Leica LCS LEI

Extensions: .lei, .tif
Developer: Leica Microsystems CMS GmbH\(^{226}\)
Owner: Leica\(^{227}\)

Support
- BSD-licensed: \(\times\)
- Export: \(\times\)

Officially Supported Versions:
- Supported Metadata Fields: *Leica LCS LEI*

Freely Available Software:
- *Leica LCS Lite*\(^{228}\)

We currently have:
- an LEI specification document (beta 2.000, from no later than 2004 February 17, in PDF)
- many LEI datasets

\(^{224}\)http://www.lavisionbiotec.com/
\(^{225}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/ImspectorReader.java
\(^{226}\)http://www.leica-microsystems.com/
\(^{227}\)http://www.leica.com/
\(^{228}\)ftp://ftp.llt.de/softlib/LCSLite/LCSLite2611537.exe
We would like to have:

**Ratings**

- **Pixels:** ▲
- **Metadata:** ▲
- **Openness:** ▲
- **Presence:** ▲
- **Utility:** ▲

**Additional Information**

**Source Code:** [LeicaReader.java](https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/LeicaReader.java)

**Notes:**

Please note that while we have specification documents for this format, we are not able to distribute them to third parties.

LCS stands for “Leica Confocal Software”. LEI presumably stands for “Leica Experimental Information”.

Commercial applications that support LEI include:

- Bitplane Imaris
- SVI Huygens
- Image-Pro Plus

### 18.68 Leica LAS AF LIF (Leica Image File Format)

**Extensions:** .lif

**Developer:** Leica Microsystems CMS GmbH

**Owner:** Leica

**Support**

- BSD-licensed: ☒
- Export: ☒

**Officially Supported Versions:** 1.0, 2.0

**Supported Metadata Fields:** *Leica LAS AF LIF (Leica Image File Format)*

**Freely Available Software:**

- Leica LAS AF Lite (links at bottom of page)

We currently have:

- a LIF specification document (version 2, from no later than 2007 July 26, in PDF)
- a LIF specification document (version 1, from no later than 206 April 3, in PDF)
- numerous LIF datasets

We would like to have:

**Ratings**

- **Pixels:** ▲

---

229 [https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/LeicaReader.java](https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/LeicaReader.java)
231 [http://svi.nl/](http://svi.nl/)
Please note that while we have specification documents for this format, we are not able to distribute them to third parties.

LAS stands for “Leica Application Suite”. AF stands for “Advanced Fluorescence”.

Commercial applications that support LIF include:

- Bitplane Imaris
- SVI Huygens
- Amira

### 18.69 Leica SCN

Extensions: .scn

Developer: Leica Microsystems

Support

- BSD-licensed: 
- Export: 

Officially Supported Versions: 2012-03-10

Supported Metadata Fields: Leica SCN

We currently have:

- a few sample datasets

We would like to have:

- an official specification document
- sample datasets that cannot be opened

Ratings

- Pixels: 
- Metadata: 
- Openness: 
- Presence: 
- Utility: 

Additional Information

Source Code: LeicaSCNReader.java
Notes:

18.70 LEO

Extensions: .sxm
Owner: Zeiss

Support

BSD-licensed: ❌
Export: ❌

Officially Supported Versions:
Supported Metadata Fields: LEO

We currently have:
  • Pascal code that can read LEO files (from ImageSXM)
  • a few LEO files

We would like to have:
  • an official specification document
  • more LEO files

Ratings

Pixels: ▼
Metadata: ▼
Openness: ▼
Presence: ▼
Utility: ▼

Additional Information

Source Code: LEOReader.java

Notes:

18.71 Li-Cor L2D

Extensions: .l2d, .tif, .scn
Owner: LiCor Biosciences

Support

BSD-licensed: ❌
Export: ❌

Officially Supported Versions:
Supported Metadata Fields: Li-Cor L2D

We currently have:
  • a few L2D datasets

---

242 http://www.zeiss.de
243 https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/LEOReader.java
244 http://www.licor.com/
We would like to have:

- an official specification document
- more L2D datasets

**Ratings**

<table>
<thead>
<tr>
<th>Pixels:</th>
<th>Metadata:</th>
<th>Openness:</th>
<th>Presence:</th>
<th>Utility:</th>
</tr>
</thead>
</table>

**Additional Information**

Source Code: L2DReader.java

Notes:

L2D datasets cannot be imported into OME using server-side import. They can, however, be imported from ImageJ, or using the omeul utility.

### 18.72 LIM (Laboratory Imaging/Nikon)

**Extensions:** .lim

**Owner:** Laboratory Imaging

**Support**

- BSD-licensed: ✗
- Export: ✗

**Officially Supported Versions:**

**Supported Metadata Fields:** LIM (Laboratory Imaging/Nikon)

We currently have:

- several LIM files
- the ability to produce more LIM files

We would like to have:

- an official specification document

**Ratings**

<table>
<thead>
<tr>
<th>Pixels:</th>
<th>Metadata:</th>
<th>Openness:</th>
<th>Presence:</th>
<th>Utility:</th>
</tr>
</thead>
</table>

**Additional Information**

Source Code: LIMReader.java

Notes:

245 [https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/L2DReader.java](https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/L2DReader.java)


247 [https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/LIMReader.java](https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/LIMReader.java)
Bio-Formats only supports uncompressed LIM files.

Commercial applications that support LIM include:

- NIS Elements

### 18.73 MetaMorph 7.5 TIFF

**Extensions**: .tiff  
**Owner**: Molecular Devices

**Support**

- BSD-licensed: ✗
- Export: ✗

**Officially Supported Versions:**

**Supported Metadata Fields**: *MetaMorph 7.5 TIFF*

We currently have:

- a few Metamorph 7.5 TIFF datasets

We would like to have:

**Ratings**

- Pixels: ▲
- Metadata: ▲
- Openness: ▲
- Presence: ▼
- Utility: ▼

**Additional Information**

**Source Code**: MetamorphTiffReader.java

**Notes**:

### 18.74 MetaMorph Stack (STK)

**Extensions**: .stk, .nd  
**Owner**: Molecular Devices

**Support**

- BSD-licensed: ✗
- Export: ✗

**Officially Supported Versions:**

**Supported Metadata Fields**: *MetaMorph Stack (STK)*

We currently have:

- an STK specification document (from 2006 November 21, in DOC)

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250 [https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/MetamorphTiffReader.java](https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/MetamorphTiffReader.java)
• an older STK specification document (from 2005 March 25, in DOC)
• an ND specification document (from 2002 January 24, in PDF)
• a large number of datasets

We would like to have:

Ratings

Pixels: ▲
Metadata: ▲
Openness: ▲
Presence: ▲
Utility: ▲

Additional Information

Source Code: MetamorphReader.java

Notes:

Please note that while we have specification documents for this format, we are not able to distribute them to third parties.

Commercial applications that support STK include:

• Bitplane Imaris
• SVI Huygens
• DIMIN

See also:

Metamorph imaging system overview

18.75 MIAS (Maia Scientific)

Extensions: .tif

Developer: Maia Scientific

Support

BSD-licensed: ❌
Export: ❌

Officially Supported Versions:

Supported Metadata Fields: MIAS (Maia Scientific)

We currently have:

• several MIAS datasets

We would like to have:

Ratings

Pixels: ▲
Metadata: ▼

---

252 https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/MetamorphReader.java
253 http://www.bitplane.com/
254 http://svi.nl/
255 http://dimin.net/
256 http://www.metamorph.com/
257 http://www.selectscience.net/supplier/maia-scientific/?compID=6088
Openness: 
Presence: 
Utility: 

Additional Information
Source Code: MIASReader.java\(^{258}\)
Notes:

18.76 Micro-Manager

Extensions: .tif, .txt, .xml
Developer: Vale Lab\(^{259}\)

Support
BSD-licensed: ✔
Export: ✗

Officially Supported Versions:

Supported Metadata Fields: Micro-Manager

Freely Available Software:
- Micro-Manager\(^{260}\)

We currently have:
- many Micro-manager datasets

We would like to have:

Ratings
Pixels: ✔
Metadata: ✔
Openness: ✔
Presence: ✗
Utility: 

Additional Information
Source Code: MicromanagerReader.java\(^{261}\)
Notes:

18.77 MINC MRI

Extensions: .mnc
Developer: McGill University\(^{262}\)

Support
BSD-licensed: ✗

\(^{258}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/MIASReader.java

\(^{259}\)http://valelab.ucsf.edu/

\(^{260}\)http://micro-manager.org/

\(^{261}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-bsd/src/loci/formats/in/MicromanagerReader.java

\(^{262}\)http://www.bic.mni.mcgill.ca/ServicesSoftware/MINC
Export: ❌

Officially Supported Versions:
Supported Metadata Fields: MINC MRI

Freely Available Software:
- MINC²⁶³

We currently have:
- a few MINC files

We would like to have:

**Ratings**

Pixels: ▶
Metadata: ▼
Openness: ▼
Presence: ▼
Utility: ▼

**Additional Information**

Source Code: MINCREader.java²⁶⁴

Notes:

**18.78 Minolta MRW**

Extensions: .mrw
Developer: Minolta²⁶⁵

**Support**

BSD-licensed: ❌
Export: ❌

Officially Supported Versions:
Supported Metadata Fields: Minolta MRW

Freely Available Software:
- dcraw²⁶⁶

We currently have:
- several .mrw files

We would like to have:

**Ratings**

Pixels: ▶
Metadata: ▼
Openness: ▼
Presence: ▼

---
²⁶³ http://www.bic.mni.mcgill.ca/ServicesSoftware/MINC
²⁶⁴ https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/MINCReader.java
²⁶⁵ http://www.konicaminolta.com/
²⁶⁶ http://www.cybercom.net/%7Edcoffin/dcraw/
Utility:

**Additional Information**

Source Code: `MRWReader.java`[^267]

Notes:

**See also:**

Description of MRW format[^268]

### 18.79 MNG (Multiple-image Network Graphics)

Extensions: `.mng`

Developer: MNG Development Group[^269]

**Support**

BSD-licensed: ![Checkmark](https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/MRWReader.java)

Export: ![X](https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/MRWReader.java)

Officially Supported Versions:

Supported Metadata Fields: **MNG (Multiple-image Network Graphics)**

Freely Available Software:

- `libmng` (MNG reference library)[^270]

Sample Datasets:

- MNG sample files[^271]

We currently have:

- the `libmng-testsuites`[^272] package (from 2003 March 05, in C)
- a large number of MNG datasets

We would like to have:

**Ratings**

Pixels: ![Not Applicable](https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/MRWReader.java)

Metadata: ![Not Applicable](https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/MRWReader.java)

Openness: ![Not Applicable](https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/MRWReader.java)

Presence: ![Not Applicable](https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/MRWReader.java)

Utility: ![Not Applicable](https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/MRWReader.java)

**Additional Information**

Source Code: `MNGReader.java`[^273]

Notes:

**See also:**

MNG homepage[^274] MNG specification[^275]

[^267]: https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/MRWReader.java
[^269]: http://www.libpng.org/pub/mng/mngnews.html
[^270]: http://sourceforge.net/projects/libmng/
[^271]: http://sourceforge.net/projects/libmng/files/libmng-testsuites/MNGsuite-1.0/MNGsuite.zip/download
[^272]: http://downloads.sourceforge.net/libmng/MNGsuite-20030305.zip
[^273]: https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-bsd/src/loci/formats/in/MNGReader.java
[^274]: http://www.libpng.org/pub/mng
[^275]: http://www.libpng.org/pub/mng/spec
18.80 Molecular Imaging

Extensions: .stp
Owner: Molecular Imaging Corp, San Diego CA (closed)

Support
BSD-licensed: ❌
Export: ❌

Officially Supported Versions:
Supported Metadata Fields: Molecular Imaging

We currently have:
- Pascal code that reads Molecular Imaging files (from ImageSXM)
- a few Molecular Imaging files

We would like to have:
- an official specification document
- more Molecular Imaging files

Ratings
Pixels: ▼
Metadata: ▼
Openness: ▼
Presence: ▼
Utility: ▼

Additional Information
Source Code: MolecularImagingReader.java\(^{276}\)

Notes:

18.81 MRC (Medical Research Council)

Extensions: .mrc
Developer: MRC Laboratory of Molecular Biology\(^{277}\)

Support
BSD-licensed: ❌
Export: ❌

Officially Supported Versions:
Supported Metadata Fields: MRC (Medical Research Council)

Sample Datasets:
- golgi.mrc\(^{278}\)

We currently have:
- an MRC specification document\(^{279}\) (in HTML)

\(^{276}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/MolecularImagingReader.java
\(^{277}\)http://www2.mrc-lmb.cam.ac.uk/
\(^{278}\)http://bio3d.colorado.edu/imod/files/imod_data.tar.gz
\(^{279}\)http://ami.scripps.edu/software/mrctools/mrc_specification.php
• another MRC specification document\(^\text{280}\) (in TXT)

• a few MRC datasets

We would like to have:

**Ratings**

Pixels: 🔺

Metadata: 🔺

Openness: 🔺

Presence: 🟡

Utility: 🟡

**Additional Information**

Source Code: MRCReader.java\(^\text{281}\)

Notes:

Commercial applications that support MRC include:

• Bitplane Imaris\(^\text{282}\)

See also:

MRC on Wikipedia\(^\text{283}\)

### 18.82 NEF (Nikon Electronic Format)

Extensions: .nef, .tif

Developer: Nikon\(^\text{284}\)

**Support**

BSD-licensed: ❌

Export: ❌

Officially Supported Versions:

Supported Metadata Fields: NEF (Nikon Electronic Format)

Sample Datasets:

• neffile1.zip\(^\text{285}\)

• Sample NEF images\(^\text{286}\)

We currently have:

• a NEF specification document (v0.1, from 2003, in PDF)

• several NEF datasets

We would like to have:

**Ratings**

Pixels: 🔺

Metadata: 🔺

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\(^\text{280}\) http://bio3d.colorado.edu/imod/doc/mrc_format.txt

\(^\text{281}\) https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/MRCReader.java

\(^\text{282}\) http://www.bitplane.com/

\(^\text{283}\) http://en.wikipedia.org/wiki/MRC_%28file_format%29

\(^\text{284}\) http://www.nikon.com/

\(^\text{285}\) http://www.outbackphoto.com/workshop/NEF_conversion/neffile1.zip

\(^\text{286}\) http://www.nikondigital.org/articles/library/nikon_d2x_first_impressions.htm
Openness: ▼
Presence: ▼
Utility: ▼

Additional Information
Source Code: NikonReader.java\textsuperscript{287}
Notes:
Please note that while we have specification documents for this format, we are not able to distribute them to third parties.
See also:
NEF Conversion\textsuperscript{288}

\textbf{18.83 NIfTI}

Extensions: .img, .hdr
Developer: National Institutes of Health\textsuperscript{289}
Support
BSD-licensed: X
Export: X
Officially Supported Versions:
Supported Metadata Fields: \textit{NIfTI}
Sample Datasets:
\begin{itemize}
\item Official test data\textsuperscript{290}
\end{itemize}
We currently have:
\begin{itemize}
\item NIfTI specification documents\textsuperscript{291}
\item several NIfTI datasets
\end{itemize}
We would like to have:
Ratings
Pixels: ▲
Metadata: ■
Openness: ▲
Presence: ■
Utility: ▼

Additional Information
Source Code: NiftiReader.java\textsuperscript{292}
Notes:
\begin{itemize}
\item \textsuperscript{287}https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/NikonReader.java
\item \textsuperscript{288}http://www.outbackphoto.com/workshop/NEF_conversion/nefconversion.html
\item \textsuperscript{289}http://www.nih.gov/
\item \textsuperscript{290}http://nifti.nimh.nih.gov/nifti-1/data
\item \textsuperscript{291}http://nifti.nimh.nih.gov/nifti-1/
\item \textsuperscript{292}https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/NiftiReader.java
\end{itemize}
18.84 Nikon Elements TIFF

Extensions: .tiff
Developer: Nikon

Support

BSD-licensed: 
Export: 

Officially Supported Versions:
Supported Metadata Fields: Nikon Elements TIFF

We currently have:
• a few Nikon Elements TIFF files

We would like to have:
• more Nikon Elements TIFF files

Ratings

Pixels: 
Metadata: 
Openness: 
Presence: 
Utility: 

Additional Information

Source Code: NikonElementsTiffReader.java

Notes:

18.85 Nikon EZ-C1 TIFF

Extensions: .tiff
Developer: Nikon

Support

BSD-licensed: 
Export: 

Officially Supported Versions:
Supported Metadata Fields: Nikon EZ-C1 TIFF

We currently have:
• a few Nikon EZ-C1 TIFF files

We would like to have:

Ratings

Pixels: 
Metadata: 

Notes:

http://www.nikon.com
https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/NikonElementsTiffReader.java
http://www.nikon.com/
Openness: △
Presence: ▼
Utility: ▼

Additional Information
Source Code: NikonTiffReader.java

Notes:

18.86 Nikon NIS-Elements ND2

Extensions: .nd2
Developer: Nikon USA

Support
BSD-licensed: ❌
Export: ❌

Officially Supported Versions:
Supported Metadata Fields: Nikon NIS-Elements ND2
Freely Available Software:
  • NIS-Elements Viewer from Nikon

We currently have:
  • many ND2 datasets

We would like to have:
  • an official specification document

Ratings
Pixels: ▲
Metadata: ▲
Openness: ▼
Presence: ▲
Utility: ▲

Additional Information
Source Code: NativeND2Reader.java

Notes:

There are two distinct versions of ND2: an old version, which uses JPEG-2000 compression, and a new version which is either uncompressed or Zip-compressed. We are not aware of the version number or release date for either format.

Bio-Formats uses the JAI Image I/O Tools library to read ND2 files compressed with JPEG-2000.

There is also an ND2 reader that uses Nikon’s native libraries. To use it, you must be using Windows and have Nikon’s ND2 reader plugin for ImageJ installed. Additionally, you will need to download LegacyND2Reader.dll and place it in your ImageJ plugin folder.

296 https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/NikonTiffReader.java
297 http://www.nikonusa.com/
298 http://www.nis-elements.com/resources-downloads.html
299 https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/NativeND2Reader.java
300 http://java.net/projects/jai-imageio
302 https://github.com/openmicroscopy/bioformats/blob/v5.0.2/lib/LegacyND2Reader.dll?raw=true
18.87 NRRD (Nearly Raw Raster Data)

Extensions: .nrrd, .nhdr, .raw, .txt

Developer: Teem developers

Support

BSD-licensed: ✔

Export: ❌

Officially Supported Versions:

Supported Metadata Fields: NRRD (Nearly Raw Raster Data)

Freely Available Software:
- nrrd (NRRD reference library)

Sample Datasets:
- Diffusion tensor MRI datasets

We currently have:
- an nrrd specification document (v1.9, from 2005 December 24, in HTML)
- a few nrrd datasets

We would like to have:

Ratings

Pixels: ▲

Metadata: ▲

Openness: ▲

Presence: ◻

Utility: ✔

Additional Information

Source Code: NRRDReader.java

Notes:

18.88 Olympus CellR/APL

Extensions: .apl, .mtb, .tnb, .tif, .obsep

Owner: Olympus

Support

BSD-licensed: ❌

Export: ❌

Officially Supported Versions:

Supported Metadata Fields: Olympus CellR/APL
We currently have:
- a few CellR datasets

We would like to have:
- more Cellr datasets
- an official specification document

**Ratings**

Pixels: 🟢
Metadata: 🟡
Openness: 🟡
Presence: ⬇
Utility: ⬇

**Additional Information**

Source Code: [APLReader.java](https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/APLReader.java)

Notes:

**18.89 Olympus FluoView FV1000**

Extensions: .oib, .oif

Owner: Olympus

**Support**

BSD-licensed: ✗
Export: ✗

Officially Supported Versions: 1.0, 2.0

Supported Metadata Fields: *Olympus FluoView FV1000*

Freely Available Software:
- FV-Viewer from Olympus

We currently have:
- an OIF specification document (v2.0.0.0, from 2008, in PDF)
- an FV1000 specification document (v1.0.0.0, from 2004 June 22, in PDF)
- older FV1000 specification documents (draft, in DOC and XLS)
- many FV1000 datasets

We would like to have:
- more OIB datasets (especially 2+ GB files)
- more FV1000 version 2 datasets

**Ratings**

Pixels: 🟢
Metadata: 🟢
Openness: 🟢

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309https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/APLReader.java
310http://www.olympus.com/
311http://www.olympus.co.uk/microscopy/22_FluoView_FV1000__Confocal_Microscope.htm
Presence: □
Utility: ▲

Additional Information

Source Code: FV1000Reader.java

Notes:

Please note that while we have specification documents for this format, we are not able to distribute them to third parties.

Bio-Formats uses a modified version of the Apache Jakarta POI library to read OIB files. OIF stands for “Original Imaging Format”. OIB stands for “Olympus Image Binary”. OIF is a multi-file format that includes an .oif file and a directory of .tif, .roi, .pty, .lut, and .bmp files. OIB is a single file format.

Commercial applications that support this format include:

• Bitplane Imaris
• SVI Huygens

See also:
Olympus FluoView Resource Center

18.90 Olympus FluoView TIFF

Extensions: .tif
Owner: Olympus

Support

BSD-licensed: X
Export: X

Officially Supported Versions:

Supported Metadata Fields: Olympus FluoView TIFF

Freely Available Software:

• DIMIN

We currently have:

• a FluoView specification document (from 2002 November 14, in DOC)
• Olympus’ FluoView Image File Reference Suite (from 2002 March 1, in DOC)
• several FluoView datasets

We would like to have:

Ratings

Pixels: ▲
Metadata: ▲
Openness: ▲

Presence: □

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312 https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/FV1000Reader.java
313 http://jakarta.apache.org/poi/
314 http://www.bitplane.com/
315 http://svi.nl/
316 http://www.olympusflouview.com
317 http://www.olympus.com/
318 http://www.dimin.net/

18.90. Olympus FluoView TIFF 167
Utility: 

Additional Information

Source Code: FluoviewReader.java

Notes:

Please note that while we have specification documents for this format, we are not able to distribute them to third parties.

Commercial applications that support this format include:

- Bitplane Imaris
- SVI Huygens

18.91 Olympus ScanR

Extensions: .xml, .dat, .tif

Developer: Olympus

Owner: Olympus

Support

BSD-licensed: ✗

Export: ✗

Officially Supported Versions:

Supported Metadata Fields: Olympus ScanR

We currently have:

- several ScanR datasets

We would like to have:

Ratings

Pixels: ▲

Metadata: ▼

Openness: ▼

Presence: ▼

Utility: ▼

Additional Information

Source Code: ScanrReader.java

Notes:

18.92 Olympus SIS TIFF

Extensions: .tiff

Developer: Olympus

Notes:

18.91. Olympus ScanR
Support

BSD-licensed: ✗
Export: ✗

Officially Supported Versions:
Supported Metadata Fields: *Olympus SIS TIFF*

We currently have:
- a few example SIS TIFF files

We would like to have:

**Ratings**

Pixels: ▼
Metadata: ▼
Openness: ▼
Presence: ▼
Utility: ▼

**Additional Information**

Source Code: [SISReader.java](https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/SISReader.java)

Notes:

18.93 OME-TIFF

Extensions: .ome.tiff

Developer: [Open Microscopy Environment](http://www.openmicroscopy.org/)

**Support**

BSD-licensed: ✔
Export: ✔


Supported Metadata Fields: **OME-TIFF**

We currently have:
- many OME-TIFF datasets
- the ability to produce additional datasets

We would like to have:

**Ratings**

Pixels: ▲
Metadata: ▲
Openness: ▲
Presence: ▲

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326 https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/SISReader.java
327 http://www.openmicroscopy.org/
328 http://www.openmicroscopy.org/site/support/ome-model/ome-tiff/specification.html
Utility: ▲

Additional Information

Source Code: OMETiffReader.java\(^{329}\) Source Code: OMETiffWriter.java\(^{330}\)

Notes:

Bio-Formats can save image stacks as OME-TIFF.

Commercial applications that support OME-TIFF include:

- Bitplane Imaris\(^{331}\)
- SVI Huygens\(^{332}\)

See also:

OME-TIFF technical overview\(^{333}\)

18.94 OME-XML

Extensions: .ome

Developer: Open Microscopy Environment\(^{334}\)

Support

BSD-licensed: ☑

Export: ☑


Supported Metadata Fields: OME-XML

We currently have:

- OME-XML specification documents\(^{335}\)
- many OME-XML datasets
- the ability to produce more datasets

We would like to have:

Ratings

Pixels: ▲

Metadata: ▲

Openness: ▲

Presence: ▼

Utility: ▲

Additional Information

Source Code: OMEXMLReader.java\(^{336}\) Source Code: OMEXMLWriter.java\(^{337}\)

Notes:

\(^{329}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-bsd/src/loci/formats/in/OMETiffReader.java

\(^{330}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-bsd/src/loci/formats/out/OMETiffWriter.java

\(^{331}\)http://www.bitplane.com/

\(^{332}\)http://svi.nl/

\(^{333}\)http://www.openmicroscopy.org/site/support/ome-model/ome-tiff/index.html

\(^{334}\)http://www.openmicroscopy.org/

\(^{335}\)http://www.openmicroscopy.org/Schemas/

\(^{336}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-bsd/src/loci/formats/in/OMEXMLReader.java

\(^{337}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-bsd/src/loci/formats/out/OMEXMLWriter.java
Bio-Formats uses the OME-XML Java library\(^{338}\) to read OME-XML files.

Commercial applications that support OME-XML include:

- Bitplane Imaris\(^ {339}\)
- SVI Huygens\(^ {340}\)

### 18.95 Oxford Instruments

**Extensions:** .top  
**Owner:** Oxford Instruments\(^ {341}\)

**Support**

- BSD-licensed: ✗
- Export: ✗

**Officially Supported Versions:**

**Supported Metadata Fields:** *Oxford Instruments*

We currently have:

- Pascal code that can read Oxford Instruments files (from ImageSXM)
- A few Oxford Instruments files

We would like to have:

- An official specification document
- More Oxford Instruments files

**Ratings**

- Pixels: ▼
- Metadata: ▼
- Openness: ▼
- Presence: ▼
- Utility: ▼

**Additional Information**

**Source Code:** OxfordInstrumentsReader.java\(^ {342}\)

**Notes:**

### 18.96 PCORAW

**Extensions:** .pcoraw, .rec  
**Developer:** PCO\(^ {343}\)

**Support**

- BSD-licensed: ✗

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\(^{340}\) [http://svi.nl/](http://svi.nl/)  
\(^{341}\) [http://www.oxinst.com](http://www.oxinst.com)  
\(^{343}\) [http://www.pco.de/](http://www.pco.de/)
Export: ❌
Officially Supported Versions:
Supported Metadata Fields: **PCORAW**
We currently have:
  • a few example datasets
We would like to have:

**Ratings**
Pixels: ❌
Metadata: ❌
Openness: ❌
Presence: ❌
Utility: ❌

**Additional Information**
Source Code: [PCORAWReader.java](https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/PCORAWReader.java)

**Notes:**

### 18.97 PCX (PC Paintbrush)

Extensions: .pcx
Developer: ZSoft Corporation

**Support**
BSD-licensed: ✔️
Export: ❌

Officially Supported Versions:
Supported Metadata Fields: **PCX (PC Paintbrush)**
We currently have:
  • several .pcx files
  • the ability to generate additional .pcx file
We would like to have:

**Ratings**
Pixels: ✔️
Metadata: ❌
Openness: ❌
Presence: ❌
Utility: ❌

**Additional Information**
Source Code: [PCXReader.java](https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-bsd/src/loci/formats/in/PCXReader.java)

**Notes:**

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[344](https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/PCORAWReader.java)
[345](https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-bsd/src/loci/formats/in/PCXReader.java)
Commercial applications that support PCX include Zeiss LSM Image Browser\textsuperscript{346}.

## 18.98 Perkin Elmer Densitometer

Extensions: .pds
Developer: Perkin Elmer\textsuperscript{347}

**Support**

BSD-licensed: \xmark
Export: \xmark

Officially Supported Versions:

Supported Metadata Fields: *Perkin Elmer Densitometer*

We currently have:

- a few PDS datasets

We would like to have:

- an official specification document
- more PDS datasets

**Ratings**

Pixels: [ ]
Metadata: [ ]
Openness: [ ]

Presence: \xmark
Utility: \xmark

**Additional Information**

Source Code: PDSReader.java\textsuperscript{348}

Notes:

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## 18.99 PerkinElmer Operetta

Extensions: .tiff, .xml
Developer: PerkinElmer\textsuperscript{349}

**Support**

BSD-licensed: \xmark
Export: \xmark

Officially Supported Versions:

Supported Metadata Fields: *PerkinElmer Operetta*

We currently have:

- a few sample datasets

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\textsuperscript{347} http://www.perkinelmer.com
\textsuperscript{348} https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/PDSReader.java
\textsuperscript{349} http://www.perkinelmer.com/
We would like to have:

- an official specification document
- more sample datasets

**Ratings**

Pixels: 🟢
Metadata: ⬇️
Openness: 🟢
Presence: ⬇️
Utility: 🟢

**Additional Information**

Source Code: OperettaReader.java[^350]

Notes:

### 18.100 PerkinElmer UltraView

Extensions: .tif, .2, .3, .4, etc.

Owner: PerkinElmer[^351]

**Support**

BSD-licensed: ☠️
Export: ☠️

**Officially Supported Versions:**

**Supported Metadata Fields:** *PerkinElmer UltraView*

We currently have:

- several UltraView datasets

We would like to have:

**Ratings**

Pixels: 🟢
Metadata: ⬇️
Openness: ⬇️
Presence: ⬇️
Utility: ⬇️

**Additional Information**

Source Code: PerkinElmerReader.java[^352]

Notes:

Other associated extensions include: .tim, .zpo, .csv, .htm, .cfg, .ano, .rec

Commercial applications that support this format include:

- Bitplane Imaris[^353]

[^350]: https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/OperettaReader.java
[^351]: http://www.perkinelmer.com/
[^352]: https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/PerkinElmerReader.java
[^353]: http://www.bitplane.com/
• Image-Pro Plus\textsuperscript{354}

See also:
PerkinElmer UltraView system overview\textsuperscript{355}

18.101 PGM (Portable Gray Map)

Extensions: .pgm
Developer: Netpbm developers

Support
BSD-licensed: ☑
Export: ☒

Officially Supported Versions:
Supported Metadata Fields: \textit{PGM (Portable Gray Map)}

Freely Available Software:
• Netpbm graphics filter\textsuperscript{356}

We currently have:
• a PGM specification document\textsuperscript{357} (from 2003 October 3, in HTML)
• a few PGM files

We would like to have:

Ratings
Pixels: ▲
Metadata: ▼
Openness: ▲
Presence: ▼
Utility: ▼

Additional Information
Source Code: PGMReader.java\textsuperscript{358}

Notes:

18.102 Adobe Photoshop PSD

Extensions: .psd
Developer: Adobe\textsuperscript{359}

Support
BSD-licensed: ☒
Export: ☒

\textsuperscript{354}http://www.mediacy.com/
\textsuperscript{355}http://www.perkinelmer.com/pages/020/cellularimaging/products/ultraviewvoxsystemsoverview.xhtml
\textsuperscript{356}http://netpbm.sourceforge.net/
\textsuperscript{357}http://netpbm.sourceforge.net/doc/pgm.html
\textsuperscript{358}https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-bsd/src/loci/formats/in/PGMReader.java
\textsuperscript{359}http://www.adobe.com/
Officially Supported Versions: 1.0

Supported Metadata Fields: Adobe Photoshop PSD

We currently have:
  • a PSD specification document (v3.0.4, 16 July 1995)
  • a few PSD files

We would like to have:
  • more PSD files

Ratings

Pixels:
Metadata:
Openness:
Presence:
Utility:

Additional Information

Source Code: PSDReader.java

Notes:

18.103 Photoshop TIFF

Extensions: .tif, .tiff

Developer: Adobe

Support

BSD-licensed: ❌
Export: ❌

Officially Supported Versions:

Supported Metadata Fields: Photoshop TIFF

We currently have:
  • a Photoshop TIFF specification document
  • a few Photoshop TIFF files

We would like to have:

Ratings

Pixels:
Metadata:
Openness:
Presence:
Utility:

Additional Information

360 https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/PSDReader.java

361 http://www.adobe.com
18.104 PICT (Macintosh Picture)

Extensions: .pict
Developer: Apple Computer

Support
BSD-licensed: ☑
Export: ✗

Officially Supported Versions:
Supported Metadata Fields: PICT (Macintosh Picture)
We currently have:
- many PICT datasets
We would like to have:

Ratings
Pixels: ☑
Metadata: ☗
Openness: ☗
Presence: ☑
Utility: ☗

Additional Information
Source Code: PictReader.java

Notes:
QuickTime for Java is required for reading vector files and some compressed files.
See also:
PICT technical overview. Another PICT technical overview

18.105 PNG (Portable Network Graphics)

Extensions: .png
Developer: PNG Development Group

Support
BSD-licensed: ☑
Export: ☑

Officially Supported Versions:

---

18.104. PICT (Macintosh Picture)
Supported Metadata Fields: *PNG (Portable Network Graphics)*

Freely Available Software:

- PNG Writer plugin for ImageJ\(^{369}\)

We currently have:

- a PNG specification document\(^{370}\) (W3C/ISO/IEC version, from 2003 November 10, in HTML)
- several PNG datasets

We would like to have:

**Ratings**

Pixels: ▲

Metadata: □

Openness: ▲

Presence: ▶

Utility: ▼

**Additional Information**

Source Code: APNGReader.java\(^{371}\)

Notes:

Bio-Formats uses the Java Image I/O\(^{372}\) API to read and write PNG files.

See also:

PNG technical overview\(^{373}\)

### 18.106 Prairie Technologies TIFF

Extensions: .tif, .xml, .cfg

Developer: Prairie Technologies\(^{374}\)

**Support**

BSD-licensed: ✗

Export: ✗

Officially Supported Versions:

Supported Metadata Fields: *Prairie Technologies TIFF*

We currently have:

- many Prairie datasets

We would like to have:

**Ratings**

Pixels: ▲

Metadata: □

Openness: 🔺

---


\(^{371}\) [https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-bsd/src/loci/formats/in/APNGReader.java](https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-bsd/src/loci/formats/in/APNGReader.java)

\(^{372}\) [http://docs.oracle.com/javase/6/docs/technotes/guides/imageio/](http://docs.oracle.com/javase/6/docs/technotes/guides/imageio/)

\(^{373}\) [http://www.libpng.org/pub/png/](http://www.libpng.org/pub/png/)

\(^{374}\) [http://www.prairie-technologies.com/](http://www.prairie-technologies.com/)
**18.107 Quesant**

Extensions: .afm

Developer: Quesant Instrument Corporation

Owner: KLA-Tencor Corporation

**Support**

BSD-licensed: ✗

Export: ✗

Officially Supported Versions:

Supported Metadata Fields: **Quesant**

We currently have:

- Pascal code that can read Quesant files (from ImageSXM)
- several Quesant files

We would like to have:

- an official specification document
- more Quesant files

**Ratings**

Pixels:

Metadata:

Openness:

Presence:

Utility:

**Additional Information**

Source Code: QuesantReader.java

Notes:

**18.108 QuickTime Movie**

Extensions: .mov

Owner: Apple Computer

**Support**

https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/QuesantReader.java


https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/QuesantReader.java

http://www.apple.com/
BSD-licensed: ✓

Export: ✓

Officially Supported Versions:

Supported Metadata Fields: *QuickTime Movie*

Freely Available Software:

- QuickTime Player

We currently have:

- a QuickTime specification document (from 2001 March 1, in HTML)
- several QuickTime datasets
- the ability to produce more datasets

We would like to have:

- more QuickTime datasets, including:
  - files compressed with a common, unsupported codec
  - files with audio tracks and/or multiple video tracks

Ratings

Pixels:

Metadata:

Openness:

Presence:

Utility:

Additional Information

Source Code: [NativeQTReader.java](https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-bsd/src/loci/formats/in/NativeQTReader.java)
Source Code: [QTWriter.java](https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-bsd/src/loci/formats/out/QTWriter.java)

Notes:

Bio-Formats has two modes of operation for QuickTime:

- QTJava mode requires QuickTime to be installed.
- Native mode works on systems with no QuickTime (e.g. Linux).

Bio-Formats can save image stacks as QuickTime movies. The following table shows supported codecs:

---

http://developer.apple.com/documentation/Quicktime/QTFF/
https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-bsd/src/loci/formats/in/NativeQTReader.java
https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-bsd/src/loci/formats/out/QTWriter.java
<table>
<thead>
<tr>
<th>Codec</th>
<th>Description</th>
<th>Native</th>
<th>QTJava</th>
</tr>
</thead>
<tbody>
<tr>
<td>raw</td>
<td>Full Frames (Uncompressed)</td>
<td>read &amp; write</td>
<td>read &amp; write</td>
</tr>
<tr>
<td>iraw</td>
<td>Intel YUV Uncompressed Animation (run length encoded RGB)</td>
<td>read only</td>
<td>read only</td>
</tr>
<tr>
<td>rle</td>
<td>Still Image JPEG DIB</td>
<td>read only</td>
<td>read only</td>
</tr>
<tr>
<td>jpeg</td>
<td>Apple Video 16 bit “road pizza”</td>
<td>read only (partial)</td>
<td>read only</td>
</tr>
<tr>
<td>rpza</td>
<td>Motion JPEG codec Cinepak</td>
<td>read only</td>
<td>read only</td>
</tr>
<tr>
<td>mjpb</td>
<td>Sorenson Video</td>
<td></td>
<td>read &amp; write</td>
</tr>
<tr>
<td>cvid</td>
<td>Sorenson Video 3</td>
<td></td>
<td>read &amp; write</td>
</tr>
<tr>
<td>svq1</td>
<td>MPEG-4</td>
<td></td>
<td>read &amp; write</td>
</tr>
<tr>
<td>svq3</td>
<td>H.263</td>
<td></td>
<td>read &amp; write</td>
</tr>
</tbody>
</table>

See also:

QuickTime software overview[^384]

18.109 RHK

Extensions: .sm2, .sm3

Owner: RHK Technologies[^385]

Support

BSD-licensed: ❌

Export: ❌

Officially Supported Versions:

Supported Metadata Fields: RHK

We currently have:

- Pascal code that can read RHK files (from ImageSXM)
- a few RHK files

We would like to have:

- an official specification document
- more RHK files

Ratings

Pixels: ▼

Metadata: ▼

Openness: ▼

Presence: ▼

Utility: ▼

[^385]: [http://www.rhk-tech.com](http://www.rhk-tech.com)
Additional Information
Source Code: RHKReader.java\textsuperscript{386}

Notes:

18.110 SBIG

Owner: Santa Barbara Instrument Group (SBIG)\textsuperscript{387}

Support
BSD-licensed: \xmark
Export: \xmark

Officially Supported Versions:

Supported Metadata Fields: SBIG

We currently have:

• an official SBIG specification document\textsuperscript{388}
• a few SBIG files

We would like to have:

• more SBIG files

Ratings
Pixels: ▲
Metadata: ▼
Openness: ▲
Presence: ▼
Utility: ▼

Additional Information
Source Code: SBIGReader.java\textsuperscript{389}

Notes:

18.111 Seiko

Extensions: .xqd, .xqf
Owner: Seiko\textsuperscript{390}

Support
BSD-licensed: \xmark
Export: \xmark

Officially Supported Versions:

Supported Metadata Fields: Seiko

We currently have:

\textsuperscript{386}https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/RHKReader.java
\textsuperscript{387}http://www.sbig.com
\textsuperscript{388}http://sbig.impulse.net/pdf/files/file.format.pdf
\textsuperscript{389}https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/SBIGReader.java
\textsuperscript{390}http://www.seiko.co.jp/en/index.php
• Pascal code that can read Seiko files (from ImageSXM)
• a few Seiko files

We would like to have:
• an official specification document
• more Seiko files

Ratings

Pixels: ▼
Metadata: ▼
Openness: ▼
Presence: ▼
Utility: ▼

Additional Information

Source Code: SeikoReader.java\(^{391}\)
Notes:

18.112 SimplePCI & HClmage

Extensions: .cxd
Developer: Compix\(^{392}\)

Support

BSD-licensed: ☒
Export: ☒

Officially Supported Versions:

Supported Metadata Fields: SimplePCI & HClmage

We currently have:
• several SimplePCI files

We would like to have:

Ratings

Pixels: ▲
Metadata: ▼
Openness: ▲
Presence: ▼
Utility: ▼

Additional Information

Source Code: PCIReader.java\(^{393}\)
Notes:

Bio-Formats uses a modified version of the Apache Jakarta POI library\(^{394}\) to read CXD files.

---

\(^{391}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/SeikoReader.java

\(^{392}\)http://hcimage.com

\(^{393}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/PCIReader.java

\(^{394}\)http://jakarta.apache.org/poi/
See also:
SimplePCI software overview

18.113 SimplePCI & HClipage TIFF

Extensions: .tiff
Developer: Hamamatsu

Support
BSD-licensed: x
Export: x

Officially Supported Versions:
Supported Metadata Fields: SimplePCI & HClipage TIFF
We currently have:
• a few SimplePCI TIFF datasets
We would like to have:
• more SimplePCI TIFF datasets

Ratings
Pixels: ▲
Metadata: ▼
Openness: ▲
Presence: ▼
Utility: ▼

Additional Information
Source Code: SimplePCITiffReader.java

Notes:

18.114 SM Camera

Support
BSD-licensed: x
Export: x

Officially Supported Versions:
Supported Metadata Fields: SM Camera
We currently have:
• Pascal code that can read SM-Camera files (from ImageSXM)
• a few SM-Camera files
We would like to have:
• an official specification document

395 http://hcimage.com/simple-pci-legacy/
396 http://hcimage.com/simple-pci-legacy/
397 https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/SimplePCITiffReader.java
• more SM-Camera files

### Ratings

**Pixels:**

**Metadata:**

**Openness:**

**Presence:**

**Utility:**

### Additional Information

**Source Code:** SMCameraReader.java

**Notes:**

## 18.115 SPIDER

**Extensions:** .spi, .stk

**Developer:** Wadsworth Center

**Support**

**BSD-licensed:**

**Export:**

**Officially Supported Versions:**

**Supported Metadata Fields:** SPIDER

**Freely Available Software:**

• SPIDER

**We currently have:**

• a few example datasets

• official file format documentation

**We would like to have:**

### Ratings

**Pixels:**

**Metadata:**

**Openness:**

**Presence:**

**Utility:**

### Additional Information

**Source Code:** SpiderReader.java

**Notes:**

---

398: https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/SMCameraReader.java

399: http://www.wadsworth.org/spider_doc/spider/docs/spider.html

400: http://www.wadsworth.org/spider_doc/spider/docs/spider.html

401: http://www.wadsworth.org/spider_doc/spider/docs/image_doc.html

402: https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/SpiderReader.java

---

18.115. SPIDER 185
18.116 Targa

Extensions: .tga
Developer: Truevision

Support
BSD-licensed: ☑
Export: ☒

Officially Supported Versions:
Supported Metadata Fields: Targa

We currently have:
- a Targa specification document
- a few Targa files

We would like to have:

Ratings
Pixels: ▲
Metadata: ▲
Openness: ▲
Presence: ☐
Utility: ☐

Additional Information
Source Code: TargaReader.java

Notes:

18.117 Text

Extensions: .txt

Support
BSD-licensed: ☑
Export: ☒

Officially Supported Versions:
Supported Metadata Fields: Text

We currently have:
We would like to have:

Ratings
Pixels: ☐
Metadata: ☐
Openness: ☐
Presence: ☐

---

403 http://www.truevision.com
404 https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/TargaReader.java
Bio-Formats Documentation, Release 5.0.2

Utility: 

Additional Information
Source Code: TextReader.java

Notes:
Reads tabular pixel data produced by a variety of software.

18.118 TIFF (Tagged Image File Format)

Extensions: .tif
Developer: Aldus and Microsoft
Owner: Adobe

Support
BSD-licensed: 
Export: 

Officially Supported Versions:

Supported Metadata Fields: TIFF (Tagged Image File Format)
Sample Datasets:
• LZW TIFF data gallery
• Big TIFF

We currently have:
• a TIFF specification document (v6.0, from 1992 June 3, in PDF)
• many TIFF datasets
• a few BigTIFF datasets

We would like to have:

Ratings
Pixels: 
Metadata: 
Openness: 
Presence: 
Utility:

Additional Information
Source Code: TiffReader.java Source Code: TiffWriter.java

Notes:
Bio-Formats can also read BigTIFF files (TIFF files larger than 4 GB). Bio-Formats can save image stacks as TIFF or BigTIFF.

See also:

https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-bsd/src/loci/formats/in/TextReader.java
http://www.adobe.com
http://marlin.life.utsa.edu/Data_Gallery.html
http://tiffcentral.com/
https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-bsd/src/loci/formats/in/TiffReader.java
https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-bsd/src/loci/formats/out/TiffWriter.java
TIFF technical overview\textsuperscript{412} BigTIFF technical overview\textsuperscript{413}

18.119 TillPhotonics TillVision

Extensions: .vws
Developer: TILL Photonics\textsuperscript{414}

Support
BSD-licensed: 
Export: 

Officially Supported Versions:
Supported Metadata Fields: \textit{TillPhotonics TillVision}
We currently have:
- several TillVision datasets
We would like to have:
- an official specification document

Ratings
Pixels: 
Metadata: 
Openness: 
Presence: 
Utility: 

Additional Information
Source Code: TillVisionReader.java\textsuperscript{415}

Notes:

18.120 Topometrix

Extensions: .tfr, .ffr, .zfr, .zfp, .2fl
Owner: TopoMetrix (now Veeco)\textsuperscript{416}

Support
BSD-licensed: 
Export: 

Officially Supported Versions:
Supported Metadata Fields: \textit{Topometrix}
We currently have:
- Pascal code that reads Topometrix files (from ImageSXM)
- a few Topometrix files

\textsuperscript{412}\url{http://www.awaresystems.be/imaging/tiff/faq.html#q3}
\textsuperscript{413}\url{http://www.awaresystems.be/imaging/tiff/bigtiff.html}
\textsuperscript{414}\url{http://www.till-photonics.com/}
\textsuperscript{415}\url{https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/TillVisionReader.java}
\textsuperscript{416}\url{http://www.veeco.com/}

18.119. TillPhotonics TillVision 188
We would like to have:

- an official specification document
- more Topometrix files

**Ratings**

Pixels: 
Metadata: 
Openness: 
Presence: 
Utility: 

**Additional Information**

Source Code: TopometrixReader.java

Notes:

---

**18.121 Trestle**

Extensions: .tif, .sld, .jpg

**Support**

BSD-licensed: 
Export: 

Officially Supported Versions:

Supported Metadata Fields: Trestle

Sample Datasets:

- OpenSlide

We currently have:

- a few example datasets
- developer documentation from the OpenSlide project

We would like to have:

**Ratings**

Pixels: 
Metadata: 
Openness: 
Presence: 
Utility: 

**Additional Information**

Source Code: TrestleReader.java

Notes:

---

417 https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/TopometrixReader.java
418 http://openslide.cs.cmu.edu/download/openslide-testdata/Trestle/
419 http://openslide.org/Trestle%20format/
420 https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/TrestleReader.java
18.122 UBM

Extensions: .pr3

Support

BSD-licensed: ✗

Export: ✗

Officially Supported Versions:

Supported Metadata Fields: *UBM*

We currently have:

- Pascal code that can read UBM files (from ImageSXM)
- one UBM file

We would like to have:

- an official specification document
- more UBM files

Ratings

Pixels: ▼
Metadata: ▼
Openness: ▼
Presence: ▼
Utility: ▼

Additional Information

Source Code: UBMReader.java\(^{421}\)

Notes:

18.123 Unisoku

Extensions: .dat, .hdr

Owner: Unisoku\(^{422}\)

Support

BSD-licensed: ✗

Export: ✗

Officially Supported Versions:

Supported Metadata Fields: *Unisoku*

We currently have:

- Pascal code that can read Unisoku files (from ImageSXM)
- a few Unisoku files

We would like to have:

- an official specification document

\(^{421}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/UBMReader.java

\(^{422}\)http://www.unisoku.com
• more Unisoku files

Ratings

Pixels: 
Metadata: 
Openness: 
Presence: 
Utility: 

Additional Information

Source Code: UnisokuReader.java

Notes:

18.124  Varian FDF

Extensions: .fdf
Developer: Varian, Inc.

Support

BSD-licensed: 
Export: 

Officially Supported Versions:
Supported Metadata Fields: Varian FDF

We currently have:
• a few Varian FDF datasets

We would like to have:
• an official specification document
• more Varian FDF datasets

Ratings

Pixels: 
Metadata: 
Openness: 
Presence: 
Utility: 

Additional Information

Source Code: VarianFDFReader.java

Notes:

423 https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/UnisokuReader.java
424 http://www.varianinc.com
425 https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/VarianFDFReader.java
18.125 VG SAM

Extensions: .dti

Support
BSD-licensed: ❌
Export: ❌

Officially Supported Versions:
Supported Metadata Fields: VG SAM
We currently have:
- a few VG-SAM files

We would like to have:
- an official specification document
- more VG-SAM files

Ratings
Pixels:
Metadata:
Openness:
Presence:
Utility:

Additional Information
Source Code: VGSAMReader.java\(^{426}\)

Notes:

18.126 VisiTech XYS

Extensions: .xys, .html

Developer: VisiTech International\(^{427}\)

Support
BSD-licensed: ❌
Export: ❌

Officially Supported Versions:
Supported Metadata Fields: VisiTech XYS
We currently have:
- several VisiTech datasets

We would like to have:
- an official specification document

\(^{426}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/VGSAMReader.java
\(^{427}\)http://www.visitech.co.uk/
### Ratings

**Pixels:**

**Metadata:**

**Openness:**

**Presence:**

**Utility:**

### Additional Information

Source Code: [VisitechReader.java](https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/VisitechReader.java)

Notes:

#### 18.127 Volocity

**Extensions:** .mvd2

**Developer:** PerkinElmer

**Support**

- BSD-licensed: 
- Export: 

**Officially Supported Versions:**

**Supported Metadata Fields:** *Volocity*

**Sample Datasets:**

- *Volocity Demo*

We currently have:

- many example Volocity datasets

We would like to have:

- an official specification document
- any Volocity datasets that do not open correctly

### Ratings

**Pixels:**

**Metadata:**

**Openness:**

**Presence:**

**Utility:**

### Additional Information

Source Code: [VolocityReader.java](https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/VolocityReader.java)

Notes:

.mvd2 files are Metakit database files.

---

\[428\] https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/VisitechReader.java

\[429\] http://www.perkinelmer.com/pages/020/cellularimaging/products/volocity.xhtml

\[430\] http://www.perkinelmer.com/pages/020/cellularimaging/products/volociytedemo.xhtml

\[431\] https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/VolocityReader.java

\[432\] http://equi4.com/metakit/
18.128  Volocity Library Clipping

Extensions: .acff
Developer: PerkinElmer

Support
BSD-licensed: 
Export: 

Officially Supported Versions:
Supported Metadata Fields: Volocity Library Clipping

We currently have:
• several Volocity library clipping datasets

We would like to have:
• any datasets that do not open correctly
• an official specification document

Ratings
Pixels: 
Metadata: 
Openness: 
Presence: 
Utility: 

Additional Information
Source Code: VolocityClippingReader.java
Notes:
RGB .acff files are not yet supported. See #6413.

18.129  WA-TOP

Extensions: .wat
Developer: WA Technology
Owner: Oxford Instruments

Support
BSD-licensed: 
Export: 

Officially Supported Versions:
Supported Metadata Fields: WA-TOP

We currently have:
• Pascal code that can read WA-TOP files (from ImageSXM)

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433 http://www.perkinelmer.com/pages/020/cellularimaging/products/volocity.xhtml
434 https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/VolocityClippingReader.java
435 http://trac.openmicroscopy.org.uk/ome/ticket/6413
436 http://www.oxinst.com
- a few WA-TOP files

We would like to have:
- an official specification document
- more WA-TOP files

**Ratings**

Pixels: ▼
Metadata: ▼
Openness: ▼
Presence: ▼
Utility: ▼

**Additional Information**

Source Code: WATOPReader.java\(^{437}\)

Notes:

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**18.130 Windows Bitmap**

Extensions: .bmp

Developer: Microsoft and IBM

**Support**

BSD-licensed: ✔

Export: ☒

Officially Supported Versions:

Supported Metadata Fields: *Windows Bitmap*

Freely Available Software:
- BMP Writer plugin for ImageJ\(^{438}\)

We currently have:
- many BMP datasets

We would like to have:

**Ratings**

Pixels: ▲
Metadata: ▲
Openness: ▼
Presence: ▲
Utility: ▼

**Additional Information**

Source Code: BMPReader.java\(^{439}\)

Notes:

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\(^{437}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/WATOPReader.java


\(^{439}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-bsd/src/loci/formats/in/BMPReader.java
Compressed BMP files are currently not supported.

See also:

Technical Overview

18.131 Woolz

Extensions: .wlz

Developer: MRC Human Genetics Unit

Support

BSD-licensed: ✗

Export: ✔

Officially Supported Versions:

Supported Metadata Fields: Woolz

Freely Available Software:

• Woolz

We currently have:

• a few Woolz datasets

We would like to have:

Ratings

Pixels: ▲

Metadata: ▼

Openness: ▲

Presence: ▼

Utility: ▼

Additional Information

Source Code: WlzReader.java Source Code: WlzWriter.java

Notes:

18.132 Zeiss AxioVision TIFF

Extensions: .xml, .tiff

Developer: Carl Zeiss MicroImaging GmbH

Owner: Carl Zeiss MicroImaging GmbH

Support

BSD-licensed: ✗

Export: ✗
Officially Supported Versions:

Supported Metadata Fields: **Zeiss AxioVision TIFF**

Freely Available Software:

- **Zeiss ZEN Lite**

We currently have:

- many example datasets

We would like to have:

- an official specification document

**Ratings**

- Pixels: 🔺
- Metadata: 🔺
- Openness: 🔺
- Presence: 🔻
- Utility: 🔻

**Additional Information**

Source Code: [ZeissTIFFReader.java](http://microscopy.zeiss.com/microscopy/en_de/downloads/zen.html)

Notes:

### 18.133 Zeiss AxioVision ZVI (Zeiss Vision Image)

Extensions: `.zvi`

Developer: Carl Zeiss MicroImaging GmbH (AxioVision)

Owner: Carl Zeiss MicroImaging GmbH

**Support**

BSD-licensed: ✗

Export: ✗

Officially Supported Versions: 1.0, 2.0

Supported Metadata Fields: **Zeiss AxioVision ZVI (Zeiss Vision Image)**

Freely Available Software:

- **Zeiss Axiovision LE**

We currently have:

- a ZVI specification document (v2.0.5, from 2010 August, in PDF)
- an older ZVI specification document (v2.0.2, from 2006 August 23, in PDF)
- an older ZVI specification document (v2.0.1, from 2005 April 21, in PDF)
- an older ZVI specification document (v1.0.26.01.01, from 2001 January 29, in DOC)
- Zeiss’ ZvImageReader code (v1.0, from 2001 January 25, in C++)
- many ZVI datasets

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448 [https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/ZeissTIFFReader.java](https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/ZeissTIFFReader.java)
449 [http://www.zeiss.com/axiovision](http://www.zeiss.com/axiovision)
450 [http://www.zeiss.com/micro](http://www.zeiss.com/micro)
451 [http://www.zeiss.de/c12567be0045acf1/Contents-Frame/cbe917247da02a1cc1256e0000491172](http://www.zeiss.de/c12567be0045acf1/Contents-Frame/cbe917247da02a1cc1256e0000491172)
We would like to have:

**Ratings**

Pixels: ★
Metadata: ★
Openness: ★
Presence: ★
Utility: ★

**Additional Information**

Source Code: ZeissZVIReader.java\(^{452}\)

Notes:

Please note that while we have specification documents for this format, we are not able to distribute them to third parties.

Bio-Formats uses a modified version of the Apache Jakarta POI library\(^{453}\) to read ZVI files.

Commercial applications that support ZVI include Bitplane Imaris\(^{454}\).

See also:

Axiovision software overview\(^{455}\)

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### 18.134 Zeiss CZI

Extensions: .czi

Developer: Carl Zeiss MicroImaging GmbH\(^{456}\)

**Support**

BSD-licensed: ✗
Export: ✗

Of officially Supported Versions:

Supported Metadata Fields: Zeiss CZI

Freely Available Software:

- Zeiss ZEN 2011\(^{457}\)

We currently have:

- many example datasets
- official specification documents

We would like to have:

**Ratings**

Pixels: ★
Metadata: ★
Openness: ★
Presence: ★

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\(^{452}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/ZeissZVIReader.java

\(^{453}\)http://jakarta.apache.org/poi/

\(^{454}\)http://www.bitplane.com/

\(^{455}\)http://www.zeiss.com/C12567BE0045ACF1/ContentsWWWIntern/668C9FDCBB18C6E2412568C10045A72E

\(^{456}\)http://www.zeiss.com/micro

\(^{457}\)http://www.zeiss.de/C12567BE0045ACF1/Contents-Frame/A57B6AE510CE8FF1C12578FE002A725D
Utility:  

Additional Information

Source Code: ZeissCZIReader.java

Notes:

Please note that while we have specification documents for this format, we are not able to distribute them to third parties.

18.135  Zeiss LSM (Laser Scanning Microscope) 510/710

Extensions: .lsm, .mdb

Owner: Carl Zeiss MicroImaging GmbH

Support

BSD-licensed: ✗

Export: ✗

Officially Supported Versions:

Supported Metadata Fields: Zeiss LSM (Laser Scanning Microscope) 510/710

Freely Available Software:

  • Zeiss LSM Image Browser
  • LSM Toolbox plugin for ImageJ
  • LSM Reader plugin for ImageJ
  • DIMIN

We currently have:

  • LSM specification v3.2, from 2003 March 12, in PDF
  • LSM specification v5.5, from 2009 November 23, in PDF
  • LSM specification v6.0, from 2010 September 28, in PDF
  • many LSM datasets

We would like to have:

Ratings

Pixels: ▲

Metadata: ▲

Openness: ▼

Presence: ▲

Utility: ▼

Additional Information

Source Code: ZeissLSMReader.java

Notes:

Please note that while we have specification documents for this format, we are not able to distribute them to third parties.

458 https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/ZeissCZIReader.java

459 http://www.zeiss.com/micro


461 http://imagejdocu.tudor.lu/Members/ppirrotte/lsmtoolbox


463 http://www.dimin.net/

464 https://github.com/openmicroscopy/bioformats/blob/v5.0.2/components/formats-gpl/src/loci/formats/in/ZeissLSMReader.java
Bio-Formats uses the MDB Tools Java port\textsuperscript{465}

Commercial applications that support this format include:

- SVI Huygens\textsuperscript{466}
- Bitplane Imaris\textsuperscript{467}
- Amira\textsuperscript{468}
- Image-Pro Plus\textsuperscript{469}

\textsuperscript{465}http://mdbtools.sourceforge.net/
\textsuperscript{466}http://www2.svi.nl/
\textsuperscript{467}http://www.bitplane.com/
\textsuperscript{468}http://www.amira.com/
\textsuperscript{469}http://www.mediacy.com/
### SUMMARY OF SUPPORTED METADATA FIELDS

#### 19.1 Format readers

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43 [http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_AmplificationGain]
45 [http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_ID]
46 [http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_LotNumber]
47 [http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_Manufacturer]
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51 [http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_Type]
52 [http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_Voltage]
53 [http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_Zoom]
54 [http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_Binning]
58 [http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_ReadOutRate]
60 [http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_LotNumber]
62 [http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_SerialNumber]
63 [http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SA_xsd.html#AnnotationRef_ID]
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69http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SA_xsd.html#DoubleAnnotation_Value
70http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_FillColor
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88http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_Visible
89http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Ellipse_X
90http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Ellipse_Y
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136 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SA_xsd.html#AnnotationRef_ID
137 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Description
139 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#InstrumentRef_ID
140 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#MicrobeamManipulationRef_ID
141 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
142 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_FillColor
143 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_FillRule
144 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_FontFamily
145 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_FontSize
146 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_FontStyle
147 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_ID
148 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_LineCap
149 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_Locked
150 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_StrokeColor

19.2. Metadata fields
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160 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_StrokeDashArray
161 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_StrokeWidth
162 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_Text
163 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_TheC
164 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_TheT
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167 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_Visible
169 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Label_Y
171 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#LightSource_ID
173 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_LotNumber
174 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_Manufacturer
178 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pump_ID
179 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Laser_RepetitionRate
180 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_SerialNumber
182 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Laser_Type
184 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#LightSource_ID

19.2. Metadata fields
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215 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Line_Y1
217 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SA_xsd.html#AnnotationRef_ID
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235 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SA_xsd.html#LongAnnotation_Value

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19.2. Metadata fields 213
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266 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/OME_xsd.html#ManufacturerSpec_Model
267 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/OME_xsd.html#Microscope_Type
268 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/OME_xsd.html#Objective_CalibratedMagnification
269 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/OME_xsd.html#Objective_Correction

19.2. Metadata fields

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274 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#AnnotationRef_ID
275 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
276 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
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427 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#StageLabel_Z
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429 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SA_xsd.html#Annotation_Description
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452 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#TransmittanceRange_CutOutTolerance
453 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#TransmittanceRange_Transmittance
454 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#TiffData_TiffData_UUID_FileName
455 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#UniversallyUniqueIdentifier
456 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SA_xsd.html#AnnotationRef_ID
457 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Well_Color
458 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Well_Column
459 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Well_ExternalDescription
460 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Well_ExternalIdentifier
461 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Well_ID
462 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#ReagentRef_ID
463 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Well_Row
464 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Well_Type
465 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SA_xsd.html#AnnotationRef_ID
466 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#WellSample_ID
468 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#WellSample_Index
470 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#WellSample_PositionY
471 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#WellSample_Timepoint
472 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SA_xsd.html#AnnotationRef_ID
473 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SA_xsd.html#Annotation_ID

19.2. Metadata fields

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Table 19.2 – continued from previous page

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19.2.1 SlidebookReader

This page lists supported metadata fields for the Bio-Formats Olympus Slidebook format reader.

These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

- The file format itself supports 34 of them (7%).
- Of those, Bio-Formats fully or partially converts 34 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Olympus Slidebook format reader:

- Channel: ID
- Channel: NDFilter
- Channel: Name
- Channel: SamplesPerPixel
- Image: AcquisitionDate
- Image: Description
- Image: ID
- Image: InstrumentRef
- Image: Name
- Instrument: ID
- Objective: Correction
- Objective: ID
- Objective: Immersion
- Objective: Model
- Objective: NominalMagnification
- ObjectiveSettings: ID

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475 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SA_xsd.html#XMLAnnotation_Value
476 http://www.openmicroscopy.org/site/support/ome-model/
477 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
478 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_NDFilter
479 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_Name
480 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
481 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
482 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Description
484 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#InstrumentRef_ID
485 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Instrument_Name
487 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_Correction
488 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_ID
489 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_Immersion
490 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_Model
491 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_NominalMagnification
492 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ObjectiveSettings_ID
19.2. AIMReader

This page lists supported metadata fields for the Bio-Formats AIM format reader.

These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

- The file format itself supports 22 of them (4%).
- Of those, Bio-Formats fully or partially converts 22 (100%).

Total supported: 34

Total unknown or missing: 441
Supported fields

These fields are fully supported by the Bio-Formats AIM format reader:

- Channel: ID\(^{512}\)
- Channel: SamplesPerPixel\(^{513}\)
- Image: AcquisitionDate\(^{514}\)
- Image: ID\(^{515}\)
- Image: Name\(^{516}\)
- Pixels: BigEndian\(^{517}\)
- Pixels: DimensionOrder\(^{518}\)
- Pixels: ID\(^{519}\)
- Pixels: Interleaved\(^{520}\)
- Pixels: PhysicalSizeX\(^{521}\)
- Pixels: PhysicalSizeY\(^{522}\)
- Pixels: PhysicalSizeZ\(^{523}\)
- Pixels: SignificantBits\(^{524}\)
- Pixels: SizeC\(^{525}\)
- Pixels: SizeT\(^{526}\)
- Pixels: SizeX\(^{527}\)
- Pixels: SizeY\(^{528}\)
- Pixels: SizeZ\(^{529}\)
- Pixels: Type\(^{530}\)
- Plane: TheC\(^{531}\)
- Plane: TheT\(^{532}\)
- Plane: TheZ\(^{533}\)

Total supported: 22

Total unknown or missing: 453

\(^{512}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
\(^{513}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
\(^{514}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
\(^{515}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID
\(^{516}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
\(^{517}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
\(^{518}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
\(^{519}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
\(^{520}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
\(^{521}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeX
\(^{522}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
\(^{523}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeZ
\(^{524}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
\(^{525}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
\(^{526}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
\(^{527}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
\(^{528}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
\(^{529}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
\(^{530}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
\(^{531}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
\(^{532}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
\(^{533}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
19.2.3 AliconaReader

This page lists supported metadata fields for the Bio-Formats Alicona AL3D format reader. These fields are from the OME data model[^34]. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

- The file format itself supports 33 of them (6%).
- Of those, Bio-Formats fully or partially converts 33 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Alicona AL3D format reader:

- **Channel**: ID[^535]
- **Channel**: SamplesPerPixel[^536]
- **Detector**: ID[^537]
- **Detector**: Type[^538]
- **DetectorSettings**: ID[^539]
- **DetectorSettings**: Voltage[^540]
- **Image**: AcquisitionDate[^541]
- **Image**: ID[^542]
- **Image**: InstrumentRef[^543]
- **Image**: Name[^544]
- **Instrument**: ID[^545]
- **Objective**: CalibratedMagnification[^546]
- **Objective**: Correction[^547]
- **Objective**: ID[^548]
- **Objective**: Immersion[^549]
- **Objective**: WorkingDistance[^550]
- **ObjectiveSettings**: ID[^551]
- **Pixels**: BigEndian[^552]

[^34]: http://www.openmicroscopy.org/site/support/ome-model/
[^536]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
[^537]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_ID
[^538]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_Type
[^539]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_ID
[^541]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
[^544]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
[^546]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_CalibratedMagnification
[^547]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_Correction
[^548]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_ID
[^549]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_Immersion
[^550]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_WorkingDistance
[^551]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ObjectiveSettings_ID
[^552]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
• Pixels : DimensionOrder\textsuperscript{553}
• Pixels : ID\textsuperscript{554}
• Pixels : Interleaved\textsuperscript{555}
• Pixels : PhysicalSizeX\textsuperscript{556}
• Pixels : PhysicalSizeY\textsuperscript{557}
• Pixels : SignificantBits\textsuperscript{558}
• Pixels : SizeC\textsuperscript{559}
• Pixels : SizeT\textsuperscript{560}
• Pixels : SizeX\textsuperscript{561}
• Pixels : SizeY\textsuperscript{562}
• Pixels : SizeZ\textsuperscript{563}
• Pixels : Type\textsuperscript{564}
• Plane : TheC\textsuperscript{565}
• Plane : TheT\textsuperscript{566}
• Plane : TheZ\textsuperscript{567}

Total supported: 33
Total unknown or missing: 442

19.2.4 GelReader

This page lists supported metadata fields for the Bio-Formats Amersham Biosciences GEL format reader.

These fields are from the OME data model\textsuperscript{568}. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

• The file format itself supports 21 of them (4%).
• Of those, Bio-Formats fully or partially converts 21 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Amersham Biosciences GEL format reader:

• Channel : ID\textsuperscript{569}
• Channel : SamplesPerPixel\textsuperscript{570}

\textsuperscript{553}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
\textsuperscript{554}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
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\textsuperscript{567}http://www.openmicroscopy.org/Site/support/ome-model/
\textsuperscript{568}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
\textsuperscript{569}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
This page lists supported metadata fields for the Bio-Formats Amira format reader. These fields are from the OME data model\(^{590}\). Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

- The file format itself supports 22 of them (4%).
- Of those, Bio-Formats fully or partially converts 22 (100%).

\[^{571}\]http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
\[^{572}\]http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID
\[^{573}\]http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
\[^{574}\]http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
\[^{575}\]http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
\[^{576}\]http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
\[^{577}\]http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
\[^{578}\]http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeX
\[^{579}\]http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
\[^{580}\]http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
\[^{581}\]http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
\[^{582}\]http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
\[^{583}\]http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
\[^{584}\]http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
\[^{585}\]http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
\[^{586}\]http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
\[^{587}\]http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
\[^{588}\]http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
\[^{589}\]http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
Supported fields

These fields are fully supported by the Bio-Formats Amira format reader:

- Channel: ID
- Channel: SamplesPerPixel
- Image: AcquisitionDate
- Image: ID
- Image: Name
- Pixels: BigEndian
- Pixels: DimensionOrder
- Pixels: ID
- Pixels: Interleaved
- Pixels: PhysicalSizeX
- Pixels: PhysicalSizeY
- Pixels: PhysicalSizeZ
- Pixels: SignificantBits
- Pixels: SizeC
- Pixels: SizeT
- Pixels: SizeX
- Pixels: SizeY
- Pixels: SizeZ
- Pixels: Type
- Plane: TheC
- Plane: TheT
- Plane: TheZ

Total supported: 22

Total unknown or missing: 453

591 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
592 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
593 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
595 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
596 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
597 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
598 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
599 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
600 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeX
603 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
604 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
605 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
606 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
607 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
608 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
609 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
610 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
611 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
612 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
19.2.6 AnalyzeReader

This page lists supported metadata fields for the Bio-Formats Analyze 7.5 format reader.

These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

- The file format itself supports 24 of them (5%).
- Of those, Bio-Formats fully or partially converts 24 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Analyze 7.5 format reader:

- Channel: ID
- Channel: SamplesPerPixel
- Image: AcquisitionDate
- Image: Description
- Image: ID
- Image: Name
- Pixels: BigEndian
- Pixels: DimensionOrder
- Pixels: ID
- Pixels: Interleaved
- Pixels: PhysicalSizeX
- Pixels: PhysicalSizeY
- Pixels: PhysicalSizeZ
- Pixels: SignificantBits
- Pixels: SizeC
- Pixels: SizeT
- Pixels: SizeX
- Pixels: SizeY

613http://www.openmicroscopy.org/site/support/ome-model/
614http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
615http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
616http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
617http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Description
619http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
620http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
621http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
622http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
623http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
625http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
626http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeZ
627http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
628http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
629http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
630http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
631http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
• Pixels : SizeZ
• Pixels : TimeIncrement
• Pixels : Type
• Plane : TheC
• Plane : TheT
• Plane : TheZ

Total supported: 24
Total unknown or missing: 451

19.2.7 AFIReader

This page lists supported metadata fields for the Bio-Formats Aperio AFI format reader.

These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

• The file format itself supports 23 of them (4%).
• Of those, Bio-Formats fully or partially converts 23 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Aperio AFI format reader:

• Channel : EmissionWavelength
• Channel : ExcitationWavelength
• Channel : ID
• Channel : Name
• Channel : SamplesPerPixel
• Image : AcquisitionDate
• Image : ID
• Image : Name
• Pixels : BigEndian
• Pixels : DimensionOrder
• Pixels : ID

http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_TimeIncrement
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
http://www.openmicroscopy.org/site/support/ome-model/
• Pixels: Interleaved
• Pixels: SignificantBits
• Pixels: SizeC
• Pixels: SizeT
• Pixels: SizeX
• Pixels: SizeY
• Pixels: SizeZ
• Pixels: Type
• Plane: ExposureTime
• Plane: TheC
• Plane: TheT
• Plane: TheZ

Total supported: 23
Total unknown or missing: 452

19.2.8 SVSReader

This page lists supported metadata fields for the Bio-Formats Aperio SVS format reader.

These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:
• The file format itself supports 29 of them (6%).
• Of those, Bio-Formats fully or partially converts 29 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Aperio SVS format reader:
• Channel: EmissionWavelength
• Channel: ExcitationWavelength
• Channel: ID
• Channel: SamplesPerPixel
• Image: AcquisitionDate

http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_ExposureTime
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
http://www.openmicroscopy.org/site/support/ome-model/
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_EmissionWavelength
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ExcitationWavelength
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
• Image: Description
• Image: ID
• Image: InstrumentRef
• Image: Name
• Instrument: ID
• Objective: ID
• Objective: NominalMagnification
• ObjectiveSettings: ID
• Pixels: BigEndian
• Pixels: DimensionOrder
• Pixels: ID
• Pixels: Interleaved
• Pixels: PhysicalSizeX
• Pixels: PhysicalSizeY
• Pixels: SignificantBits
• Pixels: SizeC
• Pixels: SizeT
• Pixels: SizeX
• Pixels: SizeY
• Pixels: SizeZ
• Pixels: Type
• Plane: TheC
• Plane: TheT
• Plane: TheZ

Total supported: 29

Total unknown or missing: 446
19.2.9 CellWorxReader

This page lists supported metadata fields for the Bio-Formats CellWorx format reader.

These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

**Of the 475 fields documented in the metadata summary table:**

- The file format itself supports 45 of them (9%).
- Of those, Bio-Formats fully or partially converts 45 (100%).

**Supported fields**

These fields are fully supported by the Bio-Formats CellWorx format reader:

- Channel: EmissionWavelength
- Channel: ExcitationWavelength
- Channel: ID
- Channel: Name
- Channel: SamplesPerPixel
- Detector: ID
- DetectorSettings: Gain
- DetectorSettings: ID
- Image: AcquisitionDate
- Image: ID
- Image: InstrumentRef
- Image: Name
- Instrument: ID
- Microscope: SerialNumber
- Pixels: BigEndian
- Pixels: DimensionOrder
- Pixels: ID
- Pixels: Interleaved
- Pixels: PhysicalSizeX

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697 [http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel](http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel)
701 [http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate](http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate)
• Pixels: PhysicalSizeY
• Pixels: SignificantBits
• Pixels: SizeC
• Pixels: SizeT
• Pixels: SizeX
• Pixels: SizeY
• Pixels: SizeZ
• Pixels: Type
• Plane: TheC
• Plane: TheT
• Plane: TheZ
• Plate: ID
• Plate: Name
• PlateAcquisition: EndTime
• PlateAcquisition: ID
• PlateAcquisition: MaximumFieldCount
• PlateAcquisition: StartTime
• PlateAcquisition: WellSampleRef
• Well: Column
• Well: ID
• Well: Row
• WellSample: ID
• WellSample: ImageRef
• WellSample: Index
• WellSample: PositionX
• WellSample: PositionY

712 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
713 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
714 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
715 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
716 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
717 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
718 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
719 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
721 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
722 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
723 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Plate_ID
724 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Plate_Name
725 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#PlateAcquisition_EndTime
726 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#PlateAcquisition_InitialTime
727 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#PlateAcquisition_MagnitudeFieldCount
728 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#PlateAcquisition_InitialTime
729 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#WellSampleRef_ID
730 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Well_Column
731 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Well_ID
732 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Well_Row
733 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#WellSample_ID
734 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#ImageRef_ID
735 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#WellSample_InitialIndex
737 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#WellSample_PositionY
Total supported: 45
Total unknown or missing: 430

19.2.10 AVIReader

This page lists supported metadata fields for the Bio-Formats Audio Video Interleave format reader. These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

- The file format itself supports 19 of them (4%).
- Of those, Bio-Formats fully or partially converts 19 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Audio Video Interleave format reader:

- Channel: ID
- Channel: SamplesPerPixel
- Image: AcquisitionDate
- Image: ID
- Image: Name
- Pixels: BigEndian
- Pixels: DimensionOrder
- Pixels: ID
- Pixels: Interleaved
- Pixels: SignificantBits
- Pixels: SizeC
- Pixels: SizeT
- Pixels: SizeX
- Pixels: SizeY
- Pixels: SizeZ
- Pixels: Type
- Plane: TheC

738http://www.openmicroscopy.org/site/support/ome-model/
739http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
740http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
741http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
742http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID
743http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
744http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
745http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
746http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
747http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
748http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
749http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
750http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
751http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
752http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
753http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
754http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
• Plane: TheT
• Plane: TheZ

Total supported: 19
Total unknown or missing: 456

19.2.11 ARFReader

This page lists supported metadata fields for the Bio-Formats ARF format reader.

These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

• The file format itself supports 19 of them (4%).
• Of those, Bio-Formats fully or partially converts 19 (100%).

Supported fields

These fields are fully supported by the Bio-Formats ARF format reader:

• Channel: ID
• Channel: SamplesPerPixel
• Image: AcquisitionDate
• Image: ID
• Image: Name
• Pixels: BigEndian
• Pixels: DimensionOrder
• Pixels: ID
• Pixels: Interleaved
• Pixels: SignificantBits
• Pixels: SizeC
• Pixels: SizeT
• Pixels: SizeX
• Pixels: SizeY
• Pixels: SizeZ

http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
• Pixels: Type
• Plane: TheC
• Plane: TheT
• Plane: TheZ

Total supported: 19
Total unknown or missing: 456

19.2.12 BDReader

This page lists supported metadata fields for the Bio-Formats BD Pathway format reader.

These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

• The file format itself supports 57 of them (12%).
• Of those, Bio-Formats fully or partially converts 57 (100%).

Supported fields

These fields are fully supported by the Bio-Formats BD Pathway format reader:

• Channel: EmissionWavelength
• Channel: ExcitationWavelength
• Channel: ID
• Channel: Name
• Channel: SamplesPerPixel
• Detector: ID
• DetectorSettings: Binning
• DetectorSettings: Gain
• DetectorSettings: ID
• DetectorSettings: Offset
• Image: AcquisitionDate
• Image: ID
• Image: InstrumentRef

774 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
775 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
776 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
777 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
778 http://www.openmicroscopy.org/site/support/ome-model/
780 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ExcitationWavelength
781 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
782 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_Name
783 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
784 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_ID
785 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_Binning
786 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_Gain
787 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_ID
789 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
Bio-Formats Documentation, Release 5.0.2

- Image: Name
- Image: ROIRef
- Instrument: ID
- Objective: ID
- Objective: LensNA
- Objective: Manufacturer
- Objective: NominalMagnification
- ObjectiveSettings: ID
- Pixels: BigEndian
- Pixels: DimensionOrder
- Pixels: ID
- Pixels: Interleaved
- Pixels: SignificantBits
- Pixels: SizeC
- Pixels: SizeT
- Pixels: SizeX
- Pixels: SizeY
- Pixels: SizeZ
- Pixels: Type
- Plane: DeltaT
- Plane: ExposureTime
- Plane: TheC
- Plane: TheT
- Plane: TheZ
- Plate: ColumnNamingConvention
- Plate: Description

19.2. Metadata fields
• Plate: ID
• Plate: Name
• Plate: RowNamingConvention
• PlateAcquisition: ID
• PlateAcquisition: MaximumFieldCount
• PlateAcquisition: WellSampleRef
• ROI: ID
• Rectangle: Height
• Rectangle: ID
• Rectangle: Width
• Rectangle: X
• Rectangle: Y
• Well: Column
• Well: ID
• Well: Row
• WellSample: ID
• WellSample: ImageRef
• WellSample: Index

Total supported: 57
Total unknown or missing: 418

19.2.13 SDTReader

This page lists supported metadata fields for the Bio-Formats SPC Image Data format reader. These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

• The file format itself supports 19 of them (4%).
• Of those, Bio-Formats fully or partially converts 19 (100%).

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818 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Plate_ID
819 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Plate_Name
820 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Plate_RowNamingConvention
821 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#PlateAcquisition_ID
822 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#PlateAcquisition_MaximumFieldCount
823 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#WellSampleRef_ID
824 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#ROI_ID
825 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#ROI_ID
826 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_ID
827 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Rectangle_Width
829 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Rectangle_Y
830 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Well_Column
831 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Well_ID
832 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Well_Row
833 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#WellSample_ID
834 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#WellSample_Id
835 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#WellSample_Index
836 http://www.openmicroscopy.org/site/support/ome-model/
Supported fields

These fields are fully supported by the Bio-Formats SPCImage Data format reader:

- Channel: ID
- Channel: SamplesPerPixel
- Image: AcquisitionDate
- Image: ID
- Image: Name
- Pixels: BigEndian
- Pixels: DimensionOrder
- Pixels: ID
- Pixels: Interleaved
- Pixels: SignificantBits
- Pixels: SizeC
- Pixels: SizeT
- Pixels: SizeX
- Pixels: SizeY
- Pixels: SizeZ
- Pixels: Type
- Plane: TheC
- Plane: TheT
- Plane: TheZ

Total supported: 19

Total unknown or missing: 456

19.2.14 BioRadGelReader

This page lists supported metadata fields for the Bio-Formats Bio-Rad GEL format reader.

These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g., physical width of the image in microns) in a format-independent way.
Of the 475 fields documented in the metadata summary table:

- The file format itself supports 21 of them (4%).
- Of those, Bio-Formats fully or partially converts 21 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Bio-Rad GEL format reader:

- Channel: ID
- Channel: SamplesPerPixel
- Image: AcquisitionDate
- Image: ID
- Image: Name
- Pixels: BigEndian
- Pixels: DimensionOrder
- Pixels: ID
- Pixels: Interleaved
- Pixels: PhysicalSizeX
- Pixels: PhysicalSizeY
- Pixels: SignificantBits
- Pixels: SizeC
- Pixels: SizeT
- Pixels: SizeX
- Pixels: SizeY
- Pixels: SizeZ
- Pixels: Type
- Plane: TheC
- Plane: TheT
- Plane: TheZ

Total supported: 21

Total unknown or missing: 454

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857 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
858 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
859 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
861 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
862 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
863 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
864 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
865 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
866 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeX
867 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
868 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
869 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
870 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
871 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
872 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
873 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
874 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
875 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
876 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
877 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
19.2.15 BioRadReader

This page lists supported metadata fields for the Bio-Formats Bio-Rad PIC format reader.

These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

- The file format itself supports 40 of them (8%).
- Of those, Bio-Formats fully or partially converts 40 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Bio-Rad PIC format reader:

- Channel : ID
- Channel : SamplesPerPixel
- Detector : Gain
- Detector : ID
- Detector : Offset
- Detector : Type
- DetectorSettings : Gain
- DetectorSettings : ID
- DetectorSettings : Offset
- Experiment : ID
- Experiment : Type
- Image : AcquisitionDate
- Image : ID
- Image : InstrumentRef
- Image : Name
- Instrument : ID
- Objective : Correction
- Objective : ID
- Objective : Immersion

http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_Offset
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_Type
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_Offset
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Experiment_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Experiment_Type
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_Correction
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_Immersion
Bio-Formats Documentation, Release 5.0.2

- **Objective**: LensNA
- **Objective**: Model
- **Objective**: NominalMagnification
- **ObjectiveSettings**: ID
- **Pixels**: BigEndian
- **Pixels**: DimensionOrder
- **Pixels**: ID
- **Pixels**: Interleaved
- **Pixels**: PhysicalSizeX
- **Pixels**: PhysicalSizeY
- **Pixels**: PhysicalSizeZ
- **Pixels**: SignificantBits
- **Pixels**: SizeC
- **Pixels**: SizeT
- **Pixels**: SizeX
- **Pixels**: SizeY
- **Pixels**: SizeZ
- **Pixels**: Type
- **Plane**: TheC
- **Plane**: TheT
- **Plane**: TheZ

Total supported: 40
Total unknown or missing: 435

19.2.16 BioRadSCNReader

This page lists supported metadata fields for the Bio-Formats Bio-Rad SCN format reader.

These fields are from the OME data model. Bio-Formats standardizes each format's original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_LensNA
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_Model
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_NominalMagnification
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ObjectiveSettings_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
http://www.openmicroscopy.org/site/support/ome-model/
Of the 475 fields documented in the metadata summary table:

- The file format itself supports 29 of them (6%).
- Of those, Bio-Formats fully or partially converts 29 (100%).

**Supported fields**

These fields are fully supported by the Bio-Formats Bio-Rad SCN format reader:

- **Channel**: ID
- **Channel**: SamplesPerPixel
- **Detector**: ID
- **DetectorSettings**: Binning
- **DetectorSettings**: Gain
- **DetectorSettings**: ID
- **Image**: AcquisitionDate
- **Image**: ID
- **Image**: Name
- **Instrument**: ID
- **Microscope**: Model
- **Microscope**: SerialNumber
- **Pixels**: BigEndian
- **Pixels**: DimensionOrder
- **Pixels**: ID
- **Pixels**: Interleaved
- **Pixels**: PhysicalSizeX
- **Pixels**: PhysicalSizeY
- **Pixels**: SignificantBits
- **Pixels**: SizeC
- **Pixels**: SizeT
- **Pixels**: SizeX

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^921^ [http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel](http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel)
^926^ [http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate](http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate)
• Pixels: SizeY
• Pixels: SizeZ
• Pixels: Type
• Plane: ExposureTime
• Plane: TheC
• Plane: TheT
• Plane: TheZ

Total supported: 29
Total unknown or missing: 446

19.2.17 ImarisHDFReader

This page lists supported metadata fields for the Bio-Formats Bitplane Imaris 5.5 (HDF) format reader. These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:
- The file format itself supports 23 of them (4%).
- Of those, Bio-Formats fully or partially converts 23 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Bitplane Imaris 5.5 (HDF) format reader:
- Channel: Color
- Channel: ID
- Channel: SamplesPerPixel
- Image: AcquisitionDate
- Image: ID
- Image: Name
- Pixels: BigEndian
- Pixels: DimensionOrder
- Pixels: ID
- Pixels: Interleaved
• Pixels: PhysicalSizeX
• Pixels: PhysicalSizeY
• Pixels: PhysicalSizeZ
• Pixels: SignificantBits
• Pixels: SizeC
• Pixels: SizeT
• Pixels: SizeX
• Pixels: SizeY
• Pixels: SizeZ
• Pixels: Type
• Plane: TheC
• Plane: TheT
• Plane: TheZ

Total supported: 23
Total unknown or missing: 452

19.2.18 BrukerReader

This page lists supported metadata fields for the Bio-Formats Bruker format reader. These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g., physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:
• The file format itself supports 23 of them (4%).
• Of those, Bio-Formats fully or partially converts 23 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Bruker format reader:
• Channel: ID
• Channel: SamplesPerPixel
• Experimenter: ID
• Experimenter: Institution

http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channels
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Experimenter_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Experimenter_Institution
• Experimenter : LastName
• Image : AcquisitionDate
• Image : ExperimenterRef
• Image : ID
• Image : Name
• Pixels : BigEndian
• Pixels : DimensionOrder
• Pixels : ID
• Pixels : Interleaved
• Pixels : SignificantBits
• Pixels : SizeC
• Pixels : SizeT
• Pixels : SizeX
• Pixels : SizeY
• Pixels : SizeZ
• Pixels : Type
• Plane : TheC
• Plane : TheT
• Plane : TheZ

Total supported: 23
Total unknown or missing: 452

19.2.19 BurleighReader

This page lists supported metadata fields for the Bio-Formats Burleigh format reader. These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

• The file format itself supports 22 of them (4%).
• Of those, Bio-Formats fully or partially converts 22 (100%).

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[979] http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
Supported fields

These fields are fully supported by the Bio-Formats Burleigh format reader:

- Channel : ID
- Channel : SamplesPerPixel
- Image : AcquisitionDate
- Image : ID
- Image : Name
- Pixels : BigEndian
- Pixels : DimensionOrder
- Pixels : ID
- Pixels : Interleaved
- Pixels : PhysicalSizeX
- Pixels : PhysicalSizeY
- Pixels : PhysicalSizeZ
- Pixels : SignificantBits
- Pixels : SizeC
- Pixels : SizeT
- Pixels : SizeX
- Pixels : SizeY
- Pixels : SizeZ
- Pixels : Type
- Plane : TheC
- Plane : TheT
- Plane : TheZ

Total supported: 22
Total unknown or missing: 453

998 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
999 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
1000 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
1002 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
1003 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
1004 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
1005 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
1006 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
1008 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
1010 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
1011 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
1012 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
1013 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
1014 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
1015 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
1016 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
1017 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
1018 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
1019 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
19.2.20 DNGReader

This page lists supported metadata fields for the Bio-Formats DNG format reader.

These fields are from the OME data model\(^{(1020)}\). Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

- The file format itself supports 19 of them (4%).
- Of those, Bio-Formats fully or partially converts 19 (100%).

**Supported fields**

These fields are fully supported by the Bio-Formats DNG format reader:

- **Channel**: ID\(^{(1021)}\)
- **Channel**: SamplesPerPixel\(^{(1022)}\)
- **Image**: AcquisitionDate\(^{(1023)}\)
- **Image**: ID\(^{(1024)}\)
- **Image**: Name\(^{(1025)}\)
- **Pixels**: BigEndian\(^{(1026)}\)
- **Pixels**: DimensionOrder\(^{(1027)}\)
- **Pixels**: ID\(^{(1028)}\)
- **Pixels**: Interleaved\(^{(1029)}\)
- **Pixels**: SignificantBits\(^{(1030)}\)
- **Pixels**: SizeC\(^{(1031)}\)
- **Pixels**: SizeT\(^{(1032)}\)
- **Pixels**: SizeX\(^{(1033)}\)
- **Pixels**: SizeY\(^{(1034)}\)
- **Pixels**: SizeZ\(^{(1035)}\)
- **Pixels**: Type\(^{(1036)}\)
- **Plane**: TheC\(^{(1037)}\)
- **Plane**: TheT\(^{(1038)}\)

\(^{(1020)}\)http://www.openmicroscopy.org/site/support/ome-model/
\(^{(1021)}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
\(^{(1022)}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
\(^{(1023)}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
\(^{(1024)}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID
\(^{(1025)}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
\(^{(1026)}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
\(^{(1027)}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
\(^{(1028)}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
\(^{(1029)}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
\(^{(1030)}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
\(^{(1031)}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
\(^{(1032)}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
\(^{(1033)}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
\(^{(1034)}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
\(^{(1035)}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
\(^{(1036)}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
\(^{(1037)}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
\(^{(1038)}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
Plane: TheZ

Total supported: 19
Total unknown or missing: 456

19.2.21 CellomicsReader

This page lists supported metadata fields for the Bio-Formats Cellomics C01 format reader. These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

- The file format itself supports 31 of them (6%).
- Of those, Bio-Formats fully or partially converts 31 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Cellomics C01 format reader:

- Channel: ID
- Channel: SamplesPerPixel
- Image: AcquisitionDate
- Image: ID
- Image: Name
- Pixels: BigEndian
- Pixels: DimensionOrder
- Pixels: ID
- Pixels: Interleaved
- Pixels: PhysicalSizeX
- Pixels: PhysicalSizeY
- Pixels: SignificantBits
- Pixels: SizeC
- Pixels: SizeT
- Pixels: SizeX
- Pixels: SizeY

1039 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
1040 http://www.openmicroscopy.org/site/support/ome-model/
1041 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
1042 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
1043 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
1044 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID
1045 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
1046 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
1047 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
1048 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
1049 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
1051 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
1052 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
1053 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
1054 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
1056 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
• Pixels: SizeZ\textsuperscript{1057}
• Pixels: Type\textsuperscript{1058}
• Plane: TheC\textsuperscript{1059}
• Plane: TheT\textsuperscript{1060}
• Plane: TheZ\textsuperscript{1061}
• Plate: ColumnNamingConvention\textsuperscript{1062}
• Plate: ID\textsuperscript{1063}
• Plate: Name\textsuperscript{1064}
• Plate: RowNamingConvention\textsuperscript{1065}
• Well: Column\textsuperscript{1066}
• Well: ID\textsuperscript{1067}
• Well: Row\textsuperscript{1068}
• WellSample: ID\textsuperscript{1069}
• WellSample: ImageRef\textsuperscript{1070}
• WellSample: Index\textsuperscript{1071}

Total supported: 31
Total unknown or missing: 444

19.2.22 CellSensReader

This page lists supported metadata fields for the Bio-Formats CellSens VSI format reader.

These fields are from the OME data model\textsuperscript{1072}. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:
• The file format itself supports 19 of them (4%).
• Of those, Bio-Formats fully or partially converts 19 (100%).

Supported fields

These fields are fully supported by the Bio-Formats CellSens VSI format reader:

• Channel: ID\textsuperscript{1073}
• Channel: SamplesPerPixel\textsuperscript{1074}

\textsuperscript{1057}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
\textsuperscript{1058}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
\textsuperscript{1059}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
\textsuperscript{1060}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
\textsuperscript{1061}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
\textsuperscript{1062}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Plate_ColumnNamingConvention
\textsuperscript{1063}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
\textsuperscript{1064}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel

19.2. Metadata fields
• Image: AcquisitionDate\textsuperscript{1075}
• Image: ID\textsuperscript{1076}
• Image: Name\textsuperscript{1077}
• Pixels: BigEndian\textsuperscript{1078}
• Pixels: DimensionOrder\textsuperscript{1079}
• Pixels: ID\textsuperscript{1080}
• Pixels: Interleaved\textsuperscript{1081}
• Pixels: SignificantBits\textsuperscript{1082}
• Pixels: SizeC\textsuperscript{1083}
• Pixels: SizeT\textsuperscript{1084}
• Pixels: SizeX\textsuperscript{1085}
• Pixels: SizeY\textsuperscript{1086}
• Pixels: SizeZ\textsuperscript{1087}
• Pixels: Type\textsuperscript{1088}
• Plane: TheC\textsuperscript{1089}
• Plane: TheT\textsuperscript{1090}
• Plane: TheZ\textsuperscript{1091}

Total supported: 19
Total unknown or missing: 456

19.2.23 CellVoyagerReader

This page lists supported metadata fields for the Bio-Formats CellVoyager format reader.

These fields are from the OME data model\textsuperscript{1092}. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

- The file format itself supports 34 of them (7%).
- Of those, Bio-Formats fully or partially converts 34 (100%).

\textsuperscript{1075}\url{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate}
\textsuperscript{1076}\url{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID}
\textsuperscript{1077}\url{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name}
\textsuperscript{1078}\url{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian}
\textsuperscript{1079}\url{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder}
\textsuperscript{1080}\url{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID}
\textsuperscript{1081}\url{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved}
\textsuperscript{1082}\url{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits}
\textsuperscript{1083}\url{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC}
\textsuperscript{1084}\url{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT}
\textsuperscript{1085}\url{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX}
\textsuperscript{1086}\url{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY}
\textsuperscript{1087}\url{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ}
\textsuperscript{1088}\url{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type}
\textsuperscript{1089}\url{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC}
\textsuperscript{1090}\url{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT}
\textsuperscript{1091}\url{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ}
\textsuperscript{1092}\url{http://www.openmicroscopy.org/site/support/ome-model/}
Supported fields

These fields are fully supported by the Bio-Formats CellVoyager format reader:

• Channel: ID
• Channel: Name
• Channel: PinholeSize
• Channel: SamplesPerPixel
• Image: AcquisitionDate
• Image: ID
• Image: Name
• Pixels: BigEndian
• Pixels: DimensionOrder
• Pixels: ID
• Pixels: Interleaved
• Pixels: SignificantBits
• Pixels: SizeC
• Pixels: SizeT
• Pixels: SizeX
• Pixels: SizeY
• Pixels: SizeZ
• Pixels: Type
• Plane: TheC
• Plane: TheT
• Plane: TheZ
• Plate: Columns
• Plate: Rows
• PlateAcquisition: EndTime
• PlateAcquisition : ID
• PlateAcquisition : MaximumFieldCount
• PlateAcquisition : StartTime
• Well : Column
• Well : ID
• Well : Row
• WellSample : ID
• WellSample : Index
• WellSample : PositionX
• WellSample : PositionY

Total supported: 34
Total unknown or missing: 441

19.2.24 DeltavisionReader

This page lists supported metadata fields for the Bio-Formats Deltavision format reader.

These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

• The file format itself supports 52 of them (10%).
• Of those, Bio-Formats fully or partially converts 52 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Deltavision format reader:

• Channel : EmissionWavelength
• Channel : ExcitationWavelength
• Channel : ID
• Channel : NDFilter
• Channel : Name
• Channel : SamplesPerPixel
• Detector : ID

1117 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#PlateAcquisition_ID
1118 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#PlateAcquisition_MaximumFieldCount
1119 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#PlateAcquisition_StartTime
1120 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Well_Column
1121 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Well_ID
1122 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Well_Row
1123 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#WellSample_ID
1124 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#WellSample_Index
1126 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#WellSample_PositionY
1127 http://www.openmicroscopy.org/site/support/ome-model/
1129 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ExcitationWavelength
1130 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
1131 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_NDFilter
1132 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_Name
1133 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
1134 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_ID
• Detector: Model\textsuperscript{1135}
• Detector: Type\textsuperscript{1136}
• DetectorSettings: Binning\textsuperscript{1137}
• DetectorSettings: Gain\textsuperscript{1138}
• DetectorSettings: ID\textsuperscript{1139}
• DetectorSettings: ReadOutRate\textsuperscript{1140}
• Image: AcquisitionDate\textsuperscript{1141}
• Image: Description\textsuperscript{1142}
• Image: ID\textsuperscript{1143}
• Image: InstrumentRef\textsuperscript{1144}
• Image: Name\textsuperscript{1145}
• ImagingEnvironment: Temperature\textsuperscript{1146}
• Instrument: ID\textsuperscript{1147}
• Objective: CalibratedMagnification\textsuperscript{1148}
• Objective: Correction\textsuperscript{1149}
• Objective: ID\textsuperscript{1150}
• Objective: Immersion\textsuperscript{1151}
• Objective: LensNA\textsuperscript{1152}
• Objective: Manufacturer\textsuperscript{1153}
• Objective: Model\textsuperscript{1154}
• Objective: NominalMagnification\textsuperscript{1155}
• Objective: WorkingDistance\textsuperscript{1156}
• ObjectiveSettings: ID\textsuperscript{1157}
• Pixels: BigEndian\textsuperscript{1158}
• Pixels: DimensionOrder\textsuperscript{1159}
• Pixels: ID\textsuperscript{1160}

\textsuperscript{1135}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_Model
\textsuperscript{1136}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_Type
\textsuperscript{1137}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_Binning
\textsuperscript{1138}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_Gain
\textsuperscript{1139}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_ID
\textsuperscript{1140}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_ReadOutRate
\textsuperscript{1141}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
\textsuperscript{1142}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Description
\textsuperscript{1143}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID
\textsuperscript{1144}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#InstrumentRef_ID
\textsuperscript{1145}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
\textsuperscript{1146}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ImagingEnvironment_Temperature
\textsuperscript{1147}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Instrument_ID
\textsuperscript{1148}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_CalibratedMagnification
\textsuperscript{1149}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_Correction
\textsuperscript{1150}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_ID
\textsuperscript{1151}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_Immersion
\textsuperscript{1152}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_LensNA
\textsuperscript{1153}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_Manufacturer
\textsuperscript{1154}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_Model
\textsuperscript{1155}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_NominalMagnification
\textsuperscript{1156}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_WorkingDistance
\textsuperscript{1157}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ObjectiveSettings_ID
\textsuperscript{1158}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
\textsuperscript{1159}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
\textsuperscript{1160}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID

19.2. Metadata fields 257
• Pixels: Interleaved
• Pixels: PhysicalSizeX
• Pixels: PhysicalSizeY
• Pixels: PhysicalSizeZ
• Pixels: SignificantBits
• Pixels: SizeC
• Pixels: SizeT
• Pixels: SizeX
• Pixels: SizeY
• Pixels: SizeZ
• Pixels: Type
• Plane: DeltaT
• Plane: ExposureTime
• Plane: PositionX
• Plane: PositionY
• Plane: PositionZ
• Plane: TheC
• Plane: TheT
• Plane: TheZ

Total supported: 52
Total unknown or missing: 423

19.2.25 DicomReader

This page lists supported metadata fields for the Bio-Formats DICOM format reader. These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

• The file format itself supports 23 of them (4%).
• Of those, Bio-Formats fully or partially converts 23 (100%).

1161 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
1163 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
1165 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
1166 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
1167 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
1168 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
1169 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
1170 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
1171 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
1172 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_DeltaT
1173 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_ExposureTime
1175 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_PositionY
1178 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
1179 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
1180 http://www.openmicroscopy.org/site/support/ome-model/
Supported fields

These fields are fully supported by the Bio-Formats DICOM format reader:

- Channel: ID
- Channel: SamplesPerPixel
- Image: AcquisitionDate
- Image: Description
- Image: ID
- Image: Name
- Pixels: BigEndian
- Pixels: DimensionOrder
- Pixels: ID
- Pixels: Interleaved
- Pixels: PhysicalSizeX
- Pixels: PhysicalSizeY
- Pixels: PhysicalSizeZ
- Pixels: SignificantBits
- Pixels: SizeC
- Pixels: SizeT
- Pixels: SizeX
- Pixels: SizeY
- Pixels: SizeZ
- Pixels: Type
- Plane: TheC
- Plane: TheT
- Plane: TheZ

Total supported: 23

Total unknown or missing: 452

19.2.26 Ecat7Reader

This page lists supported metadata fields for the Bio-Formats ECAT7 format reader.

These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

- The file format itself supports 23 of them (4%).
- Of those, Bio-Formats fully or partially converts 23 (100%).

Supported fields

These fields are fully supported by the Bio-Formats ECAT7 format reader:

- Channel : ID
- Channel : SamplesPerPixel
- Image : AcquisitionDate
- Image : Description
- Image : ID
- Image : Name
- Pixels : BigEndian
- Pixels : DimensionOrder
- Pixels : ID
- Pixels : Interleaved
- Pixels : PhysicalSizeX
- Pixels : PhysicalSizeY
- Pixels : PhysicalSizeZ
- Pixels : SignificantBits
- Pixels : SizeC
- Pixels : SizeT
- Pixels : SizeX
- Pixels : SizeY
Bio-Formats Documentation, Release 5.0.2

- Pixels: SizeZ
- Pixels: Type
- Plane: TheC
- Plane: TheT
- Plane: TheZ

Total supported: 23
Total unknown or missing: 452

19.2.27 EPSReader

This page lists supported metadata fields for the Bio-Formats Encapsulated PostScript format reader.

These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:
  - The file format itself supports 19 of them (4%).
  - Of those, Bio-Formats fully or partially converts 19 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Encapsulated PostScript format reader:

- Channel: ID
- Channel: SamplesPerPixel
- Image: AcquisitionDate
- Image: ID
- Image: Name
- Pixels: BigEndian
- Pixels: DimensionOrder
- Pixels: ID
- Pixels: Interleaved
- Pixels: SignificantBits
- Pixels: SizeC
- Pixels: SizeT

1223http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
1224http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
1225http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
1226http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
1227http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
1228http://www.openmicroscopy.org/site/support/ome-model/
1229http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
1230http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
1231http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
1233http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
1234http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
1235http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
1236http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
1237http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
1238http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
1239http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
1240http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
**19.2.28 FlexReader**

This page lists supported metadata fields for the Bio-Formats Evotec Flex format reader. These fields are from the OME data model\(^{1248}\). Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:
- The file format itself supports 69 of them (14%).
- Of those, Bio-Formats fully or partially converts 69 (100%).

**Supported fields**

These fields are fully supported by the Bio-Formats Evotec Flex format reader:
- Channel : ID\(^{1249}\)
- Channel : LightSourceSettingsID\(^{1250}\)
- Channel : Name\(^{1251}\)
- Channel : SamplesPerPixel\(^{1252}\)
- Detector : ID\(^{1253}\)
- Detector : Type\(^{1254}\)
- DetectorSettings : Binning\(^{1255}\)
- DetectorSettings : ID\(^{1256}\)
- Dichroic : ID\(^{1257}\)
- Dichroic : Model\(^{1258}\)

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\(^{1241}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
\(^{1242}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
\(^{1243}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
\(^{1244}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
\(^{1245}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
\(^{1246}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
\(^{1247}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
\(^{1248}\)http://www.openmicroscopy.org/site/support/ome-model/
\(^{1249}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
\(^{1250}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#LightSourceSettings_ID
\(^{1251}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_Name
\(^{1252}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
\(^{1253}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_ID
\(^{1254}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_Type
\(^{1255}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_Binning
\(^{1256}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_ID
\(^{1257}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Dichroic_ID
\(^{1258}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_Model
• Filter : FilterWheel\textsuperscript{1259}
• Filter : ID\textsuperscript{1260}
• Filter : Model\textsuperscript{1261}
• Image : AcquisitionDate\textsuperscript{1262}
• Image : ID\textsuperscript{1263}
• Image : InstrumentRef\textsuperscript{1264}
• Image : Name\textsuperscript{1265}
• Instrument : ID\textsuperscript{1266}
• Laser : ID\textsuperscript{1267}
• Laser : LaserMedium\textsuperscript{1268}
• Laser : Type\textsuperscript{1269}
• Laser : Wavelength\textsuperscript{1270}
• LightPath : DichroicRef\textsuperscript{1271}
• LightPath : EmissionFilterRef\textsuperscript{1272}
• LightPath : ExcitationFilterRef\textsuperscript{1273}
• Objective : CalibratedMagnification\textsuperscript{1274}
• Objective : Correction\textsuperscript{1275}
• Objective : ID\textsuperscript{1276}
• Objective : Immersion\textsuperscript{1277}
• Objective : LensNA\textsuperscript{1278}
• ObjectiveSettings : ID\textsuperscript{1279}
• Pixels : BigEndian\textsuperscript{1280}
• Pixels : DimensionOrder\textsuperscript{1281}
• Pixels : ID\textsuperscript{1282}
• Pixels : Interleaved\textsuperscript{1283}
• Pixels : PhysicalSizeX\textsuperscript{1284}

\textsuperscript{1259}\url{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Filter_FilterWheel}
\textsuperscript{1260}\url{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Filter_ID}
\textsuperscript{1261}\url{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_Model}
\textsuperscript{1262}\url{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate}
\textsuperscript{1263}\url{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID}
\textsuperscript{1264}\url{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#InstrumentRef_ID}
\textsuperscript{1265}\url{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name}
\textsuperscript{1266}\url{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Instrument_ID}
\textsuperscript{1267}\url{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#LightSource_ID}
\textsuperscript{1268}\url{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Laser_LaserMedium}
\textsuperscript{1269}\url{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Laser_Type}
\textsuperscript{1270}\url{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Laser_Wavelength}
\textsuperscript{1271}\url{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DichroicRef_ID}
\textsuperscript{1272}\url{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#FilterRef_ID}
\textsuperscript{1273}\url{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#FilterRef_ID}

\subsection*{19.2. Metadata fields}
19.2. Metadata fields

- Pixels: PhysicalSizeY
- Pixels: SignificantBits
- Pixels: SizeC
- Pixels: SizeT
- Pixels: SizeX
- Pixels: SizeY
- Pixels: SizeZ
- Pixels: Type
- Plane: DeltaT
- Plane: ExposureTime
- Plane: PositionX
- Plane: PositionY
- Plane: PositionZ
- Plane: TheC
- Plane: TheT
- Plane: TheZ
- Plate: ColumnNamingConvention
- Plate: ExternalIdentifier
- Plate: ID
- Plate: Name
- Plate: RowNamingConvention
- PlateAcquisition: ID
- PlateAcquisition: MaximumFieldCount
- PlateAcquisition: StartTime
- PlateAcquisition: WellSampleRef
- Well: Column

• Well: ID
• Well: Row
• WellSample: ID
• WellSample: ImageRef
• WellSample: Index
• WellSample: PositionX
• WellSample: PositionY

Total supported: 69
Total unknown or missing: 406

19.2.29 FEIReader

This page lists supported metadata fields for the Bio-Formats FEI/Philips format reader.

These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:
• The file format itself supports 19 of them (4%).
• Of those, Bio-Formats fully or partially converts 19 (100%).

Supported fields

These fields are fully supported by the Bio-Formats FEI/Philips format reader:
• Channel: ID
• Channel: SamplesPerPixel
• Image: AcquisitionDate
• Image: ID
• Image: Name
• Pixels: BigEndian
• Pixels: DimensionOrder
• Pixels: ID
• Pixels: Interleaved
• Pixels: SignificantBits

[141] http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
19.2.30 FEITiffReader

This page lists supported metadata fields for the Bio-Formats FEI TIFF format reader. These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

- The file format itself supports 39 of them (8%).
- Of those, Bio-Formats fully or partially converts 39 (100%).

Supported fields

These fields are fully supported by the Bio-Formats FEI TIFF format reader:

- Channel: ID
- Channel: SamplesPerPixel
- Detector: ID
- Detector: Model
- Detector: Type
- Experimenter: ID
- Experimenter: LastName
- Image: AcquisitionDate
• Image: Description
• Image: ID
• Image: InstrumentRef
• Image: Name
• Instrument: ID
• Microscope: Model
• Objective: Correction
• Objective: ID
• Objective: Immersion
• Objective: NominalMagnification
• Pixels: BigEndian
• Pixels: DimensionOrder
• Pixels: ID
• Pixels: Interleaved
• Pixels: PhysicalSizeX
• Pixels: PhysicalSizeY
• Pixels: SignificantBits
• Pixels: SizeC
• Pixels: SizeT
• Pixels: SizeX
• Pixels: SizeY
• Pixels: SizeZ
• Pixels: TimeIncrement
• Pixels: Type
• Plane: TheC
• Plane: TheT

1347 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Description
1350 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
1352 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_Model
1353 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_Correction
1354 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_ID
1355 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_Immersion
1356 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_NominalMagnification
1357 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
1358 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
1359 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
1360 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
1362 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
1363 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
1364 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
1365 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
1366 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
1367 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
1368 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
1369 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_TimeIncrement
1370 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
1371 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
1372 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT

19.2. Metadata fields
• Plane: TheZ
• StageLabel: Name
• StageLabel: X
• StageLabel: Y
• StageLabel: Z

Total supported: 39
Total unknown or missing: 436

19.2.31 FitsReader

This page lists supported metadata fields for the Bio-Formats Flexible Image Transport System format reader. These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:
• The file format itself supports 19 of them (4%).
• Of those, Bio-Formats fully or partially converts 19 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Flexible Image Transport System format reader:

• Channel: ID
• Channel: SamplesPerPixel
• Image: AcquisitionDate
• Image: ID
• Image: Name
• Pixels: BigEndian
• Pixels: DimensionOrder
• Pixels: ID
• Pixels: Interleaved
• Pixels: SignificantBits
• Pixels: SizeC
• Pixels: SizeT

http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#StageLabel_Name
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#StageLabel_X
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#StageLabel_Y
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#StageLabel_Z
http://www.openmicroscopy.org/site/support/ome-model/
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
• Pixels: SizeX
• Pixels: SizeY
• Pixels: SizeZ
• Pixels: Type
• Plane: TheC
• Plane: TheT
• Plane: TheZ

Total supported: 19
Total unknown or missing: 456

19.2.32 GatanDM2Reader

This page lists supported metadata fields for the Bio-Formats Gatan DM2 format reader.

These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

• The file format itself supports 30 of them (6%).
• Of those, Bio-Formats fully or partially converts 30 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Gatan DM2 format reader:

• Channel: ID
• Channel: SamplesPerPixel
• Detector: ID
• DetectorSettings: Binning
• DetectorSettings: ID
• Experimenter: FirstName
• Experimenter: ID
• Experimenter: LastName
• Image: AcquisitionDate
• Image: ExperimenterRef

1391 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
1392 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
1393 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
1394 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
1395 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
1396 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
1397 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
1398 http://www.openmicroscopy.org/site/support/ome-model/
1399 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
1400 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
1401 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_ID
1402 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_Binning
1403 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_ID
1404 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Experimenter_FirstName
1405 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Experimenter_LastName
1406 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ExperimenterRef_ID
1407 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
19.2.33 GatanReader

This page lists supported metadata fields for the Bio-Formats Gatan Digital Micrograph format reader.

These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

- Image: ID
- Image: InstrumentRef
- Image: Name
- Instrument: ID
- Pixels: BigEndian
- Pixels: DimensionOrder
- Pixels: ID
- Pixels: Interleaved
- Pixels: PhysicalSizeX
- Pixels: PhysicalSizeY
- Pixels: SignificantBits
- Pixels: SizeC
- Pixels: SizeT
- Pixels: SizeX
- Pixels: SizeY
- Pixels: SizeZ
- Pixels: Type
- Plane: TheC
- Plane: TheT
- Plane: TheZ

Total supported: 30
Total unknown or missing: 445
• The file format itself supports 36 of them (7%).
• Of those, Bio-Formats fully or partially converts 36 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Gatan Digital Micrograph format reader:

- Channel: AcquisitionMode\(^{1430}\)
- Channel: ID\(^{1431}\)
- Channel: SamplesPerPixel\(^{1432}\)
- Detector: ID\(^{1433}\)
- DetectorSettings: ID\(^{1434}\)
- DetectorSettings: Voltage\(^{1435}\)
- Image: AcquisitionDate\(^{1436}\)
- Image: ID\(^{1437}\)
- Image: Name\(^{1438}\)
- Instrument: ID\(^{1439}\)
- Objective: Correction\(^{1440}\)
- Objective: ID\(^{1441}\)
- Objective: Immersion\(^{1442}\)
- Objective: NominalMagnification\(^{1443}\)
- ObjectiveSettings: ID\(^{1444}\)
- Pixels: BigEndian\(^{1445}\)
- Pixels: DimensionOrder\(^{1446}\)
- Pixels: ID\(^{1447}\)
- Pixels: Interleaved\(^{1448}\)
- Pixels: PhysicalSizeX\(^{1449}\)
- Pixels: PhysicalSizeY\(^{1450}\)
- Pixels: PhysicalSizeZ\(^{1451}\)
- Pixels: SignificantBits\(^{1452}\)

\(^{1430}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_AcquisitionMode
^{1431}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
^{1432}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
^{1433}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_ID
^{1434}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_ID
^{1435}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_Voltage
^{1436}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
^{1437}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID
^{1438}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
^{1440}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_Correction
^{1441}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_ID
^{1442}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_Immersion
^{1443}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ObjectiveNominalMagnification
^{1444}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ObjectiveSettings_ID
^{1445}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
^{1446}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
^{1447}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
^{1448}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeX
^{1449}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
^{1450}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeZ
^{1451}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits

19.2. Metadata fields
• Pixels: SizeC
• Pixels: SizeT
• Pixels: SizeX
• Pixels: SizeY
• Pixels: SizeZ
• Pixels: Type
• Plane: ExposureTime
• Plane: PositionX
• Plane: PositionY
• Plane: PositionZ
• Plane: TheC
• Plane: TheT
• Plane: TheZ

Total supported: 36
Total unknown or missing: 439

19.2.34 GIFReader

This page lists supported metadata fields for the Bio-Formats Graphics Interchange Format format reader. These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:
• The file format itself supports 19 of them (4%).
• Of those, Bio-Formats fully or partially converts 19 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Graphics Interchange Format format reader:
• Channel: ID
• Channel: SamplesPerPixel
• Image: AcquisitionDate
• Image: ID
• Image : Name
• Pixels : BigEndian
• Pixels : DimensionOrder
• Pixels : ID
• Pixels : Interleaved
• Pixels : SignificantBits
• Pixels : SizeC
• Pixels : SizeT
• Pixels : SizeX
• Pixels : SizeY
• Pixels : SizeZ
• Pixels : Type
• Plane : TheC
• Plane : TheT
• Plane : TheZ

Total supported: 19
Total unknown or missing: 456

19.2.35 NAFReader

This page lists supported metadata fields for the Bio-Formats Hamamatsu Aquacosmos format reader.

These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

• The file format itself supports 19 of them (4%).
• Of those, Bio-Formats fully or partially converts 19 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Hamamatsu Aquacosmos format reader:

• Channel : ID
• Channel : SamplesPerPixel

19.2.36 HISReader

This page lists supported metadata fields for the Bio-Formats Hamamatsu HIS format reader.

These fields are from the [OME data model](http://www.openmicroscopy.org/site/support/ome-model/). Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

- The file format itself supports 27 of them (5%).
- Of those, Bio-Formats fully or partially converts 27 (100%).
Supported fields

These fields are fully supported by the Bio-Formats Hamamatsu HIS format reader:

- Channel: ID
- Channel: SamplesPerPixel
- Detector: ID
- Detector: Offset
- Detector: Type
- DetectorSettings: Binning
- DetectorSettings: ID
- Image: AcquisitionDate
- Image: ID
- Image: InstrumentRef
- Image: Name
- Instrument: ID
- Pixels: BigEndian
- Pixels: DimensionOrder
- Pixels: ID
- Pixels: Interleaved
- Pixels: SignificantBits
- Pixels: SizeC
- Pixels: SizeT
- Pixels: SizeX
- Pixels: SizeY
- Pixels: SizeZ
- Pixels: Type
- Plane: ExposureTime

1507 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
1508 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
1509 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_ID
1510 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_Offset
1511 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_Type
1512 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_Binning
1513 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_ID
1514 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
1517 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Instrument_Name
1519 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
1520 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
1521 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
1522 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
1523 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
1524 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
1525 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
1526 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
1527 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
1528 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
1530 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_ExposureTime
19.2.37 NDPIReader

This page lists supported metadata fields for the Bio-Formats Hamamatsu NDPI format reader.

These fields are from the OME data model\(^1\). Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

- The file format itself supports 21 of them (4%).
- Of those, Bio-Formats fully or partially converts 21 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Hamamatsu NDPI format reader:

- Channel : ID\(^2\)
- Channel : SamplesPerPixel\(^3\)
- Image : AcquisitionDate\(^4\)
- Image : ID\(^5\)
- Image : Name\(^6\)
- Pixels : BigEndian\(^7\)
- Pixels : DimensionOrder\(^8\)
- Pixels : ID\(^9\)
- Pixels : Interleaved\(^10\)
- Pixels : PhysicalSizeX\(^11\)
- Pixels : PhysicalSizeY\(^12\)
- Pixels : SignificantBits\(^13\)
- Pixels : SizeC\(^14\)
- Pixels : SizeT\(^15\)
- Pixels : SizeZ\(^16\)

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\(^1\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
\(^2\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
\(^3\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
\(^4\) http://www.openmicroscopy.org/site/support/ome-model/
\(^5\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
\(^6\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
\(^7\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
\(^8\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID
\(^9\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
\(^10\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
\(^11\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
\(^12\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
\(^13\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
\(^14\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeX
\(^15\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
\(^16\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
• Pixels: SizeX\textsuperscript{1549}
• Pixels: SizeY\textsuperscript{1550}
• Pixels: SizeZ\textsuperscript{1551}
• Pixels: Type\textsuperscript{1552}
• Plane: The\textsuperscript{1553}
• Plane: The\textsuperscript{\textsuperscript{\textsuperscript{\textsuperscript{\textsuperscript{T}}}}\textsuperscript{1554}}
• Plane: The\textsuperscript{\textsuperscript{\textsuperscript{\textsuperscript{Z}}}}\textsuperscript{1555}

Total supported: 21
Total unknown or missing: 454

19.2.38 HamamatsuVMSReader

This page lists supported metadata fields for the Bio-Formats Hamamatsu VMS format reader.

These fields are from the OME data model\textsuperscript{1556}. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:
• The file format itself supports 26 of them (5%).
• Of those, Bio-Formats fully or partially converts 26 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Hamamatsu VMS format reader:

• Channel: ID\textsuperscript{1557}
• Channel: SamplesPerPixel\textsuperscript{1558}
• Image: AcquisitionDate\textsuperscript{1559}
• Image: ID\textsuperscript{1560}
• Image: InstrumentRef\textsuperscript{1561}
• Image: Name\textsuperscript{1562}
• Instrument: ID\textsuperscript{1563}
• Objective: ID\textsuperscript{1564}
• Objective: NominalMagnification\textsuperscript{1565}
• ObjectiveSettings: ID\textsuperscript{1566}

\textsuperscript{1549}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
\textsuperscript{1550}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
\textsuperscript{1551}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
\textsuperscript{1552}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
\textsuperscript{1553}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
\textsuperscript{1554}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
\textsuperscript{1555}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
\textsuperscript{1556}http://www.openmicroscopy.org/site/support/ome-model/
\textsuperscript{1557}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
\textsuperscript{1558}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
\textsuperscript{1559}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
\textsuperscript{1560}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID
\textsuperscript{1561}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#InstrumentRef_ID
\textsuperscript{1562}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
\textsuperscript{1563}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Instrument_ID
\textsuperscript{1564}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_ID
\textsuperscript{1565}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_NominalMagnification
\textsuperscript{1566}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ObjectiveSettings_ID

19.2. Metadata fields
• Pixels : BigEndian\textsuperscript{1567}
• Pixels : DimensionOrder\textsuperscript{1568}
• Pixels : ID\textsuperscript{1569}
• Pixels : Interleaved\textsuperscript{1570}
• Pixels : PhysicalSizeX\textsuperscript{1571}
• Pixels : PhysicalSizeY\textsuperscript{1572}
• Pixels : SignificantBits\textsuperscript{1573}
• Pixels : SizeC\textsuperscript{1574}
• Pixels : SizeT\textsuperscript{1575}
• Pixels : SizeX\textsuperscript{1576}
• Pixels : SizeY\textsuperscript{1577}
• Pixels : SizeZ\textsuperscript{1578}
• Pixels : Type\textsuperscript{1579}
• Plane : TheC\textsuperscript{1580}
• Plane : TheT\textsuperscript{1581}
• Plane : TheZ\textsuperscript{1582}

Total supported: 26
Total unknown or missing: 449

19.2.39 HitachiReader

This page lists supported metadata fields for the Bio-Formats Hitachi format reader.

These fields are from the OME data model\textsuperscript{1583}. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:
• The file format itself supports 31 of them (6%).
• Of those, Bio-Formats fully or partially converts 31 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Hitachi format reader:
• Channel : ID\textsuperscript{1584}

\textsuperscript{1567}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
\textsuperscript{1568}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
\textsuperscript{1569}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
\textsuperscript{1570}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
\textsuperscript{1571}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeX
\textsuperscript{1572}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
\textsuperscript{1573}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
\textsuperscript{1574}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
\textsuperscript{1575}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
\textsuperscript{1576}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
\textsuperscript{1577}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
\textsuperscript{1578}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
\textsuperscript{1579}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
\textsuperscript{1580}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
\textsuperscript{1581}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
\textsuperscript{1582}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
\textsuperscript{1583}http://www.openmicroscopy.org/site/support/ome-model/
\textsuperscript{1584}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
• Channel: SamplesPerPixel\(^{1585}\)
• Image: AcquisitionDate\(^{1586}\)
• Image: ID\(^{1587}\)
• Image: InstrumentRef\(^{1588}\)
• Image: Name\(^{1589}\)
• Instrument: ID\(^{1590}\)
• Microscope: Model\(^{1591}\)
• Microscope: SerialNumber\(^{1592}\)
• Objective: ID\(^{1593}\)
• Objective: WorkingDistance\(^{1594}\)
• ObjectiveSettings: ID\(^{1595}\)
• Pixels: BigEndian\(^{1596}\)
• Pixels: DimensionOrder\(^{1597}\)
• Pixels: ID\(^{1598}\)
• Pixels: Interleaved\(^{1599}\)
• Pixels: PhysicalSizeX\(^{1600}\)
• Pixels: PhysicalSizeY\(^{1601}\)
• Pixels: SignificantBits\(^{1602}\)
• Pixels: SizeC\(^{1603}\)
• Pixels: SizeT\(^{1604}\)
• Pixels: SizeX\(^{1605}\)
• Pixels: SizeY\(^{1606}\)
• Pixels: SizeZ\(^{1607}\)
• Pixels: Type\(^{1608}\)
• Plane: PositionX\(^{1609}\)
• Plane: PositionY\(^{1610}\)

\(^{1585}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
\(^{1586}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
\(^{1587}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID
\(^{1588}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#InstrumentRef_ID
\(^{1589}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
\(^{1590}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_Model
\(^{1591}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_SerialNumber
\(^{1592}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_ID
\(^{1593}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_WorkingDistance
\(^{1594}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ObjectiveSettings_ID
\(^{1595}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
\(^{1596}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
\(^{1597}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
\(^{1598}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
\(^{1600}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeX
\(^{1601}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
\(^{1602}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
\(^{1603}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
\(^{1604}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
\(^{1605}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
\(^{1606}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
\(^{1607}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
\(^{1608}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
\(^{1609}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_PositionX
\(^{1610}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_PositionY
• Plane: PositionZ
• Plane: TheC
• Plane: TheT
• Plane: TheZ

Total supported: 31
Total unknown or missing: 444

19.2.40 ICSReader

This page lists supported metadata fields for the Bio-Formats Image Cytometry Standard format reader. These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:
• The file format itself supports 72 of them (15%).
• Of those, Bio-Formats fully or partially converts 72 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Image Cytometry Standard format reader:

• Channel: EmissionWavelength
• Channel: ExcitationWavelength
• Channel: ID
• Channel: Name
• Channel: PinholeSize
• Channel: SamplesPerPixel
• Detector: ID
• Detector: Manufacturer
• Detector: Model
• Detector: Type
• DetectorSettings: Gain
• DetectorSettings: ID
• Dichroic: ID
- Dichroic : Model
- Experiment : ID
- Experiment : Type
- Experimenter : ID
- Experimenter : LastName
- Filter : ID
- Filter : Model
- FilterSet : DichroicRef
- FilterSet : EmissionFilterRef
- FilterSet : ExcitationFilterRef
- FilterSet : ID
- FilterSet : Model
- Image : AcquisitionDate
- Image : Description
- Image : ID
- Image : InstrumentRef
- Image : Name
- Instrument : ID
- Laser : ID
- Laser : LaserMedium
- Laser : Manufacturer
- Laser : Model
- Laser : Power
- Laser : RepetitionRate
- Laser : Type
- Laser : Wavelength

19.2. Metadata fields

http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_Model
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Experiment_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Experiment_Type
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Experimenter_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Experimenter_LastName
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Filter_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DichroicRef_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#FilterRef_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_Model
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#LightSource_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_Merchant
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufactureSpec_Model
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Laser_RepetitionRate
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Laser_Type
• Microscope: Manufacturer

• Microscope: Model

• Objective: CalibratedMagnification

• Objective: Correction

• Objective: ID

• Objective: Immersion

• Objective: LensNA

• Objective: Model

• Objective: WorkingDistance

• ObjectiveSettings: ID

• Pixels: BigEndian

• Pixels: DimensionOrder

• Pixels: ID

• Pixels: Interleaved

• Pixels: PhysicalSizeX

• Pixels: PhysicalSizeY

• Pixels: PhysicalSizeZ

• Pixels: SignificantBits

• Pixels: SizeC

• Pixels: SizeT

• Pixels: SizeX

• Pixels: SizeY

• Pixels: SizeZ

• Pixels: TimeIncrement

• Pixels: Type

• Plane: DeltaT

1655 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_Manufacturer
1656 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_Model
1657 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_CalibratedMagnification
1658 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_Correction
1659 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_ID
1660 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_Immersion
1661 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_LensNA
1662 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_Model
1663 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_WorkingDistance
1664 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ObjectiveSettings_ID
1665 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
1666 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
1667 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
1668 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
1670 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
1672 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
1673 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
1674 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
1675 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
1676 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
1677 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
1678 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_TimeIncrement
1679 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
1680 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_DeltaT
• Plane: ExposureTime
• Plane: PositionX
• Plane: PositionY
• Plane: PositionZ
• Plane: TheC
• Plane: TheT
• Plane: TheZ

Total supported: 72
Total unknown or missing: 403

19.2.41 ImaconReader

This page lists supported metadata fields for the Bio-Formats Imacon format reader.

These fields are from the OME data model\(^1\). Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

- The file format itself supports 23 of them (4%).
- Of those, Bio-Formats fully or partially converts 23 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Imacon format reader:

- Channel: ID
- Channel: SamplesPerPixel
- Experimenter: FirstName
- Experimenter: ID
- Experimenter: LastName
- Image: AcquisitionDate
- Image: ExperimenterRef
- Image: ID
- Image: Name
- Pixels: BigEndian

\(^1\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_ExposureTime
\(^2\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_PositionX
\(^3\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_PositionY
\(^4\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_PositionZ
\(^5\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
\(^6\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
\(^7\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
\(^8\) http://www.openmicroscopy.org/site/support/ome-model/
• Pixels: DimensionOrder^{1699}
• Pixels: ID^{1700}
• Pixels: Interleaved^{1701}
• Pixels: SignificantBits^{1702}
• Pixels: SizeC^{1703}
• Pixels: SizeT^{1704}
• Pixels: SizeX^{1705}
• Pixels: SizeY^{1706}
• Pixels: SizeZ^{1707}
• Pixels: Type^{1708}
• Plane: TheC^{1709}
• Plane: TheT^{1710}
• Plane: TheZ^{1711}

Total supported: 23
Total unknown or missing: 452

19.2.42 SEQReader

This page lists supported metadata fields for the Bio-Formats Image-Pro Sequence format reader. These fields are from the OME data model^{1712}. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:
• The file format itself supports 19 of them (4%).
• Of those, Bio-Formats fully or partially converts 19 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Image-Pro Sequence format reader:
• Channel: ID^{1713}
• Channel: SamplesPerPixel^{1714}
• Image: AcquisitionDate^{1715}
• Image: ID^{1716}

^{1699}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
^{1700}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
^{1701}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
^{1702}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
^{1703}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
^{1704}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
^{1705}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
^{1706}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
^{1707}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
^{1708}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
^{1709}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
^{1710}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
^{1711}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
^{1712}http://www.openmicroscopy.org/site/support/ome-model/
^{1713}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
^{1714}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
^{1715}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
^{1716}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID
• Image: Name[^1717]
• Pixels: BigEndian[^1718]
• Pixels: DimensionOrder[^1719]
• Pixels: ID[^1720]
• Pixels: Interleaved[^1721]
• Pixels: SignificantBits[^1722]
• Pixels: SizeC[^1723]
• Pixels: SizeT[^1724]
• Pixels: SizeX[^1725]
• Pixels: SizeY[^1726]
• Pixels: SizeZ[^1727]
• Pixels: Type[^1728]
• Plane: TheC[^1729]
• Plane: TheT[^1730]
• Plane: TheZ[^1731]

Total supported: 19
Total unknown or missing: 456

19.2.43 IPWReader

This page lists supported metadata fields for the Bio-Formats Image-Pro Workspace format reader.

These fields are from the OME data model[^1732]. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:
• The file format itself supports 20 of them (4%).
• Of those, Bio-Formats fully or partially converts 20 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Image-Pro Workspace format reader:
• Channel: ID[^1733]
• Channel: SamplesPerPixel[^1734]

[^1717]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
[^1718]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
[^1719]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
[^1720]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
[^1721]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
[^1722]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
[^1723]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
[^1724]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
[^1726]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
[^1727]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
[^1728]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
[^1729]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
[^1730]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
[^1731]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
[^1732]: http://www.openmicroscopy.org/site/support/ome-model/
[^1733]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
[^1734]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
This page lists supported metadata fields for the Bio-Formats IMAGIC format reader. These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g., physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

- The file format itself supports 22 of them (4%).
- Of those, Bio-Formats fully or partially converts 22 (100%).

19.2.44 ImagicReader

Total supported: 20
Total unknown or missing: 455

19.2. Metadata fields
Supported fields

These fields are fully supported by the Bio-Formats IMAGIC format reader:

- Channel: ID
- Channel: SamplesPerPixel
- Image: AcquisitionDate
- Image: ID
- Image: Name
- Pixels: BigEndian
- Pixels: DimensionOrder
- Pixels: ID
- Pixels: Interleaved
- Pixels: PhysicalSizeX
- Pixels: PhysicalSizeY
- Pixels: PhysicalSizeZ
- Pixels: SignificantBits
- Pixels: SizeC
- Pixels: SizeT
- Pixels: SizeX
- Pixels: SizeY
- Pixels: SizeZ
- Pixels: Type
- Plane: TheC
- Plane: TheT
- Plane: TheZ

Total supported: 22

Total unknown or missing: 453

1754 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
1755 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
1756 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
1758 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
1759 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
1760 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
1761 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
1762 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
1764 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
1766 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
1767 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
1768 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
1769 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
1770 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
1771 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
1772 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
1774 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
1775 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
19.2.45 IMODReader

This page lists supported metadata fields for the Bio-Formats IMOD format reader.

These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

- The file format itself supports 44 of them (9%).
- Of those, Bio-Formats fully or partially converts 44 (100%).

Supported fields

These fields are fully supported by the Bio-Formats IMOD format reader:

- Channel : ID
- Channel : SamplesPerPixel
- Image : AcquisitionDate
- Image : ID
- Image : Name
- Image : ROIRef
- Pixels : BigEndian
- Pixels : DimensionOrder
- Pixels : ID
- Pixels : Interleaved
- Pixels : PhysicalSizeX
- Pixels : PhysicalSizeY
- Pixels : PhysicalSizeZ
- Pixels : SignificantBits
- Pixels : SizeC
- Pixels : SizeT
- Pixels : SizeX
- Pixels : SizeY

1776 http://www.openmicroscopy.org/site/support/ome-model/
1777 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
1778 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
1779 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
1781 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
1782 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#ROIRef_ID
1783 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
1784 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
1785 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
1786 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
1788 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
1790 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
1791 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
1792 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
1793 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
1794 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
• Pixels: SizeZ
• Pixels: Type
• Plane: TheC
• Plane: TheT
• Plane: TheZ
• Point: ID
• Point: StrokeColor
• Point: StrokeDashArray
• Point: StrokeWidth
• Point: TheZ
• Polygon: ID
• Polygon: Points
• Polygon: StrokeColor
• Polygon: StrokeDashArray
• Polygon: StrokeWidth
• Polygon: TheZ
• Polyline: ID
• Polyline: Points
• Polyline: StrokeColor
• Polyline: StrokeDashArray
• Polyline: StrokeWidth
• Polyline: TheZ
• ROI: ID
• ROI: Name

19.2. Metadata fields
Total supported: 44
Total unknown or missing: 431

19.2.46 OpenlabReader

This page lists supported metadata fields for the Bio-Formats Openlab LIFF format reader.

These fields are from the OME data model[^1821]. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

- The file format itself supports 32 of them (6%).
- Of those, Bio-Formats fully or partially converts 32 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Openlab LIFF format reader:

- Channel: ID[^1822]
- Channel: Name[^1823]
- Channel: SamplesPerPixel[^1824]
- Detector: ID[^1825]
- Detector: Type[^1826]
- DetectorSettings: Gain[^1827]
- DetectorSettings: ID[^1828]
- DetectorSettings: Offset[^1829]
- Image: AcquisitionDate[^1830]
- Image: ID[^1831]
- Image: InstrumentRef[^1832]
- Image: Name[^1833]
- Instrument: ID[^1834]
- Pixels: BigEndian[^1835]
- Pixels: DimensionOrder[^1836]
- Pixels: ID[^1837]
- Pixels: Interleaved[^1838]

[^1821]: http://www.openmicroscopy.org/site/support/ome-model/
[^1822]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
[^1823]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_Name
[^1824]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
[^1825]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_ID
[^1826]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_Type
[^1830]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
[^1833]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
[^1835]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
[^1836]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
[^1837]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
[^1838]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
19.2.47 OpenlabRawReader

This page lists supported metadata fields for the Bio-Formats Openlab RAW format reader. These fields are from the OME data model[1854]. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

- The file format itself supports 19 of them (4%).
- Of those, Bio-Formats fully or partially converts 19 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Openlab RAW format reader:

- Channel: ID[1855]
- Channel: SamplesPerPixel[1856]

---

• Image: AcquisitionDate
• Image: ID
• Image: Name
• Pixels: BigEndian
• Pixels: DimensionOrder
• Pixels: ID
• Pixels: Interleaved
• Pixels: SignificantBits
• Pixels: SizeC
• Pixels: SizeT
• Pixels: SizeX
• Pixels: SizeY
• Pixels: SizeZ
• Pixels: Type
• Plane: TheC
• Plane: TheT
• Plane: TheZ

Total supported: 19
Total unknown or missing: 456

19.2.48 Improvision TiffReader

This page lists supported metadata fields for the Bio-Formats Improvision TIFF format reader.

These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

• The file format itself supports 25 of them (5%).
• Of those, Bio-Formats fully or partially converts 25 (100%).

1857 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
1858 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID
1859 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
1860 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
1861 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
1862 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
1863 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
1864 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
1865 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
1866 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
1867 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
1868 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
1869 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
1870 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
1872 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
1873 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
1874 http://www.openmicroscopy.org/site/support/ome-model/
Supported fields

These fields are fully supported by the Bio-Formats Improvision TIFF format reader:

- Channel: ID
- Channel: Name
- Channel: SamplesPerPixel
- Image: AcquisitionDate
- Image: Description
- Image: ID
- Image: Name
- Pixels: BigEndian
- Pixels: DimensionOrder
- Pixels: ID
- Pixels: Interleaved
- Pixels: PhysicalSizeX
- Pixels: PhysicalSizeY
- Pixels: PhysicalSizeZ
- Pixels: SignificantBits
- Pixels: SizeC
- Pixels: SizeT
- Pixels: SizeX
- Pixels: SizeY
- Pixels: SizeZ
- Pixels: TimeIncrement
- Pixels: Type
- Plane: TheC
- Plane: TheT

1875 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
1876 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_Name
1877 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
1878 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image.AcquisitionDate
1879 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Description
1881 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
1882 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
1883 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
1884 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
1885 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
1887 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
1889 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
1890 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
1891 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
1892 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
1893 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
1894 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
1895 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_TimeIncrement
1896 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
1897 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
1898 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
• Plane: TheZ

Total supported: 25
Total unknown or missing: 450

19.2.49 OBFRewriter

This page lists supported metadata fields for the Bio-Formats OBFRewriter.

These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g., physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

• The file format itself supports 19 of them (4%).
• Of those, Bio-Formats fully or partially converts 19 (100%).

Supported fields

These fields are fully supported by the Bio-Formats OBFRewriter:

• Channel: ID
• Channel: SamplesPerPixel
• Image: AcquisitionDate
• Image: ID
• Image: Name
• Pixels: BigEndian
• Pixels: DimensionOrder
• Pixels: ID
• Pixels: Interleaved
• Pixels: SignificantBits
• Pixels: SizeC
• Pixels: SizeT
• Pixels: SizeX
• Pixels: SizeY
• Pixels: SizeZ
• Pixels: Type
• Plane: TheC
• Plane: TheT
• Plane: TheZ

Total supported: 19
Total unknown or missing: 456

19.2.50 InCellReader

This page lists supported metadata fields for the Bio-Formats InCell 1000/2000 format reader.

These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

• The file format itself supports 67 of them (14%).
• Of those, Bio-Formats fully or partially converts 67 (100%).

Supported fields

These fields are fully supported by the Bio-Formats InCell 1000/2000 format reader:

• Channel: EmissionWavelength
• Channel: ExcitationWavelength
• Channel: ID
• Channel: Name
• Channel: SamplesPerPixel
• Detector: ID
• Detector: Model
• Detector: Type
• DetectorSettings: Binning
• DetectorSettings: Gain
• DetectorSettings: ID
• Experiment: ID
• Experiment: Type
• Image: AcquisitionDate

http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
http://www.openmicroscopy.org/site/support/ome-model/
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_EmissionWavelength
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ExcitationWavelength
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_Name
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_Type
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_Binning
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Experiment_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Experiment_Type
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
19.2. Metadata fields

- Image: Description
- Image: ExperimentRef
- Image: ID
- Image: InstrumentRef
- Image: Name
- ImagingEnvironment: Temperature
- Instrument: ID
- Objective: Correction
- Objective: ID
- Objective: Immersion
- Objective: LensNA
- Objective: Manufacturer
- Objective: NominalMagnification
- ObjectiveSettings: ID
- ObjectiveSettings: RefractiveIndex
- Pixels: BigEndian
- Pixels: DimensionOrder
- Pixels: ID
- Pixels: Interleaved
- Pixels: PhysicalSizeX
- Pixels: PhysicalSizeY
- Pixels: SignificantBits
- Pixels: SizeC
- Pixels: SizeT
- Pixels: SizeX
- Pixels: SizeY

http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Description
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ExperimentRef_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_Correction
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_Immersion
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_LensNA
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_Manufacturer
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_NominalMagnification
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ObjectiveSettings_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ObjectiveSettings_RefractiveIndex
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#PixelsDimensionOrder
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#PixelsInterleaved
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#PixelsPhysicalSizeY
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#PixelsSignificantBits
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#PixelsSizeC
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#PixelsSizeT
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#PixelsSizeY
19.2. Metadata fields
WellSample : PositionY

Total supported: 67
Total unknown or missing: 408

19.2.51 InCell3000Reader

This page lists supported metadata fields for the Bio-Formats InCell 3000 format reader.

These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

- The file format itself supports 19 of them (4%).
- Of those, Bio-Formats fully or partially converts 19 (100%).

Supported fields

These fields are fully supported by the Bio-Formats InCell 3000 format reader:

- Channel : ID
- Channel : SamplesPerPixel
- Image : AcquisitionDate
- Image : ID
- Image : Name
- Pixels : BigEndian
- Pixels : DimensionOrder
- Pixels : ID
- Pixels : Interleaved
- Pixels : SignificantBits
- Pixels : SizeC
- Pixels : SizeT
- Pixels : SizeX
- Pixels : SizeY
- Pixels : SizeZ
- Pixels : Type

1988 http://www.openmicroscopy.org/Site/support/ome-model/
1990 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
1991 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
1993 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
2004 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
• Plane: TheC\textsuperscript{2005}
• Plane: TheT\textsuperscript{2006}
• Plane: TheZ\textsuperscript{2007}

Total supported: 19

Total unknown or missing: 456

19.2.52 INRReader

This page lists supported metadata fields for the Bio-Formats INR format reader.

These fields are from the OME data model\textsuperscript{2008}. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

• The file format itself supports 22 of them (4%).
• Of those, Bio-Formats fully or partially converts 22 (100%).

Supported fields

These fields are fully supported by the Bio-Formats INR format reader:

• Channel: ID\textsuperscript{2009}
• Channel: SamplesPerPixel\textsuperscript{2010}
• Image: AcquisitionDate\textsuperscript{2011}
• Image: ID\textsuperscript{2012}
• Image: Name\textsuperscript{2013}
• Pixels: BigEndian\textsuperscript{2014}
• Pixels: DimensionOrder\textsuperscript{2015}
• Pixels: ID\textsuperscript{2016}
• Pixels: Interleaved\textsuperscript{2017}
• Pixels: PhysicalSizeX\textsuperscript{2018}
• Pixels: PhysicalSizeY\textsuperscript{2019}
• Pixels: PhysicalSizeZ\textsuperscript{2020}
• Pixels: SignificantBits\textsuperscript{2021}
• Pixels: SizeC\textsuperscript{2022}

\textsuperscript{2005}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
\textsuperscript{2006}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
\textsuperscript{2007}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
\textsuperscript{2008}http://www.openmicroscopy.org/site/support/ome-model/
\textsuperscript{2009}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
\textsuperscript{2010}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
\textsuperscript{2011}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
\textsuperscript{2012}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID
\textsuperscript{2013}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
\textsuperscript{2014}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
\textsuperscript{2015}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
\textsuperscript{2016}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
\textsuperscript{2017}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
\textsuperscript{2018}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeX
\textsuperscript{2019}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
\textsuperscript{2020}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeZ
\textsuperscript{2021}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
\textsuperscript{2022}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
19.2.53 InveonReader

This page lists supported metadata fields for the Bio-Formats Inveon format reader. These fields are from the OME data model\textsuperscript{2031}. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

- The file format itself supports 30 of them (6%).
- Of those, Bio-Formats fully or partially converts 30 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Inveon format reader:

- Channel: ID\textsuperscript{2032}
- Channel: SamplesPerPixel\textsuperscript{2033}
- Experimenter: ID\textsuperscript{2034}
- Experimenter: Institution\textsuperscript{2035}
- Experimenter: UserName\textsuperscript{2036}
- Image: AcquisitionDate\textsuperscript{2037}
- Image: Description\textsuperscript{2038}
- Image: ExperimenterRef\textsuperscript{2039}
- Image: ID\textsuperscript{2040}

\textsuperscript{2023}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
\textsuperscript{2024}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
\textsuperscript{2025}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
\textsuperscript{2026}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
\textsuperscript{2027}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
\textsuperscript{2028}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
\textsuperscript{2029}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
\textsuperscript{2030}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
\textsuperscript{2031}http://www.openmicroscopy.org/site/support/ome-model/
\textsuperscript{2032}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
\textsuperscript{2033}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
\textsuperscript{2034}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Experimenter_ID
\textsuperscript{2035}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Experimenter_Institution
\textsuperscript{2036}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Experimenter_UserName
\textsuperscript{2037}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
\textsuperscript{2038}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Description
\textsuperscript{2039}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ExperimenterRef_ID
\textsuperscript{2040}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID
• Image : InstrumentRef
• Image : Name
• Instrument : ID
• Microscope : Model
• Pixels : BigEndian
• Pixels : DimensionOrder
• Pixels : ID
• Pixels : Interleaved
• Pixels : PhysicalSizeX
• Pixels : PhysicalSizeY
• Pixels : PhysicalSizeZ
• Pixels : SignificantBits
• Pixels : SizeC
• Pixels : SizeT
• Pixels : SizeX
• Pixels : SizeY
• Pixels : SizeZ
• Pixels : Type
• Plane : TheC
• Plane : TheT
• Plane : TheZ

Total supported: 30
Total unknown or missing: 445

19.2.54 IvisionReader

This page lists supported metadata fields for the Bio-Formats Ivision format reader.

These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_Model
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
Of the 475 fields documented in the metadata summary table:

- The file format itself supports 34 of them (7%).
- Of those, Bio-Formats fully or partially converts 34 (100%).

Supported fields

These fields are fully supported by the Bio-Formats IVision format reader:

- Channel: ID
- Channel: SamplesPerPixel
- Detector: ID
- Detector: Type
- DetectorSettings: Binning
- DetectorSettings: Gain
- DetectorSettings: ID
- Image: AcquisitionDate
- Image: ID
- Image: InstrumentRef
- Image: Name
- Instrument: ID
- Objective: Correction
- Objective: ID
- Objective: Immersion
- Objective: LensNA
- Objective: NominalMagnification
- ObjectiveSettings: ID
- ObjectiveSettings: RefractiveIndex
- Pixels: BigEndian
- Pixels: DimensionOrder
- Pixels: ID

References:

http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_Type
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_Binning
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_Correction
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_Immersion
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_LensNA
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_NominalMagnification
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ObjectiveSettings_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ObjectiveSettings_RefractiveIndex
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
• Pixels: Interleaved
• Pixels: SignificantBits
• Pixels: SizeC
• Pixels: SizeT
• Pixels: SizeX
• Pixels: SizeY
• Pixels: SizeZ
• Pixels: TimeIncrement
• Pixels: Type
• Plane: TheC
• Plane: TheT
• Plane: TheZ

Total supported: 34
Total unknown or missing: 441

19.2.55 IPLabReader

This page lists supported metadata fields for the Bio-Formats IPLab format reader.

These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:
• The file format itself supports 31 of them (6%).
• Of those, Bio-Formats fully or partially converts 31 (100%).

Supported fields

These fields are fully supported by the Bio-Formats IPLab format reader:
• Channel: ID
• Channel: SamplesPerPixel
• Image: AcquisitionDate
• Image: Description
• Image: ID

http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_TimeIncrement
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
http://www.openmicroscopy.org/site/support/ome-model/
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Description
19.2. Metadata fields

- Image: Name
- Image: ROIRef
- Pixels: BigEndian
  - http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
- Pixels: DimensionOrder
- Pixels: ID
- Pixels: Interleaved
- Pixels: PhysicalSizeX
- Pixels: PhysicalSizeY
- Pixels: SignificantBits
- Pixels: SizeC
- Pixels: SizeT
  - http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
- Pixels: SizeX
- Pixels: SizeY
- Pixels: SizeZ
- Pixels: TimeIncrement
- Pixels: Type
  - http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
- Plane: DeltaT
- Plane: TheC
- Plane: TheT
- Plane: TheZ
- ROI: ID
- Rectangle: Height
  - http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Rectangle_Height
- Rectangle: ID
- Rectangle: Width
- Rectangle: X
- Rectangle: Y
Total supported: 31
Total unknown or missing: 444

19.2.56 JEOLReader

This page lists supported metadata fields for the Bio-Formats JEOL format reader.

These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

- The file format itself supports 19 of them (4%).
- Of those, Bio-Formats fully or partially converts 19 (100%).

Supported fields

These fields are fully supported by the Bio-Formats JEOL format reader:

- Channel: ID
- Channel: SamplesPerPixel
- Image: AcquisitionDate
- Image: ID
- Image: Name
- Pixels: BigEndian
- Pixels: DimensionOrder
- Pixels: ID
- Pixels: Interleaved
- Pixels: SignificantBits
- Pixels: SizeC
- Pixels: SizeT
- Pixels: SizeX
- Pixels: SizeY
- Pixels: SizeZ
- Pixels: Type
- Plane: TheC

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2129 http://www.openmicroscopy.org/site/support/ome-model/
2130 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
2131 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
2132 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
2133 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID
2134 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
2135 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
2136 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
2137 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
2138 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
2139 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
2140 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
2141 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
2142 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
2143 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
2144 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
2145 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
2146 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
19.2.57 JPEG2000Reader

This page lists supported metadata fields for the Bio-Formats JPEG-2000 format reader. These fields are from the OME data model\(^{2149}\). Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

- The file format itself supports 19 of them (4%).
- Of those, Bio-Formats fully or partially converts 19 (100%).

Supported fields

These fields are fully supported by the Bio-Formats JPEG-2000 format reader:

- Channel : ID\(^{2150}\)
- Channel : SamplesPerPixel\(^{2151}\)
- Image : AcquisitionDate\(^{2152}\)
- Image : ID\(^{2153}\)
- Image : Name\(^{2154}\)
- Pixels : BigEndian\(^{2155}\)
- Pixels : DimensionOrder\(^{2156}\)
- Pixels : ID\(^{2157}\)
- Pixels : Interleaved\(^{2158}\)
- Pixels : SignificantBits\(^{2159}\)
- Pixels : SizeC\(^{2160}\)
- Pixels : SizeT\(^{2161}\)
- Pixels : SizeX\(^{2162}\)
- Pixels : SizeY\(^{2163}\)
- Pixels : SizeZ\(^{2164}\)

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\(^{2147}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT

\(^{2148}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ

\(^{2149}\)http://www.openmicroscopy.org/site/support/ome-model/

\(^{2150}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID

\(^{2151}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel

\(^{2152}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate

\(^{2153}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID

\(^{2154}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name

\(^{2155}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian

\(^{2156}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder

\(^{2157}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID

\(^{2158}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved

\(^{2159}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits

\(^{2160}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC

\(^{2161}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT

\(^{2162}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX

\(^{2163}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY

\(^{2164}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
Total supported: 19
Total unknown or missing: 456

19.2.58 JPEGReader

This page lists supported metadata fields for the Bio-Formats JPEG format reader.

These fields are from the OME data model\[^{2169}\]. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

- The file format itself supports 19 of them (4%).
- Of those, Bio-Formats fully or partially converts 19 (100%).

Supported fields

These fields are fully supported by the Bio-Formats JPEG format reader:

- Channel: ID\[^{2170}\]
- Channel: SamplesPerPixel\[^{2171}\]
- Image: AcquisitionDate\[^{2172}\]
- Image: ID\[^{2173}\]
- Image: Name\[^{2174}\]
- Pixels: BigEndian\[^{2175}\]
- Pixels: DimensionOrder\[^{2176}\]
- Pixels: ID\[^{2177}\]
- Pixels: Interleaved\[^{2178}\]
- Pixels: SignificantBits\[^{2179}\]
- Pixels: SizeC\[^{2180}\]
- Pixels: SizeT\[^{2181}\]
- Pixels: SizeX\[^{2182}\]
• Pixels: SizeY
• Pixels: SizeZ
• Pixels: Type
• Plane: TheC
• Plane: TheT
• Plane: TheZ

Total supported: 19
Total unknown or missing: 456

19.2.59 JPKReader

This page lists supported metadata fields for the Bio-Formats JPK Instruments format reader. These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

• The file format itself supports 19 of them (4%).
• Of those, Bio-Formats fully or partially converts 19 (100%).

Supported fields

These fields are fully supported by the Bio-Formats JPK Instruments format reader:

• Channel: ID
• Channel: SamplesPerPixel
• Image: AcquisitionDate
• Image: ID
• Image: Name
• Pixels: BigEndian
• Pixels: DimensionOrder
• Pixels: ID
• Pixels: Interleaved
• Pixels: SignificantBits
• Pixels: SizeC

http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
http://www.openmicroscopy.org/site/support/ome-model/
19.2.60 JPXReader

This page lists supported metadata fields for the Bio-Formats JPX format reader. These fields are from the OME data model\(^{2209}\). Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g., physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

- The file format itself supports 19 of them (4%).
- Of those, Bio-Formats fully or partially converts 19 (100%).

Supported fields

These fields are fully supported by the Bio-Formats JPX format reader:

- Channel : ID\(^{2210}\)
- Channel : SamplesPerPixel\(^{2211}\)
- Image : AcquisitionDate\(^{2212}\)
- Image : ID\(^{2213}\)
- Image : Name\(^{2214}\)
- Pixels : BigEndian\(^{2215}\)
- Pixels : DimensionOrder\(^{2216}\)
- Pixels : ID\(^{2217}\)
- Pixels : Interleaved\(^{2218}\)

\(^{2201}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
\(^{2202}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
\(^{2203}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
\(^{2204}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
\(^{2205}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
\(^{2206}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
\(^{2207}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
\(^{2208}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
\(^{2209}\)http://www.openmicroscopy.org/site/support/ome-model/
\(^{2210}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
\(^{2211}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
\(^{2212}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
\(^{2213}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID
\(^{2214}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
\(^{2215}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
\(^{2216}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
\(^{2217}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
\(^{2218}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
• Pixels: SignificantBits
• Pixels: SizeC
• Pixels: SizeT
• Pixels: SizeX
• Pixels: SizeY
• Pixels: SizeZ
• Pixels: Type
• Plane: TheC
• Plane: TheT
• Plane: TheZ

Total supported: 19
Total unknown or missing: 456

19.2.61 KhorosReader

This page lists supported metadata fields for the Bio-Formats Khoros XV format reader.

These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

• The file format itself supports 19 of them (4%).
• Of those, Bio-Formats fully or partially converts 19 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Khoros XV format reader:

• Channel: ID
• Channel: SamplesPerPixel
• Image: AcquisitionDate
• Image: ID
• Image: Name
• Pixels: BigEndian
• Pixels: DimensionOrder

http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
http://www.openmicroscopy.org/site/support/ome-model/

19.2. Metadata fields

310
This page lists supported metadata fields for the Bio-Formats Kodak Molecular Imaging format reader. These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

- The file format itself supports 26 of them (5%).
- Of those, Bio-Formats fully or partially converts 26 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Kodak Molecular Imaging format reader:

- Channel: ID
- Channel: SamplesPerPixel
- Image: AcquisitionDate
- Image: ID
- Image: InstrumentRef

Total supported: 19

Total unknown or missing: 456
• Image : Name
• ImagingEnvironment : Temperature
• Instrument : ID
• Microscope : Model
• Pixels : BigEndian
• Pixels : DimensionOrder
• Pixels : ID
• Pixels : Interleaved
• Pixels : PhysicalSizeX
• Pixels : PhysicalSizeY
• Pixels : SignificantBits
• Pixels : SizeC
• Pixels : SizeT
• Pixels : SizeX
• Pixels : SizeY
• Pixels : SizeZ
• Pixels : Type
• Plane : ExposureTime
• Plane : TheC
• Plane : TheT
• Plane : TheZ

Total supported: 26
Total unknown or missing: 449

19.2.63 LiFlimReader

This page lists supported metadata fields for the Bio-Formats LI-FLIM format reader.

These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_Model
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_ExposureTime
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
http://www.openmicroscopy.org/site/support/ome-model/
Of the 475 fields documented in the metadata summary table:

- The file format itself supports 25 of them (5%).
- Of those, Bio-Formats fully or partially converts 25 (100%).

**Supported fields**

These fields are fully supported by the Bio-Formats LI-FLIM format reader:

- Channel: ID
- Channel: SamplesPerPixel
- Image: AcquisitionDate
- Image: ID
- Image: Name
- Image: ROIRef
- Pixels: BigEndian
- Pixels: DimensionOrder
- Pixels: ID
- Pixels: Interleaved
- Pixels: SignificantBits
- Pixels: SizeC
- Pixels: SizeT
- Pixels: SizeX
- Pixels: SizeY
- Pixels: SizeZ
- Pixels: Type
- Plane: DeltaT
- Plane: ExposureTime
- Plane: TheC
- Plane: TheT
- Plane: TheZ

2277 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
2278 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
2279 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
2280 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID
2281 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
2282 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#ROIRef_ID
2283 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
2284 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
2285 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
2286 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
2287 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
2288 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
2289 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
2290 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
2291 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
2292 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
2293 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
2294 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_DeltaT
2295 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_ExposureTime
2296 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
2297 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
2298 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
• Polygon: ID
• Polygon: Points
• ROI: ID

Total supported: 25
Total unknown or missing: 450

19.2.64 InspectorReader

This page lists supported metadata fields for the Bio-Formats Lavision Inspector format reader.

These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:
• The file format itself supports 19 of them (4%).
• Of those, Bio-Formats fully or partially converts 19 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Lavision Inspector format reader:

• Channel: ID
• Channel: SamplesPerPixel
• Image: AcquisitionDate
• Image: ID
• Image: Name
• Pixels: BigEndian
• Pixels: DimensionOrder
• Pixels: ID
• Pixels: Interleaved
• Pixels: SignificantBits
• Pixels: SizeC
• Pixels: SizeT
• Pixels: SizeX
• Pixels: SizeY

http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Polygon_Points
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#ROI_ID
http://www.openmicroscopy.org/site/support/ome-model/
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
• Pixels : SizeZ
• Pixels : Type
• Plane : TheC
• Plane : TheT
• Plane : TheZ

Total supported: 19

Total unknown or missing: 456

19.2.65 LeicaReader

This page lists supported metadata fields for the Bio-Formats Leica format reader.

These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

• The file format itself supports 56 of them (11%).
• Of those, Bio-Formats fully or partially converts 56 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Leica format reader:

• Channel : Color
• Channel : EmissionWavelength
• Channel : ExcitationWavelength
• Channel : ID
• Channel : Name
• Channel : PinholeSize
• Channel : SamplesPerPixel
• Detector : ID
• Detector : Offset
• Detector : Type
• Detector : Voltage
• DetectorSettings : ID

2317 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
2318 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
2320 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
2321 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
2322 http://www.openmicroscopy.org/site/support/ome-model/
2323 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_Color
2324 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_EmissionWavelength
2325 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ExcitationWavelength
2326 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
2327 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_Name
2328 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_PinholeSize
2329 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
2330 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_ID
2331 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_Offset
2332 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_Type
2333 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_Voltage
2334 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_ID
• Filter: ID
• Filter: Model
• Image: AcquisitionDate
• Image: Description
• Image: ID
• Image: InstrumentRef
• Image: Name
• Instrument: ID
• LightPath: EmissionFilterRef
• Objective: Correction
• Objective: ID
• Objective: Immersion
• Objective: LensNA
• Objective: Model
• Objective: NominalMagnification
• Objective: SerialNumber
• ObjectiveSettings: ID
• ObjectiveSettings: RefractiveIndex
• Pixels: BigEndian
• Pixels: DimensionOrder
• Pixels: ID
• Pixels: Interleaved
• Pixels: PhysicalSizeX
• Pixels: PhysicalSizeY
• Pixels: PhysicalSizeZ
• Pixels: SignificantBits

http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Filter_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_Model
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Description
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#FilterRef_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_Correction
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_Immersion
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_LensNA
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_Model
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_NominalMagnification
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_SerialNumber
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ObjectiveSettings_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ObjectiveSettings_RefractiveIndex
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits

19.2. Metadata fields
• Pixels : SizeC
• Pixels : SizeT
• Pixels : SizeX
• Pixels : SizeY
• Pixels : SizeZ
• Pixels : TimeIncrement
• Pixels : Type
• Plane : DeltaT
• Plane : ExposureTime
• Plane : PositionX
• Plane : PositionY
• Plane : TheC
• Plane : TheT
• Plane : TheZ
• StageLabel : Name
• StageLabel : Z
• TransmittanceRange : CutIn
• TransmittanceRange : CutOut

Total supported: 56
Total unknown or missing: 419

19.2.66 LIFReader

This page lists supported metadata fields for the Bio-Formats Leica Image File Format format reader. These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

• The file format itself supports 85 of them (17%).
• Of those, Bio-Formats fully or partially converts 85 (100%).
Supported fields

These fields are fully supported by the Bio-Formats Leica Image File Format format reader:

- Channel: Color
- Channel: ExcitationWavelength
- Channel: ID
- Channel: LightSourceSettings:Attenuation
- Channel: LightSourceSettings:ID
- Channel: Name
- Channel: PinholeSize
- Channel: SamplesPerPixel
- Detector: ID
- Detector: Model
- Detector: Offset
- Detector: Type
- Detector: Zoom
- DetectorSettings: Gain
- DetectorSettings: ID
- DetectorSettings: Offset
- Filter: ID
- Filter: Model
- Image: AcquisitionDate
- Image: Description
- Image: ID
- Image: InstrumentRef
- Image: Name
- Image: ROIRef

References:
- http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
- http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_Type
- http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_Zoom
- http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
• Instrument: ID
• Label: FontSize
• Label: ID
• Label: StrokeWidth
• Label: Text
• Label: X
• Label: Y
• Laser: ID
• Laser: LaserMedium
• Laser: Type
• Laser: Wavelength
• LightPath: EmissionFilterRef
• Line: ID
• Line: X1
• Line: X2
• Line: Y1
• Line: Y2
• Microscope: Model
• Microscope: Type
• Objective: Correction
• Objective: ID
• Objective: Immersion
• Objective: LensNA
• Objective: Model
• Objective: NominalMagnification
• Objective: SerialNumber

http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_FontSize
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_StrokeWidth
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_Text
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#LightSource_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/OME-2013-06/ome_xsd.html#Laser_Type
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/OME-2013-06/ome_xsd.html#Shape_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/OME-2013-06/ome_xsd.html#Line_X1
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/OME-2013-06/ome_xsd.html#Line_Y1
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/OME-2013-06/ome_xsd.html#Microscope_Type
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/OME-2013-06/ome_xsd.html#Objective_Correction
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/OME-2013-06/ome_xsd.html#Objective_Immersion
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/OME-2013-06/ome_xsd.html#Objective_NominalMagnification
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/OME-2013-06/ome_xsd.html#ManufacturerSpec_SerialNumber

19.2. Metadata fields
• ObjectiveSettings: ID
• ObjectiveSettings: RefractiveIndex
• Pixels: BigEndian
• Pixels: DimensionOrder
• Pixels: ID
• Pixels: Interleaved
• Pixels: PhysicalSizeX
• Pixels: PhysicalSizeY
• Pixels: PhysicalSizeZ
• Pixels: SignificantBits
• Pixels: SizeC
• Pixels: SizeT
• Pixels: SizeX
• Pixels: SizeY
• Pixels: SizeZ
• Pixels: TimeIncrement
• Pixels: Type
• Plane: DeltaT
• Plane: ExposureTime
• Plane: PositionX
• Plane: PositionY
• Plane: PositionZ
• Plane: TheC
• Plane: TheT
• Plane: TheZ
• Polygon: ID

2430http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ObjectiveSettings_ID
2431http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ObjectiveSettings_RefractiveIndex
2432http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
2433http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
2434http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
2435http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
2437http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
2438http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeZ
2439http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
2440http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
2441http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
2442http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
2443http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
2444http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
2445http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_TimeIncrement
2446http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
2447http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_DeltaT
2448http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_ExposureTime
2452http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
2453http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
2454http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
2455http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_ID

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```
• Polygon: Points
• ROI: ID
• Rectangle: Height
• Rectangle: ID
• Rectangle: Width
• Rectangle: X
• Rectangle: Y
• TransmittanceRange: CutIn
• TransmittanceRange: CutOut

Total supported: 85
Total unknown or missing: 390

19.2.67 LeicaSCNReader

This page lists supported metadata fields for the Bio-Formats Leica SCN format reader.

These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

- The file format itself supports 33 of them (6%).
- Of those, Bio-Formats fully or partially converts 33 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Leica SCN format reader:

- Channel: ID
- Channel: IlluminationType
- Channel: SamplesPerPixel
- Image: AcquisitionDate
- Image: Description
- Image: ID
- Image: InstrumentRef
- Image: Name

http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Polygon_Points
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#ROI_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Rectangle_Height
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Rectangle_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Rectangle_Width
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Rectangle_Y
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#TransmittanceRange_CutIn
http://www.openmicroscopy.org/site/support/ome-model/
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_IlluminationType
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Description
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
```
• Instrument: ID
• Objective: CalibratedMagnification
• Objective: ID
• Objective: LensNA
• Objective: NominalMagnification
• ObjectiveSettings: ID
• Pixels: BigEndian
• Pixels: DimensionOrder
• Pixels: ID
• Pixels: Interleaved
• Pixels: PhysicalSizeX
• Pixels: PhysicalSizeY
• Pixels: PhysicalSizeZ
• Pixels: SignificantBits
• Pixels: SizeC
• Pixels: SizeT
• Pixels: SizeX
• Pixels: SizeY
• Pixels: SizeZ
• Pixels: Type
• Plane: PositionX
• Plane: PositionY
• Plane: TheC
• Plane: TheT
• Plane: TheZ

Total supported: 33

Total unknown or missing: 442
19.2.68 LEOReader

This page lists supported metadata fields for the Bio-Formats LEO format reader.

These fields are from the OME data model\textsuperscript{2499}. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

- The file format itself supports 27 of them (5%).
- Of those, Bio-Formats fully or partially converts 27 (100%).

Supported fields

These fields are fully supported by the Bio-Formats LEO format reader:

- Channel: ID\textsuperscript{2500}
- Channel: SamplesPerPixel\textsuperscript{2501}
- Image: AcquisitionDate\textsuperscript{2502}
- Image: ID\textsuperscript{2503}
- Image: InstrumentRef\textsuperscript{2504}
- Image: Name\textsuperscript{2505}
- Instrument: ID\textsuperscript{2506}
- Objective: Correction\textsuperscript{2507}
- Objective: ID\textsuperscript{2508}
- Objective: Immersion\textsuperscript{2509}
- Objective: WorkingDistance\textsuperscript{2510}
- Pixels: BigEndian\textsuperscript{2511}
- Pixels: DimensionOrder\textsuperscript{2512}
- Pixels: ID\textsuperscript{2513}
- Pixels: Interleaved\textsuperscript{2514}
- Pixels: PhysicalSizeX\textsuperscript{2515}
- Pixels: PhysicalSizeY\textsuperscript{2516}
- Pixels: SignificantBits\textsuperscript{2517}

\textsuperscript{2499}http://www.openmicroscopy.org/site/support/ome-model/  
\textsuperscript{2500}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID  
\textsuperscript{2501}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel  
\textsuperscript{2502}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate  
\textsuperscript{2503}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID  
\textsuperscript{2504}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#InstrumentRef_ID  
\textsuperscript{2505}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name  
\textsuperscript{2506}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Instrument_ID  
\textsuperscript{2507}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_Correction  
\textsuperscript{2508}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_ID  
\textsuperscript{2509}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_Immersion  
\textsuperscript{2510}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_WorkingDistance  
\textsuperscript{2511}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian  
\textsuperscript{2512}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder  
\textsuperscript{2513}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID  
\textsuperscript{2514}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved  
\textsuperscript{2515}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeX  
\textsuperscript{2516}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY  
\textsuperscript{2517}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
19.2.69 L2DReader

This page lists supported metadata fields for the Bio-Formats Li-Cor L2D format reader. These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

- The file format itself supports 29 of them (6%).
- Of those, Bio-Formats fully or partially converts 29 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Li-Cor L2D format reader:

- Channel: ID
- Channel: LightSourceSettingsID
- Channel: SamplesPerPixel
- Image: AcquisitionDate
- Image: Description
- Image: ID
- Image: InstrumentRef
- Image: Name

Total supported: 27
Total unknown or missing: 448
Bio-Formats Documentation, Release 5.0.2

- **Instrument**: ID
- **Laser**: ID
- **Laser**: LaserMedium
- **Laser**: Type
- **Laser**: Wavelength
- **Microscope**: Model
- **Microscope**: Type
- **Laser**: LaserMedium
- **Microscope**: Type
- **Pixels**: BigEndian
- **Pixels**: DimensionOrder
- **Pixels**: ID
- **Pixels**: Interleaved
- **Pixels**: SignificantBits
- **Pixels**: SizeC
- **Pixels**: SizeT
- **Pixels**: SizeX
- **Pixels**: SizeY
- **Pixels**: SizeZ
- **Pixels**: Type
- **Plane**: TheC
- **Plane**: TheT
- **Plane**: TheZ

Total supported: 29
Total unknown or missing: 446

19.2.70 LIMReader

This page lists supported metadata fields for the Bio-Formats Laboratory Imaging format reader.

These fields are from the [OME data model](http://www.openmicroscopy.org/site/support/ome-model/). Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

19.2. Metadata fields
Of the 475 fields documented in the metadata summary table:

- The file format itself supports 19 of them (4%).
- Of those, Bio-Formats fully or partially converts 19 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Laboratory Imaging format reader:

- Channel : ID
- Channel : SamplesPerPixel
- Image : AcquisitionDate
- Image : ID
- Image : Name
- Pixels : BigEndian
- Pixels : DimensionOrder
- Pixels : ID
- Pixels : Interleaved
- Pixels : SignificantBits
- Pixels : SizeC
- Pixels : SizeT
- Pixels : SizeX
- Pixels : SizeY
- Pixels : SizeZ
- Pixels : Type
- Plane : TheC
- Plane : TheT
- Plane : TheZ

Total supported: 19

Total unknown or missing: 456
19.2.71 MetamorphTiffReader

This page lists supported metadata fields for the Bio-Formats Metamorph TIFF format reader.

These fields are from the OME data model\(^\text{2577}\). Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

**Of the 475 fields documented in the metadata summary table:**

- The file format itself supports 38 of them (8%).
- Of those, Bio-Formats fully or partially converts 38 (100%).

**Supported fields**

These fields are fully supported by the Bio-Formats Metamorph TIFF format reader:

- Channel : ID\(^\text{2578}\)
- Channel : Name\(^\text{2579}\)
- Channel : SamplesPerPixel\(^\text{2580}\)
- Image : AcquisitionDate\(^\text{2581}\)
- Image : Description\(^\text{2582}\)
- Image : ID\(^\text{2583}\)
- Image : Name\(^\text{2584}\)
- ImagingEnvironment : Temperature\(^\text{2585}\)
- Pixels : BigEndian\(^\text{2586}\)
- Pixels : DimensionOrder\(^\text{2587}\)
- Pixels : ID\(^\text{2588}\)
- Pixels : Interleaved\(^\text{2589}\)
- Pixels : PhysicalSizeX\(^\text{2590}\)
- Pixels : PhysicalSizeY\(^\text{2591}\)
- Pixels : PhysicalSizeZ\(^\text{2592}\)
- Pixels : SignificantBits\(^\text{2593}\)
- Pixels : SizeC\(^\text{2594}\)
- Pixels : SizeT\(^\text{2595}\)

\(^{2577}\)http://www.openmicroscopy.org/site/support/ome-model/

\(^{2578}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID

\(^{2579}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_Name

\(^{2580}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel

\(^{2581}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate

\(^{2582}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Description

\(^{2583}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID

\(^{2584}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name

\(^{2585}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ImagingEnvironment_Temperature

\(^{2586}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian

\(^{2587}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder

\(^{2588}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID

\(^{2589}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved

\(^{2590}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeX

\(^{2591}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY

\(^{2592}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeZ

\(^{2593}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits

\(^{2594}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC

\(^{2595}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
19.2.72 MetamorphReader

This page lists supported metadata fields for the Bio-Formats Metamorph STK format reader.

These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g., physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

- Pixels : SizeX
- Pixels : SizeY
- Pixels : SizeZ
- Pixels : Type
- Plane : DeltaT
- Plane : ExposureTime
- Plane : PositionX
- Plane : PositionY
- Plane : TheC
- Plane : TheT
- Plane : TheZ
- Plate : ColumnNamingConvention
- Plate : ID
- Plate : RowNamingConvention
- Well : Column
- Well : ID
- Well : Row
- WellSample : ID
- WellSample : ImageRef
- WellSample : Index

Total supported: 38
Total unknown or missing: 437
• The file format itself supports 43 of them (9%).
• Of those, Bio-Formats fully or partially converts 43 (100%).

**Supported fields**

These fields are fully supported by the Bio-Formats Metamorph STK format reader:

- Channel: ID
- Channel: LightSourceSettingsID
- Channel: LightSourceSettingsWavelength
- Channel: Name
- Channel: SamplesPerPixel
- Detector: ID
- Detector: Type
- DetectorSettings: Binning
- DetectorSettings: Gain
- DetectorSettings: ID
- DetectorSettings: ReadOutRate
- Image: AcquisitionDate
- Image: Description
- Image: ID
- Image: InstrumentRef
- Image: Name
- ImagingEnvironment: Temperature
- Instrument: ID
- Laser: ID
- Laser: LaserMedium
- Laser: Type
- Pixels: BigEndian
- Pixels: DimensionOrder

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2617 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
2619 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#LightSourceSettings_Wavelength
2620 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_Name
2621 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
2622 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_ID
2623 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_Type
2624 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_Binning
2626 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_ID
2627 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_ReadOutRate
2628 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
2629 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Description
2632 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
2635 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#LightSource_ID
2637 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Laser_Type
2638 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
2639 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
• Pixels: ID
• Pixels: Interleaved
• Pixels: PhysicalSizeX
• Pixels: PhysicalSizeY
• Pixels: PhysicalSizeZ
• Pixels: SignificantBits
• Pixels: SizeC
• Pixels: SizeT
• Pixels: SizeX
• Pixels: SizeY
• Pixels: SizeZ
• Pixels: Type
• Plane: DeltaT
• Plane: ExposureTime
• Plane: PositionX
• Plane: PositionY
• Plane: PositionZ
• Plane: TheC
• Plane: TheT
• Plane: TheZ

Total supported: 43
Total unknown or missing: 432

19.2.73 MIASReader

This page lists supported metadata fields for the Bio-Formats MIAS format reader.

These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_DeltaT
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_ExposureTime
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
• The file format itself supports 64 of them (13%).
• Of those, Bio-Formats fully or partially converts 64 (100%).

**Supported fields**

These fields are fully supported by the Bio-Formats MIAS format reader:

- Channel: Color
- Channel: ID
- Channel: Name
- Channel: SamplesPerPixel
- Ellipse: ID
- Ellipse: RadiusX
- Ellipse: RadiusY
- Ellipse: Text
- Ellipse: TheT
- Ellipse: TheZ
- Ellipse: X
- Ellipse: Y
- Experiment: Description
- Experiment: ID
- Experiment: Type
- Image: AcquisitionDate
- Image: ExperimentRef
- Image: ID
- Image: InstrumentRef
- Image: Name
- Image: ROIRef
- Instrument: ID
- Mask: FillColor

[^2664]: [http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel](http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel)
[^2670]: [http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_TheZ](http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_TheZ)
[^2676]: [http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/OME-2013-06/ome_xsd.html#Image_AcquisitionDate](http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/OME-2013-06/ome_xsd.html#Image_AcquisitionDate)

19.2. Metadata fields
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- Mask: Height
- Mask: ID
- Mask: StrokeColor
- Mask: Width
- Mask: X
- Mask: Y
- Objective: ID
- Objective: Model
- Objective: NominalMagnification
- Pixels: BigEndian
- Pixels: DimensionOrder
- Pixels: ID
- Pixels: Interleaved
- Pixels: PhysicalSizeX
- Pixels: PhysicalSizeY
- Pixels: SignificantBits
- Pixels: SizeC
- Pixels: SizeT
- Pixels: SizeX
- Pixels: SizeY
- Pixels: SizeZ
- Pixels: Type
- Plane: ExposureTime
- Plane: TheC
- Plane: TheT
- Plane: TheZ

2684 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Mask_Height
2685 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_ID
2686 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_StrokeColor
2687 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Mask_Width
2689 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Mask_Y
2690 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_ID
2691 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_Model
2692 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_NominalMagnification
2693 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
2694 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
2695 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
2696 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
2698 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
2699 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
2700 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
2701 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
2702 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
2703 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
2704 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
2705 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_ExposureTime
2706 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
2707 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
2708 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ

19.2. Metadata fields
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<table>
<thead>
<tr>
<th>Field</th>
<th>URL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plate: ColumnNamingConvention</td>
<td><a href="http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Plate_ColumnNamingConvention">http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Plate_ColumnNamingConvention</a></td>
</tr>
<tr>
<td>Plate: ExternalIdentifier</td>
<td><a href="http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Plate_ExternalIdentifier">http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Plate_ExternalIdentifier</a></td>
</tr>
<tr>
<td>Plate: ID</td>
<td><a href="http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Plate_ID">http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Plate_ID</a></td>
</tr>
<tr>
<td>Plate: Name</td>
<td><a href="http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Plate_Name">http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Plate_Name</a></td>
</tr>
<tr>
<td>Plate: RowNamingConvention</td>
<td><a href="http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Plate_RowNamingConvention">http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Plate_RowNamingConvention</a></td>
</tr>
<tr>
<td>PlateAcquisition: ID</td>
<td><a href="http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#PlateAcquisition_ID">http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#PlateAcquisition_ID</a></td>
</tr>
<tr>
<td>PlateAcquisition: MaximumFieldCount</td>
<td><a href="http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#PlateAcquisition_MaximumFieldCount">http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#PlateAcquisition_MaximumFieldCount</a></td>
</tr>
<tr>
<td>PlateAcquisition: WellSampleRef</td>
<td><a href="http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#WellSampleRef_ID">http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#WellSampleRef_ID</a></td>
</tr>
<tr>
<td>Well: Column</td>
<td><a href="http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Well_Column">http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Well_Column</a></td>
</tr>
<tr>
<td>Well: Row</td>
<td><a href="http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Well_Row">http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Well_Row</a></td>
</tr>
<tr>
<td>WellSample: ID</td>
<td><a href="http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#WellSample_ID">http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#WellSample_ID</a></td>
</tr>
<tr>
<td>WellSample: Index</td>
<td><a href="http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#WellSample_Index">http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#WellSample_Index</a></td>
</tr>
</tbody>
</table>

Total supported: 64
Total unknown or missing: 411

### 19.2.74 MicromanagerReader

This page lists supported metadata fields for the Bio-Formats Micro-Manager format reader.

These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g., physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:
- The file format itself supports 38 of them (8%).
- Of those, Bio-Formats fully or partially converts 38 (100%).

#### Supported fields

These fields are fully supported by the Bio-Formats Micro-Manager format reader:

- Channel: ID
- Channel: Name

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2710 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Plate_ColumnNamingConvention
2711 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Plate_ExternalIdentifier
2712 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Plate_ID
2713 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Plate_Name
2714 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Plate_RowNamingConvention
2715 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#PlateAcquisition_ID
2716 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#PlateAcquisition_MaximumFieldCount
2717 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#WellSampleRef_ID
2718 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#ROI_ID
2719 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Well_Column
2720 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Well_ID
2721 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Well_Row
2722 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#WellSample_ID
2724 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#WellSample_Index
2725 http://www.openmicroscopy.org/site/support/ome-model/
2726 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
2727 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_Name
- Channel: SamplesPerPixel
- Detector: ID
- Detector: Manufacturer
- Detector: Model
- Detector: SerialNumber
- Detector: Type
- DetectorSettings: Binning
- DetectorSettings: Gain
- DetectorSettings: ID
- DetectorSettings: Voltage
- Image: AcquisitionDate
- Image: Description
- Image: ID
- Image: InstrumentRef
- Image: Name
- ImagingEnvironment: Temperature
- Instrument: ID
- Pixels: BigEndian
- Pixels: DimensionOrder
- Pixels: ID
- Pixels: Interleaved
- Pixels: PhysicalSizeX
- Pixels: PhysicalSizeY
- Pixels: PhysicalSizeZ
- Pixels: SignificantBits
- Pixels: SizeC

http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_Manufacturer
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_Model
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_SerialNumber
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_Type
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_Binning
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_Voltage
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Description
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC

19.2. Metadata fields
19.2.75 MINCReader

This page lists supported metadata fields for the Bio-Formats MINC MRI format reader.

These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

- The file format itself supports 23 of them (4%).
- Of those, Bio-Formats fully or partially converts 23 (100%).

Supported fields

These fields are fully supported by the Bio-Formats MINC MRI format reader:

- Channel: ID
- Channel: SamplesPerPixel
- Image: AcquisitionDate
- Image: Description
- Image: ID
- Image: Name
- Pixels: BigEndian

Total supported: 38
Total unknown or missing: 437
• Pixels : DimensionOrder
• Pixels : ID
• Pixels : Interleaved
• Pixels : PhysicalSizeX
• Pixels : PhysicalSizeY
• Pixels : PhysicalSizeZ
• Pixels : SignificantBits
• Pixels : SizeC
• Pixels : SizeT
• Pixels : SizeX
• Pixels : SizeY
• Pixels : SizeZ
• Pixels : Type
• Plane : TheC
• Plane : TheT
• Plane : TheZ

Total supported: 23
Total unknown or missing: 452

19.2.76 MRWReader

This page lists supported metadata fields for the Bio-Formats Minolta MRW format reader.

These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

• The file format itself supports 19 of them (4%).
• Of those, Bio-Formats fully or partially converts 19 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Minolta MRW format reader:

• Channel : ID

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2772 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
2773 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
2774 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
2776 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
2778 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
2779 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
2780 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
2781 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
2782 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
2783 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
2784 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
2785 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
2786 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
2787 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
2789 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
• Channel: SamplesPerPixel
• Image: AcquisitionDate
• Image: ID
• Image: Name
• Pixels: BigEndian
• Pixels: DimensionOrder
• Pixels: ID
• Pixels: Interleaved
• Pixels: SignificantBits
• Pixels: SizeC
• Pixels: SizeT
• Pixels: SizeX
• Pixels: SizeY
• Pixels: SizeZ
• Pixels: Type
• Plane: TheC
• Plane: TheT
• Plane: TheZ

Total supported: 19
Total unknown or missing: 456

19.2.77 MNGReader

This page lists supported metadata fields for the Bio-Formats Multiple Network Graphics format reader. These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:
• The file format itself supports 19 of them (4%).
• Of those, Bio-Formats fully or partially converts 19 (100%).
Supported fields

These fields are fully supported by the Bio-Formats Multiple Network Graphics format reader:

- Channel : ID
- Channel : SamplesPerPixel
- Image : AcquisitionDate
- Image : ID
- Image : Name
- Pixels : BigEndian
- Pixels : DimensionOrder
- Pixels : ID
- Pixels : Interleaved
- Pixels : SignificantBits
- Pixels : SizeC
- Pixels : SizeT
- Pixels : SizeX
- Pixels : SizeY
- Pixels : SizeZ
- Pixels : Type
- Plane : TheC
- Plane : TheT
- Plane : TheZ

Total supported: 19
Total unknown or missing: 456

19.2.78 MolecularImagingReader

This page lists supported metadata fields for the Bio-Formats Molecular Imaging format reader.

These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ

19.2. Metadata fields
Of the 475 fields documented in the metadata summary table:

- The file format itself supports 21 of them (4%).
- Of those, Bio-Formats fully or partially converts 21 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Molecular Imaging format reader:

- Channel: ID
- Channel: SamplesPerPixel
- Image: AcquisitionDate
- Image: ID
- Image: Name
- Pixels: BigEndian
- Pixels: DimensionOrder
- Pixels: ID
- Pixels: Interleaved
- Pixels: PhysicalSizeX
- Pixels: PhysicalSizeY
- Pixels: SignificantBits
- Pixels: SizeC
- Pixels: SizeT
- Pixels: SizeX
- Pixels: SizeY
- Pixels: SizeZ
- Pixels: Type
- Plane: TheC
- Plane: TheT
- Plane: TheZ

Total supported: 21

Total unknown or missing: 454
19.2.79 MRCReader

This page lists supported metadata fields for the Bio-Formats Medical Research Council format reader. These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:
- The file format itself supports 22 of them (4%).
- Of those, Bio-Formats fully or partially converts 22 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Medical Research Council format reader:

- Channel : ID
- Channel : SamplesPerPixel
- Image : AcquisitionDate
- Image : ID
- Image : Name
- Pixels : BigEndian
- Pixels : DimensionOrder
- Pixels : ID
- Pixels : Interleaved
- Pixels : PhysicalSizeX
- Pixels : PhysicalSizeY
- Pixels : PhysicalSizeZ
- Pixels : SignificantBits
- Pixels : SizeC
- Pixels : SizeT
- Pixels : SizeX
- Pixels : SizeY
- Pixels : SizeZ
- Pixels : Type

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2850 http://www.openmicroscopy.org/site/support/ome-model
2851 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
2852 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
2853 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
2855 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
2856 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
2857 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
2858 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
2859 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
2861 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
2863 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
2864 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
2865 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
2866 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
2867 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
2868 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
2869 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
Bio-Formats Documentation, Release 5.0.2

• Plane: TheC
• Plane: TheT
• Plane: TheZ

Total supported: 22
Total unknown or missing: 453

19.2.80 NikonReader

This page lists supported metadata fields for the Bio-Formats Nikon NEF format reader.

These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:
• The file format itself supports 19 of them (4%).
• Of those, Bio-Formats fully or partially converts 19 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Nikon NEF format reader:
• Channel : ID
• Channel : SamplesPerPixel
• Image : AcquisitionDate
• Image : ID
• Image : Name
• Pixels : BigEndian
• Pixels : DimensionOrder
• Pixels : ID
• Pixels : Interleaved
• Pixels : SignificantBits
• Pixels : SizeC
• Pixels : SizeT
• Pixels : SizeX
• Pixels : SizeY

http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
http://www.openmicroscopy.org/site/support/ome-model/
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY

19.2. Metadata fields
Bio-Formats Documentation, Release 5.0.2

• Pixels : SizeZ
• Pixels : Type
• Plane : TheC
• Plane : TheT
• Plane : TheZ

Total supported: 19
Total unknown or missing: 456

19.2.81 NiftiReader

This page lists supported metadata fields for the Bio-Formats NIfTI format reader. These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:
• The file format itself supports 24 of them (5%).
• Of those, Bio-Formats fully or partially converts 24 (100%).

Supported fields

These fields are fully supported by the Bio-Formats NIfTI format reader:

• Channel : ID
• Channel : SamplesPerPixel
• Image : AcquisitionDate
• Image : Description
• Image : ID
• Image : Name
• Pixels : BigEndian
• Pixels : DimensionOrder
• Pixels : ID
• Pixels : Interleaved
• Pixels : PhysicalSizeX
• Pixels : PhysicalSizeY
• Pixels : SizeZ
• Pixels : Type
• Plane : TheC
• Plane : TheT
• Plane : TheZ

2888 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
2889 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
2890 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
2891 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
2892 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
2893 http://www.openmicroscopy.org/site/support/ome-model/
2894 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
2895 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
2896 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
2897 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Description
2899 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
2900 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
2901 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
2902 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
2903 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
2905 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY

19.2. Metadata fields
19.2.82 NikonElementsTiffReader

This page lists supported metadata fields for the Bio-Formats Nikon Elements TIFF format reader. These fields are from the OME data model sup. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

- The file format itself supports 50 of them (10%).
- Of those, Bio-Formats fully or partially converts 50 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Nikon Elements TIFF format reader:

- Channel: AcquisitionMode
- Channel: EmissionWavelength
- Channel: ExcitationWavelength
- Channel: ID
- Channel: Name

Total supported: 24

Total unknown or missing: 451

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2907 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
2908 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
2909 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
2910 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
2911 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
2912 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
2913 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_TimeIncrement
2914 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
2915 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
2916 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
2917 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
2918 http://www.openmicroscopy.org/site/support/ome-model/
2919 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_AcquisitionMode
2920 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_EmissionWavelength
2921 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ExcitationWavelength
2922 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
2923 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_Name
• Channel: PinholeSize
• Channel: SamplesPerPixel
• Detector: ID
• Detector: Model
• Detector: Type
• DetectorSettings: Binning
• DetectorSettings: Gain
• DetectorSettings: ID
• DetectorSettings: ReadOutRate
• DetectorSettings: Voltage
• Image: AcquisitionDate
• Image: ID
• Image: InstrumentRef
• Image: Name
• ImagingEnvironment: Temperature
• Instrument: ID
• Objective: CalibratedMagnification
• Objective: Correction
• Objective: ID
• Objective: Immersion
• Objective: LensNA
• Objective: Model
• ObjectiveSettings: ID
• ObjectiveSettings: RefractiveIndex
• Pixels: BigEndian
• Pixels: DimensionOrder
• Pixels : ID
• Pixels : Interleaved
• Pixels : PhysicalSizeX
• Pixels : PhysicalSizeY
• Pixels : PhysicalSizeZ
• Pixels : SignificantBits
• Pixels : SizeC
• Pixels : SizeT
• Pixels : SizeX
• Pixels : SizeY
• Pixels : SizeZ
• Pixels : Type
• Plane : ExposureTime
• Plane : PositionX
• Plane : PositionY
• Plane : PositionZ
• Plane : TheC
• Plane : TheT
• Plane : TheZ

Total supported: 50
Total unknown or missing: 425

19.2.83 NikonTiffReader

This page lists supported metadata fields for the Bio-Formats Nikon TIFF format reader.

These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

• The file format itself supports 47 of them (9%).
• Of those, Bio-Formats fully or partially converts 47 (100%).
Supported fields

These fields are fully supported by the Bio-Formats Nikon TIFF format reader:

- Channel: EmissionWavelength
- Channel: ExcitationWavelength
- Channel: ID
- Channel: PinholeSize
- Channel: SamplesPerPixel
- Detector: Gain
- Detector: ID
- Detector: Type
- Dichroic: ID
- Dichroic: Model
- Filter: ID
- Filter: Model
- Image: AcquisitionDate
- Image: Description
- Image: ID
- Image: InstrumentRef
- Image: Name
- Instrument: ID
- Laser: ID
- Laser: LaserMedium
- Laser: Model
- Laser: Type
- Laser: Wavelength
- Objective: Correction
• Objective: ID
• Objective: Immersion
• Objective: LensNA
• Objective: NominalMagnification
• Objective: WorkingDistance
• ObjectiveSettings: ID
• Pixels: BigEndian
• Pixels: DimensionOrder
• Pixels: ID
• Pixels: Interleaved
• Pixels: PhysicalSizeX
• Pixels: PhysicalSizeY
• Pixels: PhysicalSizeZ
• Pixels: SignificantBits
• Pixels: Size
• Pixels: SizeT
• Pixels: SizeX
• Pixels: SizeY
• Pixels: SizeZ
• Pixels: Type
• Plane: TheC
• Plane: TheT
• Plane: TheZ

Total supported: 47

Total unknown or missing: 428

2994 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_ID
2995 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_Immersion
2996 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_LensNA
2997 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_NominalMagnification
2998 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_WorkingDistance
2999 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ObjectiveSettings_ID
3000 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
3001 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
3002 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
3003 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
3004 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeX
3005 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
3007 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
3008 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
3009 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
3010 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
3011 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
3012 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
3013 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
3014 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
3015 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
3016 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
19.2.84 NativeND2Reader

This page lists supported metadata fields for the Bio-Formats Nikon ND2 format reader. These fields are from the OME data model\(^{3017}\). Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

- The file format itself supports 52 of them (10%).
- Of those, Bio-Formats fully or partially converts 52 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Nikon ND2 format reader:

- Channel: AcquisitionMode\(^{3018}\)
- Channel: Color\(^{3019}\)
- Channel: EmissionWavelength\(^{3020}\)
- Channel: ExcitationWavelength\(^{3021}\)
- Channel: ID\(^{3022}\)
- Channel: Name\(^{3023}\)
- Channel: PinholeSize\(^{3024}\)
- Channel: SamplesPerPixel\(^{3025}\)
- Detector: ID\(^{3026}\)
- Detector: Model\(^{3027}\)
- Detector: Type\(^{3028}\)
- DetectorSettings: Binning\(^{3029}\)
- DetectorSettings: Gain\(^{3030}\)
- DetectorSettings: ID\(^{3031}\)
- DetectorSettings: ReadOutRate\(^{3032}\)
- DetectorSettings: Voltage\(^{3033}\)
- Image: AcquisitionDate\(^{3034}\)
- Image: ID\(^{3035}\)
- Image: InstrumentRef\(^{3036}\)
- Image : Name
- ImagingEnvironment : Temperature
- Instrument : ID
- Objective : CalibratedMagnification
- Objective : Correction
- Objective : ID
- Objective : Immersion
- Objective : LensNA
- ObjectiveSettings : ID
- ObjectiveSettings : RefractiveIndex
- Pixels : BigEndian
- Pixels : DimensionOrder
- Pixels : ID
- Pixels : Interleaved
- Pixels : PhysicalSizeX
- Pixels : PhysicalSizeY
- Pixels : PhysicalSizeZ
- Pixels : SignificantBits
- Pixels : SizeC
- Pixels : SizeT
- Pixels : SizeX
- Pixels : SizeY
- Pixels : SizeZ
- Pixels : Type
- Plane : DeltaT

3037 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
3038 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ImagingEnvironment_Temperature
3040 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_CalibratedMagnification
3041 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_Correction
3042 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_ID
3043 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_Immersion
3044 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_LensNA
3045 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_Model
3046 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ObjectiveSettings_ID
3047 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ObjectiveSettings_RefractiveIndex
3048 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
3049 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
3050 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
3051 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
3053 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
3055 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
3056 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
3057 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
3058 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
3059 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
3060 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
3061 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
3062 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_DeltaT
• Plane: ExposureTime
• Plane: PositionX
• Plane: PositionY
• Plane: PositionZ
• Plane: TheC
• Plane: TheT
• Plane: TheZ

Total supported: 52
Total unknown or missing: 423

19.2.85 NRRDReader

This page lists supported metadata fields for the Bio-Formats NRRD format reader.

These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

• The file format itself supports 22 of them (4%).
• Of those, Bio-Formats fully or partially converts 22 (100%).

Supported fields

These fields are fully supported by the Bio-Formats NRRD format reader:

• Channel: ID
• Channel: SamplesPerPixel
• Image: AcquisitionDate
• Image: ID
• Image: Name
• Pixels: BigEndian
• Pixels: DimensionOrder
• Pixels: ID
• Pixels: Interleaved
• Pixels: PhysicalSizeX

http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_ExposureTime
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
http://www.openmicroscopy.org/site/support/ome-model/
• Pixels: PhysicalSizeY
• Pixels: PhysicalSizeZ
• Pixels: SignificantBits
• Pixels: SizeC
• Pixels: SizeT
• Pixels: SizeX
• Pixels: SizeY
• Pixels: SizeZ
• Pixels: Type
• Plane: TheC
• Plane: TheT
• Plane: TheZ

Total supported: 22

Total unknown or missing: 453

19.2.86 APLReader

This page lists supported metadata fields for the Bio-Formats Olympus APL format reader.

These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:
• The file format itself supports 21 of them (4%).
• Of those, Bio-Formats fully or partially converts 21 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Olympus APL format reader:
• Channel: ID
• Channel: SamplesPerPixel
• Image: AcquisitionDate
• Image: ID
• Image: Name

http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
http://www.openmicroscopy.org/site/support/ome-model/
Bio-Formats Documentation, Release 5.0.2

• Pixels: BigEndian
• Pixels: DimensionOrder
• Pixels: ID
• Pixels: Interleaved
• Pixels: PhysicalSizeX
• Pixels: PhysicalSizeY
• Pixels: SignificantBits
• Pixels: SizeC
• Pixels: SizeT
• Pixels: SizeX
• Pixels: SizeY
• Pixels: SizeZ
• Pixels: Type
• Plane: TheC
• Plane: TheT
• Plane: TheZ

Total supported: 21
Total unknown or missing: 454

19.2.87 FV1000Reader

This page lists supported metadata fields for the Bio-Formats Olympus FV1000 format reader.

These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

• The file format itself supports 113 of them (23%).
• Of those, Bio-Formats fully or partially converts 113 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Olympus FV1000 format reader:

• Channel: EmissionWavelength

19.2. Metadata fields
• Channel : ExcitationWavelength
• Channel : ID
• Channel : IlluminationType
• Channel : LightSourceSettingsID
• Channel : LightSourceSettingsWavelength
• Channel : Name
• Channel : SamplesPerPixel
• Detector : Gain
• Detector : ID
• Detector : Type
• Detector : Voltage
• DetectorSettings : ID
• Dichroic : ID
• Dichroic : Model
• Ellipse : FontSize
• Ellipse : ID
• Ellipse : RadiusX
• Ellipse : RadiusY
• Ellipse : StrokeWidth
• Ellipse : TheT
• Ellipse : TheZ
• Ellipse : Transform
• Ellipse : X
• Ellipse : Y
• Filter : ID

3117 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/OMEXsd.html#Channel_ExcitationWavelength
3118 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/OMEXsd.html#Channel_ID
3119 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/OMEXsd.html#Channel_IlluminationType
3120 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/OMEXsd.html#LightSourceSettings_ID
3121 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/OMEXsd.html#LightSourceSettings_Wavelength
3122 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/OMEXsd.html#Channel_Name
3123 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/OMEXsd.html#Channel_SamplesPerPixel
3124 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/OMEXsd.html#Detector_Gain
3125 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/OMEXsd.html#Detector_ID
3126 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/OMEXsd.html#Detector_Type
3127 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/OMEXsd.html#Detector_Voltage
3128 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/OMEXsd.html#DetectorSettings_ID
3129 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/OMEXsd.html#Dichroic_ID
3130 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/OMEXsd.html#Manufacturerspec_Model
3131 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_FontSize
3132 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_ID
3134 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Ellipse_RadiusY
3135 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_StrokeWidth
3136 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_TheT
3137 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_TheZ
3138 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_Transform
3140 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Ellipse_Y
3141 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/OMEXsd.html#Filter_ID
3142 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/OMEXsd.html#Manufacturerspec_Model
• Image: AcquisitionDate
• Image: ID
• Image: InstrumentRef
• Image: Name
• Image: ROIRef
• Instrument: ID
• Laser: ID
• Laser: LaserMedium
• Laser: Type
• Laser: Wavelength
• LightPath: DichroicRef
• LightPath: EmissionFilterRef
• Line: FontSize
• Line: ID
• Line: StrokeWidth
• Line: TheT
• Line: TheZ
• Line: Transform
• Line: X1
• Line: X2
• Line: Y1
• Line: Y2
• Objective: Correction
• Objective: ID
• Objective: Immersion
• Objective: LensNA

http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#ROIRef_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#LightSource_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Laser_Type
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DichroicRef_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#FilterRef_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_FontSize
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_StrokeWidth
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_TheT
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_TheZ
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_Transform
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Line_X1
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Line_X2
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Line_Y1
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_Correction
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_Immersion
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_LensNA
• Objective: Model
• Objective: NominalMagnification
• Objective: WorkingDistance
• ObjectiveSettings: ID
• Pixels: BigEndian
• Pixels: DimensionOrder
• Pixels: ID
• Pixels: Interleaved
• Pixels: PhysicalSizeX
• Pixels: PhysicalSizeY
• Pixels: PhysicalSizeZ
• Pixels: SignificantBits
• Pixels: SizeC
• Pixels: SizeT
• Pixels: SizeX
• Pixels: SizeY
• Pixels: SizeZ
• Pixels: TimeIncrement
• Pixels: Type
• Plane: DeltaT
• Plane: PositionX
• Plane: PositionY
• Plane: PositionZ
• Plane: TheC
• Plane: TheT
• Plane: TheZ

19.2. Metadata fields
• Point: FontSize
• Point: ID
• Point: StrokeWidth
• Point: TheT
• Point: TheZ
• Point: X
• Point: Y
• Polygon: FontSize
• Polygon: ID
• Polygon: Points
• Polygon: StrokeWidth
• Polygon: TheT
• Polygon: TheZ
• Polygon: Transform
• Polyline: FontSize
• Polyline: ID
• Polyline: Points
• Polyline: StrokeWidth
• Polyline: TheT
• Polyline: TheZ
• Polyline: Transform
• ROI: ID
• Rectangle: FontSize
• Rectangle: Height
• Rectangle: ID
• Rectangle: StrokeWidth

http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_FontSize
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_StrokeWidth
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_TheT
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_TheZ
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Point_X
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Point_Y
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_FontSize
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Polygon_Points
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_StrokeWidth
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_TheT
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_TheZ
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_Transform
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Polyline_Points
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_StrokeWidth
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_TheT
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_TheZ
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_Transform
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_FontSize
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#ROI_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Rectangle_Height
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_StrokeWidth
19.2.88 FluoviewReader

This page lists supported metadata fields for the Bio-Formats Olympus Fluoview/ABD TIFF format reader. These fields are from the OME data model. Bio-Formats standardizes each format's original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

- The file format itself supports 49 of them (10%).
- Of those, Bio-Formats fully or partially converts 49 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Olympus Fluoview/ABD TIFF format reader:

- Channel : ID
- Channel : Name
- Channel : SamplesPerPixel
- Detector : ID
- Detector : Manufacturer
- Detector : Model
- Detector : Type
- DetectorSettings : Gain
- DetectorSettings : ID

Total supported: 113
Total unknown or missing: 362
• DetectorSettings: Offset
• DetectorSettings: ReadOutRate
• DetectorSettings: Voltage
• Image: AcquisitionDate
• Image: Description
• Image: ID
• Image: InstrumentRef
• Image: Name
• ImagingEnvironment: Temperature
• Instrument: ID
• Objective: CalibratedMagnification
• Objective: Correction
• Objective: ID
• Objective: Immersion
• Objective: LensNA
• Objective: Model
• ObjectiveSettings: ID
• Pixels: BigEndian
• Pixels: DimensionOrder
• Pixels: ID
• Pixels: Interleaved
• Pixels: PhysicalSizeX
• Pixels: PhysicalSizeY
• Pixels: PhysicalSizeZ
• Pixels: SignificantBits
• Pixels: SizeC
• Pixels : SizeT
• Pixels : SizeX
• Pixels : SizeY
• Pixels : SizeZ
• Pixels : TimeIncrement
• Pixels : Type
• Plane : DeltaT
• Plane : ExposureTime
• Plane : PositionX
• Plane : PositionY
• Plane : PositionZ
• Plane : TheC
• Plane : TheT
• Plane : TheZ

Total supported: 49

Total unknown or missing: 426

19.2.89 ScanrReader

This page lists supported metadata fields for the Bio-Formats Olympus ScanR format reader.

These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

• The file format itself supports 43 of them (9%).
• Of those, Bio-Formats fully or partially converts 43 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Olympus ScanR format reader:

• Channel : ID
• Channel : Name
• Channel : SamplesPerPixel

http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_TimeIncrement
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_DeltaT
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_ExposureTime
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
http://www.openmicroscopy.org/site/support/ome-model/

http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_Name
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
• Image: AcquisitionDate
• Image: ID
• Image: Name
• Pixels: BigEndian
• Pixels: DimensionOrder
• Pixels: ID
• Pixels: Interleaved
• Pixels: PhysicalSizeX
• Pixels: PhysicalSizeY
• Pixels: SignificantBits
• Pixels: SizeC
• Pixels: SizeT
• Pixels: SizeX
• Pixels: SizeY
• Pixels: SizeZ
• Pixels: Type
• Plane: DeltaT
• Plane: ExposureTime
• Plane: PositionX
• Plane: PositionY
• Plane: TheC
• Plane: TheT
• Plane: TheZ
• Plate: ColumnNamingConvention
• Plate: Columns
• Plate: ID

http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_DeltaT
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_ExposureTime
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plate_ColumnNamingConvention
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plate_Columns
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plate_ID
• Plate: Name
• Plate: RowNamingConvention
• Plate: Rows
• PlateAcquisition: ID
• PlateAcquisition: MaximumFieldCount
• PlateAcquisition: WellSampleRef
• Well: Column
• Well: ID
• Well: Row
• WellSample: ID
• WellSample: ImageRef
• WellSample: Index
• WellSample: PositionX
• WellSample: PositionY

Total supported: 43
Total unknown or missing: 432

19.2.90 SISReader

This page lists supported metadata fields for the Bio-Formats Olympus SIS TIFF format reader.

These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:
• The file format itself supports 33 of them (6%).
• Of those, Bio-Formats fully or partially converts 33 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Olympus SIS TIFF format reader:
• Channel: ID
• Channel: Name
• Channel: SamplesPerPixel

3309 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Plate_Name
3310 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Plate_RowNamingConvention
3311 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Plate_Rows
3312 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#PlateAcquisition_ID
3313 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#PlateAcquisition_MaximumFieldCount
3314 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#WellSampleRef_ID
3315 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Well_Column
3316 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Well_ID
3317 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Well_Row
3318 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#WellSample_ID
3320 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#WellSample_Index
3322 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#WellSample_PositionY
3323 http://www.openmicroscopy.org/site/support/ome-model/
3324 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
3325 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_Name
3326 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
• Detector: ID
• Detector: Model
• Detector: Type
• DetectorSettings: ID
• Image: AcquisitionDate
• Image: ID
• Image: InstrumentRef
• Image: Name
• Instrument: ID
• Objective: Correction
• Objective: ID
• Objective: Immersion
• Objective: NominalMagnification
• ObjectiveSettings: ID
• Pixels: BigEndian
• Pixels: DimensionOrder
• Pixels: ID
• Pixels: Interleaved
• Pixels: PhysicalSizeX
• Pixels: PhysicalSizeY
• Pixels: SignificantBits
• Pixels: SizeC
• Pixels: SizeT
• Pixels: SizeX
• Pixels: SizeY
• Pixels: SizeZ

3327 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_ID
3328 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_Model
3329 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_Type
3330 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_ID
3331 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
3332 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID
3334 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
3336 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_Correction
3337 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_ID
3338 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_Immersion
3339 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_NominalMagnification
3340 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ObjectiveSettings_ID
3341 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
3342 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
3343 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
3344 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
3346 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
3347 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
3348 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
3349 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
3350 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
3351 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
3352 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
• Pixels: Type
• Plane: TheC
• Plane: TheT
• Plane: TheZ

Total supported: 33
Total unknown or missing: 442

19.2.91 OMETiffReader

This page lists supported metadata fields for the Bio-Formats OME-TIFF format reader. These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:
• The file format itself supports 19 of them (4%).
• Of those, Bio-Formats fully or partially converts 19 (100%).

Supported fields

These fields are fully supported by the Bio-Formats OME-TIFF format reader:
• Channel: ID
• Channel: SamplesPerPixel
• Image: AcquisitionDate
• Image: ID
• Image: Name
• Pixels: BigEndian
• Pixels: DimensionOrder
• Pixels: ID
• Pixels: Interleaved
• Pixels: SignificantBits
• Pixels: SizeC
• Pixels: SizeT
• Pixels: SizeX

http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
http://www.openmicroscopy.org/site/support/ome-model/
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX

19.2. Metadata fields
• Pixels : SizeY
• Pixels : SizeZ
• Pixels : Type
• Plane : TheC
• Plane : TheT
• Plane : TheZ

Total supported: 19
Total unknown or missing: 456

19.2.92 OMEXMLReader

This page lists supported metadata fields for the Bio-Formats OME-XML format reader.

These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:
• The file format itself supports 19 of them (4%).
• Of those, Bio-Formats fully or partially converts 19 (100%).

Supported fields

These fields are fully supported by the Bio-Formats OME-XML format reader:
• Channel : ID
• Channel : SamplesPerPixel
• Image : AcquisitionDate
• Image : ID
• Image : Name
• Pixels : BigEndian
• Pixels : DimensionOrder
• Pixels : ID
• Pixels : Interleaved
• Pixels : SignificantBits
• Pixels : SizeC

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[^3371]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
[^3372]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
[^3373]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
[^3375]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
[^3376]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
[^3377]: http://www.openmicroscopy.org/site/support/ome-model/
[^3378]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
[^3379]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
[^3380]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
[^3382]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
[^3383]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
[^3384]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
[^3385]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
[^3386]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
[^3387]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
[^3388]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
• Pixels: SizeT
• Pixels: SizeX
• Pixels: SizeY
• Pixels: SizeZ
• Pixels: Type
• Plane: TheC
• Plane: TheT
• Plane: TheZ

Total supported: 19
Total unknown or missing: 456

19.2.93 OxfordInstrumentsReader

This page lists supported metadata fields for the Bio-Formats Oxford Instruments format reader. These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

• The file format itself supports 22 of them (4%).
• Of those, Bio-Formats fully or partially converts 22 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Oxford Instruments format reader:

• Channel: ID
• Channel: SamplesPerPixel
• Image: AcquisitionDate
• Image: Description
• Image: ID
• Image: Name
• Pixels: BigEndian
• Pixels: DimensionOrder
• Pixels: ID

*References:
- http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
- http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
- http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
- http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
- http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian

19.2. Metadata fields
19.2.94 PCORAWReader

This page lists supported metadata fields for the Bio-Formats PCO-RAW format reader.

These fields are from the OME data model\[3420\]. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g., physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

- The file format itself supports 26 of them (5%).
- Of those, Bio-Formats fully or partially converts 26 (100%).

Supported fields

These fields are fully supported by the Bio-Formats PCO-RAW format reader:

- Channel: ID\[3421\]
- Channel: SamplesPerPixel\[3422\]
- Detector: ID\[3423\]
- Detector: SerialNumber\[3424\]
• DetectorSettings : Binning
• DetectorSettings : ID
• Image : AcquisitionDate
• Image : Description
• Image : ID
• Image : Name
• Instrument : ID
• Pixels : BigEndian
• Pixels : DimensionOrder
• Pixels : ID
• Pixels : Interleaved
• Pixels : SignificantBits
• Pixels : SizeC
• Pixels : SizeT
• Pixels : SizeX
• Pixels : SizeY
• Pixels : SizeZ
• Pixels : Type
• Plane : ExposureTime
• Plane : TheC
• Plane : TheT
• Plane : TheZ

Total supported: 26
Total unknown or missing: 449

19.2.95 PCXReader

This page lists supported metadata fields for the Bio-Formats PCX format reader.

These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME 

3425 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_Binning
3426 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_ID
3427 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
3428 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Description
3430 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
3432 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
3433 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
3434 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
3435 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
3436 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
3437 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
3438 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
3439 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
3440 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
3441 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
3442 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_ExposureTime
3443 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
3444 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
3445 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

• The file format itself supports 19 of them (4%).

• Of those, Bio-Formats fully or partially converts 19 (100%).

Supported fields

These fields are fully supported by the Bio-Formats PCX format reader:

• Channel: ID

• Channel: SamplesPerPixel

• Image: AcquisitionDate

• Image: ID

• Image: Name

• Pixels: BigEndian

• Pixels: DimensionOrder

• Pixels: ID

• Pixels: Interleaved

• Pixels: SignificantBits

• Pixels: Size

• Pixels: SizeT

• Pixels: SizeX

• Pixels: SizeY

• Pixels: SizeZ

• Pixels: Type

• Plane: TheC

• Plane: TheT

• Plane: TheZ

Total supported: 19

Total unknown or missing: 456

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3448 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
3449 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
3450 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
3451 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID
3452 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
3453 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
3454 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
3455 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
3456 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
3457 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
3458 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Size
3459 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
3460 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
3461 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
3462 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
3463 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
3464 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
3465 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
3466 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ

19.2. Metadata fields
19.2.96 PDSReader

This page lists supported metadata fields for the Bio-Formats Perkin Elmer Densitometer format reader. These fields are from the OME data model\(^{3467}\). Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

- The file format itself supports 23 of them (4%).
- Of those, Bio-Formats fully or partially converts 23 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Perkin Elmer Densitometer format reader:

- Channel : ID\(^{3468}\)
- Channel : SamplesPerPixel\(^{3469}\)
- Image : AcquisitionDate\(^{3470}\)
- Image : ID\(^{3471}\)
- Image : Name\(^{3472}\)
- Pixels : BigEndian\(^{3473}\)
- Pixels : DimensionOrder\(^{3474}\)
- Pixels : ID\(^{3475}\)
- Pixels : Interleaved\(^{3476}\)
- Pixels : PhysicalSizeX\(^{3477}\)
- Pixels : PhysicalSizeY\(^{3478}\)
- Pixels : SignificantBits\(^{3479}\)
- Pixels : SizeC\(^{3480}\)
- Pixels : SizeT\(^{3481}\)
- Pixels : SizeX\(^{3482}\)
- Pixels : SizeY\(^{3483}\)
- Pixels : SizeZ\(^{3484}\)
- Pixels : Type\(^{3485}\)

\(^{3467}\)http://www.openmicroscopy.org/site/support/ome-model/
^{3468}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
^{3469}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
^{3470}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
^{3471}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID
^{3472}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
^{3473}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
^{3474}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
^{3475}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
^{3476}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
^{3477}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeX
^{3478}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
^{3479}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
^{3480}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
^{3481}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
^{3482}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
^{3483}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
^{3484}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
^{3485}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
• Plane: PositionX
• Plane: PositionY
• Plane: TheC
• Plane: TheT
• Plane: TheZ

Total supported: 23
Total unknown or missing: 452

19.2.97 OperettaReader

This page lists supported metadata fields for the Bio-Formats PerkinElmer Operetta format reader.

These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:
• The file format itself supports 43 of them (9%).
• Of those, Bio-Formats fully or partially converts 43 (100%).

Supported fields

These fields are fully supported by the Bio-Formats PerkinElmer Operetta format reader:

• Channel: ID
• Channel: Name
• Channel: SamplesPerPixel
• Experimenter: ID
• Experimenter: LastName
• Image: AcquisitionDate
• Image: ExperimenterRef
• Image: ID
• Image: Name
• Pixels: BigEndian
• Pixels: DimensionOrder
• Pixels: ID
• Pixels: Interleaved
• Pixels: PhysicalSizeX
• Pixels: PhysicalSizeY
• Pixels: SignificantBits
• Pixels: SizeC
• Pixels: SizeT
• Pixels: SizeX
• Pixels: SizeY
• Pixels: SizeZ
• Pixels: Type
• Plane: PositionX
• Plane: PositionY
• Plane: PositionZ
• Plane: TheC
• Plane: TheT
• Plane: TheZ
• Plate: Columns
• Plate: Description
• Plate: ExternallIdentifier
• Plate: ID
• Plate: Name
• Plate: Rows
• PlateAcquisition: ID
• PlateAcquisition: MaximumFieldCount
• PlateAcquisition: WellSampleRef
• Well: Column

http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plate_Columns
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plate_Description
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plate_ExternalIdentifier
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plate_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plate_Name
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#PlateAcquisition_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#PlateAcquisition_MaximumFieldCount
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#WellSampleRef_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Well_Column

19.2. Metadata fields
• Well: ID
• Well: Row
• WellSample: ID
• WellSample: ImageRef
• WellSample: Index

Total supported: 43
Total unknown or missing: 432

19.2.98 PerkinElmerReader

This page lists supported metadata fields for the Bio-Formats PerkinElmer format reader.

These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

• The file format itself supports 30 of them (6%).
• Of those, Bio-Formats fully or partially converts 30 (100%).

Supported fields

These fields are fully supported by the Bio-Formats PerkinElmer format reader:

• Channel: EmissionWavelength
• Channel: ExcitationWavelength
• Channel: ID
• Channel: SamplesPerPixel
• Image: AcquisitionDate
• Image: ID
• Image: InstrumentRef
• Image: Name
• Instrument: ID
• Pixels: BigEndian
• Pixels: DimensionOrder
• Pixels: ID
19.2.99 PGMReader

This page lists supported metadata fields for the Bio-Formats Portable Gray Map format reader. These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

- The file format itself supports 19 of them (4%).
- Of those, Bio-Formats fully or partially converts 19 (100%).
Supported fields

These fields are fully supported by the Bio-Formats Portable Gray Map format reader:

- Channel: ID
- Channel: SamplesPerPixel
- Image: AcquisitionDate
- Image: ID
- Image: Name
- Pixels: BigEndian
- Pixels: DimensionOrder
- Pixels: ID
- Pixels: Interleaved
- Pixels: SignificantBits
- Pixels: SizeC
- Pixels: SizeT
- Pixels: SizeX
- Pixels: SizeY
- Pixels: SizeZ
- Pixels: Type
- Plane: TheC
- Plane: TheT
- Plane: TheZ

Total supported: 19
Total unknown or missing: 456

19.2.100 PSDReader

This page lists supported metadata fields for the Bio-Formats Adobe Photoshop format reader.

These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

19.2. Metadata fields
Of the 475 fields documented in the *metadata summary table*:

- The file format itself supports 19 of them (4%).
- Of those, Bio-Formats fully or partially converts 19 (100%).

**Supported fields**

These fields are fully supported by the Bio-Formats Adobe Photoshop format reader:

- Channel: ID
- Channel: SamplesPerPixel
- Image: AcquisitionDate
- Image: ID
- Image: Name
- Pixels: BigEndian
- Pixels: DimensionOrder
- Pixels: ID
- Pixels: Interleaved
- Pixels: SignificantBits
- Pixels: SizeC
- Pixels: SizeT
- Pixels: SizeX
- Pixels: SizeY
- Pixels: SizeZ
- Pixels: Type
- Plane: TheC
- Plane: TheT
- Plane: TheZ

**Total supported: 19**

**Total unknown or missing: 456**

19.2.101 PhotoshopTiffReader

This page lists supported metadata fields for the Bio-Formats Adobe Photoshop TIFF format reader. These fields are from the OME data model\(^{3606}\). Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

**Of the 475 fields documented in the metadata summary table:**
- The file format itself supports 19 of them (4%).
- Of those, Bio-Formats fully or partially converts 19 (100%).

**Supported fields**

These fields are fully supported by the Bio-Formats Adobe Photoshop TIFF format reader:
- Channel : ID\(^{3607}\)
- Channel : SamplesPerPixel\(^{3608}\)
- Image : AcquisitionDate\(^{3609}\)
- Image : ID\(^{3610}\)
- Image : Name\(^{3611}\)
- Pixels : BigEndian\(^{3612}\)
- Pixels : DimensionOrder\(^{3613}\)
- Pixels : ID\(^{3614}\)
- Pixels : Interleaved\(^{3615}\)
- Pixels : SignificantBits\(^{3616}\)
- Pixels : SizeC\(^{3617}\)
- Pixels : SizeT\(^{3618}\)
- Pixels : SizeX\(^{3619}\)
- Pixels : SizeY\(^{3620}\)
- Pixels : SizeZ\(^{3621}\)
- Pixels : Type\(^{3622}\)
- Plane : TheC\(^{3623}\)
- Plane : TheT\(^{3624}\)

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\(^{3606}\)http://www.openmicroscopy.org/site/support/ome-model/

\(^{3607}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID

\(^{3608}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel

\(^{3609}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate

\(^{3610}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID

\(^{3611}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name

\(^{3612}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian

\(^{3613}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder

\(^{3614}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID

\(^{3615}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved

\(^{3616}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits

\(^{3617}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC

\(^{3618}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT

\(^{3619}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX

\(^{3620}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY

\(^{3621}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ

\(^{3622}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type

\(^{3623}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC

\(^{3624}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
• Plane : TheZ

Total supported: 19
Total unknown or missing: 456

19.2.102 PictReader

This page lists supported metadata fields for the Bio-Formats PICT format reader.

These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

• The file format itself supports 19 of them (4%).
• Of those, Bio-Formats fully or partially converts 19 (100%).

Supported fields

These fields are fully supported by the Bio-Formats PICT format reader:

• Channel : ID
• Channel : SamplesPerPixel
• Image : AcquisitionDate
• Image : ID
• Image : Name
• Pixels : BigEndian
• Pixels : DimensionOrder
• Pixels : ID
• Pixels : Interleaved
• Pixels : SignificantBits
• Pixels : SizeC
• Pixels : SizeT
• Pixels : SizeX
• Pixels : SizeY
• Pixels : SizeZ
• Pixels : Type
19.2.103 APNGReader

This page lists supported metadata fields for the Bio-Formats Animated PNG format reader. These fields are from the OME data model\[^{3646}\]. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

- The file format itself supports 19 of them (4%).
- Of those, Bio-Formats fully or partially converts 19 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Animated PNG format reader:

- Channel : ID\[^{3647}\]
- Channel : SamplesPerPixel\[^{3648}\]
- Image : AcquisitionDate\[^{3649}\]
- Image : ID\[^{3650}\]
- Image : Name\[^{3651}\]
- Pixels : BigEndian\[^{3652}\]
- Pixels : DimensionOrder\[^{3653}\]
- Pixels : ID\[^{3654}\]
- Pixels : Interleaved\[^{3655}\]
- Pixels : SignificantBits\[^{3656}\]
- Pixels : SizeC\[^{3657}\]
- Pixels : SizeT\[^{3658}\]
- Pixels : SizeX\[^{3659}\]
- Pixels : SizeY\[^{3660}\]

[^3643]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
[^3644]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
[^3645]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
[^3646]: http://www.openmicroscopy.org/site/support/ome-model/
[^3647]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
[^3648]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
[^3649]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
[^3651]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
[^3652]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
[^3653]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
[^3654]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
[^3655]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
[^3656]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
[^3657]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
[^3658]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
[^3659]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
[^3660]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
• Pixels: SizeZ
• Pixels: Type
• Plane: TheC
• Plane: TheT
• Plane: TheZ

Total supported: 19
Total unknown or missing: 456

19.2.104 PrairieReader

This page lists supported metadata fields for the Bio-Formats Prairie TIFF format reader.

These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:
• The file format itself supports 45 of them (9%).
• Of those, Bio-Formats fully or partially converts 45 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Prairie TIFF format reader:

• Channel: ID
• Channel: Name
• Channel: SamplesPerPixel
• Detector: ID
• Detector: Type
• Detector: Zoom
• DetectorSettings: Gain
• DetectorSettings: ID
• DetectorSettings: Offset
• Image: AcquisitionDate
• Image: ID
• Image: InstrumentRef

3661 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
3662 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
3663 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
3664 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
3665 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
3666 http://www.openmicroscopy.org/site/support/ome-model/
3667 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
3668 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_Name
3669 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
3670 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_Type
3671 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_ID
3672 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_Zoom
3674 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_ID
3675 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_Offset
3676 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
3677 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID
• Image: Name
• Instrument: ID
• Laser: ID
• Laser: Power
• Microscope: Model
• Objective: Correction
• Objective: ID
• Objective: Immersion
• Objective: LensNA
• Objective: Manufacturer
• Objective: NominalMagnification
• ObjectiveSettings: ID
• Pixels: BigEndian
• Pixels: DimensionOrder
• Pixels: ID
• Pixels: Interleaved
• Pixels: PhysicalSizeX
• Pixels: PhysicalSizeY
• Pixels: SignificantBits
• Pixels: SizeC
• Pixels: SizeT
• Pixels: SizeX
• Pixels: SizeY
• Pixels: SizeZ
• Pixels: TimeIncrement

19.2. Metadata fields
• Plane: DeltaT
• Plane: PositionX
• Plane: PositionY
• Plane: PositionZ
• Plane: TheC
• Plane: TheT
• Plane: TheZ

Total supported: 45
Total unknown or missing: 430

19.2.105 QuesantReader

This page lists supported metadata fields for the Bio-Formats Quesant AFM format reader.

These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

• The file format itself supports 22 of them (4%).
• Of those, Bio-Formats fully or partially converts 22 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Quesant AFM format reader:

• Channel: ID
• Channel: SamplesPerPixel
• Image: AcquisitionDate
• Image: Description
• Image: ID
• Image: Name
• Pixels: BigEndian
• Pixels: DimensionOrder
• Pixels: ID
• Pixels: Interleaved

http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_DeltaT
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
http://www.openmicroscopy.org/site/support/ome-model/
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Description
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
19.2.106 NativeQTReader

This page lists supported metadata fields for the Bio-Formats QuickTime format reader. These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

- The file format itself supports 19 of them (4%).
- Of those, Bio-Formats fully or partially converts 19 (100%).

Supported fields

These fields are fully supported by the Bio-Formats QuickTime format reader:

- Channel: ID
- Channel: SamplesPerPixel
- Image: AcquisitionDate
- Image: ID
- Image: Name
19.2.107 RHKReader

This page lists supported metadata fields for the Bio-Formats RHK Technologies format reader. These fields are from the OME data model\(^{3755}\). Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

- The file format itself supports 22 of them (4%).
- Of those, Bio-Formats fully or partially converts 22 (100%).

Supported fields

These fields are fully supported by the Bio-Formats RHK Technologies format reader:

- Channel : ID\(^{3756}\)
- Channel : SamplesPerPixel\(^{3757}\)
- Image : AcquisitionDate\(^{3758}\)

\(^{3741}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
\(^{3742}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
\(^{3743}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
\(^{3744}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
\(^{3745}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
\(^{3746}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
\(^{3747}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
\(^{3748}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
\(^{3749}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SIZEY
\(^{3750}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
\(^{3751}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
\(^{3752}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
\(^{3753}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
\(^{3754}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
\(^{3755}\)http://www.openmicroscopy.org/site/support/ome-model/
\(^{3756}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
\(^{3757}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
\(^{3758}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
Total supported: 22

Total unknown or missing: 453

19.2.108 SBIGReader

This page lists supported metadata fields for the Bio-Formats SBIG format reader.

These fields are from the OME data model[3778]. Bio-Formats standardizes each format's original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

- The file format itself supports 22 of them (4%).
- Of those, Bio-Formats fully or partially converts 22 (100%).
Supported fields

These fields are fully supported by the Bio-Formats SBIG format reader:

- Channel: ID
- Channel: SamplesPerPixel
- Image: AcquisitionDate
- Image: Description
- Image: ID
- Image: Name
- Pixels: BigEndian
- Pixels: DimensionOrder
- Pixels: ID
- Pixels: Interleaved
- Pixels: PhysicalSizeX
- Pixels: PhysicalSizeY
- Pixels: SignificantBits
- Pixels: SizeC
- Pixels: SizeT
- Pixels: SizeX
- Pixels: SizeY
- Pixels: SizeZ
- Pixels: Type
- Plane: TheC
- Plane: TheT
- Plane: TheZ

Total supported: 22

Total unknown or missing: 453
19.2.109 SeikoReader

This page lists supported metadata fields for the Bio-Formats Seiko format reader. These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

- The file format itself supports 22 of them (4%).
- Of those, Bio-Formats fully or partially converts 22 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Seiko format reader:

- Channel: ID
- Channel: SamplesPerPixel
- Image: AcquisitionDate
- Image: Description
- Image: ID
- Image: Name
- Pixels: BigEndian
- Pixels: DimensionOrder
- Pixels: ID
- Pixels: Interleaved
- Pixels: PhysicalSizeX
- Pixels: PhysicalSizeY
- Pixels: SignificantBits
- Pixels: SizeC
- Pixels: SizeT
- Pixels: SizeX
- Pixels: SizeY
- Pixels: SizeZ
- Pixels: Type

[hyperlinks to OME data model and Bio-Formats documentation]
19.2.110 PCIReader

This page lists supported metadata fields for the Bio-Formats Compix Simple-PCI format reader.

These fields are from the OME data model\[3824\]. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

- The file format itself supports 29 of them (6%).
- Of those, Bio-Formats fully or partially converts 29 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Compix Simple-PCI format reader:

- Channel: ID\[3825\]
- Channel: SamplesPerPixel\[3826\]
- Detector: ID\[3827\]
- Detector: Type\[3828\]
- DetectorSettings: Binning\[3829\]
- DetectorSettings: ID\[3830\]
- Image: AcquisitionDate\[3831\]
- Image: ID\[3832\]
- Image: InstrumentRef\[3833\]
- Image: Name\[3834\]
- Instrument: ID\[3835\]
- Pixels: BigEndian\[3836\]
- Pixels: DimensionOrder\[3837\]
- Pixels: ID\[3838\]

[3831]http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
19.2.111 SimplePCITiffReader

This page lists supported metadata fields for the Bio-Formats SimplePCI TIFF format reader.

These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

- The file format itself supports 33 of them (6%).
- Of those, Bio-Formats fully or partially converts 33 (100%).

Supported fields

These fields are fully supported by the Bio-Formats SimplePCI TIFF format reader:

- Channel : ID
- Channel : SamplesPerPixel

Total supported: 29
Total unknown or missing: 446
19.2. Metadata fields

- Detector: ID
- Detector: Model
- Detector: Type
- DetectorSettings: Binning
- DetectorSettings: ID
- Image: AcquisitionDate
- Image: Description
- Image: ID
- Image: InstrumentRef
- Image: Name
- Instrument: ID
- Objective: ID
- Objective: Immersion
- Objective: NominalMagnification
- Pixels: BigEndian
- Pixels: DimensionOrder
- Pixels: ID
- Pixels: Interleaved
- Pixels: PhysicalSizeX
- Pixels: PhysicalSizeY
- Pixels: SignificantBits
- Pixels: SizeC
- Pixels: SizeT
- Pixels: SizeX
- Pixels: SizeY
- Pixels: SizeZ

http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_Model
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_Type
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_Binning
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Description
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_Immersion
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_NominalMagnification
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
Bio-Formats Documentation, Release 5.0.2

• Pixels: Type
• Plane: ExposureTime
• Plane: TheC
• Plane: TheT
• Plane: TheZ

Total supported: 33
Total unknown or missing: 442

19.2.112 SMCameraReader

This page lists supported metadata fields for the Bio-Formats SM Camera format reader.

These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

• The file format itself supports 19 of them (4%).
• Of those, Bio-Formats fully or partially converts 19 (100%).

Supported fields

These fields are fully supported by the Bio-Formats SM Camera format reader:

• Channel: ID
• Channel: SamplesPerPixel
• Image: AcquisitionDate
• Image: ID
• Image: Name
• Pixels: BigEndian
• Pixels: DimensionOrder
• Pixels: ID
• Pixels: Interleaved
• Pixels: SignificantBits
• Pixels: Size
• Pixels: SizeT

http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_ExposureTime
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT

19.2. Metadata fields
• Pixels: SizeX
• Pixels: SizeY
• Pixels: SizeZ
• Pixels: Type
• Plane: TheC
• Plane: TheT
• Plane: TheZ

Total supported: 19
Total unknown or missing: 456

19.2.113 SpiderReader

This page lists supported metadata fields for the Bio-Formats SPIDER format reader.

These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

• The file format itself supports 21 of them (4%).
• Of those, Bio-Formats fully or partially converts 21 (100%).

Supported fields

These fields are fully supported by the Bio-Formats SPIDER format reader:

• Channel: ID
• Channel: SamplesPerPixel
• Image: AcquisitionDate
• Image: ID
• Image: Name
• Pixels: BigEndian
• Pixels: DimensionOrder
• Pixels: ID
• Pixels: Interleaved
• Pixels: PhysicalSizeX

\[3901\] http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
\[3902\] http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
\[3903\] http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
\[3904\] http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
\[3905\] http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
\[3906\] http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
\[3907\] http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
\[3908\] http://www.openmicroscopy.org/site/support/ome-model/
\[3909\] http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
\[3910\] http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
\[3911\] http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
\[3912\] http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID
\[3913\] http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
\[3914\] http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
\[3915\] http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
\[3916\] http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
\[3917\] http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
\[3918\] http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeX
This page lists supported metadata fields for the Bio-Formats Truevision Targa format reader. These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

- The file format itself supports 20 of them (4%).
- Of those, Bio-Formats fully or partially converts 20 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Truevision Targa format reader:

- Channel: ID
- Channel: SamplesPerPixel
- Image: AcquisitionDate
- Image: Description
- Image: ID
- Image: Name

19.2.114 TargaReader

Total supported: 21

Total unknown or missing: 454
• Pixels: BigEndian\(^{3937}\)
• Pixels: DimensionOrder\(^{3938}\)
• Pixels: ID\(^{3939}\)
• Pixels: Interleaved\(^{3940}\)
• Pixels: SignificantBits\(^{3941}\)
• Pixels: SizeC\(^{3942}\)
• Pixels: SizeT\(^{3943}\)
• Pixels: SizeX\(^{3944}\)
• Pixels: SizeY\(^{3945}\)
• Pixels: SizeZ\(^{3946}\)
• Pixels: Type\(^{3947}\)
• Plane: TheC\(^{3948}\)
• Plane: TheT\(^{3949}\)
• Plane: TheZ\(^{3950}\)

Total supported: 20
Total unknown or missing: 455

19.2.115 TextReader

This page lists supported metadata fields for the Bio-Formats Text format reader.

These fields are from the OME data model\(^{3951}\). Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

• The file format itself supports 19 of them (4%).
• Of those, Bio-Formats fully or partially converts 19 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Text format reader:

• Channel: ID\(^{3952}\)
• Channel: SamplesPerPixel\(^{3953}\)
• Image: AcquisitionDate\(^{3954}\)

\(^{3937}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
\(^{3938}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
\(^{3939}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
\(^{3940}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
\(^{3941}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
\(^{3942}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
\(^{3943}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
\(^{3944}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
\(^{3945}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
\(^{3946}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
\(^{3947}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
\(^{3948}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
\(^{3949}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
\(^{3950}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
\(^{3951}\)http://www.openmicroscopy.org/site/support/ome-model/
\(^{3952}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
\(^{3953}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
\(^{3954}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
• Image: ID
• Image: Name
• Pixels: BigEndian
• Pixels: DimensionOrder
• Pixels: ID
• Pixels: Interleaved
• Pixels: SignificantBits
• Pixels: SizeC
• Pixels: SizeT
• Pixels: SizeX
• Pixels: SizeY
• Pixels: SizeZ
• Pixels: Type
• Plane: TheC
• Plane: TheT
• Plane: TheZ

Total supported: 19
Total unknown or missing: 456

19.2.116 TiffReader

This page lists supported metadata fields for the Bio-Formats Tagged Image File Format format reader.

These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:
• The file format itself supports 22 of them (4%).
• Of those, Bio-Formats fully or partially converts 22 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Tagged Image File Format format reader:

• Channel: ID
• Channel: SamplesPerPixel\footnote{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel}
• Image: AcquisitionDate\footnote{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate}
• Image: Description\footnote{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Description}
• Image: ID\footnote{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID}
• Image: Name\footnote{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name}
• Pixels: BigEndian\footnote{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian}
• Pixels: DimensionOrder\footnote{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder}
• Pixels: ID\footnote{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID}
• Pixels: Interleaved\footnote{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved}
• Pixels: PhysicalSizeZ\footnote{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeZ}
• Pixels: SignificantBits\footnote{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits}
• Pixels: SizeC\footnote{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC}
• Pixels: SizeT\footnote{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT}
• Pixels: SizeX\footnote{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX}
• Pixels: SizeY\footnote{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY}
• Pixels: SizeZ\footnote{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ}
• Pixels: TimeIncrement\footnote{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_TimeIncrement}
• Pixels: Type\footnote{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type}
• Plane: TheC\footnote{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC}
• Plane: TheT\footnote{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT}
• Plane: TheZ\footnote{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ}

Total supported: 22

Total unknown or missing: 453

19.2.117 TillVisionReader

This page lists supported metadata fields for the Bio-Formats TillVision format reader.

These fields are from the OME data model\footnote{http://www.openmicroscopy.org/site/support/ome-model/}. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

19.2. Metadata fields
Of the 475 fields documented in the metadata summary table:

- The file format itself supports 22 of them (4%).
- Of those, Bio-Formats fully or partially converts 22 (100%).

Supported fields

These fields are fully supported by the Bio-Formats TillVision format reader:

- Channel: ID
- Channel: SamplesPerPixel
- Experiment: ID
- Experiment: Type
- Image: AcquisitionDate
- Image: ID
- Image: Name
- Pixels: BigEndian
- Pixels: DimensionOrder
- Pixels: ID
- Pixels: Interleaved
- Pixels: SignificantBits
- Pixels: SizeC
- Pixels: SizeT
- Pixels: SizeX
- Pixels: SizeY
- Pixels: SizeZ
- Pixels: Type
- Plane: ExposureTime
- Plane: TheC
- Plane: TheT
- Plane: TheZ
Total supported: 22
Total unknown or missing: 453

19.2.118 TopometrixReader

This page lists supported metadata fields for the Bio-Formats TopoMetrix format reader.

These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

- The file format itself supports 22 of them (4%).
- Of those, Bio-Formats fully or partially converts 22 (100%).

Supported fields

These fields are fully supported by the Bio-Formats TopoMetrix format reader:

- Channel: ID
- Channel: SamplesPerPixel
- Image: AcquisitionDate
- Image: Description
- Image: ID
- Image: Name
- Pixels: BigEndian
- Pixels: DimensionOrder
- Pixels: ID
- Pixels: Interleaved
- Pixels: PhysicalSizeX
- Pixels: PhysicalSizeY
- Pixels: SignificantBits
- Pixels: SizeC
- Pixels: SizeT
- Pixels: SizeX
- Pixels: SizeY

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4017 http://www.openmicroscopy.org/site/support/ome-model/
4018 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
4019 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
4020 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
4021 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Description
4022 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID
4023 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
4024 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
4025 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
4026 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
4027 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
4029 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
4030 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
4031 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
4032 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
4033 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
4034 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY

19.2. Metadata fields
• Pixels : SizeZ
• Pixels : Type
• Plane : TheC
• Plane : TheT
• Plane : TheZ

Total supported: 22
Total unknown or missing: 453

19.2.119 TrestleReader

This page lists supported metadata fields for the Bio-Formats Trestle format reader.

These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

• The file format itself supports 26 of them (5%).
• Of those, Bio-Formats fully or partially converts 26 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Trestle format reader:

• Channel : ID
• Channel : SamplesPerPixel
• Image : AcquisitionDate
• Image : ID
• Image : Name
• Image : ROIRef
• Mask : Height
• Mask : ID
• Mask : Width
• Mask : X
• Mask : Y
• Pixels : BigEndian

http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
http://www.openmicroscopy.org/site/support/ome-model/
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#ROIRef_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Mask_Height
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Mask_Width
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
• Pixels : DimensionOrder
• Pixels : ID
• Pixels : Interleaved
• Pixels : SignificantBits
• Pixels : SizeC
• Pixels : SizeT
• Pixels : SizeX
• Pixels : SizeY
• Pixels : SizeZ
• Pixels : Type
• Plane : TheC
• Plane : TheT
• Plane : TheZ
• ROI : ID

Total supported: 26
Total unknown or missing: 449

19.2.120 UBMReader

This page lists supported metadata fields for the Bio-Formats UBM format reader. These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:
• The file format itself supports 19 of them (4%).
• Of those, Bio-Formats fully or partially converts 19 (100%).

Supported fields

These fields are fully supported by the Bio-Formats UBM format reader:
• Channel : ID
• Channel : SamplesPerPixel
• Image : AcquisitionDate
• Image: ID
• Image: Name
• Pixels: BigEndian
• Pixels: DimensionOrder
• Pixels: ID
• Pixels: Interleaved
• Pixels: SignificantBits
• Pixels: SizeC
• Pixels: SizeT
• Pixels: SizeX
• Pixels: SizeY
• Pixels: SizeZ
• Pixels: Type
• Plane: TheC
• Plane: TheT
• Plane: TheZ

Total supported: 19
Total unknown or missing: 456

19.2.121 UnisokuReader

This page lists supported metadata fields for the Bio-Formats Unisoku STM format reader.

These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

• The file format itself supports 22 of them (4%).
• Of those, Bio-Formats fully or partially converts 22 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Unisoku STM format reader:

• Channel: ID

http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
Total supported: 22
Total unknown or missing: 453

19.2.122 VarianFDFReader

This page lists supported metadata fields for the Bio-Formats Varian FDF format reader.

These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Metadata fields

- Channel: SamplesPerPixel
- Image: AcquisitionDate
- Image: Description
- Image: ID
- Image: Name
- Pixels: BigEndian
- Pixels: DimensionOrder
- Pixels: ID
- Pixels: Interleaved
- Pixels: PhysicalSizeX
- Pixels: PhysicalSizeY
- Pixels: SignificantBits
- Pixels: SizeC
- Pixels: SizeT
- Pixels: SizeX
- Pixels: SizeY
- Pixels: SizeZ
- Pixels: Type
- Plane: TheC
- Plane: TheT
- Plane: TheZ

http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Description
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
Of the 475 fields documented in the metadata summary table:

- The file format itself supports 25 of them (5%).
- Of those, Bio-Formats fully or partially converts 25 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Varian FDF format reader:

- Channel: ID
- Channel: SamplesPerPixel
- Image: AcquisitionDate
- Image: ID
- Image: Name
- Pixels: BigEndian
- Pixels: DimensionOrder
- Pixels: ID
- Pixels: Interleaved
- Pixels: PhysicalSizeX
- Pixels: PhysicalSizeY
- Pixels: PhysicalSizeZ
- Pixels: SignificantBits
- Pixels: SizeC
- Pixels: SizeT
- Pixels: SizeX
- Pixels: SizeY
- Pixels: SizeZ
- Pixels: Type
- Plane: PositionX
- Plane: PositionY
- Plane: PositionZ

412[http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel]
413[http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate]
415[http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name]
416[http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian]
419[http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved]
420[http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeX]
426[http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX]
429[http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type]
19.2.123 VGSAMReader

This page lists supported metadata fields for the Bio-Formats VG SAM format reader.

These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

- The file format itself supports 19 of them (4%).
- Of those, Bio-Formats fully or partially converts 19 (100%).

Supported fields

These fields are fully supported by the Bio-Formats VG SAM format reader:

- Channel: ID
- Channel: SamplesPerPixel
- Image: AcquisitionDate
- Image: ID
- Image: Name
- Pixels: BigEndian
- Pixels: DimensionOrder
- Pixels: ID
- Pixels: Interleaved
- Pixels: SignificantBits
- Pixels: SizeC
- Pixels: SizeT
- Pixels: SizeX
- Pixels: SizeY

4133 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
4134 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
4135 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
4136 http://www.openmicroscopy.org/site/support/ome-model/
4137 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
4138 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
4139 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
4140 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID
4141 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
4142 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
4143 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
4144 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
4145 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
4146 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
4147 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
4148 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
4149 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
4150 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
Bio-Formats Documentation, Release 5.0.2

• Pixels : SizeZ
• Pixels : Type
• Plane : TheC
• Plane : TheT
• Plane : TheZ

Total supported: 19
Total unknown or missing: 456

19.2.124 VisitechReader

This page lists supported metadata fields for the Bio-Formats Visitech XYS format reader.

These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:
• The file format itself supports 19 of them (4%).
• Of those, Bio-Formats fully or partially converts 19 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Visitech XYS format reader:

• Channel : ID
• Channel : SamplesPerPixel
• Image : AcquisitionDate
• Image : ID
• Image : Name
• Pixels : BigEndian
• Pixels : DimensionOrder
• Pixels : ID
• Pixels : Interleaved
• Pixels : SignificantBits
• Pixels : SizeC
• Pixels : SizeT

http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
http://www.openmicroscopy.org/site/support/ome-model/
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
• Pixels : SizeX
• Pixels : SizeY
• Pixels : SizeZ
• Pixels : Type
• Plane : TheC
• Plane : TheT
• Plane : TheZ

Total supported: 19
Total unknown or missing: 456

19.2.125 VolocityClippingReader

This page lists supported metadata fields for the Bio-Formats Volocity Library Clipping format reader.

These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

• The file format itself supports 19 of them (4%).
• Of those, Bio-Formats fully or partially converts 19 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Volocity Library Clipping format reader:

• Channel : ID
• Channel : SamplesPerPixel
• Image : AcquisitionDate
• Image : ID
• Image : Name
• Pixels : BigEndian
• Pixels : DimensionOrder
• Pixels : ID
• Pixels : Interleaved
• Pixels : SignificantBits

4169 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
4170 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
4171 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
4172 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
4173 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
4174 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
4175 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
4176 http://www.openmicroscopy.org/site/support/ome-model/
4177 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
4178 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
4179 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
4180 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID
4181 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
4182 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
4183 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
4184 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
4185 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
4186 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
19.2. Metadata fields

Supported fields

These fields are fully supported by the Bio-Formats Volocity Library format reader:

- Channel: ID
- Channel: Name
- Channel: SamplesPerPixel
- Detector: ID
- Detector: Model
- DetectorSettings: ID
- Image: AcquisitionDate
- Image: Description

Total supported: 19
Total unknown or missing: 456

19.2.126 VolocityReader

This page lists supported metadata fields for the Bio-Formats Volocity Library format reader.

These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

- The file format itself supports 38 of them (8%).
- Of those, Bio-Formats fully or partially converts 38 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Volocity Library format reader:

- Channel: ID
- Channel: Name
- Channel: SamplesPerPixel
- Detector: ID
- Detector: Model
- DetectorSettings: ID
- Image: AcquisitionDate
- Image: Description

19.2. Metadata fields
19.2. Metadata fields
• Plane: PositionZ
• Plane: TheC
• Plane: TheT
• Plane: TheZ

Total supported: 38
Total unknown or missing: 437

19.2.127 WATOPReader

This page lists supported metadata fields for the Bio-Formats WA Technology TOP format reader.

These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

• The file format itself supports 22 of them (4%).
• Of those, Bio-Formats fully or partially converts 22 (100%).

Supported fields

These fields are fully supported by the Bio-Formats WA Technology TOP format reader:

• Channel: ID
• Channel: SamplesPerPixel
• Image: AcquisitionDate
• Image: Description
• Image: ID
• Image: Name
• Pixels: BigEndian
• Pixels: DimensionOrder
• Pixels: ID
• Pixels: Interleaved
• Pixels: PhysicalSizeX
• Pixels: PhysicalSizeY
• Pixels: SignificantBits

http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
http://www.openmicroscopy.org/site/support/ome-model/
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Description
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits

19.2. Metadata fields
• Pixels: SizeC\textsuperscript{4249}
• Pixels: SizeT\textsuperscript{4250}
• Pixels: SizeX\textsuperscript{4251}
• Pixels: SizeY\textsuperscript{4252}
• Pixels: SizeZ\textsuperscript{4253}
• Pixels: Type\textsuperscript{4254}
• Plane: TheC\textsuperscript{4255}
• Plane: TheT\textsuperscript{4256}
• Plane: TheZ\textsuperscript{4257}

Total supported: 22
Total unknown or missing: 453

19.2.128 BMPReader

This page lists supported metadata fields for the Bio-Formats Windows Bitmap format reader.

These fields are from the OME data model\textsuperscript{4258}. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

• The file format itself supports 21 of them (4%).
• Of those, Bio-Formats fully or partially converts 21 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Windows Bitmap format reader:

• Channel: ID\textsuperscript{4259}
• Channel: SamplesPerPixel\textsuperscript{4260}
• Image: AcquisitionDate\textsuperscript{4261}
• Image: ID\textsuperscript{4262}
• Image: Name\textsuperscript{4263}
• Pixels: BigEndian\textsuperscript{4264}
• Pixels: DimensionOrder\textsuperscript{4265}
• Pixels: ID\textsuperscript{4266}

\textsuperscript{4249}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
\textsuperscript{4250}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
\textsuperscript{4251}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
\textsuperscript{4252}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
\textsuperscript{4253}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
\textsuperscript{4254}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
\textsuperscript{4255}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
\textsuperscript{4256}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
\textsuperscript{4257}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
\textsuperscript{4258}http://www.openmicroscopy.org/site/support/ome-model/
\textsuperscript{4259}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
\textsuperscript{4260}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
\textsuperscript{4261}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
\textsuperscript{4262}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID
\textsuperscript{4263}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
\textsuperscript{4264}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
\textsuperscript{4265}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
\textsuperscript{4266}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID

19.2. Metadata fields
• Pixels: Interleaved
• Pixels: PhysicalSizeX
• Pixels: PhysicalSizeY
• Pixels: SignificantBits
• Pixels: SizeC
• Pixels: SizeT
• Pixels: SizeX
• Pixels: SizeY
• Pixels: SizeZ
• Pixels: Type
• Plane: TheC
• Plane: TheT
• Plane: TheZ

Total supported: 21
Total unknown or missing: 454

19.2.129 WlzReader

This page lists supported metadata fields for the Bio-Formats Woolz format reader. These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g., physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:
• The file format itself supports 26 of them (5%).
• Of those, Bio-Formats fully or partially converts 26 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Woolz format reader:

• Channel: ID
• Channel: SamplesPerPixel
• Image: AcquisitionDate
• Image: ID

4267 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
4269 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
4270 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
4271 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
4272 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
4273 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
4274 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
4275 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
4276 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
4277 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
4278 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
4279 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
4280 http://www.openmicroscopy.org/site/support/ome-model/
4281 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
4282 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
4283 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
• Image: Name
• Pixels: BigEndian
• Pixels: DimensionOrder
• Pixels: ID
• Pixels: Interleaved
• Pixels: PhysicalSizeX
• Pixels: PhysicalSizeY
• Pixels: PhysicalSizeZ
• Pixels: SignificantBits
• Pixels: SizeC
• Pixels: SizeT
• Pixels: SizeX
• Pixels: SizeY
• Pixels: SizeZ
• Pixels: Type
• Plane: TheC
• Plane: TheT
• Plane: TheZ
• StageLabel: Name
• StageLabel: X
• StageLabel: Y
• StageLabel: Z

Total supported: 26
Total unknown or missing: 449

19.2.130 ZeissTIFFReader

This page lists supported metadata fields for the Bio-Formats Zeiss AxioVision TIFF format reader.

These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME
data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

- The file format itself supports 19 of them (4%).
- Of those, Bio-Formats fully or partially converts 19 (100%).

**Supported fields**

These fields are fully supported by the Bio-Formats Zeiss AxioVision TIFF format reader:

- Channel: ID
- Channel: SamplesPerPixel
- Image: AcquisitionDate
- Image: ID
- Image: Name
- Pixels: BigEndian
- Pixels: DimensionOrder
- Pixels: ID
- Pixels: Interleaved
- Pixels: SignificantBits
- Pixels: SizeC
- Pixels: SizeT
- Pixels: SizeX
- Pixels: SizeY
- Pixels: SizeZ
- Pixels: Type
- Plane: TheC
- Plane: TheT
- Plane: TheZ

Total supported: 19

Total unknown or missing: 456

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4308 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
4309 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
4310 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
4312 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
4313 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
4314 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
4315 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
4316 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
4317 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
4318 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
4319 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
4320 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
4321 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
4322 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
4323 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
4325 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
4326 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
19.2.131 ZeissZVIReader

This page lists supported metadata fields for the Bio-Formats Zeiss Vision Image (ZVI) format reader. These fields are from the OME data model\(^{4327}\). Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

- The file format itself supports 19 of them (4%).
- Of those, Bio-Formats fully or partially converts 19 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Zeiss Vision Image (ZVI) format reader:

- Channel : ID\(^{4328}\)
- Channel : SamplesPerPixel\(^{4329}\)
- Image : AcquisitionDate\(^{4330}\)
- Image : ID\(^{4331}\)
- Image : Name\(^{4332}\)
- Pixels : BigEndian\(^{4333}\)
- Pixels : DimensionOrder\(^{4334}\)
- Pixels : ID\(^{4335}\)
- Pixels : Interleaved\(^{4336}\)
- Pixels : SignificantBits\(^{4337}\)
- Pixels : SizeC\(^{4338}\)
- Pixels : SizeT\(^{4339}\)
- Pixels : SizeX\(^{4340}\)
- Pixels : SizeY\(^{4341}\)
- Pixels : SizeZ\(^{4342}\)
- Pixels : Type\(^{4343}\)
- Plane : TheC\(^{4344}\)
- Plane : TheT\(^{4345}\)

\(^{4327}\)http://www.openmicroscopy.org/site/support/ome-model/
\(^{4328}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
\(^{4329}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
\(^{4330}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
\(^{4331}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID
\(^{4332}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
\(^{4333}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
\(^{4334}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
\(^{4335}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
\(^{4336}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
\(^{4337}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
\(^{4338}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
\(^{4339}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
\(^{4340}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
\(^{4341}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
\(^{4342}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
\(^{4343}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
\(^{4344}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
\(^{4345}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
• Plane : TheZ

Total supported: 19
Total unknown or missing: 456

19.2.132 ZeissCZIReader

This page lists supported metadata fields for the Bio-Formats Zeiss CZI format reader.

These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:

• The file format itself supports 158 of them (33%).
• Of those, Bio-Formats fully or partially converts 158 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Zeiss CZI format reader:

- Arc : LotNumber
- Arc : Manufacturer
- Arc : Model
- Arc : Power
- Arc : SerialNumber
- Channel : AcquisitionMode
- Channel : Color
- Channel : EmissionWavelength
- Channel : ExcitationWavelength
- Channel : FilterSetRef
- Channel : Fluor
- Channel : ID
- Channel : IlluminationType
- Channel : Name
- Channel : PinholeSize
- Channel : SamplesPerPixel
- Channel : SamplesPerPixel

414. Metadata fields
• Detector: AmplificationGain
• Detector: Gain
• Detector: ID
• Detector: LotNumber
• Detector: Manufacturer
• Detector: Model
• Detector: Offset
• Detector: SerialNumber
• Detector: Type
• Detector: Zoom
• DetectorSettings: Binning
• DetectorSettings: Gain
• DetectorSettings: ID
• Dichroic: ID
• Dichroic: LotNumber
• Dichroic: Manufacturer
• Dichroic: Model
• Dichroic: SerialNumber
• Ellipse: ID
• Ellipse: RadiusX
• Ellipse: RadiusY
• Ellipse: Text
• Ellipse: X
• Ellipse: Y
• Experimenter: Email
• Experimenter: FirstName
19.2. Metadata fields
• Image: Description\textsuperscript{4416}
• Image: ExperimenterRef\textsuperscript{4417}
• Image: ID\textsuperscript{4418}
• Image: InstrumentRef\textsuperscript{4419}
• Image: Name\textsuperscript{4420}
• Image: ROIRef\textsuperscript{4421}
• ImagingEnvironment: AirPressure\textsuperscript{4422}
• ImagingEnvironment: CO2Percent\textsuperscript{4423}
• ImagingEnvironment: Humidity\textsuperscript{4424}
• ImagingEnvironment: Temperature\textsuperscript{4425}
• Instrument: ID\textsuperscript{4426}
• Laser: LotNumber\textsuperscript{4427}
• Laser: Manufacturer\textsuperscript{4428}
• Laser: Model\textsuperscript{4429}
• Laser: Power\textsuperscript{4430}
• Laser: SerialNumber\textsuperscript{4431}
• LightEmittingDiode: LotNumber\textsuperscript{4432}
• LightEmittingDiode: Manufacturer\textsuperscript{4433}
• LightEmittingDiode: Model\textsuperscript{4434}
• LightEmittingDiode: Power\textsuperscript{4435}
• LightEmittingDiode: SerialNumber\textsuperscript{4436}
• Line: ID\textsuperscript{4437}
• Line: Text\textsuperscript{4438}
• Line: X1\textsuperscript{4439}
• Line: X2\textsuperscript{4440}
• Line: Y1\textsuperscript{4441}

\textsuperscript{4416}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Description
\textsuperscript{4417}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ExperimenterRef_ID
\textsuperscript{4418}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID
\textsuperscript{4419}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#InstrumentRef_ID
\textsuperscript{4420}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
\textsuperscript{4421}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#ROIRef_ID
\textsuperscript{4422}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ImagingEnvironment_AirPressure
\textsuperscript{4423}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ImagingEnvironment_CO2Percent
\textsuperscript{4424}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ImagingEnvironment_Humidity
\textsuperscript{4425}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ImagingEnvironment_Temperature
\textsuperscript{4426}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Instrument_ID
\textsuperscript{4427}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_LotNumber
\textsuperscript{4428}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_Manufacturer
\textsuperscript{4429}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_Model
\textsuperscript{4430}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#LightSource_Power
\textsuperscript{4431}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_SerialNumber
\textsuperscript{4432}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_LotNumber
\textsuperscript{4433}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_Manufacturer
\textsuperscript{4434}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_Model
\textsuperscript{4435}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#LightSource_Power
\textsuperscript{4436}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_SerialNumber
\textsuperscript{4437}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_ID
\textsuperscript{4438}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_Text
\textsuperscript{4439}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Line_X1
\textsuperscript{4440}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Line_X2
\textsuperscript{4441}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Line_Y1
19.2. Metadata fields

- Line: Y2
- Microscope: LotNumber
- Microscope: Manufacturer
- Microscope: Model
- Microscope: SerialNumber
- Microscope: Type
- Objective: CalibratedMagnification
- Objective: Correction
- Objective: ID
- Objective: Immersion
- Objective: Iris
- Objective: LensNA
- Objective: LotNumber
- Objective: Manufacturer
- Objective: Model
- Objective: NominalMagnification
- Objective: SerialNumber
- Objective: WorkingDistance
- ObjectiveSettings: CorrectionCollar
- ObjectiveSettings: ID
- ObjectiveSettings: Medium
- ObjectiveSettings: RefractiveIndex
- Pixels: BigEndian
- Pixels: DimensionOrder
- Pixels: ID
- Pixels: Interleaved
• Pixels: PhysicalSizeX
• Pixels: PhysicalSizeY
• Pixels: PhysicalSizeZ
• Pixels: SignificantBits
• Pixels: SizeC
• Pixels: SizeT
• Pixels: SizeX
• Pixels: SizeY
• Pixels: SizeZ
• Pixels: Type
• Plane: DeltaT
• Plane: ExposureTime
• Plane: PositionX
• Plane: PositionY
• Plane: PositionZ
• Plane: TheC
• Plane: TheT
• Plane: TheZ
• Polygon: ID
• Polygon: Points
• Polygon: Text
• Polyline: ID
• Polyline: Points
• Polyline: Text
• ROI: Description
• ROI: ID

4469 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
4471 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
4472 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
4473 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
4474 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
4475 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
4476 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
4477 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
4478 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_DeltaT
4479 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_ExposureTime
4483 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
4484 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
4485 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
4486 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Polygon_ID
4487 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Polygon_Points
4488 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Polygon_Text
4489 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Polyline_ID
4490 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Polyline_Points
4491 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Polyline_Text
4492 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ROI_Description
4493 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ROI_ID

19.2. Metadata fields
• ROI : Name
• Rectangle : Height
• Rectangle : ID
• Rectangle : Text
• Rectangle : Width
• Rectangle : X
• Rectangle : Y
• TransmittanceRange : CutIn
• TransmittanceRange : CutInTolerance
• TransmittanceRange : CutOut
• TransmittanceRange : CutOutTolerance
• TransmittanceRange : Transmittance

Total supported: 158
Total unknown or missing: 317

19.2.133 ZeissLSMReader

This page lists supported metadata fields for the Bio-Formats Zeiss Laser-Scanning Microscopy format reader.

These fields are from the OME data model. Bio-Formats standardizes each format’s original metadata to and from the OME data model so that you can work with a particular piece of metadata (e.g. physical width of the image in microns) in a format-independent way.

Of the 475 fields documented in the metadata summary table:
• The file format itself supports 101 of them (21%).
• Of those, Bio-Formats fully or partially converts 101 (100%).

Supported fields

These fields are fully supported by the Bio-Formats Zeiss Laser-Scanning Microscopy format reader:

• Channel : Color
• Channel : ID
• Channel : Name
• Channel : PinholeSize
• Channel : SamplesPerPixel

4494 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#ROI_Name
4495 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Rectangle_Height
4496 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_ID
4497 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_Text
4498 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Rectangle_Width
4500 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Rectangle_Y
4501 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#TransmittanceRange_CutIn
4502 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#TransmittanceRange_CutInTolerance
4503 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#TransmittanceRange_CutOut
4505 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#TransmittanceRange_Transmittance
4506 http://www.openmicroscopy.org/site/support/ome-model/
4507 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_Color
4508 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
4509 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_Name
4510 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_PinholeSize
4511 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
Bio-Formats Documentation, Release 5.0.2

- Detector: AmplificationGain
- Detector: Gain
- Detector: ID
- Detector: Type
- Detector: Zoom
- DetectorSettings: Binning
- DetectorSettings: ID
- Dichroic: ID
- Dichroic: Model
- Ellipse: FontSize
- Ellipse: ID
- Ellipse: RadiusX
- Ellipse: RadiusY
- Ellipse: StrokeWidth
- Ellipse: Transform
- Ellipse: X
- Ellipse: Y
- Experimenter: ID
- Experimenter: UserName
- Filter: ID
- Filter: Model
- Filter: Type
- Image: AcquisitionDate
- Image: Description
- Image: ID
- Image: InstrumentRef

19.2. Metadata fields
19.2. Metadata fields

- Image: Name
- Image: ROIField
- Instrument: ID
- Label: FontSize
- Label: ID
- Label: StrokeWidth
- Label: Text
- Label: X
- Label: Y
- Laser: ID
- Laser: LaserMedium
- Laser: Model
- Laser: Type
- Laser: Wavelength
- LightPath: DichroicRef
- LightPath: EmissionFilterRef
- Line: FontSize
- Line: ID
- Line: StrokeWidth
- Line: X1
- Line: X2
- Line: Y1
- Line: Y2
- Objective: Correction
- Objective: ID
- Objective: Immersion

http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#ROIField_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_FontSize
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_StrokeWidth
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_Text
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Label_Y
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#LightSource_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_Model
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Laser_Type
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DichroicRef_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#FilterRef_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_FontSize
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_StrokeWidth
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Line_X1
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Line_X2
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Line_Y1
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_Correction
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_Immersion
• Objective: Iris
• Objective: LensNA
• Objective: NominalMagnification
• ObjectiveSettings: ID
• Pixels: BigEndian
• Pixels: DimensionOrder
• Pixels: ID
• Pixels: Interleaved
• Pixels: PhysicalSizeX
• Pixels: PhysicalSizeY
• Pixels: PhysicalSizeZ
• Pixels: SignificantBits
• Pixels: SizeC
• Pixels: SizeT
• Pixels: SizeX
• Pixels: SizeY
• Pixels: SizeZ
• Pixels: TimeIncrement
• Pixels: Type
• Plane: DeltaT
• Plane: PositionX
• Plane: PositionY
• Plane: PositionZ
• Plane: TheC
• Plane: TheT
• Plane: TheZ
• Polygon: FontSize
• Polygon: ID
• Polygon: Points
• Polygon: StrokeWidth
• Polyline: FontSize
• Polyline: ID
• Polyline: Points
• Polyline: StrokeWidth
• ROI: ID
• Rectangle: FontSize
• Rectangle: Height
• Rectangle: ID
• Rectangle: StrokeWidth
• Rectangle: Width
• Rectangle: X
• Rectangle: Y
• TransmittanceRange: CutIn
• TransmittanceRange: CutOut

Total supported: 101
Total unknown or missing: 374

4590: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_FontSize
4591: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_ID
4592: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Polygon_Points
4593: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_StrokeWidth
4594: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_FontSize
4595: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_ID
4596: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Polyline_Points
4597: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_StrokeWidth
4598: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#ROI_ID
4599: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_FontSize
4600: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Rectangle_Height
4601: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_ID
4602: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_StrokeWidth
4603: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Rectangle_Width
4605: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Rectangle_Y
4606: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#TransmittanceRange_CutIn
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