# Contents

## I About Bio-Formats

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Why Java?</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>Bio-Formats metadata processing</td>
<td>5</td>
</tr>
</tbody>
</table>

## II User Information

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Using Bio-Formats with ImageJ and Fiji</td>
<td>27</td>
</tr>
<tr>
<td>6</td>
<td>Command line tools</td>
<td>38</td>
</tr>
<tr>
<td>7</td>
<td>OMERO</td>
<td>43</td>
</tr>
<tr>
<td>8</td>
<td>Image server applications</td>
<td>44</td>
</tr>
<tr>
<td>9</td>
<td>Libraries and scripting applications</td>
<td>47</td>
</tr>
<tr>
<td>10</td>
<td>Numerical data processing applications</td>
<td>49</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Subchapter</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1</td>
<td>ImageJ overview</td>
<td>27</td>
</tr>
<tr>
<td>2.2</td>
<td>Fiji overview</td>
<td>28</td>
</tr>
<tr>
<td>2.3</td>
<td>Bio-Formats features in ImageJ and Fiji</td>
<td>28</td>
</tr>
<tr>
<td>2.4</td>
<td>Installing Bio-Formats in ImageJ</td>
<td>29</td>
</tr>
<tr>
<td>2.5</td>
<td>Using Bio-Formats to load images into ImageJ</td>
<td>31</td>
</tr>
<tr>
<td>2.6</td>
<td>Managing memory in ImageJ/Fiji using Bio-Formats</td>
<td>34</td>
</tr>
<tr>
<td>6.1</td>
<td>Command line tools introduction</td>
<td>38</td>
</tr>
<tr>
<td>6.2</td>
<td>Displaying images and metadata</td>
<td>39</td>
</tr>
<tr>
<td>6.3</td>
<td>Converting a file to different format</td>
<td>40</td>
</tr>
<tr>
<td>6.4</td>
<td>Validating XML in an OME-TIFF</td>
<td>41</td>
</tr>
<tr>
<td>6.5</td>
<td>Editing XML in an OME-TIFF</td>
<td>42</td>
</tr>
<tr>
<td>8.1</td>
<td>BISQUE</td>
<td>44</td>
</tr>
<tr>
<td>8.2</td>
<td>OME Server</td>
<td>44</td>
</tr>
<tr>
<td>9.1</td>
<td>FARSIGHT</td>
<td>47</td>
</tr>
<tr>
<td>9.2</td>
<td>i3dcore</td>
<td>47</td>
</tr>
<tr>
<td>9.3</td>
<td>ImgLib</td>
<td>47</td>
</tr>
<tr>
<td>9.4</td>
<td>ITK</td>
<td>48</td>
</tr>
<tr>
<td>9.5</td>
<td>Qu for MATLAB</td>
<td>48</td>
</tr>
<tr>
<td>9.6</td>
<td>Subimager</td>
<td>48</td>
</tr>
<tr>
<td>10.1</td>
<td>IDL</td>
<td>49</td>
</tr>
<tr>
<td>10.2</td>
<td>KNIME</td>
<td>49</td>
</tr>
<tr>
<td>10.3</td>
<td>MATLAB</td>
<td>49</td>
</tr>
<tr>
<td>10.4</td>
<td>VisAD</td>
<td>50</td>
</tr>
</tbody>
</table>
11 Visualization and analysis applications
   11.1 Bitplane Imaris .......................................................... 51
   11.2 CellProfiler ............................................................. 51
   11.3 Comstat2 ................................................................. 52
   11.4 Endrov ................................................................. 52
   11.5 FocalPoint ............................................................. 52
   11.6 Graphic Converter .................................................... 52
   11.7 Icy ................................................................. 53
   11.8 imago ................................................................. 53
   11.9 Iqm ................................................................. 53
   11.10 Macnification ......................................................... 53
   11.11 MIPAV ............................................................... 53
   11.12 Vaa3D ............................................................... 54
   11.13 VisBio ............................................................... 54
   11.14 XuvTools ............................................................. 55

III Developer Documentation

12 Using Bio-Formats .......................................................... 57
   12.1 An in-depth guide to using Bio-Formats .............................. 57
   12.2 Obtaining and building Bio-Formats .................................. 59
   12.3 Generating test images ................................................ 61

13 Bio-Formats as a Java library ............................................. 63
   13.1 API documentation ..................................................... 63
   13.2 Examples ............................................................... 64

14 Interfacing from non-Java code ......................................... 75
   14.1 Interfacing with Bio-Formats from non-Java code .................. 75
   14.2 Bio-Formats C++ bindings .......................................... 75
   14.3 Build instructions for C++ bindings ................................. 75
   14.4 Building C++ bindings in Windows .................................. 77
   14.5 Building C++ bindings in Mac OS X ................................ 78
   14.6 Building C++ bindings in Linux .................................... 79

15 Writing new Bio-Formats file format readers ......................... 80
   15.1 Bio-Formats file format reader guide ................................ 80

16 Contributing to Bio-Formats .............................................. 84
   16.1 Testing individual commits (internal developers) ................. 84
   16.2 Public test data ....................................................... 85
   16.3 Bio-Formats service and dependency infrastructure ............. 88
   16.4 Code generation with xsd-fu ....................................... 90

IV Formats

17 Dataset Structure Table .................................................. 94
   17.1 Flex Support .......................................................... 97

18 Supported Formats ........................................................ 98
   18.1 3i SlideBook .......................................................... 103
   18.2 Andor Bio-Imaging Division (ABD) TIFF ............................. 104
   18.3 AIM .............................................................. 104
   18.4 Alicona 3D .......................................................... 105
   18.5 Amersham Biosciences Gel .......................................... 106
   18.6 Amira Mesh .......................................................... 107
   18.7 Analyze 7.5 .......................................................... 107
   18.8 Animated PNG ........................................................ 108
   18.9 Aperio AFI .......................................................... 109
   18.10 Aperio SVS TIFF .................................................... 109
| 18.72 | LIM (Laboratory Imaging/Nikon) | 154 |
| 18.73 | MetaMorph 7.5 TIFF | 155 |
| 18.74 | MetaMorph Stack (STK) | 155 |
| 18.75 | MIAS (Maia Scientific) | 156 |
| 18.76 | Micro-Manager | 157 |
| 18.77 | MINC MRI | 157 |
| 18.78 | Minolta MRW | 158 |
| 18.79 | MNG (Multiple-image Network Graphics) | 159 |
| 18.80 | Molecular Imaging | 160 |
| 18.81 | MRC (Medical Research Council) | 160 |
| 18.82 | NEF (Nikon Electronic Format) | 161 |
| 18.83 | NITI | 162 |
| 18.84 | Nikon Elements TIFF | 163 |
| 18.85 | Nikon EZ-C1 TIFF | 163 |
| 18.86 | Nikon NIS-Elements ND2 | 164 |
| 18.87 | NRRD (Nearly Raw Raster Data) | 165 |
| 18.88 | Olympus CellR/APL | 165 |
| 18.89 | Olympus Fluoview FV1000 | 166 |
| 18.90 | Olympus Fluoview TIFF | 167 |
| 18.91 | Olympus ScanR | 168 |
| 18.92 | Olympus SIS TIFF | 168 |
| 18.93 | OME-TIFF | 169 |
| 18.94 | OME-XML | 170 |
| 18.95 | Oxford Instruments | 171 |
| 18.96 | PCORAW | 171 |
| 18.97 | PCX (PC Paintbrush) | 172 |
| 18.98 | Perkin Elmer Densitometer | 173 |
| 18.99 | PerkinElmer Operetta | 173 |
| 18.100 | PerkinElmer UltraView | 174 |
| 18.101 | PGM (Portable Gray Map) | 175 |
| 18.102 | Adobe Photoshop PSD | 175 |
| 18.103 | Photoshop TIFF | 176 |
| 18.104 | PicoQuant Bin | 177 |
| 18.105 | PICT (Macintosh Picture) | 177 |
| 18.106 | PNG (Portable Network Graphics) | 178 |
| 18.107 | Prairie Technologies TIFF | 179 |
| 18.108 | Quesant | 179 |
| 18.109 | QuickTime Movie | 180 |
| 18.110 | RHK | 181 |
| 18.111 | SBIG | 182 |
| 18.112 | Seiko | 183 |
| 18.113 | SimplePCI & HCImage | 183 |
| 18.114 | SimplePCI & HCImage TIFF | 184 |
| 18.115 | SM Camera | 185 |
| 18.116 | SPIDER | 185 |
| 18.117 | Targa | 186 |
| 18.118 | Text | 187 |
| 18.119 | TIFF (Tagged Image File Format) | 187 |
| 18.120 | TillPhotonics TillVision | 188 |
| 18.121 | Topometrix | 189 |
| 18.122 | Trestle | 189 |
| 18.123 | UBM | 190 |
| 18.124 | Unisoku | 191 |
| 18.125 | Varian FDF | 191 |
| 18.126 | VG SAM | 192 |
| 18.127 | VisTech XYS | 193 |
| 18.128 | Velocity | 193 |
| 18.129 | Velocity Library Clipping | 194 |
| 18.130 | WA-TOP | 195 |
| 18.131 | Windows Bitmap | 195 |
| 18.132 | Woolz | 196 |
18.13 Zeiss AxioVision TIFF ................................................................. 197
18.13 Zeiss AxioVision ZVI (Zeiss Vision Image) .................................... 197
18.13 Zeiss CZI ...................................................................................... 198
18.136 Zeiss LSM (Laser Scanning Microscope) 510/710 .......................... 199

19 Summary of supported metadata fields .............................................. 201
  19.1 Format readers ............................................................................. 201
  19.2 Metadata fields ............................................................................. 204

Index ..................................................................................................... 426

Index ..................................................................................................... 427
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 in-depth 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\(^1\), particularly into the OME-TIFF\(^2\) 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\(^3\) from thinkstandards.net\(^4\) provides an excellent summary. See also LOCI’s article on open source software in science\(^5\).

\(^1\)http://genomebiology.com/2005/6/5/R47
\(^2\)http://www.openmicroscopy.org/site/support/ome-model/ome-tiff
\(^3\)http://www.thinkstandards.net/benefits.html
\(^4\)http://www.thinkstandards.net/
\(^5\)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
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.

---

\(^1\)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.

---

\(^1\)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-formats5.0/
\(^7\)http://lists.openmicroscopy.org.uk/mailman/listinfo/ome-users
\(^8\)http://qa.openmicroscopy.org.uk/qa/upload/
Please be patient - it may be a few days until you receive a response, but we reply to every email inquiry we receive.

## 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)
  - 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)
- 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 MacOS X resource fork. The ‘file’ command should tell you:

```bash
$ 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.

---

9 [http://www.openmicroscopy.org/site/support/faq](http://www.openmicroscopy.org/site/support/faq)
10 [http://trac.openmicroscopy.org.uk/ome](http://trac.openmicroscopy.org.uk/ome)
11 [http://fiji.sc/cgi-bin/bugzilla/index.cgi](http://fiji.sc/cgi-bin/bugzilla/index.cgi)
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\textsuperscript{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 5.0.8 (2015 February 10)

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

4.1.2 5.0.7 (2015 February 5)

• Several bug fixes, including:
  – ND filter parsing for DeltaVision
  – Timepoint count and original metadata parsing for Metamorph
  – Build issues when Genshi or Git are missing
  – LZW image decoding

4.1.3 5.0.6 (2014 November 11)

• Several bug fixes, including:
  – Pixel sign for DICOM images
  – Image dimensions for Zeiss CZI and Nikon ND2
  – Support for Leica LIF files produced by LAS AF 4.0 and later

4.1.4 5.0.5 (2014 September 23)

• Documentation improvements
• Support for non-spectral Prairie 5.2 datasets

4.1.5 5.0.4 (2014 September 3)

• Fix compile and runtime errors under Java 1.8
• Improvements to Nikon .nd2 metadata parsing
• Added support for PicoQuant .bin files (thanks to Ian Munro)

\textsuperscript{1}\url{http://www.openmicroscopy.org/site/support/omero5/}
4.1.6 5.0.3 (2014 August 7)

- Many bug fixes for Nikon .nd2 files
- Several other bug fixes, including:
  - LZW image decoding
  - Stage position parsing for Zeiss CZI
  - Exposure time units for ScanR
  - Physical pixel size units for DICOM
  - NDPI and Zeiss LSM files larger than 4GB
  - Z and T dimensions for InCell 6000 plates
  - Export of RGB images in ImageJ
- Improved metadata saving in MATLAB functions

4.1.7 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

4.1.8 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)

4.1.9 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
- 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

4.1.10 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 Inspector
  – 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

4.1.11 5.0.0-beta1 (2013 June 20)
• Updated to 2013-06 OME-XML schema²
• 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 Inspector
• 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

4.1.12 4.4.10 (2014 Jan 15)
• Bug fixes including CellWorx, Metamorph and Zeiss CZI
• Updates to MATLAB documentation

4.1.13 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

²http://www.openmicroscopy.org/site/support/ome-model/
4.1.14 4.4.8 (2013 May 2)

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

4.1.15 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.

4.1.16 4.4.6 (2013 February 11)

- Many bug fixes
- Further documentation improvements

4.1.17 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

4.1.18 4.4.4 (2012 September 24)

- Many bug fixes

4.1.19 4.4.2 (2012 August 22)

- Security fix for OMERO plugins for ImageJ

4.1.20 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

4.1.21 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
### 4.1.22 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

### 4.1.23 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

### 4.1.24 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
4.1.25 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
  - Velocity .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

4.1.26 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 BufferedImage 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

4.1.27 4.2.1 (2010 November 12)

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

4.1.28 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

4.1.29 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. Version history
4.1.30 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

4.1.31 4.0.0 (2009 March 3)

- Improved OME 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

4.1.32 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

### 4.1.33 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

### 4.1.34 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

### 4.1.35 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
• 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

4.1.36 2008 Feb 12

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

4.1.37 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

4.1.38 2008 Feb 1

• Fixed bugs in Zeiss LSM, Metamorph STK, FV1000 OIB/OIF, Leica LEI, TIFF, Zeiss ZVI, ICS, Prairie, Openlab LIFF, 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

4.1.39 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 1.39I
• Support for hyperstacks and virtual stacks in ImageJ - requires ImageJ 1.39I
• 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

4.1. Version history
• 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

4.1.40 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

4.1.41 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

4.1.42 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
4.1.43 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

4.1.44 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

4.1.45 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

4.1.46 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

4.1.47 2007 July 2

- Fixed issues with ND2, Openlab LIFF and Slidebook
- Added support for Visitech XYS
- Added composite stack support to ImageJ importer
4.1.48 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

4.1.49 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

4.1.50 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

4.1.51 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
• Miscellaneous bugfixes and tweaks in most readers and writers
• Many other bugfixes and improvements

4.1.52 2007 Mar 16
• Fixed calibration bugs in importer plugin
• Enhanced metadata support for additional formats
• Fixed LSM bug

4.1.53 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

4.1.54 2007 Feb 28
• Better series preview thumbnails
• Fixed bugs with multi-channel Leica LEI
• Fixed bugs with “ignore color tables” option in ImageJ plugin

4.1.55 2007 Feb 26
• Many bugfixes: 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

4.1.56 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

4.1.57 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

4.1.58 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

4.1.59 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

4.1.60 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

4.1.61 2006 Oct 31
- Added support for Imaris 5 files
- Added support for RGB ICS images

4.1. Version history
4.1.62 2006 Oct 30

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

4.1.63 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

4.1.64 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
4.1.65 2006 Sep 27

- PerkinElmer: support for PE UltraView
- Openlab LIFF: support for Openlab v5
- Leica LEI: bugfixes, 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

4.1.66 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

4.1.67 2006 Mar 31

- First release

4.1. Version history
Part II

User Information
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.

\(^1\)http://rsb.info.nih.gov/ij/
\(^2\)http://downloads.openmicroscopy.org/latest/bio-formats5.0/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-formats5.0/
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.txt8 - A macro that uses the Bio-Formats macro extensions to print the chosen file’s basic dimensional parameters to the Log.
- planeTimings.txt9 - A macro that uses the Bio-Formats macro extensions to print the chosen file’s plane timings to the Log.
- recursiveTiffConvert.txt10 - A macro for recursively converting files to TIFF using Bio-Formats.
- bfOpenAsHyperstack.txt11 - 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.txt12 - 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.txt13 - This macro from Sebastien Huart splits timepoints/channels on all DV files in a folder.
- batchTiffConvert.txt14 - This macro converts all files in a directory to TIFF using the Bio-Formats macro extensions.
- Read_Image15 - A simple plugin that demonstrates how to use Bio-Formats to read files into ImageJ.
- Mass_Importer16 - 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

Fiji17 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 structure18. 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 page19.

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 calibration20 if they are available in the file.

---

8 https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/bio-formats-plugins/utils/macros/basicMetadata.txt
9 https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/bio-formats-plugins/utils/macros/planeTimings.txt
10 https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/bio-formats-plugins/utils/macros/recursiveTiffConvert.txt
11 https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/bio-formats-plugins/utils/macros/bfOpenAsHyperstack.txt
12 https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/bio-formats-plugins/utils/macros/zvi2HyperStack.txt
13 https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/bio-formats-plugins/utils/macros/dvSplitTimePoints.txt
14 https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/bio-formats-plugins/utils/macros/batchTiffConvert.txt
15 https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/bio-formats-plugins/utils/Read_Image.java
16 https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/bio-formats-plugins/utils/Mass_Importer.java
17 http://fiji.sc/
18 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\(^{21}\) 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\(^{22}\) useful for getting you started with both plugins at the same time.

Once you [download\(^{23}\)](http://rsbweb.nih.gov/ij/download.html) and install ImageJ, you can install the Bio-Formats plugin by going to the Bio-Formats [download page\(^{24}\)](http://downloads.openmicroscopy.org/latest/bio-formats5.0/).

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.

\(^{21}\)http://www.openmicroscopy.org/site/support/ome-model/ome-tiff

\(^{22}\)http://help.openmicroscopy.org/imagej.html

\(^{23}\)http://rsbweb.nih.gov/ij/download.html

\(^{24}\)http://downloads.openmicroscopy.org/latest/bio-formats5.0/
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 and save the appropriate `bioformats_package.jar` to the Plugins directory within ImageJ.

![Plugin Directory for ImageJ](image)

Figure 5.1: Plugin Directory for ImageJ: Where in ImageJ’s file structure you should place the file once you downloaded it.

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 Plugin Menu](image)

---

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:

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 dataset available under LOCI’s Sample Data 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:

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 dataset, 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”, “dub16.pic” . . . “dub85.pic”.

It can also accept a [Java regular expression](http://download.oracle.com/javase/1.5.0/docs/api/java/util/regex/Pattern.html).

### 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 thorough 125 are being used.

---

28[http://download.oracle.com/javase/1.5.0/docs/api/java/util/regex/Pattern.html](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 of two similar images showing the effect of Autoscale]

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.

\(^{29}\)http://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\(^\text{30}\).

\(^{30}\)http://rsbweb.nih.gov/ij/docs/menus/edit.html#options
CHAPTER SIX

COMMAND LINE TOOLS

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 `xml lint --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-formats5.0/artifacts/bftools.zip
6.1.3 Using the tools directly from source

Firstly, obtain a copy of the sources and build them (see Obtaining and building Bio-Formats). 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 bftools 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’.
Error validating document: 3 errors found

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\(^1\) (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\(^2\) 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\(^3\). 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\(^4\) 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:

- OME-TIFF
- Metamorph HTD
- Deltavision DV
- Metamorph STK
- Bio-Rad PIC
- Zeiss LSM
- TIFF

---

1\(\text{http://www.bioimage.ucsb.edu/bisque}\)
2\(\text{http://openmicroscopy.org/site/support/legacy/ome-server}\)
3\(\text{http://www.openmicroscopy.org/site/support/omero5/}\)
4\(\text{http://downloads.openmicroscopy.org/ome/2.6.1/}\)
• BMP
• DICOM
• OME-XML

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::OMETIFFreader",
 "OME::ImportEngine::MetamorphHTDFormat",
 "OME::ImportEngine::DVreader",
 "OME::ImportEngine::STKreader",
 "OME::ImportEngine::LSMreader",
 "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-formats5.0/
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** – omebf Java command line tool
- **BioFormats.pm** – Perl module for OME Bio-Formats importer
- **omeis.c** – OMEIS C functions for Bio-Formats (search for “bioformats” case insensitively to find relevant sections)

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\(^2\)\(^3\) is a multidimensional image processing library. It provides a general mechanism for writing image analysis algorithms, without writing case logic for bit depth\(^14\), or worrying about the source of the pixel data (arrays in memory, files on disk, etc.).

\(^1\)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/FarsightDownloads
\(^5\)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
\(^9\)http://cbia.fi.muni.cz/user_dirs/of_doc/libi4d.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\(^{15}\) project provides an ImgOpener\(^{16}\) utility class for reading data into ImgLib2 data structures using Bio-Formats.

### 9.4 ITK

The Insight Toolkit\(^{17}\) (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\(^{18}\) plugin provides an ITK imageIO base that uses Bio-Formats 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.

### 9.5 Qu for MATLAB

Qu for MATLAB\(^{19}\) 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\(^{20}\)

### 9.6 Subimager

Subimager\(^{21}\), 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\(^{22}\) to facilitate integration with their CellProfiler\(^{23}\) image analysis application.

---

\(^{15}\)http://scif.io/

\(^{16}\)https://github.com/scifio/scifio/blob/master/src/main/java/io/scif/img/ImgOpener.java

\(^{17}\)http://itk.org/

\(^{18}\)https://github.com/scifio/scifio-imageio

\(^{19}\)http://www.scs2.net/home/index.php?option=com_content&view=article&id=46%3Aqu-for-matlab&catid=34%3Aqu&Itemid=55

\(^{20}\)http://www.scs2.net/home/index.php?option=com_content&view=article&id=46%3Aqu-for-matlab&catid=34%3Aqu&Itemid=55&limitstart=3

\(^{21}\)https://github.com/CellProfiler/subimager

\(^{22}\)http://www.broadinstitute.org/

\(^{23}\)http://www.cellprofiler.org/
CHAPTER TEN

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 \texttt{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-formats5.0/
\(^5\)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/v5.0.8/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 bf-matlab 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/
- 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.

---

9http://downloads.openmicroscopy.org/latest/bio-formats5.0/
10http://downloads.openmicroscopy.org/latest/bio-formats5.0/
12http://www.ssec.wisc.edu/~billh/visad.html
13http://downloads.openmicroscopy.org/latest/bio-formats5.0/artifacts/bioformats_package.jar
14http://downloads.openmicroscopy.org/latest/bio-formats5.0/artifacts/formats-gpl.jar
CHAPTER ELEVEN

VISUALIZATION AND ANALYSIS APPLICATIONS

11.1 Bitplane Imaris

Imaris 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, Imaris integrates with Fiji overview, which includes Bio-Formats. See this page for a detailed list of Imaris’ features.

11.2 CellProfiler

CellProfiler—developed by the Broad Institute Imaging Platform—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 Website of the CellProfiler software

Using Bio-Formats in Python Section of the developer documentation describing the Python wrapper for Bio-Formats used by CellProfiler

1http://www.bitplane.com/
3http://www.bitplane.com/imaris/imaris
4http://www.cellprofiler.org
5http://www.broadinstitute.org/science/platforms/imaging/imaging-platform
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\(^7\).

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

11.4 Endrov

Endrov\(^8\) (or [http://www.endrov.net](http://www.endrov.net)) (EV) is a multi-purpose image analysis program developed by the Thomas Burglin group\(^9\) at Karolinska Institute\(^10\), 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\(^11\) 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\(^12\) is an image browser, similar to Windows Explorer\(^13\) or other file manager\(^14\) 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\(^15\) 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\(^16\) 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.

---

\(^7\) [http://www.comstat.dk/](http://www.comstat.dk/)
\(^8\) [https://github.com/mahogany/Endrov](https://github.com/mahogany/Endrov)
\(^9\) [http://www.biosci.ki.se/groups/tbu](http://www.biosci.ki.se/groups/tbu)
\(^10\) [http://www.ki.se/](http://www.ki.se/)
\(^11\) [http://downloads.openmicroscopy.org/latest/bio-formats5.0/artifacts/formats-gpl.jar](http://downloads.openmicroscopy.org/latest/bio-formats5.0/artifacts/formats-gpl.jar)
\(^12\) [http://www.bioinformatics.bbsrc.ac.uk/projects/focalpoint/](http://www.bioinformatics.bbsrc.ac.uk/projects/focalpoint/)
\(^15\) [http://downloads.openmicroscopy.org/latest/bio-formats5.0/](http://downloads.openmicroscopy.org/latest/bio-formats5.0/)
\(^16\) [http://www.lemkesoft.com](http://www.lemkesoft.com)
11.7 Icy

Icy\textsuperscript{17} 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\textsuperscript{18} is an advanced desktop image management package that enables scientists to easily store, manage, search, and analyze 5D 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\textsuperscript{19}.

11.9 Iqm

Iqm\textsuperscript{20} 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\textsuperscript{21} 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\textsuperscript{22}.

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

See also:
Free trial download\textsuperscript{23}

11.11 MIPAV

The MIPAV\textsuperscript{24} (Medical Image Processing, Analysis, and Visualization) application—developed at the Center for Information Technology\textsuperscript{25} at the National Institutes of Health\textsuperscript{26}—enables quantitative analysis and visualization of medical images of numerous 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.

\textsuperscript{17}http://icy.bioimageanalysis.org/
\textsuperscript{18}http://mayachitra.com/imago/index.html
\textsuperscript{19}http://mayachitra.com/imago/download-trial.php
\textsuperscript{20}http://code.google.com/p/iqm/
\textsuperscript{21}http://www.orbicule.com/macnification/
\textsuperscript{22}http://www.orbicule.com
\textsuperscript{23}http://www.orbicule.com/macnification/download
\textsuperscript{24}http://mipav.cit.nih.gov/
\textsuperscript{25}http://cit.nih.gov/
\textsuperscript{26}http://nih.gov/
11.11.1 Installation

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

1. Download `bioformats_package.jar`\(^27\) and drop it into your MIPAV folder.
2. Download the plugin source code\(^28\) into your user `mipav/plugins` folder.
3. From the command line, compile the plugin with:

```bash
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\(^29\) for more information.

To upgrade, just overwrite the old `bioformats_package.jar` with the latest one\(^30\). You may want to download the latest version of MIPAV first, to take advantage of new features and bug-fixes.

11.12 Vaa3D

Vaa3D\(^31\), developed by the Peng Lab\(^32\) at the HHMI Janelia Farm Research Campus\(^33\), 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\(^34\) to read images.

11.13 VisBio

VisBio\(^35\) 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.

11.13.2 Upgrading

It should be possible to use a newer version of Bio-Formats\(^36\) 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.

\(^{27}\)http://downloads.openmicroscopy.org/latest/bio-formats5.0/artifacts/bioformats_package.jar

\(^{28}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-bsd/utils/mipav/PlugInBioFormatsImporter.java

\(^{29}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-bsd/utils/mipav/readme.txt

\(^{30}\)http://downloads.openmicroscopy.org/latest/bio-formats5.0/

\(^{31}\)http://vaa3d.org

\(^{32}\)http://penglab.janelia.org/

\(^{33}\)http://www.hhmi.org/janelia/


\(^{35}\)http://loci.wisc.edu/software/visbio

\(^{36}\)http://downloads.openmicroscopy.org/latest/bio-formats5.0/
11.14 XuvTools

XuvTools is automated 3D stitching software for biomedical image data. As of release 1.8.0, XuvTools uses Bio-Formats to read image data.

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 in the Source code section. Having a copy of the Javadocs^1^ nearby is recommended—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^2^.

12.1.2 Using Gradle, Maven or Ivy

All released .jar artifacts may be obtained through the OME Artifactory server^3^. The “Client Settings” section of the Artifactory main page provides example code snippets for inclusion into your Gradle, Maven or Ivy project, which will enable the use of this repository.

Example snippets for using the Bio-Formats 5.0.2 release formats-gpl artifact are available for Gradle and for Maven. These may be copied into your project to enable the use of the Bio-Formats library components, and may be adjusted to use different components or different release or development versions of Bio-Formats.

12.1.3 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^4^—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^5^. 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)^6^ 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)^7^ 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)^8^)

^1^http://downloads.openmicroscopy.org/latest/bio-formats5.0/api/
^2^https://github.com/openmicroscopy/bioformats/tree/v5.0.8/components/formats-gpl/utils
^3^http://artifacts.openmicroscopy.org/artifactory
^4^https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-api/src/loci/formats/IFormatReader.java
^5^https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-api/src/loci/formats/ImageReader.java
^6^http://downloads.openmicroscopy.org/latest/bio-formats5.0/api/loci/formats/IFormatHandler.html#setId(java.lang.String)
^7^http://downloads.openmicroscopy.org/latest/bio-formats5.0/api/loci/formats/IFormatReader.html#setSeries(int)
^8^http://downloads.openmicroscopy.org/latest/bio-formats5.0/api/loci/formats/IFormatReader.html#getSizeX()
• image height (getSizeY()\(^9\))
• number of series per file (getSeriesCount()\(^{10}\))
• total number of images per series (getImageCount()\(^{11}\))
• number of slices in the current series (getSizeZ()\(^{12}\))
• number of timepoints in the current series (getSizeT()\(^{13}\))
• number of actual channels in the current series (getSizeC()\(^{14}\))
• number of channels per image (getRGBChannelCount()\(^{15}\))
• the ordering of the images within the current series (getDimensionOrder()\(^{16}\))
• whether each image is RGB (isRGB()\(^{17}\))
• whether the pixel bytes are in little-endian order (isLittleEndian()\(^{18}\))
• whether the channels in an image are interleaved (isInterleaved()\(^{19}\))
• the type of pixel data in this file (getPixelType()\(^{20}\))

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 java.util.Hashtable, and can be accessed in one of two ways: individual values can be retrieved by calling getMetadataValue(String)\(^{21}\), 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 Bio-Formats metadata processing for more information on the metadata capabilities that Bio-Formats provides.

### 12.1.4 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.

  – BufferedImageReader\(^{22}\) extends IFormatReader, and allows pixel data to be returned as BufferedImages instead of raw byte arrays.

  – FileStitcher\(^{23}\) extends IFormatReader, and uses advanced pattern matching heuristics to group files that belong to the same dataset.

  – ChannelSeparator\(^{24}\) extends IFormatReader, and makes sure that all planes are grayscale - RGB images are split into 3 separate grayscale images.

  – ChannelMerger\(^{25}\) extends IFormatReader, and merges grayscale images to RGB if the number of channels is greater than 1.

  – ChannelFiller\(^{26}\) extends IFormatReader, and converts indexed color images to RGB images.

---

\(^9\) http://downloads.openmicroscopy.org/latest/bio-formats5.0/api/loci/formats/IFormatReader.html#getSizeY()

\(^{10}\) http://downloads.openmicroscopy.org/latest/bio-formats5.0/api/loci/formats/IFormatReader.html#getSeriesCount()

\(^{11}\) http://downloads.openmicroscopy.org/latest/bio-formats5.0/api/loci/formats/IFormatReader.html#getImageCount()

\(^{12}\) http://downloads.openmicroscopy.org/latest/bio-formats5.0/api/loci/formats/IFormatReader.html#getSizeZ()

\(^{13}\) http://downloads.openmicroscopy.org/latest/bio-formats5.0/api/loci/formats/IFormatReader.html#getSizeT()

\(^{14}\) http://downloads.openmicroscopy.org/latest/bio-formats5.0/api/loci/formats/IFormatReader.html#getRGBChannelCount()

\(^{15}\) http://downloads.openmicroscopy.org/latest/bio-formats5.0/api/loci/formats/IFormatReader.html#getDimensionOrder()

\(^{16}\) http://downloads.openmicroscopy.org/latest/bio-formats5.0/api/loci/formats/IFormatReader.html#isRGB()

\(^{17}\) http://downloads.openmicroscopy.org/latest/bio-formats5.0/api/loci/formats/IFormatReader.html#isLittleEndian()

\(^{18}\) http://downloads.openmicroscopy.org/latest/bio-formats5.0/api/loci/formats/IFormatReader.html#isInterleaved()

\(^{19}\) http://downloads.openmicroscopy.org/latest/bio-formats5.0/api/loci/formats/IFormatReader.html#isInterleaved()

\(^{20}\) http://downloads.openmicroscopy.org/latest/bio-formats5.0/api/loci/formats/IFormatReader.html#isInterleaved()

\(^{21}\) http://downloads.openmicroscopy.org/latest/bio-formats5.0/api/loci/formats/IFormatReader.html#isInterleaved()

\(^{22}\) https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-bsd/src/loci/formats/gui/BufferedImageReader.java

\(^{23}\) https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-bsd/src/loci/formats/FileStitcher.java

\(^{24}\) https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-bsd/src/loci/formats/ChannelSeparator.java

\(^{25}\) https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-bsd/src/loci/formats/ChannelMerger.java

\(^{26}\) https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-bsd/src/loci/formats/ChannelFiller.java
· **MinMaxCalculator**\(^{27}\) extends IFormatReader, and provides an API for retrieving the minimum and maximum pixel values for each channel.
· **DimensionSwapper**\(^{28}\) extends IFormatReader, and provides an API for changing the dimension order of a file.

- **ImageTools**\(^{29}\) and **loci.formats.gui.AWTImageTools**\(^{30}\) provide a number of methods for manipulating BufferedImage 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).

## 12.1.5 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**\(^{31}\)) is very similar to the reader API, in that files are written one plane at a 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**\(^{32}\) and this guide to exporting to OME-TIFF files for examples of how to write files.

## 12.1.6 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 Obtaining and building Bio-Formats

### 12.2.1 Source code

The source code for this Bio-Formats release is available from the [download page]\(^{33}\). This release and the latest Bio-Formats source code are also available from the Git repository. This may be accessed using the repository path:

- MinMaxCalculator\(^{27}\) [https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-bsd/src/loci/formats/MinMaxCalculator.java](https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-bsd/src/loci/formats/MinMaxCalculator.java)
- DimensionSwapper\(^{28}\) [https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-bsd/src/loci/formats/DimensionSwapper.java](https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-bsd/src/loci/formats/DimensionSwapper.java)
- [http://downloads.openmicroscopy.org/latest/bio-formats5.0/](http://downloads.openmicroscopy.org/latest/bio-formats5.0/)
More information about Git and client downloads are available from the Git project website\(^{34}\). You can also browse the Bio-Formats source on GitHub\(^{35}\).

**Note:** Windows users must set git to use `core.autocrlf=input` to ensure that Bio-Formats uses LF rather than CRLF line endings, otherwise the build will fail (Genshi can’t process code templates with CRLF line endings, leading to broken sources being generated). This can be set globally in the registry when installing `/msysgit` or by editing `etc/gitconfig` in the git installation directory. Annoyingly, these settings appear to override per-user and per-repository configuration values, requiring these to be set globally.

Lastly, you can browse the Bio-Formats Javadocs online\(^{36}\), or generate them yourself using the “docs” Ant target.

### 12.2.2 Source code structure

The Bio-Formats code is divided into several projects. Core components are located in subfolders of the `components`\(^{37}\) folder, with some components further classified into `components/forks`\(^{38}\) or `components/stubs`\(^{39}\), 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.

### 12.2.3 Building from source

Instructions for several popular options follow. In all cases, make sure that the prerequisites are installed before you begin.

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.

#### Prerequisites

In addition to the Bio-Formats source code, the following programs and packages are also required:

- Python \(^{40}\), version 2.6 or later (note: not version 3)
- Genshi\(^{41}\) 0.5 or later (0.7 recommended)

**Note:** Genshi may be installed (in order of decreasing preference) with some Linux distributions’ package managers, `pip` (`pip install genshi`), by downloading a compatible `.egg` for your system from the Genshi download page\(^{42}\), or from source. If using a `.egg`, make sure it is added to your `PYTHONPATH` environment variable.

#### 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

---

\(^{34}\)http://git-scm.com/
\(^{35}\)https://github.com/openmicroscopy/bioformats
\(^{36}\)http://downloads.openmicroscopy.org/latest/bio-formats5.0/api/
\(^{37}\)https://github.com/openmicroscopy/bioformats/tree/v5.0.8/components/
\(^{38}\)https://github.com/openmicroscopy/bioformats/tree/v5.0.8/components/forks/
\(^{39}\)https://github.com/openmicroscopy/bioformats/tree/v5.0.8/components/stubs/
\(^{40}\)http://python.org
\(^{41}\)http://genshi.edgewall.org
\(^{42}\)http://genshi.edgewall.org/wiki/Download
Alternately, you can clone the source directly from NetBeans into a project by selecting **Team → Git → Clone Other...** from the menu.

### 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](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.

To remove post-import errors, either close the **ome-xml** project or run:

```
ant jars && mvn generate-sources
```

See also:

[ome-devel] Importing source into eclipse[^1]

### 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
```

In general, **ant jars** or **ant tools** is the correct command.

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.

### 12.3 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:

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 `loci.formats.tools.ImageConverter`\(^4^4\) for `bfconvert`.

---

\(^4^4\)https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/bio-formats-tools/src/loci/formats/tools/ImageConverter.java
CHAPTER THIRTEEN

BIO-FORMATS AS A JAVA LIBRARY

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(^3)</td>
<td>ome-poi.jar(^4)</td>
<td>Apache</td>
<td>OME fork; for OLE-based formats (zvi, oib, ipw, cxd)</td>
</tr>
<tr>
<td>MDB Tools(^5)</td>
<td>mdbtools-java.jar(^6)</td>
<td>LGPL</td>
<td>Java port, OME fork; for Olympus CellR and Zeiss LSM metadata (mdb)</td>
</tr>
<tr>
<td>JAI Image I/O Tools(^7)</td>
<td>jai_imageio.jar(^8)</td>
<td>BSD</td>
<td>Pure Java implementation, OME fork; for JPEG2000-based formats (nd2, jp2)</td>
</tr>
<tr>
<td>NetCDF(^9)</td>
<td>netcdf-4.3.19.jar(^10)</td>
<td>LGPL</td>
<td>Java library; for HDF5-based formats (Imaris 5.5, MINC MRI)</td>
</tr>
<tr>
<td>QuickTime for Java(^11)</td>
<td>QTJava.zip</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.

ImageInfo\(^15\) - 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\(^16\) - A command line utility demonstrating the minimum amount of metadata needed to write a file.

PrintTimestamps\(^17\) - A command line example demonstrating how to extract timestamps from a file.

---

\(^1\)http://downloads.openmicroscopy.org/latest/bio-formats5.0/artifacts/formats-gpl.jar
\(^2\)http://slf4j.org/
\(^3\)http://jakarta.apache.org/poi/
\(^4\)http://downloads.openmicroscopy.org/latest/bio-formats5.0/artifacts/ome-poi.jar
\(^5\)http://sourceforge.net/projects/mdbtools
\(^6\)http://downloads.openmicroscopy.org/latest/bio-formats5.0/artifacts/mdbtools-java.jar
\(^7\)http://java.net/projects/jai-imageio
\(^8\)http://downloads.openmicroscopy.org/latest/bio-formats5.0/artifacts/jai_imageio.jar
\(^9\)http://www.unidata.ucar.edu/software/netcdf-java/
\(^10\)http://downloads.openmicroscopy.org/latest/bio-formats5.0/artifacts/netcdf-4.3.19.jar
\(^12\)https://github.com/openmicroscopy/bioformats/blob/v5.0.8/build.xml
\(^13\)https://github.com/openmicroscopy/bioformats/tree/v5.0.8/jar
\(^14\)https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/bio-formats-tools/src/loci/formats/tools/ImageConverter.java
\(^15\)https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/bio-formats-tools/src/loci/formats/tools/ImageInfo.java
\(^16\)https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/utils/MinimumWriter.java
\(^17\)https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/utils/PrintTimestamps.java
Simple_Read\(^{18}\) - A simple ImageJ plugin demonstrating how to use Bio-Formats to read files into ImageJ (see ImageJ overview).

Read_Image\(^{19}\) - An ImageJ plugin that uses Bio-Formats to build up an image stack, reading image planes one by one (see ImageJ overview).

Mass_Importer\(^{20}\) - 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 avoiding 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\(^{21}\) file of the distribution. You can also read our notes about each in the source distribution’s Ant build.xml\(^{22}\) script.

Also see Bio-Formats Javadocs\(^{23}\)

### 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:

```
// 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);
```

---

\(^{18}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/bio-formats-plugins/utils/Simple_Read.java

\(^{19}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/bio-formats-plugins/utils/Read_Image.java

\(^{20}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/bio-formats-plugins/utils/Mass_Importer.java

\(^{21}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.8/ant/toplevel.properties

\(^{22}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.8/build.xml#L240

\(^{23}\)http://downloads.openmicroscopy.org/latest/bio-formats5.0/api/
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 filename 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:
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:

    // 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]);
        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[^24]

---

### 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
- 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:


---

### 13.2. Examples

---

---
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:

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

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

```
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:

```
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 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’:

```
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++) {
    writer.saveBytes(image, pixelData[image]);
}
```

Finally, we must tell the writer that we are finished, so that the output file can be properly closed:
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 we 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:

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*. 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:

```matlab
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](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?

#### Opening an image file

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

```matlab
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.
- 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.

---

25[https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/matlab/bfopen.m](https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/matlab/bfopen.m)
**Accessing planes**

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

```plaintext
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};
$ _\text{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};
$ _\text{etc.}$
```

**Displaying images**

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

```plaintext
data = bfopen('/path/to/data/file');
$ _\text{plot the 1st serie'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:

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

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

```plaintext
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\(^{28}\) 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
', 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 \(\mu m\)
voxelSizeY = omeMeta.getPixelsPhysicalSizeY(0).getValue(); % in \(\mu m\)
voxelSizeZ = omeMeta.getPixelsPhysicalSizeZ(0).getValue(); % in \(\mu m\)
```

For more information about the methods to retrieve the metadata, see the MetadataRetrieve\(^ {27}\) 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\(^ {28}\)` function is that it loads all the content of an image regardless of its size.

To access the file reader without loading all the data, use the low-level `bfGetReader.m\(^ {29}\)` function:

---

\(^{26}\)http://www.openmicroscopy.org/site/support/ome-model/

\(^{27}\)http://downloads.openmicroscopy.org/latest/bio-formats5.0/api/loci/formats/meta/MetadataRetrieve.html

\(^{28}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/matlab/bfopen.m

\(^{29}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/matlab/bfGetReader.m
reader = bfGetReader('path/to/data/file');

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

omeMeta = reader.getMetadataStore();

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

series1_plane1 = bfGetPlane(reader, 1);

To switch between series in a multi-image file, use the setSeries() method. To retrieve a plane given a set of \((z, c, t)\) coordinates, these coordinates must be linearized first using getIndex() method:

````
$ Read plane from series iSeries at Z, C, T coordinates (iZ, iC, iT)
$ All indices are expected to be 1-based
reader.setSeries(iSeries - 1);
iPlane = reader.getIndex(iZ - 1, iC - 1, iT - 1) + 1;
I = bfGetPlane(reader, iPlane);
```

**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.tif');
```

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.tif');
```

By default, bfsave will create a minimal OME-XML metadata object containing basic information such as the pixel dimensions, the dimension order and the pixel type. To customize the OME metadata, it is possible to create a metadata object from the input array using createMinimalOMEXMLMetadata.m, add custom metadata and pass this object directly to bfsave:

```matlab
plane = zeros(64, 64, 1, 2, 2, 'uint8');
metadata = createMinimalOMEXMLMetadata(plane);
pixelSize = ome.xml.model.primitives.PositiveFloat(java.lang.Double(.05));
metadata.setPixelsPhysicalSizeX(pixelSize, 0);
metadata.setPixelsPhysicalSizeY(pixelSize, 0);
pixelSizeZ = ome.xml.model.primitives.PositiveFloat(java.lang.Double(.2));
metadata.setPixelsPhysicalSizeZ(pixelSizeZ, 0);
...
bfsave(plane, 'my-file.ome.tif', 'metadata', metadata);
```

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

---

30 https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/matlab/bfGetPlane.m
31 http://downloads.openmicroscopy.org/latest/bio-formats5.0/api/loci/formats/IFormatReader.html#setSeries(int)
32 http://downloads.openmicroscopy.org/latest/bio-formats5.0/api/loci/formats/IFormatReader.html#getIndex(int, int, int)
33 https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/matlab/bfsave.m
34 https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/matlab/createMinimalOMEXMLMetadata.m
35 http://downloads.openmicroscopy.org/latest/bio-formats5.0/api/loci/formats/meta/MetadataStore.html
13.2.5 Using Bio-Formats in Python

OME does not currently provide a Python implementation for Bio-Formats.

The CellProfiler project has implemented a Python wrapper around Bio-Formats used by the CellProfiler software which can be installed using *pip*:

```
pip install python-bioformats
```

See also:

https://pypi.python.org/pypi/python-bioformats  Source code of the CellProfiler Python wrapper for Bio-Formats
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\(^1\).

**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**\(^2\) 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\(^3\)
- minimum_writer\(^4\)

Other projects using BF-CPP include:

- **WiscScan**\(^5\) which uses BF-CPP to write OME-TIFF\(^6\) files.
- **XuvTools** which uses an adapted version of BF-CPP called BlitzBioFormats\(^7\).

See the build instructions (Windows, Mac OS X, Linux)\(^8\) 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/v5.0.8/components/formats-bsd/cppwrap/showinf.cpp
\(^4\)https://github.com/openmicroscopy/bioformats/blob/v5.0.8/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.
14.4 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\(^{14}\). 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\(^ {15}\). 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

Download Boost\(^ {16}\).

You can either build and install from source using the instructions in the Boost documentation, or follow the link under ‘Other downloads’ to the prebuilt binaries for several Visual Studio versions.

14.4.5 Compile-time dependencies – Windows – Java Development Kit

Download and install the JDK\(^ {17}\).

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
```

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.

---

\(^{12}\)http://www.openmicroscopy.org/community/

\(^{13}\)http://lists.openmicroscopy.org.uk/mailman/listinfo/

\(^{14}\)http://maven.apache.org/

\(^{15}\)http://cmake.org/

\(^{16}\)http://www.boost.org/users/download/

\(^{17}\)http://www.oracle.com/technetwork/java/javase/downloads/
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\(^{18}\).

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:

```
# 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\(^ {19} \):

```
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:

```
# 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:

```
# 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:

```
# 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
```
CHAPTER FIFTEEN

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.

---

\(^1\) [https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-api/src/loci/formats/FormatReader.java](https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-api/src/loci/formats/FormatReader.java)

\(^2\) [https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/](https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/)


\(^4\) [http://downloads.openmicroscopy.org/latest/bio-formats5.0/api/loci/formats/IFormatReader.html#isThisType(loci.common.RandomAccessInputStream)](http://downloads.openmicroscopy.org/latest/bio-formats5.0/api/loci/formats/IFormatReader.html#isThisType(loci.common.RandomAccessInputStream))


\(^6\) [http://downloads.openmicroscopy.org/latest/bio-formats5.0/api/loci/formats/IFormatReader.html#getSeriesUsedFiles(boolean)](http://downloads.openmicroscopy.org/latest/bio-formats5.0/api/loci/formats/IFormatReader.html#getSeriesUsedFiles(boolean))

\(^7\) [https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/PerkinElmerReader.java](https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/PerkinElmerReader.java)

\(^8\) [http://downloads.openmicroscopy.org/latest/bio-formats5.0/api/loci/formats/IFormatReader.html#openBytes(int, byte[], int, int, int, int)](http://downloads.openmicroscopy.org/latest/bio-formats5.0/api/loci/formats/IFormatReader.html#openBytes(int, byte[], int, int, int, int))
• **protected void initFile(String)**\(^9\) 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`\(^10\)).

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)**\(^11\) 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.

Note that if the new format is a variant of a format currently supported by Bio-Formats, it is more efficient to make the new reader a subclass of the existing reader (rather than subclassing `FormatReader`\(^12\)). In this case, it is usually sufficient to override `initFile(String)` and `isThisType(byte[])`.

Every reader also has an instance of `loci.formats.CoreMetadata`\(^13\). All readers should populate the fields in CoreMetadata, which are essential to reading image planes.

If you read from a file using something other than `RandomAccessInputStream`\(^14\) or `Location`\(^15\), 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:

```java
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\(^16\) 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`\(^17\) 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`\(^18\).

---


\(^10\) [https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-api/src/loci/formats/CoreMetadata.java](https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-api/src/loci/formats/CoreMetadata.java)

\(^11\) [http://downloads.openmicroscopy.org/latest/bio-formats5.0/api/loci/formats/IFormatReader.html#close(boolean)](http://downloads.openmicroscopy.org/latest/bio-formats5.0/api/loci/formats/IFormatReader.html#close(boolean))

\(^12\) [https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-api/src/loci/formats/FormatReader.java](https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-api/src/loci/formats/FormatReader.java)

\(^13\) [https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-api/src/loci/formats/CoreMetadata.java](https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-api/src/loci/formats/CoreMetadata.java)


\(^15\) [https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-common/src/loci/common/Location.java](https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-common/src/loci/common/Location.java)

\(^16\) [http://downloads.openmicroscopy.org/latest/bio-formats5.0/api/](http://downloads.openmicroscopy.org/latest/bio-formats5.0/api/)

\(^17\) [https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-api/src/loci/formats/FormatReader.java](https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-api/src/loci/formats/FormatReader.java)

\(^18\) [https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-api/src/loci/formats/FormatTools.java](https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-api/src/loci/formats/FormatTools.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`, the master file format reader, tries to identify which format reader to use according to the order given in `readers.txt`\(^{29}\), 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. `ImageReader`\(^{30}\) can take additional parameters; a brief listing is provided below for reference, but it is recommended that you take a look at the contents of `loci.formats.tools.ImageInfo`\(^{31}\) to see exactly what each one does.

\(^{19}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-common/src/loci/common/RandomAccessInputStream.java
\(^{20}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-common/src/loci/common/Location.java
\(^{21}\)http://downloads.openmicroscopy.org/latest/bio-formats5.0/api/
\(^{22}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-common/src/loci/common/DataTools.java
\(^{23}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-bsd/src/loci/formats/ImageTools.java
\(^{24}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/services/
\(^{25}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-bsd/src/loci/formats/codec/BaseCodec.java
\(^{26}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-bsd/src/loci/formats/codec/BitBuffer.java
\(^{27}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-bsd/src/loci/formats/codec/BitWriter.java
\(^{28}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-api/src/loci/formats/readers.txt
\(^{29}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-api/src/loci/formats/ImageReader.java
\(^{30}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-api/src/loci/formats/readers.txt
\(^{31}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-api/src/loci/formats/ImageReader.java
\(^{32}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/bio-formats-tools/src/loci/formats/tools/ImageInfo.java
### Argument Action

<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 ‘-fast’ 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\(^{33}\) 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\(^{34}\). 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\(^{35}\) (this is the most straightforward one). loci.formats.in.LIFReader\(^{36}\) and InCellReader\(^{37}\) 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\(^{38}\).

\(^{33}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/test-suite/src/loci/tests/testng/FormatReaderTest.java
\(^{34}\)http://downloads.openmicroscopy.org/latest/bio-formats5.0/api/
\(^{35}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/ImarisReader.java
\(^{36}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/LIFReader.java
\(^{37}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/InCellReader.java
\(^{38}\)http://www.openmicroscopy.org/site/community
16.1 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\(^1\) 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:

\(^1\)http://www.openmicroscopy.org/site/support/contributing/using-git.html
compile:

```
test-automated:
  [testng] [Parser] Running:
  [testng] Bio-Formats software test suite
  [testng] Scanning for files...
  [testng] Building list of tests...
  [testng] Ready to test 490 files
  [testng] ........................................
```

and then eventually:

```
  [testng] =-----------------------------------------------------------------
  [testng] Bio-Formats software test suite
  [testng] Total tests run: 19110, Failures: 0, Skips: 0
  [testng] =-----------------------------------------------------------------
  [testng]
```

BUILD SUCCESSFUL
Total time: 16 minutes 42 seconds

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 “yyyy-MM-dd_hh-mm-ss” 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.

## 16.2 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 (*)

[^4086]: http://trac.openmicroscopy.org.uk/ome/ticket/4086
• TIFF (*)
• Khoros (http://netghost.narod.ru/giff/sample/images/viff/index.htm)
• MNG (Download3) (*)

Formats for which we can definitely generate public sample data:
• PNG/APNG
• JPEG
• PGM
• FITS
• PCX
• GIF
• Openlab Raw
• OME-XML
• 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 .fff
• 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
• Olympus CellR/APL
• Slidebook
• Cellomics
• CellWorX
• Olympus ScanR
• BD Pathway
• Opera Flex
• MIAS

16.3 Bio-Formats service and dependency infrastructure

16.3.1 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\(^4\), dependency inversion\(^5\) or component based design\(^6\).

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\(^7\) 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\(^8\) and \#464\(^9\).

16.3.2 Writing a service

• Interface – The basic form of a service is an interface which inherits from loci.common.services.Service\(^10\). 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);
}
```

\(^4\)http://en.wikipedia.org/wiki/Dependency_injection
\(^6\)http://en.wikipedia.org/wiki/Component-based_software_engineering
\(^7\)http://en.wikipedia.org/wiki/Dependency_injection
\(^8\)http://trac.openmicroscopy.org.uk/ome/ticket/463
\(^9\)http://trac.openmicroscopy.org.uk/ome/ticket/464
\(^10\)https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-common/src/loci/common/services/Service.java
• **Implementation** – This service then has an implementation, which is usually located in the Bio-Forms component or package which imports classes from an external, dynamic or other dependency. Again looking at the OMENotesService:

```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 Class-NotFound or the like exceptions being emitted from your service methods. This is to be strongly discouraged. If a service has unresolvable 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 via the services.properties file. Following the OMENotesService again, here is an example registration:

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

### 16.3.3 Using a service

```java
OMENotesService service = null;
try {
    ServiceFactory factory = new ServiceFactory();
    service = factory.getInstance(OMENotesService.class);
} catch (DependencyException de) {
    LOGGER.info("", de);
}
```

---


12 [https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-common/src/loci/common/services/Service.java](https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-common/src/loci/common/services/Service.java)
16.4 Code generation with xsd-fu

xsd-fu 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. It is usually run automatically when building from source (see Building from source) and so running it by hand should not be needed. xsd-fu is primarily used to generate the OME-XML model objects, enums and enum handlers, plus the MetadataStore and MetadataRetrieve interfaces and implementations.

16.4.1 Running the code generator

```
$ cd components/xsd-fu
$ ./xsd-fu
Output directory must be specified!
Usage: ./xsd-fu [-n xsd_namespace] [-p package] -o <output_dir> -l <lang> <path/to/ome.xsd...>
Generates Java classes from an OME XML Schema definition.

Default package: "ome.xml.model"
Default namespace: "xsd:"

Examples:
./xsd-fu -n 'xs:' -p ome.xml -o ome/xml schemas/ome.xsd

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

```
$ cd components/xsd-fu
$ ./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>
```

16.4.2 Generating the OME-XML Java classes

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
```

Run:

```
$ ant generate-source -v
```

to see the command-line options used.

### 16.4.3 Working with Enumerations and Enumeration Handlers

XsdFu code generates enumeration regular expressions using a flexible configuration file\(^{13}\).

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

```plaintext
[Correction]
".*Pl.*Apo.*" = "PlanApo"
".*Pl.*Flu.*" = "PlanFluor"
"^\s*Vio.*Corr.*" = "VioletCorrected"
".*S.*Flu.*" = "SuperFluor"
".*Neo.*Flu.*" = "NeoFluar"
".*Fluo.*tar.*" = "Fluotar"
".*Fluo.*" = "Fluor"
".*Flua.*" = "Fluar"
"^\s*Apo.*" = "Apo"
```

### 16.4.4 Generate OMERo model specification files

Run `xsd-fu` with the `omero_model` subcommand.

### 16.4.5 Special Thanks

A special thanks goes out to Dave Kuhlman\(^ {14} \) for his fabulous work on `generateDS`\(^ {15} \) which `xsd-fu` makes heavy use of internally.

See open Trac tickets for Bio-Formats\(^ {16} \) 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\(^ {17} \).

---

\(^{13}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/xsd-fu/cfg/enum_handler.cfg
\(^{14}\)http://www.davekuhlman.org/
\(^{15}\)http://www.davekuhlman.org/generateDS.html
\(^{16}\)https://trac.openmicroscopy.org.uk/ome/report/44
\(^{17}\)http://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\(^\text{18}\). If you have any questions, or would prefer not to use QA, please email the ome-users mailing list\(^\text{19}\). 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.

\(^{18}\)http://qa.openmicroscopy.org.uk/qa/upload/

\(^{19}\)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>.tiff</td>
<td>Single file</td>
</tr>
<tr>
<td>Alcona 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>Single file</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 System</td>
<td>.fits, .fts</td>
<td>Single file</td>
</tr>
<tr>
<td>Fuji LAS 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>One .ndpis file and at least one .ndpi 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 .tif, .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 .tif/.tiff or .im file</td>
</tr>
<tr>
<td>InCell 3000</td>
<td>.frm</td>
<td>Single file</td>
</tr>
<tr>
<td>JEOL</td>
<td>.dat, .img, .par</td>
<td>A single .dat file or an .img file with a similarly-named .par file</td>
</tr>
<tr>
<td>JPEG</td>
<td>.jpg, .jpeg, .jpe</td>
<td>Single file</td>
</tr>
<tr>
<td>JPEG-2000</td>
<td>.jp2, .j2k, .jpf</td>
<td>Single file</td>
</tr>
<tr>
<td>JPK Instruments</td>
<td>.jpk</td>
<td>Single file</td>
</tr>
<tr>
<td>JPX</td>
<td>.jpx</td>
<td>Single file</td>
</tr>
<tr>
<td>Khoros XV</td>
<td>.xv</td>
<td>Single file</td>
</tr>
<tr>
<td>Kodak Molecular Imaging</td>
<td>.bip</td>
<td>Single file</td>
</tr>
<tr>
<td>LEO</td>
<td>.sxm, .tif, .tiff</td>
<td>Single file</td>
</tr>
<tr>
<td>LI-FLIM</td>
<td>.fli</td>
<td>Single file</td>
</tr>
<tr>
<td>Laboratory Imaging</td>
<td>.lim</td>
<td>Single file</td>
</tr>
<tr>
<td>Leica</td>
<td>.lei, .tif, .tiff, .raw</td>
<td>One .lei file with at least one .tif/.tiff file and an optional .txt file</td>
</tr>
<tr>
<td>Leica Image File Format</td>
<td>.tif</td>
<td>Single file</td>
</tr>
<tr>
<td>Leica SCN</td>
<td>.scn</td>
<td>Single file</td>
</tr>
<tr>
<td>Leica TCS TIFF</td>
<td>.tif, .tiff, .xml</td>
<td>Single file</td>
</tr>
<tr>
<td>Li-Cor L2D</td>
<td>.l2d, .scn, .tif</td>
<td>One .l2d file with one or more directories containing .tif/.tiff files</td>
</tr>
<tr>
<td>MIAS</td>
<td>.tif, .tiff, .txt</td>
<td>One directory per plate containing one directory per well, each with one or more .tif/.tiff files</td>
</tr>
<tr>
<td>MINC MRI</td>
<td>.mnc</td>
<td>Single file</td>
</tr>
<tr>
<td>Medical Research Council</td>
<td>.mrc, .st, .ali, .map, .rec</td>
<td>Single file</td>
</tr>
<tr>
<td>Metamorph STK</td>
<td>.stk, .nd, .tif, .tiff</td>
<td>One or more .stk or .nd/.tiff files plus an optional .nd file</td>
</tr>
<tr>
<td>Metamorph TIFF</td>
<td>.tif, .tiff</td>
<td>One or more .tif/.tiff files</td>
</tr>
</tbody>
</table>

Continued on next page
<table>
<thead>
<tr>
<th>Format name</th>
<th>File to choose</th>
<th>Structure of files</th>
</tr>
</thead>
<tbody>
<tr>
<td>Micro-Manager</td>
<td>.tif,.tiff,.txt,.xml</td>
<td>A <code>.metadata.txt</code> file plus or more <code>.tif</code> files</td>
</tr>
<tr>
<td>Minolta MRW</td>
<td>.mrw</td>
<td>Single file</td>
</tr>
<tr>
<td>Molecular Imaging</td>
<td>.spf</td>
<td>Single file</td>
</tr>
<tr>
<td>Multiple Network Graphics</td>
<td>.mng</td>
<td>Single file</td>
</tr>
<tr>
<td>NIfTI</td>
<td>.nii,.img,.hdr</td>
<td>A single <code>.nii</code> file or one <code>.img</code> file and a similarly-named <code>.hdr</code> file</td>
</tr>
<tr>
<td>NOAA-HRD Gridded Data Format</td>
<td>(no extension)</td>
<td>Single file</td>
</tr>
<tr>
<td>NRRD</td>
<td>.nrrd,.nhdr</td>
<td>A single <code>.nrrd</code> file or one <code>.nhdr</code> file and one other file containing the pixels</td>
</tr>
<tr>
<td>Nikon Elements TIFF</td>
<td>.tif,.tiff</td>
<td>Single file</td>
</tr>
<tr>
<td>Nikon ND2</td>
<td>.nd2</td>
<td>Single file</td>
</tr>
<tr>
<td>Nikon NEF</td>
<td>.nef,.tif,.tiff</td>
<td>Single file</td>
</tr>
<tr>
<td>Nikon TIFF</td>
<td>.tif,.tiff</td>
<td>Single file</td>
</tr>
<tr>
<td>OME-TIFF</td>
<td>.ome,.ome.tif</td>
<td>One or more <code>.ome.tif</code> files</td>
</tr>
<tr>
<td>OME-XML</td>
<td>.ome</td>
<td>Single file</td>
</tr>
<tr>
<td>Olympus APL</td>
<td>.apl,.tnb,.mtb,.tif</td>
<td>One <code>.apl</code> file, one <code>.mtb</code> file, one <code>.tnb</code> file, and a directory containing one or more <code>.tif</code> files</td>
</tr>
<tr>
<td>Olympus Fluoview/ABD TIFF</td>
<td>.tif,.tiff</td>
<td>Single file</td>
</tr>
<tr>
<td>Olympus SIS TIFF</td>
<td>.tif,.tiff</td>
<td>Single file</td>
</tr>
<tr>
<td>Olympus ScanR</td>
<td>.dat,.xml,.tif</td>
<td>One <code>.xml</code> file, one <code>.data</code> directory containing <code>.tif</code>.files, and optionally two <code>.dat</code> files</td>
</tr>
<tr>
<td>Olympus Slidebook</td>
<td>.sld,.spl</td>
<td>Single file</td>
</tr>
<tr>
<td>Openlab TIFF</td>
<td>.liff</td>
<td>Single file</td>
</tr>
<tr>
<td>Openlab RAW</td>
<td>.raw</td>
<td>Single file</td>
</tr>
<tr>
<td>Oxford Instruments</td>
<td>.top</td>
<td>Single file</td>
</tr>
<tr>
<td>PCX</td>
<td>.pcx</td>
<td>Single file</td>
</tr>
<tr>
<td>PICT</td>
<td>.pict,.pct</td>
<td>Single file</td>
</tr>
<tr>
<td>POV-Ray</td>
<td>.df3</td>
<td>Single file</td>
</tr>
<tr>
<td>PerkinElmer Densitometer</td>
<td>.hdr,.img</td>
<td>One <code>.hdr</code> file and a similarly-named <code>.img</code> file</td>
</tr>
<tr>
<td>PerkinElmer</td>
<td>.ano,.cfg,.csv,.htm,.rec,.tim,.zpo,.tif</td>
<td>One <code>.htm</code> file, several other metadata files (.tim,.ano,.csv,.…) and either <code>.tif</code> files or .2,.3,.4,. etc. files</td>
</tr>
<tr>
<td>PerkinElmer Operetta</td>
<td>.tif,.xml</td>
<td>Directory with <code>XML</code> file and one <code>.tif</code> file per plane</td>
</tr>
<tr>
<td>Portable Gray Map</td>
<td>.pgm</td>
<td>Single file</td>
</tr>
<tr>
<td>Prairie TIFF</td>
<td>.tif,.cfg,.xml</td>
<td>One <code>.xml</code> file, one <code>.cfg</code> file, and one or more <code>.tif</code> files</td>
</tr>
<tr>
<td>Pyramid TIFF</td>
<td>.tif,.tif</td>
<td>Single file</td>
</tr>
<tr>
<td>Quesant AFM</td>
<td>.afm</td>
<td>Single file</td>
</tr>
<tr>
<td>QuickTime</td>
<td>.mov</td>
<td>Single file</td>
</tr>
<tr>
<td>RHK Technologies</td>
<td>.sm2,.sm3</td>
<td>Single file</td>
</tr>
<tr>
<td>SBIG</td>
<td>(no extension)</td>
<td>Single file</td>
</tr>
<tr>
<td>SM Camera</td>
<td>(no extension)</td>
<td>Single file</td>
</tr>
<tr>
<td>SPCImage Data</td>
<td>.sdt</td>
<td>Single file</td>
</tr>
<tr>
<td>SPIDER</td>
<td>.spi</td>
<td>Single file</td>
</tr>
<tr>
<td>Seiko</td>
<td>.xqd,.xqf</td>
<td>Single file</td>
</tr>
<tr>
<td>SimplePCI TIFF</td>
<td>.tif,.tif</td>
<td>Single file</td>
</tr>
<tr>
<td>Simulated data</td>
<td>.fake</td>
<td>Single file</td>
</tr>
<tr>
<td>Tagged Image File Format</td>
<td>.tif,.tf2,.tif8,.btf</td>
<td>Single file</td>
</tr>
<tr>
<td>Text</td>
<td>.txt,.csv</td>
<td>Single file</td>
</tr>
<tr>
<td>TiffVision</td>
<td>.vws,.pst,.inf</td>
<td>One <code>.vws</code> file and possibly one similar directory (e.g., <code>.FocalPlane</code>,,.sld,.slx,.ROI)</td>
</tr>
<tr>
<td>TopoMetrix</td>
<td>.tif,.zfr,.zfp,.dif</td>
<td>Single file</td>
</tr>
<tr>
<td>Trestle</td>
<td>.tif</td>
<td>Single file</td>
</tr>
<tr>
<td>Truevision Targa</td>
<td>.tga</td>
<td>Single file</td>
</tr>
<tr>
<td>UBM</td>
<td>.pr3</td>
<td>Single file</td>
</tr>
<tr>
<td>Unisoku STM</td>
<td>.hdr,.dat</td>
<td>One <code>.HDR</code> file plus one similarly-named <code>.DAT</code> file</td>
</tr>
</tbody>
</table>

Continued on next page
### Table 17.1 – continued from previous page

<table>
<thead>
<tr>
<th>Format name</th>
<th>File to choose</th>
<th>Structure of files</th>
</tr>
</thead>
<tbody>
<tr>
<td>VG SAM</td>
<td>.dti</td>
<td>Single file</td>
</tr>
<tr>
<td>Varian FDF</td>
<td>.fdf</td>
<td>Single file</td>
</tr>
<tr>
<td>Visitech XYS</td>
<td>.xys, .html</td>
<td>One .html file plus one or more .xys files</td>
</tr>
<tr>
<td>Volocity Library</td>
<td>.mvd2, .aif, .aiix, .dat, .atsf</td>
<td>One .mvd2 file plus a ‘Data’ directory</td>
</tr>
<tr>
<td>Volocity Library Clipping</td>
<td>.acff</td>
<td>Single file</td>
</tr>
<tr>
<td>WA Technology TOP</td>
<td>.wat</td>
<td>Single file</td>
</tr>
<tr>
<td>Windows Bitmap</td>
<td>.bmp</td>
<td>Single file</td>
</tr>
<tr>
<td>Zeiss AxiowVision TIFF</td>
<td>.tif, .xml</td>
<td>Single file</td>
</tr>
<tr>
<td>Zeiss CZI</td>
<td>.czi</td>
<td>Single file</td>
</tr>
<tr>
<td>Zeiss Laser-Scanning Microscopy</td>
<td>.lsm, .mdb</td>
<td>One or more .lsm files; if multiple .lsm files are present, an .mdb file should also be present</td>
</tr>
<tr>
<td>Zeiss Vision Image (ZVI)</td>
<td>.zvi</td>
<td>Single file</td>
</tr>
<tr>
<td>Zip</td>
<td>.zip</td>
<td>Single file</td>
</tr>
</tbody>
</table>

#### 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:

```ini
[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*

<table>
<thead>
<tr>
<th>Format</th>
<th>Extensions</th>
<th>Pixels</th>
<th>Metadata</th>
<th>Openness</th>
<th>Presence</th>
<th>Utility</th>
<th>Export</th>
<th>BSD</th>
</tr>
</thead>
<tbody>
<tr>
<td>3i SlideBook</td>
<td>.sld</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
</tr>
<tr>
<td>Andor Bio-Imaging Division (ABD) TIFF</td>
<td>.tif</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
</tr>
<tr>
<td>AIM</td>
<td>.aim</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
</tr>
<tr>
<td>Alicona 3D</td>
<td>.al3d</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
</tr>
<tr>
<td>Amersham Bio-sciences Gel</td>
<td>.gel</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
</tr>
<tr>
<td>Amira Mesh</td>
<td>.am, .ami-ramesh, .grey, .hx, .labels</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
</tr>
<tr>
<td>Analyze 7.5</td>
<td>.img, .hdr</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
</tr>
<tr>
<td>Animated PNG</td>
<td>.png</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
</tr>
<tr>
<td>Aperio AFI</td>
<td>.afi, .svs</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
</tr>
<tr>
<td>Aperio SVS TIFF</td>
<td>.svs</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
</tr>
<tr>
<td>Applied Precision CellWorX</td>
<td>.htd, .pnl</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
</tr>
<tr>
<td>AVI (Audio Video Interleave)</td>
<td>.avi</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
</tr>
<tr>
<td>Axon Raw Format</td>
<td>.arf</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
</tr>
<tr>
<td>BD Pathway</td>
<td>.exp, .tif</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
</tr>
<tr>
<td>Becker &amp; Hickl SPCImage</td>
<td>.sdt</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
</tr>
<tr>
<td>Bio-Rad Gel</td>
<td>.1sc</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
</tr>
<tr>
<td>Bio-Rad PIC</td>
<td>.pic, .raw, .xml</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
</tr>
<tr>
<td>Bio-Rad SCN</td>
<td>.scn</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
</tr>
<tr>
<td>Bitplane Imaris</td>
<td>.ims</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
</tr>
<tr>
<td>Bruker MRI</td>
<td>.img</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
</tr>
<tr>
<td>Burleigh</td>
<td>.cr2, .crw</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
</tr>
<tr>
<td>Canon DNG</td>
<td>.c01</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
</tr>
</tbody>
</table>

*Continued on next page*
<table>
<thead>
<tr>
<th>Format</th>
<th>Extensions</th>
<th>Pixels</th>
<th>Metadata</th>
<th>Openness</th>
<th>Presence</th>
<th>Utility</th>
<th>Export</th>
<th>BSD</th>
</tr>
</thead>
<tbody>
<tr>
<td>cellSens VSI</td>
<td>.vsi</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CellVoyager</td>
<td>.xml, .tif</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DeltaVision</td>
<td>.dv, .r3d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DICOM</td>
<td>.dcm, .dicom</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECAT7</td>
<td>.v</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EPS (Encapsulated PostScript)</td>
<td>.eps, .epsi, .ps</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evotec/PerkinElmer Opera Flex</td>
<td>.flex, .mea, .res</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FEI</td>
<td>.img</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FEI TIFF</td>
<td>.tiff</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FITS (Flexible Image Transport System)</td>
<td>.fits</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gatan Digital Micrograph</td>
<td>.dm3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gatan Digital Micrograph 2</td>
<td>.dm2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GIF (Graphics Interchange Format)</td>
<td>.gif</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hamamatsu Aquacosmos NAF</td>
<td>.naf</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hamamatsu HIS</td>
<td>.his</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hamamatsu ndpi</td>
<td>.ndpi</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hamamatsu VMS</td>
<td>.vms</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hitachi S-4800</td>
<td>.txt, .tif, .bmp, .jpg</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ICS (Image Cytometry Standard)</td>
<td>.ics, .ids</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Imacon</td>
<td>.iff</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ImagePro Sequence</td>
<td>.seq</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ImagePro Workspace</td>
<td>.ipw</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IMAGIC</td>
<td>.hed, .img</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IMOD</td>
<td>.mod</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Improvision Openlab LIFF</td>
<td>.liff</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Improvision Openlab Raw</td>
<td>.raw</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Improvision TIFF</td>
<td>.tiff</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inspector OBF</td>
<td>.obf, .msr</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>InCell 1000</td>
<td>.xdce, .tif</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>InCell 3000</td>
<td>.frm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INR</td>
<td>.inr</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Continued on next page
<table>
<thead>
<tr>
<th>Format</th>
<th>Extensions</th>
<th>Pixels</th>
<th>Metadata</th>
<th>Openness</th>
<th>Presence</th>
<th>Utility</th>
<th>Export</th>
<th>BSD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inveon</td>
<td>.hdr</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
</tr>
<tr>
<td>IPLab</td>
<td>.ipl</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
</tr>
<tr>
<td>IPLab-Mac</td>
<td>.ipm</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
</tr>
<tr>
<td>JEOL</td>
<td>.dat, .img, .par</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
</tr>
<tr>
<td>JPEG</td>
<td>.jpg</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
</tr>
<tr>
<td>JPEG 2000</td>
<td>.jp2</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
</tr>
<tr>
<td>JPX</td>
<td>.jpx</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
</tr>
<tr>
<td>Khoros VIFF (Visualization Image File Format) Bitmap</td>
<td>.xv</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
</tr>
<tr>
<td>Kodak BIP</td>
<td>.bip</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
</tr>
<tr>
<td>Lambert Instruments FLIM</td>
<td>.fli</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
</tr>
<tr>
<td>LaVision Inspector</td>
<td>.msr</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
</tr>
<tr>
<td>Leica LCS LEI</td>
<td>.lei, .tif</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
</tr>
<tr>
<td>Leica LAS AF LIF (Leica Image File Format)</td>
<td>.lif</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
</tr>
<tr>
<td>Leica SCN</td>
<td>.scn</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
</tr>
<tr>
<td>LEO</td>
<td>.sxm</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
</tr>
<tr>
<td>Li-Cor L2D (Laboratory Imaging/Nikon)</td>
<td>.lim</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
</tr>
<tr>
<td>MetaMorph 7.5 TIFF</td>
<td>.tiff</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
</tr>
<tr>
<td>MetaMorph Stack (STK)</td>
<td>.stk, .nd</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
</tr>
<tr>
<td>MIAS (Maia Scientific)</td>
<td>.tif</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
</tr>
<tr>
<td>Micro-Manager</td>
<td>.tif, .txt, .xml</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
</tr>
<tr>
<td>MINC MRI</td>
<td>.mnc</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
</tr>
<tr>
<td>Minolta MRW</td>
<td>.mrw</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
</tr>
<tr>
<td>MNG (Multiple-image Network Graphics)</td>
<td>.mng</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
</tr>
<tr>
<td>Molecular Imaging</td>
<td>.stp</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
</tr>
<tr>
<td>MRC (Medical Research Council)</td>
<td>.mrc</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
</tr>
<tr>
<td>NEF (Nikon Electronic Format)</td>
<td>.nef, .tif</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
</tr>
<tr>
<td>Nikon Elements TIFF</td>
<td>.tif</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
</tr>
<tr>
<td>Nikon EZ-C1 TIFF</td>
<td>.tif</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
<td>▲▲</td>
</tr>
</tbody>
</table>

Continued on next page
Table 18.1 – continued from previous page

<table>
<thead>
<tr>
<th>Format</th>
<th>Extensions</th>
<th>Pixels</th>
<th>Metadata</th>
<th>Openness</th>
<th>Presence</th>
<th>Utility</th>
<th>Export</th>
<th>BSD</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Nikon NIS-Elements ND2</em></td>
<td>.nd2</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>×</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td><em>NRRD (Nearly Raw Raster Data)</em></td>
<td>.nrrd, .nhdr, .raw, .txt</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>×</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td><em>Olympus CellRPL</em></td>
<td>.apl, .mb, .tnb, .tif, .obsep</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td><em>Olympus FluoView FV1000</em></td>
<td>.oib, .oif</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td><em>Olympus FluoView TIFF</em></td>
<td>.tif</td>
<td>√</td>
<td>√</td>
<td>×</td>
<td>×</td>
<td>√</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td><em>Olympus ScanR</em></td>
<td>.xml, .dat, .tif</td>
<td>√</td>
<td>√</td>
<td>×</td>
<td>×</td>
<td>√</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td><em>Olympus SIS TIFF</em></td>
<td>.tif</td>
<td>×</td>
<td>√</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td><em>OME-TIFF</em></td>
<td>.ome.tif²</td>
<td>×</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>×</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td><em>OME-XML</em></td>
<td>.ome²</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>×</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td><em>Oxford Instruments</em></td>
<td>.top</td>
<td>√</td>
<td>√</td>
<td>×</td>
<td>×</td>
<td>√</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td><em>PCORAW</em></td>
<td>.pcoraw, .rec</td>
<td>√</td>
<td>√</td>
<td>×</td>
<td>√</td>
<td>×</td>
<td>√</td>
<td>×</td>
</tr>
<tr>
<td><em>PCX (PC Paintbrush)</em></td>
<td>.pcx</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>√</td>
<td>×</td>
</tr>
<tr>
<td><em>Perkin Elmer Densitometer</em></td>
<td>.pds</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td><em>PerkinElmer Opertta</em></td>
<td>.tiff, .xml</td>
<td>×</td>
<td>√</td>
<td>×</td>
<td>×</td>
<td>√</td>
<td>√</td>
<td>×</td>
</tr>
<tr>
<td><em>PerkinElmer UltraView</em></td>
<td>.tif, .2, .3, .4, etc.</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td><em>PGM (Portable Gray Map)</em></td>
<td>.pgm</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>×</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td><em>Adobe Photoshop PSD</em></td>
<td>.psd</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>√</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td><em>Photoshop TIFF</em></td>
<td>.tif, .tiff</td>
<td>×</td>
<td>×</td>
<td>√</td>
<td>×</td>
<td>√</td>
<td>√</td>
<td>×</td>
</tr>
<tr>
<td><em>PicoQuant Bin</em></td>
<td>.bin</td>
<td>×</td>
<td>√</td>
<td>×</td>
<td>×</td>
<td>√</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td><em>PICT (Macintosh Picture)</em></td>
<td>.pict</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>×</td>
</tr>
<tr>
<td><em>PNG (Portable Network Graphics)</em></td>
<td>.png</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>×</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td><em>Prairie Technologies TIFF</em></td>
<td>.tif, .xml, .cfg</td>
<td>×</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>×</td>
<td>√</td>
<td>×</td>
</tr>
<tr>
<td><em>Quesant</em></td>
<td>.afm</td>
<td>×</td>
<td>√</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>√</td>
<td>×</td>
</tr>
<tr>
<td><em>QuickTime Movie</em></td>
<td>.mov</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td><em>RHK</em></td>
<td>.sm2, .sm3</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>×</td>
</tr>
<tr>
<td><em>SBIG</em></td>
<td>.xqd, .xqf</td>
<td>×</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>×</td>
</tr>
</tbody>
</table>

Continued on next page

¹http://www.openmicroscopy.org/site/support/ome-model/ome-tiff/index.html
²http://www.openmicroscopy.org/site/support/ome-model/ome-xml/index.html
Table 18.1 – continued from previous page

<table>
<thead>
<tr>
<th>Format</th>
<th>Extensions</th>
<th>Pixels</th>
<th>Metadata</th>
<th>Openness</th>
<th>Presence</th>
<th>Utility</th>
<th>Export</th>
<th>BSD</th>
</tr>
</thead>
<tbody>
<tr>
<td>SimplePCI &amp; HCImage</td>
<td>.cdx</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
</tr>
<tr>
<td>SimplePCI &amp; HCImage TIFF</td>
<td>.tiff</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
</tr>
<tr>
<td>SM Camera</td>
<td>.spi, .stk</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
</tr>
<tr>
<td>SPIDER</td>
<td>.tga</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
</tr>
<tr>
<td>Targa</td>
<td>.tiff</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
</tr>
<tr>
<td>Text</td>
<td>.txt</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
</tr>
<tr>
<td>TIFF (Tagged Image File Format)</td>
<td>.tif</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
</tr>
<tr>
<td>TillPhotonics TillVision</td>
<td>.vws</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
</tr>
<tr>
<td>Topometrix</td>
<td>.tfr, .frf, .zfr, .zfp, .2fl</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
</tr>
<tr>
<td>Trestle</td>
<td>.tif, .sld, .jpg</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
</tr>
<tr>
<td>UBM</td>
<td>.pr3</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
</tr>
<tr>
<td>Unisoku</td>
<td>.dat, .hdr</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
</tr>
<tr>
<td>Varian FDF</td>
<td>.dfi</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
</tr>
<tr>
<td>VG SAM</td>
<td>.dti</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
</tr>
<tr>
<td>VisiTech XYS</td>
<td>.sys, .html</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
</tr>
<tr>
<td>Volocity</td>
<td>.mvd2</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
</tr>
<tr>
<td>Volocity Library Clipping</td>
<td>.acff</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
</tr>
<tr>
<td>WA-TOP</td>
<td>.vat</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
</tr>
<tr>
<td>Windows Bitmap</td>
<td>.bmp</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
</tr>
<tr>
<td>Woolz</td>
<td>.wlz</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
</tr>
<tr>
<td>Zeiss AxioVision</td>
<td>.xml, .tiff</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
</tr>
<tr>
<td>TIFF</td>
<td></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>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
</tr>
<tr>
<td>Zeiss CZI</td>
<td>.czi3</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
</tr>
<tr>
<td>Zeiss LSM (Laser Scanning Microscope) 510/710</td>
<td>.sm, .mdb</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
</tr>
</tbody>
</table>

Bio-Formats currently supports **136** formats

<table>
<thead>
<tr>
<th>Ratings legend and definitions</th>
</tr>
</thead>
<tbody>
<tr>
<td>🟢 Outstanding</td>
</tr>
<tr>
<td>🟢 Very good</td>
</tr>
<tr>
<td>🟢 Good</td>
</tr>
<tr>
<td>🟢 Fair</td>
</tr>
<tr>
<td>🟢 Poor</td>
</tr>
</tbody>
</table>

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.

See also:
Slidebook software overview

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:

Supported Metadata Fields: AIM

We currently have:
• one .aim file

We would like to have:
• an .aim specification document
• more .aim files

Ratings

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

Additional Information

Source Code: AIMReader.java¹¹

Notes:

18.4 Alicona 3D

Extensions: .al3d

Owner: Alicona Imaging¹²

Support

BSD-licensed: ✗
Export: ✗

Officially Supported Versions: 1.0

Supported Metadata Fields: Alicona 3D

We currently have:
• an AL3D specification document¹³ (v1.0, from 2003, in PDF)
• a few AL3D datasets

We would like to have:
• more AL3D datasets (Z series, T series, 16-bit)

Ratings

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

¹¹https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/AIMReader.java
¹²http://www.alicona.com/
Utility:  

Additional Information
Source Code: AliconaReader.java\(^{14}\)

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\(^{15}\)

Support
BSD-licensed: ☒
Export: ☒

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\(^{16}\)

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\(^{17}\)

\(^{14}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/AliconaReader.java  
\(^{15}\)http://www.gelifesciences.com/  
\(^{16}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/GelReader.java  
\(^{17}\)http://www.awaresystems.be/imaging/tiff/tifftags/docs/gel.html
18.6  Amira Mesh

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

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

---

18 http://www.amiravis.com/
19 https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/AmiraReader.java
20 http://www.mayo.edu/bir
We would like to have:

**Ratings**

Pixels: ▲

Metadata: ▲

Openness: ▲

Presence: ▲

Utility: ▼

**Additional Information**

Source Code: AnalyzeReader.java²²

Notes:

## 18.8 Animated PNG

Extensions: .png

Developer: The Animated PNG Project²³

**Support**

BSD-licensed: ✔

Export: ✔

**Officially Supported Versions:**

Supported Metadata Fields: *Animated PNG*

**Freely Available Software:**

- Firefox 3+²⁴
- Opera 9.5+²⁵
- KSquirrel²⁶

We currently have:

- a specification document²⁷
- several APNG files

We would like to have:

**Ratings**

Pixels: ▲

Metadata: ▲

Openness: ▲

Presence: ▲

Utility: ▼

**Additional Information**

²²[https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/AnalyzeReader.java](https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/AnalyzeReader.java)


²⁴[http://www.mozilla.com/firefox](http://www.mozilla.com/firefox)

²⁵[http://www.opera.com/download](http://www.opera.com/download)


Source Code: APNGReader.java\textsuperscript{28}

Notes:

\section*{18.9 Aperio AFI}

Extensions: .afi, .svs

Owner: Aperio\textsuperscript{29}

Support

BSD-licensed: \xmark

Export: \xmark

Officially Supported Versions:

Supported Metadata Fields: \textit{Aperio AFI}

We currently have:

\begin{itemize}
  \item several AFI datasets
\end{itemize}

We would like to have:

\textbf{Ratings}

Pixels: \uparrow

Metadata: \uparrow

Openness: \uparrow

Presence: \downarrow

Utility: \downarrow

\textbf{Additional Information}

Source Code: AFIReader.java\textsuperscript{30}

Notes:

\textbf{See also:}

Aperio ImageScope\textsuperscript{31}

\section*{18.10 Aperio SVS TIFF}

Extensions: .svs

Owner: Aperio\textsuperscript{32}

Support

BSD-licensed: \xmark

Export: \xmark

Officially Supported Versions: 8.0, 8.2, 9.0

Supported Metadata Fields: \textit{Aperio SVS TIFF}

We currently have:

\begin{itemize}
\end{itemize}

\textsuperscript{28}https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-bsd/src/loci/formats/in/APNGReader.java

\textsuperscript{29}http://www.aperio.com/

\textsuperscript{30}https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/AFIReader.java

\textsuperscript{31}http://www.leicabiosystems.com/index.php?id=8991

\textsuperscript{32}http://www.aperio.com/
• many SVS datasets
• an SVS specification document
• the ability to generate additional SVS datasets

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: ▼

---

33 [https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/SVSReader.java](https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/SVSReader.java)
35 [http://www.api.com](http://www.api.com)
### Additional Information

**Source Code:** CellWorxReader.java

**Notes:**

#### 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\(^41\) AVI on Wikipedia\(^42\)

### 18.13 Axon Raw Format

Extensions: .arf

Owner: INDECBioSystems\(^43\)

#### Support

BSD-licensed: 

Export: 

Officially Supported Versions:

Supported Metadata Fields: *Axon Raw Format*

We currently have:
- one ARF dataset
- a specification document\(^44\)

We would like to have:
- more ARF datasets

#### Ratings

Pixels: 

Metadata: 

Openness: 

Presence: 

Utility: 

#### Additional Information

Source Code: ARFReader.java\(^45\)

Notes:

### 18.14 BD Pathway

Extensions: .exp, .tif

Owner: BD Biosciences\(^46\)

#### Support

BSD-licensed: 

Export: 

Officially Supported Versions:


\(^42\)http://en.wikipedia.org/wiki/Audio_Video_Interleave

\(^43\)http://www.indecbiosystems.com/

\(^44\)http://www.indecbiosystems.com/imagingworkbench/ApplicationNotes/IWAppNote11-ARF_File_Format.pdf

\(^45\)https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/ARFReader.java

\(^46\)http://www.bdbiosciences.com

---

18.13. Axon Raw Format 112
Supported Metadata Fields: *BD Pathway*

We currently have:

- a few BD Pathway datasets

We would like to have:

- more BD Pathway datasets

**Ratings**

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

**Additional Information**

Source Code: BDReader.java\(^{47}\)

Notes:

### 18.15 Becker & Hickl SPCImage

**Extensions**: .sdt

**Owner**: Becker-Hickl\(^{48}\)

**Support**

- BSD-licensed: \(\times\)
- Export: \(\times\)

**Officially Supported Versions**:

**Supported Metadata Fields**: *Becker & Hickl SPCImage*

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\(^{49}\) software
- a large number of SDT datasets
- the ability to produce new datasets

We would like to have:

**Ratings**

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

---

\(^{47}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/BDReader.java

\(^{48}\)http://www.becker-hickl.de/

\(^{49}\)http://www.becker-hickl.de/software/tcspc/softwaretcpcpspecial.htm
Additional Information

Source Code: SDTReader.java[^50]

Notes:

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

18.16 Bio-Rad Gel

Extensions: .1sc
Owner: Bio-Rad[^51]

Support

BSD-licensed: [x]
Export: [x]

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[^52]

Notes:

18.17 Bio-Rad PIC

Extensions: .pic, .raw, .xml
Developer: Bio-Rad
Owner: Carl Zeiss, Inc.[^53]

Support

BSD-licensed: [x]

[^50]: https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/SDTReader.java
[^51]: http://www.bio-rad.com
[^52]: https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/BioRadGelReader.java
[^53]: http://www.zeiss.com/
Export: ❌

Officially Supported Versions:

Supported Metadata Fields: *Bio-Rad PIC*

Freely Available Software:

- Bio-Rad PIC reader plugin for ImageJ

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

---

54 http://rsb.info.nih.gov/ij/plugins/biorad.html
55 https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/BioRadReader.java
56 http://www.bitplane.com/
57 http://svi.nl/
58 http://www.bio-rad.com

---

18.18. Bio-Rad SCN 115
We would like to have:

**Ratings**

- Pixels: ![▲](image)
- Metadata: ![▼](image)
- Openness: ![▼](image)
- Presence: ![▼](image)
- Utility: ![▼](image)

**Additional Information**

Source Code: [BioRadSCNReader.java](https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/BioRadSCNReader.java)

Notes:

### 18.19 Bitplane Imaris

**Extensions:** .ims

**Owner:** Bitplane

**Support**

- BSD-licensed: ![✗](image)
- Export: ![✗](image)

**Officially Supported Versions:** 2.7, 3.0, 5.5

**Supported Metadata Fields:** *Bitplane Imaris*

We currently have:

- an Imaris (RAW) specification document ([1997 November 11](http://www.bitplane.com/)) in HTML
- an Imaris 5.5 (HDF) specification document
- Bitplane’s bfFileReaderImaris3N code ([2005, in C++](http://flash.bitplane.com/wda/interfaces/public/faqs/faqsview.cfm?idCat=0&inQuestionID=104))
- 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: ![▲](image)
- Metadata: ![▲](image)
- Openness: ![□](image)
- Presence: ![▼](image)
- Utility: ![▼](image)

**Additional Information**

---


60. [http://www.bitplane.com/](http://www.bitplane.com/)

Source Code: ImarisHDFReader.java\textsuperscript{62}, ImarisTiffReader.java\textsuperscript{63}, ImarisReader.java\textsuperscript{64}

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{65}

Support

BSD-licensed: \xmark

Export: \xmark

Officially Supported Versions:

Supported Metadata Fields: Bruker MRI

Freely Available Software:

- Bruker plugin for ImageJ\textsuperscript{66}

We currently have:

- a few Bruker MRI datasets

We would like to have:

- an official specification document

Ratings

Pixels: \\

Metadata: ▲

Openness: ▼

Presence: \\

Utility: ▼

Additional Information

Source Code: BrukerReader.java\textsuperscript{67}

Notes:

18.21 Burleigh

Extensions: .img

Owner: Burleigh Instruments

Support

\textsuperscript{62}https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/ImarisHDFReader.java
\textsuperscript{63}https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/ImarisTiffReader.java
\textsuperscript{64}https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/ImarisReader.java
\textsuperscript{65}http://www.bruker.com/
\textsuperscript{66}http://rsbweb.nih.gov/ij/plugins/bruker.html
\textsuperscript{67}https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/BrukerReader.java
BSD-licensed: ❌
Export: ❌
Officially Supported Versions:
Supported Metadata Fields: *Burleigh*
We currently have:
  • Pascal code that can read Burleigh files (from ImageSXM)
  • 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.java⁶⁸
Notes:

**18.22 Canon DNG**

Extensions: .cr2, .crw
Developer: *Canon*⁶⁹

**Support**
BSD-licensed: ❌
Export: ❌
Officially Supported Versions:
Supported Metadata Fields: *Canon DNG*
Freely Available Software:
  • IrfanView⁷⁰
We currently have:
  • a few example datasets
We would like to have:
  • an official specification document

---
⁶⁸ https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/BurleighReader.java
⁶⁹ http://canon.com
⁷⁰ http://www.irfanview.com/
Ratings

Pixels: ▶
Metadata: ▼
Openness: ▼
Presence: ▼
Utility: ▼

Additional Information

Source Code: 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:

71https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/DNGReader.java
72http://www.thermofisher.com/
73https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/CellomicsReader.java
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:
• 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:

74http://www.olympus.com/
75https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/CellSensReader.java
76http://www.yokogawa.com/
18.26 DeltaVision

Extensions: .dv, .r3d
Owner: Applied Precision

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.

77 https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/CellVoyagerReader.java
78 http://www.api.com/
80 http://www.api.com/downloads/software/softworxexplorer2.0/SampleImages.zip
81 https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/DeltavisionReader.java
Bio-Formats Documentation, Release 5.0.8

- Bitplane Imaris\(^{82}\)
- SVI Huygens\(^{83}\)
- Image-Pro Plus\(^{84}\)

See also:
DeltaVision system description\(^{85}\)

18.27 DICOM

Extensions: .dcm, .dicom

Developer: National Electrical Manufacturers Association\(^{86}\)

Support
BSD-licensed: ✓
Export: ✗

Officially Supported Versions:
Supported Metadata Fields: DICOM

Freely Available Software:
- OsiriX Medical Imaging Software\(^{87}\)
- ezDICOM\(^{88}\)
- Wikipedia’s list of freeware health software\(^{89}\)

Sample Datasets:
- MRI Chest from FreeVol-3D web site\(^{90}\)
- Medical Image Samples from Sebastien Barre’s Medical Imaging page\(^{91}\)
- DICOM sample image sets from OsiriX web site\(^{92}\)

We currently have:
- DICOM specification documents\(^{93}\) (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: ▼

\(^{82}\)http://www.bitplane.com/
\(^{83}\)http://svi.nl/
\(^{84}\)http://www.mediacy.com/
\(^{85}\)http://api.com/deltavision.asp
\(^{86}\)http://www.nema.org/
\(^{87}\)http://www.osirix-viewer.com/
\(^{88}\)http://www.sph.sc.edu/comd/rorden/ezdicom.html
\(^{89}\)http://en.wikipedia.org/wiki/List_of_freeware_health_software#Imaging.2FVisualization
\(^{90}\)http://members.tripod.com/%7Eeclinis_immensus/free3d/hk-40.zip
\(^{91}\)http://www.barre.nema.fr/medical/samples/
\(^{92}\)http://osirix-viewer.com/datasets/
\(^{93}\)http://medical.nema.org/dicom/2007/
Additional Information

Source Code: DicomReader.java

Notes:
- DICOM stands for “Digital Imaging and Communication in Medicine”.
- Bio-Formats supports both compressed and uncompressed DICOM files.

See also:
DICOM homepage

18.28 ECAT7

Extensions: .v
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

94https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-bsd/src/loci/formats/in/DicomReader.java
95http://medical.nema.org/
96http://www.siemens.com
97https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/Ecat7Reader.java
98http://www.adobe.com/
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
- the ability to produce new datasets

We would like to have:

**Ratings**

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

**Additional Information**

Source Code: EPSReader.java Source Code: EPSWriter.java

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

---

100 https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-bsd/src/loci/formats/in/EPSReader.java
101 https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-bsd/src/loci/formats/out/EPSWriter.java
102 http://www.perkinelmer.com/
Ratings

Pixels: 🔺
Metadata: 🔺
Openness: 🔻
Presence: 🔻
Utility: 🔻

Additional Information

Source Code: FlexReader.java\textsuperscript{103}

Notes:

The LuraWave LWF decoder library (i.e. lwf_jsdk2.6.jar) with license code is required to decode wavelet-compressed Flex files.

See also:

LuraTech (developers of the proprietary LuraWave LWF compression used for Flex image planes)\textsuperscript{104}

18.31 FEI

Extensions: .img
Developer: FEI\textsuperscript{105}

Support

BSD-licensed: ❌
Export: ❌

Officially Supported Versions:

Supported Metadata Fields: \textit{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{106}

Notes:

\textsuperscript{103}https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/FlexReader.java
\textsuperscript{104}http://www.luratech.com/
\textsuperscript{105}http://www.fei.com/
\textsuperscript{106}https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/FEIReader.java
18.32 FEI TIFF

Extensions: .tiff
Developer: FEI

Support
BSD-licensed: ✗
Export: ✗

Officially Supported Versions:
Supported Metadata Fields: FEI TIFF
We currently have:
• a few FEI TIFF datasets
We would like to have:

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

Additional Information
Source Code: FEITiffReader.java

Notes:

18.33 FITS (Flexible Image Transport System)

Extensions: .fits
Developer: National Radio Astronomy Observatory

Support
BSD-licensed: ✓
Export: ✗

Officially Supported Versions:
Supported Metadata Fields: FITS (Flexible Image Transport System)
We currently have:
• a FITS specification document (NOST 100-2.0, from 1999 March 29, in HTML)
• several FITS datasets
We would like to have:

Ratings
Pixels: ▲
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*

---

111 https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-bsd/src/loci/formats/in/FitsReader.java
112 http://archive.stsci.edu/fits/
113 http://fits.gsfc.nasa.gov/
114 http://www.gatan.com/
115 http://rsb.info.nih.gov/ji/plugins/DM3_Reader.html
116 http://blake.bcm.edu/EMAN/
117 https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/GatanReader.java
Notes:
Commercial applications that support .dm3 files include Dataseze\textsuperscript{118}.

18.35 Gatan Digital Micrograph 2

Extensions: .dm2
Developer: Gatan\textsuperscript{119}

Support
BSD-licensed: \xmark
Export: \xmark

Officially Supported Versions: 2
Supported Metadata Fields: \textit{Gatan Digital Micrograph 2}
We currently have:
\begin{itemize}
  \item Pascal code that can read DM2 files (from ImageSXM)
  \item a few DM2 files
\end{itemize}
We would like to have:
\begin{itemize}
  \item an official DM2 specification document
  \item more DM2 files
\end{itemize}

Ratings

Pixels:

Metadata:

Openness:

Presence:

Utility:

Additional Information
Source Code: GatanDM2Reader.java\textsuperscript{120}

Notes:

18.36 GIF (Graphics Interchange Format)

Extensions: .gif
Developer: CompuServe\textsuperscript{121}
Owner: Unisys\textsuperscript{122}

Support
BSD-licensed: \cmark
Export: \xmark

Officially Supported Versions:

\textsuperscript{118}http://www.dataseze software.com/
\textsuperscript{119}http://www.gatan.com
\textsuperscript{120}https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/GatanDM2Reader.java
\textsuperscript{121}http://www.compu serve.com/
\textsuperscript{122}http://www.unisys.com/
Supported Metadata Fields: *GIF (Graphics Interchange Format)*

Freely Available Software:

- Animated GIF Reader plugin for ImageJ\(^{123}\)
- GIF Stack Writer plugin for ImageJ\(^{124}\)

We currently have:

- a GIF specification document\(^{125}\) (Version 89a, from 1990, in HTML)
- numerous GIF datasets
- the ability to produce new datasets

We would like to have:

**Ratings**

Pixels: ▲

Metadata: ▲

Openness: ▼

Presence: ▲

Utility: ▼

**Additional Information**

Source Code: GIFReader.java\(^{126}\)

Notes:

### 18.37 Hamamatsu Aquacosmos NAF

Extensions: .naf

Developer: Hamamatsu\(^{127}\)

**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: ▼

---


\(^{125}\) [http://tronche.com/computer-graphics/gif/](http://tronche.com/computer-graphics/gif/)

\(^{126}\) [https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-bsd/src/loci/formats/in/GIFReader.java](https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-bsd/src/loci/formats/in/GIFReader.java)

\(^{127}\) [http://www.hamamatsu.com/](http://www.hamamatsu.com/)
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:

- OpenSlide

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: NDPIReader.java

Notes:

### 18.40 Hamamatsu VMS

Extensions: .vms

Developer: Hamamatsu

**Support**

BSD-licensed: ❌

Export: ❌

Officially Supported Versions:

Supported Metadata Fields: *Hamamatsu VMS*

Sample Datasets:

- OpenSlide

We currently have:

- a few example datasets

We would like to have:

- developer documentation from the OpenSlide project

---

133 http://openslide.cs.cmu.edu/download/openslide-testdata/Hamamatsu/
134 https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/NDPIReader.java
135 http://www.hamamatsu.com
136 http://openslide.cs.cmu.edu/download/openslide-testdata/Hamamatsu-vms/
137 http://openslide.org/Hamamatsu%20format/
• an official specification document
• more example datasets

Ratings
Pixels:
Metadata:
Openness:
Presence:
Utility:

Additional Information
Source Code: HamamatsuVMSReader.java\(^{138}\)
Notes:

18.41 Hitachi S-4800

Extensions: .txt, .tif, .bmp, .jpg
Developer: Hitachi\(^{139}\)

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\(^{140}\)
Notes:

\(^{138}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/HamamatsuVMSReader.java
\(^{139}\)http://www.hitachi-hta.com/sites/default/files/technotes/Hitachi_4800_STEM.pdf
\(^{140}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/HitachiReader.java
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:

- Libics (ICS reference library)
- ICS Opener plugin for ImageJ
- IrfanView

We currently have:

- numerous ICS datasets

We would like to have:

Ratings

Pixels: 
Metadata: 
Openness: 
Presence: 
Utility: 

Additional Information

Source Code: ICSReader.java  Source Code: ICSWriter.java

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
- SVI Huygens

18.43 Imacon

Extensions: .fff

Owner: Hasselblad

141 http://libics.sourceforge.net/
142 http://valelab.ucsf.edu/%7Enstuurman/IJplugins/Ics_Opener.html
143 http://www.irfanview.com/
144 https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-bsd/src/loci/formats/in/ICSReader.java
145 https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-bsd/src/loci/formats/out/ICSWriter.java
146 http://www.bitplane.com/
147 http://svi.nl/
148 http://www.hasselbladusa.com/
Support

BSD-licensed: ✗
Export: ✗

Officially Supported Versions:

Supported Metadata Fields: Imacon

We currently have:

• one Imacon file

We would like to have:

• more Imacon files

Ratings

Pixels:  
Metadata: 
Openness:  
Presence:  
Utility: 

Additional Information

Source Code: ImaconReader.java

Notes:

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:  

Notes:

149 https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/ImaconReader.java
150 http://www.mediacy.com/
Openness: ▼
Presence: ▼
Utility: ▼

Additional Information
Source Code: SEQReader.java

Notes:

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.

152 https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/SEQReader.java
153 http://www.mediacy.com/
155 https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/IPWReader.java
156 http://jakarta.apache.org/poi/
18.46 IMAGIC

Extensions: .hed, .img
Developer: Image Science\textsuperscript{157}

Support

BSD-licensed: \xmark
Export: \xmark

Officially Supported Versions:
Supported Metadata Fields: $IMAGIC$

Freely Available Software:

- \texttt{em2em}\textsuperscript{158}

We currently have:

- one example dataset
- official file format documentation

We would like to have:

- more example datasets

Ratings

Pixels: \uparrow
Metadata: \uparrow
Openness: \uparrow
Presence: \square
Utility: \square

Additional Information

Source Code: \texttt{ImagicReader.java}\textsuperscript{159}

Notes:

See also:

$IMAGIC$ specification\textsuperscript{160}

18.47 IMOD

Extensions: .mod
Developer: Boulder Laboratory for 3-Dimensional Electron Microscopy of Cells\textsuperscript{161}

Owner: Boulder Laboratory for 3-Dimensional Electron Microscopy of Cells\textsuperscript{162}

Support

BSD-licensed: \xmark
Export: \xmark

\textsuperscript{157}http://www.imagescience.de
\textsuperscript{158}http://www.imagescience.de/em2em.html
\textsuperscript{159}https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/ImagicReader.java
\textsuperscript{160}http://www.imagescience.de/em2em.html
\textsuperscript{161}http://bio3d.colorado.edu
\textsuperscript{162}http://bio3d.colorado.edu
Officially Supported Versions:
Supported Metadata Fields: **IMOD**

Freely Available Software:
- **IMOD**¹⁶³

We currently have:
- a few sample datasets
- official documentation¹⁶⁴

We would like to have:

**Ratings**

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

**Additional Information**

Source Code: [IMODReader.java]¹⁶⁵

Notes:

18.48 Improvision Openlab LIFF

Extensions: .liff
Developer: Improvision¹⁶⁶
Owner: PerkinElmer¹⁶⁷

**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: ▲

¹⁶³ [http://bio3d.colorado.edu/imod/](http://bio3d.colorado.edu/imod/)
¹⁶⁴ [http://bio3d.colorado.edu/imod/doc/binspec.html](http://bio3d.colorado.edu/imod/doc/binspec.html)
¹⁶⁵ [https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/IMODReader.java](https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/IMODReader.java)
Openness: ▶
Presence: ▼
Utility: ▼

Additional Information

Source Code: OpenlabReader.java\textsuperscript{168}

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 review\textsuperscript{169}

\section*{18.49 Improvision Openlab Raw}

Extensions: .raw

Developer: Improvision\textsuperscript{170}

Owner: PerkinElmer\textsuperscript{171}

Support

BSD-licensed: \xmark

Export: \xmark

Officially Supported Versions:

Supported Metadata Fields: Improvision Openlab Raw

We currently have:

\begin{itemize}
  \item an Openlab Raw specification document\textsuperscript{172} (from 2004 November 09, in HTML)
  \item a few Openlab Raw datasets
\end{itemize}

We would like to have:

Ratings

Pixels: ▶

Metadata: ▶

Openness: ▶

Presence: ▼

Utility: ▼

Additional Information

Source Code: OpenlabRawReader.java\textsuperscript{173}

Notes:

See also:

Openlab software review\textsuperscript{174}

\begin{itemize}
  \item https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/OpenlabReader.java
  \item http://www.improvision.com/products/openlab/
  \item http://www.improvision.com/
  \item http://www.perkinelmer.com/
  \item http://cellularimaging.perkinelmer.com/support/technical_notes/detail.php?id=344
  \item https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/OpenlabRawReader.java
  \item http://www.improvision.com/products/openlab/
\end{itemize}
### 18.50 Improvision TIFF

Extensions: `.tif`

Developer: Improvision

Owner: PerkinElmer

**Support**

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:

---

175 http://www.improvision.com/
176 http://www.perkinelmer.com/
177 https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/ImprovisionTiffReader.java
178 http://www.improvision.com/products/openlab/
179 https://imspector.mpibpc.mpg.de/index.html
180 http://www.mpibpc.mpg.de/
Supported Metadata Fields: *Inspector OBF*

We currently have:
- a few .msr datasets
- a specification document

We would like to have:

**Ratings**

Pixels: ▲

Metadata: ▲

Openness: ▲

Presence: ▼

Utility: ▼

**Additional Information**

Source Code: OBFReader.java

Notes:

### 18.52 InCell 1000

Extensions: .xdcc, .tif

Developer: GE

**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 [https://imspector.mpibpc.mpg.de/documentation/fileformat.html](https://imspector.mpibpc.mpg.de/documentation/fileformat.html)

182 [https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-bsd/src/loci/formats/in/OBFReader.java](https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-bsd/src/loci/formats/in/OBFReader.java)


Notes:

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

185 http://gelifesciences.com/
186 http://www.broadinstitute.org/bbhc/BBBC013/
187 https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/InCell3000Reader.java
We would like to have:

**Ratings**

**Pixels:**

**Metadata:**

**Openness:**

**Presence:**

**Utility:**

**Additional Information**

Source Code: INRReader.java

Notes:

**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: InveonReader.java

Notes:

**18.56 IPLab**

Extensions: .ipl

Developer: Scanalytics

Owner: was *BD Biosystems*\(^\text{190}\), now *BioVision Technologies*\(^\text{191}\)

---

\(^\text{188}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/INRReader.java\n
\(^\text{189}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/InveonReader.java\n
\(^\text{190}\)http://wwwbdbiosciencescom/\n
\(^\text{191}\)http://wwwbioviscomiplabhtm
Support

BSD-licensed: ❌
Export: ❌

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:

https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/IPLabReader.java
http://www.bitplane.com/
http://svi.nl/
http://www.biovis.com/iplab.htm
http://biovis.com/
Supported Metadata Fields: **IPLab-Mac**

We currently have:

- a few IPLab-Mac datasets
- a specification document

We would like to have:

- more IPLab-Mac datasets

**Ratings**

- Pixels: ▶
- Metadata: ▼
- Openness: ▶
- Presence: ▼
- Utility: ▼

**Additional Information**

Source Code: IvisionReader.java\(^{198}\)

**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\(^{199}\)

**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: ▼

\(^{198}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/IvisionReader.java

\(^{199}\)http://www.jeol.com
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: JEOLReader.java
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

18.59. JPEG
Support

BSD-licensed: 

Export: 

Officially Supported Versions:

Supported Metadata Fields: JPEG 2000

Freely Available Software:

- JJ2000 (JPEG 2000 library for Java)\(^{208}\)

We currently have:

- a JPEG 2000 specification document (free draft from 2000, no longer available online)
- a few .jp2 files

We would like to have:

Ratings

Pixels: 

Metadata: 

Openness: 

Presence: 

Utility: 

Additional Information

Source Code: JPEG2000Reader.java\(^{209}\)  Source Code: JPEG2000Writer.java\(^{210}\)

Notes:

Bio-Formats uses the JAI Image I/O Tools\(^{211}\) library to read JP2 files. JPEG stands for “Joint Photographic Experts Group”.

18.61 JPK

Extensions: .jpk

Developer: JPK Instruments\(^{212}\)

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

\(^{208}\)http://code.google.com/p/jj2000/
\(^{209}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-bsd/src/loci/formats/in/JPEG2000Reader.java
\(^{210}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-bsd/src/loci/formats/out/JPEG2000Writer.java
\(^{211}\)https://java.net/projects/jai-imageio
\(^{212}\)http://www.jpk.com
Ratings
Pixels: ◀
Metadata: ◀
Openness: ◀
Presence: ◀
Utility: ◀

Additional Information
Source Code: JPKReader.java

Notes:

18.62 JPX

Extensions: .jpx
Developer: JPEG Committee

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

Notes:

18.63 Khoros VIFF (Visualization Image File Format) Bitmap

Extensions: .xv
Developer: Khoral
Owner: AccuSoft

---

213 https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/JPKReader.java
214 http://www.jpeg.org/jpeg2000/
215 https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/JPXReader.java
216 http://www.khoral.com/company/
217 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

Notes:

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

Ratings

Pixels: ▲
Metadata: ▼
Openness: ▼

219 https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/KhorosReader.java
220 http://carestream.com
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.

18.66 LaVision Imspector

Extensions: .msr
Developer: LaVision BioTec

Support

Notes:

18.65. Lambert Instruments FLIM
BSD-licensed: ×
Export: ×

Officially Supported Versions:
Supported Metadata Fields: LaVision Inspector

We currently have:
• a few .msr files

We would like to have:

**Ratings**

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

**Additional Information**

Source Code: InspectorReader.java

Notes:

### 18.67 Leica LCS LEI

Extensions: .lei, .tif

Developer: Leica Microsystems CMS GmbH

Owner: Leica

**Support**

BSD-licensed: ×
Export: ×

Officially Supported Versions:
Supported Metadata Fields: Leica LCS LEI

Freely Available Software:
• Leica LCS Lite

We currently have:
• an LEI specification document (beta 2.000, from no later than 2004 February 17, in PDF)
• many LEI datasets

We would like to have:

**Ratings**

Pixels: ▲
Metadata: ▲
Openness: ▲

---

226: https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/ImspectorReader.java
227: http://www.leica-microsystems.com/
228: http://www.leica.com/
229: ftp://ftp.ltl.de/softlib/LCSLite/LCSLite2611537.exe
Additional Information

Source Code: 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: ▲
Metadata: ▲

Openness: ▲

Presence: ▲
Utility: ▲

Additional Information

230: https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/LeicaReader.java
231: http://www.bitplane.com/
232: http://svi.nl/
233: http://www.mediacy.com/
234: http://www.leica-microsystems.com/
235: http://www.leica.com/
236: http://www.leica-microsystems.com/products/microscope-software/software-for-life-science-research/las-x/
Source Code: LIFReader.java\textsuperscript{237}

Notes:

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\textsuperscript{238}
- SVI Huygens\textsuperscript{239}
- Amira\textsuperscript{240}

## 18.69 Leica SCN

Extensions: .scn

Developer: Leica Microsystems\textsuperscript{241}

### 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\textsuperscript{242}

Notes:

\textsuperscript{237}https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/LIFReader.java
\textsuperscript{238}http://www.bitplane.com/
\textsuperscript{239}http://svi.nl/
\textsuperscript{240}http://www.amira.com/
\textsuperscript{241}http://www.leica-microsystems.com/
\textsuperscript{242}https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/LeicaSCNReader.java
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

We would like to have:
  • an official specification document

243 http://www.zeiss.de
244 https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/LEOReader.java
245 http://www.licor.com/
• more L2D datasets

Ratings

Pixels: ▶
Metadata: ▼
Openness: 
Presence: 
Utility: 

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

Pixels: 
Metadata: 
Openness: 
Presence: 
Utility: 

Additional Information

Source Code: LIMReader.java

Notes:
Bio-Formats only supports uncompressed LIM files.

Commercial applications that support LIM include:

246 https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/L2DReader.java
247 http://www.lim.cz/
248 https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/LIMReader.java
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)
• 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:**
- **Openness:**
- **Presence:**

---

253 [https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/MetamorphReader.java](https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/MetamorphReader.java)


255 [http://svi.nl/](http://svi.nl/)

256 [http://dimin.net/](http://dimin.net/)


258 [http://www.selectscience.net/supplier/maia-scientific/?compID=6088](http://www.selectscience.net/supplier/maia-scientific/?compID=6088)
Utility:  

Additional Information

Source Code: MIASReader.java

Notes:

18.76 Micro-Manager

Extensions: .tif, .txt, .xml

Developer: Vale Lab

Support

BSD-licensed: ✔️

Export: ✗

Officially Supported Versions:

Supported Metadata Fields: Micro-Manager

Freely Available Software:

• Micro-Manager

We currently have:

• many Micro-manager datasets

We would like to have:

Ratings

Pixels: ✗

Metadata: ✓

Openness: ✔️

Presence: ✗

Utility: ✗

Additional Information

Source Code: MicromanagerReader.java

Notes:

18.77 MINC MRI

Extensions: .mnc

Developer: McGill University

Support

BSD-licensed: ✗

Export: ✗

Officially Supported Versions:

259 https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/MIASReader.java

260 http://valelab.ucsf.edu/

261 http://micro-manager.org/

262 https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-bsd/src/loci/formats/in/MicromanagerReader.java

263 http://www.bic.mni.mcgill.ca/ServicesSoftware/MINC
Supported Metadata Fields: *MINC MRI*

Freely Available Software:

- MINC

We currently have:

- a few MINC files

We would like to have:

**Ratings**

Pixels: ▲

Metadata: ▼

Openness: ▼

Presence: ▼

Utility: ▼

**Additional Information**

Source Code: MINCReader.java

Notes:

18.78 Minolta MRW

Extensions: .mrw

Developer: Minolta

**Support**

BSD-licensed: ✗

Export: ✗

Officially Supported Versions:

Supported Metadata Fields: *Minolta MRW*

Freely Available Software:

- dcraw

We currently have:

- several .mrw files

We would like to have:

**Ratings**

Pixels: ▲

Metadata: ▼

Openness: ▼

Presence: ▼

Utility: ▼

**Additional Information**

---


265 [https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/MINCReader.java](https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/MINCReader.java)


267 [http://www.cybercom.net/~Edcoffin/dcraw/](http://www.cybercom.net/~Edcoffin/dcraw/)
Source Code: MRWReader.java

Notes:

18.79 MNG (Multiple-image Network Graphics)

Extensions: .mng

Developer: MNG Development Group

Support

BSD-licensed: ✔

Export: ❌

Officially Supported Versions:

Supported Metadata Fields: MNG (Multiple-image Network Graphics)

Freely Available Software:

- libmng (MNG reference library)

Sample Datasets:

- MNG sample files

We currently have:

- the libmng-testsuites package (from 2003 March 05, in C)
- a large number of MNG datasets

We would like to have:

Ratings

Pixels:

Metadata:

Openness:

Presence:

Utility:

Additional Information

Source Code: MNGReader.java

Notes:

See also:

MNG homepage

MNG specification
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/v5.0.8/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 (in TXT)
• a few MRC datasets

We would like to have:

Ratings

Pixels: ▲
Metadata: ▲
Openness: ▲
Presence: ◡
Utility: ◡

Additional Information

Source Code: MRCReader.java

Notes:

Commercial applications that support MRC include:

• Bitplane Imaris

See also:

MRC on Wikipedia

18.82 NEF (Nikon Electronic Format)

Extensions: .nef, .tif

Developer: Nikon

Support

BSD-licensed: ✗
Export: ✗

Officially Supported Versions:

Supported Metadata Fields: NEF (Nikon Electronic Format)

Sample Datasets:

• neffile1.zip
• Sample NEF images

We currently have:

• a NEF specification document (v0.1, from 2003, in PDF)
• several NEF datasets

We would like to have:

Ratings

Pixels: ▲
Metadata: ▲

---

280 http://bio3d.colorado.edu/imod/doc/mrc_format.txt
281 https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/MRCReader.java
282 http://www.bitplane.com/
283 http://en.wikipedia.org/wiki/MRC_%28file_format%29
284 http://www.nikon.com/
285 http://www.outbackphoto.com/workshop/NEF_conversion/neffile1.zip
286 http://www.nikondigital.org/articles/library/nikon_d2x_first_impressions.htm
Openness: 
Presence: 
Utility: 

Additional Information

Source Code: NikonReader.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:
NEF Conversion

18.83 NIfTI

Extensions: .img, .hdr
Developer: National Institutes of Health

Support
BSD-licensed: 
Export: 

Officially Supported Versions:
Supported Metadata Fields: NIfTI

Sample Datasets:
• Official test data

We currently have:
• NIfTI specification documents
• several NIfTI datasets

We would like to have:

Ratings
Pixels: 
Metadata: 
Openness: 
Presence: 
Utility: 

Additional Information

Source Code: NiftiReader.java

Notes:

287 https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/NikonReader.java
288 http://www.outbackphoto.com/workshop/NEF_conversion/nefconversion.html
289 http://www.nih.gov/
290 http://nifti.nimh.nih.gov/nifti-1/data
292 https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/NiftiReader.java
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:

293 http://www.nikon.com
294 https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/NikonElementsTiffReader.java
295 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/v5.0.8/components/formats-gpl/src/loci/formats/in/NikonTiffReader.java
297 http://www.nikonusa.com/
298 http://www.nikoninstruments.com/Products/Software/NIS-Elements-Advanced-Research/NIS-Elements-Viewer
299 https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/NativeND2Reader.java
300 http://java.net/projects/jai-imageio
302 https://github.com/openmicroscopy/bioformats/blob/v5.0.8/lib/LegacyND2Reader.dll?raw=true
18.87 NRRD (Nearly Raw Raster Data)

Extensions: .nrrd, .nhdr, .raw, .txt
Developer: Teem developers\textsuperscript{303}

Support

BSD-licensed: ✔
Export: ✗

Officially Supported Versions:

Supported Metadata Fields: \textit{NRRD (Nearly Raw Raster Data)}

Freely Available Software:

- \textit{nrrd} (NRRD reference library)\textsuperscript{304}

Sample Datasets:

- Diffusion tensor MRI datasets\textsuperscript{305}

We currently have:

- an \textit{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: \texttt{NRRDReader.java}\textsuperscript{307}

Notes:

18.88 Olympus CellR/APL

Extensions: .apl, .mtb, .tnb, .tif, .obsep
Owner: Olympus\textsuperscript{308}

Support

BSD-licensed: ✗
Export: ✗

Officially Supported Versions:

Supported Metadata Fields: \textit{Olympus CellR/APL}

\begin{itemize}
\item \texttt{http://teem.sourceforge.net/}
\item \texttt{http://teem.sourceforge.net/nrrd/}
\item \texttt{http://www.sci.utah.edu/~gk/DTI-data/}
\item \texttt{http://teem.sourceforge.net/nrrd/format.html}
\item \texttt{https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-bsd/src/loci/formats/in/NRRDReader.java}
\item \texttt{http://www.olympus.com/}
\end{itemize}
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\(^{309}\)

Notes:

### 18.89 Olympus FluoView FV1000

Extensions: .oib, .oif

Owner: Olympus\(^{310}\)

**Support**

- BSD-licensed: ✗
- Export: ✗
- Officially Supported Versions: 1.0, 2.0

**Supported Metadata Fields:** *Olympus FluoView FV1000*

**Freely Available Software:**

- FV-Viewer from Olympus\(^{311}\)

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: ▲

---

\(^{309}\) [https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/APLReader.java](https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/APLReader.java)

\(^{310}\) [http://www.olympus.com/](http://www.olympus.com/)

\(^{311}\) [http://www.olympus.co.uk/microscopy/22_FluoView_FV1000__Confocal_Microscope.htm](http://www.olympus.co.uk/microscopy/22_FluoView_FV1000__Confocal_Microscope.htm)
Presence: ▲
Utility: ▲

**Additional Information**

**Source Code:** [FV1000Reader.java](https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/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](http://jakarta.apache.org/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](http://www.olympusfluoview.com)

---

### 18.90 Olympus FluoView TIFF

**Extensions:** .tif

**Owner:** Olympus

**Support**

BSD-licensed: ✗

Export: ✗

**Officially Supported Versions:**

**Supported Metadata Fields:** *Olympus FluoView TIFF*

**Freely Available Software:** *Olympus FluoView TIFF*

- [DIMIN](http://www.dimin.net/)

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:** □
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

Notes:

### 18.93 OME-TIFF

Extensions: .ome.tiff

Developer: Open Microscopy Environment

Support

BSD-licensed: ✅
Export: ✅


Supported Metadata Fields: *OME-TIFF*

We currently have:
- an OME-TIFF specification document (from 2006 October 19, in HTML)
- many OME-TIFF datasets
- the ability to produce additional datasets

We would like to have:

Ratings

Pixels: 
Metadata: 
Openness: 
Presence: 

---

326https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/SISReader.java
327http://www.openmicroscopy.org/site/support/ome-model/ome-tiff/index.html
328http://www.openmicroscopy.org/
329http://www.openmicroscopy.org/site/support/ome-model/ome-tiff/specification.html
Utility: ▲

Additional Information

Source Code: OMETiffReader.java\textsuperscript{330} Source Code: OMETiffWriter.java\textsuperscript{331}

Notes:

Bio-Formats can save image stacks as OME-TIFF.

Commercial applications that support OME-TIFF include:

- Bitplane Imaris\textsuperscript{332}
- SVI Huygens\textsuperscript{333}

See also:

OME-TIFF technical overview\textsuperscript{334}

\section*{18.94 OME-XML}

Extensions: .ome\textsuperscript{335}

Developer: Open Microscopy Environment\textsuperscript{336}

Support

BSD-licensed: ✔

Export: ✔


Supported Metadata Fields: OME-XML

We currently have:

- OME-XML specification documents\textsuperscript{337}
- 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\textsuperscript{338} Source Code: OMEXMLWriter.java\textsuperscript{339}

Notes:

\textsuperscript{330}https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-bsd/src/loci/formats/in/OMETiffReader.java

\textsuperscript{331}https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-bsd/src/loci/formats/out/OMETiffWriter.java

\textsuperscript{332}http://www.bitplane.com/

\textsuperscript{333}http://svi.nl/

\textsuperscript{334}http://www.openmicroscopy.org/site/support/ome-model/ome-tiff/index.html

\textsuperscript{335}http://www.openmicroscopy.org/site/support/ome-model/ome-xml/index.html

\textsuperscript{336}http://www.openmicroscopy.org/

\textsuperscript{337}http://www.openmicroscopy.org/Schemas/

\textsuperscript{338}https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-bsd/src/loci/formats/in/OMEXMLReader.java

\textsuperscript{339}https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-bsd/src/loci/formats/out/OMEXMLWriter.java
Bio-Formats uses the OME-XML Java library\(^\text{340}\) to read OME-XML files.

Commercial applications that support OME-XML include:

- Bitplane Imaris\(^\text{341}\)
- SVI Huygens\(^\text{342}\)

### 18.95 Oxford Instruments

Extensions: .top

Owner: Oxford Instruments\(^\text{343}\)

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


Notes:

### 18.96 PCORAW

Extensions: .pcoraw, .rec

Developer: PCO\(^\text{345}\)

Support

- BSD-licensed: 

---


\(^{341}\) [http://www.bitplane.com/](http://www.bitplane.com/)

\(^{342}\) [http://svi.nl/](http://svi.nl/)

\(^{343}\) [http://www.oxinst.com](http://www.oxinst.com)


\(^{345}\) [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/v5.0.8/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/v5.0.8/components/formats-bsd/src/loci/formats/in/PCXReader.java)

Notes:

---

346https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/PCORAWReader.java

347https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-bsd/src/loci/formats/in/PCXReader.java
Commercial applications that support PCX include Zeiss LSM Image Browser\(^{348}\).

### 18.98 Perkin Elmer Densitometer

Extensions: .pds  
Developer: Perkin Elmer\(^{349}\)

**Support**

BSD-licensed: 
Export: 

**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:**

**Utility:**

**Additional Information**

Source Code: [PDSReader.java]\(^{350}\)

**Notes:**

### 18.99 PerkinElmer Operetta

Extensions: .tiff, .xml  
Developer: PerkinElmer\(^{351}\)

**Support**

BSD-licensed: 
Export: 

**Officially Supported Versions:**

**Supported Metadata Fields:** *PerkinElmer Operetta*

We currently have:

- a few sample datasets

---

\(^{349}\) [http://www.perkinelmer.com](http://www.perkinelmer.com)  
\(^{350}\) [https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/PDSReader.java](https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/PDSReader.java)  
We would like to have:

- an official specification document
- more sample datasets

### Ratings

- **Pixels:**
- **Metadata:**
- **Openness:**
- **Presence:**
- **Utility:**

### Additional Information

Source Code: OperettaReader.java

Notes:

---

**18.100 PerkinElmer UltraView**

Extensions: .tif, .2, .3, .4, etc.

**Owner:** PerkinElmer

**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

Notes:

Other associated extensions include: .tim, .zpo, .csv, .htm, .cfg, .ano, .rec

Commercial applications that support this format include:

- Bitplane Imaris

---

18.100. PerkinElmer UltraView
See also:
PerkinElmer UltraView system overview

18.101 PGM (Portable Gray Map)

Extensions: .pgm
Developer: Netpbm developers

Support
BSD-licensed: ✓
Export: ✗

Officially Supported Versions:
Supported Metadata Fields: PGM (Portable Gray Map)

Freely Available Software:
  • Netpbm graphics filter

We currently have:
  • a PGM specification document (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

Notes:

18.102 Adobe Photoshop PSD

Extensions: .psd
Developer: Adobe

Support
BSD-licensed: ✗
Export: ✗
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

362https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/PSDReader.java

363http://www.adobe.com
Source Code: `PhotoshopTiffReader.java`\(^\text{364}\)

Notes:

**18.104 PicoQuant Bin**

Extensions: .bin

Developer: PicoQuant\(^\text{365}\)

**Support**

BSD-licensed: ☒

Export: ☒

Officially Supported Versions:

Supported Metadata Fields: *PicoQuant Bin*

Freely Available Software:

- *SymphoTime64*\(^\text{366}\)

We currently have:

- a few example datasets

We would like to have:

**Ratings**

Pixels: ☒

Metadata: ☐

Openness: ☒

Presence: ☒

Utility: ☒

**Additional Information**

Source Code: `PQBinReader.java`\(^\text{367}\)

Notes:

**18.105 PICT (Macintosh Picture)**

Extensions: .pict

Developer: Apple Computer\(^\text{368}\)

**Support**

BSD-licensed: ☑

Export: ☒

Officially Supported Versions:

Supported Metadata Fields: *PICT (Macintosh Picture)*

We currently have:

---

\(^\text{364}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/PhotoshopTiffReader.java

\(^\text{365}\)http://www.picoquant.com/


\(^\text{367}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/PQBinReader.java

\(^\text{368}\)http://www.apple.com


- many PICT datasets

We would like to have:

**Ratings**

- Pixels:
- Metadata:
- Openness:
- Presence:
- Utility:

**Additional Information**

Source Code: PictReader.java\(^{369}\)

Notes:

QuickTime for Java\(^{370}\) is required for reading vector files and some compressed files.

See also:

PICT technical overview\(^{371}\) Another PICT technical overview\(^{372}\)

### 18.106 PNG (Portable Network Graphics)

**Extensions**: .png

**Developer**: PNG Development Group\(^{373}\)

**Support**

- BSD-licensed: ✔
- Export: ✔

**Officially Supported Versions**:

**Supported Metadata Fields**: PNG (Portable Network Graphics)

**Freely Available Software**:

- PNG Writer plugin for ImageJ\(^{374}\)

We currently have:

- a PNG specification document\(^{375}\) (W3C/ISO/IEC version, from 2003 November 10, in HTML)
- several PNG datasets

We would like to have:

**Ratings**

- Pixels:
- Metadata:
- Openness:
- Presence:

---

\(^{369}\) https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-bsd/src/loci/formats/in/PictReader.java


\(^{372}\) http://www.prepressure.com/formats/pict/fileformat.htm

\(^{373}\) http://www.libpng.org/pub/png/pngnews.html

\(^{374}\) http://rsb.info.nih.gov/ij/plugins/png-writer.html

\(^{375}\) http://www.libpng.org/pub/png/spec/iso/
Utility: 🟢

Additional Information

Source Code: APNGReader.java

Notes:

Bio-Formats uses the Java Image I/O API to read and write PNG files.

See also:

PNG technical overview

### 18.107 Prairie Technologies TIFF

Extensions: .tif, .xml, .cfg

Developer: Prairie Technologies

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: ❌

Presence: ▼

Utility: ❌

#### Additional Information

Source Code: PrairieReader.java

Notes:

### 18.108 Quesant

Extensions: .afm

Developer: Quesant Instrument Corporation

Owner: KLA-Tencor Corporation

Support

376 https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-bsd/src/loci/formats/in/APNGReader.java

377 http://docs.oracle.com/javase/6/docs/technotes/guides/imageio/

378 http://www.libpng.org/pub/png/

379 http://www.prairie-technologies.com/

380 https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/PrairieReader.java

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*[^1]

Notes:

### 18.109 QuickTime Movie

Extensions: .mov

Owner: *Apple Computer*[^2]

**Support**

BSD-licensed: ✔

Export: ✔

Officially Supported Versions:

Supported Metadata Fields: *QuickTime Movie*

Freely Available Software:

- *QuickTime Player*[^3]

We currently have:

- a *QuickTime specification document*[^4] (from 2001 March 1, in HTML)
- several QuickTime datasets
- the ability to produce more datasets

We would like to have:

- more QuickTime datasets, including:

[^1]: https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/QuesantReader.java
– 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\(^\text{386}\)  Source Code: QTWriter.java\(^\text{387}\)

Notes:

Bio-Formats has two modes of operation for QuickTime:

- QTJava mode requires QuickTime\(^\text{388}\) to be installed (32-bit JVM only, not supported with 64-bit).
- 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:

<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</td>
<td>read only</td>
<td>read &amp; write</td>
</tr>
<tr>
<td>rle</td>
<td>Animation (run length encoded RGB)</td>
<td>read only</td>
<td>read &amp; write</td>
</tr>
<tr>
<td>jpeg</td>
<td>Still Image JPEG DIB</td>
<td>read only</td>
<td>read only</td>
</tr>
<tr>
<td>rpza</td>
<td>Apple Video 16 bit “road pizza”</td>
<td>read only (partial)</td>
<td>read only</td>
</tr>
<tr>
<td>mjpb</td>
<td>Motion JPEG codec</td>
<td>read only</td>
<td>read only</td>
</tr>
<tr>
<td>cvid</td>
<td>Cinepak</td>
<td>read &amp; write</td>
<td>read &amp; write</td>
</tr>
<tr>
<td>svq1</td>
<td>Sorenson Video</td>
<td>•</td>
<td>read &amp; write</td>
</tr>
<tr>
<td>svq3</td>
<td>Sorenson Video 3</td>
<td>•</td>
<td>read &amp; write</td>
</tr>
<tr>
<td>mp4v</td>
<td>MPEG-4</td>
<td>•</td>
<td>read &amp; write</td>
</tr>
<tr>
<td>h263</td>
<td>H.263</td>
<td>•</td>
<td>read &amp; write</td>
</tr>
</tbody>
</table>

See also:

QuickTime software overview\(^\text{389}\)

---

**18.110 RHK**

Extensions: .sm2, .sm3

Owner: RHK Technologies\(^\text{390}\)

Support

\(^{386}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-bsd/src/loci/formats/in/NativeQTReader.java
\(^{387}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-bsd/src/loci/formats/out/QTWriter.java
\(^{388}\)http://www.apple.com/quicktime/download/
\(^{389}\)http://www.apple.com/quicktime/
\(^{390}\)http://www.rhk-tech.com
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: ![ ]

**Additional Information**

Source Code: [RHKReader.java](https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/RHKReader.java)

Notes:

### 18.111 SBIG

**Owner:** Santa Barbara Instrument Group (SBIG)

**Support**

BSD-licensed: ![ ]

Export: ![ ]

Officially Supported Versions:

Supported Metadata Fields: **SBIG**

We currently have:
- an official SBIG specification document
- a few SBIG files

We would like to have:
- more SBIG files

**Ratings**

- Pixels: ![ ]
- Metadata: ![ ]
- Openness: ![ ]

---

2. [http://www.sbig.com](http://www.sbig.com)
3. [http://sbig.impulse.net/pdffiles/file.format.pdf](http://sbig.impulse.net/pdffiles/file.format.pdf)
18.112 Seiko

Extensions: .xqd, .xqf
Owner: Seiko

Support

BSD-licensed: 
Export: 

Officially Supported Versions:

Supported Metadata Fields: Seiko

We currently have:

• 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: 

18.113 SimplePCI & HCImage

Extensions: .cxd
Developer: Compix

Support

BSD-licensed: 

Notes: 

---

394 https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/SBIGReader.java
396 https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/SeikoReader.java
397 http://hcimage.com
Export: ❌

Officially Supported Versions:

Supported Metadata Fields: *SimplePCI & HCImage*

We currently have:

- several SimplePCI files

We would like to have:

**Ratings**

Pixels: ▲

Metadata: ▼

Openness: ▲

Presence: ▼

Utility: ◼

**Additional Information**

Source Code: [PCIReader.java](https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/PCIReader.java)

Notes:

Bio-Formats uses a modified version of the [Apache Jakarta POI library](http://jakarta.apache.org/poi/) to read CXD files.

See also:

[SimplePCI software overview](http://hcimage.com/simple-pci-legacy/)

### 18.114 SimplePCI & HCImage TIFF

Extensions: `.tiff`

Developer: [Hamamatsu](http://hcimage.com/simple-pci-legacy/)

**Support**

BSD-licensed: ❌

Export: ❌

Officially Supported Versions:

Supported Metadata Fields: *SimplePCI & HCImage TIFF*

We currently have:

- a few SimplePCI TIFF datasets

We would like to have:

- more SimplePCI TIFF datasets

**Ratings**

Pixels: ▲

Metadata: ▼

Openness: ▲

Presence: ◼
18.115 SM Camera

Support
BSD-licensed: 
Export: 

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
• more SM-Camera files

Ratings
Pixels:
Metadata:
Openness:
Presence:
Utility:

Additional Information
Source Code: SimplePCITiffReader.java

Notes:

18.116 SPIDER

Extensions: .spi, .stk
Developer: Wadsworth Center

Support
BSD-licensed: 
Export: 

Officially Supported Versions:

Supported Metadata Fields: SPIDER

Freely Available Software: [Source Code](https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/SimplePCITiffReader.java)
[Source Code](https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/SMCameraReader.java)
[SPIDER Documentation](http://www.wadsworth.org/spider_doc/spider/docs/spider.html)
• **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:

### 18.117 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

---

405 http://www.wadsworth.org/spider_doc/spider/docs/spider.html
406 http://www.wadsworth.org/spider_doc/spider/docs/image_doc.html
408 http://www.truevision.com
409 https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/TargaReader.java
Notes:

18.118 **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: ▼

Utility: ▼

**Additional Information**

Source Code: `TextReader.java`\(^{410}\)

Notes:

Reads tabular pixel data produced by a variety of software.

18.119 **TIFF (Tagged Image File Format)**

Extensions: .tif

Developer: Aldus and Microsoft

Owner: Adobe\(^{411}\)

**Support**

BSD-licensed: ✔

Export: ✔

Officially Supported Versions:

Supported Metadata Fields: *TIFF (Tagged Image File Format)*

Sample Datasets:

- LZW TIFF data gallery\(^{412}\)
- Big TIFF\(^{413}\)

We currently have:

\(^{410}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-bsd/src/loci/formats/in/TextReader.java

\(^{411}\)http://www.adobe.com

\(^{412}\)http://marlin.life.utsa.edu/Data_Gallery.html

\(^{413}\)http://www.awaresystems.be/imaging/tiff/bigtiff.html#samples
• a TIFF specification document\textsuperscript{414} (v6.0, from 1992 June 3, in PDF)
• many TIFF datasets
• a few BigTIFF datasets

We would like to have:

\textbf{Ratings}

<table>
<thead>
<tr>
<th>Pixels</th>
<th>Metadata</th>
<th>Openness</th>
<th>Presence</th>
<th>Utility</th>
</tr>
</thead>
</table>

\textbf{Additional Information}

Source Code: \texttt{TiffReader.java}\textsuperscript{415} Source Code: \texttt{TiffWriter.java}\textsuperscript{416}

Notes:

Bio-Formats can also read BigTIFF files (TIFF files larger than 4 GB). Bio-Formats can save image stacks as TIFF or BigTIFF.

\textbf{See also:}

TIFF technical overview\textsuperscript{417} BigTIFF technical overview\textsuperscript{418}

\section*{18.120 TillPhotonics TillVision}

Extensions: \texttt{.vws}

Developer: Till Photonics\textsuperscript{419}

\textbf{Support}

BSD-licensed: \textxmark

Export: \textxmark

Officially Supported Versions:

Supported Metadata Fields: \textit{TillPhotonics TillVision}

We currently have:

• several TillVision datasets

We would like to have:

• an official specification document

\textbf{Ratings}

<table>
<thead>
<tr>
<th>Pixels</th>
<th>Metadata</th>
<th>Openness</th>
<th>Presence</th>
<th>Utility</th>
</tr>
</thead>
</table>

\textsuperscript{414}http://partners.adobe.com/asn/developer/PDFS/TN/TIFF6.pdf
\textsuperscript{415}https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-bsd/src/loci/formats/in/TiffReader.java
\textsuperscript{416}https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-bsd/src/loci/formats/out/TiffWriter.java
\textsuperscript{417}http://www.awaresystems.be/imaging/tiff/faq.html#q3
\textsuperscript{418}http://www.awaresystems.be/imaging/tiff/bigtiff.html
\textsuperscript{419}http://www.till-photonics.com/
Additional Information

Source Code: TillVisionReader.java

Notes:

18.121 Topometrix

Extensions: .tfr, .ffr, .zfr, .zfp, .2fl

Owner: TopoMetrix (now Veeco)

Support

BSD-licensed: 

Export: 

Officially Supported Versions:

Supported Metadata Fields: Topometrix

We currently have:
- Pascal code that reads Topometrix files (from ImageSXM)
- a few Topometrix files

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:

18.122 Trestle

Extensions: .tif, .sld, .jpg

Support

BSD-licensed: 

Export: 

Officially Supported Versions:

Supported Metadata Fields: Trestle

Sample Datasets:

https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/TillVisionReader.java

http://www.veeco.com/

https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/TopometrixReader.java
Bio-Formats Documentation, Release 5.0.8

- 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:

### 18.123 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

---

423 http://openslide.cs.cmu.edu/download/openslide-testdata/Trestle/
424 http://openslide.org/Trestle%20format/
425 https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/TrestleReader.java
426 https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/UBMReader.java
Notes:

18.124 Unisoku

Extensions: .dat, .hdr
Owner: Unisoku

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
- more Unisoku files

Ratings
Pixels: 
Metadata: 
Openness: 
Presence: 
Utility:

Additional Information
Source Code: UnisokuReader.java

Notes:

18.125 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

http://www.unisoku.com
https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/UnisokuReader.java
http://www.varianinc.com
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\(^430\)

Notes:

\(^430\)https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/VarianFDFReader.java

---

18.126  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\(^431\)

Notes:

\(^431\)https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/VGSAMReader.java
18.127 VisiTech XYS

Extensions: .xys, .html
Developer: VisiTech International

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

Ratings
Pixels: 🔵
Metadata: 🟢
Openness: 🔴
Presence: 🔴
Utility: 🟢

Additional Information
Source Code: VisitechReader.java

Notes:

18.128 Volocity

Extensions: .mvd2
Developer: PerkinElmer

Support
BSD-licensed: ❌
Export: ❌

Officially Supported Versions:
Supported Metadata Fields: Volocity
Sample Datasets:
  • PerkinElmer Downloads
We currently have:
  • many example Volocity datasets
We would like to have:

http://www.visitech.co.uk/
https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/VisitechReader.java
http://www.perkinelmer.com/pages/020/cellularimaging/products/volocity.xhtml
http://cellularimaging.perkinelmer.com/downloads/
• an official specification document
• any Volocity datasets that do not open correctly

**Ratings**

Pixels: □
Metadata: □
Openness: ▼
Presence: ▼
Utility: ▼

**Additional Information**

Source Code: VolocityReader.java\(^{436}\)

Notes:

.mvd2 files are Metakit database files\(^{437}\).

### 18.129 Volocity Library Clipping

Extensions: .acff

Developer: PerkinElmer\(^{438}\)

**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\(^{439}\)

Notes:

\(^{436}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/VolocityReader.java

\(^{437}\)http://equi4.com/metakit/

\(^{438}\)http://www.perkinelmer.com/pages/020/cellularimaging/products/volocity.xhtml

\(^{439}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/VolocityClippingReader.java
RGB .acff files are not yet supported. See #6413.

### 18.130 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 ImageX)
- 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](https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/WATOPReader.java)

**Notes:**

### 18.131 Windows Bitmap

**Extensions:** .bmp  
**Developer:** Microsoft and IBM

**Support**

- **BSD-licensed:** ✔  
- **Export:** ✗  

**Officially Supported Versions:**

**Supported Metadata Fields:** **Windows Bitmap**

**Freely Available Software:**

---

440 [http://trac.openmicroscopy.org.uk/ome/ticket/6413](http://trac.openmicroscopy.org.uk/ome/ticket/6413)  
441 [http://www.oxinst.com](http://www.oxinst.com)  
442 [https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/WATOPReader.java](https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/WATOPReader.java)
• BMP Writer plugin for ImageJ

We currently have:
• many BMP datasets

We would like to have:

Ratings

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

Additional Information

Source Code: BMPReader.java

Notes:
Compressed BMP files are currently not supported.

See also:
Technical Overview

18.132 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\(^{448}\) Source Code: WlzWriter.java\(^{449}\)

Notes:

### 18.133 Zeiss AxioVision TIFF

Extensions: .xml, .tiff

Developer: Carl Zeiss Microscopy GmbH\(^{450}\)

Owner: Carl Zeiss Microscopy GmbH\(^{451}\)

Support

BSD-licensed: ×

Export: ×

Officially Supported Versions:

Supported Metadata Fields: *Zeiss AxioVision TIFF*

Freely Available Software:

- Zeiss ZEN Lite\(^{452}\)

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\(^{453}\)

Notes:

### 18.134 Zeiss AxioVision ZVI (Zeiss Vision Image)

Extensions: .zvi

Developer: Carl Zeiss Microscopy GmbH (AxioVision)\(^{454}\)

\(^{448}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/WlzReader.java

\(^{449}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/out/WlzWriter.java

\(^{450}\)http://www.zeiss.com/microscopy/

\(^{451}\)http://www.zeiss.com/microscopy/


\(^{453}\)https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/ZeissTIFFReader.java

Owner: Carl Zeiss Microscopy 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

We would like to have:

Ratings

Pixels: 

Metadata: 

Openness: 

Presence: 

Utility: 

Additional Information

Source Code: ZeissZVIReader.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 ZVI files.

Commercial applications that support ZVI include Bitplane Imaris.

See also:

Axiovision software overview

18.135 Zeiss CZI

Extensions: .czi

Developer: Carl Zeiss Microscopy GmbH

---

455 http://www.zeiss.com/microscopy/
457 https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/ZeissZVIReader.java
458 http://jakarta.apache.org/poi/
459 http://www.bitplane.com/
461 http://www.zeiss.com/czi
462 http://www.zeiss.com/czi
Support

BSD-licensed: ❌

Export: ❌

Officially Supported Versions:

Supported Metadata Fields: Zeiss CZI

Freely Available Software:

• Zeiss ZEN 2012463

We currently have:

• many example datasets
• official specification documents

We would like to have:

Ratings

Pixels: 🟢

Metadata: 🟢

Openness: 🟢

Presence: 🟢

Utility: 🟢

Additional Information

Source Code: ZeissCZIReader.java464

Notes:

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

18.136 Zeiss LSM (Laser Scanning Microscope) 510/710

Extensions: .lsm, .mdb

Owner: Carl Zeiss Microscopy GmbH465

Support

BSD-licensed: ❌

Export: ❌

Officially Supported Versions:

Supported Metadata Fields: Zeiss LSM (Laser Scanning Microscope) 510/710

Freely Available Software:

• Zeiss LSM Image Browser466
• LSM Toolbox plugin for ImageJ467
• LSM Reader plugin for ImageJ468
• DIMIN469

464 https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/ZeissCZIReader.java
465 http://www.zeiss.com/microscopy/
467 http://imagejdocu.tudor.lu/Members/ppirrotte/lsmtoolbox
469 http://www.dimin.net/
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](https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/ZeissLSMReader.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 the [MDB Tools Java port](http://mdbtools.sourceforge.net/)

Commercial applications that support this format include:

- SVI Huygens
- Bitplane Imaris
- Amira
- Image-Pro Plus

---

470https://github.com/openmicroscopy/bioformats/blob/v5.0.8/components/formats-gpl/src/loci/formats/in/ZeissLSMReader.java
471http://mdbtools.sourceforge.net/
472http://www2.svi.nl/
473http://www.bitplane.com/
474http://www.amira.com/
475http://www.mediacy.com/
# SUMMARY OF SUPPORTED METADATA FIELDS

## 19.1 Format readers

<table>
<thead>
<tr>
<th>Format</th>
<th>Supported</th>
<th>Unsupported</th>
<th>Partial</th>
<th>Unknown/Missing</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFIReader</td>
<td>30</td>
<td>0</td>
<td>0</td>
<td>445</td>
</tr>
<tr>
<td>AIMReader</td>
<td>22</td>
<td>0</td>
<td>0</td>
<td>453</td>
</tr>
<tr>
<td>APLReader</td>
<td>21</td>
<td>0</td>
<td>0</td>
<td>454</td>
</tr>
<tr>
<td>APNGReader</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>456</td>
</tr>
<tr>
<td>ARFReader</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>456</td>
</tr>
<tr>
<td>AVIReader</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>456</td>
</tr>
<tr>
<td>AliconaReader</td>
<td>33</td>
<td>0</td>
<td>0</td>
<td>442</td>
</tr>
<tr>
<td>AmiraReader</td>
<td>22</td>
<td>0</td>
<td>0</td>
<td>453</td>
</tr>
<tr>
<td>AnalyzeReader</td>
<td>24</td>
<td>0</td>
<td>0</td>
<td>451</td>
</tr>
<tr>
<td>BReader</td>
<td>57</td>
<td>0</td>
<td>0</td>
<td>418</td>
</tr>
<tr>
<td>BIFormatReader</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>456</td>
</tr>
<tr>
<td>BMPReader</td>
<td>21</td>
<td>0</td>
<td>0</td>
<td>454</td>
</tr>
<tr>
<td>BaseTiffReader</td>
<td>28</td>
<td>0</td>
<td>0</td>
<td>447</td>
</tr>
<tr>
<td>BaseZeissReader</td>
<td>83</td>
<td>0</td>
<td>0</td>
<td>392</td>
</tr>
<tr>
<td>BioRadGelReader</td>
<td>21</td>
<td>0</td>
<td>0</td>
<td>454</td>
</tr>
<tr>
<td>BioRadReader</td>
<td>40</td>
<td>0</td>
<td>0</td>
<td>435</td>
</tr>
<tr>
<td>BioRadSCNReader</td>
<td>29</td>
<td>0</td>
<td>0</td>
<td>446</td>
</tr>
<tr>
<td>BrukerReader</td>
<td>23</td>
<td>0</td>
<td>0</td>
<td>452</td>
</tr>
<tr>
<td>BurleighReader</td>
<td>22</td>
<td>0</td>
<td>0</td>
<td>453</td>
</tr>
<tr>
<td>CanonRavReader</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>456</td>
</tr>
<tr>
<td>CellSensReader</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>456</td>
</tr>
<tr>
<td>CellVoyagerReader</td>
<td>34</td>
<td>0</td>
<td>0</td>
<td>441</td>
</tr>
<tr>
<td>CellWorxReader</td>
<td>45</td>
<td>0</td>
<td>0</td>
<td>430</td>
</tr>
<tr>
<td>CellomicsReader</td>
<td>31</td>
<td>0</td>
<td>0</td>
<td>444</td>
</tr>
<tr>
<td>DNGReader</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>456</td>
</tr>
<tr>
<td>DeltaVisionReader</td>
<td>52</td>
<td>0</td>
<td>0</td>
<td>423</td>
</tr>
<tr>
<td>DicomReader</td>
<td>23</td>
<td>0</td>
<td>0</td>
<td>452</td>
</tr>
<tr>
<td>EPSReader</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>456</td>
</tr>
<tr>
<td>Ecat7Reader</td>
<td>23</td>
<td>0</td>
<td>0</td>
<td>452</td>
</tr>
<tr>
<td>FEIReader</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>456</td>
</tr>
<tr>
<td>FEITiffReader</td>
<td>39</td>
<td>0</td>
<td>0</td>
<td>436</td>
</tr>
<tr>
<td>FV1000Reader</td>
<td>113</td>
<td>0</td>
<td>0</td>
<td>362</td>
</tr>
<tr>
<td>FakeReader</td>
<td>21</td>
<td>0</td>
<td>0</td>
<td>454</td>
</tr>
<tr>
<td>FitsReader</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>456</td>
</tr>
<tr>
<td>FlexReader</td>
<td>69</td>
<td>0</td>
<td>0</td>
<td>406</td>
</tr>
<tr>
<td>FluoviewReader</td>
<td>49</td>
<td>0</td>
<td>0</td>
<td>426</td>
</tr>
<tr>
<td>FujiReader</td>
<td>23</td>
<td>0</td>
<td>0</td>
<td>452</td>
</tr>
<tr>
<td>GIFReader</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>456</td>
</tr>
<tr>
<td>GatanDM2Reader</td>
<td>30</td>
<td>0</td>
<td>0</td>
<td>445</td>
</tr>
<tr>
<td>GatanReader</td>
<td>36</td>
<td>0</td>
<td>0</td>
<td>439</td>
</tr>
<tr>
<td>GelReader</td>
<td>21</td>
<td>0</td>
<td>0</td>
<td>454</td>
</tr>
<tr>
<td>HISReader</td>
<td>27</td>
<td>0</td>
<td>0</td>
<td>448</td>
</tr>
</tbody>
</table>

Continued on next page
<table>
<thead>
<tr>
<th>Format</th>
<th>Supported</th>
<th>Unsupported</th>
<th>Partial</th>
<th>Unknown/Missing</th>
</tr>
</thead>
<tbody>
<tr>
<td>HRDGDFReader</td>
<td>21</td>
<td>0</td>
<td>0</td>
<td>454</td>
</tr>
<tr>
<td>HamamatsuVMSReader</td>
<td>26</td>
<td>0</td>
<td>0</td>
<td>449</td>
</tr>
<tr>
<td>HitachiReader</td>
<td>31</td>
<td>0</td>
<td>0</td>
<td>444</td>
</tr>
<tr>
<td>ICSReader</td>
<td>72</td>
<td>0</td>
<td>0</td>
<td>403</td>
</tr>
<tr>
<td>IMODReader</td>
<td>44</td>
<td>0</td>
<td>0</td>
<td>431</td>
</tr>
<tr>
<td>INRReader</td>
<td>22</td>
<td>0</td>
<td>0</td>
<td>453</td>
</tr>
<tr>
<td>IPLabReader</td>
<td>31</td>
<td>0</td>
<td>0</td>
<td>444</td>
</tr>
<tr>
<td>IPWReader</td>
<td>20</td>
<td>0</td>
<td>0</td>
<td>455</td>
</tr>
<tr>
<td>ImaconReader</td>
<td>23</td>
<td>0</td>
<td>0</td>
<td>452</td>
</tr>
<tr>
<td>ImageIOReader</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>456</td>
</tr>
<tr>
<td>ImagicReader</td>
<td>22</td>
<td>0</td>
<td>0</td>
<td>453</td>
</tr>
<tr>
<td>ImarisHDFReader</td>
<td>23</td>
<td>0</td>
<td>0</td>
<td>452</td>
</tr>
<tr>
<td>ImarisReader</td>
<td>32</td>
<td>0</td>
<td>0</td>
<td>443</td>
</tr>
<tr>
<td>ImarisTiffReader</td>
<td>23</td>
<td>0</td>
<td>0</td>
<td>452</td>
</tr>
<tr>
<td>ImprovementTiffReader</td>
<td>25</td>
<td>0</td>
<td>0</td>
<td>450</td>
</tr>
<tr>
<td>InspectorReader</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>456</td>
</tr>
<tr>
<td>InCell3000Reader</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>456</td>
</tr>
<tr>
<td>InCellReader</td>
<td>67</td>
<td>0</td>
<td>0</td>
<td>408</td>
</tr>
<tr>
<td>InveonReader</td>
<td>30</td>
<td>0</td>
<td>0</td>
<td>445</td>
</tr>
<tr>
<td>IvisionReader</td>
<td>34</td>
<td>0</td>
<td>0</td>
<td>441</td>
</tr>
<tr>
<td>JEOLReader</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>456</td>
</tr>
<tr>
<td>JPEG2000Reader</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>456</td>
</tr>
<tr>
<td>JPEGReader</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>456</td>
</tr>
<tr>
<td>JPGReader</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>456</td>
</tr>
<tr>
<td>JPKReader</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>456</td>
</tr>
<tr>
<td>JPXReader</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>456</td>
</tr>
<tr>
<td>KhorosReader</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>456</td>
</tr>
<tr>
<td>KodakReader</td>
<td>26</td>
<td>0</td>
<td>0</td>
<td>449</td>
</tr>
<tr>
<td>L2DReader</td>
<td>29</td>
<td>0</td>
<td>0</td>
<td>446</td>
</tr>
<tr>
<td>LEOReader</td>
<td>27</td>
<td>0</td>
<td>0</td>
<td>448</td>
</tr>
<tr>
<td>LIFReader</td>
<td>85</td>
<td>0</td>
<td>0</td>
<td>390</td>
</tr>
<tr>
<td>LIMReader</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>456</td>
</tr>
<tr>
<td>LegacyND2Reader</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>456</td>
</tr>
<tr>
<td>LegacyQTRender</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>456</td>
</tr>
<tr>
<td>LeicaReader</td>
<td>56</td>
<td>0</td>
<td>0</td>
<td>419</td>
</tr>
<tr>
<td>LeicaSCNReader</td>
<td>33</td>
<td>0</td>
<td>0</td>
<td>442</td>
</tr>
<tr>
<td>LiFilmReader</td>
<td>25</td>
<td>0</td>
<td>0</td>
<td>450</td>
</tr>
<tr>
<td>MIASReader</td>
<td>64</td>
<td>0</td>
<td>0</td>
<td>411</td>
</tr>
<tr>
<td>MINCReader</td>
<td>23</td>
<td>0</td>
<td>0</td>
<td>452</td>
</tr>
<tr>
<td>MNGReader</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>456</td>
</tr>
<tr>
<td>MRCReader</td>
<td>22</td>
<td>0</td>
<td>0</td>
<td>453</td>
</tr>
<tr>
<td>MRWReader</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>456</td>
</tr>
<tr>
<td>MetamorphReader</td>
<td>43</td>
<td>0</td>
<td>0</td>
<td>432</td>
</tr>
<tr>
<td>MetamorphTiffReader</td>
<td>38</td>
<td>0</td>
<td>0</td>
<td>437</td>
</tr>
<tr>
<td>MicromanagerReader</td>
<td>38</td>
<td>0</td>
<td>0</td>
<td>437</td>
</tr>
<tr>
<td>MinimalTiffReader</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>456</td>
</tr>
<tr>
<td>MolecularImagingReader</td>
<td>21</td>
<td>0</td>
<td>0</td>
<td>454</td>
</tr>
<tr>
<td>NAFReader</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>456</td>
</tr>
<tr>
<td>ND2Reader</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>456</td>
</tr>
<tr>
<td>NDIReader</td>
<td>21</td>
<td>0</td>
<td>0</td>
<td>454</td>
</tr>
<tr>
<td>NDPISReader</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>456</td>
</tr>
<tr>
<td>NRRDReader</td>
<td>22</td>
<td>0</td>
<td>0</td>
<td>453</td>
</tr>
<tr>
<td>NativeND2Reader</td>
<td>52</td>
<td>0</td>
<td>0</td>
<td>423</td>
</tr>
<tr>
<td>NativeQTRender</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>456</td>
</tr>
<tr>
<td>NiftiReader</td>
<td>24</td>
<td>0</td>
<td>0</td>
<td>451</td>
</tr>
<tr>
<td>NikonElementsTiffReader</td>
<td>50</td>
<td>0</td>
<td>0</td>
<td>425</td>
</tr>
<tr>
<td>NikonReader</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>456</td>
</tr>
<tr>
<td>NikonTiffReader</td>
<td>47</td>
<td>0</td>
<td>0</td>
<td>428</td>
</tr>
<tr>
<td>OBFReader</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>456</td>
</tr>
</tbody>
</table>

Continued on next page
<table>
<thead>
<tr>
<th>Format</th>
<th>Supported</th>
<th>Unsupported</th>
<th>Partial</th>
<th>Unknown/Missing</th>
</tr>
</thead>
<tbody>
<tr>
<td>OMETiffReader</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>456</td>
</tr>
<tr>
<td>OMEXMLReader</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>456</td>
</tr>
<tr>
<td>OpenlabRawReader</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>456</td>
</tr>
<tr>
<td>OpenlabReader</td>
<td>32</td>
<td>0</td>
<td>0</td>
<td>443</td>
</tr>
<tr>
<td>OperettaReader</td>
<td>43</td>
<td>0</td>
<td>0</td>
<td>432</td>
</tr>
<tr>
<td>OxfordInstrumentsReader</td>
<td>22</td>
<td>0</td>
<td>0</td>
<td>453</td>
</tr>
<tr>
<td>PCIReader</td>
<td>29</td>
<td>0</td>
<td>0</td>
<td>446</td>
</tr>
<tr>
<td>PCORAWReader</td>
<td>26</td>
<td>0</td>
<td>0</td>
<td>449</td>
</tr>
<tr>
<td>PCXReader</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>456</td>
</tr>
<tr>
<td>PDSReader</td>
<td>23</td>
<td>0</td>
<td>0</td>
<td>452</td>
</tr>
<tr>
<td>PGMReader</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>456</td>
</tr>
<tr>
<td>PQBinReader</td>
<td>21</td>
<td>0</td>
<td>0</td>
<td>454</td>
</tr>
<tr>
<td>PSDReader</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>456</td>
</tr>
<tr>
<td>PerkinElmerReader</td>
<td>30</td>
<td>0</td>
<td>0</td>
<td>445</td>
</tr>
<tr>
<td>PhotoshopTiffReader</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>456</td>
</tr>
<tr>
<td>PictReader</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>456</td>
</tr>
<tr>
<td>PovrayReader</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>456</td>
</tr>
<tr>
<td>PrairieReader</td>
<td>45</td>
<td>0</td>
<td>0</td>
<td>430</td>
</tr>
<tr>
<td>PyramidTiffReader</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>456</td>
</tr>
<tr>
<td>QTReader</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>456</td>
</tr>
<tr>
<td>QuesantReader</td>
<td>22</td>
<td>0</td>
<td>0</td>
<td>453</td>
</tr>
<tr>
<td>RHKReader</td>
<td>22</td>
<td>0</td>
<td>0</td>
<td>453</td>
</tr>
<tr>
<td>SBIGReader</td>
<td>22</td>
<td>0</td>
<td>0</td>
<td>453</td>
</tr>
<tr>
<td>SDTReader</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>456</td>
</tr>
<tr>
<td>SEQReader</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>456</td>
</tr>
<tr>
<td>SIFReader</td>
<td>20</td>
<td>0</td>
<td>0</td>
<td>455</td>
</tr>
<tr>
<td>SISReader</td>
<td>33</td>
<td>0</td>
<td>0</td>
<td>442</td>
</tr>
<tr>
<td>SMCameraReader</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>456</td>
</tr>
<tr>
<td>SVSReader</td>
<td>29</td>
<td>0</td>
<td>0</td>
<td>446</td>
</tr>
<tr>
<td>ScanrReader</td>
<td>43</td>
<td>0</td>
<td>0</td>
<td>432</td>
</tr>
<tr>
<td>ScreenReader</td>
<td>34</td>
<td>0</td>
<td>0</td>
<td>441</td>
</tr>
<tr>
<td>SeikoReader</td>
<td>22</td>
<td>0</td>
<td>0</td>
<td>453</td>
</tr>
<tr>
<td>SimplePCITiffReader</td>
<td>33</td>
<td>0</td>
<td>0</td>
<td>442</td>
</tr>
<tr>
<td>SlidebookReader</td>
<td>34</td>
<td>0</td>
<td>0</td>
<td>441</td>
</tr>
<tr>
<td>SlidebookTiffReader</td>
<td>30</td>
<td>0</td>
<td>0</td>
<td>445</td>
</tr>
<tr>
<td>SpiderReader</td>
<td>21</td>
<td>0</td>
<td>0</td>
<td>454</td>
</tr>
<tr>
<td>TCSReader</td>
<td>22</td>
<td>0</td>
<td>0</td>
<td>453</td>
</tr>
<tr>
<td>TargetReader</td>
<td>20</td>
<td>0</td>
<td>0</td>
<td>455</td>
</tr>
<tr>
<td>TextReader</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>456</td>
</tr>
<tr>
<td>TiffDelegateReader</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>456</td>
</tr>
<tr>
<td>TiffJAIReader</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>456</td>
</tr>
<tr>
<td>TiffReader</td>
<td>22</td>
<td>0</td>
<td>0</td>
<td>453</td>
</tr>
<tr>
<td>TileJPEGReader</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>456</td>
</tr>
<tr>
<td>TillVisionReader</td>
<td>22</td>
<td>0</td>
<td>0</td>
<td>453</td>
</tr>
<tr>
<td>TopometrixReader</td>
<td>22</td>
<td>0</td>
<td>0</td>
<td>453</td>
</tr>
<tr>
<td>TrestleReader</td>
<td>26</td>
<td>0</td>
<td>0</td>
<td>449</td>
</tr>
<tr>
<td>UBMReader</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>456</td>
</tr>
<tr>
<td>UnisokuReader</td>
<td>22</td>
<td>0</td>
<td>0</td>
<td>453</td>
</tr>
<tr>
<td>VGSAMReader</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>456</td>
</tr>
<tr>
<td>VarianFDFReader</td>
<td>25</td>
<td>0</td>
<td>0</td>
<td>450</td>
</tr>
<tr>
<td>VisitechReader</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>456</td>
</tr>
<tr>
<td>VolocityClippingReader</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>456</td>
</tr>
<tr>
<td>VolocityReader</td>
<td>38</td>
<td>0</td>
<td>0</td>
<td>437</td>
</tr>
<tr>
<td>WATOPReader</td>
<td>22</td>
<td>0</td>
<td>0</td>
<td>453</td>
</tr>
<tr>
<td>WlzReader</td>
<td>26</td>
<td>0</td>
<td>0</td>
<td>449</td>
</tr>
<tr>
<td>ZeissCZIReader</td>
<td>158</td>
<td>0</td>
<td>0</td>
<td>317</td>
</tr>
<tr>
<td>ZeissLSMReader</td>
<td>101</td>
<td>0</td>
<td>0</td>
<td>374</td>
</tr>
<tr>
<td>ZeissTIFFReader</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>456</td>
</tr>
</tbody>
</table>

Continued on next page
19.2 Metadata fields

<table>
<thead>
<tr>
<th>Field</th>
<th>Supported</th>
<th>Unsupported</th>
<th>Partial</th>
<th>Unknown/Missing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arc - ID</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Arc - LotNumber</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>159</td>
</tr>
<tr>
<td>Arc - Manufacturer</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>159</td>
</tr>
<tr>
<td>Arc - Model</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>159</td>
</tr>
<tr>
<td>Arc - Power</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>159</td>
</tr>
<tr>
<td>Arc - SerialNumber</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>159</td>
</tr>
<tr>
<td>Arc - Type</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>BooleanAnnotation - AnnotationRef</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>BooleanAnnotation - Description</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>BooleanAnnotation - ID</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>BooleanAnnotation - Namespace</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>BooleanAnnotation - Value</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Channel - AcquisitionMode</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>156</td>
</tr>
<tr>
<td>Channel - AnnotationRef</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Channel - Color</td>
<td>8</td>
<td>0</td>
<td>0</td>
<td>152</td>
</tr>
<tr>
<td>Channel - ContrastMethod</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Channel - EmissionWavelength</td>
<td>16</td>
<td>0</td>
<td>0</td>
<td>144</td>
</tr>
<tr>
<td>Channel - ExcitationWavelength</td>
<td>17</td>
<td>0</td>
<td>0</td>
<td>143</td>
</tr>
<tr>
<td>Channel - FilterSetRef</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>159</td>
</tr>
<tr>
<td>Channel - Fluor</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>159</td>
</tr>
<tr>
<td>Channel - ID</td>
<td>160</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Continued on next page

<table>
<thead>
<tr>
<th>Field</th>
<th>Supported</th>
<th>Unsupported</th>
<th>Partial</th>
<th>Unknown/Missing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Channel - IlluminationType</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>157</td>
</tr>
<tr>
<td>Channel - LightSourceSettingsAttenuation</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>159</td>
</tr>
<tr>
<td>Channel - LightSourceSettingsID</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>155</td>
</tr>
<tr>
<td>Channel - LightSourceSettingsWaveLength</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>158</td>
</tr>
<tr>
<td>Channel - NDFilter</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>158</td>
</tr>
<tr>
<td>Channel - Name</td>
<td>31</td>
<td>0</td>
<td>0</td>
<td>129</td>
</tr>
<tr>
<td>Channel - PinholeSize</td>
<td>10</td>
<td>0</td>
<td>0</td>
<td>150</td>
</tr>
<tr>
<td>Channel - PockelCellSetting</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Channel - SamplesPerPixel</td>
<td>160</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>CommentAnnotation</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>CommentAnnotation - AnnotationRef</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>CommentAnnotation - Description</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>CommentAnnotation - ID</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>CommentAnnotation - Namespace</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Dataset - AnnotationRef</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Dataset - Description</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Dataset - ExperimenterGroupRef</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Dataset - ExperimenterRef</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Dataset - ID</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Dataset - ImageRef</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Dataset - Name</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
</tbody>
</table>

Continued on next page

22http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_IlluminationType
23http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#LightSourceSettings_Attenuation
26http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_NDFilter
27http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_Name
29http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_PockelCellSetting
30http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
31http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SA_xsd.html#AnnotationRef_ID
32http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SA_xsd.html#Annotation_Description
33http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SA_xsd.html#Annotation_Namespace
34http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SA_xsd.html#Annotation_Value
35http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SA_xsd.html#ExperimenterGroupRef_ID
36http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SA_xsd.html#ExperimenterRef_ID
37http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SA_xsd.html#Dataset_Description
40http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SA_xsd.html#Dataset_Name

19.2. Metadata fields
<table>
<thead>
<tr>
<th>Field</th>
<th>Supported</th>
<th>Unsupported</th>
<th>Partial</th>
<th>Unknown/Missing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detector-AmplificationGain43</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>158</td>
</tr>
<tr>
<td>Detector-Gain</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>155</td>
</tr>
<tr>
<td>Detector-ID45</td>
<td>34</td>
<td>0</td>
<td>0</td>
<td>126</td>
</tr>
<tr>
<td>Detector-LotNumber46</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>159</td>
</tr>
<tr>
<td>Detector-Manufacturer47</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>156</td>
</tr>
<tr>
<td>Detector-Model48</td>
<td>13</td>
<td>0</td>
<td>0</td>
<td>147</td>
</tr>
<tr>
<td>Detector-Offset59</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>155</td>
</tr>
<tr>
<td>Detector-SerialNumber50</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>157</td>
</tr>
<tr>
<td>Detector-Type51</td>
<td>27</td>
<td>0</td>
<td>0</td>
<td>133</td>
</tr>
<tr>
<td>Detector-Voltage52</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>158</td>
</tr>
<tr>
<td>Detector-Zoom53</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>156</td>
</tr>
<tr>
<td>DetectorSettings-Binning54</td>
<td>17</td>
<td>0</td>
<td>0</td>
<td>143</td>
</tr>
<tr>
<td>DetectorSettings-Gain55</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>141</td>
</tr>
<tr>
<td>DetectorSettings-Id56</td>
<td>32</td>
<td>0</td>
<td>0</td>
<td>128</td>
</tr>
<tr>
<td>DetectorSettings-Offset57</td>
<td>8</td>
<td>0</td>
<td>0</td>
<td>152</td>
</tr>
<tr>
<td>DetectorSettings-ReadOutRate58</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>155</td>
</tr>
<tr>
<td>DetectorSettings-Voltage59</td>
<td>6</td>
<td>0</td>
<td>0</td>
<td>154</td>
</tr>
<tr>
<td>Dichroic-ID60</td>
<td>6</td>
<td>0</td>
<td>0</td>
<td>154</td>
</tr>
<tr>
<td>Dichroic-LotNumber61</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>159</td>
</tr>
<tr>
<td>Dichroic-Manufacturer62</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>159</td>
</tr>
<tr>
<td>Dichroic-Model63</td>
<td>6</td>
<td>0</td>
<td>0</td>
<td>154</td>
</tr>
<tr>
<td>Dichroic-SerialNumber64</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>159</td>
</tr>
<tr>
<td>DoubleAnnotation-AnnotationRef65</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
</tbody>
</table>

Continued on next page

43 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_AmplificationGain
44 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_Gain
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
48 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_Model
49 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_Offset
50 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_SerialNumber
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
56 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_ID
57 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_Offset
58 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_ReadOutRate
59 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_Voltage
60 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_LotNumber
61 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_Model
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
<table>
<thead>
<tr>
<th>Field</th>
<th>Supported</th>
<th>Unsupported</th>
<th>Partial</th>
<th>Unknown/Missing</th>
</tr>
</thead>
<tbody>
<tr>
<td>DoubleAnnotation - Description</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>DoubleAnnotation - ID</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>DoubleAnnotation - Namespace</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>DoubleAnnotation - Value</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Ellipse - FillColor</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Ellipse - FillRule</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Ellipse - FontFamily</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Ellipse - FontSize</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>158</td>
</tr>
<tr>
<td>Ellipse - FontStyle</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Ellipse - ID</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>155</td>
</tr>
<tr>
<td>Ellipse - LineCap</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Ellipse - Locked</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Ellipse - RadiusX</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>155</td>
</tr>
<tr>
<td>Ellipse - RadiusY</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>155</td>
</tr>
<tr>
<td>Ellipse - StrokeColor</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Ellipse - StrokeDashArray</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Ellipse - StrokeWidth</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>158</td>
</tr>
<tr>
<td>Ellipse - Text</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>157</td>
</tr>
<tr>
<td>Ellipse - TheC</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Ellipse - TheT</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>158</td>
</tr>
<tr>
<td>Ellipse - TheZ</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>158</td>
</tr>
<tr>
<td>Ellipse - Transform</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>158</td>
</tr>
<tr>
<td>Ellipse - Visible</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Ellipse - X</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>155</td>
</tr>
<tr>
<td>Ellipse - Y</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>155</td>
</tr>
<tr>
<td>Experiment - Description</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>159</td>
</tr>
</tbody>
</table>

**Continued on next page**

70. [http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_FillColor](http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_FillColor)
73. [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_FontSize)
74. [http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_FontStyle](http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_FontStyle)
82. [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_StrokeWidth)
84. [http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_TheC](http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_TheC)
85. [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_TheT)
86. [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)
## Table 19.2 – continued from previous page

<table>
<thead>
<tr>
<th>Field</th>
<th>Supported</th>
<th>Unsupported</th>
<th>Partial</th>
<th>Unknown/Missing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experiment-ExperimenterRef&lt;sup&gt;92&lt;/sup&gt;</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Experiment-ID&lt;sup&gt;93&lt;/sup&gt;</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>155</td>
</tr>
<tr>
<td>Experiment-Type&lt;sup&gt;94&lt;/sup&gt;</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>155</td>
</tr>
<tr>
<td>Experimenter-AnnotationRef&lt;sup&gt;95&lt;/sup&gt;</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Experimenter-Email&lt;sup&gt;96&lt;/sup&gt;</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>158</td>
</tr>
<tr>
<td>Experimenter-FirstName&lt;sup&gt;97&lt;/sup&gt;</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>155</td>
</tr>
<tr>
<td>Experimenter-ID&lt;sup&gt;98&lt;/sup&gt;</td>
<td>11</td>
<td>0</td>
<td>0</td>
<td>149</td>
</tr>
<tr>
<td>Experimenter-Institution&lt;sup&gt;99&lt;/sup&gt;</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>156</td>
</tr>
<tr>
<td>Experimenter-LastName&lt;sup&gt;100&lt;/sup&gt;</td>
<td>9</td>
<td>0</td>
<td>0</td>
<td>151</td>
</tr>
<tr>
<td>Experimenter-MiddleName&lt;sup&gt;101&lt;/sup&gt;</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>159</td>
</tr>
<tr>
<td>Experimenter-Email&lt;sup&gt;102&lt;/sup&gt;</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>157</td>
</tr>
<tr>
<td>Experimenter-AnnotationRef&lt;sup&gt;103&lt;/sup&gt;</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>ExperimenterGroup-Description&lt;sup&gt;104&lt;/sup&gt;</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>ExperimenterGroup-ExperimenterRef&lt;sup&gt;105&lt;/sup&gt;</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>ExperimenterGroup-ID&lt;sup&gt;106&lt;/sup&gt;</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>ExperimenterGroup-Leader&lt;sup&gt;107&lt;/sup&gt;</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>ExperimenterGroup-Name&lt;sup&gt;108&lt;/sup&gt;</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Filament-ID&lt;sup&gt;109&lt;/sup&gt;</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Filament-LotNumber&lt;sup&gt;110&lt;/sup&gt;</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>159</td>
</tr>
<tr>
<td>Filament-Manufacturer&lt;sup&gt;111&lt;/sup&gt;</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>159</td>
</tr>
<tr>
<td>Filament-Model&lt;sup&gt;112&lt;/sup&gt;</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>159</td>
</tr>
<tr>
<td>Filament-Power&lt;sup&gt;113&lt;/sup&gt;</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>159</td>
</tr>
</tbody>
</table>

Continued on next page

<sup>92</sup>http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ExperimenterRef_ID

<sup>93</sup>http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Experiment_ID

<sup>94</sup>http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Experiment_Type

<sup>95</sup>http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SA_xsd.html#AnnotationRef_ID

<sup>96</sup>http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Experimenter_Email

<sup>97</sup>http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Experimenter_FirstName

<sup>98</sup>http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Experimenter_ID

<sup>99</sup>http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Experimenter_Institution

<sup>100</sup>http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Experimenter_LastName

<sup>101</sup>http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Experimenter_MiddleName

<sup>102</sup>http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Experimenter_UserName

<sup>103</sup>http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SA_xsd.html#AnnotationRef_ID

<sup>104</sup>http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ExperimenterGroup_Description

<sup>105</sup>http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ExperimenterGroup_ID

<sup>106</sup>http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Leader_ID

<sup>107</sup>http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ExperimenterGroup_Name

<sup>108</sup>http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#LightSource_ID

<sup>109</sup>http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_LotNumber

<sup>110</sup>http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_Manufacturer

<sup>111</sup>http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_Model

<sup>112</sup>http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#LightSource_Power
Table 19.2 – continued from previous page

<table>
<thead>
<tr>
<th>Field</th>
<th>Supported</th>
<th>Unsupported</th>
<th>Partial</th>
<th>Unknown/Missing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Filament - Serial-Number</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>159</td>
</tr>
<tr>
<td>Filament - Type</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>FileAnnotation - AnnotationRef</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>FileAnnotation - Description</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>FileAnnotation - ID</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>FileAnnotation - Namespace</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Filter - Filter-Wheel</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>158</td>
</tr>
<tr>
<td>Filter - ID</td>
<td>8</td>
<td>0</td>
<td>0</td>
<td>152</td>
</tr>
<tr>
<td>Filter - LotNumber</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>159</td>
</tr>
<tr>
<td>Filter - Manufacturer</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>159</td>
</tr>
<tr>
<td>Filter - Model</td>
<td>8</td>
<td>0</td>
<td>0</td>
<td>152</td>
</tr>
<tr>
<td>Filter - SerialNumber</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>159</td>
</tr>
<tr>
<td>Filter - Type</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>158</td>
</tr>
<tr>
<td>FilterSet - DichroicRef</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>158</td>
</tr>
<tr>
<td>FilterSet - EmissionFilterRef</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>158</td>
</tr>
<tr>
<td>FilterSet - ExcitationFilterRef</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>158</td>
</tr>
<tr>
<td>FilterSet - ID</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>158</td>
</tr>
<tr>
<td>FilterSet - LotNumber</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>159</td>
</tr>
<tr>
<td>FilterSet - Manufacturer</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>159</td>
</tr>
<tr>
<td>FilterSet - Model</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>158</td>
</tr>
<tr>
<td>FilterSet - SerialNumber</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>159</td>
</tr>
<tr>
<td>Image - AcquisitionDate</td>
<td>160</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Continued on next page

114 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_SerialNumber
115 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Filament_Type
116 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SA_xsd.html#AnnotationRef_ID
117 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SA_xsd.html#Annotation_Description
118 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SA_xsd.html#Annotation_ID
119 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SA_xsd.html#Annotation_Namespace
120 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Filter_FilterWheel
121 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Filter_ID
122 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_LotNumber
123 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_Manufacturer
124 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_Model
125 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_SerialNumber
126 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Filter_Type
127 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DichroicRef_ID
128 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#FilterRef_ID
129 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#FilterRef_ID
130 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_LotNumber
131 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_Manufacturer
132 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_Model
133 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_SerialNumber
134 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
<table>
<thead>
<tr>
<th>Field</th>
<th>Supported</th>
<th>Unsupported</th>
<th>Partial</th>
<th>Unknown/Missing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Image - Annotation-Ref[^136]</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Image - Description[^137]</td>
<td>43</td>
<td>0</td>
<td>0</td>
<td>117</td>
</tr>
<tr>
<td>Image - ExperimenterRef[^138]</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>158</td>
</tr>
<tr>
<td>Image - ExperimenterGroupRef[^139]</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Image - ExperimenterRef[^140]</td>
<td>6</td>
<td>0</td>
<td>0</td>
<td>154</td>
</tr>
<tr>
<td>Image - ID[^141]</td>
<td>160</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Image - InstrumentRef[^142]</td>
<td>43</td>
<td>0</td>
<td>0</td>
<td>117</td>
</tr>
<tr>
<td>Image - Microbeam-ManipulationRef[^143]</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Image - Name[^144]</td>
<td>160</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Image - ROIRef[^145]</td>
<td>11</td>
<td>0</td>
<td>0</td>
<td>149</td>
</tr>
<tr>
<td>ImagingEnvironment - AirPressure[^146]</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>159</td>
</tr>
<tr>
<td>ImagingEnvironment - CO2Percent[^147]</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>159</td>
</tr>
<tr>
<td>ImagingEnvironment - Humidity[^148]</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>159</td>
</tr>
<tr>
<td>ImagingEnvironment - Temperature[^149]</td>
<td>10</td>
<td>0</td>
<td>0</td>
<td>150</td>
</tr>
<tr>
<td>Instrument - ID[^150]</td>
<td>48</td>
<td>0</td>
<td>0</td>
<td>112</td>
</tr>
<tr>
<td>Label - FillColor[^151]</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Label - FillRule[^152]</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Label - FontFamily[^153]</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Label - FontSize[^154]</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>158</td>
</tr>
<tr>
<td>Label - FontStyle[^155]</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Label - ID[^156]</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>157</td>
</tr>
<tr>
<td>Label - LineCap[^157]</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Label - Locked[^158]</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Label - StrokeColor[^159]</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
</tbody>
</table>

\[^136\]\(^\text{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SA_xsd.html#AnnotationRef_ID}\)
\[^137\]\(^\text{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Description}\)
\[^138\]\(^\text{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Ref_ID}\)
\[^139\]\(^\text{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ExperimenterGroupRef_ID}\)
\[^140\]\(^\text{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ExperimenterRef_ID}\)
\[^141\]\(^\text{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID}\)
\[^142\]\(^\text{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#InstrumentRef_ID}\)
\[^143\]\(^\text{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#MicrobeamManipulationRef_ID}\)
\[^144\]\(^\text{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name}\)
\[^145\]\(^\text{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROIs_xsd.html#ROIRef_ID}\)
\[^146\]\(^\text{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROIs_xsd.html#ImagingEnvironment_AirPressure}\)
\[^147\]\(^\text{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROIs_xsd.html#ImagingEnvironment_CO2Percent}\)
\[^148\]\(^\text{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROIs_xsd.html#ImagingEnvironment_Humidity}\)
\[^149\]\(^\text{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROIs_xsd.html#ImagingEnvironment_Temperature}\)
\[^150\]\(^\text{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROIs_xsd.html#Instrument_ID}\)
\[^151\]\(^\text{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROIs_xsd.html#Shape_FillColor}\)
\[^152\]\(^\text{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROIs_xsd.html#Shape_FillRule}\)
\[^153\]\(^\text{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROIs_xsd.html#Shape_FontFamily}\)
\[^154\]\(^\text{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROIs_xsd.html#Shape_FontSize}\)
\[^155\]\(^\text{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROIs_xsd.html#Shape_FontStyle}\)
\[^156\]\(^\text{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROIs_xsd.html#Shape_ID}\)
\[^157\]\(^\text{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROIs_xsd.html#Shape_LineCap}\)
\[^158\]\(^\text{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROIs_xsd.html#Shape_Locked}\)
\[^159\]\(^\text{http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROIs_xsd.html#Shape_StrokColor}\)
### Table 19.2 – continued from previous page

<table>
<thead>
<tr>
<th>Field</th>
<th>Supported</th>
<th>Unsupported</th>
<th>Partial</th>
<th>Unknown/Missing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Label - StrokeDashArray</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Label - StrokeWidth</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>158</td>
</tr>
<tr>
<td>Label - Text</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>157</td>
</tr>
<tr>
<td>Label - TheC</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Label - TheT</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Label - TheZ</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Label - Transform</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Label - Visible</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Label - X</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>157</td>
</tr>
<tr>
<td>Label - Y</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>157</td>
</tr>
<tr>
<td>Laser - Frequency-Multiplication</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Laser - ID</td>
<td>9</td>
<td>0</td>
<td>0</td>
<td>151</td>
</tr>
<tr>
<td>Laser - Laser-Medium</td>
<td>8</td>
<td>0</td>
<td>0</td>
<td>152</td>
</tr>
<tr>
<td>Laser - LotNumber</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>159</td>
</tr>
<tr>
<td>Laser - Manufacturer</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>158</td>
</tr>
<tr>
<td>Laser - Model</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>156</td>
</tr>
<tr>
<td>Laser - PockelCell</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Laser - Power</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>157</td>
</tr>
<tr>
<td>Laser - Pulse</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Laser - Pump</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Laser - Repetition-Rate</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>159</td>
</tr>
<tr>
<td>Laser - SerialNumber</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>159</td>
</tr>
<tr>
<td>Laser - Tunable</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Laser - Type</td>
<td>8</td>
<td>0</td>
<td>0</td>
<td>152</td>
</tr>
<tr>
<td>Laser - Wavelength</td>
<td>7</td>
<td>0</td>
<td>0</td>
<td>153</td>
</tr>
<tr>
<td>LightEmittingDiode - ID</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
</tbody>
</table>

Continued on next page

---

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
165 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_TheZ
166 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_Transform
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
<table>
<thead>
<tr>
<th>Field</th>
<th>Supported</th>
<th>Unsupported</th>
<th>Partial</th>
<th>Unknown/Missing</th>
</tr>
</thead>
<tbody>
<tr>
<td>LightEmittingDiode - LotNumber</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>159</td>
</tr>
<tr>
<td>LightEmittingDiode - Manufacturer</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>159</td>
</tr>
<tr>
<td>LightEmittingDiode - Model</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>159</td>
</tr>
<tr>
<td>LightEmittingDiode - Power</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>159</td>
</tr>
<tr>
<td>LightEmittingDiode - SerialNumber</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>159</td>
</tr>
<tr>
<td>LightPath - DichroicRef</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>157</td>
</tr>
<tr>
<td>LightPath - EmissionFilterRef</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>155</td>
</tr>
<tr>
<td>LightPath - ExcitationFilterRef</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>159</td>
</tr>
<tr>
<td>Line - FillColor</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Line - FillRule</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Line - FontFamily</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>158</td>
</tr>
<tr>
<td>Line - FontStyle</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Line - ID</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>155</td>
</tr>
<tr>
<td>Line - LineCap</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Line - Locked</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Line - MarkerEnd</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Line - MarkerStart</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Line - StrokeColor</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Line - StrokeDashArray</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Line - StrokeWidth</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>158</td>
</tr>
<tr>
<td>Line - Text</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>158</td>
</tr>
<tr>
<td>Line - TheC</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Line - TheT</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>159</td>
</tr>
<tr>
<td>Line - TheZ</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>159</td>
</tr>
<tr>
<td>Line - Transform</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>159</td>
</tr>
</tbody>
</table>

Continued on next page
<table>
<thead>
<tr>
<th>Field</th>
<th>Supported</th>
<th>Unsupported</th>
<th>Partial</th>
<th>Unknown/Missing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line - Visible</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Line - X1</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>155</td>
</tr>
<tr>
<td>Line - X2</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>155</td>
</tr>
<tr>
<td>Line - Y1</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>155</td>
</tr>
<tr>
<td>Line - Y2</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>155</td>
</tr>
<tr>
<td>ListAnnotation - AnnotationRef</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>ListAnnotation - Description</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>ListAnnotation - ID</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>ListAnnotation - Namespace</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>ListAnnotation - AnnotationRef</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>ListAnnotation - Description</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>ListAnnotation - ID</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>ListAnnotation - Namespace</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>ListAnnotation - Value</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Mask - FillColor</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>159</td>
</tr>
<tr>
<td>Mask - FillRule</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Mask - FontFamily</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Mask - FontSize</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>158</td>
</tr>
<tr>
<td>Mask - ID</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>158</td>
</tr>
<tr>
<td>Mask - LineCap</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Mask - Locked</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Mask - StrokeColor</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>159</td>
</tr>
<tr>
<td>Mask - StrokeDashArray</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
</tbody>
</table>

Continued on next page

212 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_Visible
213 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Line_X1
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
218 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SA_xsd.html#Annotation_Description
219 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SA_xsd.html#Annotation_ID
220 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SA_xsd.html#Annotation_Namespace
221 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SA_xsd.html#AnnotationRef_ID
222 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SA_xsd.html#Annotation_Description
223 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SA_xsd.html#Annotation_ID
224 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SA_xsd.html#Annotation_Namespace
225 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SA_xsd.html#LongAnnotation_Value
226 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SA_xsd.html#Shape_FillColor
227 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SA_xsd.html#Shape_FillRule
228 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SA_xsd.html#Shape_FontFamily
229 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SA_xsd.html#Shape_FontSize
230 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SA_xsd.html#Shape_ID
231 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SA_xsd.html#Shape_LineCap
232 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SA_xsd.html#ShapeLocked
233 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SA_xsd.html#ShapeLocked
234 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SA_xsd.html#ShapeStrokeColor
235 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#ShapeStrokeDashArray

19.2. Metadata fields
<table>
<thead>
<tr>
<th>Field</th>
<th>Supported</th>
<th>Unsupported</th>
<th>Partial</th>
<th>Unknown/Missing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mask</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>StrokeWidth236</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Mask - Text237</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Mask - TheC238</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Mask - TheT239</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Mask - TheZ240</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Mask - Transform241</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Mask - Visible242</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Mask - Width243</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>158</td>
</tr>
<tr>
<td>Mask - X244</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>158</td>
</tr>
<tr>
<td>Mask - Y245</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>158</td>
</tr>
<tr>
<td>MicrobeamManipulation - ExperimenterRef246</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>MicrobeamManipulation - ID247</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>MicrobeamManipulation - ROIRef248</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>MicrobeamManipulation - Type249</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>MicrobeamManipulationLightSourceSettings - Attenuation250</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>MicrobeamManipulationLightSourceSettings - ID251</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Microscope - Lot-Number253</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>159</td>
</tr>
<tr>
<td>Microscope - Manufacturer254</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>158</td>
</tr>
<tr>
<td>Microscope - Model255</td>
<td>11</td>
<td>0</td>
<td>0</td>
<td>149</td>
</tr>
<tr>
<td>Microscope - Serial-Number256</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>156</td>
</tr>
<tr>
<td>Microscope - Type257</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>157</td>
</tr>
<tr>
<td>Objective - CalibratedMagnification258</td>
<td>9</td>
<td>0</td>
<td>0</td>
<td>151</td>
</tr>
<tr>
<td>Objective - Correction259</td>
<td>25</td>
<td>0</td>
<td>0</td>
<td>135</td>
</tr>
</tbody>
</table>

Continued on next page
Table 19.2 – continued from previous page

<table>
<thead>
<tr>
<th>Field</th>
<th>Supported</th>
<th>Unsupported</th>
<th>Partial</th>
<th>Unknown/Missing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objective-ID</td>
<td>260</td>
<td>33</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Objective - Immer- sion</td>
<td>261</td>
<td>26</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Objective - Iris</td>
<td>262</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Objective - LensNA</td>
<td>263</td>
<td>19</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Objective - LotNumber</td>
<td>264</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Objective - Manufacturer</td>
<td>265</td>
<td>5</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Objective - Model</td>
<td>266</td>
<td>12</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Objective - Nominal-Magnification</td>
<td>267</td>
<td>25</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Objective - Serial-Number</td>
<td>268</td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Objective - WorkingDistance</td>
<td>269</td>
<td>9</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>ObjectiveSettings - CorrectionCollar</td>
<td>270</td>
<td>28</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>ObjectiveSettings - ID</td>
<td>271</td>
<td>28</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>ObjectiveSettings - Medium</td>
<td>272</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>ObjectiveSettings - RefractiveIndex</td>
<td>273</td>
<td>7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Pixels - AnnotationRef</td>
<td>274</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Pixels - BigEndian</td>
<td>275</td>
<td>160</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Pixels - DimensionOrder</td>
<td>276</td>
<td>160</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Pixels - ID</td>
<td>277</td>
<td>160</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Pixels - Interleaved</td>
<td>278</td>
<td>85</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Pixels - PhysicalSizeX</td>
<td>279</td>
<td>85</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Pixels - PhysicalSizeY</td>
<td>280</td>
<td>42</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Continued on next page

260 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_ID
261 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_Immersion
262 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_Iris
263 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_LensNA
264 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_LotNumber
265 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_Manufacturer
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#Objective_NominalMagnification
268 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ObjectiveSpec_SerialNumber
269 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_WorkingDistance
270 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ObjectiveSettings_CorrectionCollar
271 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ObjectiveSettings_ID
272 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ObjectiveSettings_Medium
273 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ObjectiveSettings_RefractiveIndex
274 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SA_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
277 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
278 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
280 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
<table>
<thead>
<tr>
<th>Field</th>
<th>Supported</th>
<th>Unsupported</th>
<th>Partial</th>
<th>Unknown/Missing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pixels - Significant Bits</td>
<td>160</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Pixels - SizeC</td>
<td>160</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Pixels - SizeT</td>
<td>160</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Pixels - SizeX</td>
<td>160</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Pixels - SizeY</td>
<td>160</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Pixels - SizeZ</td>
<td>160</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Pixels - TimeIncrement</td>
<td>16</td>
<td>0</td>
<td>0</td>
<td>144</td>
</tr>
<tr>
<td>Pixels - Type</td>
<td>160</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Plane - AnnotationRef</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Plane - DeltaT</td>
<td>24</td>
<td>0</td>
<td>0</td>
<td>136</td>
</tr>
<tr>
<td>Plane - ExposureTime</td>
<td>30</td>
<td>0</td>
<td>0</td>
<td>130</td>
</tr>
<tr>
<td>Plane - HashSHA1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Plane - PositionX</td>
<td>27</td>
<td>0</td>
<td>0</td>
<td>133</td>
</tr>
<tr>
<td>Plane - PositionY</td>
<td>27</td>
<td>0</td>
<td>0</td>
<td>133</td>
</tr>
<tr>
<td>Plane - PositionZ</td>
<td>21</td>
<td>0</td>
<td>0</td>
<td>139</td>
</tr>
<tr>
<td>Plane - TheC</td>
<td>160</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Plane - TheT</td>
<td>160</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Plane - TheZ</td>
<td>160</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Plate - AnnotationRef</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Plate - ColumnNamingConvention</td>
<td>8</td>
<td>0</td>
<td>0</td>
<td>152</td>
</tr>
<tr>
<td>Plate - Columns</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>156</td>
</tr>
<tr>
<td>Plate - Description</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>158</td>
</tr>
<tr>
<td>Plate - ExternalIdenti-</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>157</td>
</tr>
<tr>
<td>fiers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plate - ID</td>
<td>10</td>
<td>0</td>
<td>0</td>
<td>150</td>
</tr>
<tr>
<td>Plate - Name</td>
<td>9</td>
<td>0</td>
<td>0</td>
<td>151</td>
</tr>
<tr>
<td>Plate - RowNamingConven-</td>
<td>8</td>
<td>0</td>
<td>0</td>
<td>152</td>
</tr>
</tbody>
</table>

Continued on next page
<table>
<thead>
<tr>
<th>Field</th>
<th>Supported</th>
<th>Unsupported</th>
<th>Partial</th>
<th>Unknown/Missing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plate - Rows</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>156</td>
</tr>
<tr>
<td>Plate - Status</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Plate - WellOriginX</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>159</td>
</tr>
<tr>
<td>Plate - WellOriginY</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>159</td>
</tr>
<tr>
<td>Plate Acquisition - AnnotationRef</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Plate Acquisition - Description</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Plate Acquisition - EndTime</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>158</td>
</tr>
<tr>
<td>Plate Acquisition - ID</td>
<td>8</td>
<td>0</td>
<td>0</td>
<td>152</td>
</tr>
<tr>
<td>Plate Acquisition - MaximumFieldCount</td>
<td>8</td>
<td>0</td>
<td>0</td>
<td>152</td>
</tr>
<tr>
<td>Plate Acquisition - Name</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Plate Acquisition - StartTime</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>157</td>
</tr>
<tr>
<td>Plate Acquisition - WellSampleRef</td>
<td>7</td>
<td>0</td>
<td>0</td>
<td>153</td>
</tr>
<tr>
<td>Point - FillColor</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Point - FillRule</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Point - FontFamily</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Point - FontSize</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>159</td>
</tr>
<tr>
<td>Point - FontStyle</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Point - ID</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>157</td>
</tr>
<tr>
<td>Point - LineCap</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Point - Locked</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Point - StrokeColor</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>159</td>
</tr>
<tr>
<td>Point - StrokeDashArray</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>159</td>
</tr>
<tr>
<td>Point - StrokeWidth</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>158</td>
</tr>
<tr>
<td>Point - Text</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>159</td>
</tr>
</tbody>
</table>

Note: The table continues on the next page.

---

308: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Plate_Rows
309: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Plate_Status
311: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Plate_WellOriginY
312: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#AnnotationRef_ID
313: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#PlateAcquisition_Description
314: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#PlateAcquisition_EndTime
315: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#PlateAcquisition_ID
316: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#PlateAcquisition_MaximumFieldCount
317: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#PlateAcquisition_Name
318: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#PlateAcquisition_StartTime
319: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_LineCap
320: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_FillColor
321: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_FillRule
322: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_FontFamily
323: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_FontSize
324: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_FontStyle
325: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_ID
326: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_StrokeDashArray
327: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_StrokeWidth
328: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_StrokeColor
329: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_Text

---

19.2. Metadata fields

217
<table>
<thead>
<tr>
<th>Field</th>
<th>Supported</th>
<th>Unsupported</th>
<th>Partial</th>
<th>Unknown/Missing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Point - TheC(^{332})</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Point - TheT(^{333})</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>159</td>
</tr>
<tr>
<td>Point - TheZ(^{334})</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>158</td>
</tr>
<tr>
<td>Point - Transform(^{335})</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Point - Visible(^{336})</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Point - X(^{337})</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>157</td>
</tr>
<tr>
<td>Point - Y(^{338})</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>157</td>
</tr>
<tr>
<td>Polygon - Fill-Color(^{339})</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Polygon - FillRule(^{340})</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Polygon - FontFamily(^{341})</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>158</td>
</tr>
<tr>
<td>Polygon - Font-Size(^{342})</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Polygon - FontStyle(^{343})</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Polygon - ID(^{344})</td>
<td>7</td>
<td>0</td>
<td>0</td>
<td>153</td>
</tr>
<tr>
<td>Polygon - LineCap(^{345})</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Polygon - Locked(^{346})</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Polygon - Points(^{347})</td>
<td>7</td>
<td>0</td>
<td>0</td>
<td>153</td>
</tr>
<tr>
<td>Polygon - StrokeColor(^{348})</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>159</td>
</tr>
<tr>
<td>Polygon - StrokeDashArray(^{349})</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>159</td>
</tr>
<tr>
<td>Polygon - StrokeWidth(^{350})</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>157</td>
</tr>
<tr>
<td>Polygon - Text(^{351})</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>158</td>
</tr>
<tr>
<td>Polygon - TheC(^{352})</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Polygon - TheT(^{353})</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>159</td>
</tr>
<tr>
<td>Polygon - TheZ(^{354})</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>158</td>
</tr>
<tr>
<td>Polygon - Transform(^{355})</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>159</td>
</tr>
<tr>
<td>Polygon - Visible(^{356})</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Polylime - Fill-Color(^{357})</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
</tbody>
</table>

Continued on next page

---

332\[http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_TheC\]
333\[http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_TheT\]
334\[http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_TheZ\]
335\[http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_Transform\]
336\[http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_Visible\]
337\[http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Point_X\]
338\[http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Point_Y\]
339\[http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_FillColor\]
340\[http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_FillRule\]
341\[http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_FontFamily\]
342\[http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_FontSize\]
343\[http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_FontStyle\]
344\[http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_ID\]
345\[http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_LineCap\]
346\[http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_Locked\]
347\[http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Polygon_Points\]
348\[http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_StrokeDashArray\]
349\[http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_StrokeWidth\]
350\[http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_Text\]
351\[http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_TheC\]
352\[http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_TheT\]
353\[http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_TheZ\]
354\[http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_Transform\]
355\[http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_Visible\]
356\[http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_StrokeDashArray\]
357\[http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_FillColor\]
Table 19.2 – continued from previous page

<table>
<thead>
<tr>
<th>Field</th>
<th>Supported</th>
<th>Unsupported</th>
<th>Partial</th>
<th>Unknown/Missing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polyline - FillRule</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Polyline - FontFamily</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Polyline - FontSize</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>158</td>
</tr>
<tr>
<td>Polyline - FontStyle</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Polyline - ID</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>155</td>
</tr>
<tr>
<td>Polyline - LineCap</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Polyline - Locked</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Polyline - MarkerEnd</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Polyline - MarkerStart</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>155</td>
</tr>
<tr>
<td>Polyline - Points</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>159</td>
</tr>
<tr>
<td>Polyline - StrokeColor</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>159</td>
</tr>
<tr>
<td>Polyline - StrokeDashArray</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>157</td>
</tr>
<tr>
<td>Polyline - Text</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>158</td>
</tr>
<tr>
<td>Polyline - TheC</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Polyline - TheT</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>159</td>
</tr>
<tr>
<td>Polyline - TheZ</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>158</td>
</tr>
<tr>
<td>Polyline - Transform</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>159</td>
</tr>
<tr>
<td>Polyline - Visible</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Project - AnnotationRef</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Project - DatasetRef</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Project - Description</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Project - ExperimenterGroupRef</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Project - ExperimenterRef</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
</tbody>
</table>

Continued on next page

---

358 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_FillRule
359 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_FontFamily
360 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_FontSize
361 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_FontStyle
362 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_ID
363 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_LineCap
364 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_Locked
365 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Polyline_MarkerEnd
366 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Polyline_MarkerStart
367 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Polyline_Points
368 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_StrokeColor
369 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_StrokeDashArray
370 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_StrokeWidth
371 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_Text
372 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_TheC
373 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_TheT
374 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_TheZ
375 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_Transform
376 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_TheC
377 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_TheT
378 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_TheZ
379 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SA_xsd.html#AnnotationRef_ID
380 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DatasetRef_ID
381 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ExperimenterRef_ID
382 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ExperimenterGroupRef_ID
383 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ExperimenterRef_ID

19.2. Metadata fields 219
<table>
<thead>
<tr>
<th>Field</th>
<th>Supported</th>
<th>Unsupported</th>
<th>Partial</th>
<th>Unknown/Missing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project-ID</td>
<td>382</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Project-Name</td>
<td>383</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>ROI - Annotation-Ref</td>
<td>384</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>ROI - Description</td>
<td>385</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>ROI - ID</td>
<td>386</td>
<td>11</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>ROI - Name</td>
<td>387</td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>ROI - Namespace</td>
<td>388</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Reagent - AnnotationRef</td>
<td>389</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Reagent - Description</td>
<td>390</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Reagent - ID</td>
<td>391</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Reagent - Name</td>
<td>392</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Reagent - ReagentIdentifier</td>
<td>393</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Rectangle - Fill-Color</td>
<td>394</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Rectangle - Fill-Rule</td>
<td>395</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Rectangle - FontFamily</td>
<td>396</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Rectangle - Font-Size</td>
<td>397</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Rectangle - FontStyle</td>
<td>398</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Rectangle - Height</td>
<td>399</td>
<td>7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Rectangle - ID</td>
<td>400</td>
<td>7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Rectangle - LineCap</td>
<td>401</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Rectangle - Locked</td>
<td>402</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Rectangle - StrokeColor</td>
<td>403</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Rectangle - StrokeDashArray</td>
<td>404</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Rectangle - StrokeWidth</td>
<td>405</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
### Table 19.2 – continued from previous page

<table>
<thead>
<tr>
<th>Field</th>
<th>Supported</th>
<th>Unsupported</th>
<th>Partial</th>
<th>Unknown/Missing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rectangle - Text</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>158</td>
</tr>
<tr>
<td>Rectangle - TheC</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Rectangle - TheT</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>159</td>
</tr>
<tr>
<td>Rectangle - TheZ</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>159</td>
</tr>
<tr>
<td>Rectangle - Transform</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>159</td>
</tr>
<tr>
<td>Rectangle - Visible</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Rectangle - Width</td>
<td>7</td>
<td>0</td>
<td>0</td>
<td>153</td>
</tr>
<tr>
<td>Rectangle - X</td>
<td>7</td>
<td>0</td>
<td>0</td>
<td>153</td>
</tr>
<tr>
<td>Rectangle - Y</td>
<td>7</td>
<td>0</td>
<td>0</td>
<td>153</td>
</tr>
<tr>
<td>Screen - AnnotationRef</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Screen - Description</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Screen - ID</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>159</td>
</tr>
<tr>
<td>Screen - Name</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>159</td>
</tr>
<tr>
<td>Screen - PlateRef</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>159</td>
</tr>
<tr>
<td>Screen - ProtocolDescription</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Screen - ProtocolIdentifier</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Screen - ReagentSetDescription</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Screen - ReagentSetIdentifier</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Screen - Type</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>StageLabel - Name</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>157</td>
</tr>
<tr>
<td>StageLabel - X</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>158</td>
</tr>
<tr>
<td>StageLabel - Y</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>158</td>
</tr>
<tr>
<td>StageLabel - Z</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>157</td>
</tr>
<tr>
<td>TagAnnotation - AnnotationRef</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>TagAnnotation - Description</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
</tbody>
</table>

Continued on next page

---

408: [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_TheT)
409: [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)
417: [http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Screen_Description](http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Screen_Description)
422: [http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Screen_ReagentSetDescription](http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Screen_ReagentSetDescription)
424: [http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Screen_Type](http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Screen_Type)
430: [http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SA_xsd.html#Annotation_Description](http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SA_xsd.html#Annotation_Description)
<table>
<thead>
<tr>
<th>Field</th>
<th>Supported</th>
<th>Unsupported</th>
<th>Partial</th>
<th>Unknown/Missing</th>
</tr>
</thead>
<tbody>
<tr>
<td>TagAnnotation ID</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>TagAnnotation Namespace</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>TagAnnotation Value</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>TermAnnotation AnnotationRef</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>TermAnnotation Description</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>TermAnnotation ID</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>TermAnnotation Namespace</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>TermAnnotation Value</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>TiffData - FirstC</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>TiffData - FirstT</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>TiffData - FirstZ</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>TiffData - IFD</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>TiffData - PlaneCount</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>TimestampAnnotation AnnotationRef</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>TimestampAnnotation Description</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>TimestampAnnotation ID</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>TimestampAnnotation Namespace</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>TimestampAnnotation Value</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>TransmittanceRange - CutIn</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>155</td>
</tr>
<tr>
<td>TransmittanceRange - CutInTolerance</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>159</td>
</tr>
<tr>
<td>TransmittanceRange - CutOut</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>155</td>
</tr>
</tbody>
</table>

Continued on next page
### Table 19.2 – continued from previous page

<table>
<thead>
<tr>
<th>Field</th>
<th>Supported</th>
<th>Unsupported</th>
<th>Partial</th>
<th>Unknown/Missing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transmittance Range - CutOutTolerance</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>159</td>
</tr>
<tr>
<td>Transmittance Range - Transmittance</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>159</td>
</tr>
<tr>
<td>UUID - File Name</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>UUID - Value</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Well - AnnotationRef</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Well - Color</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Well - Column</td>
<td>11</td>
<td>0</td>
<td>0</td>
<td>149</td>
</tr>
<tr>
<td>Well - ExternalDescription</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Well - ExternalIdentifier</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Well - ID</td>
<td>11</td>
<td>0</td>
<td>0</td>
<td>149</td>
</tr>
<tr>
<td>Well - ReagentRef</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>Well - Row</td>
<td>11</td>
<td>0</td>
<td>0</td>
<td>149</td>
</tr>
<tr>
<td>Well - Type</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>WellSample - AnnotationRef</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>WellSample - ID</td>
<td>11</td>
<td>0</td>
<td>0</td>
<td>149</td>
</tr>
<tr>
<td>WellSample - ImageRef</td>
<td>10</td>
<td>0</td>
<td>0</td>
<td>150</td>
</tr>
<tr>
<td>WellSample - Index</td>
<td>11</td>
<td>0</td>
<td>0</td>
<td>149</td>
</tr>
<tr>
<td>WellSample - PositionX</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>155</td>
</tr>
<tr>
<td>WellSample - PositionY</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>155</td>
</tr>
<tr>
<td>WellSample - Timepoint</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>XMLAnnotation - AnnotationRef</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>XMLAnnotation - ID</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
<tr>
<td>XMLAnnotation - Namespace</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
</tbody>
</table>

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
474 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SA_xsd.html#Annotation_Namespace

19.2. Metadata fields
<table>
<thead>
<tr>
<th>Field</th>
<th>Supported</th>
<th>Unsupported</th>
<th>Partial</th>
<th>Unknown/Missing</th>
</tr>
</thead>
<tbody>
<tr>
<td>XMLAnnotation Value</td>
<td>-</td>
<td>0</td>
<td>0</td>
<td>160</td>
</tr>
</tbody>
</table>

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[^76]. 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[^77]
- Channel : NDFilter[^78]
- Channel : Name[^79]
- Channel : SamplesPerPixel[^80]
- Image : AcquisitionDate[^81]
- Image : Description[^82]
- Image : ID[^83]
- Image : InstrumentRef[^84]
- Image : Name[^85]
- Instrument : ID[^86]
- Objective : Correction[^87]
- Objective : ID[^88]
- Objective : Immersion[^89]
- Objective : Model[^90]
- Objective : NominalMagnification[^91]
- ObjectiveSettings : ID[^92]

[^75]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SA_xsd.html#XMLAnnotation_Value
[^76]: http://www.openmicroscopy.org/site/support/ome-model/
[^77]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
[^78]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_NDFilter
[^79]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_Name
[^80]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
[^81]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
[^82]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Description
[^84]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#InstrumentRef_ID
[^85]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Instrument_Name
[^86]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_Correction
[^87]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_ID
[^88]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_Immersion
[^89]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_NominalMagnification
[^90]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_Model
[^91]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ObjectiveSettings_ID
- Pixels : BigEndian\textsuperscript{493}
- Pixels : DimensionOrder\textsuperscript{494}
- Pixels : ID\textsuperscript{495}
- Pixels : Interleaved\textsuperscript{496}
- Pixels : PhysicalSizeX\textsuperscript{497}
- Pixels : PhysicalSizeY\textsuperscript{498}
- Pixels : PhysicalSizeZ\textsuperscript{499}
- Pixels : SignificantBits\textsuperscript{500}
- Pixels : SizeC\textsuperscript{501}
- Pixels : SizeT\textsuperscript{502}
- Pixels : SizeX\textsuperscript{503}
- Pixels : SizeY\textsuperscript{504}
- Pixels : SizeZ\textsuperscript{505}
- Pixels : Type\textsuperscript{506}
- Plane : ExposureTime\textsuperscript{507}
- Plane : TheC\textsuperscript{508}
- Plane : TheT\textsuperscript{509}
- Plane : TheZ\textsuperscript{510}

Total supported: 34
Total unknown or missing: 441

19.2.2 AIMReader

This page lists supported metadata fields for the Bio-Formats AIM format reader. These fields are from the OME data model\textsuperscript{511}. 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%).

\textsuperscript{493}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
\textsuperscript{494}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
\textsuperscript{495}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
\textsuperscript{496}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
\textsuperscript{497}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeX
\textsuperscript{498}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
\textsuperscript{499}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeZ
\textsuperscript{500}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
\textsuperscript{501}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
\textsuperscript{502}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
\textsuperscript{503}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
\textsuperscript{504}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
\textsuperscript{505}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
\textsuperscript{506}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
\textsuperscript{507}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_ExposureTime
\textsuperscript{508}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
\textsuperscript{509}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
\textsuperscript{510}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
\textsuperscript{511}http://www.openmicroscopy.org/site/support/ome-model/
Supported fields

These fields are fully supported by the Bio-Formats AIM 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

19.2. Metadata fields
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\textsuperscript{534}. 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\textsuperscript{535}
- Channel: SamplesPerPixel\textsuperscript{536}
- Detector: ID\textsuperscript{537}
- Detector: Type\textsuperscript{538}
- DetectorSettings: ID\textsuperscript{539}
- DetectorSettings: Voltage\textsuperscript{540}
- Image: AcquisitionDate\textsuperscript{541}
- Image: ID\textsuperscript{542}
- Image: InstrumentRef\textsuperscript{543}
- Image: Name\textsuperscript{544}
- Instrument: ID\textsuperscript{545}
- Objective: CalibratedMagnification\textsuperscript{546}
- Objective: Correction\textsuperscript{547}
- Objective: ID\textsuperscript{548}
- Objective: Immersion\textsuperscript{549}
- Objective: WorkingDistance\textsuperscript{550}
- ObjectiveSettings: ID\textsuperscript{551}
- Pixels: BigEndian\textsuperscript{552}

\textsuperscript{534}http://www.openmicroscopy.org/site/support/ome-model/
\textsuperscript{535}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
\textsuperscript{536}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
\textsuperscript{537}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_ID
\textsuperscript{538}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_Type
\textsuperscript{539}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_ID
\textsuperscript{540}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_Voltage
\textsuperscript{541}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
\textsuperscript{542}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID
\textsuperscript{543}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#InstrumentRef_ID
\textsuperscript{544}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
\textsuperscript{545}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Instrument_ID
\textsuperscript{546}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_CalibratedMagnification
\textsuperscript{547}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_Correction
\textsuperscript{548}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_ID
\textsuperscript{549}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_Immersion
\textsuperscript{550}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_WorkingDistance
\textsuperscript{551}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ObjectiveSettings_ID
\textsuperscript{552}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
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. 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
- 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

19.2.5 AmiraReader

This page lists supported metadata fields for the Bio-Formats Amira 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%).

---

571 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
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
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
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
590 http://www.openmicroscopy.org/site/support/ome-model/
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
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

613 http://www.openmicroscopy.org/site/support/ome-model/
614 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
615 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
616 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
617 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Description
619 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
620 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
621 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
622 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
623 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
625 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
626 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeZ
627 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
628 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
629 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
630 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
631 http://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 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 Aperio AFI format reader:

• Channel : EmissionWavelength
• Channel : ExcitationWavelength
• Channel : ID
• Channel : Name
• Channel : SamplesPerPixel
• Image : AcquisitionDate
• Image : ID
• Image : InstrumentRef
• Image : Name
• Instrument : ID
• Objective : 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/
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_Name
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_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 : ExposureTime
• Plane : TheC
• Plane : TheT
• Plane : TheZ

Total supported: 30
Total unknown or missing: 445

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%).

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_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/
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
- Image: Description
- Image: ID
- 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

671 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ExcitationWavelength
672 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
673 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
674 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
675 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Description
676 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID
678 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
679 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_ID
680 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_NominalMagnification
681 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ObjectiveSettings_ID
682 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
683 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
684 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
685 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
687 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
688 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
689 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
690 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
691 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
692 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
• Pixels: SizeZ\(^{694}\)
• Pixels: Type\(^{695}\)
• Plane: TheC\(^{696}\)
• Plane: TheT\(^{697}\)
• Plane: TheZ\(^{698}\)

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\(^{699}\). 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\(^{700}\)
- Channel: ExcitationWavelength\(^{701}\)
- Channel: ID\(^{702}\)
- Channel: Name\(^{703}\)
- Channel: SamplesPerPixel\(^{704}\)
- Detector: ID\(^{705}\)
- DetectorSettings: Gain\(^{706}\)
- DetectorSettings: ID\(^{707}\)
- Image: AcquisitionDate\(^{708}\)
- Image: ID\(^{709}\)
- Image: InstrumentRef\(^{710}\)
- Image: Name\(^{711}\)

\(^{694}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
\(^{695}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
\(^{696}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
\(^{697}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
\(^{698}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
\(^{699}\)http://www.openmicroscopy.org/site/support/ome-model/
\(^{700}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_EmissionWavelength
\(^{701}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ExcitationWavelength
\(^{702}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
\(^{703}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_Name
\(^{704}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
\(^{705}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_ID
\(^{706}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_Gain
\(^{707}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_ID
\(^{708}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
\(^{709}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID
\(^{710}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#InstrumentRef_ID
\(^{711}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
• Instrument : ID
• Microscope : SerialNumber
• 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
• Plate : ID
• Plate : Name
• PlateAcquisition : EndTime
• PlateAcquisition : ID
• PlateAcquisition : MaximumFieldCount
• PlateAcquisition : StartTime
• PlateAcquisition : WellSampleRef
• Well : Column

713 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_SerialNumber
714 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
715 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
716 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
717 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
719 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
720 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
721 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
722 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
723 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
724 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
725 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
726 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
728 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
729 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
730 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plate_ID
731 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plate_Name
732 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#PlateAcquisition_EndTime
733 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#PlateAcquisition_ID
734 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#PlateAcquisition_MaximumFieldCount
735 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#PlateAcquisition_StartTime
736 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#WellSampleRef_ID
737 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Well_Column
• Well : ID
• Well : Row
• WellSample : ID
• WellSample : ImageRef
• WellSample : Index
• WellSample : PositionX
• 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

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
Total supported: 19

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\(^{66}\). 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\(^{766}\)
- Channel: SamplesPerPixel\(^{767}\)
- Image: AcquisitionDate\(^{768}\)
- Image: ID\(^{769}\)
- Image: Name\(^{770}\)
- Pixels: BigEndian\(^{771}\)
- Pixels: DimensionOrder\(^{772}\)
- Pixels: ID\(^{773}\)

---

\(^{56}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
\(^{57}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
\(^{58}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
\(^{59}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
\(^{60}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
\(^{61}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
\(^{62}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
\(^{63}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
\(^{64}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
\(^{65}\)http://www.openmicroscopy.org/site/support/ome-model/
\(^{66}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
\(^{67}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
\(^{68}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
\(^{69}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID
\(^{70}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
\(^{71}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
\(^{72}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
\(^{73}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
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

Total supported: 19
Total unknown or missing: 456
• DetectorSettings: Binning
• DetectorSettings: Gain
• DetectorSettings: ID
• DetectorSettings: Offset
• Image: AcquisitionDate
• Image: ID
• Image: InstrumentRef
• 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

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_Offset
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#ROIRef_ID
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_LensNA
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_Maker
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_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
• Plane: DeltaT
• Plane: ExposureTime
• Plane: TheC
• Plane: TheT
• Plane: TheZ
• Plate: ColumnNamingConvention
• Plate: Description
• 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 SPCImageData format reader. These fields are from the OME data model\[843]. 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 SPCImageData format reader:

- Channel : ID\[844]
- Channel : SamplesPerPixel\[845]
- Image : AcquisitionDate\[846]
- Image : ID\[847]
- Image : Name\[848]
- Pixels : BigEndian\[849]
- Pixels : DimensionOrder\[850]
- Pixels : ID\[851]
- Pixels : Interleaved\[852]
- Pixels : SignificantBits\[853]
- Pixels : SizeC\[854]
- Pixels : SizeT\[855]
- Pixels : SizeX\[856]
- Pixels : SizeY\[857]
- Pixels : SizeZ\[858]
- Pixels : Type\[859]
- Plane : TheC\[860]
- Plane : TheT\[861]

\[843]\ http://www.openmicroscopy.org/site/support/ome-model/
\[844]\ http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
\[845]\ http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
\[846]\ http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
\[848]\ http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
\[849]\ http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
\[850]\ http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
\[851]\ http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
\[852]\ http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
\[853]\ http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
\[854]\ http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
\[855]\ http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
\[856]\ http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
\[857]\ http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
\[858]\ http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
\[859]\ http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
\[860]\ http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
\[861]\ http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
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
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\(^{885}\). 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\(^{886}\)
- **Channel**: SamplesPerPixel\(^{887}\)
- **Detector**: Gain\(^{888}\)
- **Detector**: ID\(^{889}\)
- **Detector**: Offset\(^{890}\)
- **Detector**: Type\(^{891}\)
- **DetectorSettings**: Gain\(^{892}\)
- **DetectorSettings**: ID\(^{893}\)
- **DetectorSettings**: Offset\(^{894}\)
- **Experiment**: ID\(^{895}\)
- **Experiment**: Type\(^{896}\)
- **Image**: AcquisitionDate\(^{897}\)
• Image : ID
• Image : InstrumentRef
• Image : Name
• Instrument : ID
• Objective : Correction
• Objective : ID
• Objective : Immersion
• 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

19.2. Metadata fields

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_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_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
• 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\(^926\). 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 Bio-Rad SCN format reader:
• Channel: ID\(^927\)
• Channel: SamplesPerPixel\(^928\)
• Detector: ID\(^929\)
• DetectorSettings: Binning\(^930\)
• DetectorSettings: Gain\(^931\)
• DetectorSettings: ID\(^932\)
• Image: AcquisitionDate\(^933\)
• Image: ID\(^934\)
• Image: Name\(^935\)
• Instrument: ID\(^936\)
• Microscope: Model\(^937\)
• Microscope: SerialNumber\(^938\)
• Pixels: BigEndian\(^939\)
• Pixels: DimensionOrder\(^940\)
• Pixels: ID\(^941\)

\(^924\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
\(^925\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
\(^926\)http://www.openmicroscopy.org/site/support/ome-model/
\(^927\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
\(^928\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
\(^929\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_ID
\(^930\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_Binning
\(^931\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_Gain
\(^932\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_ID
\(^933\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
\(^934\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID
\(^935\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
\(^936\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Instrument_ID
\(^937\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_Model
\(^938\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_SerialNumber
\(^939\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
\(^940\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
\(^941\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
• Pixels: Interleaved
• Pixels: PhysicalSizeX
• Pixels: PhysicalSizeY
• Pixels: SignificantBits
• Pixels: Size
• Pixels: SizeX
• 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

942 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
944 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
945 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
946 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
947 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
948 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
949 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
950 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
951 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
952 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_ExposureTime
954 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
955 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
956 http://www.openmicroscopy.org/site/support/ome-model/
957 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_Color
958 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
959 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
Bio-Formats Documentation, Release 5.0.8

- 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:

19.2. Metadata fields
• 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
- 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\(^{1004}\). 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 Burleigh format reader:

- Channel : ID\(^{1005}\)
- Channel : SamplesPerPixel\(^{1006}\)
- Image : AcquisitionDate\(^{1007}\)
- Image : ID\(^{1008}\)
- Image : Name\(^{1009}\)
- Pixels : BigEndian\(^{1010}\)
- Pixels : DimensionOrder\(^{1011}\)
- Pixels : ID\(^{1012}\)
- Pixels : Interleaved\(^{1013}\)
- Pixels : PhysicalSizeX\(^{1014}\)
- Pixels : PhysicalSizeY\(^{1015}\)
- Pixels : PhysicalSizeZ\(^{1016}\)
- Pixels : SignificantBits\(^{1017}\)
- Pixels : SizeC\(^{1018}\)
- Pixels : SizeT\(^{1019}\)
- Pixels : SizeX\(^{1020}\)
- Pixels : SizeY\(^{1021}\)

\(^{1004}\)http://www.openmicroscopy.org/site/support/ome-model/
\(^{1005}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
\(^{1006}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
\(^{1007}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
\(^{1008}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID
\(^{1009}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
\(^{1010}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
\(^{1011}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
\(^{1012}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
\(^{1013}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
\(^{1014}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeX
\(^{1015}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
\(^{1016}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeZ
\(^{1017}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
\(^{1018}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
\(^{1019}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
\(^{1020}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
\(^{1021}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
Bio-Formats Documentation, Release 5.0.8

• Pixels: SizeZ
• Pixels: Type
• Plane: TheC
• Plane: TheT
• Plane: TheZ

Total supported: 22
Total unknown or missing: 453

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. 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
• 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

19.2.21 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
• Pixels : SizeZ
• Pixels : Type
• Plane : TheC
• Plane : TheT
• Plane : TheZ
• Plate : ColumnNamingConvention
• Plate : ID
• Plate : Name
• Plate : RowNamingConvention
• Well : Column
• Well : ID
• Well : Row
• WellSample : ID
• WellSample : ImageRef
• WellSample : Index

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. 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#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/SPW_xsd.html#Plate_ColumnNamingConvention
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_Name
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#Well_Column
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Well_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Well_Name
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#WellSample_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#WellSample_Index
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
- 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

19.2.23 CellVoyagerReader

This page lists supported metadata fields for the Bio-Formats CellVoyager 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 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

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_PinholeSize
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
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

1118 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC  
1119 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT  
1120 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ  
1121 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Plate_Columns  
1122 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Plate_Rows  
1123 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#PlateAcquisition_EndTime  
1124 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#PlateAcquisition_ID  
1125 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#PlateAcquisition_MaximumFieldCount  
1126 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#PlateAcquisition_StartTime  
1127 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Well_Column  
1128 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Well_ID  
1129 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Well_Row  
1130 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#WellSample_ID  
1131 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#WellSample_Index  
1133 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#WellSample_PositionY  
1134 http://www.openmicroscopy.org/site/support/ome-model/  
1135 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_EmissionWavelength
• Channel: ExcitationWavelength
• Channel: ID
• Channel: NDFilter
• Channel: Name
• Channel: SamplesPerPixel
• Detector: ID
• Detector: Model
• Detector: Type
• DetectorSettings: Binning
• DetectorSettings: Gain
• DetectorSettings: ID
• DetectorSettings: ReadOutRate
• 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: Manufacturer
• Objective: Model

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_NDFilter
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#ManufacturerSpec_Manufacturer
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_Model

19.2. Metadata fields
• 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: 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

---

1162 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_NominalMagnification
1163 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_WorkingDistance
1164 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ObjectiveSettings_ID
1165 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
1166 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
1167 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
1168 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
1172 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
1173 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
1174 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
1175 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
1176 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
1177 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
1178 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
1179 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_DeltaT
1180 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_ExposureTime
1185 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
1186 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
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%).

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

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
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: 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
• 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

Footnotes:
1225 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
1226 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
1227 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
1228 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html# Pixels_SizeX
1229 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
1230 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
1231 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
1233 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
1234 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
1235 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
1236 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
1237 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
1239 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
1240 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
  - http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT

• **Pixels**: SizeX

• **Pixels**: SizeY

• **Pixels**: SizeZ

• **Pixels**: Type
  - http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type

• **Plane**: TheC

• **Plane**: TheT

• **Plane**: TheZ

Total supported: **19**

Total unknown or missing: **456**

### 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. 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
- **Channel**: LightSourceSettingsID
- **Channel**: Name
- **Channel**: SamplesPerPixel
• Detector: ID\textsuperscript{1260}
• Detector: Type\textsuperscript{1261}
• DetectorSettings: Binning\textsuperscript{1262}
• DetectorSettings: ID\textsuperscript{1263}
• Dichroic: ID\textsuperscript{1264}
• Dichroic: Model\textsuperscript{1265}
• Filter: FilterWheel\textsuperscript{1266}
• Filter: ID\textsuperscript{1267}
• Filter: Model\textsuperscript{1268}
• Image: AcquisitionDate\textsuperscript{1269}
• Image: ID\textsuperscript{1270}
• Image: InstrumentRef\textsuperscript{1271}
• Image: Name\textsuperscript{1272}
• Instrument: ID\textsuperscript{1273}
• Laser: ID\textsuperscript{1274}
• Laser: LaserMedium\textsuperscript{1275}
• Laser: Type\textsuperscript{1276}
• Laser: Wavelength\textsuperscript{1277}
• LightPath: DichroicRef\textsuperscript{1278}
• LightPath: EmissionFilterRef\textsuperscript{1279}
• LightPath: ExcitationFilterRef\textsuperscript{1280}
• Objective: CalibratedMagnification\textsuperscript{1281}
• Objective: Correction\textsuperscript{1282}
• Objective: ID\textsuperscript{1283}
• Objective: Immersion\textsuperscript{1284}
• Objective: LensNA\textsuperscript{1285}

\textsuperscript{1260}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_ID
\textsuperscript{1261}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_Type
\textsuperscript{1262}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_Binning
\textsuperscript{1263}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_ID
\textsuperscript{1264}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Dichroic_ID
\textsuperscript{1265}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_Model
\textsuperscript{1266}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Filter_FilterWheel
\textsuperscript{1267}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Filter_ID
\textsuperscript{1268}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_Model
\textsuperscript{1269}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
\textsuperscript{1270}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID
\textsuperscript{1271}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#InstrumentRef_ID
\textsuperscript{1272}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
\textsuperscript{1273}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Instrument_ID
\textsuperscript{1274}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#LightSource_ID
\textsuperscript{1275}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Laser_LaserMedium
\textsuperscript{1276}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Laser_Type
\textsuperscript{1277}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Laser_Wavelength
\textsuperscript{1278}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DichroicRef_ID
\textsuperscript{1279}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#FilterRef_ID
\textsuperscript{1280}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#FilterRef_ID
\textsuperscript{1281}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_CalibratedMagnification
\textsuperscript{1282}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_Correction
\textsuperscript{1283}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_ID
\textsuperscript{1284}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_Immersion
\textsuperscript{1285}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_LensNA
• 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 : DeltaT
• Plane : ExposureTime
• Plane : PositionX
• Plane : PositionY
• Plane : PositionZ
• Plane : TheC
• Plane : TheT
• Plane : TheZ
• Plate : ColumnNamingConvention
• Plate : ExternalIdentifier
• Plate : ID
• Plate : Name

1286 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ObjectiveSettings_ID
1287 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
1288 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
1289 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
1290 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
1291 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeX
1292 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
1293 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
1294 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
1295 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
1296 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
1297 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
1298 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
1299 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
1300 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_DeltaT
1301 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_ExposureTime
1306 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
1307 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
1308 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Plate_ColumnNamingConvention
1309 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Plate_ExternalIdentifier
1310 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Plate_ID
1311 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#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

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/SPW_xsd.html#Plate_RowNamingConvention
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_MaximumFieldCount
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#PlateAcquisition_StartTime
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#Well_Column
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Well_ID
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_Index
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#WellSample_PositionY
http://www.openmicroscopy.org/site/support/ome-model/
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

1330 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
1331 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
1332 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
1333 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
1334 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
1335 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
1336 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
1337 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
1338 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
1339 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
1340 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
1341 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
1342 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
1343 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
1344 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
1345 http://www.openmicroscopy.org/site/support/ome-model/
1346 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
1347 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
• Detector: ID \(^{1348}\)
• Detector: Model \(^{1349}\)
• Detector: Type \(^{1350}\)
• Experimenter: ID \(^{1351}\)
• Experimenter: LastName \(^{1352}\)
• Image: AcquisitionDate \(^{1353}\)
• Image: Description \(^{1354}\)
• Image: ID \(^{1355}\)
• Image: InstrumentRef \(^{1356}\)
• Image: Name \(^{1357}\)
• Instrument: ID \(^{1358}\)
• Microscope: Model \(^{1359}\)
• Objective: Correction \(^{1360}\)
• Objective: ID \(^{1361}\)
• Objective: Immersion \(^{1362}\)
• Objective: NominalMagnification \(^{1363}\)
• Pixels: BigEndian \(^{1364}\)
• Pixels: DimensionOrder \(^{1365}\)
• Pixels: ID \(^{1366}\)
• Pixels: Interleaved \(^{1367}\)
• Pixels: PhysicalSizeX \(^{1368}\)
• Pixels: PhysicalSizeY \(^{1369}\)
• Pixels: SignificantBits \(^{1370}\)
• Pixels: SizeC \(^{1371}\)
• Pixels: SizeT \(^{1372}\)
• Pixels: SizeX \(^{1373}\)

\(^{1348}\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_ID
\(^{1349}\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_Model
\(^{1350}\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_Type
\(^{1351}\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Experimenter_ID
\(^{1352}\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Experimenter_LastName
\(^{1353}\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
\(^{1354}\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Description
\(^{1355}\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID
\(^{1356}\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#InstrumentRef_ID
\(^{1357}\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Instrument_Name
\(^{1358}\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_Model
\(^{1359}\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_Correction
\(^{1360}\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_ID
\(^{1361}\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_Immersion
\(^{1362}\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_NominalMagnification
\(^{1363}\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
\(^{1364}\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
\(^{1365}\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
\(^{1366}\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
\(^{1367}\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeX
\(^{1368}\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
\(^{1369}\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
\(^{1370}\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
\(^{1371}\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
\(^{1372}\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
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\(^{1385}\). 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\(^{1386}\)
- Channel : SamplesPerPixel\(^{1387}\)
- Image : AcquisitionDate\(^{1388}\)
- Image : ID\(^{1389}\)
- Image : Name\(^{1390}\)
- Pixels : BigEndian\(^{1391}\)

---

\(^{1374}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome-xsd.html#Pixels_SizeY
\(^{1375}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome-xsd.html#Pixels_SizeZ
\(^{1376}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome-xsd.html#Pixels_TimeIncrement
\(^{1377}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome-xsd.html#Pixels_Type
\(^{1378}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome-xsd.html#Plane_TheC
\(^{1379}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome-xsd.html#Plane_TheT
\(^{1380}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome-xsd.html#Plane_TheZ
\(^{1381}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome-xsd.html#StageLabel_Name
\(^{1382}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome-xsd.html#StageLabel_X
\(^{1383}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome-xsd.html#StageLabel_Y
\(^{1384}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome-xsd.html#StageLabel_Z
\(^{1385}\)http://www.openmicroscopy.org/site/support/ome-model/
\(^{1386}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome-xsd.html#Channel_ID
\(^{1387}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome-xsd.html#Channel_SamplesPerPixel
\(^{1388}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome-xsd.html#Image_AcquisitionDate
\(^{1389}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome-xsd.html#Image_ID
\(^{1390}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome-xsd.html#Image_Name
\(^{1391}\)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

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

1392 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
1393 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
1394 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
1395 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
1396 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
1397 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
1398 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
1399 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
1400 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
1401 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
1402 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
1403 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
1404 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
1405 http://www.openmicroscopy.org/site/support/ome-model/
1406 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
1407 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
1408 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
1409 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_ID
1410 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_Binning
• DetectorSettings: ID
• Experimenter: FirstName
• Experimenter: ID
• Experimenter: LastName
• Image: AcquisitionDate
• Image: ExperimenterRef
• 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

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:

- 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
- Channel: ID
- Channel: SamplesPerPixel
- Detector : ID
- DetectorSettings : ID
- DetectorSettings : Voltage
- Image : AcquisitionDate
- Image : ID
- Image : Name
- Instrument : ID
- Objective : Correction
- Objective : ID
- Objective : Immersion
- Objective : NominalMagnification
- ObjectiveSettings : ID
- Pixels : BigEndian
- Pixels : DimensionOrder

---

1436 http://www.openmicroscopy.org/site/support/ome-model/
1437 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_AcquisitionMode
1438 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
1439 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
1440 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_ID
1441 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_ID
1442 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_Voltage
1443 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
1445 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
1447 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_Correction
1448 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_ID
1449 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_Immersion
1450 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ObjectiveNominalMagnification
1451 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ObjectiveSettings_ID
1452 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
1453 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
• Pixels: ID\textsuperscript{1454}
• Pixels: Interleaved\textsuperscript{1455}
• Pixels: PhysicalSizeX\textsuperscript{1456}
• Pixels: PhysicalSizeY\textsuperscript{1457}
• Pixels: PhysicalSizeZ\textsuperscript{1458}
• Pixels: SignificantBits\textsuperscript{1459}
• Pixels: SizeC\textsuperscript{1460}
• Pixels: SizeT\textsuperscript{1461}
• Pixels: SizeX\textsuperscript{1462}
• Pixels: SizeY\textsuperscript{1463}
• Pixels: SizeZ\textsuperscript{1464}
• Pixels: Type\textsuperscript{1465}
• Plane: ExposureTime\textsuperscript{1466}
• Plane: PositionX\textsuperscript{1467}
• Plane: PositionY\textsuperscript{1468}
• Plane: PositionZ\textsuperscript{1469}
• Plane: TheC\textsuperscript{1470}
• Plane: TheT\textsuperscript{1471}
• Plane: TheZ\textsuperscript{1472}

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\textsuperscript{1473}. 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%).

\textsuperscript{1454}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
\textsuperscript{1455}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
\textsuperscript{1456}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeX
\textsuperscript{1457}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
\textsuperscript{1458}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeZ
\textsuperscript{1459}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
\textsuperscript{1460}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
\textsuperscript{1461}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
\textsuperscript{1462}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
\textsuperscript{1463}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
\textsuperscript{1464}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
\textsuperscript{1465}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
\textsuperscript{1466}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_ExposureTime
\textsuperscript{1467}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_PositionX
\textsuperscript{1468}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_PositionY
\textsuperscript{1469}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_PositionZ
\textsuperscript{1470}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
\textsuperscript{1471}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
\textsuperscript{1472}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
\textsuperscript{1473}http://www.openmicroscopy.org/site/support/ome-model/
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
- 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

1494 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
1495 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
1496 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
1497 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID
1498 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
1499 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
1500 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
1501 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
1502 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
1503 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
1504 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
1505 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
1506 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
1507 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
1508 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
1509 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
1510 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
1511 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
1512 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
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\(^{1513}\). 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\(^{1514}\)
- Channel : SamplesPerPixel\(^{1515}\)
- Detector : ID\(^{1516}\)
- Detector : Offset\(^{1517}\)
- Detector : Type\(^{1518}\)
- DetectorSettings : Binning\(^{1519}\)
- DetectorSettings : ID\(^{1520}\)
- Image : AcquisitionDate\(^{1521}\)
- Image : ID\(^{1522}\)
- Image : InstrumentRef\(^{1523}\)
- Image : Name\(^{1524}\)
- Instrument : ID\(^{1525}\)
- Pixels : BigEndian\(^{1526}\)
- Pixels : DimensionOrder\(^{1527}\)
- Pixels : ID\(^{1528}\)
- Pixels : Interleaved\(^{1529}\)
- Pixels : SignificantBits\(^{1530}\)
- Pixels : SizeC\(^{1531}\)

\(^{1513}\)http://www.openmicroscopy.org/site/support/ome-model/
\(^{1514}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
\(^{1515}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
\(^{1516}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_ID
\(^{1517}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_Offset
\(^{1518}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_Type
\(^{1519}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_Binning
\(^{1520}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_ID
\(^{1521}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
\(^{1522}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID
\(^{1523}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#InstrumentRef_ID
\(^{1524}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
\(^{1525}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Instrument_ID
\(^{1526}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
\(^{1527}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
\(^{1528}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
\(^{1529}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
\(^{1530}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
\(^{1531}\)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: ExposureTime
• Plane: TheC
• Plane: TheT
• Plane: TheZ

Total supported: 27
Total unknown or missing: 448

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. 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
• Channel: SamplesPerPixel
• Image: AcquisitionDate
• Image: ID
• Image: Name
• Pixels: BigEndian
• Pixels: DimensionOrder
• 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

19.2.38 HamamatsuVMSReader

This page lists supported metadata fields for the Bio-Formats Hamamatsu VMS 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 Hamamatsu VMS format reader:
• Channel: ID
• Channel: SamplesPerPixel
• Image: AcquisitionDate
• Image: ID

1550 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
1552 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
1553 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
1554 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
1555 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
1556 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
1557 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
1558 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
1559 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
1560 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
1561 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
1562 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
1563 http://www.openmicroscopy.org/site/support/ome-model/
1564 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
1565 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
1566 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
• 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: 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. 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
• Channel: SamplesPerPixel
• Image: AcquisitionDate
• Image: ID
• Image: InstrumentRef
• Image: Name
• Instrument: ID
• Microscope: Model
• Microscope: SerialNumber
• Objective: ID
• Objective: WorkingDistance
• ObjectiveSettings: ID
• Pixels: BigEndian
• Pixels: DimensionOrder
• Pixels: ID
• Pixels: Interleaved
• Pixels: PhysicalSizeX
• Pixels: PhysicalSizeY
• Pixels: SignificantBits
• Pixels: SizeC
• Pixels: SizeT\(^{1611}\)
• Pixels: SizeX\(^{1612}\)
• Pixels: SizeY\(^{1613}\)
• Pixels: SizeZ\(^{1614}\)
• Pixels: Type\(^{1615}\)
• Plane: PositionX\(^{1616}\)
• Plane: PositionY\(^{1617}\)
• Plane: PositionZ\(^{1618}\)
• Plane: TheC\(^{1619}\)
• Plane: TheT\(^{1620}\)
• Plane: TheZ\(^{1621}\)

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\(^{1622}\). 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\(^{1623}\)
• Channel: ExcitationWavelength\(^{1624}\)
• Channel: ID\(^{1625}\)
• Channel: Name\(^{1626}\)
• Channel: PinholeSize\(^{1627}\)
• Channel: SamplesPerPixe\(^{1628}\)

\(^{1611}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
\(^{1612}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
\(^{1613}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
\(^{1614}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
\(^{1615}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
\(^{1616}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_PositionX
\(^{1617}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_PositionY
\(^{1618}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_PositionZ
\(^{1619}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
\(^{1620}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
\(^{1621}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
\(^{1622}\)http://www.openmicroscopy.org/site/support/ome-model/
\(^{1623}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_EmissionWavelength
\(^{1624}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ExcitationWavelength
\(^{1625}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
\(^{1626}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_Name
\(^{1627}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_PinholeSize
\(^{1628}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#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
• 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
• 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. 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
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\(^\text{1719}\). 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:

- Experimenter: ID\(^\text{1699}\)
- Experimenter: LastName\(^\text{1700}\)
- Image: AcquisitionDate\(^\text{1701}\)
- Image: ExperimenterRef\(^\text{1702}\)
- Image: ID\(^\text{1703}\)
- Image: Name\(^\text{1704}\)
- Pixels: BigEndian\(^\text{1705}\)
- Pixels: DimensionOrder\(^\text{1706}\)
- Pixels: ID\(^\text{1707}\)
- Pixels: Interleaved\(^\text{1708}\)
- Pixels: SignificantBits\(^\text{1709}\)
- Pixels: SizeC\(^\text{1710}\)
- Pixels: SizeT\(^\text{1711}\)
- Pixels: SizeX\(^\text{1712}\)
- Pixels: SizeY\(^\text{1713}\)
- Pixels: SizeZ\(^\text{1714}\)
- Pixels: Type\(^\text{1715}\)
- Plane: TheC\(^\text{1716}\)
- Plane: TheT\(^\text{1717}\)
- Plane: TheZ\(^\text{1718}\)

Total supported: 23
Total unknown or missing: 452

---

\(^\text{1699}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Experimenter_ID
\(^\text{1700}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Experimenter_LastName
\(^\text{1701}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
\(^\text{1702}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ExperimenterRef_ID
\(^\text{1703}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID
\(^\text{1704}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
\(^\text{1705}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
\(^\text{1706}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
\(^\text{1707}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
\(^\text{1708}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
\(^\text{1709}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
\(^\text{1710}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
\(^\text{1711}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
\(^\text{1712}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
\(^\text{1713}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
\(^\text{1714}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
\(^\text{1715}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
\(^\text{1716}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
\(^\text{1717}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
\(^\text{1718}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
\(^\text{1719}\)http://www.openmicroscopy.org/site/support/OME-model/
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
- 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
19.2.43 IPWReader

This page lists supported metadata fields for the Bio-Formats Image-Pro Workspace format reader.

These fields are from the OME data model\[1739\]. 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\[1740\]
- Channel : SamplesPerPixel\[1741\]
- Image : AcquisitionDate\[1742\]
- Image : Description\[1743\]
- Image : ID\[1744\]
- Image : Name\[1745\]
- Pixels : BigEndian\[1746\]
- Pixels : DimensionOrder\[1747\]
- Pixels : ID\[1748\]
- Pixels : Interleaved\[1749\]
- Pixels : SignificantBits\[1750\]
- Pixels : SizeC\[1751\]
- Pixels : SizeT\[1752\]
- Pixels : SizeX\[1753\]
- Pixels : SizeY\[1754\]
- Pixels : SizeZ\[1755\]
- Pixels : Type\[1756\]
- Plane : TheC\[1757\]

\[1739\]http://www.openmicroscopy.org/site/support/ome-model/
\[1740\]http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
\[1741\]http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
\[1742\]http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
\[1743\]http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Description
\[1744\]http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID
\[1745\]http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
\[1746\]http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
\[1747\]http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
\[1748\]http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
\[1749\]http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
\[1750\]http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
\[1751\]http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
\[1752\]http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
\[1753\]http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
\[1754\]http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
\[1755\]http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
\[1756\]http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
\[1757\]http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
Total supported: 20
Total unknown or missing: 455

19.2.44 ImagicReader

This page lists supported metadata fields for the Bio-Formats IMAGIC format reader. These fields are from the OME data model\(^{1760}\). 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 IMAGIC format reader:

- Channel: ID\(^{1761}\)
- Channel: SamplesPerPixel\(^{1762}\)
- Image: AcquisitionDate\(^{1763}\)
- Image: ID\(^{1764}\)
- Image: Name\(^{1765}\)
- Pixels: BigEndian\(^{1766}\)
- Pixels: DimensionOrder\(^{1767}\)
- Pixels: ID\(^{1768}\)
- Pixels: Interleaved\(^{1769}\)
- Pixels: PhysicalSizeX\(^{1770}\)
- Pixels: PhysicalSizeY\(^{1771}\)
- Pixels: PhysicalSizeZ\(^{1772}\)
- Pixels: SignificantBits\(^{1773}\)
- Pixels: SizeC\(^{1774}\)
- Pixels: SizeT\(^{1775}\)

\(^{1758}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
\(^{1759}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
\(^{1760}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
\(^{1761}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
\(^{1762}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
\(^{1763}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
\(^{1764}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID
\(^{1765}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
\(^{1766}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
\(^{1767}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
\(^{1768}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
\(^{1769}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
\(^{1770}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeX
\(^{1771}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
\(^{1772}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeZ
\(^{1773}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
\(^{1774}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
\(^{1775}\)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: 22
Total unknown or missing: 453

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

19.2. Metadata fields
• 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
• Point: ID
• Point: StrokeColor
• Point: StrokeDashArray
• Point: StrokeWidth
• Point: TheZ
• Point: X
• Point: Y
• Polygon: ID
• Polygon: Points
• Polygon: StrokeColor
• Polygon: StrokeDashArray
• Polygon: StrokeWidth
• Polygon: TheZ

1795 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
1797 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
1779 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
1779 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
1801 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
1802 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
1803 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
1804 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
1805 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
1806 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
1808 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_ID
1809 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_StrokeColor
1810 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_StrokeDashArray
1811 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_StrokeWidth
1812 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Point_X
1813 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Point_Y
1814 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Point_Z
1815 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Polygon_Points
1816 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_StrokeColor
1817 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_StrokeDashArray
1818 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_StrokeWidth
1819 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_TheZ

19.2. Metadata fields
• Polyline: ID
• Polyline: Points
• Polyline: StrokeColor
• Polyline: StrokeDashArray
• Polyline: StrokeWidth
• Polyline: TheZ
• ROI: ID
• ROI: Name

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. 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
• Channel: Name
• Channel: SamplesPerPixel
• Detector: ID
• Detector: Type
• DetectorSettings: Gain
• DetectorSettings: ID
• DetectorSettings: Offset
• Image: AcquisitionDate

References:
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_StrokeColor
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_StrokeDashArray
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_TheZ
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#ROI_Name
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
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_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#Image_AcquisitionDate
- 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: PositionX
- Plane: PositionY
- Plane: PositionZ
- Plane: TheC
- Plane: TheT
- Plane: TheZ

Total supported: 32

Total unknown or missing: 443
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\(^\text{1861}\). 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\(^\text{1862}\)
- Channel : SamplesPerPixel\(^\text{1863}\)
- Image : AcquisitionDate\(^\text{1864}\)
- Image : ID\(^\text{1865}\)
- Image : Name\(^\text{1866}\)
- Pixels : BigEndian\(^\text{1867}\)
- Pixels : DimensionOrder\(^\text{1868}\)
- Pixels : ID\(^\text{1869}\)
- Pixels : Interleaved\(^\text{1870}\)
- Pixels : SignificantBits\(^\text{1871}\)
- Pixels : SizeC\(^\text{1872}\)
- Pixels : SizeT\(^\text{1873}\)
- Pixels : SizeX\(^\text{1874}\)
- Pixels : SizeY\(^\text{1875}\)
- Pixels : SizeZ\(^\text{1876}\)
- Pixels : Type\(^\text{1877}\)
- Plane : TheC\(^\text{1878}\)
- Plane : TheT\(^\text{1879}\)

\(^{1861}\)http://www.openmicroscopy.org/site/support/ome-model/  
^{1862}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID  
^{1863}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel  
^{1864}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate  
^{1865}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID  
^{1866}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name  
^{1867}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian  
^{1868}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder  
^{1869}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID  
^{1870}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved  
^{1871}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits  
^{1872}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC  
^{1873}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT  
^{1874}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX  
^{1875}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY  
^{1876}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ  
^{1877}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type  
^{1878}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC  
^{1879}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
Total supported: 19
Total unknown or missing: 456

19.2.48 ImprovisionTiffReader

This page lists supported metadata fields for the Bio-Formats Improvision TIFF 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 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 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

---

\(^1\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ

---

\(^2\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID

---

\(^3\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_Name

---

\(^4\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel

---

\(^5\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate

---

\(^6\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Description

---

\(^7\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID

---

\(^8\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name

---

\(^9\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian

---

\(^10\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder

---

\(^11\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID

---

\(^12\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved

---

\(^13\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeX

---

\(^14\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY

---

\(^15\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeZ

---

\(^16\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits

---

\(^17\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
• Pixels: SizeT
• Pixels: SizeX
• Pixels: SizeY
• Pixels: SizeZ
• Pixels: TimeIncrement
• Pixels: Type
• Plane: TheC
• Plane: TheT
• Plane: TheZ

Total supported: 25
Total unknown or missing: 450

19.2.49 OBFReader

This page lists supported metadata fields for the Bio-Formats OBF 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 OBF 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

19.2.50 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
• 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

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#Experiment_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#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_LensNA
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_Maker
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

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: DeltaT
- Plane: ExposureTime
- Plane: PositionX
- Plane: PositionY
- Plane: PositionZ
- Plane: TheC
- Plane: TheT
- Plane: TheZ
- Plate: ColumnNamingConvention
- Plate: ID
- Plate: Name
- Plate: RowNamingConvention
- Plate: WellOriginX
- Plate: WellOriginY
- PlateAcquisition: ID
- PlateAcquisition: MaximumFieldCount

- 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/SPW_xsd.html#Plate_ColumnNamingConvention
- 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_Name
- 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#PlateAcquisition_ID
- http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#PlateAcquisition_MaximumFieldCount
• PlateAcquisition : WellSampleRef
• Well : Column
• Well : ID
• Well : Row
• WellSample : ID
• WellSample : ImageRef
• WellSample : Index
• WellSample : PositionX
• 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

1986 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#WellSampleRef_ID
1992 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#WellSample_Index
1995 http://www.openmicroscopy.org/site/support/ome-model/
1997 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
1998 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
2001 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
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\(^\text{2015}\). 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\(^\text{2016}\)
- Channel : SamplesPerPixel\(^\text{2017}\)
- Image : AcquisitionDate\(^\text{2018}\)
- Image : ID\(^\text{2019}\)
- Image : Name\(^\text{2020}\)
- Pixels : BigEndian\(^\text{2021}\)

\(^\text{2004}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
\(^\text{2005}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
\(^\text{2006}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
\(^\text{2007}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
\(^\text{2009}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
\(^\text{2010}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
\(^\text{2011}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
\(^\text{2013}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
\(^\text{2014}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
\(^\text{2015}\)http://www.openmicroscopy.org/site/support/ome-model/
\(^\text{2016}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
\(^\text{2017}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
\(^\text{2018}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
\(^\text{2020}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
\(^\text{2021}\)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 : 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

19.2.53 InveonReader

This page lists supported metadata fields for the Bio-Formats Inveon 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 Inveon format reader:

• Channel : ID

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
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
• Channel: SamplesPerPixel
• Experimenter: ID
• Experimenter: Institution
• Experimenter: UserName
• Image: AcquisitionDate
• Image: Description
• Image: ExperimenterRef
• 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.

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
• 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
- Image: Name
- Image: ROIRef
- 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: DeltaT
- Plane: TheC

[2107]http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
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

Total supported: 31
Total unknown or missing: 444
Bio-Formats Documentation, Release 5.0.8

- 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

19.2.57 JPEG2000Reader

This page lists supported metadata fields for the Bio-Formats JPEG-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 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
- Channel: SamplesPerPixel
- Image: AcquisitionDate
- Image: ID
- Image: Name
- Pixels: BigEndian
- Pixels: DimensionOrder

19.2. Metadata fields
• 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

19.2.58 JPEGReader

This page lists supported metadata fields for the Bio-Formats JPEG 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 JPEG format reader:

• Channel : ID
• Channel : SamplesPerPixel
• Image : AcquisitionDate
• Image : ID
• Image : Name

[Links to OME data model documentation for each field]
• 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

19.2.59 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
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. 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
- 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
• 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

19.2.61 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
- 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

19.2.62 KodakReader

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.

2237 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
2238 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
2239 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
2240 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID
2241 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
2242 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
2243 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
2244 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
2245 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
2246 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
2247 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
2248 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
2249 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
2250 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
2251 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
2252 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
2253 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
2254 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
2255 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
2256 http://www.openmicroscopy.org/site/support/ome-model/
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
- 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

2257 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
2258 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
2259 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
2262 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
2263 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ImagingEnvironment_Temperature
2265 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_Model
2266 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
2267 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
2268 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
2269 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
2271 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
2272 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
2273 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
2274 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
2275 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
2276 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
2277 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
2278 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#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.

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

2279 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_ExposureTime
2280 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
2281 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
2282 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
2283 http://www.openmicroscopy.org/site/support/ome-model/
2284 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
2285 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
2286 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
2287 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID
2288 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
2289 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#ROIRef_ID
2290 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
2291 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
2292 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
2293 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
2294 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
2295 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
2296 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
• Pixels: SizeX
• Pixels: SizeY
• Pixels: SizeZ
• Pixels: Type
• Plane: DeltaT
• Plane: ExposureTime
• Plane: TheC
• Plane: TheT
• 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

2297 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
2298 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
2299 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
2300 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
2301 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_DeltaT
2302 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_ExposureTime
2303 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
2304 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
2305 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
2306 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_ID
2307 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Polygon_Points
2308 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#ROI_ID
2309 http://www.openmicroscopy.org/site/support/ome-model/
2310 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
2311 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
2312 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
2314 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
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
• 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

2333 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
2334 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_Name
2335 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_PinholeSize
2336 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
2337 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_ID
2338 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_Offset
2339 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_Type
2340 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_Voltage
2341 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_ID
2342 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Filter_ID
2343 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_Model
2344 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
2345 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Description
2348 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Instrument_Name
2350 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#FilterRef_ID
2351 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_Correction
2352 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_ID
2353 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_Immersion
2354 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_LensNA
2355 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_Model
2356 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_NominalMagnification
2357 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_SerialNumber
2358 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ObjectiveSettings_ID

19.2. Metadata fields
- **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**: TheC
- **Plane**: TheT
- **Plane**: TheZ
- **StageLabel**: Name
- **StageLabel**: Z
- **TransmittanceRange**: CutIn

---

19.2. Metadata fields
• 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 : LightSourceSettingsAttenuation
• Channel : LightSourceSettingsID
• Channel : Name
• Channel : PinholeSize
• Channel : SamplesPerPixel
• Detector : ID
• Detector : Model
• Detector : Offset
• Detector : Type
• Detector : Zoom
• DetectorSettings : Gain
• DetectorSettings : ID
• DetectorSettings : Offset

http://www.openmicroscopy.org/Site/support/ome-model/
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_Color
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#LightSourceSettings_Attenuation
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#LightSourceSettings_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_PinholeSize
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_Model
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#Detector_Zoom
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
Filter : ID
Filter : Model
Image : AcquisitionDate
Image : Description
Image : ID
Image : InstrumentRef
Image : Name
Image : ROIRef
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

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/ROI_xsd.html#ROIRef_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#Laser_Type
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#ROIRef_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ROIRef_ID
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#ManufacturerSpec_Model
• Microscope: Type
• 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
• Pixels: SizeC
• Pixels: SizeT
• Pixels: SizeX
• Pixels: SizeY
• Pixels: SizeZ
• Pixels: TimeIncrement
• Pixels: Type
• Plane: DeltaT

2429 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Microscope_Type
2430 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_Correction
2431 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_ID
2432 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_Immersion
2433 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_LensNA
2434 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_Model
2435 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_NominalMagnification
2436 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_SerialNumber
2437 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ObjectiveSettings_ID
2438 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ObjectiveSettings_RefractiveIndex
2439 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
2440 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
2441 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
2442 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
2444 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
2446 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
2447 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
2448 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
2449 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
2450 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
2451 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
2452 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_TimeIncrement
2453 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
2454 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_DeltaT

19.2. Metadata fields
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%).

Total supported: 85
Total unknown or missing: 390

9.2. Metadata fields

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/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/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#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/
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
- 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
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\cite{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 LEO format reader:

- Channel: ID\cite{channel-id}
- Channel: SamplesPerPixel\cite{channelsamplesperpixel}
- Image: AcquisitionDate\cite{imageacquisitiondate}
- Image: ID\cite{image-id}
- Image: InstrumentRef\cite{instrumentref}
- Image: Name\cite{image-name}
- Instrument: ID\cite{instrument-id}
- Objective: Correction\cite{objective-correction}

Total supported: 33
Total unknown or missing: 442
• Objective: ID
• Objective: Immersion
• Objective: WorkingDistance
• 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: 27
Total unknown or missing: 448

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%).

---

2515 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_ID
2516 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_Immersion
2517 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_WorkingDistance
2518 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
2519 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
2520 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
2521 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
2523 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
2524 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
2525 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
2526 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
2527 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
2528 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
2529 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
2530 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
2531 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
2532 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
2533 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
2534 http://www.openmicroscopy.org/site/support/ome-model/
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
- Instrument: ID
- Laser: ID
- Laser: LaserMedium
- Laser: Type
- Laser: Wavelength
- Microscope: Model
- Microscope: Type
- Pixels: BigEndian
- Pixels: DimensionOrder
- Pixels: ID
- Pixels: Interleaved
- Pixels: SignificantBits
- Pixels: SizeC
- Pixels: SizeT
- Pixels: SizeX
- Pixels: SizeY

\(^{2535}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
\(^{2536}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#LightSourceSettings_ID
\(^{2537}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
\(^{2538}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
\(^{2539}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Description
\(^{2540}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID
\(^{2541}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#InstrumentRef_ID
\(^{2542}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
\(^{2543}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Instrument_ID
\(^{2544}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#LightSource_ID
\(^{2545}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Laser_LaserMedium
\(^{2546}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Laser_Type
\(^{2547}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Laser_Wavelength
\(^{2548}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_Model
\(^{2549}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Microscope_Type
\(^{2550}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
\(^{2551}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
\(^{2552}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
\(^{2553}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
\(^{2554}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
\(^{2555}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
\(^{2556}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
\(^{2557}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
\(^{2558}\)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: 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. 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 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
This page lists supported metadata fields for the Bio-Formats Metamorph TIFF format reader.

These fields are from the OME data model\(^{2584}\). 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\(^{2585}\)
- **Channel**: Name\(^{2586}\)
- **Channel**: SamplesPerPixel\(^{2587}\)
- **Image**: AcquisitionDate\(^{2588}\)
- **Image**: Description\(^{2589}\)
- **Image**: ID\(^{2590}\)
- **Image**: Name\(^{2591}\)
- **ImagingEnvironment**: Temperature\(^{2592}\)
- **Pixels**: BigEndian\(^{2593}\)
- **Pixels**: DimensionOrder\(^{2594}\)

---

\(^{2577}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX  
\(^{2578}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY  
\(^{2579}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ  
\(^{2580}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type  
\(^{2581}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC  
\(^{2582}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT  
\(^{2583}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ  
\(^{2584}\)http://www.openmicroscopy.org/site/support/ome-model/  
\(^{2585}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID  
\(^{2586}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_Name  
\(^{2587}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel  
\(^{2588}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate  
\(^{2589}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Description  
\(^{2590}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID  
\(^{2591}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name  
\(^{2592}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ImagingEnvironment_Temperature  
\(^{2593}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian  
\(^{2594}\)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: 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

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:
• 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

2622 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#WellSample_Index
2623 http://www.openmicroscopy.org/site/support/ome-model/
2624 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
2625 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#LightSourceSettings_ID
2626 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#LightSourceSettings_Wavelength
2627 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_Name
2628 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
2629 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_ID
2630 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_Type
2631 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_Binning
2632 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_Gain
2633 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_ID
2634 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_ReadOutRate
2635 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
2636 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Description

19.2. Metadata fields
• Image : Name
• ImagingEnvironment : Temperature
• Instrument : ID
• Laser : ID
• Laser : LaserMedium
• Laser : Type
• 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
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:

- 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

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_Color
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
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#Ellipse_RadiusY
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#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#Ellipse_Y
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Experiment_Description
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
• Image: AcquisitionDate
• Image: ExperimentRef
• Image: ID
• Image: InstrumentRef
• Image: Name
• Image: ROIRef
• Instrument: ID
• Mask: FillColor
• 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\textsuperscript{2709}
• Pixels: SizeY\textsuperscript{2710}
• Pixels: SizeZ\textsuperscript{2711}
• Pixels: Type\textsuperscript{2712}
• Plane: ExposureTime\textsuperscript{2713}
• Plane: TheC\textsuperscript{2714}
• Plane: TheT\textsuperscript{2715}
• Plane: TheZ\textsuperscript{2716}
• Plate: ColumnNamingConvention\textsuperscript{2717}
• Plate: ExternalIdentifier\textsuperscript{2718}
• Plate: ID\textsuperscript{2719}
• Plate: Name\textsuperscript{2720}
• Plate: RowNamingConvention\textsuperscript{2721}
• PlateAcquisition: ID\textsuperscript{2722}
• PlateAcquisition: MaximumFieldCount\textsuperscript{2723}
• PlateAcquisition: WellSampleRef\textsuperscript{2724}
• ROI: ID\textsuperscript{2725}
• Well: Column\textsuperscript{2726}
• Well: ID\textsuperscript{2727}
• Well: Row\textsuperscript{2728}
• WellSample: ID\textsuperscript{2729}
• WellSample: ImageRef\textsuperscript{2730}
• WellSample: Index\textsuperscript{2731}

\textbf{Total supported: 64}

\textbf{Total unknown or missing: 411}

\textsuperscript{2709}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
\textsuperscript{2710}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
\textsuperscript{2711}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
\textsuperscript{2712}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
\textsuperscript{2713}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_ExposureTime
\textsuperscript{2714}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
\textsuperscript{2715}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
\textsuperscript{2716}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Plate_ColumnNamingConvention
\textsuperscript{2717}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Plate_ExternalIdentifier
\textsuperscript{2718}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Plate_ID
\textsuperscript{2719}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Plate_Name
\textsuperscript{2720}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Plate_RowNamingConvention
\textsuperscript{2721}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#PlateAcquisition_ID
\textsuperscript{2722}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#PlateAcquisition_MaximumFieldCount
\textsuperscript{2723}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#WellSampleRef_ID
\textsuperscript{2724}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#ROI_ID
\textsuperscript{2725}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Well_Column
\textsuperscript{2726}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Well_ID
\textsuperscript{2727}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Well_Row
\textsuperscript{2728}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#WellSample_ID
\textsuperscript{2729}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#ImageRef_ID
\textsuperscript{2730}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#WellSample_Index

19.2. Metadata fields
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\textsuperscript{2732}. 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\textsuperscript{2733}
- Channel: Name\textsuperscript{2734}
- Channel: SamplesPerPixel\textsuperscript{2735}
- Detector: ID\textsuperscript{2736}
- Detector: Manufacturer\textsuperscript{2737}
- Detector: Model\textsuperscript{2738}
- Detector: SerialNumber\textsuperscript{2739}
- Detector: Type\textsuperscript{2740}
- DetectorSettings: Binning\textsuperscript{2741}
- DetectorSettings: Gain\textsuperscript{2742}
- DetectorSettings: ID\textsuperscript{2743}
- DetectorSettings: Voltage\textsuperscript{2744}
- Image: AcquisitionDate\textsuperscript{2745}
- Image: Description\textsuperscript{2746}
- Image: ID\textsuperscript{2747}
- Image: InstrumentRef\textsuperscript{2748}
- Image: Name\textsuperscript{2749}
- ImagingEnvironment: Temperature\textsuperscript{2750}

\textsuperscript{2732}http://www.openmicroscopy.org/site/support/ome-model/
\textsuperscript{2733}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
\textsuperscript{2734}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_Name
\textsuperscript{2735}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
\textsuperscript{2736}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_ID
\textsuperscript{2737}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_Manufacturer
\textsuperscript{2738}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_Model
\textsuperscript{2739}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_SerialNumber
\textsuperscript{2740}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_Type
\textsuperscript{2741}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_Binning
\textsuperscript{2742}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_Gain
\textsuperscript{2743}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_ID
\textsuperscript{2744}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_Voltage
\textsuperscript{2745}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
\textsuperscript{2746}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Description
\textsuperscript{2747}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID
\textsuperscript{2748}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#InstrumentRef_ID
\textsuperscript{2749}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
\textsuperscript{2750}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ImagingEnvironment_Temperature
• Instrument : 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 : DeltaT
• Plane : ExposureTime
• Plane : TheC
• Plane : TheT
• Plane : TheZ

Total supported: 38
Total unknown or missing: 437

### 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](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:

[2751](http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Instrument_ID)
[2752](http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian)
[2753](http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder)
[2754](http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID)
[2755](http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved)
[2756](http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeX)
[2757](http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY)
[2758](http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeZ)
[2759](http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits)
[2760](http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC)
[2761](http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT)
[2762](http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX)
[2763](http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY)
[2764](http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ)
[2765](http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type)
[2766](http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_DeltaT)
[2767](http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_ExposureTime)
[2768](http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC)
[2769](http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT)
[2770](http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ)
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[^2772]
- **Channel**: SamplesPerPixel[^2773]
- **Image**: AcquisitionDate[^2774]
- **Image**: Description[^2775]
- **Image**: ID[^2776]
- **Image**: Name[^2777]
- **Pixels**: BigEndian[^2778]
- **Pixels**: DimensionOrder[^2779]
- **Pixels**: ID[^2780]
- **Pixels**: Interleaved[^2781]
- **Pixels**: PhysicalSizeX[^2782]
- **Pixels**: PhysicalSizeY[^2783]
- **Pixels**: PhysicalSizeZ[^2784]
- **Pixels**: SignificantBits[^2785]
- **Pixels**: SizeC[^2786]
- **Pixels**: SizeT[^2787]
- **Pixels**: SizeX[^2788]
- **Pixels**: SizeY[^2789]
- **Pixels**: SizeZ[^2790]
- **Pixels**: Type[^2791]
- **Plane**: TheC[^2792]
- **Plane**: TheT[^2793]
- **Plane**: TheZ[^2794]

[^2772]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
[^2773]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
[^2774]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
[^2775]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Description
[^2777]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
[^2778]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
[^2779]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
[^2780]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
[^2781]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
[^2785]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
[^2786]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
[^2787]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
[^2788]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
[^2789]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
[^2790]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
[^2791]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
[^2792]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
[^2793]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
[^2794]: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#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
- 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

[2795: http://www.openmicroscopy.org/site/support/ome-model/]
[2797: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel]
[2798: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate]
[2800: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name]
[2801: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian]
[2804: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved]
[2806: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC]
[2807: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT]
[2808: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX]
[2809: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY]
[2811: http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type]
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

2813 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
2814 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
2815 http://www.openmicroscopy.org/site/support/ome-model/
2816 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
2817 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
2818 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
2819 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID
2820 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
2821 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
2822 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
2823 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
2824 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
2825 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
2826 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
2827 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
2828 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
2829 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
2830 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
• Pixels: Type\(^{2831}\)
• Plane: TheC\(^{2832}\)
• Plane: TheT\(^{2833}\)
• Plane: TheZ\(^{2834}\)

**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\(^{2835}\). 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 Molecular Imaging format reader:

- Channel: ID\(^{2836}\)
- Channel: SamplesPerPixel\(^{2837}\)
- Image: AcquisitionDate\(^{2838}\)
- Image: ID\(^{2839}\)
- Image: Name\(^{2840}\)
- Pixels: BigEndian\(^{2841}\)
- Pixels: DimensionOrder\(^{2842}\)
- Pixels: ID\(^{2843}\)
- Pixels: Interleaved\(^{2844}\)
- Pixels: PhysicalSizeX\(^{2845}\)
- Pixels: PhysicalSizeY\(^{2846}\)
- Pixels: SignificantBits\(^{2847}\)
- Pixels: SizeC\(^{2848}\)

\(^{2831}\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
\(^{2832}\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
\(^{2833}\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
\(^{2834}\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
\(^{2835}\) http://www.openmicroscopy.org/site/support/ome-model/
\(^{2836}\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
\(^{2837}\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
\(^{2838}\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
\(^{2839}\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID
\(^{2840}\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
\(^{2841}\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
\(^{2842}\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
\(^{2843}\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
\(^{2844}\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
\(^{2845}\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeX
\(^{2846}\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
\(^{2847}\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
\(^{2848}\) 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: 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

19.2. Metadata fields
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

---

2868 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
2870 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
2871 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
2872 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
2873 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
2874 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
2875 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
2876 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
2877 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
2878 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
2879 http://www.openmicroscopy.org/site/support/ome-model/
• 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

19.2.81 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

---

2885 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
2886 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
2887 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
2888 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
2889 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
2890 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
2891 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
2892 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
2893 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
2894 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
2895 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
2896 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
2897 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
2898 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
2899 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
2900 http://www.openmicroscopy.org/site/support/ome-model/
2901 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
2902 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#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
• Plane: TheZ

Total supported: 24
Total unknown or missing: 451

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. Bio-Formats standardizes each format’s original metadata to and from the OME

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_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
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
- 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

http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_CalibratedMagnification
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#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
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
• Plane: TheC\textsuperscript{2973}
• Plane: TheT\textsuperscript{2974}
• Plane: TheZ\textsuperscript{2975}

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\textsuperscript{2976}. 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\textsuperscript{2977}
• Channel: ExcitationWavelength\textsuperscript{2978}
• Channel: ID\textsuperscript{2979}
• Channel: PinholeSize\textsuperscript{2980}
• Channel: SamplesPerPixel\textsuperscript{2981}
• Detector: Gain\textsuperscript{2982}
• Detector: ID\textsuperscript{2983}
• Detector: Type\textsuperscript{2984}
• Dichroic: ID\textsuperscript{2985}
• Dichroic: Model\textsuperscript{2986}
• Filter: ID\textsuperscript{2987}
• Filter: Model\textsuperscript{2988}
• Image: AcquisitionDate\textsuperscript{2989}
• Image: Description\textsuperscript{2990}

\textsuperscript{2973}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
\textsuperscript{2974}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
\textsuperscript{2975}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
\textsuperscript{2976}http://www.openmicroscopy.org/site/support/ome-model/
\textsuperscript{2977}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_EmissionWavelength
\textsuperscript{2978}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ExcitationWavelength
\textsuperscript{2979}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
\textsuperscript{2980}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_PinholeSize
\textsuperscript{2981}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
\textsuperscript{2982}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_Gain
\textsuperscript{2983}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_ID
\textsuperscript{2984}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_Type
\textsuperscript{2985}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Dichroic_ID
\textsuperscript{2986}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_Model
\textsuperscript{2987}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Filter_ID
\textsuperscript{2988}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_Model
\textsuperscript{2989}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
\textsuperscript{2990}http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Description

19.2. Metadata fields
• Image : ID 2991
• Image : InstrumentRef 2992
• Image : Name 2993
• Instrument : ID 2994
• Laser : ID 2995
• Laser : LaserMedium 2996
• Laser : Model 2997
• Laser : Type 2998
• Laser : Wavelength 2999
• Objective : Correction 3000
• Objective : ID 3001
• Objective : Immersion 3002
• Objective : LensNA 3003
• Objective : NominalMagnification 3004
• Objective : WorkingDistance 3005
• ObjectiveSettings : ID 3006
• Pixels : BigEndian 3007
• Pixels : DimensionOrder 3008
• Pixels : ID 3009
• Pixels : Interleaved 3010
• Pixels : PhysicalSizeX 3011
• Pixels : PhysicalSizeY 3012
• Pixels : PhysicalSizeZ 3013
• Pixels : SignificantBits 3014
• Pixels : SizeC 3015
• Pixels : SizeT 3016

2991 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID
2993 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
2995 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#LightSource_ID
2997 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_Model
2998 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Laser_Type
2999 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Laser_Wavelength
3000 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_Correction
3001 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_ID
3002 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_Immersion
3003 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_LensNA
3004 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_NominalMagnification
3005 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_WorkingDistance
3006 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ObjectiveSettings_ID
3007 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
3008 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
3009 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
3010 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
3012 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
3014 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
3015 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
3016 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT

19.2. Metadata fields
Total supported: 47
Total unknown or missing: 428

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. 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
- Channel : Color
- Channel : EmissionWavelength
- Channel : ExcitationWavelength
- Channel : ID
- Channel : Name
- Channel : PinholeSize
- Channel : SamplesPerPixel
- Detector : ID
- Detector : Model

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/
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_AcquisitionMode
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_Color
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_Name
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_PinholeSize
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_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

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_ReadOutRate
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_Name
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_CalibratedMagnification
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_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#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

19.2. Metadata fields
Bio-Formats Documentation, Release 5.0.8

This pagelistssupportedmetadatafieldsfortheBio-FormatsNRRDformatreader.

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

---

3062 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
3063 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
3064 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
3065 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
3066 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
3067 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
3068 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
3069 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_DeltaT
3070 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_ExposureTime
3074 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
3075 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
3076 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
3077 http://www.openmicroscopy.org/site/support/ome-model/
3078 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: 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

19.2.8.6 APLReader

This page lists supported metadata fields for the Bio-Formats Olympus APL format reader.

These fields are from the OME data model\(^{3100}\). 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.

\(^{3079}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
\(^{3080}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
\(^{3081}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID
\(^{3082}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
\(^{3083}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
\(^{3084}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
\(^{3085}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
\(^{3086}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
\(^{3087}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeX
\(^{3088}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
\(^{3089}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeZ
\(^{3090}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
\(^{3091}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
\(^{3092}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
\(^{3093}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
\(^{3094}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
\(^{3095}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
\(^{3096}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
\(^{3097}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
\(^{3098}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
\(^{3099}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
\(^{3100}\)http://www.openmicroscopy.org/site/support/ome-model/
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
- Pixels: BigEndian
- Pixels: DimensionOrder
- Pixels: ID
- Pixels: Interleaved
- Pixels: PhysicalSizeX
- Pixels: PhysicalSizeY
- Pixels: SignificantBits
- Pixels: SizeC
- Pixels: SizeE
- Pixels: SizeX
- Pixels: SizeY
- Pixels: SizeZ
- Pixels: Type
- Plane: TheC
- Plane: TheT
- Plane: TheZ

Total supported: 21

Total unknown or missing: 454

---

2. [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)
3. [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)
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
- 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

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_IlluminationType
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#LightSourceSettings_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#LightSourceSettings_Wavelength
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#Detector_Voltage
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#ManufacturerSpec_Model
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_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Ellipse_RadiusY
• Ellipse: StrokeWidth
• Ellipse: TheT
• Ellipse: TheZ
• Ellipse: Transform
• Ellipse: X
• Ellipse: Y
• Filter: ID
• Filter: 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

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/ome_xsd.html#Ellipsoid_Y
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_Name
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_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/ome_xsd.html#FilterRef_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Shape_FontSize
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Shape_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Shape_StrokeWidth
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Shape_TheT
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Shape_TheZ

19.2. Metadata fields
• Line : X1
• Line : X2
• Line : Y1
• Line : Y2
• Objective : Correction
• Objective : ID
• Objective : Immersion
• 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

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
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#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#Objective_WorkingDistance
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_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_TimeIncrement

19.2. Metadata fields
• Pixels : Type
• Plane : DeltaT
• Plane : PositionX
• Plane : PositionY
• Plane : PositionZ
• Plane : TheC
• Plane : TheT
• Plane : TheZ
• 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

Note: The links in the text are placeholders and are not clickable. For more information, please refer to the corresponding URLs.
• Polyline: TheT
• Polyline: TheZ
• Polyline: Transform
• ROI: ID
• Rectangle: FontSize
• Rectangle: Height
• Rectangle: ID
• Rectangle: StrokeWidth
• Rectangle: TheT
• Rectangle: TheZ
• Rectangle: Transform
• Rectangle: Width
• Rectangle: X
• Rectangle: Y
• TransmittanceRange: CutIn
• TransmittanceRange: CutOut

Total supported: 113

Total unknown or missing: 362

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

19.2. Metadata fields

- Channel: Name
- Channel: SamplesPerPixel
- Detector: ID
- Detector: Manufacturer
- Detector: Model
- Detector: Type
- DetectorSettings: Gain
- DetectorSettings: ID
- 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

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_TimeIncrement
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
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
- 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

3287 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
3288 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_Name
3289 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
3290 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
3292 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
3293 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
3294 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
3295 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
3296 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
3298 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
3299 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
3300 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
3301 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
3302 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
3303 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
3304 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
3305 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
3306 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_DeltaT
3307 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_ExposureTime
• Plane: PositionX
• Plane: PositionY
• Plane: TheC
• Plane: TheT
• Plane: TheZ
• Plate: ColumnNamingConvention
• Plate: Columns
• 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
- 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

---

3338. http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
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

3353 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
3354 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
3355 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
3356 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
3357 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
3358 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
3359 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
3360 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
3361 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
3362 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
3363 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
3364 http://www.openmicroscopy.org/site/support/ome-model/
3365 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
3366 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
3367 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
3368 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID
3369 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#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

19.2.92 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
• 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

[References]
- 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

19.2.94 PCORAWReader

This page lists supported metadata fields for the Bio-Formats PCO-RAW 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 PCO-RAW format reader:

- Channel: ID
- Channel: SamplesPerPixel
- Detector: ID
- Detector: SerialNumber
- 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

3428 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
3429 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
3430 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_ID
3431 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_SerialNumber
3432 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_Binning
3433 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_ID
3434 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
3435 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Description
3436 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID
3437 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
3439 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
3440 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
3441 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
3442 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
3443 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
3444 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
3445 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
3446 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
3447 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
3448 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
3449 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#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 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: SizeC
• Pixels: SizeT
• Pixels: SizeX

"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_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"
Bio-Formats Documentation, Release 5.0.8

• Pixels : SizeY
• Pixels : SizeZ
• Pixels : Type
• Plane : TheC
• Plane : TheT
• Plane : TheZ

Total supported: 19
Total unknown or missing: 456

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. 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
• 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: 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

3486 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
3487 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
3488 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
3489 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
3490 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
3491 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
3492 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
3495 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
3496 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
3497 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
3498 http://www.openmicroscopy.org/site/support/ome-model/
3499 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
3500 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_Name
3501 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
3502 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Experimenter_ID
3503 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#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: ExternalIdentifier

3504 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
3505 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ExperimenterRef_ID
3507 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
3508 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
3509 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
3510 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
3511 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
3513 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
3514 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
3515 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
3516 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
3517 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
3518 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
3519 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
3520 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
3524 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
3525 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
3526 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
3527 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Plate_Columns
3528 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Plate_Description
3529 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/SPW_xsd.html#Plate_ExternalIdentifier

19.2. Metadata fields
• Plate: ID
• Plate: Name
• Plate: Rows
• PlateAcquisition: ID
• PlateAcquisition: MaximumFieldCount
• PlateAcquisition: WellSampleRef
• Well: Column
• 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
• 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: PositionZ
• Plane: TheC
• Plane: TheT
• Plane: TheZ

Total supported: 30
Total unknown or missing: 445

3550 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
3552 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
3553 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
3554 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
3555 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
3556 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeX
3557 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
3558 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
3559 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
3560 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
3561 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
3562 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
3563 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
3564 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
3565 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_DeltaT
3566 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_ExposureTime
3570 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
3571 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
3572 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ

19.2. Metadata fields
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\(^\text{3573}\). 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\(^\text{3574}\)
- **Channel**: SamplesPerPixel\(^\text{3575}\)
- **Image**: AcquisitionDate\(^\text{3576}\)
- **Image**: ID\(^\text{3577}\)
- **Image**: Name\(^\text{3578}\)
- **Pixels**: BigEndian\(^\text{3579}\)
- **Pixels**: DimensionOrder\(^\text{3580}\)
- **Pixels**: ID\(^\text{3581}\)
- **Pixels**: Interleaved\(^\text{3582}\)
- **Pixels**: SignificantBits\(^\text{3583}\)
- **Pixels**: SizeC\(^\text{3584}\)
- **Pixels**: SizeT\(^\text{3585}\)
- **Pixels**: SizeX\(^\text{3586}\)
- **Pixels**: SizeY\(^\text{3587}\)
- **Pixels**: SizeZ\(^\text{3588}\)
- **Pixels**: Type\(^\text{3589}\)
- **Plane**: TheC\(^\text{3590}\)
- **Plane**: TheT\(^\text{3591}\)

\(^{3573}\)http://www.openmicroscopy.org/site/support/ome-model/
\(^{3574}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
\(^{3575}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
\(^{3576}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
\(^{3577}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID
\(^{3578}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
\(^{3579}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
\(^{3580}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
\(^{3581}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
\(^{3582}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
\(^{3583}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
\(^{3584}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
\(^{3585}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
\(^{3586}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
\(^{3587}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
\(^{3588}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
\(^{3589}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
\(^{3590}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
\(^{3591}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
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.

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

3592 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
3593 http://www.openmicroscopy.org/site/support/ome-model/
3594 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
3595 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
3596 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
3597 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID
3598 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
3599 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
3600 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
3601 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
3602 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
3603 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
3604 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
3605 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
3606 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
3607 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
3608 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
3609 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type

19.2. Metadata fields
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. 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
- 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

3610 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
3611 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
3612 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
3613 http://www.openmicroscopy.org/site/support/ome-model/
3614 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
3615 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
3616 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
3617 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID
3618 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
3619 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
3620 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
3621 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
3622 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
3623 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
3624 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
3625 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
3626 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
3627 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
This page lists supported metadata fields for the Bio-Formats PicoQuant Bin 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 PicoQuant Bin 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

19.2. Metadata fields
• 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

19.2.103 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: SizeC
• Pixels: SizeT
• Pixels: SizeX
• Pixels: SizeY
• Pixels: SizeZ
• Pixels: Type
• Plane: TheC
• Plane: TheT
• Plane: TheZ

19.2. Metadata fields
• 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

19.2.104 APNGReader

This page lists supported metadata fields for the Bio-Formats Animated PNG 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 Animated PNG 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

19.2.105 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

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/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
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_ID
• Detector: Type
• Detector: Zoom
• DetectorSettings: Gain
• DetectorSettings: ID
• DetectorSettings: Offset
• Image: AcquisitionDate
• Image: ID
• Image: InstrumentRef
• 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

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#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#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#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#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_LensNA
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_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#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
• 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

Total supported: 45
Total unknown or missing: 430

19.2.106 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

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_TimeIncrement
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/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
• 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

19.2.107 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:

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_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/
• 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
• 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

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
19.2.108 RHKReader

This page lists supported metadata fields for the Bio-Formats RHK Technologies format reader.

These fields are from the OME data model\(^{3784}\). 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\(^{3785}\)
- Channel : SamplesPerPixel\(^{3786}\)
- Image : AcquisitionDate\(^{3787}\)
- Image : Description\(^{3788}\)
- Image : ID\(^{3789}\)
- Image : Name\(^{3790}\)
- Pixels : BigEndian\(^{3791}\)
- Pixels : DimensionOrder\(^{3792}\)
- Pixels : ID\(^{3793}\)
- Pixels : Interleaved\(^{3794}\)
- Pixels : PhysicalSizeX\(^{3795}\)
- Pixels : PhysicalSizeY\(^{3796}\)
- Pixels : SignificantBits\(^{3797}\)
- Pixels : SizeC\(^{3798}\)
- Pixels : SizeT\(^{3799}\)
- Pixels : SizeX\(^{3800}\)
- Pixels : SizeY\(^{3801}\)
- Pixels : SizeZ\(^{3802}\)
- Pixels : Type\(^{3803}\)

\(^{3784}\)http://www.openmicroscopy.org/site/support/ome-model/

\(^{3785}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID

\(^{3786}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel

\(^{3787}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate

\(^{3788}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Description

\(^{3789}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID

\(^{3790}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name

\(^{3791}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian

\(^{3792}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder

\(^{3793}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID

\(^{3794}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved

\(^{3795}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeX

\(^{3796}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY

\(^{3797}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits

\(^{3798}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC

\(^{3799}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT

\(^{3800}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX

\(^{3801}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY

\(^{3802}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ

\(^{3803}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
• Plane: TheC
• Plane: TheT
• Plane: TheZ

Total supported: 22
Total unknown or missing: 453

19.2.109 SBIGReader

This page lists supported metadata fields for the Bio-Formats SBIG 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 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

19.2. Metadata fields
• Pixels : SizeT
• Pixels : SizeX
• Pixels : SizeY
• Pixels : SizeZ
• Pixels : Type
• Plane : TheC
• Plane : TheT
• Plane : TheZ

Total supported: 22
Total unknown or missing: 453

19.2.110 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

Total supported: 22
Total unknown or missing: 453
This page lists supported metadata fields for the Bio-Formats Compix Simple-PCI 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 Compix Simple-PCI format reader:

- Channel : ID
- Channel : SamplesPerPixel
- Detector : ID
- Detector : Type
Bio-Formats Documentation, Release 5.0.8

- `DetectorSettings`: Binning
- `DetectorSettings`: ID
- `Image`: AcquisitionDate
- `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`: TimeIncrement
- `Pixels`: Type
- `Plane`: DeltaT
- `Plane`: TheC
- `Plane`: TheT
- `Plane`: TheZ

Total supported: 29

Total unknown or missing: 446

3860  [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)
3878  [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#Pixels_Type)
19.2.112 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
- 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

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#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
19.2.113 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

Total supported: 33
Total unknown or missing: 442
19.2.114 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
- 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
19.2.115 TargaReader

This page lists supported metadata fields for the Bio-Formats Truevision Targa format reader.

These fields are from the OME data model\(^\text{3959}\). 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\(^\text{3960}\)
- Channel: SamplesPerPixel\(^\text{3961}\)
- Image: AcquisitionDate\(^\text{3962}\)
- Image: Description\(^\text{3963}\)
- Image: ID\(^\text{3964}\)
- Image: Name\(^\text{3965}\)
- Pixels: BigEndian\(^\text{3966}\)
- Pixels: DimensionOrder\(^\text{3967}\)
- Pixels: ID\(^\text{3968}\)
- Pixels: Interleaved\(^\text{3969}\)
- Pixels: SignificantBits\(^\text{3970}\)
- Pixels: SizeC\(^\text{3971}\)
- Pixels: SizeT\(^\text{3972}\)
- Pixels: SizeX\(^\text{3973}\)
- Pixels: SizeY\(^\text{3974}\)
- Pixels: SizeZ\(^\text{3975}\)
- Pixels: Type\(^\text{3976}\)
- Plane: TheC\(^\text{3977}\)

\(^{3959}\) http://www.openmicroscopy.org/site/support/ome-model/
\(^{3960}\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
\(^{3961}\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
\(^{3962}\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
\(^{3963}\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Description
\(^{3964}\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID
\(^{3965}\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
\(^{3966}\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
\(^{3967}\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
\(^{3968}\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
\(^{3969}\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
\(^{3970}\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
\(^{3971}\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
\(^{3972}\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
\(^{3973}\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
\(^{3974}\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
\(^{3975}\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
\(^{3976}\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
\(^{3977}\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
• Plane: TheT
• Plane: TheZ

Total supported: 20
Total unknown or missing: 455

19.2.116 TextReader

This page lists supported metadata fields for the Bio-Formats Text 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 Text 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

19.2. Metadata fields
• Pixels: Type
• Plane: TheC
• Plane: TheT
• Plane: TheZ

Total supported: 19
Total unknown or missing: 456

19.2.117 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
• Image: AcquisitionDate
• Image: Description
• Image: ID
• Image: Name
• Pixels: BigEndian
• Pixels: DimensionOrder
• Pixels: ID
• Pixels: Interleaved
• Pixels: PhysicalSizeZ
• Pixels: SignificantBits
• Pixels: SizeC

3996 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
3997 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC
3998 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheT
3999 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
4000 http://www.openmicroscopy.org/site/support/ome-model/
4001 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
4002 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
4003 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
4004 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Description
4006 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
4007 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
4008 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
4009 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
4010 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
4012 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
4013 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
19.2.118 TillVisionReader

This page lists supported metadata fields for the Bio-Formats TillVision 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 TillVision format reader:

- Channel: ID
- Channel: SamplesPerPixel
- Experiment: ID
- Experiment: Type
- Image: AcquisitionDate
- Image: ID
- Image: Name
- Pixels: BigEndian
- Pixels: SizeT
- Pixels: SizeX
- Pixels: SizeY
- Pixels: SizeZ
- Pixels: TimeIncrement
- Plane: TheC
- Plane: TheT
- Plane: TheZ

Total supported: 22
Total unknown or missing: 453
19.2.119 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

---

• 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
• 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

19.2.120 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
- Pixels: DimensionOrder
- Pixels: ID
- Pixels: Interleaved
- Pixels: SignificantBits
- Pixels: SizeC
- Pixels: SizeT
- Pixels: SizeX
- Pixels: SizeY
- Pixels: SizeZ
- Pixels: Type
- Plane: TheC
- Plane: TheT

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/ROI_xsd.html#Mask_Y
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
19.2.121 UBMReader

This page lists supported metadata fields for the Bio-Formats UBM format reader.

These fields are from the OME data model\(^4\). 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\(^4\)
- Channel: SamplesPerPixel\(^4\)
- Image: AcquisitionDate\(^4\)
- Image: ID\(^4\)
- Image: Name\(^4\)
- Pixels: BigEndian\(^4\)
- Pixels: DimensionOrder\(^4\)
- Pixels: ID\(^4\)
- Pixels: Interleaved\(^4\)
- Pixels: SignificantBits\(^4\)
- Pixels: SizeC\(^4\)
- Pixels: SizeT\(^4\)
- Pixels: SizeX\(^4\)
- Pixels: SizeY\(^4\)
- Pixels: SizeZ\(^4\)

\(^4\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheZ
\(^4\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#ROI_ID
\(^4\)http://www.openmicroscopy.org/site/support/ome-model/
\(^4\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
\(^4\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
\(^4\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
\(^4\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID
\(^4\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
\(^4\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
\(^4\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
\(^4\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
\(^4\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
\(^4\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
\(^4\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
\(^4\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
\(^4\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
\(^4\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
\(^4\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
19.2.122 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
- Channel: SamplesPerPixel
- Image: AcquisitionDate
- Image: Description
- Image: ID
- Image: Name
- Pixels: BigEndian
- Pixels: DimensionOrder
- Pixels: ID
- Pixels: Interleaved
- Pixels: PhysicalSizeX
- Pixels: PhysicalSizeY
- Pixels: SignificantBits
Total supported: 22
Total unknown or missing: 453

19.2.123 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.

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
This page lists supported metadata fields for the Bio-Formats VGSAM format reader.

These fields are from the OME data model\(^\text{4165}\). 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
- Pixels: SizeZ
- Pixels: Type
- Plane: TheC
- Plane: TheT
- Plane: TheZ

Total supported: 19

Total unknown or missing: 456

#### 19.2.125 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.

---

19.2. Metadata fields

405
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
- Pixels: SizeX
- Pixels: SizeY
- Pixels: SizeZ
- Pixels: Type
- Plane: TheC
- Plane: TheT
- Plane: TheZ

**Total supported: 19**

**Total unknown or missing: 456**
19.2.126 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
- Pixels: SizeC
- Pixels: SizeT
- Pixels: SizeX
- Pixels: SizeY
- Pixels: SizeZ
- Pixels: Type
- Plane: TheC
- Plane: TheT

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
• Plane: TheZ

Total supported: 19
Total unknown or missing: 456

19.2.127 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
• Image: ID
• Image: InstrumentRef
• Image: Name
• Instrument: ID
• Objective: Correction
• Objective: ID
• Objective: Immersion
• Objective: NominalMagnification

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_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#ManufacturerSpec_Model
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#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_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 : DeltaT
• Plane : PositionX
• Plane : PositionY
• Plane : PositionZ
• Plane : TheC
• Plane : TheT
• Plane : TheZ

Total supported: 38
Total unknown or missing: 437

19.2.128 WATOPReader

This page lists supported metadata fields for the Bio-Formats WA Technology TOP 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 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\(^2\)
- Channel: SamplesPerPixel\(^3\)
- Image: AcquisitionDate\(^4\)
- Image: Description\(^5\)
- Image: ID\(^6\)
- Image: Name\(^7\)
- Pixels: BigEndian\(^8\)
- Pixels: DimensionOrder\(^9\)
- Pixels: ID\(^10\)
- Pixels: Interleaved\(^11\)
- Pixels: PhysicalSizeX\(^12\)
- Pixels: PhysicalSizeY\(^13\)
- Pixels: SignificantBits\(^14\)
- Pixels: SizeC\(^15\)
- Pixels: SizeT\(^16\)
- Pixels: SizeX\(^17\)
- Pixels: SizeY\(^18\)
- Pixels: SizeZ\(^19\)
- Pixels: Type\(^20\)
- Plane: TheC\(^21\)

---

\(^1\) http://www.openmicroscopy.org/site/support/ome-model/
\(^2\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID
\(^3\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel
\(^4\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate
\(^5\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Description
\(^6\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID
\(^7\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name
\(^8\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
\(^9\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
\(^10\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
\(^11\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
\(^12\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeX
\(^13\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
\(^14\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
\(^15\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
\(^16\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeT
\(^17\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeX
\(^18\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeY
\(^19\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeZ
\(^20\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Type
\(^21\) http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Plane_TheC

---

19.2. Metadata fields
• Plane: TheT
• Plane: TheZ

Total supported: 22
Total unknown or missing: 453

19.2.129 BMPReader

This page lists supported metadata fields for the Bio-Formats Windows Bitmap 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 Windows Bitmap 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
19.2.130 WlzReader

This page lists supported metadata fields for the Bio-Formats Woolz format reader. These fields are from the OME data model[4309]. 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[4310]
- Channel: SamplesPerPixel[4311]
- Image: AcquisitionDate[4312]
- Image: ID[4313]
- Image: Name[4314]
- Pixels: BigEndian[4315]
- Pixels: DimensionOrder[4316]
- Pixels: ID[4317]
- Pixels: Interleaved[4318]
- Pixels: PhysicalSizeX[4319]
- Pixels: PhysicalSizeY[4320]

• 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

19.2.131 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
Bio-Formats Documentation, Release 5.0.8

• 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

19.2.132 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. 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%).

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
http://www.openmicroscopy.org/site/support/ome-model/
Supported fields

These fields are fully supported by the Bio-Formats Zeiss Vision Image (ZVI) 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

19.2.133 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.

[Links to OME data model specifications]
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
- Detector: AmplificationGain
- Detector: Gain
- Detector: ID
- Detector: LotNumber
- Detector: Manufacturer
- Detector: Model
19.2. Metadata fields
• Filament : Manufacturer
• Filament : Model
• Filament : Power
• Filament : SerialNumber
• Filter : FilterWheel
• Filter : ID
• Filter : LotNumber
• Filter : Manufacturer
• Filter : Model
• Filter : SerialNumber
• Filter : Type
• FilterSet : DichroicRef
• FilterSet : EmissionFilterRef
• FilterSet : ExcitationFilterRef
• FilterSet : ID
• FilterSet : LotNumber
• FilterSet : Manufacturer
• FilterSet : Model
• FilterSet : SerialNumber
• Image : AcquisitionDate
• Image : Description
• Image : ExperimenterRef
• Image : ID
• Image : InstrumentRef
• Image : Name
• Image : ROIRef
Bio-Formats Documentation, Release 5.0.8

- ImagingEnvironment: AirPressure
- ImagingEnvironment: CO2Percent
- ImagingEnvironment: Humidity
- ImagingEnvironment: Temperature
- Instrument: ID
- Laser: LotNumber
- Laser: Manufacturer
- Laser: Model
- Laser: Power
- Laser: SerialNumber
- LightEmittingDiode: LotNumber
- LightEmittingDiode: Manufacturer
- LightEmittingDiode: Model
- LightEmittingDiode: Power
- LightEmittingDiode: SerialNumber
- Line: ID
- Line: Text
- Line: X1
- Line: X2
- Line: Y1
- Line: Y2
- Microscope: LotNumber
- Microscope: Manufacturer
- Microscope: Model
- Microscope: SerialNumber
- Microscope: Type

19.2. Metadata fields
• 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

4477 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_CalibratedMagnification
4478 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_Correction
4479 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_ID
4480 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_Immersion
4481 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_Iris
4482 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_LensNA
4483 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_LotNumber
4484 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_Manufacturer
4485 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_Model
4486 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_NominalMagnification
4487 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_SerialNumber
4488 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Objective_WorkingDistance
4489 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ObjectiveSettings_CorrectionCollar
4490 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ObjectiveSettings_ID
4491 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ObjectiveSettings_Medium
4492 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ObjectiveSettings_RefractiveIndex
4493 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_BigEndian
4494 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder
4495 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_ID
4496 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_Interleaved
4498 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_PhysicalSizeY
4500 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SignificantBits
4501 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_SizeC
4502 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: 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
- ROI: Name
- Rectangle: Height
- Rectangle: ID
- Rectangle: Text
- Rectangle: Width
- Rectangle: X
19.2.134 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\(^\text{4535}\). 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\(^\text{4536}\)
- Channel : ID\(^\text{4537}\)
- Channel : Name\(^\text{4538}\)
- Channel : PinholeSize\(^\text{4539}\)
- Channel : SamplesPerPixel\(^\text{4540}\)
- Detector : AmplificationGain\(^\text{4541}\)
- Detector : Gain\(^\text{4542}\)
- Detector : ID\(^\text{4543}\)
- Detector : Type\(^\text{4544}\)
- Detector : Zoom\(^\text{4545}\)
- DetectorSettings : Binning\(^\text{4546}\)

---

\(^{4529}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Rectangle_Y

\(^{4530}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#TransmittanceRange_CutIn

\(^{4531}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#TransmittanceRange_CutInTolerance

\(^{4532}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#TransmittanceRange_CutOut

\(^{4533}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#TransmittanceRange_CutOutTolerance

\(^{4534}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#TransmittanceRange_Transmittance

\(^{4535}\)http://www.openmicroscopy.org/site/support/ome-model/

\(^{4536}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_Color

\(^{4537}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_ID

\(^{4538}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_Name

\(^{4539}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_PinholeSize

\(^{4540}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Channel_SamplesPerPixel

\(^{4541}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_AmplificationGain

\(^{4542}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_Gain

\(^{4543}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_ID

\(^{4544}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_Type

\(^{4545}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Detector_Zoom

\(^{4546}\)http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_Binning

19.2. Metadata fields

422
• 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

• Image : Name

• Instrument : ID

• Label : FontSize

• Label : ID

• Label : StrokeWidth

4547 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#DetectorSettings_ID

4548 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Dichroic_ID

4549 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_Model

4550 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_FontSize

4551 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_ID


4553 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Ellipse_RadiusY

4554 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_StrokeWidth

4555 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_Transform


4557 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Ellipse_Y

4558 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Experimenter_ID

4559 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Experimenter_UserName

4560 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Filter_ID

4561 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#ManufacturerSpec_Model

4562 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Filter_Type

4563 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_AcquisitionDate

4564 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Description

4565 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_ID


4567 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Image_Name

4568 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#ROIRef_ID


4570 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_FontSize

4571 http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_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
• Objective: Iris
• Objective: LensNA
• Objective: NominalMagnification
• ObjectiveSettings: ID
• Pixels: BigEndian
• Pixels: DimensionOrder

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/ome_xsd.html#Shape_FontSize
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Shape_ID
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_Stripes
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_X1
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_X2
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_Y1
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ROI_xsd.html#Shape_Y2
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_Iris
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#Pixels_BigEndian
http://www.openmicroscopy.org/Schemas/Documentation/Generated/OME-2013-06/ome_xsd.html#Pixels_DimensionOrder

19.2. Metadata fields
• 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

19.2. Metadata fields
• 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
Symbols

1sc, 114
2, 174
2fl, 189
3, 174
4, 174
.acff, 194
.afi, 109
.afm, 179
.aim, 104
.al3d, 105
.am, 106
.amiramesh, 106
.apl, 165
.arf, 112
.avi, 111
.bin, 177
.bip, 148
.bmp, 132, 195
c01, 119
cfg, 179
cr2, 118
crw, 118
cxd, 183
czi, 198
dat, 144, 168, 191
dcm, 122
dicom, 122
dm2, 128
dm3, 127
dti, 192
dv, 121
dps, 123
dpsi, 123
.exp, 112
.fdf, 191
.iff, 133
.ffd, 189
.fits, 126
.flex, 124
.fli, 149
.frm, 141
gel, 106
gif, 128
grey, 106
.hdr, 107, 142, 162, 191
.hed, 135
.his, 130
.htd, 110
.html, 192
.hx, 106
.ics, 132
.ids, 132
.img, 107, 117, 125, 135, 144, 162
.ims, 116
.inr, 141
.ipi, 142
.ipm, 143
.ipw, 135
.jp2, 145
.jpeg, 132, 145, 189
.jpkg, 146
.jpj, 147
.l2d, 153
.labels, 106
.lei, 150
.lif, 151
.liff, 137
.lim, 154
.lsm, 199
.mdb, 199
.mea, 124
.mnc, 157
.mng, 159
.mod, 136
.mov, 180
.mrc, 160
.mrw, 158
.msr, 139, 149
.mtb, 165
.mvd2, 193
.naf, 129
.nd, 155
.nd2, 164
.ndpi, 130
.nef, 161
.nhdr, 164
.nrrd, 164
.obf, 139
.obsep, 165
.oib, 166
.tif, 166
.ome, 170
.ome.tif, 169
.par, 144
.pcoraw, 171
.pcx, 172
.pds, 173
Axon Raw Format, 112

B
BD Pathway, 112
Becker & Hickl SPCLmage, 113
BF_DEVEL, 39
bfconvert, 38
Bio-Rad Gel, 114
Bio-Rad PIC, 114
Bio-Rad SCN, 115
Bitplane Imaris, 116
Bruker MRI, 117
BSD, 103
Burleigh, 117

C
Canon DNG, 118
Cellomics, 119
cellSens VSI, 119
CellVoyager, 120
CLASSPATH, 62

D
DeltaVision, 121
DICOM, 122

E
ECAT7, 123
environment variable
BF_DEVEL, 39
CLASSPATH, 62
PYTHONPATH, 60
EPS (Encapsulated PostScript), 123
Evotec/PerkinElmer Opera Flex, 124
Export, 103

F
FEI, 125
FEI TIFF, 125
FITS (Flexible Image Transport System), 126
formatlist, 38

G
Gatan Digital Micrograph, 127
Gatan Digital Micrograph 2, 128
GIF (Graphics Interchange Format), 128

H
Hamamatsu Aquacosmos NAF, 129
Hamamatsu HIS, 130
Hamamatsu ndpi, 130
Hamamatsu VMS, 131
Hitachi S-4800, 132

I
ICS (Image Cytometry Standard), 132
ijview, 38
Imacon, 133
ImagePro Sequence, 134
ImagePro Workspace, 135

A
Adobe Photoshop PSD, 175
AIM, 104
Alicona 3D, 105
Amersham Biosciences Gel, 106
Amira Mesh, 106
Analyze 7.5, 107
Andor Bio-Imaging Division (ABD) TIFF, 104
Animated PNG, 108
Aperio AFI, 109
Aperio SVS TIFF, 109
Applied Precision CellWorX, 110
AVI (Audio Video Interleave), 111
Windows Bitmap, 195
Woolz, 196

X
xmlindent, 38
xmlvalid, 38

Z
Zeiss AxioVision TIFF, 197
Zeiss AxioVision ZVI (Zeiss Vision Image), 197
Zeiss CZI, 198
Zeiss LSM (Laser Scanning Microscope) 510/710, 199