IVD

CE UK CA

NZDicomMD
U15136-21MDEU
Instruction Manual

Thank you for your purchase

CAUTION	• Follow the safety precautions in Chapter 1 to avoid personal injury and damage to property when using this system. This manual describes how to operate the system correctly and provides instructions that should be followed to avoid accidents. **Read this manual carefully** before using the system. After reading this manual, store it in a location where you can refer to it at any time.
CAUTION	• Any serious incident that has occurred in relation to the device shall be reported to the manufacturer and the competent authority of the Member State in which the user and/or patient is established.

Ver.1.1 / Rev.1
September 2024

HAMAMATSU PHOTONICS K.K.

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1. SAFETY PRECAUTIONS

1-1 SYMBOLS

The symbols shown below are used in the labeling for this system.

CE	CE mark indicating conformity with Regulation (EU) 2017/746	EC REP	Authorized representative for the European Union
UK CA	UK Conformity Assessed marking	CH REP	Swiss authorized representative
IVD	In vitro diagnostic medical device	UK REP	UK Responsible Person
	Legal manufacturer for the European Union		

1-2 CLASSIFICATION OF WARNING SYMBOLS

We have classified the warnings symbols that appear in this manual and on the system as follows for your convenience. Make sure that you fully understand them and follow the accompanying instructions while using the system.

WARNING	Improper handling of the system without observing these warnings, could lead to serious injury to the user and even death.
CAUTION	Improper handling of the system without observing these cautions, could lead to personal injury to the user or damage to property.

	This symbol indicates a precaution that should be followed when handling the system. Read the contents carefully to ensure correct and safe use.
	This symbol indicates an action that is forbidden. Read and follow the instructions carefully.
	This symbol indicates a compulsory action or instruction. Read and follow the instructions carefully.
Note	This symbol indicates a note to help you get the best performance from the system. Read the contents of the note carefully to ensure correct and safe use. Failure to observe one of these notes might impair the performance of the system.

1-3 INSTALLATION OF OTHER SOFTWARE

CAUTION	• This software has been validated only with combinations of already installed software. Do not install unintended software with the exception of Adobe Acrobat, Virus Scan software and NZ software.

2. INTRODUCTION

Thanks for purchasing “U15136-21MDEU NZDicomMD”. This manual describes how to use the software. Read this manual carefully before using the software.

2-1 SYSTEM REQUIREMENTS

The system requirements for this software are as follows.

Type of computer	PC-AT compatibles
OS	Windows 10 64bit and Windows 11 64bit
CPU	Intel Core i5 or more
Memory	8 GB or more is recommended
Available HDD space	500 MB or more
Drive	CD-ROM Drive
Screen resolution	1024 × 768 or higher

Note

- This software may not work satisfactorily on some computers. The software may fail to operate due to the operating system or system requirements. Please read the clause of "System requirements" well and use it in the right system requirements.

Note

- It is not recommended to install NZDicomMD on the same PC as the scanner software. For the best performance, both the scanner and NZDicomMD should have dedicated hardware. Files can be transferred from the scanner PC to the NZDicomMD PC via a network share.

Note

- Disk performance may become a bottleneck if many conversions are performed concurrently. During conversion, NZDicomMD creates a large number of temporary files in a user-specified directory. Therefore it is recommended that this directory and the source NDPi files reside on a solid-state drive (SSD)

2-2 TRADEMARKS

Windows are the registered trademarks of Microsoft Corporation in the United States and other countries. Other brand names are the trademarks or registered trademarks of each company.

3. CHECK THE CONTENTS OF PACKAGE

When opening the package, check that the following items are included before use. If the contents are incorrect, insufficient, or damaged in any way, contact a Hamamatsu subsidiary or your local distributor before attempting to operate this software.

NZDicomMD: U15136-21MDEU	Install CD (CD-ROM)	1
	Instruction manual (in install CD)	1
	Before Use	1
	Key Code Sheet	1

Contents

4. OVERVIEW

This equipment has been tested and found to comply with the regulatory requirements of the Regulation (EU) 2017/746 of the European Parliament and of the council.

Note

- This declaration shall become invalid if modifications are made to the device without our approval.

4-1 INTENDED USE

This software converts image data (*.ndpi) acquired by the NanoZoomer Slide scanner system (MDEU series), patient information, and color correction information (ICC profile) into data objects of the international standard DICOM WSI format for medical images.

4-2 INTENDED USERS

This software is intended to be used by Health care workers and computer administrators.

Note

- We have no liability for any damage or risks caused by using this device for purposes other than those for which it was intended, or not using it according to the specifications of the NanoZoomer Slide scanner system (MDEU series).

Note

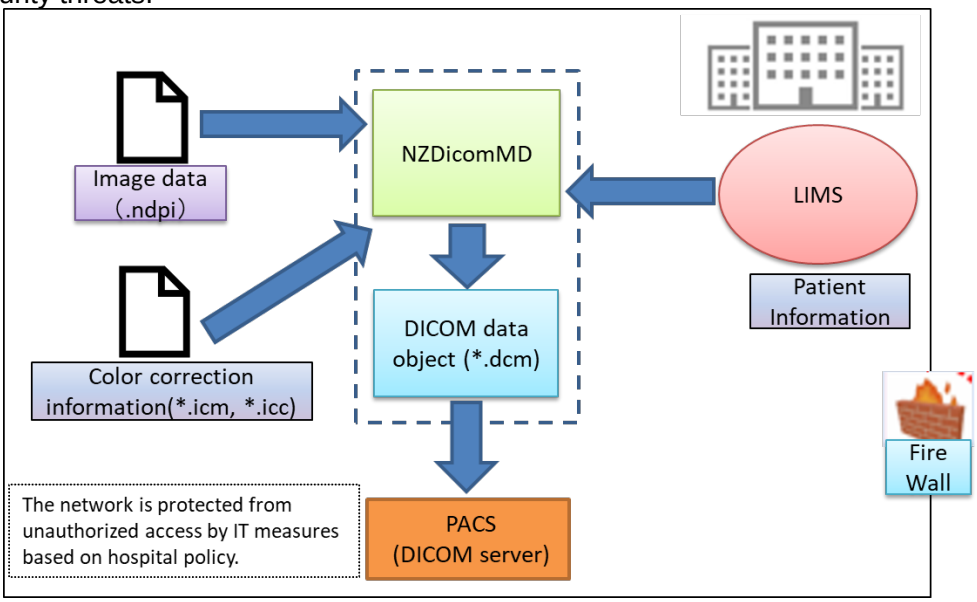
- This device is not intended to be combined with medical devices according to EN 60601-1. If it is electrically connected to a medical device according to EN 60601-1, the requirements defined in EN 60601-1 ME systems shall apply.

5. CYBERSECURITY

This chapter contains information on requirements and recommendations for ensuring that the NZDicomMD on your network are protected from security threats while still providing a good user experience. This chapter is provided for IT personnel and network administrators who are responsible for maintaining the NZDicomMD within your institution's network environment.

5-1 PROTECTING THE PC ON WHICH NZDICOMMD IS INSTALLED

This section provides tips and recommendations to protect your PC with NZDicomMD installed from security threats.



5-1-1 Password, Login, And User Configuration Safeguards

- To prevent inadvertent operation, it is advisable to restrict the users who can log in to the PC on which NZDicomMD is installed according to hospital policy.
- Password management must also follow hospital policy.

5-1-2 Physical Safeguards

- Must be used on a PC within a network built based on hospital policy.
- Protect against unauthorized access by restricting physical access to PCs on which NZDicomMD is installed.

5-1-3 Administrative Safeguards

- NZDicomMD uses standard IT techniques to protect installed PCs from unauthorized access.
  For example:

  Firewalls
  Antivirus

Note

- The administrator should review the Windows Event Logs and those event codes periodically.

5-1-4 Update Policies

- Hamamatsu hot fixes, patches, and software upgrades will be made available to you by Hamamatsu Technical Services.
- Hamamatsu security specialists evaluate industry security reports and Microsoft operating system vulnerability and problem reports and determine what actions need to be taken. If critical updates are required, Hamamatsu Technical Services will notify affected customers.

6. WORKFLOW OF NZDicomMD

NZDicomMD is an automated DICOM conversion and transmission tool for NanoZoomer digital slide (NDPi) files. It uses the following process to create files compliant with the DICOM standard for Whole Slide Imaging (WSI) with minimal operator interaction:

1. A directory is periodically scanned for NDPi files.
2. NDPi files in the directory are converted to DICOM objects using metadata retrieved from a Laboratory Information System (LIS) or from operator input.
3. After conversion, the original NDPi files can be moved to a long-term, local storage solution or deleted.

Note

- NZDicomMD can connect with the LIS of Tieto and Finalist Software to retrieve the metadata. Also it can connect the systems which support Hamamatsu's JSON-based DICOM metadata transfer format. Regarding the Hamamatsu's JSON-based DICOM metadata, please refer '10 JSON Representation of DICOM Metadata'.

⚠ **CAUTION**	• Only NDPi files acquired by the NanoZoomer System (MDEU series) can be converted. A conversion error will occur for NDPi files acquired by other NanoZoomer Systems.
⚠ **CAUTION**	• After conversion, if the original NDPi files are deleted by the associated setting you can not view them in the NanoZoomer image viewer anymore.

Using this workflow, digital slide files can be converted automatically as they are produced by a scanner. Once DICOM objects have been generated, NZDicomMD can transfer them in the following way:

1. A directory is periodically scanned for DICOM files.
2. DICOM files in the directory are transmitted using C-STORE to remote storage, such as a Picture Archiving and Communication System (PACS).
3. After successful transmission, if storage commitment is not active, the original DICOM files can be automatically moved to a long-term, local storage solution or deleted.

⚠ **CAUTION**	• In order to incorrect patient information is not being used, after conversion or successful transmission, check whether the contents of the metadata in the created the DICOM objects are correct with the patient information in the retrieved LIS or not by DICOM viewer etc before using them on the PACS.
⚠ **CAUTION**	• Check whether there are any missing items in the scanning area or not by using a DICOM Viewer. The display function of slide labels and whole slide images also depends on the DICOM viewer. Also check whether the scanning area (covers all samples) and the focus of image are correct or not before converting NDPi.
⚠ **CAUTION**	• The DICOM standard defines the use of ICC Profiles to perform the color correction on images outputted by virtual slide scanner. In this version of NZDicomMD, the ICC Profile equivalent to gamma 2.2 in the DICOM object is embedded, to be the same as the initial setting of NZViewMD. It is a role of the user's chosen DICOM Viewer to adapt the ICC Profile included in the DICOM object for the display image. Regarding the functions of the DICOM viewer, please contact with the vendor that provides the DICOM viewer.

Once a DICOM file has been transmitted via C-STORE to a remote storage successfully, storage commitment can be requested for the file. This is done in the following way:

1. Files in the transmission source directory that have been successfully transmitted are added to a list of files for storage commitment.
2. That list of files is sent in a storage commitment request to a user-specified location (usually the same location as transmission).
3. A response to that storage commitment request is either received on the same association that the request was sent from, or the response is received later by the NZDicomMD storage commitment listener.
4. After storage commitment is completed successfully, the original DICOM files can be automatically moved to a long-term, local storage solution or deleted.

Storage commitment requests are sent one at a time, however they contain as many files as possible that are awaiting storage commitment, up to the limit defined by the 'concurrent commitments' setting (Section 7).

It is possible for the conversion output and transmission input directories to be the same. In this case, NZDicomMD will provide a fully automated conversion / transmission / storage commitment workflow.

NZDicomMD can convert and/or transmit and/or storage commit multiple files simultaneously. If a file is ready to undergo an operation but the maximum number of concurrent operations of that type has already been reached, the file will be added to a queue. Queued files will be operated on one-by-one as earlier operations are completed. If any stage of the process is not completed successfully, NZDicomMD can add the failed files to the back of the queue so that further attempts can be made. If a file fails repeatedly, it can be moved to another directory automatically for inspection by a human operator.

7. OPERATION AND FUNCTIONS

This section provides a quick overview of the layout of the NZDicomMD and will give a brief introduction to each function.

7-1 FILES PANE (INACTIVE)

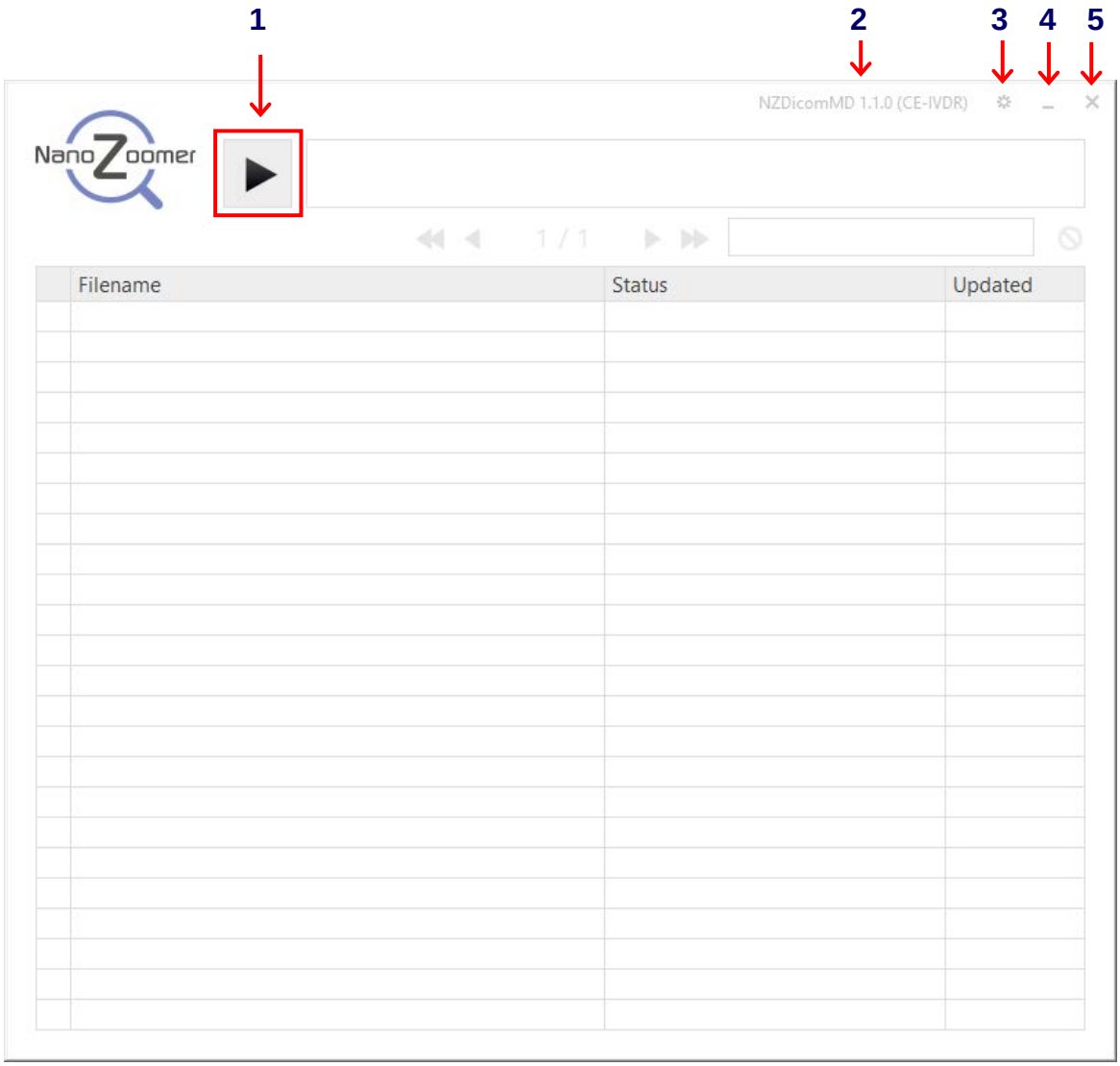


Image 6-1

1. **Start conversions and transmissions**

   When this button is clicked, NZDicomMD will begin checking the specified source folders for NDPi/DICOM files.

2. **Version display**
3. **Switch to settings pane**
4. **Minimise button**
5. **Exit button**

7-2 FILES PANE (ACTIVE)

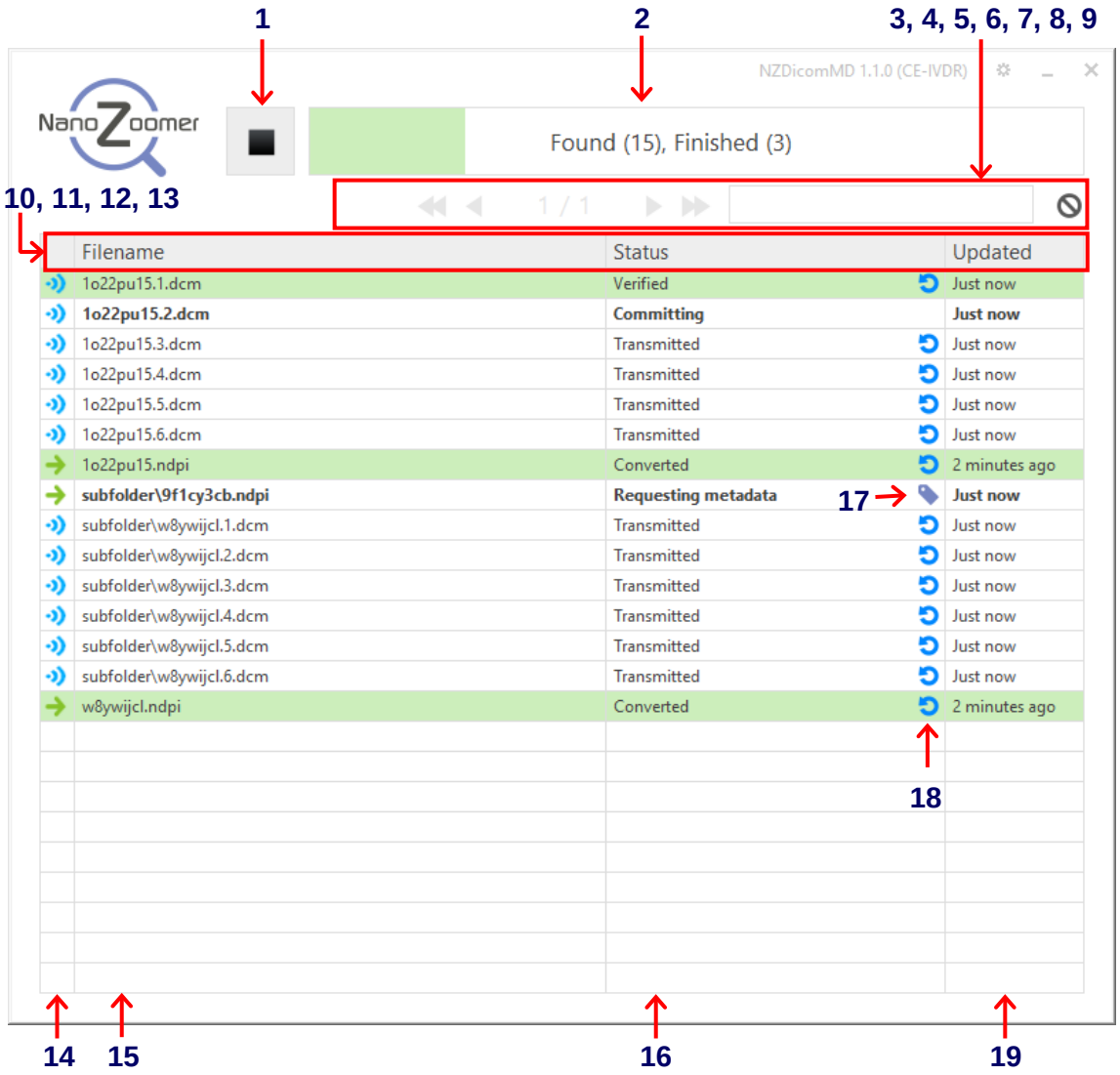


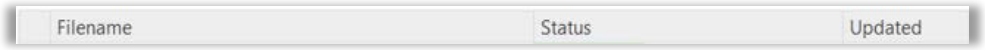
Image 6-2

1. **Stop conversions and transmissions**
2. **Overall progress indicator**

3. **Go to first page**
4. **Go to previous page**
5. **Page indicator**
6. **Go to next page**
7. **Go to last page**
8. **Filename filter**

9. Clear completed items

10 11 12 13



10. Sort by item type

11. Sort by filename

12. Sort by status

13. Sort by last updated

14. Item type

15. Filename

16. Status/progress

17. Open metadata user input window (Please refer '7-4 USER INPUT INDOW')

18. Manually reset individual conversion/transmissions

19. Last updated

7-3 SETTINGS PANE

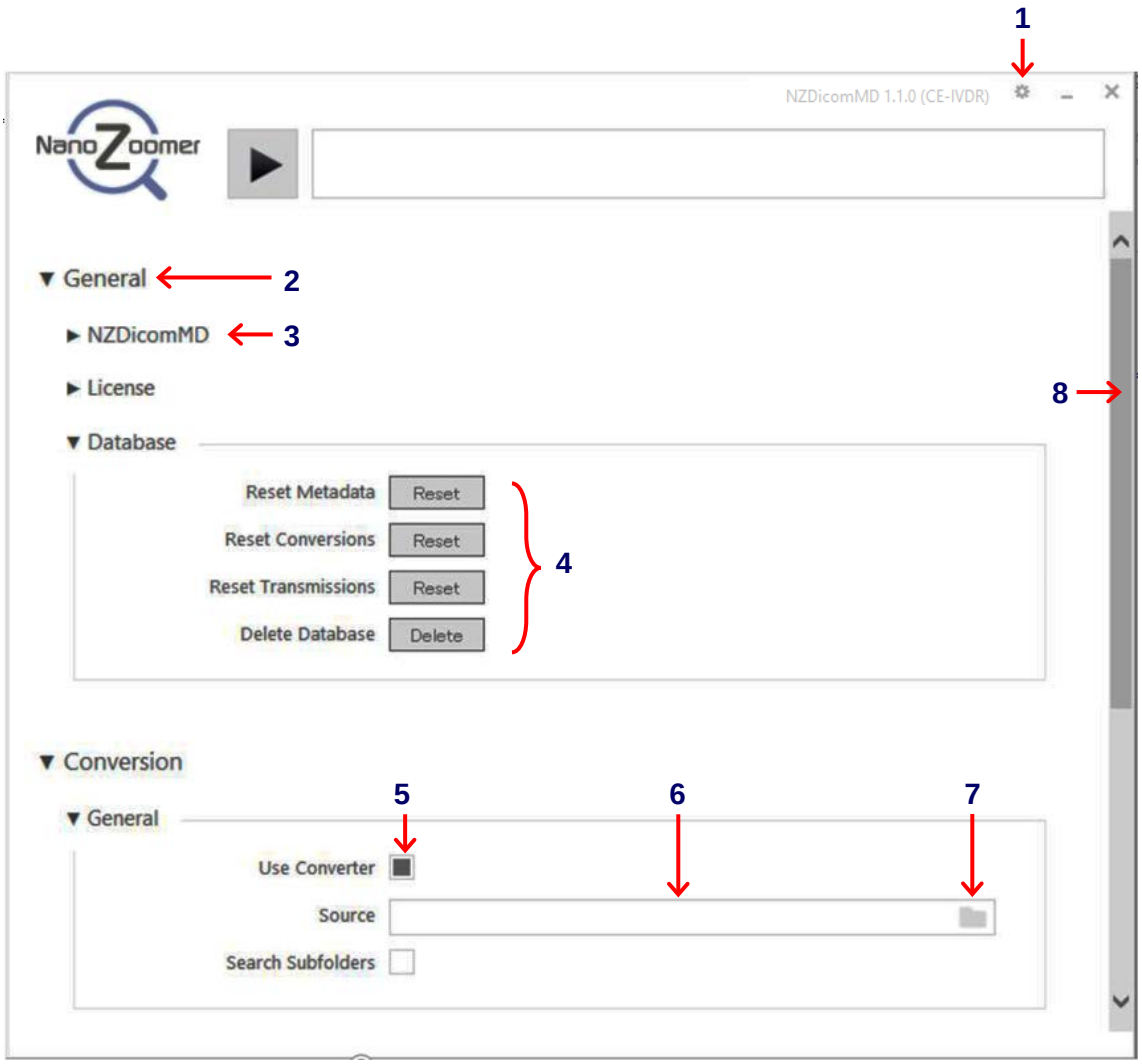


Image 6-3

1. **Switch to files pane**
2. **Setting section**
   Click to expand.
3. **Settings subsection**
   Click to expand.
4. **Button setting**
   Click to activate.
5. **Checkbox setting**
   Click to toggle.
6. **File/folder setting**
7. **File/folder selector**
   Click to choose file/folder.
8. **Scrollbar**

8. ALL SETTINGS IN THE SETTINGS PANE

This section provides the list of all settings in the settings pane and will give a brief content of each setting.

8-1 GENERAL

Section	Setting	Description	Values	Default
NZDicomMD	Start Automatically	Start conversions and transmissions automatically when NZDicomMD starts.	*Enabled* *Disabled*	*Disabled*
	Start Minimised	Start NZDicomMD minimised.	*Enabled* *Disabled*	*Disabled*
	About NZDicom	Opens information window.		
License	Enter License Key	See ‘License installation’.	*License Key*	*Blank*
	License Status	Current status of registered license.		
	Update License Key	See ‘License installation’.		
	Elevate License	Allow the license to be used by all users. Present if a license is installed but has not been elevated and NZDicomMD has been started by an administrator account.		
	Delete License	Delete the installed license. Present if a license is installed.		
Database	Reset Metadata	Deletes all metadata from database.		
	Reset Conversions	Deletes conversions from database.		
	Reset Transmissions	Deletes transmissions from database.		
	Delete Database	Deletes the whole database.		

8-2 CONVERSION

Section	Setting	Description	Values	Default
General	Use Converter	Toggle detection and conversion of NDPi files.	*Enabled* *Disabled*	*Disabled*
	Source	Folder to scan for NDPi files.	*Folder Path*	*Blank*
	Search subfolders	Search subfolders of the NDPi source folder.	*Enabled* *Disabled*	*Enabled*
Metadata	Preprocess Reference	Toggle whether to use Regular Expressions to modify the reference of files before metadata is requested.	*Enabled* *Disabled*	*Disabled*
	Search For	Regular Expression (without surrounding slashes) indicating what tokens to search for. Present if 'Preprocess Reference' is enabled	*Regular Expression*	*Blank*
	Replace With	Regular Expression (without surrounding slashes) indicating what to replace found tokens with.	*Regular Expression*	*Blank*
	Provider	Provider from which to request slide metadata. (Please refer '10Metadata Providers').	Barcode Finalist Hamamatsu Test Tieto User Input	User Input
	Retry Attempts	Number of times to retry failed metadata requests (-1=infinite)	-1 ~ 100	1
	Retry Delay	Delay between retry attempts for failed metadata requests (seconds). Present if 'Retry Attempts' is not zero.	0 ~ 3600	1
	Move On Failure	Folder where NDPi files will be moved if metadata request fails	*Folder Path*	*Blank*

Section	Setting	Description	Values	Default
Provider Settings	(Barcode)	Custom settings for selected metadata provider. (Please refer '10-1 Barcode')		
	(Finalist)	Custom settings for selected metadata provider. (Please refer '10-2Finalist')		
	(Hamamatsu)	Custom settings for selected metadata provider. (Please refer '10-3 Hamamatsu')		
	(Test)	Custom settings for selected metadata provider. (Please refer '10-4 Test')		
	(Tieto)	Custom settings for selected metadata provider. (Please refer '10-5 Tieto')		
	(User input)	Custom settings for selected metadata provider. (Please refer '10-6 User input')		
Conversions	Destination	Folder where DICOM files will be placed when generated.	*Folder Path*	*Blank*
	Retry Attempts	Number of times to retry failed conversions (-1=infinite).	-1 ~ 100	1
	Retry Delay	Delay between retry attempts for failed conversions (seconds). Present if 'Retry Attempts' is not zero.	0 ~ 3600	1
	Concurrent Conversions	Number of conversion operations to perform concurrently.	1 ~ 100	1
	Move On Failure	Folder where NDPi files will be moved if conversion fails.	*Folder Path*	*Blank*

Section	Setting	Description	Values	Default
Conversions	Validate Metadata	Toggle validation of metadata DICOM compliance.	*Enabled* *Disabled*	*Enabled*
	Create Subfolders	Create a subfolder in the destination directory for each converted item.	*Enabled* *Disabled*	*Enabled*
Output	Encoding	Character encoding of generated DICOM files.	UTF-8 ISO 8859-1 (Latin-1)	UTF-8
	Encoding Conversion	Behavior if conversion of metadata to Latin-1 fails. Present if 'Encoding' is set to 'ISO 8859-1 (Latin-1)'.	Fail Conversion Replace Invalid Characters Use UTF-8	Fail conversion
	Encoding Replacement	Text to use as replacement for characters which cannot be converted to Latin-1. Present if 'Encoding Conversion' is set to 'Replace invalid characters'.	*Text*	*Blank*
	Pyramid Ratio	Ratio between the size of each layer in the pyramid structure of the DICOM images generated.	No Pyramid From source image 2 4 8	From source image
	Tile Size	Tile size of DICOM images to be generated (pixels).	256 512 1024 2048 4096	256
	Slide Image	Produce slide or label image during conversion.	None Whole Slide Label Only Whole Slide and Label	None
	Localizer Size	Minimum size of localizer image, if produced (pixels). Default: 256 Possible Values: 256 -> 8192, in multiples of 2	No Localizer 256 512 1024 2048 4096 8192	No localizer

Section	Setting	Description	Values	Default
Output	Pyramid Stop Condition	Stop condition for creating pyramid layers.	Thumbnail Image Size Tile Size Localizer Image Size	Tile size
	Z-Plane	Z-plane/s to convert.	All Centre	All
	Extension	Extension to be appended to output file name.	*Text*	dcm
	Icon Image	Toggle generation of icon image. Enabling icon image generation will result in objects which is created in the “PALETTE COLOR” model.	*Enabled* *Disabled*	*Disabled*
	Icon Image Size	Maximum size of icon image (pixels). Present if ‘Icon Image’ is enabled.	32 ~ 4096	256
	Thumbnail Image	Toggle generation of thumbnail image.	*Enabled* *Disabled*	*Disabled*
	Thumbnail Image Size	Maximum size of thumbnail image (pixels). Present if ‘Thumbnail Image’ is enabled.	128 ~ 4096	256
	Length Encoding	Type of length encoding.	Undefined Explicit	Explicit
	Use Max Tiles	Toggle use of Max Tiles Per Instance.	*Enabled* *Disabled*	*Disabled*
	Max Tiles Per Instance	Maximum number of tiles per DICOM instance. Present if ‘Use Max Tiles’ is enabled.	1 ~ 10000000	10000
	Use Max Size	Toggle use of Max Size Per Instance.	*Enabled* *Disabled*	*Disabled*

Section	Setting	Description	Values	Default
Output	Max Size Per Instance (MB)	Maximum dataset size per DICOM instance (megabytes). Present if 'Use Max Size' is enabled.	1 ~ 10000000	10000
	Offset Table	Type of offset table.	Empty Basic Extended	Basic
	Tiled Full	Toggle use of TILED_FULL (CP 1713).	*Enabled* *Disabled*	*Enabled*
Finish	Move To Folder	Folder where NDPi files will be moved after conversion.	*Folder Path*	*Blank*
	Delete After	Period after which successfully converted NDPi files will be deleted.	Immediately After one day After one week After one month After one year Never Custom	Never
	Hours	Hours after which successfully converted NDPi files will be deleted. Present if 'Delete After' is set to 'Custom'.	1 ~ 100000	8760

8-3 TRANSMISSION

Section	Setting	Description	Values	Default
General	Use C-Store	Toggle detection and transmission of DICOM files.	*Enabled Disabled*	*Disabled*
	DICOM Source	Folder to scan for DICOM files.	*Folder Path*	*Blank*
	Search Subfolders	Search subfolders of the DICOM source folder.	*Enabled Disabled*	*Enabled*
	AET	Application Entity Title of NZDicomMD.	*Text*	*Blank*
	Connection Timeout	Timeout for connection requests (seconds, -1=infinite).	-1 ~ 3600	5
	ACSE Timeout	Timeout for receiving ACSE messages (seconds, -1=infinite).	-1 ~ 3600	5
	DIMSE Timeout	Timeout for receiving DIMSE messages (seconds, -1=infinite).	-1 ~ 3600	5
Transmission	Retry Attempts	Number of times to retry failed C-STORE operations (-1=infinite).	-1 ~ 100	1
	Retry Delay	Delay between retry attempts for failed transmissions (seconds). Present if 'Retry Attempts' is not zero.	0 ~ 3600	1
	Concurrent Transmissions	Number of transmission operations to perform concurrently.	1 ~ 1000	1
	Move On Failure	Folder where DICOM files will be moved if transmission fails.	*Folder Path*	*Blank*
	Address	Host name or IP address of remote host used for C-STORE.	*URL*	*Blank*
	Port	Port of remote host used for C-STORE.	1 ~ 65535	104
	Peer AET	Application Entity Title of remote C-STORE peer.	*Text*	*Blank*

Section	Setting	Description	Values	Default
Storage Commitment	Use Storage Commitment	Toggle use of storage commitment for transferred DICOM files.	*Enabled Disabled*	*Disabled*
	Retry Attempts	Number of times to retry storage commitment for files that fail storage commitment (-1=infinite).	1 ~ 100000	10000
	Retry Delay	Delay between retry attempts for failed storage commitments (seconds). Present if 'Retry Attempts' is not zero.	0 ~ 3600	60
	Concurrent Commitments	Maximum number of files to request storage commitment for at one time.	1 ~ 10000	100
	Move On Failure	Folder where DICOM files will be moved if storage commitment fails.	*Folder Path*	*Blank*
	Address	Host name or IP address of remote host used for storage commitment.	*URL*	*Blank*
	Port	Port of remote host used for storage commitment.	1 ~ 65535	104
	Receive Port	Port on local machine used to receive storage commitment responses	1 ~ 65535	104
	Peer AET	Application Entity Title of remote storage commitment peer.	*Text*	*Blank*
	Timeout	Timeout for storage commitment requests (-1=infinite).	-1 ~ 86400	5

Section	Setting	Description	Values	Default
Finish	Move To Folder	Folder where DICOM files will be moved after transmission (or storage commitment, if applicable).	*Folder Path*	*Empty*
	Delete After	Period after which successfully transmitted (and storage committed, if applicable) DICOM files will be deleted.	Immediately After one day After one week After one month After one year Never Custom	Never
	Hours	Hours after which successfully transmitted (or storage committed, if applicable) DICOM files will be deleted. Present if 'Delete After' is set to 'Custom'.	1 ~ 100000	8760

8-4 USER INPUT WINDOW

Clicking the purple metadata icon (Please refer '6-2 File Pane (active)(17)') will open the user input window. This allows a human operator to manually enter the metadata for a file.

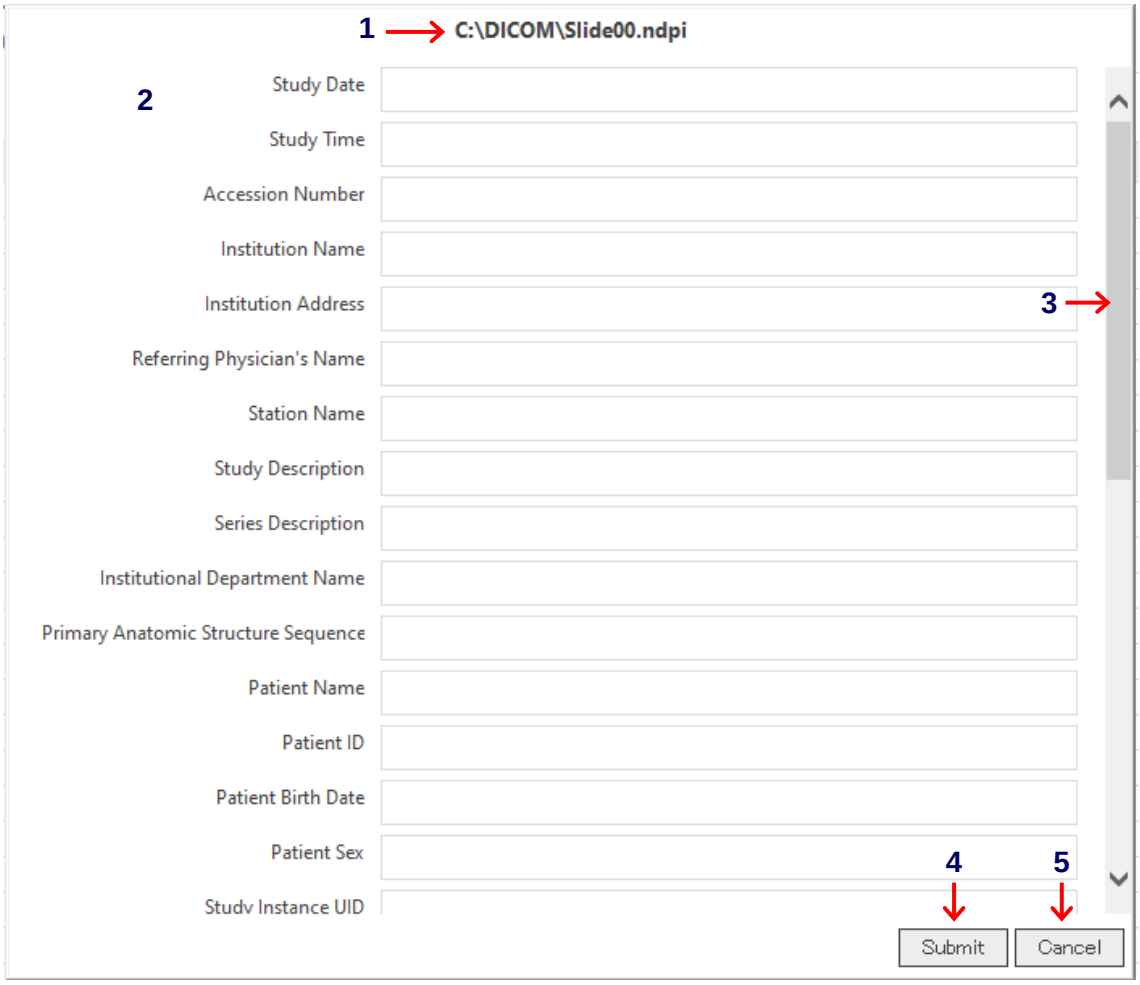


Image 7-1

1. **File to which metadata applies**
2. **Metadata field**
3. **Scrollbar**
4. **Submit metadata for this file**

   The file will proceed to conversion.
5. **Cancel metadata entry for this file**

   The file will continue to wait to metadata.

9. LICENSE INSTALLATION

To register a new license with NZDicomMD:

- Open the settings pane by clicking the gear icon in the top-right of the files pane (the default NZDicomMD view)
- Expand the ‘General’ section
- Expand the ‘License’ subsection
- Enter the license key into the ‘Enter License Key’ field
- Click the ‘Update’ button

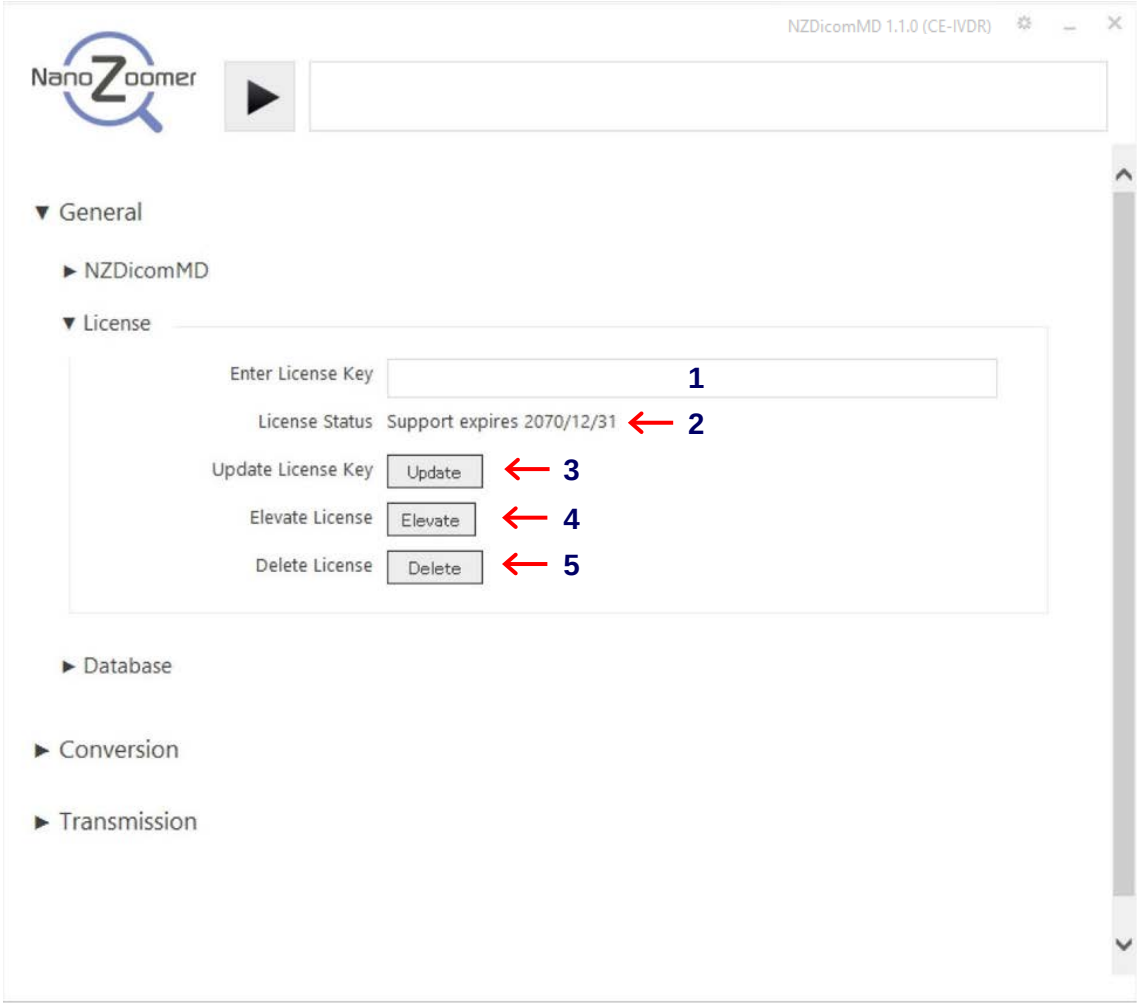


Image 8-1

1. **License key entry field**
2. **Status of installed license**
3. **Button to update the installed license with the key in (1)**
4. **Button to elevate license (Displayed only for the administrator to bind license to all users)**
5. **Button to delete license (Displayed only for the user who installed the license)**

10. METADATA PROVIDERS

During conversion, NZDicomMD populates DICOM objects with metadata. This metadata is retrieved from a metadata provider, such as user input or a LIMS. Several providers are available by default. These are listed below. Additional providers can be added via plugins.

10-1 BARCODE

The Barcode provider populates the Container Identifier (0040,0512) DICOM attribute with the slide reference embedded in the NDPi. The conversion will fail if the reference is not present. This provider has no additional settings.

10-2 FINALIST

This provider implements a proprietary protocol for retrieving metadata from a Finalist LIMS. It has the following settings:

Address	IP address or hostname of remote peer.
Port	Port of remote peer.
Log Responses	Write the remote peer's responses to metadata requests to a log file (%APPDATA%¥Hamamatsu¥NZDicomMD¥Plugin_Finalist.log)

10-3 HAMAMATSU

This provider implements a proprietary protocol for retrieving metadata from systems which support Hamamatsu's JSON-based DICOM metadata transfer format (Please refer '10 JSON Representation of DICOM Metadata'.). It has the following settings:

Address	IP address or hostname of remote peer.
Port	Port of remote peer.
Log Responses	Write the remote peer's responses to metadata requests to a log file (%APPDATA%¥Hamamatsu¥NZDicomMD¥Plugin_Hamamatsu.log)

10-4 TEST

The Test provider allows the values of individual DICOM attributes to be set explicitly. All converted slides will contain the same metadata. It has the following settings:

Study Date	DICOM tag (0008,0020)
Study Time	DICOM tag (0008,0030)
Accession Number	DICOM tag (0008,0050)
Institution Name	DICOM tag (0008,0080)
Institution Address	DICOM tag (0008,0081)
Referring Physician's Name	DICOM tag (0008,0090)
Station Name	DICOM tag (0008,1010)
Study Description	DICOM tag (0008,1030)
Series Description	DICOM tag (0008,103E)
Institutional Department Name	DICOM tag (0008,1040)
Primary Anatomic Structure Sequence	DICOM tag (0008,2228). Expects JSON array representing Primary Anatomic Structure (Please refer '10. JSON Representation of DICOM Metadata')
Patient Name	DICOM tag (0010,0010)
Patient ID	DICOM tag (0010,0020)
Patient Birth Date	DICOM tag (0010,0030)
Patient Sex	DICOM tag (0010,0040)
Study Instance UID	DICOM tag (0020,000D)
Study ID	DICOM tag (0020,0010)
Series Number	DICOM tag (0020,0011)
Instance Number	DICOM tag (0020,0013)
Issuer of Container Identifier Value	DICOM tag (0040,0032) in Issuer of Container Identifier Sequence (0040,0513)
Issuer of Container Identifier Type	DICOM tag (0040,0033) in Issuer of Container Identifier Sequence (0040,0513)
Container Identifier	DICOM tag (0040,0512)
Container Description	DICOM tag (0040,051A)
Specimen Identifier	DICOM tag (0040,0551)
Specimen UID	DICOM tag (0040,0554)
Specimen Type Code Sequence	DICOM tag (0040,059A). Expects JSON object representing Specimen Type Code Sequence (Please refer '10. JSON Representation of DICOM Metadata')

Specimen Short Description	DICOM tag (0040,0600)
Specimen Detailed Description	DICOM tag (0040,0602)
Specimen Preparation Sequence	DICOM tag (0040,0610). Expects JSON array representing Specimen Preparation Sequence (Please refer ’10. JSON Representation of DICOM Metadata’)
Optical Path Identifier	DICOM tag (0048,0106)
Optical Path Description	DICOM tag (0048,0107)

10-5 TIETO

This provider implements a proprietary protocol for retrieving metadata from a Tieto LIMS. It has the following settings:

Address	IP address or hostname of remote peer.
Port	Port of remote peer.
Log Responses	Write the remote peer’s responses to metadata requests to a log file (%APPDATA%¥Hamamatsu¥NZDicomMD¥Plugin_Finalist.log)

10-6 USER INPUT

This provider allows the user to specify the values of individual DICOM attributes explicitly for each file. It has no additional settings but requires metadata to be entered manually during the metadata acquisition phase of the conversion process. See ‘User Input Window’.

11. JSON REPRESENTATION OF DICOM METADATA

NZDicomMD uses JSON to represent some metadata. An example of the JSON structure for the Specimen Type Code Sequence, Specimen Preparation Sequence and Primary Anatomic Structure Sequence is given below. DICOM value representation rules must be obeyed if 'Validate Metadata' is enabled.

Specimen Type Code Sequence

```
{
  "CodeValue": "G-8439",
  "CodingSchemeDesignator": "SRT",
  "CodeMeaning": "Tissue section"
}
```

Specimen Preparation Sequence

```
[
  {
    "SpecimenPreparationStepContentItemSequence": [
      {
        "ValueType": "TEXT",
        "ConceptNameCodeSequence": {
          "CodeValue": "121041",
          "CodingSchemeDesignator": "DCM",
          "CodeMeaning": "Specimen Identifier"
        },
        "TextValue": "Text value"
      },
      {
        "ValueType": "CODE",
        "ConceptNameCodeSequence": {
          "CodeValue": "111703",
          "CodingSchemeDesignator": "DCM",
          "CodeMeaning": "Processing step description"
        },
        "ConceptCodeSequence": {
          "CodeValue": "433841000124109",
          "CodingSchemeDesignator": "SCT",
          "CodeMeaning": "Fixation of specimen using formalin"
        }
      }
    ]
  },
  {
    "SpecimenPreparationStepContentItemSequence": [
      {
        "ValueType": "DATETIME",
        "ConceptNameCodeSequence": {
          "CodeValue": "111701",
          "CodingSchemeDesignator": "DCM",
          "CodeMeaning": "DateTime of processing"
        },
        "DateTime": "201908301230"
      },
      {
```

```
      "ValueType": "NUMERIC",
      "ConceptNameCodeSequence": {
        "CodeValue": "111710",
        "CodingSchemeDesignator": "DCM",
        "CodeMeaning": "Location of sampling site X offset"
      },
      "NumericValue": "123.45",
      "MeasurementUnitsCodeSequence": {
        "CodeValue": "mm",
        "CodingSchemeDesignator": "UCUM",
        "CodeMeaning": "mm"
      }
    },
    {
      "ValueType": "IMAGE",
      "ConceptNameCodeSequence": {
        "CodeValue": "111709",
        "CodingSchemeDesignator": "DCM",
        "CodeMeaning": "Location of sampling site"
      },
      "ReferencedSOPSequence": {
        "ReferencedSOPClassUID": "1.2.840.10008.5.1.4.1.1.77.1.6",
        "ReferencedSOPInstanceUID": "1.2.840.00000.3.152.235.2.12.187636473",
        "ReferencedFrameNumber": "1¥¥2¥¥3¥¥4"
      }
    }
  ]
 }
]
```


Primary Anatomic Structure Sequence


```
[
 {
  "CodeValue": "T-AB001",
  "CodingSchemeDesignator": "SRT",
  "CodeMeaning": "Ear",
  "PrimaryAnatomicStructureModifierSequence": [
    {
      "CodeValue": "G-A101",
      "CodingSchemeDesignator": "SRT",
      "CodeMeaning": "Left"
    }
  ]
 },
 {
  "CodeValue": "T-AA810",
  "CodingSchemeDesignator": "SRT",
  "CodeMeaning": "Eyelid",
  "PrimaryAnatomicStructureModifierSequence": [
    {
      "CodeValue": "G-A100",
      "CodingSchemeDesignator": "SRT",
      "CodeMeaning": "Right"
    },
    {
      "CodeValue": "G-A110",
      "CodingSchemeDesignator": "SRT",
      "CodeMeaning": "Central"
    }
  ]
 }
]
```

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13. CONTACT INFORMATION

Manufacturer:

Hamamatsu Photonics K. K., Systems Division
Joko Factory

812 Joko-cho, Chuo-ku, Hamamatsu City, Shizuoka Pref. 431-3196, Japan
Tel.: +81 53-431-0124, Fax: +81 53-435-1574
Email: export@sys.hpk.co.jp

Authorised Representatives:

EC REP **Hamamatsu Photonics Deutschland GmbH**	Arzbergerstr.10, 82211 Herrsching am Ammersee, Germany E-mail: pms-med@hamamatsu.eu
UK REP **Hamamatsu Photonics UK Limited**	2 Howard Court, 10 Tewin Road, Welwyn Garden City, Hertfordshire AL7 1BW, UK E-mail: pms-med@hamamatsu.co.uk
CH REP **Hamamatsu Photonics France S.A.R.L. Swiss Office**	Dornacherplatz 7, 4500 Solothurn, Switzerland E-mail: swiss@hamamatsu.ch

Importers:

Hamamatsu Photonics Deutschland GmbH	Arzbergerstr. 10, 82211 Herrsching am Ammersee, Germany
Hamamatsu Photonics France S.A.R.L.	19, Rue du Saule Trapu, Parc du Moulin de Massy, 91882 Massy Cedex, France
Hamamatsu Photonics Norden AB	Torshamnsgatan 35, 16440 Kista, Sweden
Hamamatsu Photonics Italia S.R.L.	Strada della Moia, 1 int. 6 20044 Arese (Milano), Italy
Hamamatsu Photonics UK Limited	2 Howard Court, 10 Tewin Road, Welwyn Garden City, Hertfordshire AL7 1BW, UK
Hamamatsu Photonics France S.A.R.L. Swiss Office	Dornacherplatz 7, 4500 Solothurn, Switzerland

Local contact information worldwide can be found at: www.hamamatsu.com

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