



DICOM Conformance Statement
FUJIFILM Medical Dry Imager
DRYPIX Station Print Manager

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5th Edition

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Revision History

Revision	Date	Author	Reason for Change
2nd Edition	05/01/2003	Katakura	Modifications / additions for 2nd Edition
3rd Edition	11/01/2003	Katakura	Modifications / additions for 3rd Edition (Added 10IN×12IN, MWM)
4th Edition	07/27/2004	Katakura	Modifications / additions for 4th Edition (MWM)
5th Edition	10/01/2006		The corporate name was changed.

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1 Introduction

This document provides the DICOM conformance statement for the FUJIFILM DRYPIX Station Print Manager product.

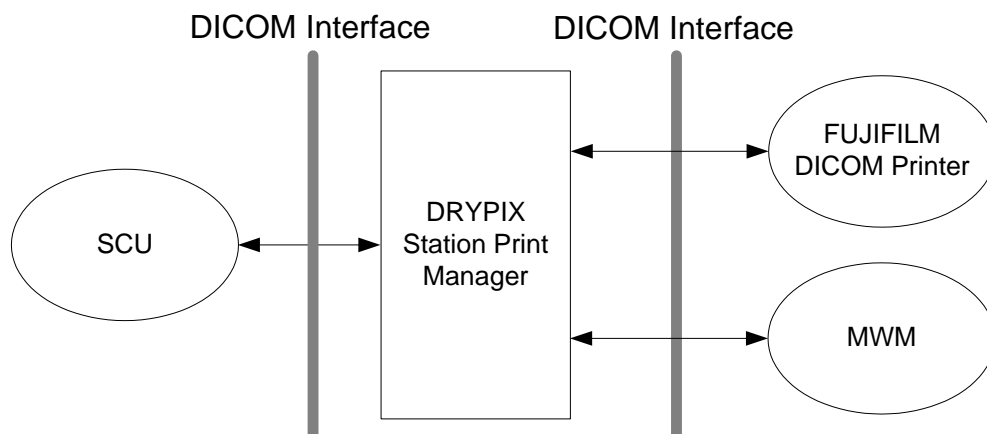
2 Implementation Model

The FUJIFILM DRYPIX Station Print Manager is a plural (depending on configuration) Application Entities which provide the services of a DICOM Print Management Service Class.

- Modality Worklist Management

2.1 Data Flow Diagram

The FUJIFILM Print Server receives images from a DICOM Print Management Service Class User, and prints them on FUJIFILM Printers.



2.2 Functional Definitions of Application Entities

The FUJIFILM DRYPIX Station Print Manager provides the DICOM Print Management Service Class support required to print images from one or more SCUs to attached FUJIFILM Laser imagers. The following functionality is supported:

- DICOM Association Management
- Management of DICOM Film Sessions, Film Boxes and Image Boxes
- Print Job Status Tracking
- Image Buffering
- Printing
- Printer Status Tracking
- The Print Manager retrieves the actual worklist from the RIS.

2.3 Sequencing of Real World Activities

Not applicable for Real World Activities.

3 Application Entity Specification

The DRYPIX Station Print Manager Application Entity provides Standard Conformance¹ to the following DICOM SOP Classes as an SCP.

SOP Class Name	SOP Class UID
Verification SOP Class	1.2.840.10008.1.1
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9
Basic Annotation Box SOP Class	1.2.840.10008.5.1.1.15
Printer SOP Class	1.2.840.10008.5.1.1.16
Presentation LUT SOP Class(Supplement 22)	1.2.840.10008.5.1.1.23

The DRYPIX Station Print Manager Application Entity also provides Standard Conformance¹ to the following DICOM SOP Classes as an SCU.

SOP Class Name	SOP Class UID
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9
Basic Annotation Box SOP Class	1.2.840.10008.5.1.1.15
Printer SOP Class	1.2.840.10008.5.1.1.16
Presentation LUT SOP Class	1.2.840.10008.5.1.1.23
Modality Worklist Information Model – FIND SOP Class	1.2.840.10008.5.1.4.31

¹The following Correction Proposals are applied.
CP16, 19, 20, 35, 49, 55, 56, 80, 81, 85, 94 and 108.

4 Association

4.1 Association Establishment Policies

◆ General

- The SCU AE attempts to initiate a new Association for each print session.
- Only the SCU AE shall release an Association.
- The Association may be aborted by the SCU or the SCP.
- The Maximum PDU Size for the PDUs offered by the SCP equals 32Kbytes.
- Do not set up a title that includes “::” for the SCU AE Title to be specified when an association is established. (It is guarded for the DRYPIX Station Print Manager utility setting so that any AE Title that includes “::” is not determined.)
- The client’s AE Title is transmitted to the output printer as is.
- When a substitute printer is used, the DRYPIX Station Print Manager function generates printout to another printer using the utility-determined printer AE Title, in defiance of the printer AE Title specified by the client.
- When a search is performed over the MWM, the MWM AE Title by the utility setting is used.

◆ Number of Associations

SCP: Maximum 10 associations at a time. Further associations will be rejected with the reason ‘busy’.
SCU: Maximum 4 associations at a time.

◆ Asynchronous Nature

- Not support negotiation of multiple outstanding transactions.

◆ Implementation ID information

- Implementation Class UID is 1.2.392.200036.9125.5399.1

4.2 Association Initiation

This application does not initiate any DICOM associations.

4.3 Association Acceptance Policy

This application accepts an association.

◆ Associated Real-World Activity

When an association is established, one of the following activities may occur.

- 1) The SCU instructs the printing of a set of images. The SCP prints the set of images.
- 2) A request from the SCU for Print JOB status acquisition is not supported.
- 3) A request for verification from the SCU is supported. However, it is not a response from the real SCP (printer), and is a response that represents the overall DRYPIX Station Print Manager system.
A normal response will be given while the DRYPIX Station Print Manager function is activated.

◆ **Proposed Presentation Contexts**

The following transfer syntax is acceptable.

Table-1

Name	UID
DICOM Implicit VR Little Endian	1.2.840.10008.1.2

The following presentation contexts are acceptable.

No.	Abstract Syntax		Transfer syntax	Role	Extended Negotiation
	Name	UID			
1	Verification SOP Class	1.2.840.10008.1.1	Table-1	SCP	None
2	Basic Grayscale PrintManagement Meta SOP Class	1.2.840.10008.5.1.1.9	Table-1	SCP	None
3	Printer SOP Class	1.2.840.10008.5.1.1.16	Table-1	SCP	None
4	Presentation LUT SOP Class	1.2.840.10008.5.1.1.23	Table-1	SCP	None
5	Basic Annotation Box SOP Class	1.2.840.10008.5.1.1.15	Table-1	SCP	None

The No. 3 SOP Class has been negotiated only in a pair with the No. 2 SOP Class. It is now allowed that the No. 2 and No. 3 SOP Classes are negotiated individually, which enables consumption of resources to be suppressed more efficiently than negotiation in a pair with the No. 2 SOP Class. As a result, it can improve the processing speed on the SCP side (CP-81). SOP Specific Conformance.

- DRYPIX Station Print Manager may return the following error codes in response to any message received.

Code	Status	Meaning
0122H	Failure	SOP class not supported.
0211H	Failure	Unrecognized operation : The command is not supported for the SOP class (e.g. N_CREATE for Image Box SOP class).

- It is possible that Warning Status 0107H, 0116H and B604H are set up individually so that they are handled same as Success (0000H), in defiance of their original status.
- The N-EVENT-REPORT message can be set up so that it is not issued.
- It is allowed that print jobs occupy a maximum of 80% of the disk storage area (10GB).
- When the same Image Position (2020, 0010) was specified several times with N-SET of the Basic Grayscale Image Box, the one specified the last will be enabled. N-ACTION for the Basic Film Session or Basic Film Box will quit normally and no C604H error occurs (CP-80).
- When in Failure status, the “Attribute List” will return nothing.
- When in Success/Warning status with N-CREATE, all supported attributes included in the generated instance will be returned as an “Attribute List”.
- When in Success/Warning status with N-SET, only successfully updated items out of those specified by the SCU will be returned in the “Attribute List”. However, Preformatted grayscale image sequence of the Basic Grayscale Image Box will not be returned.

- No Attribute Identifier List (0000, 1005) will be returned when Status (0000, 0900) is equal to 0107H (Attribute list error).
- Error Comment (0000, 0902) will be returned for some Failure/Warning status. See Appendix C.

5 Verification SOP Class (1.2.840.10008.1.1)

The DRYPIX Station Print Manager provides standard conformance to the DICOM Verification Service Class as an SCP. Upon receipt from an SCU of a verification of communication request, the DRYPIX Station Print Manager will issue a confirmation.

6 Basic Film Session SOP Class (1.2.840.10008.5.1.1.1)

The following DIMSE services are supported.

- N-CREATE
- N-SET
- N-DELETE
- N-ACTION

6.1 N-CREATE

◆ Description

- Generates a Basic Film Session SOP instance and initializes it based on the values sent from the SCU (default values if not available).
- An instance of this SOP must be created before creating a Basic Film Box SOP instance.
- One Association may have only one Basic Film Session SOP instance at a time. If you wish to use several Basic Film Session SOP instances, delete the previous ones and then create new ones.

◆ Attribute Information

Tag	Name	Usage	Supported	Default
2000,0010	Number of Copies	U/M	1-99	Config
2000,0020	Print Priority	U/M	HIGH, MED, LOW	LOW
2000,0030	Medium Type	U/M	CLEAR FILM, BLUE FILM	Config
2000,0040	Film Destination	U/M	PROCESSOR BIN_I	PROCESSOR
2000,0050	Film Session Label	U/U	Up to 64 characters.	Null string
2000,0060	Memory Allocation	U/U	1-131072	None
2050,0500	Referenced Presentation LUT Sequence	U/MC		None
0008,1150	>SOP Class UID	U/MC		None
0008,1155	>SOP Instance UID	U/MC		None
2100,0160	Owner ID	U/U		None

◆ Status

- When no element values have been specified, the default values are used to return “Success: 0000H”, which, however, will not be sent to the printer.
- When there is not Affected SOP Instance UID (0000, 1000) or when it has been sent with the length set to 0, a UID will be generated according to the SCP returning then “Success: 0000H”.
- If element values exceed the determined range, the default values are used to return “Warning: 0116H”.
- For the Medium Type (2000, 0030), no Warning will be returned even if a type that is not available for the printer targeted for output has been specified, and image data will be output in the type available for the printer².

² It is common that multiple number of films are loaded into a printer, which makes it impossible to judge whether the operation is successful or not unless the Film Size ID (2010, 0050) is determined accordingly. For this reason, it is always handled as a “Success”.

- Also in the event of a Warning, a Basic Film Session SOP instance will be generated, being possible to proceed to processing continuously.
- In the event of a Failure, no Basic Film Session SOP instances will be generated.

Code	Status	Meaning
0000H	Success	Film session successfully created. The actual values assigned to attributes are returned.
0107H	Warning	Attribute list error. An attribute that is not applied to the Basic Film Session SOP instance was specified.
0110H	Failure	Processing failure. An attempt was made to create the second Basic Film Session SOP instance.
0116H	Warning	Attribute Value Out of Range.
0117H	Failure	Invalid Object Instance. Returned if a given instance UID has violated the UID construction rules.
0213H	Failure	Resource Limitation. The requested allocation can temporarily not be provided.

◆ **Remarks**

The following attributes of the Basic Film Session IODs are not released to the SCU. Those attributes are set up within the SCP when a Basic Film Box SOP instance is created.

Tag	Name
2000, 0500	Referenced Film Box Sequence
0008, 1150	> Referenced SOP Class UID
0008, 1155	> Referenced SOP Instance UID

6.2 N-SET

◆ **Description**

- Updates the Basic Film Session SOP instance attributes. N-SET updates all attributes that can be determined with N-CREATE.

◆ **Status**

- In the event of a Warning, no attributes will be updated, remaining thus the same. Processing can be continued.
- In the event of a Failure, no attributes will be updated, remaining thus the same. Processing can be continued.

Code	Status	Meaning
0000H	Success	Specified attributes of the SOP instance have been updated. The actual values assigned to attributes are returned.
0107H	Warning	Attribute list error. An attribute that is not applied to the Basic Film Session SOP instance was specified.
0116H	Warning	Attribute Value out of Range.
0119H	Failure	Class-Instance Conflict. Returned if the SOP class Instance UID is not defined for the given SOP Class.
0213H	Failure	Resource Limitation. The requested allocation can temporarily not be provided.

6.3 N-DELETE

◆ **Description**

- Deletes all information layers rooted in a Basic Film Session SOP instance and releases assigned resources.

◆ **Status**

Code	Status	Meaning
0000H	Success	The specified SOP Instance hierarchy has been deleted.
0119H	Failure	Class-Instance Conflict. Returned if the SOP class Instance UID is not defined for the given SOP Class.

6.4 N-ACTION

◆ **Description**

- After copying all information layers rooted in the Basic Film Session SOP Instance, N-ACTION prints all belonging films. When multiple Film Boxes are included, order for printing will, for instance, be 1-2-3, 1-2-3.
- The Film Size ID (2010, 0050) for all Basic Film Box SOP Instances that are related with the Basic Film Session SOP Instance should be the same. If any different ID is included, “Failure: 0110H” will be returned and printing is disabled. In such a case, N-ACTION needs to be issued individually for each Basic Film Box SOP Instance.
- The SCU can update and operate all information layers rooted in the Basic Film Session SOP instance continuously, which will not affect printing operation caused by N-ACTION.

◆ **Status**

Code	Status	Meaning
0000H	Success	Films in the film session have been queued for printing.
0110H	Failure	Processing failure. There are Basic Film Box SOP Instances of different film sizes.
0115H	Failure	Invalid Argument Value. Returned if the Action Type provided by the SCU is not recognized.
0119H	Failure	Class-Instance Conflict. Returned if the SOP class Instance UID is not defined for the given SOP Class.
B602H	Warning	Film Session SOP instance hierachy does not contain Image Box SOP Instance. Empty page will not be printed.
C600H	Failure	Film Session SOP Instance hierachy does not contain Film Box SOP Instances.
C601H	Failure	Unable to create Print Job SOP Instance. Print queue if full.

7 Basic Film Box (1.2.840.10008.5.1.1.2)

The following DIMSE services are supported.

- N-CREATE
- N-SET
- N-DELETE
- N-ACTION

7.1 N-CREATE

◆ Description

- Generates a Basic Film Box SOP instance and initializes it based on the values transferred from the SCU (default values if not available).
- Initialization will be performed so that the Basic Film Box SOP instance is linked with the one that created 2000, 0500 (Referenced Film Box Sequence) of the Basic Film Session SOP instance.
- Generates necessary quantity of Basic Grayscale Image Box SOP Instances as required by 2010, 0010 (Image Display Format), and sets them up for 2010, 0510 (Referenced Image Box Sequence) of the Basic Film Box SOP instance. Such values will be returned to the SCU as a Response.
- Generates necessary Basic Annotation Box SOP Instances as required by 2010, 0030 (Annotation Display Format ID), and sets up 2010, 0520 (Referenced Basic Annotation Box Sequence). Such values will be returned to the SCU as a Response. Even when the use of the Basic Annotation Box SOP Class is not agreed, a Basic Annotation Box SOP Instance will be generated to print a reprint ID. When the position where an annotation is to be added as specified by the SCU and the position where a reprint ID is to be added (utility setting) overlap with each other, the SCU-specified annotation will prevail. (If the annotation added is for a reprint ID, no Instance UID will be returned to the SCU.) Even if no usage is agreed upon for the Basic Annotation Box SOP Class, a Basic Annotation Box SOP Instance will be generated for the purpose of yielding printout of an annotation determined by the utility setting. Note, however, that when the position where an annotation is to be added as specified by the SCU and the position where an annotation is to be added by the utility setting overlap with each other, the SCU-specified annotation will prevail. (When an annotation is added by the utility setting, no Instance UID will be returned to the SCU.)

◆ Attribute Information

(Basic Film Box Presentation Module)

Tag	Name	Usage	Supported	Default
2010,0010	Image Display Format	M/M	See Appendix A.	
2010,0030	Annotation Display Format ID	U/U	FORMAT1	FORMAT1
2010,0040	Film Orientation	U/M	PORTRAIT LANDSCAPE	Config
2010,0050	Film Size ID	U/M	14INX17IN 14INX14IN 10INX14IN 8INX10IN 10INX12IN	Config

2010,0060	Magnification Type	U/M	CUBIC NONE (No image magnification / reduction applied.)	CUBIC
2010,0080	Smoothing type	U/U	SHARP SMOOTH MEDIUM	Config
2010,0100	Border Density	U/U	BLACK WHITE 0-300	Config
2010,0110	Empty Image Density	U/U	(Not supported.)	
2010,0120	Min Density	U/U	0-300	Config
2010,0130	Max Density	U/M	0-300	Config
2010,0140	Trim	U/U	YES NO	Config
2010,0150	Configuration Information	U/M	'1' – '8', "CS000" – "CS999"	Config
2010,015E	Illumination	U/MC		2000 cd/m ²
2010,0160	Reflective Ambient Light	U/MC		10 cd/m ²
2020,0050	Requested Resolution ID	U/U		None

(Basic Film Box Relationship Module)

Tag	Name	Usage	Supported	Default
2010,0500	Referenced Film Session Sequence	M/M		
0008,1150	>Referenced SOP Class UID	M/M		
0008,1155	>Referenced SOP instance UID	M/M		
2010,0510	Referenced Image Box Sequence	-/M		
0008,1150	>Referenced SOP Class UID	-/M		
0008,1155	>Referenced SOP instance UID	-/M		
2010,0520	Referenced Basic Annotation Box Sequence	-/MC		
0008,1150	>Referenced SOP Class UID	-/MC		
0008,1155	>Referenced SOP instance UID	-/MC		
2050,0500	Referenced Presentation LUT Sequence	U/MC		Basic Film Session Value
0008,1150	>SOP Class UID	U/MC		Basic Film Session Value
0008,1155	>SOP Instance UID	U/MC		Basic Film Session Value

* If a low density is specified with (2010, 0100), (2010, 0120) or (2010, 0130), film's base density will cause an effect to occur.

◆ **Status**

- When an attribute that is determined to be an attribute of a Basic Film Box SOP instance, but not supported by the DRYPIX Station Print Manager function, “Warning: 0170H” will be returned.
- When there is not Affected SOP Instance UID (0000, 1000) or when it has been sent with the length set to 0, a UID will be generated according to the SCP returning then “Success: 0000H”.
- If no element values are specified when “Usage SCU=U”, the default values will be used to return “Success: 0000H”.
- If element values exceed the determined range when “Usage SCU=U”, the default values will be used to return “Warning: 0116H”.
- Even if the Film Size ID (2010, 0050) is used to specify a size not available for the printer used for image output, no Warning or Failure will result. The DRYPIX Station Print Manager function enables setting for replacing printer or outputting printout to the printer (the printer takes care of image output).
- If no element values are specified when “Usage SCU=M”, “Failure: 0120H” will be returned. The same applies when nothing has been transferred as a Data Set.
- If element values exceed the determined range when “Usage SCU=M”, “Failure: 0106H” will be returned.
- A Basic Film Box SOP instance will be created even in the event of a Warning, and processing is possible continuously.
- No Basic Film Box SOP instances will be created in the event of a Failure. In such a case, no Affected SOP Instance UID (0000, 1000) will be returned.

Code	Status	Meaning
0000H	Success	Film Box is successfully created. The actual values assigned to attributes are returned.
0106H	Failure	Invalid Attribute Value. Mandatory attribute had illegal value.
0107H	Warning	Attribute list error. An attribute not supported by the DRYPIX Station Print Manager function was specified. An attribute not applied to a Basic Film Box SOP instance was specified.
0110H	Failure	Processing failure. Returned if the number of film boxes exceeds 32.
0111H	Failure	Duplicate SOP instance. Instance UID given is already in use.
0116H	Warning	Attribute Value Out of Range.
0117H	Failure	Invalid Object Instance. Returned if a given instance UID has violated the UID construction rules.
0120H	Failure	Missing attribute. Returned if a mandatory attribute is missing.
B605H	Warning	Requested Min Density or Max Density outside of printer’s operating range. The printer will use its respective minimum or maximum density value instead.

7.2 N-SET

◆ **Description**

- Updates attributes of the Basic Film Box SOP Instance created the last.

◆ **Attributes That can be Updated**

Tag	Name	Usage	Supported
2010,0060	Magnification Type	U/M	CUBIC NONE (No image magnification / reduction applied.)
2010,0080	Smoothing type	U/U	SHARP SMOOTH MEDIUM
2010,0100	Border Density	U/U	BLACK WHITE 0-300
2010,0110	Empty Image Density	U/U	(Not supported.)
2010,0120	Min Density	U/U	0-300
2010,0130	Max Density	U/M	0-300
2010,0140	Trim	U/U	YES NO
2010,0150	Configuration Information	U/M	'1' – '8', "CS000" – "CS999"
2010,015E	Illumination	U/MC	
2010,0160	Reflective Ambient Light	U/MC	
2050,0500	Referenced Presentation LUT Sequence	U/MC	
0008,1150	>SOP Class UID	U/MC	
0008,1155	>SOP Instance UID	U/MC	

◆ **Status**

- When nothing has been sent as a Data Set, "Failure: 0120H" will be returned.
- In the event of a Warning, no attributes will be updated remaining thus the same. Processing can be continued.
- In the event of a Failure, no attributes will be updated remaining thus the same. Processing can be continued.

Code	Status	Meaning
0000H	Success	Specified attributes of the SOP instance have been updated. The actual values assigned to attributes are returned.
0107H	Warning	Attribute list error. An attribute not supported by the DRYPIX Station Print Manager function was specified. An attribute not applied to a Basic Film Box SOP instance was specified.
0110H	Failure	Processing failure. The instance created the last was not specified.
0116H	Warning	Attribute Value Out of Range.
0119H	Failure	Class-Instance Conflict. Returned if the SOP class Instance UID is not defined for the given SOP Class.
0120H	Failure	Missing attribute. Returned if no Data Set is provided by the SCU.

B605H	Warning	Requested Min Density or Max Density outside of printer's operating range. The printer will use its respective minimum or maximum density value instead.
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7.3 N-DELETE

◆ **Description**

- Deletes the layer of the Basic Film Box SOP Instance created the last.
- Deletes a relevant portion of 2000, 0500 (Referenced Film Box Sequence) of the Basic Film Session SOP Instance.

◆ **Status**

Code	Status	Meaning
0000H	Success	The specified SOP Instance hierarchy has been deleted.
0110H	Failure	Processing failure. The instance created the last was not specified.
0119H	Failure	Class-Instance Conflict. Returned if the SOP class Instance UID is not defined for the given SOP Class.

7.4 N-ACTION

◆ **Description**

- After copying all information layers rooted in the specified Basic Film Box SOP Instance, N-ACTION prints the relevant films.
- The SCU can update and operate all information layers rooted in the Basic Film Session SOP instance continuously, which will not affect printing operation caused by N-ACTION.

◆ **Status**

Code	Status	Meaning
0000H	Success	Success is normally returned.
0115H	Failure	Invalid Argument Value. Returned if the Action Type provided by the SCU is not recognized.
0119H	Failure	Class-Instance Conflict. Returned if the SOP class Instance UID is not defined for the given SOP Class.
B603H	Warning	Film Box SOP Instance hierarchy does not contain Image Box SOP Instances (empty page). Empty page will not be printed.
C602H	Failure	Unable to create Print Job SOP Instance. Print queue if full.

8 Basic Grayscale Image Box (1.2.840.10008.5.1.1.4)

The following DIMSE service is supported.

- N-SET

8.1 N-SET

◆ Description

- Updates attribute information of a Basic Grayscale Image Box SOP instance that belongs to the Film Box SOP instance created the last.
- 2010, 0060 (Magnification Type), 2010, 0080 (Smoothing Type) and 2010, 0150 (Configuration Information) prevail over values setup for the Film Box SOP instance.
- An image can be erased by sending 2020, 0110 (Preformatted Grayscale Image Sequence) in the length of 0.
- When 2020,0030 (requested image size) is specified, N-SET processes 2010, 0060 (magnification type) as “CUBIC” unconditionally.
- When two or more images have been set up for the same Image position (2020, 0010), the image set up the last will be enabled.

◆ Attributes That can be Set Up

(Basic Image Box Presentation Module)

Tag	Name	Usage	Supported	Default
2020,0010	Image position	M/M	1-x (See Appendix A.)	None
2020,0020	polarity	U/M	NORMAL REVERSE	Config
2020,0050	Requested Resolution ID	U/U		None
2010,0060	magnification type	U/U	CUBIC NONE (No image magnification/ reduction applied.)	Basic Film Box Value
2010,0080	smoothing type	U/U	SHARP SMOOTH MEDIUM	Basic Film Box Value
2010,0120	Min Density	U/U	0-300	Basic Film Box Value
2010,0130	Max Density	U/U	0-300	Basic Film Box Value
2010,0150	Configuration Information	U/U		Basic Film Box Value
2020,0030	requested image size	U/U	See Appendix A.	None
2020,0110	preformatted grayscale image sequence	M/M		
0028,0002	>samples per pixel	M/M	1	None
0028,0004	>photometric interpretation	M/M	MONOCHROME1 MONOCHROME2	None
0028,0010	>rows	M/M	1-8800	None
0028,0011	>columns	M/M	1-8800	None
0028,0034	>pixel aspect ratio	MC/M	R\C (Vertical\Horizontal) R,C=1-9999	1\1

0028,0100	>bits allocated	M/M	8, 16	None
0028,0101	>bits stored	M/M	8, 10, 12	None
0028,0102	>high bit	M/M	7, 9, 11	None
0028,0103	>pixel representation	M/M	0	None
7fe0,0010	>pixel data	M/M	(any)	None

(Basic Image Box Relationship Module)

Tag	Name	Usage	Supported	Default
2020,0130	referenced image overlay box sequence	U/MC	(Not supported.)	
0008,1150	>referenced sop class uid	MC/M	(Not supported.)	
0008,1155	>referenced sop instance uid	MC/M	(Not supported.)	
2050,0500	Referenced Presentation LUT Sequence	U/U		
0008,1150	>SOP Class UID	U/U		
0008,1155	>SOP Instance UID	U/U		

◆ **Status**

- If no element values are specified when “Usage SCU=U”, the default values will be used to return “Success: 0000H”.
- If element values exceed the determined range when “Usage SCU=U”, the default values will be used to return “Warning: 0116H”.
- If no element values are specified when “Usage SCU=M”, “Failure: 0120H” will be returned. The same applies when nothing has been transferred as a Data Set.
- If element values exceed the determined range when “Usage SCU=M”, “Failure: 0106H” will be returned.
- If the data length calculated from 0028, 0010 (rows), 0028, 0011 (columns) and 0028, 0100 (bits allocated) does not agree with that of 7fe0, 0010 (pixel data), “Failure: 0106H” that is for 7fe0, 0010 (pixel data) will be returned.
- In the event of a Warning, attributes will be updated. Processing can be continued.
- In the event of a Failure, no attributes will be updated remaining thus the same. Processing can be continued.
- When 2020, 0030 (requested image size) exceeds the maximum size to be determined by 2010, 0010 (Image Display Format), 2010, 0050 (Film Size ID) and 2020, 0010 (Image position), the maximum size will be used to return “Warning: 0116H”.
- When “NONE” is set to 2010, 0060 (Magnification Type), if 0028, 0010 (rows) and 0028, 0011 (columns) exceed the maximum size to be determined by 2010, 0010 (Image Display Format), 2010, 0050 (Film Size ID), 2020, 0010 (Image position) and 2010, 0040 (Film Orientation), it will be changed from “NONE” to “CUBIC” to return “Warning: B604H”.

Code	Status	Meaning
0000H	Success	Image instance has been updated successfully.
0106H	Failure	Invalid attribute value. Mandatory attribute has illegal value.
0107H	Warning	Attribute list error.

0110H	Failure	Processing failure. A Basic Grayscale Image Box SOP instance that does not belong to the Film Box SOP instance created the last was specified.
0116H	Warning	Attribute Value Out of Range.
0119H	Failure	Class-Instance Conflict. Returned if the SOP class Instance UID is not defined for the given SOP Class.
0120H	Failure	Missing attribute Returned if a mandatory attribute of the Data Set, provided by the SCU AE, is missing.
B604H	Warning	Image size is larger than image box size, the image has been demagnified.
B605H	Warning	Requested Min Density or Max Density outside of printer's operating range. The printer will use its respective minimum or maximum density value instead.
C605H	Failure	Insufficient memory in printer to store images.

9 Printer SOP Class (1.2.840.10008.5.1.1.16)

The following DIMSE services are supported.

- N-EVENT-REPORT
- N-GET

9.1 Overview

- The Printer SOP Class is used to express printers and acquire printer status.
- At printer startup, the SCP creates an instance automatically so that it has “well known SOP instance UID”. The value is “1.2.840.10008.5.1.1.17”.

9.2 N-EVENT-REPORT

◆ Description

- When the printer status changes, N-EVENT-REPORT is issued to all SCUs, with which association is established, so that the printer is used.

◆ Event Types and Attributes

Event type name	Event type ID	Attribute	Tag	Usage
Normal	1			
Warning	2	Printer Name	(2110,0030)	U/U
		Printer Status Info	(2110,0020)	U/M
Failure	3	Printer Name	(2100,0010)	U/U
		Printer Status Info	(2110,0030)	U/M

9.3 N-GET

◆ Description

- Returns attribute information in which a printer instance is specified. When no Data Set has been sent, all attribute information will be returned. Note that the DRYPIX Station status is handled here with N-GET, and not the printer status.

◆ Obtainable Attributes

Tag	Name	Usage	Supported
2110,0010	printer status	U/M	NORMAL
2110,0020	printer status info	U/M	NORMAL
2110,0030	printer name	U/U	Config (AE Title of the DRYPIX Station Print Manager)
0008,0070	manufacture	U/U	FUJI PHOTO FILM CO., LTD.
0008,1090	manufacture model name	U/U	DRYPIX Station
0018,1000	device serial number	U/U	Not supported.
0018,1020	software versions	U/U	
0018,1200	date of last calibration	U/U	Not supported.
0018,1201	time of last calibration	U/U	Not supported.

* 0018, 1020 are represented in the “major. minor” format; an alphabet from A to Z is for “major” and a two-digit decimal number from 00 to 99 for “minor”.

◆ **Status**

- Although N-GET is determined to be an attribute for a Basic Film Box SOP instance, “Warning: 0107H” will be returned if an attribute not supported by the DRYPIX Station is specified.

Code	Status	Meaning
0000H	Success	Printer information is returned.
0107H	Warning	Attribute list error. An attribute not supported by the DRYPIX Station Print Manager function was specified. An attribute not applied to a Print Job SOP instance was specified.
0119H	Failure	Class-Instance Conflict. Returned if the SOP class Instance UID is not defined for the given SOP Class.

10 Presentation LUT (1.2.840.10008.5.1.1.23)

The following DIMSE services are supported.

- N-EVENT-REPORT
- N-GET

10.1 N-CREATE

◆ Description

- Creates a Presentation LUT SOP instance and initializes it according to a value transferred from the SCU.
- To join an instance thus created with the Basic Film Session SOP instance, Basic Film Box SOP instance and Basic Grayscale Image Box SOP instance, the UID of this instance needs to be set up for each instance according to N-CREATE or N-SET.
- Setting according to the Presentation LUT prevails over that according to the Configuration Information (2010, 0150).

◆ Attribute Information

Tag	name	Usage	Supported	Default
(2050,0010)	Presentation LUT Sequence	MC/M		None
(0028,3002)	>LUT Descriptor	MC/M	The first value is the number of elements of 0028, 3006. The second value is the pixel number to be mapped to the first elements of 0028, 3006. The third value is the valid bit number of elements of 0028, 3006. This value, however, is disregarded.	None
(0028,3003)	>LUT Explanation	U/U	Any value will do. Disregard this value.	None
(0028,3006)	>LUT Data	MC/M		None
(2050,0020)	Presentation LUT Shape	MC/M	IDENTITY LIN OD	None

* 2050, 0020 are valid only when 2050, 0010 are not determined. Use 2050, 0010 when both are determined.

◆ Status

- If no element values are specified when “Usage SCU=U”, the default values will be used to return “Success: 0000H”.
- If values of the elements of “Usage SCU=MC” are not specified in a situation where those values need to be specified, “Failure: 0120H” will be returned. The same applies when no Data Set was sent.
- If element values exceed the determined range when “Usage SCU=M”, “Failure: 0106H” will be returned.
- The LUT Data (0028, 3003) length must be double the first value of the LUT Descriptor (0028, 3002). For other than that, “Failure: 0106H” will be returned to the LUT Descriptor (0028, 3002).

- In the event of a Failure, no Presentation LUT SOP instances will be created. In such a case, no Affected SOP Instance UID (0000, 1000) will be returned.
- In an attempt to set up character strings that exceed 64 characters for the LUT Explanation (0028, 3003), “Warning: 0116H” will be returned.

Code	Status	Meaning
0000H	Success	Presentation LUT is successfully created.
0106H	Failure	Invalid attribute value. Mandatory attribute has illegal value.
0107H	Warning	Attribute list error.
0111H	Failure	Duplicate SOP instance. Instance UID given is already in use.
0116H	Warning	Attribute Value Out of Range.
0117H	Failure	Invalid Object Instance. Returned if a given instance UID has violated the UID construction rules.
0120H	Failure	Missing attribute Returned if a mandatory attribute of the Data Set, provided by the SCU AE, is missing.

10.2 N-EVENT-REPORT

◆ Description

- Deletes a Presentation LUT SOP instance. Note, however, that a Presentation LUT SOP instance cannot be deleted when it is viewed from Basic Film Session SOP instance, Basic Film Box SOP instance or Basic Grayscale Image Box SOP instance.

◆ Status

Code	Status	Meaning
0000H	Success	The specified SOP Instance has been deleted.
0110H	Failure	Processing failure. An attempt was made to delete a viewed instance.
0119H	Failure	Class-Instance Conflict. Returned if the SOP class Instance UID is not defined for the given SOP Class.

11 Basic Annotation Box SOP Class (1.2.840.10008.5.1.1.15)

The following DIMSE service supported.

- N-SET

11.1 N-SET

◆ Description

- Updates attribute information of a Basic Annotation Box SOP instance that belongs to the Film Box SOP instance created the last.
- An Annotation already determined can be deleted if 2030, 0020 (Text String) is set up with the length of 0.
- When settings have been performed several times for the same 2030, 0010 (Annotation position), the last one will be enabled.

◆ Attribute Information

(Basic Annotation Presentation Module)

Tag	Name	Usage	Supported	Default
0008, 0005	Specific Character	U/U	ISO 2022 IR 13 /ISO 2022 IR 87	None
2030,0010	Annotation position	M/M	1 – 6 ³	None
2030,0020	Text String	U/M		NULL

◆ Status

- If no element values are specified when “Usage SCU=U”, the default values will be used to return “Success: 0000H”.
- If values of the elements of “Usage SCU=MC” are not specified, “Failure: 0120H” will be returned. The same applies when no Data Set was sent.
- If element values exceed the determined range when “Usage SCU=M”, “Failure: 0106H” will be returned.
- In the event of a Failure, no attributes will be updated, remaining thus the same. Processing can be continued.

Code	Status	Meaning
0000H	Success	Annotation Box instance has been updated successfully.
0106H	Failure	Invalid attribute value. Mandatory attribute has illegal value.
0107H	Warning	Attribute list error.
0110H	Failure	Processing failure. A Basic Annotation Box SOP instance not belonging to the Film Box SOP instance created the last was specified.
0116H	Warning	Attribute Value Out of Range.
0119H	Failure	Class-Instance Conflict. Returned if the SOP class Instance UID is not defined for the given SOP Class.
0120H	Failure	Missing attribute Returned if a mandatory attribute of the Data Set, provided by the SCU AE, is missing.

³ There are 6 Annotation Boxes. 1: Top left, 2: Center top, 3: Top right, 4: Bottom left, 5: Center bottom and 6: Bottom right. Cut the end appropriately if too long to print.

12 DIMSE-Service and Attributes in the Basic Grayscale Print Management [SCP]

12.1 DIMSE-Service

SOP Class	DIMSE	Usage SCU	Usage
Basic Film Session SOP Class	N-CREATE	M	Used.
	N-SET	U	Not Used.
	N-DELETE	U	Used.
	N-ACTION	U	Used.
Basic Film Box SOP Class	N-CREATE	M	Used.
	N-SET	U	Used.
	N-DELETE	U	Not Used.
	N-ACTION	M	Not Used.
Image Box SOP Class	N-SET	M	Used.
Printer SOP Class	N-EVENT-REPORT	M	Used.
	N-GET	U	Used.
Basic Grayscale Image Box SOP Class	N-SET	M	Used.
Basic Annotation Box SOP Class	N-SET	M	Used.
Presentation LUT SOP Class	N-CREATE	U	Used.
	N-DELETE	U	Not Used.

12.2 Basic Film Session SOP Class

◆ N-CREATE

Name	Tag	Usage	Value
Number of Copies	2000,0010	U	1-99
Print Priority	2000,0020	U	HIGH MED LOW
Medium Type	2000,0030	U	CLEAR FILM BLUE FILM
Film Destination	2000,0040	U	PROCESSOR BIN_i
Film Session Label	2000,0050	U	Up to 64 character
Memory Allocation	2000,0060	U	1-131072
Referenced Presentation LUT Sequence	2050,0500	U	
>SOP Class UID	0008,1150	U	
>SOP Instance UID	0008,1155	U	
Owner ID	2100,0160	U	

12.3 Basic Film Box SOP Class

◆ **N-CREATE**

(Basic Film Box Presentation Module)

Name	Tag	Usage	Value
Image Display Format	2010,0010	M	STANDARD \1,1...etc, SLIDE
Annotation Display Format	2010,0030	U	FORMAT1
Film Orientation	2010,0040	U	PORTRAIT LANDSCAPE
Film Size ID	2010,0050	U	11INX14IN or 10INX14IN 14INX17IN 14INX14IN 8INX10IN
Magnification Type	2010,0060	U	CUBIC NONE
Smoothing Type	2010,0080	U	SHARP SMOOTH MEDIUM
Border Density	2010,0100	U	BLACK WHITE 0-300
Min Density	2010,0120	U	0-300
Max Density	2010,0130	U	0-300
Trim	2010,0140	U	NO YES
Configuration Information	2010,0150	U	
Illumination	2010,015E	U	
Reflective Ambient light	2010,0160	U	

(Basic Film Box Relationship Module)

Name	Tag	Usage	Value
Referenced Film Session Sequence	2010,0500	M	
>Referenced SOP Class UID	0008,1150	M	
>Referenced SOP instance UID	0008,1155	M	
Referenced Image Box Sequence	2010,0510	-	
>Referenced SOP Class UID	0008,1150	-	
>Referenced SOP instance UID	0008,1155	-	
Referenced Basic Annotation Box Sequence	2010,0520	-	
>Referenced SOP Class UID	0008,1150	-	
>Referenced SOP instance UID	0008,1155	-	
Referenced Presentation LUT Sequence	2050,0500	U	
>SOP Class UID	0008,1150	U	
>SOP Instance UID	0008,1155	U	

◆ N-SET

Name	Tag	Usage	Value
Magnification Type	2010,0060	U	CUBIC NONE (No image magnification / reduction applied.)
Smoothing type	2010,0080	U	SHARP SMOOTH MEDIUM
Border Density	2010,0100	U	BLACK WHITE 0-300
Min Density	2010,0120	U	0-300
Max Density	2010,0130	U	0-300
Trim	2010,0140	U	NO YES
Configuration Information	2010,0150	U	
Illumination	2010,015E	U	
Reflective Ambient light	2010,0160	U	
Referenced Presentation LUT Sequence	2050,0500	U	
>SOP Class UID	0008,1150	U	
>SOP Instance UID	0008,1155	U	

12.4 Basic Grayscale Image Box SOP Class

◆ N-SET

(Basic Image Box Presentation module)

Name	Tag	Usage	Value
Image Position	2020,0010	M	1 –
Polarity	2020,0020	U	NORMAL REVERSE
Magnification Type	2010,0060	U	CUBIC NONE
Smoothing Type	2010,0080	U	SHARP SMOOTH MEDIUM
Min Density	2010,0120	U	0~300
Max Density	2010,0130	U	0~300
Configuration Information	2010,0150	U	1 – 8, FINE1 – FINE8
Requested Image Size	2020,0030	U	(Columns/10,Columns/20)
Samples Per Pixel	0028,0002	M	1
Photometric Interpretation	0028,0004	M	MONOCHROME1 MONOCHROME2
Rows	0028,0010	M	1 – 8800
Columns	0028,0011	M	1 – 8800
Pixel aspect ratio	0028,0034	MC	
Bits Allocated	0028,0100	M	16,8
Bits Stored	0028,0101	M	12, 10,8

High bit	0028,0102	M	11, 9,7
Pixel Representation	0028,0103	M	0
Pixel data	7fe0,0010	M	

(Basic Image Box Relationship module)

Name	Tag	Usage	Value
Referenced Presentation LUT Sequence	2050,0500	U	
>SOP Class UID	0008,1150	U	
>SOP Instance UID	0008,1155	U	

12.5 Printer SOP Class

◆ N-EVENT-REPORT

Event Type Name	Event Type ID	Attribute	Tag	Usage
Normal	1			
Warning	2	Printer Name	2110,0030	U
		Printer Status Info	2110,0020	U
Failure	3	Printer Name	2110,0030	U
		Printer Info	2110,0020	U

◆ N-GET

Name	Tag	Usage
Printer Status	2110,0010	U
Printer Status Info	2110,0020	U
Printer Name	2110,0030	U

12.6 Basic Annotation Box SOX Class

◆ N-SET

◆ Description

- Sets 0008, 0005 (Specific Character Set) when additional expansion characters are used for 2030, 0020 (Text String). Note, however, that according to Config settings, no Basic Annotation Box SOP using additional expansion characters will be output to printers not supported for such characters.

Name	Tag	Usage	Value
Specific Character Set	0008,0005	U	ISO 2022 IR 13\ ISO 2022 IR 87
Annotation position	2030,0010	M	1-6
Text String	2030,0020	U	

12.7 Presentation LUT

◆ N-CREATE

Name	Tag	Usage	Value
Presentation LUT Sequence	2050,0010	MC	
>LUT Descriptor	0028,3002	MC	
>LUT Explanation	0028,3003	U	
>LUT Data	0028,3006	MC	
Presentation LUT Shape	2050,0020	MC	

13 Communication Profiles

13.1 Supported Communication Stacks

The DRYPIX STATION Print Server provides DICOM V3.0 TCP/IP Network Communication support as defined in Part 8 of the DICOM Standard.

The TCP/IP stack is inherited from the Windows XP Operating System.

14 Extensions / Specializations / Privatizations

SOP Class : Basic Grayscale Image Box

- ◆ Attribute : bits stored (0028,0101)
10 bits stored is supported. DICOM only specifies 8 and 12 for number of bits stored.
- ◆ Attribute : high bit (0028,0102)
High bit position 9th is supported. DICOM specifies 7th or 11th bit.
- ◆ Attribute : magnification type (2010,0060)
When Requested Image Size (2020, 0030) is specified, the magnification type will be processed as “CUBIC” unconditionally.

General

After opening a session, monitoring of “Data transfer timeout value” will start. This timeout value monitoring will be reset every time a message is received from the SCU. The session will be closed when a monitoring timeout occurs.

15 Configuration

- ◆ Overall DRYPIX Station Print Manager settings
 - Host name
 - IP Address
 - Subnet Mask
 - TCP Port number used by SCP
 - AE Title (AE Title as the DRYPIX Station Print Manager)
It is also possible that the SCU specifies an AE Title of the DRYPIX Station Print Manager or an AE Title corresponding to a maximum of 10 printers that can be connected.
 - Data transfer timeout value
- ◆ Setting for each SCU AE Title (Use default values for an unregistered AE.)
 - Whether 0107H status is legal or not.
 - Whether 0116H status is legal or not.
 - Whether B604H status is legal or not.
 - Whether N-EVENT-REPORT is legal or not.

- Number of Copies (2000,0010)
- Medium Type (2000,0030)
- Film orientation (2010,0040)
- Film Size ID (2010,0050)
- Smoothing type (2010,0080)
- Border Density (2010,0100)
- Min Density (2010,0120)
- Max Density (2010,0130)
- Trim (2010,0140)
- Configuration Information (2010,0150)
- Polarity (2020,0020)

16 Modality Worklist Information Model – FIND SOP Class

◆ **C-FIND**

Name	Tag	Matching Key Type	Return Key Type	Value
Specific Character Set	0008,0005	O	1C	
Accession Number	0008,0050	O	2	
Patient's Name	0010,0010	R	1	
Patient's ID	0010,0020	R	1	
Patient's Birth Date	0010,0030	O	3	
Patient's Sex	0010,0040	O	2	
Study Instance UID	0020,000D	O	1	
Study ID	0020,0010	O	3	
Requesting Service	0032,1033	O	2	
Scheduled Procedure Step Sequence	0040,0100	R	1	
>Scheduled Station AE Title	0040,0001	R	1	
>Scheduled Procedure Step Start Date	0040,0002	R	1	
>Scheduled Procedure Step Start Time	0040,0003	R	1	
>Scheduled Procedure Step Description	0040,0007	R	1C	
>Modality	0008,0060	R	1	
>Scheduled Performing Physician's Name	0040,0006	R	2	

◆ **Description**

- A search over the MWM will be performed based on Accession Number (0008,0050) or Patient's ID (0010,0020) determined by the service utility.
- If a multiple number of hits are found as a result of search performed based on the Accession Number (0008,0050), only the first patient information hit result will be acquired and other results discarded.
- If a multiple number of hits are found as a result of search performed based on the Patient's ID (0010,0020), all study information hit results will be subjected to check for matching and only those that match accordingly will be acquired as study information.
As for patient information, the first hit result will be acquired.

Appendix A

Image Display Format (2010,0010)

Image Position (2020,0010)

Requested Image Size (2020,0030)

Appendix C: Error Comment

To return the following status, Error Comment (0000, 0902) needs to be determined at a maximum of 64 characters.

Code	Meaning	Error comment (0000,0902)
0110H	An attempt was made to create the second Basic Film Session SOP instance.	Unable to handle multiple film session (BFS, N-CREATE).
0110H	The number of instances exceeded 32 with BFB's N-CREATE.	Number of film boxes exceeds 32 (BFB, N-CREATE).
0110H	The instance created the last with BFB's N-SET was not specified.	Unable to handle a instance not created lastly (BFB, N-SET).
0110H	The instance created the last with BFB's N-DELETE was not specified.	Unable to handle a instance not created lastly (BFB, N-DELETE).
0110H	The instance created the last with BIB's N-SET, not belonging to the BFB, was specified.	The instance doesn't belong to the last created FB (BIB, N-SET).
0110H	An instance viewed with Presentation LUT's N-DELETE was specified.	Can't delete a instance which is referred to (LUT, N-DELETE).
0110H	BFBs of different film sizes existed with BFS's N-ACTION.	Unable to print mixed film size Basic Film Boxes (BFS, N-ACTION).
0122H	An unsupported SOP class was specified.	SOP class not supported.
B602H	There was no Image Box while operating BFS's N-ACTION.	No Image Box SOP instances (BFS, N-ACTION).
B603H	There was no Image Box while operating BFB's N-ACTION.	No Image Box SOP instances (BFB, N-ACTION).
B605H	Maximum and minimum densities exceeded the allowable range.	Requested Min Density or Max Density outside of printer's range.
C600H	There was no Film Box while operating BFS's N-ACTION.	No Film Box SOP instances (BFS, N-ACTION).
C601H	Because the print queue full, it was unable to create new jobs while operating BFS's N-ACTION.	Unable to create Print Job : Resource limitation (BFS, N-ACTION).
C602H	Because the print queue full, it was unable to create new jobs while operating BFB's N-ACTION.	Unable to create Print Job : Resource limitation (BFB, N-ACTION).
C605H	No image storage space available while operating BIB's N-SET.	Unable to store image data : Resource limitation (BIB, N-SET).

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