



C-View 1.0

DICOM Conformance Statement

MAN-02865 Rev 001

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MergeCOM-3 Advanced Integrator's
Tool Kit is a product of Merge
Healthcare.

1. Overview

C-View uses proprietary software applications developed by Hologic to generate a synthesized 2D mammography image from a Hologic Selenia Dimensions tomosynthesis data set by collapsing a tomosynthesis volume to a single slice, similar to a CT MIP. This synthesized 2D image preserves geometric features (lines and spots) of the tomosynthesis slices commonly found in mass lesions and architectural distortions, and bright spots that are commonly found in microcalcifications.

C-View implements the necessary DICOM services for interoperability between this product, other Hologic products, and products from other vendors. It also provides information necessary to configure other vendors' products to communicate with this product via DICOM.

The following table provides an overview of the network services supported by C-View.

SOP Classes	User of Service (SCU)	Provider of Service (SCP)
Transfer		
Digital Mammography X-Ray Image Storage – For Processing	No	Yes
Digital Mammography X-Ray Image Storage – For Presentation	Yes	Yes
Secondary Capture Image Storage	No	Yes

C-View does not support Media Storage Application Profiles.

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3. Introduction

Hologic, Inc. develops and markets a full line of mammography products including Selenia Dimensions with digital breast tomosynthesis option and C-View. In general, C-View accepts Hologic digital breast tomosynthesis raw projection images and reconstructed slices as a Service Class Provider (SCP) of the Storage Service Class, performs synthesized image generation, and exports C-View images as a Service Class User (SCU) of the Storage Service Class. The system also serves as an SCU and SCP of the Verification Service Class.

3.1. Revision History

The information in this document applies to C-View software version 1.0.

3.2. Audience

This document is intended to aid in connecting C-View to other components that make use of the DICOM standard for interconnecting networked imaging devices. The reader of this document should be familiar with the DICOM standard and PACS components that utilize the standard.

3.3. Remarks

A DICOM conformance statement – the structure and content of which are specified by the DICOM standard – is intended to aid in determining the suitability of interconnecting digital imaging devices. References to specific functionality in a conformance statement are not sufficient to guarantee interoperability between components. The following should be considered when evaluating interoperability:

- The DICOM conformance statement for C-View provides a starting point for ascertaining whether the product can communicate with other systems.
- The only way to know whether C-View can interoperate with other systems is to perform connectivity testing.
- This document represents a best effort to document the functionality of commercial versions of C-View and is not a functional specification of any Hologic component or product. Hologic reserves the right to make changes at any time to the functionality of the DICOM components described herein, and is committed to following the evolution of the DICOM standard.

3.4. Definitions, Terms and Abbreviations

This document uses the following acronyms.

AE	Application Entity
CT	Computed Tomography
DICOM	Digital Imaging and Communications in Medicine
IOD	Information Object Definition
MIP	Maximum Intensity Projection
PDU	Protocol Data Unit
SCP	Service Class Provider
SCU	Service Class User
SOP	Service Object Pair
UID	Unique Identifier
VR	Value Representation

3.5. References

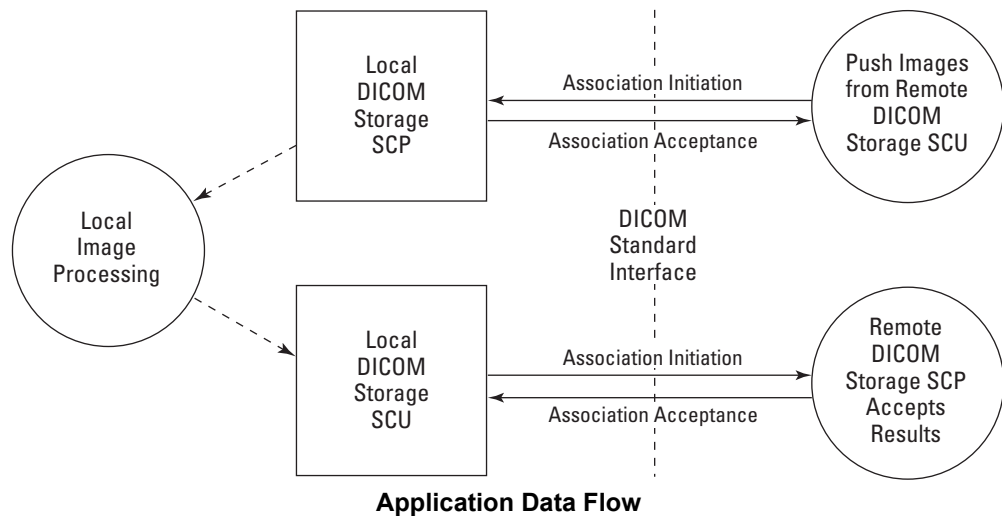
NEMA PS3 / ISO 12052, Digital Imaging and Communications in Medicine (DICOM) Standard, National Electrical Manufacturers Association, Rosslyn, VA, USA (available free at <http://medical.nema.org/>)

4. Networking

4.1. Implementation Model

4.1.1. Application Data Flow

The following diagram depicts the Application Entities (AE) and their relationships to Real-World Activities.



The Local Image Processing is initiated at system startup. The Local DICOM Storage SCU and Local DICOM storage SCP are executed at system startup and exist in one executable program using two AE titles.

A Remote DICOM Storage SCU initiates a push of images to the Local DICOM Storage SCP. Each accepted image is passed to Local Image Processing. Upon completion of synthesized image generation, the C-View image passes to the Local DICOM Storage SCU, which pushes the C-View image to a Remote DICOM Storage SCP.

Images that are accepted by the Local DICOM Storage SCP are stored temporarily, until synthesized image generation is completed and the C-View image is exported successfully.

4.1.2. Functional Definition of AE's

The Local DICOM Storage SCP AE supports the following functions:

- Accepts DICOM association requests
- Accepts DICOM storage requests
- Validates images for synthesized image generation, checks for disk space, and stores images to disk files

The Local DICOM Storage SCU AE supports the following functions:

- Negotiates and establishes DICOM association with remote destination
- Stores C-View image to remote destination

4.1.3. Sequencing of Real-World Activities

4.1.3.1. Local Image Processing

When Local Image Processing is triggered by Hologic digital breast tomosynthesis images pushed from a remote application:

- The Local DICOM Storage SCP AE responds to DICOM association initiation, and selects a matching Presentation Context (Abstract Syntax and Transfer Syntax).
- The Local DICOM Storage SCP AE accepts an association and waits for a C-STORE request.
- Upon receiving a C-STORE request, the Local DICOM Storage SCP validates the attributes in the message, performs a license check, stores the image object to disk, and queues the synthesized image generation.
- The Local DICOM Storage SCP sends a C-STORE response.
- Upon completion of synthesized image generation, the C-View image is formatted into DICOM Digital Mammography X-Ray Image – For Presentation.
- The Local DICOM Storage SCU is executed, which initiates an association to a remote application.
- The Local DICOM Storage SCU sends a C-STORE request containing the C-View image, and waits for a C-STORE response.
- The Local DICOM Storage SCU closes the association and exits.

4.2. AE Specifications

4.2.1. Local DICOM Storage SCP

4.2.1.1. SOP Classes

This Application Entity provides Standard Conformance to the following DICOM SOP Classes as an SCP:

SOP Class Name	SOP Class UID
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7
Digital Mammography X-Ray Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.2.1
Digital Mammography X-Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.2
Verification SOP Class	1.2.840.10008.1.1

4.2.1.2. Association Policies

The Local DICOM Storage SCP accepts associations, but does not initiate associations.

4.2.1.2.1. General

The maximum PDU size accepted is 64234. If during association negotiation the maximum sized PDU of the system negotiating with the application is larger than this value, the PDU size will be limited to this value. This value is defined in the mergecom.pro file provided with the MergeCOM-3 Advanced Integrator’s Tool Kit.

The DICOM standard Application context is accepted:

DICOM Application Context for Local DICOM Storage SCP	
Application Context Name	1.2.840.10008.3.1.1.1

4.2.1.2.2. Number of Associations

The Local DICOM Storage SCP accepts up to six simultaneous associations.

4.2.1.2.3. Asynchronous Nature

Asynchronous mode is not supported. All operations are performed synchronously.

4.2.1.2.4. Implementation Identifying Information

The Implementation Class UID is ‘2.16.840.1.1.2.840.113986’, and the Implementation Version Name is ‘MergeCOM3_390’. These values are defined in the mergecom.pro file provided with the MergeCOM-3 Advanced Integrator’s Tool Kit.

4.2.1.3. Association Initiation Policy

The Local DICOM Storage SCP does not initiate associations.

4.2.1.4. Association Acceptance Policy

The Local DICOM Storage SCP accepts an association when it receives a valid association request, with at least one matching presentation context. If the number of simultaneous associations has reached the maximum, an association request remains pending (i.e., no response is returned) until an opened association is closed or the remote SCU aborts the association.

4.2.1.4.1. Push Images from Remote DICOM Storage SCU

4.2.1.4.1.1. Description and Sequencing of Activities

The Real-World Activity (i.e., Local Image Processing) is associated with a C-STORE SCP operation (i.e., Local DICOM Storage SCP Application Entity), and is triggered by Push images from Remote DICOM Storage SCU. This results in storage and synthesized image generation on C-View for received Hologic digital breast tomosynthesis raw projection images and corresponding reconstructed slices. The C-STORE SCP operation will respond with a failure status if it is unable to store the images.

The Local DICOM Storage SCP is always available to respond to echo requests from any Remote DICOM Storage SCU.

4.2.1.4.1.2. Accepted Presentation Contexts

The Local DICOM Storage SCP accepts the Presentation Contexts shown in the following table:

Abstract Syntax Name / UID	Transfer Syntax Name	Transfer Syntax UID	Role	Extended Negotiation
Secondary Capture Image Storage / 1.2.840.10008.5.1.4.1.1.7	JPEG Lossless, Non-Hierarchical, First-Order Prediction (Process 14 [Selection Value 1])	1.2.840.10008.1.2.4.70	SCP	None
	JPEG 2000 Image Compression (Lossless Only)	1.2.840.10008.1.2.4.90	SCP	None
	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Digital Mammography X-Ray Image Storage – For Processing / 1.2.840.10008.5.1.4.1.1.1.2.1	JPEG Lossless, Non-Hierarchical, First-Order Prediction (Process 14 [Selection Value 1])	1.2.840.10008.1.2.4.70	SCP	None
	JPEG 2000 Image Compression (Lossless Only)	1.2.840.10008.1.2.4.90	SCP	None
	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Digital Mammography X-Ray Image Storage – For Presentation / 1.2.840.10008.5.1.4.1.1.1.2	JPEG Lossless, Non-Hierarchical, First-Order Prediction (Process 14 [Selection Value 1])	1.2.840.10008.1.2.4.70	SCP	None
	JPEG 2000 Image Compression (Lossless Only)	1.2.840.10008.1.2.4.90	SCP	None
	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None

Abstract Syntax Name / UID	Transfer Syntax Name	Transfer Syntax UID	Role	Extended Negotiation
	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Verification / 1.2.840.10008.1.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None

When presented with multiple transfer syntaxes within one requested Presentation Context, the Local DICOM Storage SCP accepts one transfer syntax according to the order of the table above.

4.2.1.4.1.3. SOP Specific Conformance

The Local DICOM Storage SCP provides Level 2 (Full) conformance to all of the accepted Storage SOP Classes. It does not provide Digital Signature support. No coercion of Attributes is performed. Images that are stored successfully may not be accessed by remote systems.

Only Secondary Capture Images created by Hologic Selenia Dimensions that represent raw projection images and reconstructed slices of digital breast tomosynthesis are accepted and queued. Other Secondary Capture Images are rejected. All instances of other SOP Classes are accepted and discarded.

The following table lists the possible values for the Status (0000,0900) attribute of the C-STORE response:

Service Status	Further Meaning	Status Code	Reason
Success	Success	0000	Image accepted, and either queued for synthesized image generation or discarded.
Refused	Out of resources	A700	Not enough disk space to store the image. Error Comment (0000,0902) contains 'Out of resources'.
Error	Data set does not match SOP Class.	A900	Offending Element (0000,0901) is the Attribute Tag that is missing or has an invalid value, returned for a Secondary Capture Image that is not Hologic tomosynthesis.
Error	License attribute missing	C010	Offending Element (0000,0901) is the missing Attribute Tag that is required for license check.
Error	License validation failed	C011	Offending Element (0000,0901), if present, is the Attribute Tag that failed the license check.
Error	Required attribute missing	C012	Offending Element (0000,0901) is the missing Attribute Tag that is required for synthesized image generation.
Error	Attribute value out of range	C013	Offending Element (0000,0901) is the Attribute Tag for which the value is out of range (includes zero-length value) for synthesized image generation.
Error	Image will not be processed	C014	Reason internal to C-View.

4.2.2. Local DICOM Storage SCU

4.2.2.1. SOP Classes

This Application Entity provides Standard Conformance to the following DICOM SOP Class as an SCU:

SOP Class Name	SOP Class UID
Digital Mammography X-Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.2

4.2.2.2. Association Policies

The Local DICOM Storage SCU initiates associations, but does not accept associations.

4.2.2.2.1. General

The maximum PDU size offered is 64234. This value is defined in the mergecom.pro file provided with the MergeCOM-3 Advanced Integrator’s Tool Kit. The DICOM standard Application context is proposed:

DICOM Application Context for Local DICOM Storage SCU	
Application Context Name	1.2.840.10008.3.1.1.1

4.2.2.2.2. Number of Associations

Up to two Local DICOM Storage SCU instances may be executed simultaneously.

4.2.2.2.3. Asynchronous Nature

Asynchronous mode is not supported. All operations are performed synchronously.

4.2.2.2.4. Implementation Identifying Information

The Implementation Class UID is ‘2.16.840.1.1.2.840.113986’, and the Implementation Version Name is ‘MergeCOM3_390’. These values are defined in the mergecom.pro file provided with the MergeCOM-3 Advanced Integrator’s Tool Kit.

4.2.2.3. Association Initiation Policy

4.2.2.3.1. Local Image Processing

4.2.2.3.1.1. Description and Sequencing of Activities

The Real-World Activity (i.e., Remote DICOM Storage SCP Accepts Results) is associated with a C-STORE SCU operation (i.e., Local DICOM Storage SCU Application Entity) and is triggered by the completion of Local Image Processing, which initiates the sending of a C-View image to a Remote DICOM Storage SCP.

4.2.2.3.1.2. Proposed Presentation Contexts

The following Presentation Contexts will be proposed in each association request, with one Presentation Context per SOP Class containing all of the proposed transfer syntaxes:

Abstract Syntax Name / UID	Transfer Syntax Name	Transfer Syntax UID	Role	Extended Negotiation
Digital Mammography X-Ray Image Storage – For Presentation / 1.2.840.10008.5.1.4.1.1.1.2	JPEG Lossless, Non-Hierarchical, First-Order Prediction (Process 14 [Selection Value 1])	1.2.840.10008.1.2.4.70	SCU	None
	JPEG 2000 Image Compression (Lossless Only)	1.2.840.10008.1.2.4.90	SCU	None
	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Verification / 1.2.840.10008.1.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None

Additional SOP Classes may be proposed in the association request but these are the only SOP Classes that are used.

4.2.2.3.1.3. SOP Specific Conformance

The Verification SCU is part of the Web-based Configuration Tool, to send a C-ECHO request to a configured destination manually.

The behavior of the Local DICOM Storage SCU when encountering status codes in a C-STORE response is summarized in the table below:

Service Status	Further Meaning	Status Code	Reason
Success	Success	0000	The Remote Store SCP successfully stored the SOP Instance. The C-View image and associated images shall be permitted to be deleted.
Warning	Coercion of data elements, Data set does not match SOP Class, Elements discarded	B000, B007, B006	Treated as Success. The C-View image and associated images shall be permitted to be deleted.
Failure	Any	Any	The Local Storage SCU releases the association, and the error is reported to the user after the configured retry attempts have failed.

The behavior of the Local DICOM Storage SCU during communication failure is summarized in the table below.

Exception	Behavior
Timeout	Local DICOM Storage SCU aborts the association. Failure is logged. The association will be reattempted at a later time, according to the retry strategy.
Association rejected or aborted by SCP	Failure is logged. The association will be reattempted at a later time, according to the retry strategy.

Instance UIDs are globally unique for all SOP Instances generated by the Local DICOM Storage SCU. The UID root is copied from the source image and is likely to be '1.2.840.113681'.

The local DICOM Storage SCU provides standard conformance to the Digital Mammography X-Ray Image Storage – For Presentation SOP Class for C-View images. See section 8.1.1, 'Created SOP Instance(s)' for details.

4.2.2.4. Association Acceptance Policy

The Local DICOM Storage SCU does not accept associations.

4.3. Network Interfaces

4.3.1. Physical Network Interface

C-View is tested and supports using 100-BaseT and 1000-Base T Ethernet media.

4.3.2. Additional Protocols

None

4.4. Configuration

A Web-based Configuration Tool is used for DICOM configuration.

4.4.1. AE Title/Presentation Address Mapping

The user configures C-View's Local Storage SCU AE and Local Storage SCP AE, and remote SCU AEs and SCP AEs by entering the AE Title, IP Address, and TCP/IP port number (SCPs only). There are no dedicated ports associated with dedicated services.

4.4.2. Configurable Parameters

The following fields are configurable for each output device (Remote DICOM Storage SCP):

- Retry Interval (in minutes)
- Retry Duration (in hours)

5. Media Interchange

None.

6. Support of Character Sets

C-View supports the following character sets:

- Default: ISO-IR 6
- Latin Alphabet No. 1: ISO-IR 100

7. Security Profiles

C-View does not support any specific DICOM security measures.

It is assumed that C-View is used within a secured environment. For additional information about Hologic security policies, see Hologic's Enterprise Cybersecurity Best Practices.

8. Annexes

8.1. IOD Contents

8.1.1. Created SOP Instance(s)

Abbreviations for Presence of Value:

ALWAYS	Attribute always present with a value
ANAP	Attribute not always present
EMPTY	Attribute is sent without a value (zero length)
VNAP	Attribute value not always present (zero length if no value)

Abbreviations for Source:

AUTO	Attribute value is generated automatically
CONFIG	Attribute value source is a configurable parameter

The attributes contained in created Digital Mammography X-Ray Image – For Presentation Instances are listed in the following tables.

Table 1: IOD of Created Digital Mammography X-Ray Image – For Presentation Instances

IE	Module	Reference	Presence of Module
Patient	Patient	Table 2	ALWAYS
Study	General Study	Table 3	ALWAYS
	Patient Study	Table 4	ANAP
Series	General Series	Table 5	ALWAYS
	DX Series	Table 6	ALWAYS
	Mammography Series	Table 6	ALWAYS
	Frame of Reference	Table 7	ALWAYS
Equipment	General Equipment	Table 8	ALWAYS
Image	General Image	Table 9	ALWAYS
	Image Pixel	Table 10	ALWAYS
	DX Anatomy Imaged	Table 11	ALWAYS
	DX Image	Table 12	ALWAYS
	DX Detector	Table 13	ALWAYS
	DX Positioning	Table 14	ALWAYS
	X-Ray Acquisition Dose	Table 15	ALWAYS
	X-Ray Generation	Table 16	ALWAYS
X-Ray Filtration	Table 17	ALWAYS	

X-Ray Grid	Table 18	ALWAYS
Mammography Image	Table 19	ALWAYS
VOI LUT	Table 12	ALWAYS
Acquisition Context	Table 20	ALWAYS
SOP Common	Table 21	ALWAYS

Table 2: Patient Module of Created SOP Instances

Attribute Name	Tag	Value	Presence of Value	Source
Patient's Name	(0010,0010)	Copied from source image header	ALWAYS	AUTO
Patient ID	(0010,0020)	Copied from source image header	ALWAYS	AUTO
Patient's Birth Date	(0010,0030)	Copied from source image header	VNAP	AUTO
Patient's Sex	(0010,0040)	Copied from source image header	VNAP	AUTO
All other Patient Attributes		Copied from source image header, if present	ANAP	AUTO

Table 3: General Study Module of Created SOP Instances

Attribute Name	Tag	Value	Presence of Value	Source
Study Date	(0008,0020)	Copied from source image header	ALWAYS	AUTO
Study Time	(0008,0030)	Copied from source image header	ALWAYS	AUTO
Accession Number	(0008,0050)	Copied from source image header	VNAP	AUTO
Referring Physician's Name	(0008,0090)	Copied from source image header	VNAP	AUTO
Study Description	(0008,1030)	Copied from source image header, if present	ANAP	AUTO
Study Instance UID	(0020,000D)	Copied from source image header	ALWAYS	AUTO
Study ID	(0020,0010)	Copied from source image header	VNAP	AUTO
All other General Study Attributes		Copied from source image header, if present	ANAP	AUTO

Table 4: Patient Study Module of Created SOP Instances

Attribute Name	Tag	Value	Presence of Value	Source
Patient's Age	(0010,1010)	Copied from source image header, if present	ANAP	AUTO
All other Patient Study Attributes		Copied from source image header, if present	ANAP	AUTO

Table 5: General Series Module of Created SOP Instances

Attribute Name	Tag	Value	Presence of Value	Source
Series Date	(0008,0021)	Copied from source image header	ALWAYS	AUTO
Series Time	(0008,0031)	Copied from source image header	ALWAYS	AUTO
Modality	(0008,0060)	See Table 6		
Protocol Name	(0018,1030)	Copied from source image header	ALWAYS	AUTO
Series Description	(0008,103E)	Default = laterality + view + 'C-View'	ALWAYS	CONFIG

Attribute Name	Tag	Value	Presence of Value	Source
Operators' Name	(0008,1070)	Copied from source image header	ALWAYS	AUTO
Series Instance UID	(0020,000E)	Generated automatically with configurable suffix	ALWAYS	CONFIG
Series Number	(0020,0011)	Copied from source image header	ALWAYS	CONFIG
Body Part Examined	(0018,0015)	Copied from source image header	ALWAYS	AUTO
Performed Procedure Step ID	(0040,0253)	Copied from source image header, if present	ANAP	AUTO
Performed Procedure Step Description	(0040,0254)	Copied from source image header, if present	ANAP	AUTO
Performed Procedure Step Start Date	(0040,0244)	Copied from source image header, if present	ANAP	AUTO
Performed Procedure Step Start Time	(0040,0245)	Copied from source image header, if present	ANAP	AUTO
Performed Protocol Code Sequence	(0040,0260)	One Item, copied from source image header, if present	ANAP	AUTO
> Code Value	(0008,0100)	Copied from source image header, if present	ANAP	AUTO
> Coding Scheme Designator	(0008,0102)	Copied from source image header, if present	ANAP	AUTO
> Code Meaning	(0008,0104)	Copied from source image header, if present	ANAP	AUTO

Table 6: DX Series / Mammography Series Module of SOP Instances

Attribute Name	Tag	Value	Presence of Value	Source
Modality	(0008,0060)	MG	ALWAYS	AUTO
Presentation Intent Type	(0008,0068)	FOR PRESENTATION	ALWAYS	AUTO
Referenced Performed Procedure Step Sequence	(0008,1111)	Copied from source image header, if present	ANAP	AUTO
> Referenced SOP Class UID	(0008,1150)	Copied from source image header, if present	ANAP	AUTO
> Referenced SOP Instance UID	(0008,1155)	Copied from source image header, if present	ANAP	AUTO
Request Attributes Sequence	(0040,0275)	One Item, copied from source image header, if present	ANAP	AUTO
> Requested Procedure Description	(0032,1060)	Copied from source image header, if present	ANAP	AUTO
> Scheduled Procedure Step Description	(0040,0007)	Copied from source image header, if present	ANAP	AUTO
> Scheduled Protocol Code Sequence	(0040,0008)	One Item, copied from source image header, if present	ANAP	AUTO
>> Code Value	(0008,0100)	Copied from source image header, if present	ANAP	AUTO
>> Coding Scheme Designator	(0008,0102)	Copied from source image header, if present	ANAP	AUTO
>> Code Meaning	(0008,0104)	Copied from source image header, if present	ANAP	AUTO
> Scheduled Procedure Step ID	(0040,0009)	Copied from source image header, if present	ANAP	AUTO

> Requested Procedure ID (0040,1001)	Copied from source image header, if present	ANAP	AUTO
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Table 7: Frame of Reference Module of Created SOP Instances

Attribute Name	Tag	Value	Presence of Value	Source
Frame of Reference UID	(0020,0052)	Copied from source image header	ALWAYS	AUTO
Position Reference Indicator	(0020,1040)		EMPTY	AUTO

Table 8: General Equipment Module of Created SOP Instances

Attribute Name	Tag	Value	Presence of Value	Source
Manufacturer	(0008,0070)	Copied from source image header	ALWAYS	AUTO
Institution Name	(0008,0080)	Copied from source image header, if present	ANAP	AUTO
Institution Address	(0008,0081)	Copied from source image header, if present	ANAP	AUTO
Station Name	(0008,1010)	Copied from source image header	ALWAYS	AUTO
Institutional Department Name	(0008,1040)	Copied from source image header, if present	ANAP	AUTO
Manufacturer's Model Name	(0008,1090)	Copied from source image header	ALWAYS	AUTO
Device Serial Number	(0018,1000)	Copied from source image header	ALWAYS	AUTO
Software Versions	(0018,1020)	Copied from source image header	ALWAYS	AUTO
Pixel Padding Value	(0028,0120)	Copied from source image header	ALWAYS	AUTO

Table 9: General Image Module of Created SOP Instances

Attribute Name	Tag	Value	Presence of Value	Source
Instance Number	(0020,0013)	Copied from source image header	ALWAYS	AUTO
Patient Orientation	(0020,0020)	See Table 12		
Content Date	(0008,0023)	Copied from source image header	ALWAYS	AUTO
Content Time	(0008,0033)	Copied from source image header	ALWAYS	AUTO
Image Type	(0008,0008)	See Table 12		
Acquisition Date	(0008,0022)	Copied from source image header	ALWAYS	AUTO
Acquisition Time	(0008,0032)	Copied from source image header	ALWAYS	AUTO
Source Image Sequence	(0008,2112)	One Item that identifies the source raw projection images, copied from source image header	ALWAYS	AUTO
> Referenced SOP Class UID	(0008,1150)	SOP Class UID of raw projection image	ALWAYS	AUTO
> Referenced SOP Instance UID	(0008,1155)	SOP Instance UID of raw projection image	ALWAYS	AUTO
> Purpose of Reference	(0040,A170)	One Item, copied from source image	ANAP	AUTO

Attribute Name	Tag	Value	Presence of Value	Source
Code Sequence		header, if present		
>> Code Value	(0008,0100)	Copied from source image header, if present	ANAP	AUTO
>> Coding Scheme Designator	(0008,0102)	Copied from source image header, if present	ANAP	AUTO
>> Code Meaning	(0008,0104)	Copied from source image header, if present	ANAP	AUTO
> Spatial Locations Preserved	(0028,135A)	NO	ALWAYS	AUTO
Image Comments	(0020,4000)	Default = 'C-View'	ALWAYS	CONFIG
Burned In Annotation	(0028,0301)	See Table 12		
Lossy Image Compression	(0028,2110)	See Table 12		

Table 10: Image Pixel Module of Created SOP Instances

Attribute Name	Tag	Value	Presence of Value	Source
Samples per Pixel	(0028,0002)	See Table 12		
Photometric Interpretation	(0028,0004)	See Table 12		
Rows	(0028,0010)	Generated by the system	ALWAYS	AUTO
Columns	(0028,0011)	Generated by the system	ALWAYS	AUTO
Bits Allocated	(0028,0100)	See Table 12		
Bits Stored	(0028,0101)	See Table 12		
High Bit	(0028,0102)	See Table 12		
Pixel Representation	(0028,0103)	See Table 12		
Pixel Padding Range Limit	(0028,0121)	Copied from source image header	ALWAYS	AUTO
Pixel Data	(7FE0,0010)	Generated by the system	ALWAYS	AUTO

Table 11: DX Anatomy Imaged Module of SOP Instances

Attribute Name	Tag	Value	Presence of Value	Source
The supported attributes are overridden by the Mammography Image module. See Table 19 .				

Table 12: DX Image Module of Created SOP Instances

Attribute Name	Tag	Value	Presence of Value	Source
Image Type	(0008,0008)	DERIVED\PRIMARY, copied from source image header	ALWAYS	AUTO
Samples per Pixel	(0028,0002)	1	ALWAYS	AUTO
Photometric Interpretation	(0028,0004)	MONOCHROME2	ALWAYS	AUTO
Bits Allocated	(0028,0100)	16	-ALWAYS	AUTO
Bits Stored	(0028,0101)	10	ALWAYS	AUTO
High Bit	(0028,0102)	9	ALWAYS	AUTO
Pixel Representation	(0028,0103)	0	ALWAYS	AUTO
Pixel Intensity Relationship	(0028,1040)	LOG	ALWAYS	AUTO
Pixel Intensity Relationship Sign	(0028,1041)	-1	ALWAYS	AUTO

Attribute Name	Tag	Value	Presence of Value	Source
Rescale Intercept	(0028,1052)	0	ALWAYS	AUTO
Rescale Slope	(0028,1053)	1	ALWAYS	AUTO
Rescale Type	(0028,1054)	US	ALWAYS	AUTO
Presentation LUT Shape	(2050,0020)	IDENTITY	ALWAYS	AUTO
Lossy Image Compression	(0028,2110)	00	ALWAYS	AUTO
Patient Orientation	(0020,0020)	Copied from source image header	ALWAYS	AUTO
Burned In Annotation	(0028,0301)	NO, copied from source image header	ALWAYS	AUTO
Window Center	(0028,1050)	Generated by the system	ALWAYS	CONFIG
Window Width	(0028,1051)	Generated by the system	ALWAYS	CONFIG

Table 13: DX Detector Module of Created SOP Instances

Attribute Name	Tag	Value	Presence of Value	Source
Detector Type	(0018,7004)	Copied from source image header	ALWAYS	AUTO
Detector ID	(0018,700A)	Copied from source image header	ALWAYS	AUTO
Date of Last Detector Calibration	(0018,700C)	Copied from source image header	ALWAYS	AUTO
Time of Last Detector Calibration	(0018,700E)	Copied from source image header	ALWAYS	AUTO
Detector Conditions Nominal Flag	(0018,7000)	Copied from source image header	ALWAYS	AUTO
Detector Temperature	(0018,7001)	Copied from source image header	ALWAYS	AUTO
Detector Binning	(0018,701A)	Copied from source image header	ALWAYS	AUTO
Field of View Origin	(0018,7030)	Copied from source image header	ALWAYS	AUTO
Field of View Rotation	(0018,7032)	Copied from source image header	ALWAYS	AUTO
Field of View Horizontal Flip	(0018,7034)	Copied from source image header	ALWAYS	AUTO
Imager Pixel Spacing	(0018,1164)	Derived from source image	ALWAYS	AUTO
Pixel Spacing	(0028,0030)	Derived from source image	ALWAYS	AUTO

Table 14: DX Positioning Module of Created SOP Instances

Attribute Name	Tag	Value	Presence of Value	Source
View Position	(0018,5101)	Copied from source image header	ALWAYS	AUTO
View Code Sequence	(0054,0220)	See Table 19		
Distance Source to Detector	(0018,1110)	Copied from source image header	ALWAYS	AUTO
Distance Source to Patient	(0018,1111)	Copied from source image header	ALWAYS	AUTO
Estimated Radiographic Magnification Factor	(0018,1114)	1.0	ALWAYS	AUTO
Positioner Type	(0018,1508)	See Table 19		
Positioner Primary Angle	(0018,1510)	See Table 19		
Body Part Thickness	(0018,11A0)	Copied from source image header	ALWAYS	AUTO
Compression Force	(0018,11A2)	Copied from source image header	ALWAYS	AUTO

Table 15: X-Ray Acquisition Dose Module of Created SOP Instances

Attribute Name	Tag	Value	Presence of Value	Source
KVP	(0018,0060)	See Table 16		
X-Ray Tube Current	(0018,1151)	See Table 16		
Exposure Time	(0018,1150)	See Table 16		
Exposure	(0018,1152)	See Table 16		
Exposure in uAs	(0018,1153)	Copied from source image header	ALWAYS	AUTO
Exposure Time in uS	(0018,8150)	Copied from source image header	ALWAYS	AUTO
Distance Source to Detector	(0018,1110)	See Table 14		
Distance Source to Patient	(0018,1111)	See Table 14		
Body Part Thickness	(0018,11A0)	See Table 14		
Entrance Dose	(0040,0302)	Copied from source image header	ALWAYS	AUTO
Entrance Dose in mGy	(0040,8302)	Copied from source image header	ALWAYS	AUTO
Half Value Layer	(0040,0314)	Copied from source image header	ALWAYS	AUTO
Organ Dose	(0040,0316)	Copied from source image header	ALWAYS	AUTO
Organ Exposed	(0040,0318)	See Table 19		
Anode Target Material	(0018,1191)	See Table 16		
Filter Material	(0018,7050)	Copied from source image header	ALWAYS	AUTO
Filter Thickness Minimum	(0018,7052)	Copied from source image header	ALWAYS	AUTO
Filter Thickness Maximum	(0018,7054)	Copied from source image header	ALWAYS	AUTO
Relative X-Ray Exposure	(0018,1405)	Copied from source image header	ALWAYS	AUTO

Table 16: X-Ray Generation Module of Created SOP Instances

Attribute Name	Tag	Value	Presence of Value	Source
KVP	(0018,0060)	Copied from source image header	ALWAYS	AUTO
X-Ray Tube Current	(0018,1151)	Copied from source image header	ALWAYS	AUTO
Exposure Time	(0018,1150)	Copied from source image header	ALWAYS	AUTO
Exposure	(0018,1152)	Copied from source image header	ALWAYS	AUTO
Focal Spot(s)	(0018,1190)	Copied from source image header	ALWAYS	AUTO
Anode Target Material	(0018,1191)	Copied from source image header	ALWAYS	AUTO
Exposure Control Mode	(0018,7060)	Copied from source image header	ALWAYS	AUTO
Exposure Control Mode Description	(0018,7062)	Copied from source image header	ALWAYS	AUTO

Table 17: X-Ray Filtration Module of SOP Instances

Attribute Name	Tag	Value	Presence of Value	Source
The supported attributes are overridden by the X-Ray Acquisition Dose module. See Table 15 .				

Table 18: X-Ray Grid Module of Created SOP Instances

Attribute Name	Tag	Value	Presence of Value	Source
Grid	(0018,1166)	Copied from source image header	ALWAYS	AUTO

Table 19: Mammography Image Module of Created SOP Instances

Attribute Name	Tag	Value	Presence of Value	Source
Positioner Type	(0018,1508)	Copied from source image header	ALWAYS	AUTO
Positioner Primary Angle	(0018,1510)	Copied from source image header	ALWAYS	AUTO
Image Laterality	(0020,0062)	Copied from source image header	ALWAYS	AUTO
Organ Exposed	(0040,0318)	Copied from source image header	ALWAYS	AUTO
Breast Implant Present	(0028,1300)	Copied from source image header, if present	ANAP	AUTO
Partial View	(0028,1350)	Copied from source image header, if present	ANAP	AUTO
Anatomic Region Sequence	(0008,2218)	One Item	ALWAYS	AUTO
> Code Value	(0008,0100)	T-04000	ALWAYS	AUTO
> Coding Scheme Designator	(0008,0102)	SNM3	ALWAYS	AUTO
> Code Meaning	(0008,0104)	Breast	ALWAYS	AUTO
View Code Sequence	(0054,0220)	One Item	ALWAYS	AUTO
> Code Value	(0008,0100)	Copied from source image header	ALWAYS	AUTO
> Coding Scheme Designator	(0008,0102)	Copied from source image header	ALWAYS	AUTO
> Code Meaning	(0008,0104)	Copied from source image header	ALWAYS	AUTO
> View Modifier Code Sequence	(0054,0222)	All Items copied from source image header, if present	VNAP	AUTO
>> Code Value	(0008,0100)	Copied from source image header, if present	ANAP	AUTO
>> Coding Scheme Designator	(0008,0102)	Copied from source image header, if present	ANAP	AUTO
>> Code Meaning	(0008,0104)	Copied from source image header, if present	ANAP	AUTO

Table 20: Acquisition Context Module of Created SOP Instances

Attribute Name	Tag	Value	Presence of Value	Source
Acquisition Context Sequence	(0040,0555)		EMPTY	AUTO

Table 21: SOP Common Module of Created SOP Instances

Attribute Name	Tag	Value	Presence of Value	Source
SOP Class UID	(0008,0016)	'1.2.840.10008.5.1.4.1.1.1.2'	ALWAYS	AUTO
SOP Instance UID	(0008,0018)	Generated automatically with configurable suffix	ALWAYS	CONFIG
Specific Character Set	(0008,0005)	Copied from source image header, if present	ANAP	AUTO

8.2. Usage of Attributes from Received IODs

The following attributes are required to be present with a valid value (not zero length), in order for an image instance to be accepted for synthesized image generation:

- (0008,0020) Study Date
- (0008,0070) Manufacturer
- (0008,1090) Manufacturer's Model Name
- (0018,1000) Device Serial Number

8.2.1. Attribute Mapping

Patient and Study level attributes are copied from the received image SOP Instances to the corresponding C-View image SOP Instances. See tables in section **8.1.1**, 'Created SOP Instance(s)' for details and additional information copied from the source images to the corresponding C-View images.

8.2.2. Coerced/Modified Attributes

None

8.3. Data Dictionary of Private Attributes

Created SOP Instances contain a Private Group (0019) labeled HOLOGIC, Inc., containing proprietary image characteristics.

8.4. Coded Terminology and Templates

Not Applicable

8.5. Grayscale Image Consistency

Not Applicable

8.6. Standard Extended/Specialized/Private SOP Classes

None

8.7. Private Transfer Syntaxes

None