Technical Publications

Direction 40472
Revision 3

enCORE™ 6.0 CONFORMANCE STATEMENT for DICOM V3.0

Prodigy
DPX-NT
DPX-MD+

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GE Medical Systems

REVISION HISTORY

REV	DATE	REASON FOR CHANGE
1	June 23, 2001	Updated for enCore 4.0
2	July 3, 2001	Updated for enCore 5.0 Expand MWL queries to include wildcard PN queries. Added specific date queries – today, tomorrow.
3	January 29, 2002	Updated for enCore 6.0 Removed non standard attribute length restrictions on patient name, patient ID, referring physician, operator's name. Store/Print modality configurable.

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1. INTRODUCTION

1.1 OVERVIEW

This DICOM Conformance Statement is divided into Sections as described below:

Section 1 (Introduction), which describes the overall structure, intent, and references for this Conformance Statement

Section 2 (Network Conformance Statement), which specifies the GEMS equipment compliance to the DICOM requirements for the implementation of Networking features.

Section 3 (Computed Radiography Information Object Implementation), which specifies the GEMS equipment compliance to DICOM requirements for the implementation of a Computed Radiography Information Object.

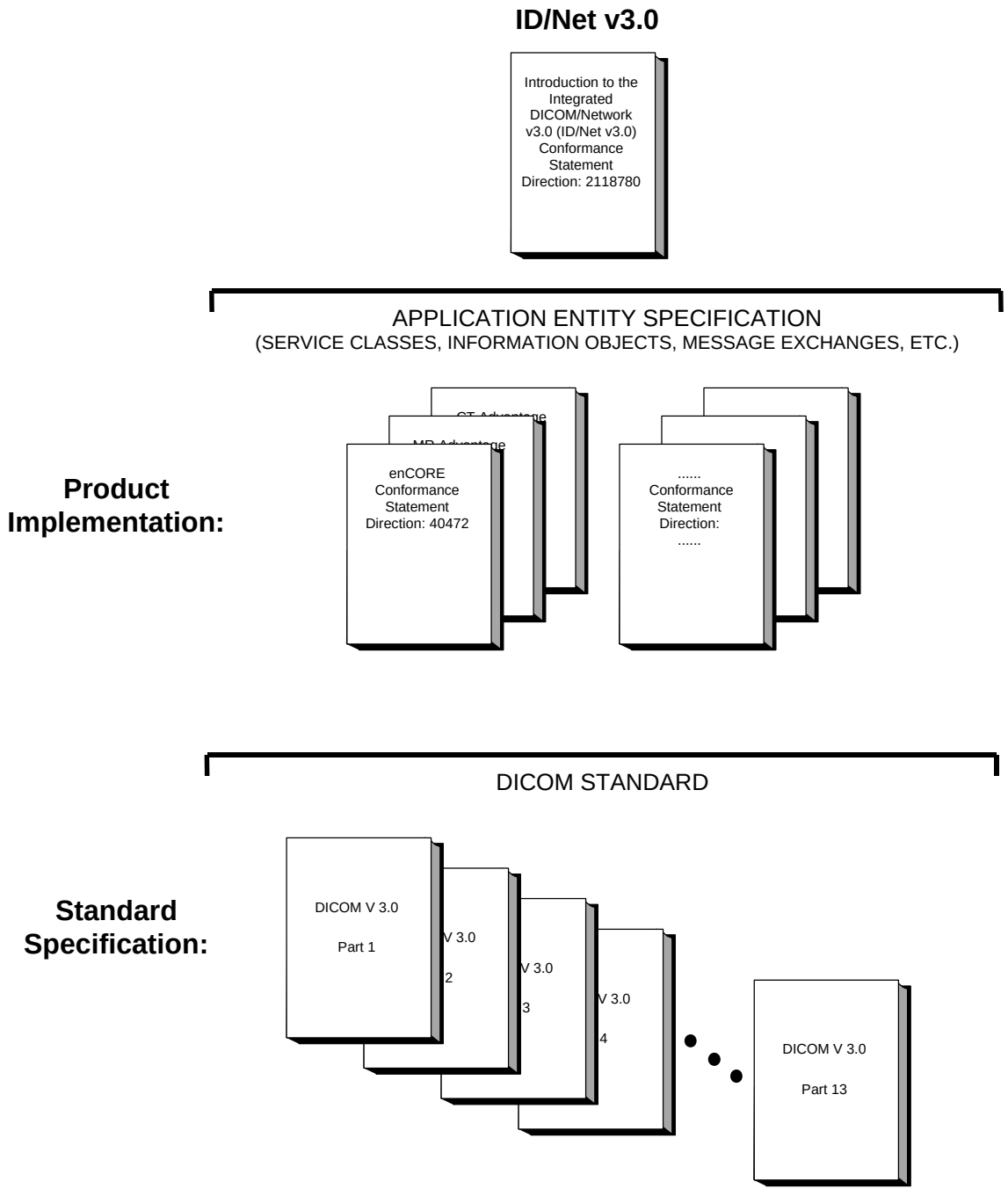
Section 4 (Scecondary Capture Information Object Implementation), which specifies the GEMS equipment compliance to DICOM requirements for the implementation of a Secondary Capture Information Object.

Section 5 (Basic Print Meta SOP Class Information Object Implementation), which specifies the GEMS equipment compliance to DICOM requirements for the implementation of Basic Print Meta SOP Classes.

Section 6 (Modality Worklist Information Model), which specifies the GEMS equipment compliance to DICOM requirements for the implementation of the Modality Worklist service.

1.2 OVERALL DICOM CONFORMANCE STATEMENT DOCUMENT STRUCTURE

The Documentation Structure of the GEMS Conformance Statements and their relationship with the DICOM v3.0 Conformance Statements is shown in the Illustration below.



This document specifies the DICOM v3.0 implementation. It is entitled:

enCORE
Conformance Statement for DICOM v3.0
Direction 40472

This DICOM Conformance Statement documents the DICOM v3.0 Conformance Statement and Technical Specification required to interoperate with the GEMS network interface. Introductory information, which is applicable to all GEMS Conformance Statements, is described in the document:

Introduction to the Integrated DICOM/Network v3.0 (ID/Net v3.0)
Conformance Statement
Direction: 2118780.

This Introduction familiarizes the reader with DICOM terminology and general concepts. It should be read prior to reading the individual products' GEMS Conformance Statements.

The GEMS Conformance Statement, contained in this document, also specifies the Lower Layer communications which it supports (e.g., TCP/IP). However, the Technical Specifications are defined in the DICOM v3.0 Part 8 standard.

For more information including Network Architecture and basic DICOM concepts, please refer to the Introduction.

For the convenience of software developers, there is "collector" Direction available. By ordering the collector, the Introduction described above and all of the currently published GEMS Product Conformance Statements will be received. The collector Direction is:

ID/Net v3.0 Conformance Statements
Direction: 2117016

For more information regarding DICOM v3.0, copies of the Standard may be obtained by written request or phone by contacting:

NEMA Publication
1300 North 17th Street
Suite 1847
Rosslyn, VA 22209
USA
Phone: (703) 841-3200

1.3 INTENDED AUDIENCE

The reader of this document is concerned with software design and/or system integration issues. It is assumed that the reader of this document is familiar with the DICOM v3.0 Standards and with the terminology and concepts which are used in those Standards.

If readers are unfamiliar with DICOM v3.0 terminology they should first refer to the document listed below, then read the DICOM v3.0 Standard itself, prior to reading this DICOM Conformance Statement document.

Introduction to the Integrated DICOM/Network v3.0 (ID/Net v3.0)
Conformance Statement
Direction: 2118780

1.4 SCOPE AND FIELD OF APPLICATION

It is the intent of this document, in conjunction with the *Introduction to the Integrated DICOM/Network v3.0 (ID/Net v3.0) Conformance Statement, Direction: 2118780*, to provide an unambiguous specification for GEMS implementations. This specification, called a Conformance Statement, includes a DICOM v3.0 Conformance Statement and is necessary to ensure proper processing and interpretation of GEMS medical data exchanged using DICOM v3.0. The GEMS Conformance Statements are available to the public.

The reader of this DICOM Conformance Statement should be aware that different GEMS devices are capable of using different Information Object Definitions. For example, a GEMS CT Scanner may send images using the CT Information Object, MR Information Object, Secondary Capture Object, etc.

Included in this DICOM Conformance Statement are the Module Definitions which define all data elements used by this GEMS implementation. If the user encounters unspecified private data elements while parsing a GEMS Data Set, the user is well advised to ignore those data elements (per the DICOM v3.0 standard). Unspecified private data element information is subject to change without notice. If, however, the device is acting as a "full fidelity storage device", it should retain and re-transmit all of the private data elements which are sent by GEMS devices.

1.5 IMPORTANT REMARKS

The use of these DICOM Conformance Statements, in conjunction with the DICOM v3.0 Standards, is intended to facilitate communication with GE imaging equipment. However, **by itself, it is not sufficient to ensure that inter-operation will be successful**. The **user (or user's agent)** needs to proceed with caution and address at least four issues:

- **Integration** - The integration of any device into an overall system of interconnected devices goes beyond the scope of standards (DICOM v3.0), and of this introduction and associated DICOM Conformance Statements when interoperability with non-GE equipment is desired. The responsibility to analyze the applications requirements and to design a solution that integrates GE imaging equipment with non–GE systems is the **user's** responsibility and should not be underestimated. The **user** is strongly advised to ensure that such an integration analysis is correctly performed.

- **Validation** - Testing the complete range of possible interactions between any GE device and non–GE devices, before the connection is declared operational, should not be overlooked. Therefore, the **user** should ensure that any non–GE provider accepts full responsibility for all validation required for their connection with GE devices. This includes the accuracy of the image data once it has crossed the interface between the GE imaging equipment and the non–GE device and the stability of the image data for the intended applications.

  Such a validation is required before any clinical use (diagnosis and/or treatment) is performed. It applies when images acquired on GE imaging equipment are processed/displayed on a non-GE device, as well as when images acquired on non-GE equipment is processed/displayed on a GE console or workstation.

- **Future Evolution** - GE understands that the DICOM Standard will evolve to meet the user's growing requirements. GE is actively involved in the development of the DICOM v3.0 Standard. DICOM v3.0 will incorporate new features and technologies and GE may follow the evolution of the Standard. The GEMS protocol is based on DICOM v3.0 as specified in each DICOM Conformance Statement. Evolution of the Standard may require changes to devices which have implemented DICOM v3.0. **In addition, GE reserves the right to discontinue or make changes to the support of communications features (on its products) reflected on by these DICOM Conformance Statements**. The **user** should ensure that any non–GE provider, which connects with GE devices, also plans for the future evolution of the DICOM Standard. Failure to do so will likely result in the loss of function and/or connectivity as the DICOM Standard changes and GE Products are enhanced to support these changes.

- **To be informed of the evolution of the implementation described in this document, the User is advised to regularly check the GE Internet Server, accessible via anonymous ftp (GE Internet Server Address: ftp.med.ge.com, 192.88.230.11).**

- **Interaction** - It is the sole responsibility of the **non–GE provider** to ensure that communication with the interfaced equipment does not cause degradation of GE imaging equipment performance and/or function.

1.6 REFERENCES

A list of references which is applicable to all GEMS Conformance Statements is included in the *Introduction to the Integrated DICOM/Network v3.0 (ID/Net v3.0) Conformance Statement, Direction: 2118780*.

The information object implementation refers to DICOM PS 3.3 (Information Object Definition).

1.7 DEFINITIONS

A set of definitions which is applicable to all GEMS Conformance Statements is included in *the Introduction to the Integrated DICOM/Network v3.0 (ID/Net v3.0) Conformance Statement, Direction: 2118780*.

1.8 SYMBOLS AND ABBREVIATIONS

A list of symbols and abbreviations which is applicable to all GEMS Conformance Statements is included in the *Introduction to the Integrated DICOM/Network v3.0 (ID/Net v3.0) Conformance Statement, Direction: 2118780*.

2. NETWORK CONFORMANCE STATEMENT

2.1 INTRODUCTION

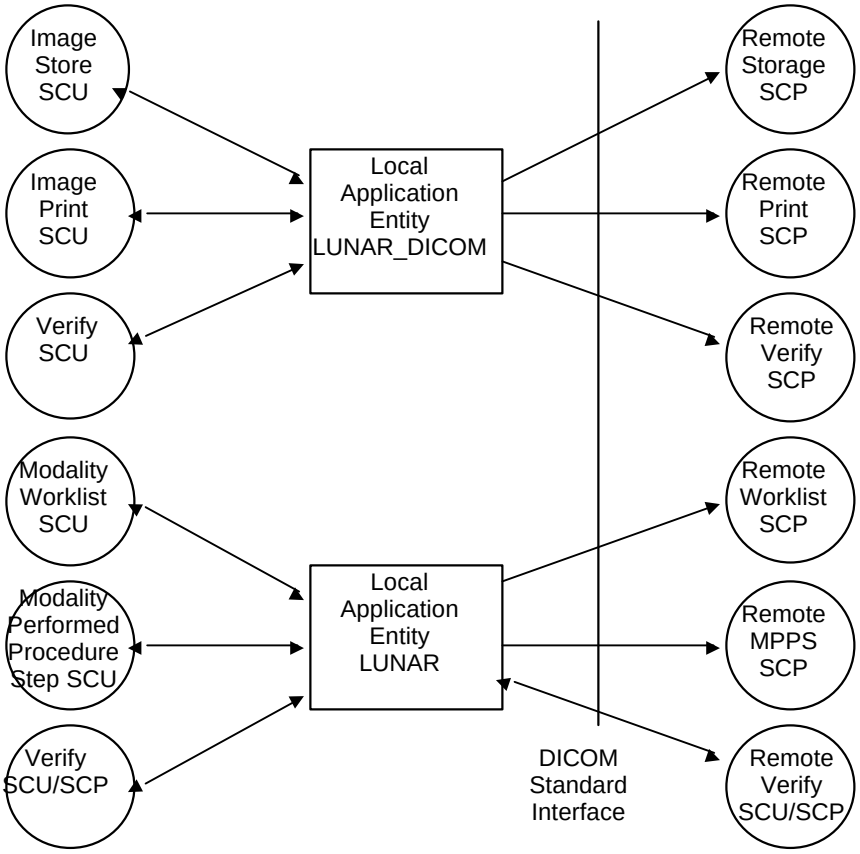
This section of the DICOM Conformance Statement specifies the compliance to DICOM conformance requirements for the relevant **Networking** features on this GEMS product. Note that the format of this section strictly follows the format defined in DICOM Standard PS 3.2 (Conformance). Please refer to that part of the standard while reading this section.

The enCORE DICOM feature is an optional software feature that supports DICOM v3.0 and permits interoperability across equipment produced by different vendors that also utilize DICOM v3.0 services. On any given network, enCORE can send images to multiple archive/review stations (PACS) and printers or query a modality worklist provider for a list of exams to perform. The network is easily configured at any time, but is normally done at sofware installation by a GEMS field service engineer. enCORE provides all DICOM services that are required to support the image store, image print, modality worklist, performed procedure step and verify DICOM services as an SCU.

2.2 IMPLEMENTATION MODEL

2.2.1 Application Data Flow Diagram

The Basic and Specific Application models for this device are shown in the following illustration:



There are five real-world activites that occur in the enCORE DICOM software – image store, image print, modality worklist query, modality performed procedure step, and remote verification.

All DICOM image transfers are handled in a queued manner by one AE. If the network is not connected or the SCP is not running, the images will go into a holding queue.

You can configure the application with multiple storeage and print devices however there can only be one active storage and one active print device at any one time along with one worklist and one performed procedure step.

A verification test can be initiated at any time by the user to check the current status of any networked DICOM device. A separate verify SCP task is always running in the background to allow other DICOM devices to verify the enCORE connection.

2.2.2 Functional Definition of AEs

The AE LUNAR_DICOM initiates an association to store images to a storage device or print images to a remote printer. It also initiates an association to verify a connection with another DICOM device.

The AE LUNAR initiates an association to query a modality worklist provider for a list of exams to perform or to signal a performed procedure step at the start and end of a measurement. It also initiates an association to verify a connection with another DICOM device and responds to an association request for verification from other DICOM devices.

2.2.3 Sequencing of Real-World Activities

Image Store

- Initiates an association with the selected archive device SCP when the user requests an image to be stored.
- Selects the appropriate transfer syntax from those accepted by the SCP.
- Pushes the image to the remote archive device using the C-STORE command.

Image Print

- Initiates an association with the selected print device SCP when the user requests an image to be printed.
- Selects the appropriate transfer syntax from those accepted by the SCP.
- Create a basic film session instance using the N-CREATE command.
- Creates a basic film box instance using the N-CREATE command.
- Prints the image using the N-ACTION command.
- Deletes the film box instance using the N-DELETE command.

Modality Worklist Query

- Initiates an association with the selected Modality Worklist SCP when the user requests to retrieve the current worklist information.
- Selects the apporpriate transfer syntax from those accepted by the SCP.
- Queries and retrieves the worklist information using the C-FIND command.

Modality Performed Procedure Step

- Initiaties an association with the selected Modality Performed Procedure Step SCP when an exam is started.
- Selects the appropriate transfer syntax from those accepted by the SCP.
- Creates a procedure step begin using the N-CREATE command when the acquisition is started.
- Creates a procedure step end using the N-SET command when the acquisition is complete.

Verification

- Each local AE initiates an association with its respective remote device when the user requests to verify the DICOM connection.
- Selectes the appropriate transfer syntax from those accepted by the remote AE.
- Verifies communication with the remote AE using the C-ECHO command.
- If the remote device is a printer, requests status information using the N-GET command.

2.3 AE SPECIFICATIONS

2.3.1 LUNAR_DICOM AE Specification

This Application Entity provides Standard Conformance to the following DICOM V3.0 SOP Classes as an **SCU**:

SOP Class Name	SOP Class UID
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7
Basic Grayscale Print Mangagement Meta SOP Class	1.2.840.10008.5.1.1.9
Verification SOP Class	1.2.840.10008.1.1

2.3.1.1 Association Establishment Policies

2.3.1.1.1 General

The DICOM Application Context Name (ACN), which is always proposed, is:

Application Context Name	1.2.840.10008.3.1.1.1

The Maximum Length PDU negotiation is included in all association establishment requests.

The maximum length PDU for an association initiated by the LUNAR_DICOM AE is:

Maximum Length PDU	16384 bytes

The SOP Class Extended Negotiation is not supported.

The maximum number of Presentation Context Items that will be proposed is 1.

The user information Items sent by this product are :

- Maximum PDU Length
- Implementation UID

2.3.1.1.2 Number of Associations

The LUNAR_DICOM AE will initiate a single association at a time to perform an image store, print, or verify.

2.3.1.1.3 Asynchronous Nature

Asynchronous mode is not supported. All operations will be performed synchronously.

2.3.1.1.4 Implementation Identifying Information

The Implementation UID for this DICOM v3.0 Implementation is:

enCORE Implementation UID	1.2.840.113619.6.110

2.3.1.2 Association Initiation Policy

The LUNAR_DICOM AE attempts to establish a new association with a remote device due to three real-world activites as described in the following sections.

2.3.1.2.1 Real-World Activity Image Store

Upon a request from the user (manual or automatic), an image will be sent to a previously configured DICOM storage SCP. If an error occurs during the transmission, the current association is released and a new association is initiated. A failed job will be retried until the user halts the queue proceesing and manually deletes the job.

2.3.1.2.1.1 Proposed Presentation Context Table

Presentation Context Table - Proposed					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None

2.3.1.2.1.1.1 SOP Specific DICOM Conformance Statement for all Storage SOP Classes

Following are the status codes that are more specifically processed when receiving messages from **Storage** SCP equipment:

Service Status	Status Codes	Further Meaning	Application Behavior When receiving Status Codes	Related Fields Processed if received
Refused	A7xx	Out of resources	Logs store failed message along with error comment returned from SCP. Displays store failure message and moves on to next job. Failed job is retried after have processed all other jobs.	(0000,0902)
	0122	SOP Class not Supported	Logs store failed message along with error comment returned from SCP. Displays store failure message and moves on to next job. Failed job is retried after have processed all other jobs.	(0000,0902)

Error	Cxxx	Cannot Understand	Logs store failed message along with list of offending elements and any error comments returned from SCP. Displays store failure message and moves on to next job. Failed job is retried after have processed all other jobs.	(0000,0901) (0000,0902)
	A9xx	Data Set does not match SOP Class	Logs store failed message along with list of offending elements and any error comments returned from SCP. Displays store failure message and moves on to next job. Failed job is retried after have processed all other jobs.	(0000,0901) (0000,0902)
Warning	B000	Coercion of Data Elements	Logs store failed message along with list of offending elements and any error comments returned from SCP. Displays store failure message and moves on to next job. Failed job is retried after have processed all other jobs.	(0000,0901) (0000,0902)
	B007	Data Set does not match SOP Class	Logs store failed message along with list of offending elements and any error comments returned from SCP. Displays store failure message and moves on to next job. Failed job is retried after have processed all other jobs.	(0000,0901) (0000,0902)
	B006	Elements Discarded	Logs store failed message along with list of offending elements and any error comments returned from SCP. Displays store failure message and moves on to next job. Failed job is retried after have processed all other jobs.	(0000,0901) (0000,0902)
Success	0000			None

2.3.1.2.2 Real-World Activity Image Print

Upon a request from the user, an image will be sent to a previously configured DICOM printer SCP. If an error occurs during the transmission, the current association is released and a new association is initiated. A failed job will be retried until the user halts the queue proceesing and manually deletes the job.

2.3.1.2.2.1 Proposed Presentation Context Table

Presentation Context Table - Proposed					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended**
Name	**UID**	**Name List**	**UID List**		**Negotiation**
Basic Grayscale Print Print Print Management Meta SOP Class	1.2.840.10008.5.1.1.9	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None
Printer SOP Class	1.2.840.10008.5.1.1.16	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None

2.3.1.2.2.1.1 SOP Specific DICOM Conformance Statement for all Print SOP Classes

Following are the status codes that are more specifically processed when receiving messages from **Print** SCP equipment:

Service Status	Status Codes	Further Meaning	Application Behavior When receiving Status Codes	Related Fields Processed if received
Refused	A7xx	Out of resources	Displays print failure message and moves on to next job. Failed job is retried after have processed all other jobs.	None
	0122	SOP Class not Supported	Displays print failure message and moves on to next job. Failed job is retried after have processed all other jobs.	None
Error	Cxxx	Cannot Understand	Displays print failure message and moves on to next job. Failed job is retried after have processed all other jobs.	None
	A9xx	Data Set does not match SOP Class	Displays print failure message and moves on to next job. Failed job is retried after have processed all other jobs.	None
Warning	B000	Coercion of Data Elements	Displays print failure message and moves on to next job. Failed job is retried after have processed all other jobs.	None
	B007	Data Set does not match SOP Class	Displays print failure message and moves on to next job. Failed job is retried after have processed all other jobs.	None

			other jobs.	
	B006	Elements Discarded	Displays print failure message and moves on to next job. Failed job is retried after have processed all other jobs.	None
Success	0000			None

2.3.1.2.3 Real-World Activity Verification

The Verification Service Class is used as a diagnostic and informative tool to provide information to the user regarding the current connection status of other networked DICOM devices. If the device is a printer, printer attributes are also retrieved and displayed using the N-GET command. When selected by the user, the remote device will be tested with a DICOM C-ECHO command. The results of the C-ECHO are displayed on the screen. Associations will be released upon the receipt of a C-ECHO confirmation. Each networked DICOM device is verified individually. The table below lists all the possible proposed SOP classes when a verification association is opened however only the Verification SOP class and the SOP class of the DICOM service being verified are actually offered. Store SOPs are only offered when verifying a storage device, print SOPs are only offered when verifying a print device.

2.3.1.2.3.1 Proposed Presentation Context Table

Presentation Context Table – Proposed					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended**
Name	**UID**	**Name List**	**UID List**		**Negotiation**
Verification SOP Class	1.2.840.10008.1.1	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None

2.3.2 LUNAR AE Specification

This Application Entity provides Standard Conformance to the following DICOM V3.0 SOP Classes as an **SCU**:

SOP Class Name	SOP Class UID
Modality Worklist Information Model - FIND	1.2.840.10008.5.1.4.31
Modality Performed Procedure Step SOP Class	1.2.840.10008.3.1.2.3.3
Verification SOP Class	1.2.840.10008.1.1

This Application Entity provides Standard Conformance to the following DICOM V3.0 SOP Classes as an **SCP**:

SOP Class Name	SOP Class UID
Verification SOP Class	1.2.840.10008.1.1

2.3.2.1 Association Establishment Policies

2.3.2.1.1 General

The DICOM Application Context Name (ACN), which is always proposed, is:

Application Context Name	1.2.840.10008.3.1.1.1

The Maximum Length PDU negotiation is included in all association establishment requests.

The maximum length PDU for an association initiated by the LUNAR AE is configurable. The possible values are:

Maximum Length PDU	16384 - 131072 bytes

The SOP Class Extended Negotiation is not supported.

The maximum number of Presentation Context Items that will be proposed is 1.

The user information Items sent by this product are :

- Maximum PDU Length
- Implementation UID

2.3.2.1.2 Number of Associations

The LUNAR AE will initiate a single association at a time to perform a Modality Worklist query, Modality Performed Procedure Step, or verify.

2.3.2.1.3 Asynchronous Nature

Asynchronous mode is not supported. All operations will be performed synchronously.

2.3.2.1.4 Implementation Identifying Information

The Implementation UID for this DICOM v3.0 Implementation is:

enCORE Implementation UID	1.2.840.113619.6.110

2.3.2.2 Association Initiation Policy

The LUNAR AE attempts to establish a new association with a remote device due to three real-world activites as described in the following sections.

2.3.2.2.1 Real-World Activity Modality Worklist

Upon a request from the user, the Worklist SCP will be queried for the worklist items that match the user-defined query.

2.3.2.2.1.1 Proposed Presentation Context Table

Presentation Context Table – Proposed					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Basic Worklist Management SOP Class	1.2.840.10008.5.1.4.31	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None

2.3.2.2.1.1.1 SOP Specific DICOM Conformance Statement for the Modality Worklist Information Model - FIND SOP Class

Following are the status codes that are more specifically processed when receiving messages from **Modality Worklist** SCP equipment:

Service Status	Status Codes	Further Meaning	Application Behavior When receiving Status Codes	Related Fields Processed if received
Refused	A700	Out of resources	Terminates receiving of matches. Logs failure message along with error comment returned from SCP and displays failure message. The matches that are received prior to this code are handled normally.	(0000,0902)
	0122	SOP Class not Supported	Terminates receiving of matches. Logs failure message along with error comment returned from	(0000,0902)

			SCP and displays failure message. The matches that are received prior to this code are handled normally.	
Failed	A900	Identifier does not match SOP Class	Terminates receiving of matches. Logs failure message along with offending element and any error comment returned from SCP and displays failure message. The matches that are received prior to this code are handled normally.	(0000,0901) (0000,0902)
	Cxxx	Unable to process	Terminates receiving of matches. Logs failure message along with offending element and any error comment returned from SCP and displays failure message. The matches that are received prior to this code are handled normally.	(0000,0901) (0000,0902)
Cancel	FE00	Matching terminated due to cancel	Terminates receiving of matches. Logs SCP cancel message and displays failure message. Any matches received prior to this code are thrown away.	None
Success	0000	Matching is complete - No final identifier is supplied		None
Pending	FF00	Matches are continuing - Current Match is supplied and any Optional Keys were supported in the same manner as Required Keys.	Receiving of matches continues.	None
	FF01	Matches are continuing - Warning that one or more Optional Keys were not supported for existence for this Identifier	Receiving of matches continues without any warnings or errors.	None

2.3.2.2.2 Real-World Activity Modality Performed Procedure Step

Upon start of an exam, the state of "IN PROGRESS" is signaled to a previously configured DICOM performed procedure step SCP. Upon completion and save of an exam, the state of "COMPLETED" is signaled to the SCP. If the exam is aborted, the state of "DISCONTINUED" is signaled to the SCP.

2.3.2.2.2.1 Proposed Presentation Context Table

Presentation Context Table – Proposed					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
Modality Performed Procedure Step SOP Class	1.2.840.10008.3.1.2.3.3	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None

2.3.2.2.2.1.1 SOP Specific DICOM Conformance Statement for the Modality Performed Procedure Step SOP Class

Following are the status codes that are more specifically processed when receiving messages from **Perfromed Procedure Step** SCP equipment:

Service Status	Status Codes	Further Meaning	Application Behavior When receiving Status Codes	Related Fields Processed if received
Refused	A7xx	Out of resources	Logs failure message along with error comment returned from SCP and displays failure message.	(0000,0902)
	0122	SOP Class not Supported	Logs failure message along with error comment returned from SCP and displays failure message.	(0000,0902)
Error	Cxxx	Cannot Understand	Logs failure message along with offending element and any error comment returned from SCP and displays failure message.	(0000,0901) (0000,0902)
	A9xx	Data Set does not match SOP Class	Logs failure message along with offending element and any error comment returned from SCP and displays failure message.	(0000,0901) (0000,0902)
Warning	B000	Coercion of Data Elements	Logs failure message along with offending element and any error comment returned from SCP and displays failure message.	(0000,0901) (0000,0902)
	B007	Data Set does not match SOP Class	Logs failure message along with offending element and any error comment returned from SCP and displays failure message.	(0000,0901) (0000,0902)
	B006	Elements Discarded	Logs failure message along with offending element and any error comment returned from SCP and displays failure message.	(0000,0901) (0000,0902)
Success	0000			None

2.3.2.2.3 Real-World Activity Verification

The Verification Service Class is used as a diagnostic and informative tool to provide information to the user regarding the current connection status of other networked DICOM devices. When selected by the user, the remote device will be tested with a DICOM C-ECHO command. The results of the C-ECHO are displayed on the screen. Associations will be released upon the receipt of a C-ECHO confirmation. Each networked DICOM device is verified individually. The table below lists all the possible proposed SOP classes when a verification association is opened however only the Verification SOP class and the SOP class of the DICOM service being verified are actually proposed. Worklist SOPs are only offered when verifying a worklist provider, performed procedure step SOPs are only offered when verifying a procedure step provider.

2.3.2.2.3.1 Proposed Presentation Context Table

Presentation Context Table – Proposed					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended**
Name	**UID**	**Name List**	**UID List**		**Negotiation**
Verification SOP Class	1.2.840.10008.1.1	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None
Basic Worklist Management SOP Class	1.2.840.10008.5.1.4.31	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None
Modality Performed Procedure Step SOP Class	1.2.840.10008.3.1.2.3.3	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None

2.3.2.3 Association Acceptance Policy

The LUNAR AE accepts an association only when the enCORE device receives a verification request from another networked DICOM device.

2.3.2.3.1 Real-World Activity Verification Request

An incoming verifcation request will cause the AE to accept the association and respond with a verification response.

2.3.2.3.1.1 Accepted Presentation Context Table

Presentation Context Table – Accepted					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended**
Name	**UID**	**Name List**	**UID List**		**Negotiation**
Verification SOP Class	1.2.840.10008.1.1	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCP	None

2.4 COMMUNICATION PROFILES

2.4.1 Supported Communication Stacks (PS 3.8, PS 3.9)

DICOM Upper Layer (PS 3.8) is supported using TCP/IP.

2.4.2 OSI Stack

OSI stack not supported

2.4.3 TCP/IP Stack

The TCP/IP stack is inherited from WindowsNT Operating System.

2.4.3.1 API

Not applicable to this product.

2.4.3.2 Physical Media Support

DICOM is indifferent to the Physical medium over which TCP/IP executes (e.g. Ethernet V2.0,IEEE 802.3, ATM, FDDI)

2.4.4 Point-to-Point Stack

A 50-pin ACR-NEMA connection is not applicable to this product.

2.5 EXTENSIONS / SPECIALIZATIONS / PRIVATIZATIONS

2.5.1 Standard Extended /Specialized/Private SOPs

Not applicable.

2.6 CONFIGURATION

2.6.1 AE Title/Presentation Address Mapping

The local AE title is configurable and is normally setup by a GEMS service engineer during DICOM software installation. It can be modified by the user if the need arises.

2.6.2 Configurable Parameters

The following fields are configurable for this AE (local):

- Local AE Title
- Local IP Address
- Local IP Netmask
- Association Establishment Timer
- Maximum Length PDU
- Read Timeout
- Write Timeout

The Local Port number's default value is 104 and is not configurable.

The following fields are configurable for every remote DICOM AE:

- Remote AE Title
- Remote IP Address
- Listening TCP/IP Port Number

2.7 SUPPORT OF EXTENDED CHARACTER SETS

No extended character sets are supported.

3. SC INFORMATION OBJECT IMPLEMENTATION

3.1 INTRODUCTION

This section specifies the use of the DICOM SC Image IOD to represent the information included in SC images produced by this implementation. Corresponding attributes are conveyed using the module construct. SC images are generated for enCORE report images that are sent to PACS. The contents of this section are:

3.2 - IOD Description

3.3 - IOD Entity-Relationship Model

3.4 - IOD Module Table

3.5- IOD Module Definition

3.2 SC IOD IMPLEMENTATION

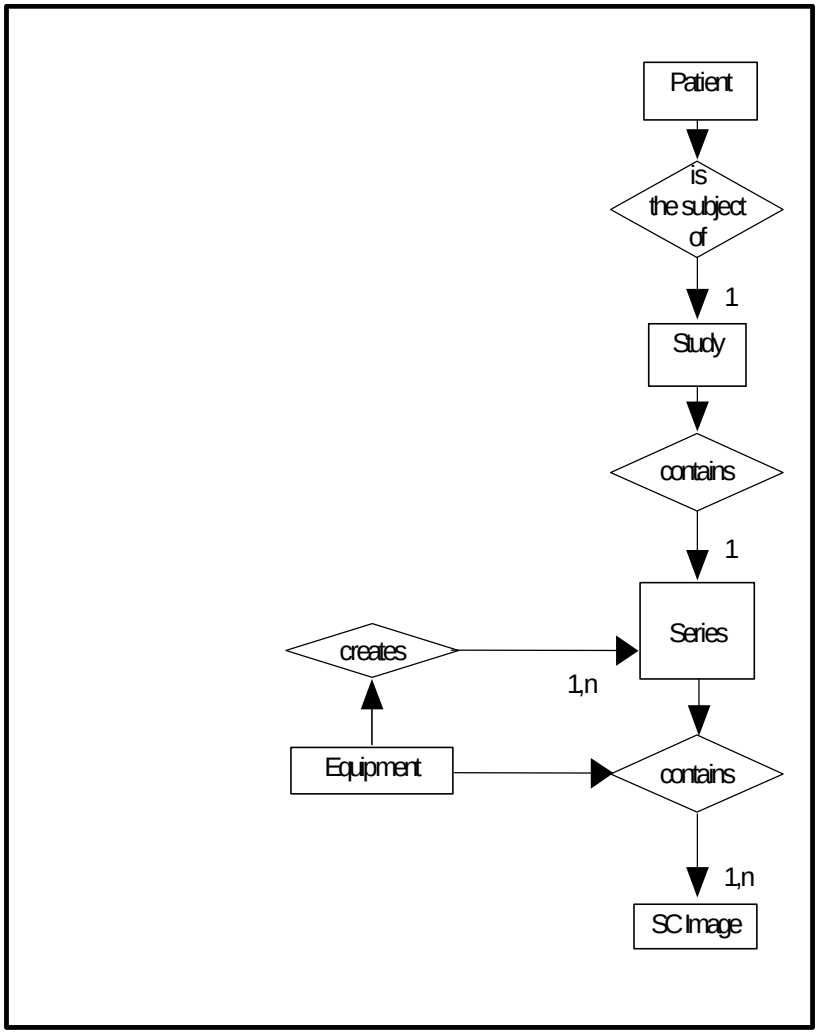
3.3 SC ENTITY-RELATIONSHIP MODEL

The Entity-Relationship diagram for the SC Image interoperability schema is shown in Illustration 3.3-1**.** In this figure, the following diagrammatic convention is established to represent the information organization:

- each entity is represented by a rectangular box
- each relationship is represented by a diamond shaped box
- the fact that a relationship exists between two entities is depicted by lines connecting the corresponding entity boxes to the relationship boxes

The relationships are fully defined with the maximum number of possible entities in the relationship shown.

ILLUSTRATION 3.3-1
SC IMAGE ENTITY RELATIONSHIP DIAGRAM



3.3.1 ENTITY DESCRIPTIONS

Please refer to DICOM Standard Part 3 (Information Object Definitions) for a description of each of the entities contained within the SC Information Object.

3.3.2 enCORE Mapping of DICOM entities

TABLE 3.3-1
MAPPING OF DICOM ENTITIES TO enCORE ENTITIES

DICOM	enCORE Entity
Patient	Patient
Study	Exam
Series	Series
Image	Image
Frame	Not Applicable

3.4 IOD MODULE TABLE

Within an entity of the DICOM v3.0 SC IOD, attributes are grouped into related set of attributes. A set of related attributes is termed a module. A module facilitates the understanding of the semantics concerning the attributes and how the attributes are related with each other. A module grouping does not infer any encoding of information into datasets.

Table 3.4-1 identifies the defined modules within the entities which comprise the DICOM v3.0 SC IOD. Modules are identified by Module Name.

See DICOM v3.0 Part 3 for a complete definition of the entities, modules, and attributes.

TABLE 3.4-1
SC IMAGE IOD MODULES

Entity Name	Module Name	Reference
Patient	Patient	3.5.1.1
Study	General Study	3.5.2.1
	Patient Study	3.5.2.2
Series	General Series	3.5.3.1
Equipment	General Equipment	3.5.4.1
	SC Equipment	3.5.7.1
Image	General Image	3.5.5.1
	Image Pixel	3.5.5.2
	SC Image	3.5.7.2
	Overlay Plane	Not used
	Modality LUT	Not used
	VOI LUT	Not used
	SOP Common	3.5.6.1

3.5 INFORMATION MODULE DEFINITIONS

Please refer to DICOM v3.0 Standard Part 3 (Information Object Definitions) for a description of each of the entities and modules contained within the SC Information Object.

The following modules are included to convey Enumerated Values, Defined Terms, and Optional Attributes supported. Type 1 & Type 2 Attributes are also included for completeness and to define what values they may take and where these values are obtained from. It should be noted that they are the same ones as defined in the DICOM v3.0 Standard Part 3 (Information Object Definitions).

3.5.1 Common Patient Entity Modules

3.5.1.1 Patient Module

This section specifies the Attributes of the Patient that describe and identify the Patient who is the subject of a diagnostic Study. This Module contains Attributes of the patient that are needed for diagnostic interpretation of the Image and are common for all studies performed on the patient.

TABLE 3.5-1
PATIENT MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Patient's Name	(0010,0010)	2	Patient name from user interface or Worklist SCP. The user interface allows the user to enter up to 52 characters for last name, 34 characters for first name, and 1 character for middle initial. If received from the Worklist SCP, up to 64 characters per component group will be accepted.
Patient ID	(0010,0020)	2	Patient ID from user interface or Worklist SCP. The user interface allows the user to enter up to 64 alpha-numberic characters.
Patient's Birth Date	(0010,0030)	2	Patient birthdate from user interface or Worklist SCP.
Patient's Sex	(0010,0040)	2	Patient sex from user interface or Worklist SCP - 'F' for female, 'M' for male
Referenced Patient Sequence	(0008,1120)	3	Not used
>Referenced SOP Class UID	(0008,1150)	1C	
>Referenced SOP Instance UID	(0008,1155)	1C	
Patient's Birth Time	(0010,0032)	3	Not used
Other Patient Ids	(0010,1000)	3	Used only if received from Worklist SCP.
Other Patient Names	(0010,1001)	3	Not used
Ethnic Group	(0010,2160)	3	Ethnicity from user interface or ethnic group from Worklist SCP - 'White', 'Black', 'Asian', 'Hispanic', 'Other'
Patient Comments	(0010,4000)	3	Patient comments from user interface or Worklist SCP. The user interface will allow the user to enter up to 256 characters. If received from the Worklist SCP, up to 10240 characters will be accepted, but only the first 256 characters will be displayed and stored to the image file.

3.5.2 Common Study Entity Modules

The following Study IE Modules are common to all Composite Image IODs which reference the Study IE. These Modules contain Attributes of the patient and study that are needed for diagnostic interpretation of the image.

3.5.2.1 General Study Module

This section specifies the Attributes which describe and identify the Study performed upon the Patient.

TABLE 3.5-2
GENERAL STUDY MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Study Instance UID	(0020,000D)	1	Study Instance UID from Worklist SCP or internally generated using enCORE UID 1.2.840.113619.2.110 + system number + current date/time stamp (yyyymmddhhmmss).
Study Date	(0008,0020)	2	Date study was acquired.
Study Time	(0008,0030)	2	Time study was acquired.
Referring Physician's Name	(0008,0090)	2	Physician from user interface or referring physician from Worklist SCP. The user interface allows the user to enter up to 64 characters. If received from the Worklist SCP, up to 64 characters per component group will be accepted.
Study ID	(0020,0010)	2	Internally generated.
Accession Number	(0008,0050)	2	Exam ID from user interface or accession number from Worklist SCP. 16 characters maximum.
Study Description	(0008,1030)	3	Site selected from user interface – 'AP Spine', 'Left Femur', 'Right Femur', 'DualFemur', 'Lateral Spine, 'LVA', 'Left Forearm', 'Right Forearm', 'Total Body', 'Left Ortho', 'Right Ortho'
Physician(s) of Record	(0008,1048)	3	Not used
Name of Physician(s) Reading Study	(0008,1060)	3	Not used
Referenced Study Sequence	(0008,1110)	3	Not used
>Referenced SOP Class UID	(0008,1150)	1C	
>Referenced SOP Instance UID	(0008,1155)	1C	

3.5.2.2 Patient Study Module

This section defines Attributes that provide information about the Patient at the time the Study was performed.

TABLE 3.5-3
PATIENT STUDY MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Admitting Diagnoses Description	(0008,1080)	3	Not used
Patient's Age	(0010,1010)	3	Patient age in years at time of exam as calculated from DOB entered from user interface or Worklist SCP.
Patient's Size	(0010,1020)	3	Patient height from user interface or patient size from Worklist SCP.
Patient's Weight	(0010,1030)	3	Patient weight from user interface or Worklist SCP.
Occupation	(0010,2180)	3	Not used
Additional Patient History	(0010,21B0)	3	Used only if received from Worklist SCP.

3.5.3 Common Series Entity Modules

The following Series IE Modules are common to all Composite Image IODs which reference the Series IE.

3.5.3.1 General Series Module

This section specifies the Attributes which identify and describe general information about the Series within a Study.

TABLE 3.5-4
GENERAL SERIES MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Modality	(0008,0060)	1	Configurable. Default is 'OT'= Other.
Series Instance UID	(0020,000E)	1	Internally generated using enCORE UID 1.2.840.113619.2.110 + system number + current date/time stamp (yyyymmddhhmmss) + Series Number.
Series Number	(0020,0011)	2	Internally generated number.
Laterality	(0020,0060)	2C	Sent as zero length.
Series Date	(0008,0021)	3	Not used
Series Time	(0008,0031)	3	Not used
Performing Physicians' Name	(0008,1050)	3	Not used
Protocol Name	(0018,1030)	3	Site selected from user interface – 'AP Spine', 'Left Femur', 'Right Femur', 'DualFemur', 'Lateral Spine', 'LVA', 'Left Forearm', 'Right Forearm', 'Total Body', 'Left Ortho', 'Right Ortho'
Series Description	(0008,103E)	3	Not used
Operators' Name	(0008,1070)	3	Attendant from user interface or operator's name from Worklist SCP. The user interface allows the user to enter up to 64 characters. If received from the Worklist SCP, up to 64 characters per component group will be accepted.
Referenced Study Component Sequence	(0008,1111)	3	Not used
>Referenced SOP Class UID	(0008,1150)	1C	
>Referenced SOP Instance UID	(0008,1155)	1C	
Body Part Examined	(0018,0015)	3	Not used
Patient Position	(0018,5100)	2C	Not used
Smallest Pixel Value in Series	(0028,0108)	3	Not used
Largest Pixel Value in Series	(0028,0109)	3	Not used
Requested Attribute Sequence	(0040,0275)	3	
>Requested Procedure ID	(0040,1001)	1C	Used only if received from Worklist SCP.
>Scheduled Procedure Step ID	(0040, 0009)	1C	Used only if received from Worklist SCP.
>Scheduled Procedure Step Description	(0040, 0007)	3	Used only if received from Worklist SCP.

3.5.4 Common Equipment Entity Modules

The following Equipment IE Module is common to all Composite Image IODs which reference the Equipment IE.

3.5.4.1 General Equipment Module

This section specifies the Attributes which identify and describe the piece of equipment which produced a Series of Images.

TABLE 3.5-5
GENERAL EQUIPMENT MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Manufacturer	(0008,0070)	2	'G.E. Medical Systems'
Institution Name	(0008,0080)	3	Report title 1 from user interface.
Institution Address	(0008,0081)	3	Not used
Station Name	(0008,1010)	3	Scanner serial number.
Institutional Department Name	(0008,1040)	3	Not used
Manufacturer's Model Name	(0008,1090)	3	Lunar scanner model – 'Prodigy', 'DPX-NT', 'DPX-MD+'
Device Serial Number	(0018,1000)	3	Scanner serial number.
Software Versions	(0018,1020)	3	Version of application software that was used to acquire the image.
Spatial Resolution	(0018,1050)	3	Not used
Date of Last Calibration	(0018,1200)	3	Not used
Time of Last Calibration	(0018,1201)	3	Not used
Pixel Padding Value	(0028,0120)	3	Not used

3.5.5 Common Image Entity Modules

The following Image IE Modules are common to all Composite Image IODs which reference the Image IE.

3.5.5.1 General Image Module

This section specifies the Attributes which identify and describe an image within a particular series.

TABLE 3.5-6
GENERAL IMAGE MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Image Number	(0020,0013)	2	Internal value which is incremented for each captured image within a study series.
Patient Orientation	(0020,0020)	2C	Sent as zero length.
Image Date	(0008,0023)	2C	Not used
Image Time	(0008,0033)	2C	Not used
Image Type	(0008,0008)	3	Not used
Acquisition Number	(0020,0012)	3	Not used

Acquisition Date	(0008,0022)	3	Date image was acquired.
Acquisition Time	(0008,0032)	3	Time image was acquired.
Referenced Image Sequence	(0008,1140)	3	Not used
>Referenced SOP Class UID	(0008,1150)	1C	
>Referenced SOP Instance UID	(0008,1155)	1C	
Derivation Description	(0008,2111)	3	Not used
Source Image Sequence	(0008,2112)	3	Not used
>Referenced SOP Class UID	(0008,1150)	1C	
>Referenced SOP Instance UID	(0008,1155)	1C	
Images in Acquisition	(0020,1002)	3	Not used
Image Comments	(0020,4000)	3	Encoded Densitometry results (configurable).
Lossy Image Compression	(0028,2110)	3	Not used

3.5.5.1.1 General Image Attribute Descriptions

3.5.5.2 Image Pixel Module

This section specifies the Attributes that describe the pixel data of the image.

TABLE 3.5-7
IMAGE PIXEL MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Samples per Pixel	(0028,0002)	1	Value of '1' when photometric interpretation = 'PALETTE COLOR'. Value of '3' when photometric interpretation = 'RGB'.
Photometric Interpretation	(0028,0004)	1	Value of 'PALETTE COLOR' or 'RGB' for report images.
Rows	(0028,0010)	1	Number of rows in the image
Columns	(0028,0011)	1	Number of columns in the image.
Bits Allocated	(0028,0100)	1	Value always = 0008H.
Bits Stored	(0028,0101)	1	Value always = 0008H.
High Bit	(0028,0102)	1	Value always = 0007H.
Pixel Representation	(0028,0103)	1	Value always = 0000H (unsigned integer).
Pixel Data	(7FE0,0010)	1	
Planar Configuration	(0028,0006)	1C	Value of 0000H (color-by-pixel) for RGB images.
Pixel Aspect Ratio	(0028,0034)	1C	Value always = 1:1.
Smallest Image Pixel Value	(0028,0106)	3	Not used
Largest Image Pixel Value	(0028,0107)	3	Not used
Red Palette Color Lookup Table Descriptor	(0028,1101)	1C	Only used if photometric interpretation = PALETTE COLOR.

Green Palette Color Lookup Table Descriptor	(0028,1102)	1C	Only used if photometric interpretation = PALETTE COLOR.
Blue Palette Color Lookup Table Descriptor	(0028,1103)	1C	Only used if photometric interpretation = PALETTE COLOR.
Red Palette Color Lookup Table Data	(0028,1201)	1C	Only used if photometric interpretation = PALETTE COLOR.
Green Palette Color Lookup Table Data	(0028,1202)	1C	Only used if photometric interpretation = PALETTE COLOR.
Blue Palette Color Lookup Table Data	(0028,1203)	1C	Only used if photometric interpretation = PALETTE COLOR.

3.5.6 General Modules

The SOP Common Module is mandatory for all DICOM IODs.

3.5.6.1 SOP Common Module

This section defines the Attributes which are required for proper functioning and identification of the associated SOP Instances. They do not specify any semantics about the Real-World Object represented by the IOD.

TABLE 3.5-8
SOP COMMON MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
SOP Class UID	(0008,0016)	1	1.2.840.10008.5.1.4.1.1.7
SOP Instance UID	(0008,0018)	1	Internally generated from Series Instance UID + Image Number.
Specific Character Set	(0008,0005)	1C	Not used, as expanded or replacement character sets are not used.
Instance Creation Date	(0008,0012)	3	Not used
Instance Creation Time	(0008,0013)	3	Not used
Instance Creator UID	(0008,0014)	3	Not used

3.5.7 SC Modules

This Section describes SC Equipment, and Image Modules. These Modules contain Attributes that are specific to SC Image IOD.

3.5.7.1 SC Equipment Module

This Module describes equipment used to convert images into a DICOM format.

TABLE 3.5-9
SC IMAGE EQUIPMENT MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Conversion Type	(0008,0064)	1	'WSD' = Workstation.
Modality	(0008,0060)	3	Configurable. Default is 'OT' = Other.
Secondary Capture Device ID	(0018,1010)	3	Not used
Secondary Capture Device Manufacturer	(0018,1016)	3	Not used
Secondary Capture Device Manufacturer's Model Name	(0018,1018)	3	Lunar scanner model – 'Prodigy', 'DPX-NT', 'DPX-MD+'.
Secondary Capture Device Software Version	(0018,1019)	3	Version of application software that was used to analyze the image.
Video Image Format Acquired	(0018,1022)	3	Not used
Digital Image Format Acquired	(0018,1023)	3	Not used

3.5.7.2 SC Image Module

The table in this Section contains IOD Attributes that describe SC images.

TABLE 3.5-10
SC IMAGE MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Date of Secondary Capture	(0018,1012)	3	Date image was analyzed.
Time of Secondary Capture	(0018,1014)	3	Time image was analyzed.

4. CR INFORMATION OBJECT IMPLEMENTATION

4.1 INTRODUCTION

This section specifies the use of the DICOM CR Image IOD to represent the information included in CR images produced by this implementation. Corresponding attributes are conveyed using the module construct. CR images are generated for enCORE raw scan images that are sent to PACS. The contents of this section are:

4.2 - IOD Description

4.3 - IOD Entity-Relationship Model

4.4 - IOD Module Table

4.5- IOD Module Definition

4.2 CR IOD IMPLEMENTATION

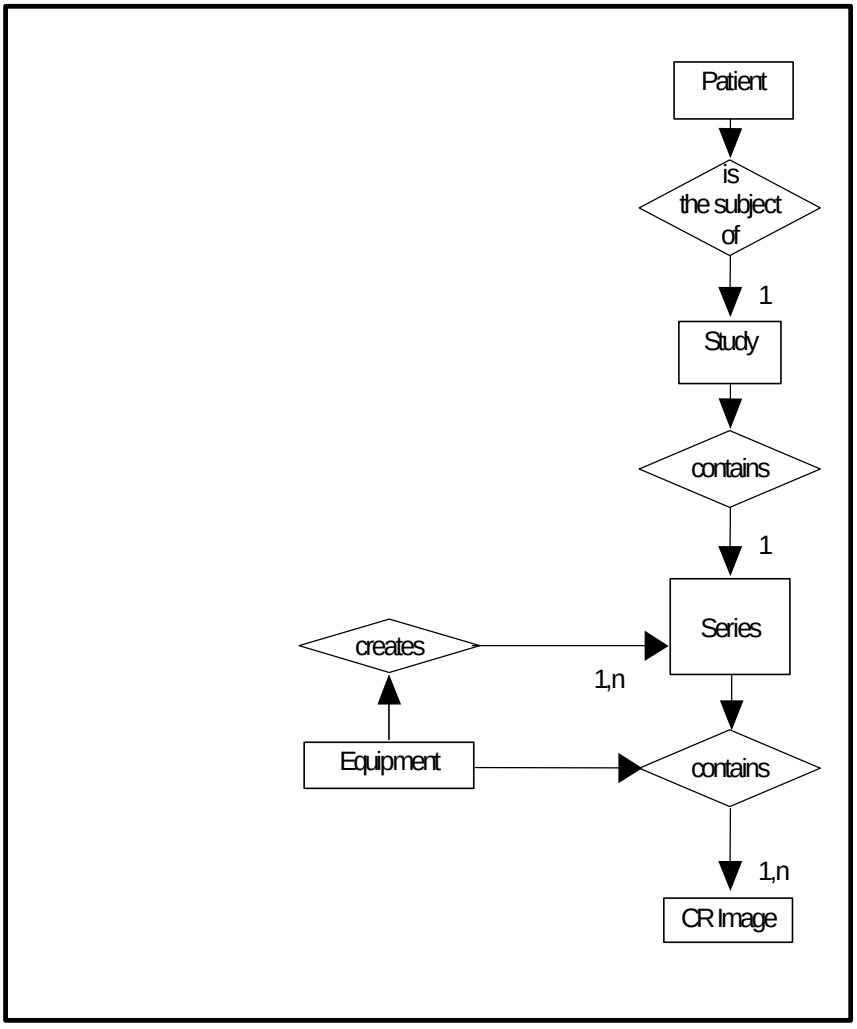
4.3 CR ENTITY-RELATIONSHIP MODEL

The Entity-Relationship diagram for the CR Image interoperability schema is shown in Illustration 4.3-1**.** In this figure, the following diagrammatic convention is established to represent the information organization:

- each entity is represented by a rectangular box
- each relationship is represented by a diamond shaped box
- the fact that a relationship exists between two entities is depicted by lines connecting the corresponding entity boxes to the relationship boxes

The relationships are fully defined with the maximum number of possible entities in the relationship shown.

ILLUSTRATION 4.3-1
CR IMAGE ENTITY RELATIONSHIP DIAGRAM



4.3.1 ENTITY DESCRIPTIONS

Please refer to DICOM Standard Part 3 (Information Object Definitions) for a description of each of the entities contained within the CR Information Object.

4.3.2 enCORE Mapping of DICOM entities

TABLE 4.3-1
MAPPING OF DICOM ENTITIES TO enCORE ENTITIES

DICOM	enCORE Entity
Patient	Patient
Study	Exam
Series	Series
Image	Image

Frame	Not Applicable

4.4 IOD MODULE TABLE

Within an entity of the DICOM v3.0 CR IOD, attributes are grouped into related set of attributes. A set of related attributes is termed a module. A module facilitates the understanding of the semantics concerning the attributes and how the attributes are related with each other. A module grouping does not infer any encoding of information into datasets.

Table 4.4-1 identifies the defined modules within the entities which comprise the DICOM v3.0 CR IOD. Modules are identified by Module Name.

See DICOM v3.0 Part 3 for a complete definition of the entities, modules, and attributes.

TABLE 4.4-1
CR IMAGE IOD MODULES

Entity Name	Module Name	Reference
Patient	Patient	4.5.1.1
Study	General Study	4.5.2.1
	Patient Study	Not used
Series	General Series	4.5.3.1
	CR Series	4.5.7.1
Equipment	General Equipment	4.5.4.1
Image	General Image	4.5.5.1
	Image Pixel	4.5.5.2
	Contrast/Bolus	Not used
	CR Image	4.5.7.2
	Overlay Plane	Not used
	Curve	Not used
	Modality LUT	Not used
	VOI LUT	Not used
	SOP Common	4.5.6.1

4.5 INFORMATION MODULE DEFINITIONS

Please refer to DICOM v3.0 Standard Part 3 (Information Object Definitions) for a description of each of the entities and modules contained within the CR Information Object.

The following modules are included to convey Enumerated Values, Defined Terms, and Optional Attributes supported. Type 1 & Type 2 Attributes are also included for completeness and to define what values they may take and where these values are obtained from. It should be noted that they are the same ones as defined in the DICOM v3.0 Standard Part 3 (Information Object Definitions).

4.5.1 Common Patient Entity Modules

4.5.1.1 Patient Module

This section specifies the Attributes of the Patient that describe and identify the Patient who is the subject of a diagnostic Study. This Module contains Attributes of the patient that are needed for diagnostic interpretation of the Image and are common for all studies performed on the patient.

TABLE 4.5-1
PATIENT MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Patient's Name	(0010,0010)	2	Patient name from user interface or Worklist SCP. The user interface allows the user to enter up to 52 characters for last name, 34 characters for first name, and 1 character for middle initial. If received from the Worklist SCP, up to 64 characters per component group will be accepted.
Patient ID	(0010,0020)	2	Patient ID from user interface or Worklist SCP. The user interface allows the user to enter up to 64 alpha-numberic characters.
Patient's Birth Date	(0010,0030)	2	Patient birthdate from user interface or Worklist SCP.
Patient's Sex	(0010,0040)	2	Patient sex from user interface or Worklist SCP - 'F' for female, 'M' for male
Referenced Patient Sequence	(0008,1120)	3	Not used
>Referenced SOP Class UID	(0008,1150)	1C	
>Referenced SOP Instance UID	(0008,1155)	1C	
Patient's Birth Time	(0010,0032)	3	Not used
Other Patient Ids	(0010,1000)	3	Used only if received from Worklist SCP.
Other Patient Names	(0010,1001)	3	Not used
Ethnic Group	(0010,2160)	3	Ethnicity from user interface or ethnic group from Worklist SCP - 'White', 'Black', 'Asian', 'Hispanic', 'Other'
Patient Comments	(0010,4000)	3	Patient comments from user interface or Worklist SCP. The user interface will allow the user to enter up to 256 characters. If received from the Worklist SCP, up to 10240 characters will be accepted, but only the first 256 characters will be displayed and stored to the image file.

4.5.2 Common Study Entity Modules

The following Study IE Modules are common to all Composite Image IODs which reference the Study IE. These Modules contain Attributes of the patient and study that are needed for diagnostic interpretation of the image.

4.5.2.1 General Study Module

This section specifies the Attributes which describe and identify the Study performed upon the Patient.

TABLE 4.5-2
GENERAL STUDY MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Study Instance UID	(0020,000D)	1	Study Instance UID from Worklist SCP or internally generated using enCORE UID 1.2.840.113619.2.110 + system number + current date/time stamp (yyyymmddhhmmss).
Study Date	(0008,0020)	2	Date study was acquired.
Study Time	(0008,0030)	2	Time study was acquired.
Referring Physician's Name	(0008,0090)	2	Physician from user interface or referring physician from Worklist SCP. The user interface allows the user to enter up to 64 characters. If received from the Worklist SCP, up to 64 characters per component group will be accepted.
Study ID	(0020,0010)	2	Internally generated.
Accession Number	(0008,0050)	2	Exam ID from user interface or accession number from Worklist SCP. 16 characters maximum.
Study Description	(0008,1030)	3	Site selected from user interface – 'AP Spine', 'Left Femur', 'Right Femur', 'DualFemur', 'Lateral Spine, 'LVA', 'Left Forearm', 'Right Forearm', 'Total Body', 'Left Ortho', 'Right Ortho'
Physician(s) of Record	(0008,1048)	3	Not used
Name of Physician(s) Reading Study	(0008,1060)	3	Not used
Referenced Study Sequence	(0008,1110)	3	Not used
>Referenced SOP Class UID	(0008,1150)	1C	
>Referenced SOP Instance UID	(0008,1155)	1C	

4.5.2.2 Patient Study Module

This section defines Attributes that provide information about the Patient at the time the Study was performed.

TABLE 4.5-3
PATIENT STUDY MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Admitting Diagnoses Description	(0008,1080)	3	Not used
Patient's Age	(0010,1010)	3	Patient age in years at time of exam as calculated from DOB entered from user interface or Worklist SCP.
Patient's Size	(0010,1020)	3	Patient height from user interface or patient size from Worklist SCP.
Patient's Weight	(0010,1030)	3	Patient weight from user interface or Worklist SCP.
Occupation	(0010,2180)	3	Not used
Additional Patient History	(0010,21B0)	3	Used only if received from Worklist SCP.

4.5.3 Common Series Entity Modules

The following Series IE Modules are common to all Composite Image IODs which reference the Series IE.

4.5.3.1 General Series Module

This section specifies the Attributes which identify and describe general information about the Series within a Study.

TABLE 4.5-4
GENERAL SERIES MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Modality	(0008,0060)	1	'CR'= Computed Radiography
Series Instance UID	(0020,000E)	1	Internally generated using enCORE UID 1.2.840.113619.2.110 + system number + current date/time stamp (yyyymmddhhmmss) + Series Number.
Series Number	(0020,0011)	2	Internally generated number.
Laterality	(0020,0060)	2C	Sent as zero length.
Series Date	(0008,0021)	3	Not used
Series Time	(0008,0031)	3	Not used
Performing Physicians' Name	(0008,1050)	3	Not used
Protocol Name	(0018,1030)	3	Site selected from user interface – 'AP Spine', 'Left Femur', 'Right Femur', 'DualFemur', 'Lateral Spine', 'LVA', 'Left Forearm', 'Right Forearm', 'Total Body', 'Left Ortho', 'Right Ortho'
Series Description	(0008,103E)	3	Not used
Operators' Name	(0008,1070)	3	Attendant from user interface or operator's name from Worklist SCP. The user interface allows the user to enter up to 64 characters. If received from the Worklist SCP, up to 64 characters per component group will be accepted.
Referenced Study Component Sequence	(0008,1111)	3	Not used
>Referenced SOP Class UID	(0008,1150)	1C	
>Referenced SOP Instance UID	(0008,1155)	1C	
Body Part Examined	(0018,0015)	3	Not used
Patient Position	(0018,5100)	2C	Not used
Smallest Pixel Value in Series	(0028,0108)	3	Not used
Largest Pixel Value in Series	(0028,0109)	3	Not used

4.5.4 Common Equipment Entity Modules

The following Equipment IE Module is common to all Composite Image IODs which reference the Equipment IE.

4.5.4.1 General Equipment Module

This section specifies the Attributes which identify and describe the piece of equipment which produced a Series of Images.

TABLE 4.5-5
GENERAL EQUIPMENT MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Manufacturer	(0008,0070)	2	'G.E. Medical Systems'
Institution Name	(0008,0080)	3	Report title 1 from user interface.
Institution Address	(0008,0081)	3	Not used
Station Name	(0008,1010)	3	Scanner serial number.
Institutional Department Name	(0008,1040)	3	Not used
Manufacturer's Model Name	(0008,1090)	3	Lunar scanner model – 'Prodigy', 'DPX-NT', 'DPX-MD+'
Device Serial Number	(0018,1000)	3	Scanner serial number.
Software Versions	(0018,1020)	3	Version of application software that was used to acquire the image.
Spatial Resolution	(0018,1050)	3	Not used
Date of Last Calibration	(0018,1200)	3	Not used
Time of Last Calibration	(0018,1201)	3	Not used
Pixel Padding Value	(0028,0120)	3	Not used

4.5.5 Common Image Entity Modules

The following Image IE Modules are common to all Composite Image IODs which reference the Image IE.

4.5.5.1 General Image Module

This section specifies the Attributes which identify and describe an image within a particular series.

TABLE 4.5-6
GENERAL IMAGE MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Image Number	(0020,0013)	2	Internal value which is incremented for each captured image within a study series.
Patient Orientation	(0020,0020)	2C	Sent as zero length.
Image Date	(0008,0023)	2C	Not used
Image Time	(0008,0033)	2C	Not used
Image Type	(0008,0008)	3	Not used
Acquisition Number	(0020,0012)	3	Not used
Acquisition Date	(0008,0022)	3	Date image was acquired.
Acquisition Time	(0008,0032)	3	Time image was acquired.
Referenced Image Sequence	(0008,1140)	3	Not used
>Referenced SOP Class UID	(0008,1150)	1C	
>Referenced SOP Instance UID	(0008,1155)	1C	
Derivation Description	(0008,2111)	3	Not used
Source Image Sequence	(0008,2112)	3	Not used
>Referenced SOP Class UID	(0008,1150)	1C	
>Referenced SOP Instance UID	(0008,1155)	1C	
Images in Acquisition	(0020,1002)	3	Not used
Image Comments	(0020,4000)	3	Encoded Densitometry results.
Lossy Image Compression	(0028,2110)	3	Not used

4.5.5.2 Image Pixel Module

This section specifies the Attributes that describe the pixel data of the image.

TABLE 4.5-7
IMAGE PIXEL MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Samples per Pixel	(0028,0002)	1	Value always = ‘1’.
Photometric Interpretation	(0028,0004)	1	Value always = ‘MONOCHROME2’.
Rows	(0028,0010)	1	Number or rows in the image.
Columns	(0028,0011)	1	Number of columns in the image.
Bits Allocated	(0028,0100)	1	Value always = 0008H.
Bits Stored	(0028,0101)	1	Value always = 0008H.

High Bit	(0028,0102)	1	Value always = 0007H.
Pixel Representation	(0028,0103)	1	Value always = 0000H (unsigned integer).
Pixel Data	(7FE0,0010)	1	
Planar Configuration	(0028,0006)	1C	Not used
Pixel Aspect Ratio	(0028,0034)	1C	Value always = '1:1'.
Smallest Image Pixel Value	(0028,0106)	3	Not used
Largest Image Pixel Value	(0028,0107)	3	Not used
Red Palette Color Lookup Table Descriptor	(0028,1101)	1C	Not used
Green Palette Color Lookup Table Descriptor	(0028,1102)	1C	Not used
Blue Palette Color Lookup Table Descriptor	(0028,1103)	1C	Not used
Red Palette Color Lookup Table Data	(0028,1201)	1C	Not used
Green Palette Color Lookup Table Data	(0028,1202)	1C	Not used
Blue Palette Color Lookup Table Data	(0028,1203)	1C	Not used

4.5.6 General Modules

The SOP Common Module is mandatory for all DICOM IODs.

4.5.6.1 SOP Common Module

This section defines the Attributes which are required for proper functioning and identification of the associated SOP Instances. They do not specify any semantics about the Real-World Object represented by the IOD.

TABLE 4.5-8
SOP COMMON MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
SOP Class UID	(0008,0016)	1	1.2.840.10008.5.1.4.1.1.1
SOP Instance UID	(0008,0018)	1	Internally generated from Series Instance UID + Image Number.
Specific Character Set	(0008,0005)	1C	Not used, as expanded or replacement character sets are not used.
Instance Creation Date	(0008,0012)	3	Not used
Instance Creation Time	(0008,0013)	3	Not used
Instance Creator UID	(0008,0014)	3	Not used

4.5.7 CR Modules

This Section describes CR Equipment, and Image Modules. These Modules contain Attributes that are specific to CR Image IOD.

4.5.7.1 CR SeriesModule

This Module contains IOD Attributes that describe a computed radiography series performed on the patient.

TABLE 4.5-9
CR SERIES MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Body Part Examined	(0018,0015)	2	Sent as zero length.
View Position	(0018,5101)	2	Sent as zero length.
Filter Type	(0018,1160)	3	Not used
Collimator/grid Name	(0018,1180)	3	Not used
Focal Spot	(0018,1190)	3	Not used
Plate Type	(0018,1260)	3	Not used
Phosphor Type	(0018,1261)	3	Not used

4.5.7.2 CR Image Module

The table in this Section contains IOD Attributes that describe CR images.

TABLE 4.5-10
CR IMAGE MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
KVP	(0018,0060)	3	Not used
Plate ID	(0018,1004)	3	Not used
Distance Source to Detector	(0018,1110)	3	Not used
Distance Source to Patient	(0018,1111)	3	Not used
Exposure Time	(0018,1150)	3	Not used
X-ray Tube Current	(0018,1151)	3	Not used
Exposure	(0018,1152)	3	Not used
Generator Power	(0018,1170)	3	Not used
Acquisition Device Processing Description	(0018,1400)	3	Not used
Acquisition Device Processing Code	(0018,1401)	3	Not used
Cassette Orientation	(0018,1402)	3	Not used
Cassette Size	(0018,1403)	3	Not used
Exposures on Plate	(0018,1404)	3	Not used
Relative X-ray Exposure	(0018,1405)	3	Not used
Sensitivity	(0018,6000)	3	Not used

5. PRINT MANAGEMENT SOP CLASS DEFINITION

5.1 INTRODUCTION

This section of the DICOM Conformance Statement specifies the supported Print Management SOP and Meta SOP Classes, the optional attributes and service elements supported, the valid range of values for mandatory and optional attributes, and the status code behaviour.

This section contains:

5.2.1 - Basic Film Session SOP Class

5.2.1 - Basic Film Box SOP Class

5.2.3 - Image Box SOP Classes

5.2.4 - Printer SOP Class

5.2 PRINT MANAGEMENT SOP CLASS DEFINITIONS

5.2.1 Basic Film Session SOP Class

5.2.1.1 IOD Description

5.2.1.1.1 IOD modules

Module	Reference	Module Description
SOP Common		Contains SOP Common information
Basic Film Session Presentation Module	5.2.1.1.2	Contains Film Session presentations information
Basic Film Session Relationship	5.2.1.1.3	References to related SOPs

5.2.1.1.2 Basic Film Session Presentation Module

Attribute name	Tag	Attribute Description
Number of Copies	(2000,0010)	Default is 1. Max is 20. This field is user configurable.
Print Priority	(2000,0020)	'MEDIUM'
Medium Type	(2000,0030)	Not used
Film Destination	(2000,0040)	Not used
Film Session Label	(2000,0050)	Not used
Memory Allocation	(2000,0060)	Not used

5.2.1.1.3 Basic Film Session Relationship Module

Attribute Name	Tag	Attribute Description
Referenced Film Box Sequence	(2000,0500)	Not used
>Referenced SOP Class UID	(0008,1150)	
>Referenced SOP Instance UID	(0008,1155)	

5.2.1.2 DIMSE Service Group

DIMSE Service Element	Usage SCU
N-CREATE	M
N-SET	Not used
N-DELETE	Not used
N-ACTION	Not used

5.2.1.2.1 N-CREATE

5.2.1.2.1.1 Attributes

Attribute Name	Tag	Usage SCU
Number of Copies	(2000,0010)	Used
Print Priority	(2000,0020)	Used
Medium Type	(2000,0030)	Not used
Film Destination	(2000,0040)	Not used
Film Session Label	(2000,0050)	Not used
Memory Allocation	(2000,0060)	Not used

5.2.1.2.1.2 Status

Service Status	Status Codes	Further Meaning	Application Behavior When receiving Status Codes
Warning	B600	Memory allocation not supported	Ignored
Success	0000	Film session successfully created	Ignored

5.2.1.2.1.3 Behavior

The N-CREATE DIMSE Service is used to request that the SCP create a Film Session SOP Instance.

5.2.2 Basic Film Box SOP Class

5.2.2.1 IOD Description

5.2.2.1.1 IOD modules

Module	Reference	Module Descripion
SOP Common		Contains SOP Common information
Basic Film Box Presentation Module	5.2.2.1.2	Contains Film Box presentation information
Basic Film Box Relationship	5.2.2.1.3	References to related SOPs

5.2.2.1.2 Basic Film Box Presentation Module

Attribute Name	Tag	Attribute Description
Image Display Format	(2010,0010)	'STANDARD\1,1'
Annotation Display Format ID	(2010,0030)	Not used
Film Orientation	(2010,0040)	'PORTRAIT'
Film Size ID	(2010,0050)	'8INX10IN''or '14INX17IN'. This field is user configurable.
Magnification Type	(2010,0060)	Not used
Smoothing Type	(2010,0080)	Not used
Border Density	(2010,0100)	'WHITE'
Empty Image Density	(2010,0110)	Not used
Min Density	(2010,0120)	Not used
Max Density	(2010,0130)	Not used
Trim	(2010,0140)	Not used
Configuration Information	(2010,0150)	Not used

5.2.2.1.3 Basic Film Box Relationship Module

Attribute Name	Tag	Attribute Description
Referenced Film Session Sequence	(2010,0500)	
>Referenced SOP Class UID	(0008,1150)	1.2.840.10008.5.1.1.1
>Referenced SOP Instance UID	(0008,1155)	Provided by printer SCP.
Referenced Image Box Sequence	(2010,0510)	Not used
>Referenced SOP Class UID	(0008,1150)	
>Referenced SOP Instance UID	(0008,1155)	
Referenced Basic Annotation Box Sequence	(2010,0520)	Not used
>Referenced SOP Class UID	(0008,1150)	
>Referenced SOP Instance UID	(0008,1155)	

5.2.2.2 DIMSE Service Group

DIMSE Service Element	Usage SCU
N-CREATE	M
N-ACTION	M
N-DELETE	Used
N-SET	Not used

5.2.2.2.1 N-CREATE

5.2.2.2.1.1 Attributes

Attribute Name	Tag	Usage SCU
Image Display Format	(2010,0010)	M
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)	Not used
>Referenced SOP Class UID	(0008,1150)	
>Referenced SOP Instance UID	(0008,1155)	
Film Orientation	(2010,0040)	Used
Film Size ID	(2010,0050)	Used
Magnification Type	(2010,0060)	Not used
Max Density	(2010,0130)	Not used
Configuration Information	(2010,0150)	Not used
Annotation Display Format ID	(2010,0030)	Not used
Smoothing Type	(2010,0080)	Not used
Border Density	(2010,0100)	Used
Empty Image Density	(2010,0110)	Not used
Min Density	(2010,0120)	Not used
Trim	(2010,0140)	Not used

5.2.2.2.1.2 Status

There are no specific status codes.

5.2.2.2.1.3 Behavior

The N-CREATE DIMSE Service is used to request that the SCP create a Film Box SOP Instance.

5.2.2.2.2 N-DELETE

5.2.2.2.2.1 Behavior

The N-DELETE DIMSE Service is used to request the SCP to delete the Basic Film Box SOP Instance hierarchy.

5.2.2.2.3 N-ACTION

5.2.2.2.3.1 Attributes

Action Type Name	Action Type ID	Attribute	Tag	Usage SCU
Print	1	Referenced Print Job Sequence	(2100,0500)	Not used
		>Referenced SOP Class UID	(0008,1150)	
		>Referenced SOP Instance UID	(0008,1155)	

5.2.2.2.3.2 Status

Service Status	Status Codes	Further Meaning	Application Behavior When receiving Status Codes
Success	0000	Film accepted for printing; if supported, the Print Job SOP Instance is created	Displays print success message and moves on to next job.
Warning	B603	Film Box SOP Instance hierarchy does not contain Image Box SOP Instances (empty page)	Displays print failure message and moves on to next job. Failed job is retried after have processed all other jobs.
Failure	C602	Unable to create Print Job SOP Instance; print queue is full	Displays print failure message and moves on to next job. Failed job is retried after have processed all other jobs.
	C604	Image position collision : multiple images assigned to single image position	Displays print failure message and moves on to next job. Failed job is retried after have processed all other jobs.
	C603	Image size is larger than image box size (by using the specified magnification value)	Displays print failure message and moves on to next job. Failed job is retried after have processed all other jobs.

5.2.2.2.3.3 Behavior

The N-ACTION DIMSE Service is used to request the SCP to print the number of copies configured by the user to a film of the film session.

5.2.3 Image Box SOP Classes

5.2.3.1 Basic Grayscale Image Box SOP Class

5.2.3.1.1 IOD description

####### 5.2.3.1.1.1 IOD modules

Module	Reference	Module Description
SOP Common		Contains SOP Common information
Image Box Presentation Module	5.2.3.1.1.2	Contains Image Box presentation information

####### 5.2.3.1.1.2 Image Box Pixel Presentation Module

Attribute Name	Tag	Attribute Description
Image Position	(2020,0010)	Value always ‘1’.
Polarity	(2020,0020)	Not used Note: if Polarity (2020,0020) is not specified by the SCU, the SCP shall print with ‘NORMAL’ polarity.
Magnification Type	(2010,0060)	Not used
Smoothing Type	(2010,0080)	Not used
Requested Image Size	(2020,0030)	Not used
Preformatted Grayscale Image Sequence	(2020,0110)	
>Samples Per Pixel	(0028,0002)	Values always ‘1’.
>Photometric Interpretation	(0028,0004)	Value always ‘MONOCHROME2’.
>Rows	(0028,0010)	Number of rows in the image.
>Columns	(0028,0011)	Number of columns in the image.
>Pixel Aspect Ratio	(0028,0034)	Value always = ‘1:1’.
>Bits Allocated	(0028,0100)	Value always = 0008H.
>Bits Stored	(0028,0101)	Value always = 0008H.
>High Bit	(0028,0102)	Value always = 0007H.
>Pixel Representation	(0028,0103)	Value always = 0000H (unsigned interger).
>Pixel Data	(7FE0,0010)	

5.2.3.1.2 DIMSE Service Group

DIMSE Service Element	Usage SCU
N-SET	M

5.2.3.1.2.1 N-SET

5.2.3.1.2.1.1 Attributes

Attribute Name	Tag	Usage SCU
Image Position	(2020,0010)	M
Preformatted Grayscale Image Sequence	(2020,0110)	M
>Samples Per Pixel	(0028,0002)	M
>Photometric Interpretation	(0028,0004)	M
>Rows	(0028,0010)	M
>Columns	(0028,0011)	M
>Pixel Aspect Ratio	(0028,0034)	Used
>Bits Allocated	(0028,0100)	M
>Bits Stored	(0028,0101)	M
>High Bit	(0028,0102)	M
>Pixel Representation	(0028,0103)	M
>Pixel Data	(7FE0,0010)	M
Polarity	(2020,0020)	Not used
Referenced Overlay Sequence	(0008,1130)	Not used
>SOP Class UID	(0008,1150)	Not used
>SOP Instance UID	(0008,1155)	Not used
Magnification Type	(2010,0060)	Not used
Smoothing Type	(2010,0080)	Not used
Requested Image Size	(2020,0030)	Not used

5.2.3.1.2.1.2 Status

Service Status	Status Codes	Further Meaning	Application Behavior When receiving Status Codes
Failue	C605	Insufficient memory in printer to store the image	Ignored

5.2.3.1.2.1.3 Behavior

The N-SET DIMSE Service is used to update the Basic Grayscale Image Box SOP Instance.

5.2.4 Printer SOP Class

5.2.4.1 IOD Description

5.2.4.1.1 IOD modules

Module	Reference	Module Description
SOP Common		Contains SOP Common information
Printer Module	5.2.4.1.2	Contains status information to monitor the printer

5.2.4.1.2 Printer Module

Attribute Name	Tag	Attribute Description
Printer Status	(2110,0010)	Displayed in Printer Test dialog to show status of selected printer and in job queue window if print job fails.
Printer Status Info	(2110,0020)	Displayed in Printer Test dialog to show information of selected printer and in job queue window if print job fails.
Printer Name	(2110,0030)	Displayed in Printer Test dialog to show name of selected printer and in job queue window if print job fails.
Manufacturer	(0008,0070)	Displayed in Printer Test dialog to show information of selected printer.
Manufacturer Model Name	(0008,1090)	Displayed in Printer Test dialog to show information of selected printer.
Device Serial Number	(0018,1000)	Displayed in Printer Test dialog to show information of selected printer.
Software Versions	(0018,1020)	Displayed in Printer Test dialog to show information of selected printer.
Date Of Last Calibration	(0018,1200)	Displayed in Printer Test dialog to show information of selected printer.
Time Of Last Calibration	(0018,1201)	Displayed in Printer Test dialog to show information of selected printer.

5.2.4.2 DIMSE Service Group

DIMSE Service Element	Usage SCU
N-EVENT-REPORT	M
N-GET	U

5.2.4.2.1 N-EVENT-REPORT

5.2.4.2.1.1 Attributes

Event Type Name	Event Type ID	Attribute	Tag	Usage SCU
Normal	1			
Warning	2	Printer Name	(2110,0030)	Displayed in job queue window if print job fails.
		Printer Status Info	(2110,0020)	Displayed in job queue window if print job fails.
Failure	3	Printer Name	(2110,0030)	Displayed in job queue window if print job fails.
		Printer Status Info	(2110,0020)	Displayed in job queue window if print job fails.

5.2.4.2.1.2 Behavior

Displays print failure message and moves on to next job. Failed job is retried after have processed all other jobs in job queue.

5.2.4.2.2 N-GET

5.2.4.2.2.1 Attributes

Attribute name	Tag	Usage SCU
Printer Status	(2110,0010)	Used
Printer Status Info	(2110,0020)	Used
Printer Name	(2110,0030)	Used
Manufacturer	(0008,0070)	Used
Manufacturer Model Name	(0008,1090)	Used
Device Serial Number	(0018,1000)	Used
Software Versions	(0018,1020)	Used
Date Last Calibration	(0018,1200)	Used
Time Last Calibration	(0018,1201)	Used

5.2.4.2.2.2 Behavior

The N-GET DIMSE Service is used to to get a Printer SOP Instance.

6. MODALITY WORKLIST INFORMATION MODEL DEFINITION

6.1 INTRODUCTION

This section specifies the use of the DICOM Modality Worklist Information Model used to organize data and against which a Modality Worklist Query will be performed. The contents of this section are:

6.2 - Information Model Description

6.3 - Information Model Entity-Relationship Model

6.4 - Information Model Module Table

6.5- Information Model Keys

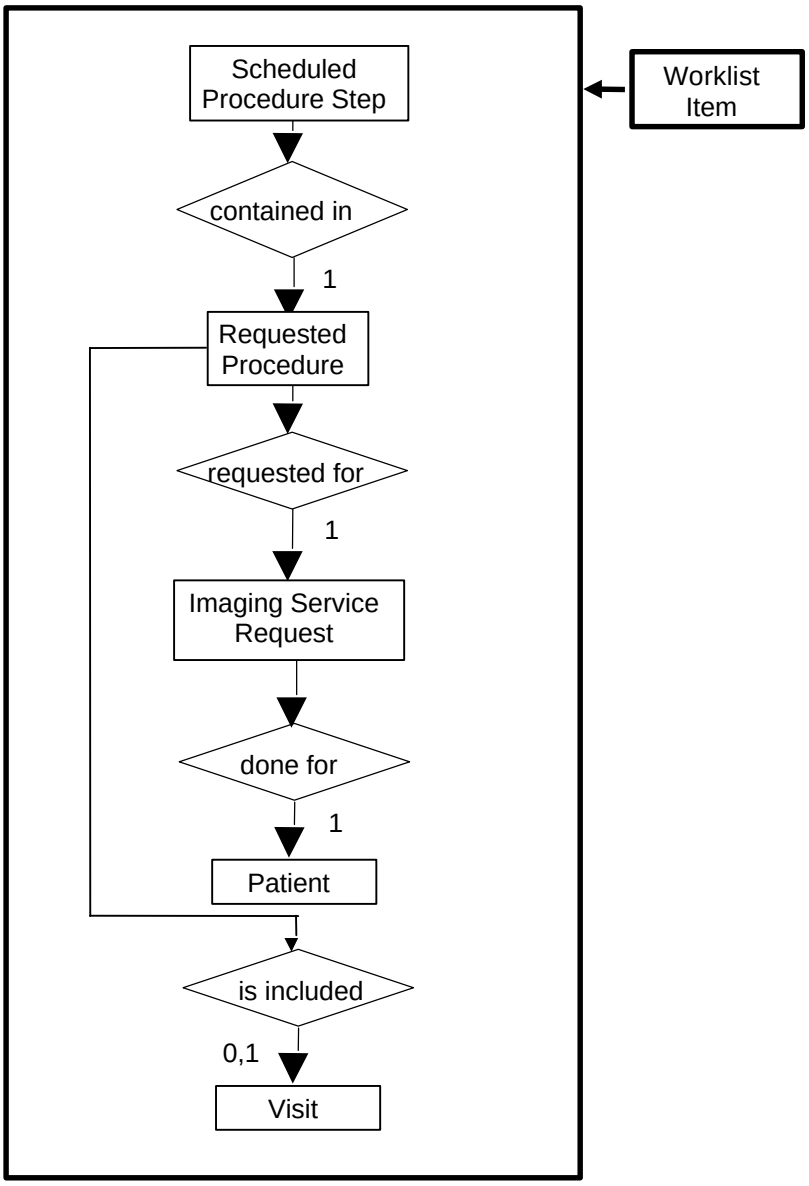
6.2 MODALITY WORKLIST INFORMATION MODEL DESCRIPTION

6.3 MODALITY WORKLIST INFORMATION MODEL ENTITY-RELATIONSHIP MODEL

The Entity-Relationship diagram for the Modality Worklist Information Model schema is shown in Illustration 6.3-2. It represents the information that composes a Worklist Item. In this figure, the following diagrammatic convention is established to represent the information organization:

- each entity is represented by a rectangular box
- each relationship is represented by a diamond shaped box
- the fact that a relationship exists between two entities is depicted by lines connecting the corresponding entity boxes to the relationship boxes

ILLUSTRATION 6.3-2
MODALITY WORKLIST INFORMATION MODEL E/R DIAGRAM



6.3.1 ENTITY DESCRIPTIONS

Please refer to DICOM Standard PS 3.3. (Information Object Definitions) and PS 3.4 (Service Class Specifications) for a description of each of the Entities contained within the Modality Worklist Information Model.

6.3.1.1 Scheduled Procedure Step

6.3.1.2 Requested Procedure Entity Description

6.3.1.3 Imaging Service Request Entity Description

6.3.1.4 Visit Entity Description

6.3.1.5 Patient Entity Description

6.3.2 enCORE Mapping of DICOM entities

TABLE 6.3-1
MAPPING OF DICOM ENTITIES TO enCORE ENTITIES

DICOM	enCORE Entity
Scheduled Procedure Step	Exam
Requested Procedure	Exam
Imaging Service Request	Exam
Visit	Exam
Patient	Patient

6.4 INFORMATION MODEL MODULE TABLE

Within an entity of the DICOM v3.0 Modality Worklist Information Model, attributes are grouped into related set of attributes. A set of related attributes is termed a module. A module facilitates the understanding of the semantics concerning the attributes and how the attributes are related with each other. A module grouping does not infer any encoding of information into datasets.

Table 6.4-1 identifies the defined modules within the entities which comprise the DICOM v3.0 Modality Worklist Information Model. Modules are identified by Module Name.

See DICOM v3.0 PS 3.3 and PS 3.4 for a complete definition of the entities, modules, and attributes.

TABLE 6.4-1
MODALITY WORKLIST INFORMATION MODEL MODULES

Entity Name	Module Name	Reference
Scheduled Procedure Step	SOP Common	Not used
	Scheduled Procedure Step	6.5.2.1
Requested Procedure	Requested Procedure	6.5.3.1
Imaging Service Request	Imaging Service Request	6.5.4.1
Visit	Visit Identification	Not used
	Visit Status	6.5.5.1
	Visit Relationship	Not used
	Visit Admission	Not used
Patient	Patient Relationship	Not used
	Patient Identification	6.5.6.1
	Patient Demographic	0
	Patient Medical	6.5.6.3

6.5 INFORMATION MODEL KEYS

Please refer to DICOM Standard PS 3.3. (Information Object Definitions) and PS 3.4 (Service Class Specifications) for a description of each of the Entities contained within the Modality Worklist Information Model.

The following Module descriptions are included to specify what data elements are supported and what type of matching can be applied. It should be noted that they are the same ones as defined in the DICOM v3.0 Standard PS 3.4 (Service Class Specifications). The list of data elements that is requested is dynamically configurable.

6.5.1 Supported Matching

Following are the types of matching that can be requested by the implementation:

– Single Value matching
– Range of date

– Wild Card Matching

6.5.2 Scheduled Procedure Step Entity

6.5.2.1 Scheduled Procedure Step Module

TABLE 6.5-2
SCHEDULED PROCEDURE STEP MODULE ATTRIBUTES

Attribute Name	Tag	Expected Matching Key Type	Expected Returned Key Type	Mapped into the Image	Note
Scheduled Procedure Step Sequence	(0040,0100)	R	1	No	
>Scheduled Station AE Title	(0040,0001)	R	1	No	Matching is supported. This field is dynamically configurable by the user.
>Scheduled Procedure Step Start Date	(0040,0002)	R	1	No	Matching is supported. This field is dynamically configurable by the user. Today, Tomorrow, or range matching is supported through the user interface.
>Scheduled Procedure Step Start Time	(0040,0003)	R	1	No	
>Modality	(0008,0060)	R	1	Yes	Matching is supported. This field is dynamically configurable by the user.
>Scheduled Performing Physician's Name	(0040,0006)	R	2	Yes	Wild card matching is supported. This field is dynamically configurable by the user.
>Scheduled Procedure Step Description	(0040,0007)	O	1C	Yes	
>Scheduled Station Name	(0040,0010)	O	2	Yes	
>Scheduled Procedure Step Location	(0040,0011)	O	2	No	
>Scheduled Action Item Code Sequence	(0040,0008)	O	1C	No	
>>Code Value	(0008,0100)	O	1C	No	
>>Coding Scheme Designator	(0008,0102)	O	1C	No	
>>Coding Scheme Version	(0008,0103)	O	3	No	
>>Code Meaning	(0008,0104)	O	3	No	
>Scheduled Procedure Step ID	(0040,0009)	O	1	Yes	

6.5.3 Requested Procedure Entity

6.5.3.1 Requested Procedure Module

TABLE 6.5-3
REQUESTED PROCEDURE MODULE ATTRIBUTES

Attribute Name	Tag	Expected Matching Key Type	Expected Returned Key Type	Mapped into the Image	Note
Requested Procedure ID	(0040,1001)	O	1	Yes	Single value matching is supported. This field is dynamically configurable by the user.
Requested Procedure Description	(0032,1060)	O	1C	No	
Requested Procedure Code Sequence	(0032,1064)	O	1C	No	
>Code Value	(0008,0100)	O	1C	No	
>Coding Scheme Designator	(0008,0102)	O	1C	No	
>Coding Scheme Version	(0008,0103)	0	3	No	
>Code Meaning	(0008,0104)	O	3	No	
Study Instance UID	(0020,000D)	O	1	No	
Requested Procedure Comments	(0040,1400)	O	3	No	
Names of Intended Recipients of results	(0040,1010)	O	3	No	

6.5.4 Imaging Service Request Entity

6.5.4.1 Imaging Service Request Module

TABLE 6.5-4
IMAGING SERVICE REQUEST MODULE ATTRIBUTES

Attribute Name	Tag	Expected Matching Key Type	Expected Returned Key Type	Mapped into the Image	Note
Accession Number	(0008,0050)	O	2	Yes	Single value matching is supported. This field is dynamically configurable by the user.
Requesting Physician	(0032,1032)	O	2	No	
Referring Physician's Name	(0008,0090)	O	2	Yes	
Requesting Service	(0032,1033)	O	3	No	
Requested Service Comments	(0040,2400)	O	3	No	

6.5.5 Visit Entity

6.5.5.1 Visit Status

TABLE 6.5-5
VISIT STATUS MODULE ATTRIBUTES

Attribute Name	Tag	Expected Matching Key Type	Expected Returned Key Type	Mapped into the Image	Note
Current Patient Location	(0038,0300)	O	2	No	

6.5.6 Patient Entity

6.5.6.1 Patient Identification

TABLE 6.5-6
PATIENT IDENTIFICATION MODULE ATTRIBUTES

Attribute Name	Tag	Expected Matching Key Type	Expected Returned Key Type	Mapped into the Image	Note
Patient's Name	(0010,0010)	R	1	Yes	Last name wild card matching is supported. This field is dynamically configurable by the user.
Patient ID	(0010,0020)	R	1	Yes	Single value matching is supported. This field is dynamically configurable by the user.
Other Patient Ids	(0010,1000)	O	3	Yes	

6.5.6.2 Patient Demographic

TABLE 6.5-7
PATIENT DEMOGRAPHIC MODULE ATTRIBUTES

Attribute Name	Tag	Expected Matching Key Type	Expected Returned Key Type	Mapped into the Image	Note
Patients Birth Date	(0010,0030)	O	2	Yes	
Patient's Sex	(0010,0040)	O	2	Yes	
Patient's Weight	(0010,1030)	O	2	Yes	
Patient’s Size	(0010,1020)	O	3	Yes	
Ethnic Group	(0010,2160)	O	3	Yes	
Patient Comments	(0010,4000)	O	3	Yes	

6.5.6.3 Patient Medical

TABLE 6.5-8
PATIENT MEDICAL MODULE ATTRIBUTES

Attribute Name	Tag	Expected Matching Key Type	Expected Returned Key Type	Mapped into the Image	Note
Pregnancy Status	(0010,21C0)	O	2	No	
Medical Alerts	(0010,2000)	O	2	No	
Additional Patient History	(0010,21B0)	O	3	Yes	