Carestream DRX-1 Product Family
Software Version 5.6b

DICOM Conformance Statement

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Introduction

1.1 Executive Overview

This document applies to the *Carestream* DRX-1 Family of products operating Capture Console version 5.6b software. When the document makes reference to the *DRX-1 System* it applies to all products unless otherwise noted.

1.1.1 DRX-1 Product Family

- *Carestream* DRX-1 System
- *Carestream* DRX-Mobile Retrofit Kit
- *Carestream* DRX-Transportable Retrofit Kit
- *Carestream* DRX-Ascend
- *Carestream* DRX-Revolution

1.2 Supported DICOM SOP Classes

Table 1.2A   Supported DICOM SOP Classes for Verification

SOP Class Name	SOP Class UID	Service Class Role
Verification SOP Class	1.2.840.10008.1.1	SCU, SCP

Table 1.2B   Supported DICOM SOP Classes for Image Delivery

SOP Class Name	SOP Class UID	Service Class Role
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9	SCU
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	SCU
Digital X-Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.1	SCU
Digital X-Ray Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	SCU
Grayscale Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.1	SCU

Table 1.2C   Supported DICOM SOP Classes for Modality Work List

SOP Class Name	SOP Class UID	Service Class Role
Modality Work List Information Model – FIND	1.2.840.10008.5.1.4.31	SCU

Table 1.2D   Supported DICOM SOP Classes for MPPS

SOP Class Name	SOP Class UID	Service Class Role
Modality Performed Procedure Step SOP Class	1.2.840.10008.3.1.2.3.3	SCU

Table 1.2E   Supported DICOM SOP Classes for Storage Commit

SOP Class Name	SOP Class UID	Service Class Role
Storage Commitment Push Model SOP Class	1.2.840.10008.1.20.1	SCU

Table 1.2F   Supported DICOM SOP Classes for Prior Image Recall Feature Only

SOP Class Name	SOP Class UID	Service Class Role
Study Root Query Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.2.1	SCU
Study Root Query Retrieve Information Model - MOVE	1.2.840.10008.5.1.4.1.2.2.2	SCU
CR Image Storage	1.2.840.10008.5.1.4.1.1.1.1	SCP
Digital X-Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1	SCP
Grayscale Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.1	SCP

1.3   Scope and Field of Application

This document describes the DICOM functionality of the *Carestream* DRX-1 family of products. A *Carestream* DRX-1 product is capable of performing projection radiographic examinations and producing a digital image. Throughout the remainder of this document the term **DRX-1 System** shall refer to products in the DRX-1 product family (see section 1.1.1) , operating with a *Carestream* DRX-1, a *Carestream* DRX-1C, a Varian PaxScan 4343R, or a *Carestream* DRX-2530C detector.

The *DRX-1 System* acts as a DICOM Service Class User (SCU) that performs transactions over a TCP/IP network via the DICOM messages exchange protocol.

1.4   Important Considerations for the Reader

This DICOM Conformance Statement by itself is not sufficient to guarantee successful connectivity between the *DRX-1 System* and equipment from other vendors. The following considerations should be made:

- The integration of equipment from different vendors (including Carestream) goes beyond the scope of the DICOM 3.0 standard and the DICOM Conformance Statements from Carestream and other vendors. It is the responsibility of the user (or user's agent) to assess the application requirements and to design a solution that integrates Carestream equipment with equipment from other vendors.

- When the comparison of this DICOM Conformance Statement with a DICOM Conformance Statement from another vendor indicates that connectivity should be possible, it is the responsibility of the user (or user's agent) to verify this by carrying out validation tests and to check whether all required functionality is met.

- With regard to the future evolution of the DICOM 3.0 standard Carestream, Inc. reserves the right to make changes to the *DRX-1 System* architecture described in this document. The user (or user's agent) should ensure that any equipment connected via DICOM to Carestream equipment also follows the future evolution of the DICOM 3.0 standard. Failure to do so may result in (partial) loss of connectivity.

1.5   Accessing this Conformance Statement on the World Wide Web

As the *DRX-1 System* product changes, changes to this DICOM Conformance Statement are inevitable. To obtain the most recent revision of this DICOM Conformance Statement, access the following URL:

http://www.carestream.com/dicom.html

1.6   Definitions, Acronyms, Abbreviations

The following symbols and abbreviations are used in this document.

ASCII	American Standard Code for Information Interchange
AE	Application Entity
CR	Computed Radiography
DICOM	Digital Imaging and Communications in Medicine
DIMSE	DICOM Message Service Element
DR	Digital Radiography
DX	Digital X-Ray
GSPS	Grayscale Softcopy Presentation State
HIS/RIS	Hospital Information System / Radiology Information System.
IHE	Integrating the Healthcare Enterprise – initiative by healthcare professionals and industry to improve the way computer systems in healthcare share information
ISO	International Standards Organization
LUT	Look-up Table
MPPS	Modality Performed Procedure Step Notification SOP Class
MWL	Modality Work List
PDU	Protocol Data Unit
PLUT	Presentation Look-up Table
SC	Secondary Capture
SCU	Service Class User
SCP	Service Class Provider
SOP	Service-Object Pair
SCPM	Storage Commitment Push Model SOP Class
TCP/IP	Transmission Control Protocol/Internet Protocol
UID	Unique Identifier

2   Implementation Model

This implementation model uses the DICOM Basic Print Management Meta SOP Class to deliver studies to remote printers. The DX Image Storage SOP Class is used to deliver studies to archives. Basic Work List Management service is used for the acquisition of patient demographics. DICOM Query/Retrieve service is used to retrieve prior images.
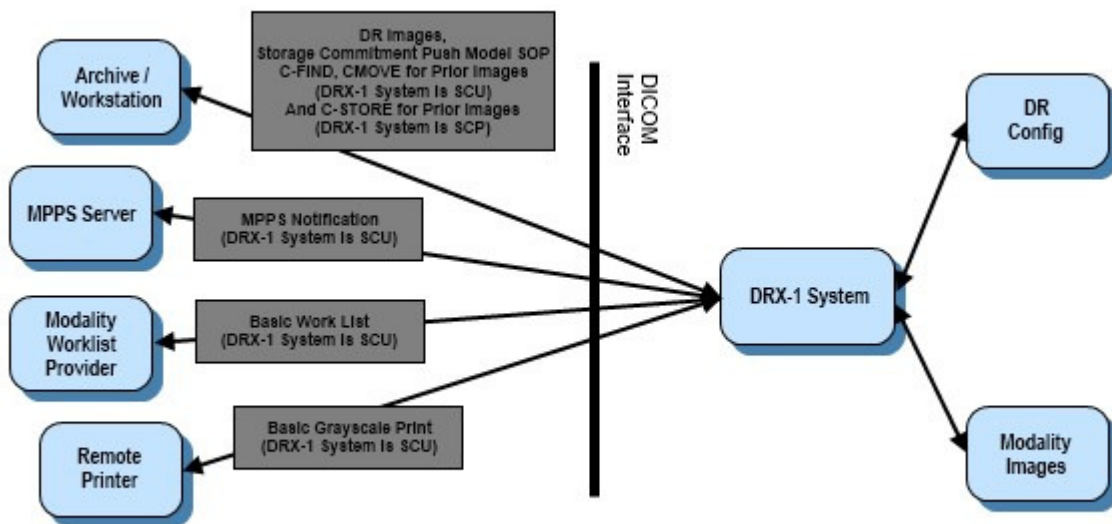
Figure 2.1 Implementation Model

2.1   Functional Definitions

The *DRX-1 System* is a digital radiographic image acquisition product utilizing a digital X-Ray detector. The system allows the technologist to acquire and identify images, review images for placement and motion, add markers, adjust image processing, manipulate images (flip, rotate, etc.), pan/zoom and route images to their final destinations. The system is capable of obtaining patient demographic information manually from the user interface, the Remote Patient Data Entry System (RPDES) or via a DICOM Work List. The RPDES allows patient demographic data to be entered from remote computers for sites that do not support the DICOM Work List. The *DRX-1 System* is also capable of automatic or on demand querying for and retrieving of prior radiographic images for any exams in the DICOM Work List and displaying those images to the technologist.

2.2 Sequencing of Real-World Activities

If a HIS/RIS service is present and the *DRX-1* System has polling is enabled, the *DRX-1 System* establishes an association when the application is started to obtain a modality Work List. The Work List is used as a source of patient demographics. The *DRX-1 System* establishes an association with a selected SCP when *it* has collected sufficient information to begin sending images.

3 Application Entity Specifications

The *DRX-1 System* provides Standard Conformance to the SOP Classes depicted in Table 1.1 as an SCU.

3.1 Association Establishment Policies

3.1.1 General

3.1.1.1 Delivery

An Association may be attempted whenever a valid destination is selected and at least one image has been acquired.

The maximum PDU size, which the *DRX-1 System* will negotiate, is 128 Kbytes.

3.1.1.2 HIS/RIS

The *DRX-1 System* may be configured to poll the HIS/RIS broker at periodic intervals and/or asynchronously on demand from the user. If periodic polling is enabled, an association for Basic Work List will be attempted when the *DRX-1 System* application is started and then periodically thereafter.

3.1.1.3 Priors

The *DRX-1 System* may be configured to retrieve Prior images from the PACS as soon as the HIS/RIS record is retrieved, when the exam is started, or only when specifically requested by the Technologist.

3.1.2 Number of Associations

3.1.2.1 Delivery

Associations are initiated with the default limitation that no more than three total SCU delivery associations may be open at any given time to a print or a store destination. The default limitation for each class of destination may be increased to 6 by the service provider.

3.1.2.2 HIS/RIS

Two associations may be initiated at a time. The *DRX-1 System* will close each association after receiving a C-FIND response.

3.1.2.3 Priors

One C-FIND associations may be initiated at a time. The *DRX-1 System* will close each association after receiving a C-FIND response.

Two C-MOVE associations may be initiated at a time. The *DRX-1 System* will close each association after receiving a C-MOVE response.

3.1.2.4 Storage Commitment

Associations are initiated with the default limitation that no more than three total SCU storage commitment associations may be open at any given time. The default limitation may be increased to 6 by the service provider.

3.1.3 Asynchronous Nature

The *DRX-1 System* allows up to 1 invoked and 1 performed operation on an Association (it is synchronous).

3.1.4 Implementation Identifying Information

The *DRX-1 System* provides the Implementation Class UID of "1.2.840.113564.3.4.1".

The implementation version name attribute is optional and is not used by the *DRX-1 System.*

The *DRX-1 System* establishes an Association using its network node name for the calling DICOM Application Entity title. The network node name is configurable through the *DRX-1 System* Service Application.

The *DRX-1 System* stores a called DICOM Application Entity Title and socket number for each DICOM compatible network destination it knows about.

3.2 Association Initiation Policy

3.2.1 Associated Real-World Activity

3.2.1.1 Delivery

The *DRX-1 System* initiates Associations for the purpose of sending images and associated information for printing to a Basic Grayscale Print Management SCP and archiving to an SC Image Storage SCP.

The default and well-known socket 5040 will be used for making the Association, unless a product service provider configures a different one.

3.2.1.2 HIS/RIS

The *DRX-1 System* initiates Associations for the purpose of obtaining the current Modality Work List IOD.

3.2.2 Presentation Context Table

The *DRX-1 System* proposes the Presentation Contexts shown in Table 3.1.

Table 3.1   Presentation Context Table

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**			**Ext.**
Name	**UID**	**Name List**	**UID**	**Role**	**Negot**
Verification	1.2.840.10008.1.1	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Basic Grayscale Print Management	1.2.840.10008.5.1.1.9	DICOM Explicit VR Little Endian DICOM Implicit VR Little Endian	1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCU	None
Modality Work List	1.2.840.10008.5.1.4.31	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	DICOM Explicit VR Little Endian DICOM Implicit VR Little Endian	1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCU	None
Digital X-Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.1	DICOM Explicit VR Little Endian DICOM Implicit VR Little Endian	1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCU	None
Digital X-Ray Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	DICOM Explicit VR Little Endian DICOM Implicit VR Little Endian	1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCU	None
Modality Performed Procedure Step Notification SOP Class	1.2.840.10008.3.1.2.3.5	DICOM Explicit VR Little Endian DICOM Implicit VR Little Endian	1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCU	None
Storage Commitment Push Model SOP Class	1.2.840.10008.1.20.1	DICOM Explicit VR Little Endian DICOM Implicit VR Little Endian	1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCU	None
Grayscale Softcopy	1.2.840.10008.5.1.4.1.1.11.1	DICOM Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None

Presentation Context Table				
Abstract Syntax		**Transfer Syntax**		**Ext.**
Presentation State Storage SOP Class		DICOM Implicit VR Little Endian	1.2.840.10008.1.2	

3.2.3 SOP Specific Conformance

3.2.3.1 Verification

The *DRX-1 System* provides standard conformance to the DICOM Verification Service Class:

- When prompted by a user, the *DRX-1 System* will request verification of communication to a remote DICOM AE using the C-ECHO primitive.

- Upon receipt from an SCU of a verification of communication request, the *DRX-1 System* will issue confirmation.

3.2.3.2 Delivery

Association attempts will be retried if the SCP rejects the request with the RESULT = 2 (rejected transient) and the REASON = 1 (temporary congestion). If all Association attempts fail, then the user will be notified and the Film Session or Study is saved for resending or deletion. No undelivered image files are deleted without manual user direction.

3.3 Association Acceptance Policy

Upon receipt from an SCU of a verification of communication request, the *DRX-1 System* will issue confirmation.

3.4 Basic Print Management Meta SOP Class

The Meta SOP Class is defined by the set of supported SOP Classes depicted in Table 3.2.

Table 3.2   Meta SOP Class

SOP Class	UID Value
Basic Film Session SOP Class	1.2.840.10008.5.1.1.1
Basic Film Box SOP Class	1.2.840.10008.5.1.1.2
Basic Grayscale Image Box SOP Class	1.2.840.10008.5.1.1.4
Printer SOP Class	1.2.840.10008.5.1.1.16

3.4.1   Basic Film Session SOP Class

3.4.1.1 DIMSE Service N-CREATE

Table 3.3   Basic Film Session SOP Class – Supported Attributes

Attribute	SCU Usage	Tag	Possible Values
Number of Copies	U	(2000,0010)	1 –> 99
Print Priority	U	(2000,0020)	HIGH, MED, LOW
Medium Type	U	(2000,0030)	PAPER, CLEAR FILM, BLUE FILM, NONE
Film Destination	U	(2000,0040)	MAGAZINE, PROCESSOR, BIN_n (where n=1 to 9)
Film Session Label	U	(2000,0050)	Up to 64 characters may be provided
Memory Allocation	U	(2000,0060)	Not used

3.4.1.2 DIMSE Service N-Action

The *DRX-1 System* uses the N-ACTION to instruct the SCP to print all films in the session. The *DRX-1 System* is configurable (when the destination is installed) to issue the N-ACTION at the Film Session for destinations known to support this optional service. If the destination is not known to support collation, the *DRX-1 System* will only issue the N-ACTION on the Film Box. For Print SCPs that conform to the N-ACTION specification in Part 4 section H.4.1.2.4 of the DICOM standard, the *DRX-1 System* expects that all film boxes will be collated when printed.

3.4.1.3 DIMSE Service N-SET

This service is not used.

3.4.1.4 DIMSE Service N-DELETE

This service is not used.

3.4.2   Basic Film Box SOP Class

3.4.2.1 DIMSE Service N-CREATE

Table 3.4   Basic Film Box SOP Class – Supported Attributes

Attribute	SCU Usage	Tag	Possible Values
Image Display Format	M	(2010,0010)	With no annotation being present, these formats may be used: STANDARD\C,R For LANDSCAPE Film Orientation, (C,R) may = (1,1), (1,2), (2,1), (2,2), (1,3), (3,1), (2,3), (3,2), (3,3) For PORTRAIT Film Orientation, (C,R) may = (1,1), (1,2), (2,1), (2,2) , (3,1), (2,3), (3,2), (3,3) With annotation, the ROW Symmetric format is being used as following: With Image annotations alone: ROW\n,m,.., (n,m..) may = (1,1), (1,1,1,1), (1,1,1,1,1,1), (2,2), (2,2,2,2), (2,2,2,2,2,2), (3,3), (3,3,3,3), (3,3,3,3,3,3) With Page annotations alone: ROW\n,m,.., (n,m..) may = (1,1), (1,1,1), (2,1), (2,2,1), (3,1), (3,3,1), (3,3,3,1) With Image and Page annotation combined: ROW\n,m,.., (n,m..) may = (1,1,1), (1,1,1,1,1), (1,1,1,1,1,1,1), (2,2,1), (2,2,2,2,1), (2,2,2,2,2,2,1), (3,3,1), (3,3,3,3,1), (3,3,3,3,3,3,1)
Referenced Film Session Sequence	M	(2010,0500)	
>Referenced SOP Class UID	M	(0008,1150)	
>Referenced SOP Instance UID	M	(0008,1155)	
Referenced Basic Image Box Sequence	-	(2010,0510)	Not sent.
Referenced Basic Annotation Box Sequence	-	(2010,0520)	Not used.
Film Orientation	U	(2010,0040)	PORTRAIT, LANDSCAPE
Film Size ID	U	(2010,0050)	8INX10IN 8.5INX11IN 8.5INX12IN 10INX12IN 11INX14IN 14INX14IN 14INX17IN 10INX12IN A4
Magnification Type	U	(2010,0060)	REPLICATE, BILINEAR, CUBIC, NONE Will be constant for the entire Film Box.
Max Density	U	(2010,0130)	0-450 Configurable for Destination
Configuration Information	U	(2010,0150)	Not used.
Annotation Display Format ID	U	(2010,0030)	Not used
Smoothing Type	U	(2010,0080)	NORMAL (minimum cubic convolution error) ENHANCED ENHANCED1 Valid only for Magnification Type CUBIC. 0-15
Border Density	U	(2010,0100)	410 Configurable for Destination

Attribute	SCU Usage	Tag	Possible Values
Empty Image Density	U	(2010,0110)	Not used
Min Density	U	(2010,0120)	0-410 (Value must be less than Max Density (2010,0130)) Configurable for Destination
Illumination	MC	(2010,015E)	Positive integer in units of cd/m^2 Configurable for Destination
Reflective Ambient Light	MC	(2010,0160)	Positive integer in units of cd/m^2 Configurable for Destination
Trim	U	(2010,0140)	YES and NO

3.4.2.2 DIMSE Service N-ACTION

The *DRX-1 System* uses the N-ACTION to instruct the SCP to print the current film in the session.

3.4.2.3 DIMSE Service N-SET

This service is not used.

3.4.2.4 DIMSE Service N-DELETE

This service is not used.

3.4.3   Basic Image Box SOP Class

3.4.3.1 DIMSE Service N-SET

Table 3.5   Basic Image Box SOP Class – Supported Attributes

Attribute & Usage	SCU Usage	Tag	Supported Values
Image Position	M	(2020,0010)	All values within the range of Image Display Format
Preformatted Grayscale Image Sequence	M	(2020,0110)	
>Samples Per Pixel	M	(0028,0002)	1
>Photometric Interpretation	M	(0028,0004)	MONOCHROME1, MONOCHROME2 (If the image space configured on the destination is set to density, MONOCHROME1 is set. If the image space configured on the destination is p-values or luminance, MONOCHROME2 is set. See section 5.1.3 for more information.
>Rows	M	(0028,0010)	Minimum Value 64 Maximum Values: Known for all *Carestream* printers, configurable for others. The aspect ratio is used with the printer's page extents, display format, etc. to calculate this value.

Attribute & Usage	SCU Usage	Tag	Supported Values
>Columns	M	(0028,0011)	Minimum Value 64 Maximum Values: Known for all *Carestream* printers, configurable for others. The aspect ratio is used with the printer's page extents, display format, etc. to calculate this value.
>Pixel Aspect Ratio	MC	(0028,0034)	R\C R, C = 1 to 9999 (Integer) **Note**: This attribute is always included, even if it is 1\1. It's value will always be 1\1 if Magnification Type is NONE
>Bits Allocated	M		16
>Bits Stored	M	(0028,0101)	12
>High Bit	M	(0028,0102)	Bits Stored -1
>Pixel Representation	M	(0028,0103)	0000H (unsigned integer)
>Pixel Data	M	(7FE0,0010)	All values consistent with Bits Stored
Polarity	U	(2020,0020)	NORMAL
Magnification Type	U	(2010,0060)	REPLICATE, BILINEAR, CUBIC, NONE **Note**: Is always the same as the Magnification Type specified for the Film Box.
Smoothing Type	U	(2010,0080)	NORMAL, ENHANCED, ENHANCED1 Valid only for Magnification Type CUBIC. 0-15 Must be the same as the Smoothing Type specified for the Film Box.
Configuration Information	U	(2010,0150)	Not used.
Requested Image Size	U	(2020,0030)	Row length in mm up to the size of the printable image, which is a function of Image Display Format and Film Size ID.

3.4.4   Printer SOP Class

3.4.4.1 DIMSE Service N-EVENT-REPORT

The *DRX-1 System* will process the indication of the N-EVENT-REPORT operation. Any string sent by the SCP is accepted and displayed on the *DRX-1 System* user interface. In this translation, all characters that are not space characters or in the ASCII range "A" - "Z" are stripped.

The *DRX-1 System* translates Attributes as described in Table 3.6. Other strings are not translated but may be displayed on a *DRX-1 System* user interface.

Table 3.6   Basic Image Box SOP Class – Supported Attributes

Attribute	SCU Usage	Tag	Expected Values

Attribute	SCU Usage	Tag	Expected Values
Printer Status	U	(2110,0010)	NORMAL WARNING FAILURE
Printer Status Info	U	(2110,0020)	Any valid string including the following. for NORMAL conditions: "NORMAL" for WARNING conditions: "RECEIVER FULL", "FILM JAM", "PRINTER NOT RDY", "PROCESSOR DOWN", "CHECK PROCESSOR", "PROC NOT READY", "NO RECEIVE MGZ", "NO SUPPLY MGZ", "NO TONER", "NO STATE", "CHECK RIBBON", "PRINTER BUSY", "OFFLINE", "PRINTER STOPPED", "CHECK SUPPLY MAG", "COVER OPEN", "PRINTER OFFLINE", "EXPOSURE FAILURE", "CHECK R MAG", "PROC NOT RDY", "STATE UNKNOWN", "CHECK INK CART", "INK OUT", "QUEUED", "SUPPLY EMPTY", "SUPPLY LOW", "BAD RECEIVE MGZ", "BAD SUPPLY MGZ", "FILM TRANSP ERR", "CHECK CHEMISTRY", "CHECK SORTER", "CHEMICALS LOW", "CHEMICALS EMPTY",

Attribute	SCU Usage	Tag	Expected Values
Printer Status Info (continued from previous page)			"FINISHER EMPTY", "FINISHER ERROR", "FINISHER LOW", "CHECK PROC", "PRINTER BUSY", "PROC DOWN", "PROC INIT", "PROC OVERFLOW FL", "PROC OVERFLOW HI", "PRINTER DOWN", "PRINTER INIT", "CALIBRATING", "CALIBRATION ERR", "ELEC CONFIG ERR", "ELEC DOWN", "ELEC SW ERROR", "EXPOSURE FAILURE", "REQ MED NOT INST", "REQ MED NOT AVAI", "RIBBON ERROR", "NO RIBBON", "UNKNOWN" for FAILURE conditions: "FATAL", "INVALID PAGE DES", "INSUFFIC MEMORY", "FATAL ERROR", "CHECK PRINTER", "PRINTER DOWN", "NO RESPONSE", "RIBBON MISMATCH", "TIME OUT", "UNKNOWN STATUS
Printer Name	U	(2110,0030)	Any valid string
Manufacturer	U	(0008,0070)	Any valid string
Manufacturer Model Name	U	(0008,1090)	Any valid string
Device Serial Number	U	(0018,1000)	Any valid string
Software Version	U	(0018,1020)	Any valid string
Date of Last Calibration	U	(0018,1200)	Ignored
Time of Last Calibration	U	(0018,1201)	Ignored

3.5   Store Service Classes

Table 1.2B lists all the Storage SOP Classes that are supported by the *DRX-1 System*. The following tables list, for each Storage SOP Class, the attributes that the *DRX-1 System* supports.

3.5.1 Digital X-Ray Image Storage

The DRX-1 System provides standard conformance to the Digital X-Ray Image Storage SOP Class as an SCU.

Table 3.7 Digital X-Ray Image SOP Class – For Presentation

SOP Class	SOP Class UID
Digital X-Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.1

Table 3.8 Digital X-Ray Image SOP Class – For Processing

SOP Class	SOP Class UID
Digital X-Ray Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.1.1

Table 3.9 Digital X-Ray Image SOP Class – Supported Attributes

Attribute Name	Tag	DICOM Type	Supported Values
Patient Module			
Patient Name	(0010,0010)	2	Refer to Addendum B
Patient ID	(0010,0020)	2	Refer to Addendum B
Patient Birth Date	(0010,0030)	2	Refer Addendum B
Patient Sex	(0010,0040)	2	Refer to Addendum B
Patient Birth Time	(0010,0032)	3	
Other Patient IDs	(0010,1000)	3	This value will be sent only if it has been received from the DICOM modality work list (MWL).
Other Patient Names	(0010,1001)	3	This value will be sent only if it has been received from the DICOM modality work list (MWL).
Ethnic Group	(0010,2160)	3	This value will be sent only if it has been received from the DICOM modality work list (MWL).
Patient Comments	(0010,4000)	3	Refer to Addendum B
General Study			
Study Instance UID	(0020,000D)	1	
Study Date	(0008,0020)	2	Refer to Addendum B
Study Time	(0008,0030)	2	Refer to Addendum B
Referring Physician Name	(0008,0090)	2	Refer to Addendum B
Study ID	(0020,0010)	2	
Accession Number	(0008,0050)	2	Refer to Addendum B

Attribute Name	Tag	DICOM Type	Supported Values
Study Description	(0008,1030)	3	Refer to Addendum B
Referenced Study Sequence	(0008,1110)	3	
>Referenced SOP Class UID	(0008,1150)	1C	
>Referenced SOP Instance UID	(0008,1155)	1C	
Procedure Code Sequence	(0008,1032)	3	
> Code Value	(0008,0100)	1C	Refer to Addendum B
> Coding Scheme Designator	(0008,0102)	1C	
> Code Meaning	(0008,0104)	1C	
Patient Study			
Admitting Diagnoses Description	(0008,1080)	3	
Patient's Age	(0010,1010)	3	Refer to Addendum B
Patient's Size	(0010,1020)	3	
Patient's Weight	(0010,1030)	3	
Occupation	(0010,2180)	3	
Additional Patient's History	(0010,21B0)	3	
General Series			
Modality	(0008,0060)	1	DX
Series Instance UID	(0020,000E)	1	
Series Number	(0020,0011)	2	
Laterality	(0020,0060)	2C	L R
Series Date	(0008,0021)	3	
Series Time	(0008,0031)	3	
Series Description	(0008,103E)	3	Same value as tag (0018,5101)
Operator Name	(0008,1070)	3	Refer to Addendum B
Body Part Examined	(0018,0015)	3	Refer to Addendum B
Performed Procedure Step Start Date	(0040,0244)	3	
Performed Procedure Step Start Time	(0040,0245)	3	
Performed Procedure Step ID	(0040,0253)	3	
Performed Procedure Step Description	(0040,0254)	3	Refer to Addendum B
Performed Protocol Code Sequence	(0040,0260)	3	

Attribute Name	Tag	DICOM Type	Supported Values
>Code Value	(0008,0100)	1C	
>Coding Scheme Designator	(0008,0102)	1C	
>Coding Scheme Version	(0008,0103)	1C	
>Code Meaning	(0008,0104)	1C	
Protocol Name	(0008,1030)	3	
Request Attributes Sequence	(0040,0275)	3	
>Requested Procedure Description	(0032,1060)	3	Refer to Addendum B
>Scheduled Procedure Step Description	(0040,0007)	3	Refer to Addendum B
>Scheduled Protocol Code Sequence	(0040,0008)	3	
>> Code Value	(0008,0100)	1C	Refer to Addendum B
>> Coding Scheme Designator	(0008,0102)	1C	
>> Coding Scheme Version	(0008,0103)	1C	
>> Code Meaning	(0008,0104)	1C	Refer to Addendum B
>Scheduled Procedure Step ID	(0040,0009)	1C	
>Requested Procedure ID	(0040,1001)	1C	Refer to Addendum B
DX Series			
Modality	(0008,0060)	1	DX
Referenced Performed Procedure Step Sequence	(0008,1111)	1C	
>Referenced SOP Class UID	(0008,1150)	1C	
>Referenced SOP Instance UID	(0008,1155)	1C	
Presentation Intent Type	(0008,0068)	1	FOR PRESENTATION
General Equipment			
Manufacturer	(0008,0070)	2	Carestream Health
Institution Name	(0008,0080)	3	For this value to be populated and sent, the *DRX-1 System* user needs to enter the value on the *Delivery Preferences* screen.
Institution Address	(0008,0081)	3	For this value to be populated and sent, the *DRX-1 System* user needs to enter the value on the *Delivery Preferences* screen.
Station Name	(0008,1010)	3	

Attribute Name	Tag	DICOM Type	Supported Values
Institutional Department Name	(0008,1040)	3	Refer to Addendum B
Manufacturer Model Name	(0008,1090)	3	DRX-1
Device Serial Number	(0018,1000)	3	
Software Versions	(0018,1020)	3	
General Image			
Instance Number	(0020,0013)	2	
Patient Orientation	(0020,0020)	2C	
Image Type	(0008,0008)	3	
Content Date	(0008,0023)	2C	
Content Time	(0008,0033)	2C	
Acquisition Date	(0008,0022)	3	
Acquisition Time	(0008,0032)	3	
Derivation Description	(0008,2111)	3	
Acquisition Number	(0020,0012)	3	
Source Image Sequence	(0008,2112)	3	Note: This is sent for the FOR_PRESENTATION image, with the UID to the FOR_PROCESSING image, even if the FOR_PROCESSING image was not sent to store destination.
>Referenced SOP Class UID	(0008,1150)	1C	
>Referenced SOP Instance UID	(0008,1155)	1C	
Images In Acquisition	(0020,1002)	3	
Image Comments	(0020,4000)	3	Refer to Addendum B
Lossy Image Compression	(0028,2110)	3	00 = No Compression
Image Pixel			
Samples per Pixel	(0028,0002)	1	1

Attribute Name	Tag	DICOM Type	Supported Values
Photometric Interpretation	(0028,0004)	1	MONOCHROME1 MONOCHROME2 (If the image space configured on the destination is set to density, MONOCHROME1 is set. If the image space configured on the destination is p-values or luminance, MONOCHROME2 is set. See section 5.1.3 for more information.
Rows	(0028,0010)	1	Max Value for a DRX-1 (GOS) is 3056 Max Value for a DRX-1C (CsI) is 3032 Max Value for a V4343R is 3024 Max Value for a DRX2530C is 2136 (if the user crops the image, the supported rows value may be less than max value. Some auto-cropping will take place if Black Surround is enabled and the DR image is going to a store device.)
Columns	(0028,0011)	1	Max Value for a DRX-1 (GOS) is 2544 Max Value for a DRX-1C (CsI) is 2520 Max Value for a V4343R is 3024 Max Value for a DRX2530C is 1752 (if the user crops the image, the supported columns value may be less than max value. Some auto-cropping will take place if Black Surround is enabled and the DR image is going to a store device.)
Pixel Aspect Ratio	(0028,0034)	1C	1\1
Bits Allocated	(0028,0100)	1	16

Attribute Name	Tag	DICOM Type	Supported Values
Bits Stored	(0028,0101)	1	12
High Bit	(0028,0102)	1	11
Pixel Representation	(0028,0103)	1	0
Smallest Image Pixel Value	(0028,0106)	1	0
Largest Image Pixel Value	(0028,0107)	1	4095
Pixel Data	(7FE0,0010)	1	
Contrast/Bolus			
Contrast/Bolus Agent	(0018,0010)	2	Refer to Addendum B
DX Anatomy Imaged			
Image Laterality	(0020,0062)	1	L R
Anatomic Region Sequence	(0008,2218)	2	Refer to Context Identifier 4031 in Addendum A for supported SNOMED Code Values
>Code Value	(0008,0100)	1C	
>Coding Scheme Designator	(0008,0102)	1C	
>Code Meaning	(0008,0104)	1C	
>Mapping Resource	(0008,0105)	1C	
>Context Group Version	(0008,0106)	1C	
>Context Identifier	(0008,010f)	3	
DX Image			
Image Type	(0008,0008)	1	
Samples per Pixel	(0028,0002)	1	1
Photometric Interpretation	(0028,0004)	1	MONOCHROME1 MONOCHROME2 (If the image space configured on the destination is set to density, MONOCHROME1 is set. If the image space configured on the destination is p-values or luminance, MONOCHROME2 is set. See section 5.1.3 for more information.
Bits Allocated	(0028,0100)	1	16
Bits Stored	(0028,0101)	1	12

Attribute Name	Tag	DICOM Type	Supported Values
High Bit	(0028,0102)	1	11
Pixel Representation	(0028,0103)	1	0
Pixel Intensity Relationship	(0028,1040)	1	LOG
Pixel Intensity Relationship Sign	(0028,1041)	1	-1 if output is p-values or luminance +1 if output is density
Rescale Intercept	(0028,1052)	1	0
Rescale Slope	(0028,1053)	1	1
Rescale Type	(0028,1054)	1	US
Presentation LUT Shape	(2050,0020)	1	If FOR_PRESENTATION image, IDENTITY If FOR_PROCESSING image, INVERSE
Lossy Image Compression	(0028,2110)	1	00 = No Compression
Patient Orientation	(0020,0020)	1	
Calibration Image	(0050,0004)	3	
Burned In Annotation	(0028,0301)	1	NO
>LUT Descriptor	(0028,3002)	1C	
>LUT Explanation	(0028,3003)	3	
>LUT Data	(0028,3006)	1C	
Window Center	(0028,1050)	1C	
Window Width	(0028,1051)	1C	
Window Center & Width Explanation	(0028,1055)	3	
DX Detector			
Detector Type	(0018,7004)	2	DIRECT
Detector Configuration	(0018,7005)	3	AREA
Detector Description	(0018,7006)	3	
Detector Mode	(0018,7008)	3	
Detector ID	(0018,700A)	3	
Date of Last Detector Calibration	(0018,700C)	3	
Time of Last Detector Calibration	(0018,700E)	3	
Exposures on Detector Since Last Calibration	(0018,7010)	3	

Attribute Name	Tag	DICOM Type	Supported Values
Detector Binning	(0018,701A)	3	1\1
Detector Manufacturer Name	(0018,702A)	3	CARESTREAM VARIAN

Detector Manufacturer's Model Name	(0018,702B)	3	If (0018,702A) is CARESTREAM:
			
			DRX-1 if the scintillator is GOS
			
			DRX-1C if the scintillator is CsI
			
			DRX2530C if detector is 25x30C
			
			If (0018,702A) is VARIAN:
			
			PAXSCAN4343R

Detector Temperature	(0018,7001)	3	
Field of View Shape	(0018,1147)	3	RECTANGLE
Field of View Dimension(s)	(0018,1149)	3	
Sensitivity	(0018,6000)	3	
Detector Active Time	(0018, 7014)	3	
Imager Pixel Spacing	(0018,1164)	1	"0.139\0.139"
Detector Element Physical Size	(0018,7020)	3	
Detector Element Spacing	(0018,7022)	3	
X-Ray Collimator			
Collimator Shape	(0018,1700)	1	RECTANGULAR
ColilmatorLeftVerticalEdge	(0018,1720)	1C	
ColilmatorRightVerticalEdge	(0018,1704)	1C	
ColilmatorUpperHorizontallEdg e	(0018,1706)	1C	
ColilmatorLowerHorizontalEdg e	(0018,1780)	1C	
DX Positioning			
View Position	(0018,5101)	3	
View Code Sequence	(0054,0220)	3	Refer to Context Identifier 4010 in Addendum A for supported SNOMED Code Values
>Code Value	(0008,0100)	1C	
>Coding Scheme Designator	(0008,0102)	1C	
>Coding Scheme Version	(0008,0103)	1C	

Attribute Name	Tag	DICOM Type	Supported Values
>Code Meaning	(0008,0104)	1C	
>Mapping Resource	(0008,0105)	1C	
>Context Group Version	(0008,0106)	1C	
>Context Identifier	(0008,010f)	3	
>View Modifier Code Sequence	(0054,0222)	2	Refer to Context Identifier 4010 in Addendum A for supported SNOMED Code Values
>>Code Value	(0008,0100)	1C	
>>Coding Scheme Designator	(0008,0102)	1C	
>>Code Meaning	(0008,0104)	1C	
>>Mapping Resource	(0008,0105)	1C	
>>Context Group Version	(0008,0106)	1C	
>>Context Identifier	(0008,010f)	3	
Patient Orientation Code Sequence	(0054,0410)	3	Refer to Context Identifier 19 in Addendum A for supported SNOMED Code Values
>Code Value	(0008,0100)	1C	
>Coding Scheme Designator	(0008,0102)	1C	
>Code Meaning	(0008,0104)	1C	
>Mapping Resource	(0008,0105)	1C	
>Context Group Version	(0008,0106)	1C	
>Context Identifier	(0008,010f)	3	
>Patient Orientation Modifier Code Sequence	(0054,0412)	2	Refer to Context Identifier 20 in Addendum A for supported SNOMED Code Values
>>Code Value	(0008,0100)	1C	
>>Coding Scheme Designator	(0008,0102)	1C	
>>Code Meaning	(0008,0104)	1C	
>>Mapping Resource	(0008,0105)	1C	
>>Context Group Version	(0008,0106)	1C	
>>Context Identifier	(0008,010f)	3	
Positioner Type	(0018,1508)	2	
Positioner Primary Angle	(0018,1510)	3	DRX-Revolution only: Accuracy of ±X degrees
Positioner Secondary Angle	(0018,1511)	3	DRX-Revolution only: Accuracy of ±X degrees

Attribute Name	Tag	DICOM Type	Supported Values
Detector Primary Angle	(0018,1530)	3	DRX-Revolution only: Accuracy of ±X degrees
Detector Secondary Angle	(0018,1531)	3	DRX-Revolution only: Accuracy of ±X degrees
Column Angulation	(0018,1450)	3	DRX-Revolution only: Accuracy of ±X degrees
Table Angle	(0018,1138)	3	DRX-Revolution only: Accuracy of ±X degrees
Table Type	(0018,113A)	3	DRX-Revolution only: TILTING
X-Ray Acquisition Dose			
KVP	(0018,0060)	3	*(DRX-Ascend and DRX-Revolution* – This value is automatically populated.)
X-Ray Tube Current	(0018,1151)	3	*(DRX-Ascend and DRX-Revolution* – This value is automatically populated.)
Exposure Time	(0018,1150)	3	*(DRX-Ascend and DRX-Revolution* – This value is automatically populated.)
Exposure	(0018,1152)	3	*(DRX-Ascend and DRX-Revolution* – This value is automatically populated.)
Exposure in μAs	(0018,1153)	3	*(DRX-Ascend and DRX-Revolution* – This value is automatically populated.)
Distance Source to Detector	(0018,1110)	3	
Distance Source to Patient	(0018,1111)	3	If LLI Feature is enabled Refer to Addendum B
Image and Fluoroscopy Area Dose Product	(0018,115E)	3	*(DRX-Ascend and DRX-Revolution* – This value is automatically populated.)
Relative X-Ray Exposure	(0018,1405)	3	
Exposure Index	(0018,1411)	3	Defined in IEC 62494-1
Target Exposure Index	(0018,1412)	3	Defined in IEC 62494-1
Deviation Index	(0018,1413)	3	Defined in IEC 62494-1
Entrance Dose	(0040,0302)	3	
Exposed Area	(0040,0303)	3	
Distance Source to Entrance	(0040,0306)	3	
Anode Target Material	(0018,1191)	3	DRX-Revolution only: "TUNGSTEN"

Attribute Name	Tag	DICOM Type	Supported Values
Filter Material	(0018,7050)	3	DRX-Revolution only: "ALUMINUM", or "ALUMINUM+COPPER"
Filter Thickness Minimum	(0018,7052)	3	DRX-Revolution only: "0.94", "0.94\0.098", or "0.94\0.198"
Filter Thickness Maximum	(0018,7054)	3	DRX-Revolution only: "1.06", "1.06\0.102", or "1.06\0.202"
Rectification Type	(0018,1156)	3	DRX-Revolution only: "CONST POTENTIAL"
Exposure Index Macro			
Exposure Index	(0018,1411)	3	
Target Exposure Index	(0018,1412)	3	
Deviation Index	(0018,1413)	3	
X-Ray Filtration			
Filter Type	(0018,1160)	3	DRX-Revolution only: "NONE", "WEDGE", or "MULTIPLE"
Filter Material	(0018,7050)	3	DRX-Revolution only: "ALUMINUM", or "ALUMINUM+COPPER"
Filter Thickness Minimum	(0018,7052)	3	DRX-Revolution only: "0.94", "0.94\0.098", or "0.94\0.198"
Filter Thickness Maximum	(0018,7054)	3	DRX-Revolution only: "1.06", "1.06\0.102", or "1.06\0.202"
X-Ray Grid			
Grid	(0018,1166)	3	DRX-Revolution Tube and Grid Alignment only: "FIXED", or "NONE" Values below only apply when using Carestream Grid
Grid Absorbing Material	(0018,7040)	3	DRX-Revolution Tube and Grid Alignment only: "LEAD"
Grid Spacing Material	(0018,7041)	3	DRX-Revolution Tube and Grid Alignment only: "ALUMINUM"
Grid Thickness	(0018,7042)	3	DRX-Revolution Tube and Grid Alignment only: "1.20"

Attribute Name	Tag	DICOM Type	Supported Values
Grid Pitch	(0018,7044)	3	DRX-Revolution Tube and Grid Alignment only: "800"
Grid Aspect Ratio	(0018,7046)	3	DRX-Revolution Tube and Grid Alignment only: "6\1"
Grid Period	(0018,7048)	3	
Grid Focal Distance	(0018,704C)	3	DRX-Revolution Tube and Grid Alignment only: "1295"
Overlay Plane			Only sent if measurement tools are added to the image and the image is sent to an SCP configured as supports overlays in the DRX-1 System configuration.
Overlay Rows	(6000,0010)	1	
Overlay Columns	(6000,0011)	1	
Overlay Type	(6000,0040)	1	G = GRAPHICS
Overlay Origin	(6000,0050)	1	1/1
Overlay Bits Allocated	(6000,0100)	1	1
Overlay Bit Position	(6000,0102)	1	1
Overlay Data	(6000,3000)	1	
VOI LUT			
VOI LUT Sequence	(0028,3010)	3	
>LUT Descriptor	(0028,3002)	1C	
>LUT Explanation	(0028,3003)	1C	
>LUT Data	(0028,3006)	1C	
Window Center	(0028,1050)	1C	2048
Window Width	(0028,1051)	1C	4096
Acquisition Context			
Acquisition Context Sequence	(0040,0555)	2	Empty Sequence
SOP Common			
SOP Class UID	(0008,0016)	1	
SOP Instance UID	(0008,0018)	1	
Specific Character Set	(0008,0005)	1C	

3.5.2 Computed Radiography Image Storage

The DRX-1 System provides standard conformance to the Computed Radiography Image Storage SOP Class as an SCU.

Table 3.13 Computed Radiography Image SOP Class

SOP Class	SOP Class UID
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1

Table 3.14 Computed Radiography Image SOP Class – Supported Attributes

Attribute Name	Tag	DICOM Type	Supported Values
Patient Module			
Patient Name	(0010,0010)	2	Refer to Addendum B
Patient ID	(0010,0020)	2	Refer to Addendum B
Patient Birth Date	(0010,0030)	2	Refer to Addendum B
Patient Sex	(0010,0040)	2	Refer to Addendum B
Patient Birth Time	(0010,0032)	3	
Other Patient IDs	(0010,1000)	3	This value will be sent only if it has been received from the DICOM modality work list (MWL).
Other Patient Names	(0010,1001)	3	This value will be sent only if it has been received from the DICOM modality work list (MWL).
Ethnic Group	(0010,2160)	3	This value will be sent only if it has been received from the DICOM modality work list (MWL).
Patient Comments	(0010,4000)	3	Refer to Addendum B
General Study			
Study Instance UID	(0020,000D)	1	
Study Date	(0008,0020)	2	Refer to Addendum B
Study Time	(0008,0030)	2	Refer to Addendum B
Referring Physician Name	(0008,0090)	2	Refer to Addendum B
Study ID	(0020,0010)	2	
Accession Number	(0008,0050)	2	Refer to Addendum B
Study Description	(0008,1030)	3	Refer to Addendum B
Referenced Study Sequence	(0008,1110)	3	

Attribute Name	Tag	DICOM Type	Supported Values
>Referenced SOP Class UID	(0008,1150)	1C	
>Referenced SOP Instance UID	(0008,1155)	1C	
Procedure Code Sequence	(0008,1032)	3	
> Code Value	(0008,0100)	1C	Refer to Addendum B
> Coding Scheme Designator	(0008,0102)	1C	
> Coding Scheme Version	(0008,0103)	1C	
> Code Meaning	(0008,0104)	1C	
Patient Study			
Admitting Diagnoses Description	(0008,1080)	3	
Patient's Age	(0010,1010)	3	Refer to Addendum B
Patient's Size	(0010,1020)	3	
Patient's Weight	(0010,1030)	3	
Occupation	(0010,2180)	3	
Additional Patient's History	(0010,21B0)	3	
General Series			
Modality	(0008,0060)	1	CR
Series Instance UID	(0020,000E)	1	
Series Number	(0020,0011)	2	
Laterality	(0020,0060)	2C	L R
Series Date	(0008,0021)	3	
Protocol Name	(0008,1030)	3	
Series Time	(0008,0031)	3	
Operator Name	(0008,1070)	3	Refer to Addendum B
Performed Procedure Step Start Date	(0040,0244)	3	
Performed Procedure Step Start Time	(0040,0245)	3	
Performed Procedure Step ID	(0040,0253)	3	
Performed Procedure Step Description	(0040,0254)	3	Refer to Addendum B
Performed Protocol Code Sequence	(0040,0260)	3	
>Code Value	(0008,0100)	1C	

Attribute Name	Tag	DICOM Type	Supported Values
>Coding Scheme Designator	(0008,0102)	1C	
>Coding Scheme Version	(0008,0103)	1C	
>Code Meaning	(0008,0104)	1C	
Request Attributes Sequence	(0040,0275)	3	
>Requested Procedure Description	(0032,1060)	3	Refer to Addendum B
>Scheduled Procedure Step Description	(0040,0007)	3	Refer to Addendum B
>Scheduled Protocol Code Sequence	(0040,0008)	3	
>> Code Value	(0008,0100)	1C	Refer to Addendum B
>> Coding Scheme Designator	(0008,0102)	1C	
>> Coding Scheme Version	(0008,0103)	1C	
>> Code Meaning	(0008,0104)	1C	Refer to Addendum B
>Scheduled Procedure Step ID	(0040,0009)	1C	
>Requested Procedure ID	(0040,1001)	1C	Refer to Addendum B
CR Series			
Body Part Examined	(0018,0015)	2	
View Position	(0018,5101)	2	
General Equipment			
Manufacturer	(0008,0070)	2	Carestream Health
Institution Name	(0008,0080)	3	For this value to be populated and sent, the *DRX-1 System* user needs to enter the value on the *Delivery Preferences* screen.
Institution Address	(0008,0081)	3	For this value to be populated and sent, the *DRX-1 System* user needs to enter the value on the *Delivery Preferences* screen.
Station Name	(0008,1010)	3	
Institutional Department Name	(0008,1040)	3	Refer to Addendum B
Manufacturer Model Name	(0008,1090)	3	DRX-1
Device Serial Number	(0018,1000)	3	
Software Versions	(0018,1020)	3	
General Image			

Attribute Name	Tag	DICOM Type	Supported Values
Instance Number	(0020,0013)	2	
Patient Orientation	(0020,0020)	2C	
Image Type	(0008,0008)	3	
Content Date	(0008,0023)	2C	
Content Time	(0008,0033)	2C	
Acquisition Date	(0008,0022)	3	
Acquisition Time	(0008,0032)	3	
Derivation Description	(0008,2111)	3	
Acquisition Number	(0020,0012)	3	
Images In Acquisition	(0020,1002)	3	
Image Comments	(0020,4000)	3	Refer to Addendum B
Lossy Image Compression	(0028,2110)	3	00 = No Compression
Image Plane			
Pixel Spacing	(0028,0030)	3	"0.139\0.139"
Image Pixel			
Samples per Pixel	(0028,0002)	1	1
Photometric Interpretation	(0028,0004)	1	MONOCHROME1 MONOCHROME2 (If the image space configured on the destination is set to density, MONOCHROME1 is set. If the image space configured on the destination is p-values or luminance, MONOCHROME2 is set. See section 5.1.3 for more information.
Planar Configuration	(0028,0006)	1C	

Attribute Name	Tag	DICOM Type	Supported Values
Rows	(0028,0010)	1	Max Value for a DRX-1 (GOS) is 3056 Max Value for a DRX-1C (CsI) is 3032 Max Value for a V4343R is 3024 Max Value for a DRX2530C is 2136 (if the user crops the image, the supported rows value may be less than max value. Some auto-cropping will take place if Black Surround is enabled and the DR image is going to a store device.)
Columns	(0028,0011)	1	Max Value for a DRX-1 (GOS) is 2544 Max Value for a DRX-1C (CsI) is 2520 Max Value for a V4343R is 3024 Max Value for a DRX2530C is 1752 (if the user crops the image, the supported columns value may be less than max value. Some auto-cropping will take place if Black Surround is enabled and the DR image is going to a store device.)
Pixel Aspect Ratio	(0028,0034)	1C	
Bits Allocated	(0028,0100)	1	16
Bits Stored	(0028,0101)	1	12
High Bit	(0028,0102)	1	11
Pixel Representation	(0028,0103)	1	0
Smallest Image Pixel Value	(0028,0106)	1	0
Largest Image Pixel Value	(0028,0107)	1	4095
Pixel Data	(7FE0,0010)	1	
CR Image			
KVP	(0018,0060)	3	*(DRX-Ascend and DRX-Revolution* – This value is automatically populated.)
Plate ID	(0018,1004)	3	
Distance Source to Detector	(0018,1110)	3	Refer to Addendum B

Attribute Name	Tag	DICOM Type	Supported Values
Distance Source to Patient	(0018,1111)	3	If LLI Feature is enabled Refer to Addendum B
Exposure	(0018,1152)	3	*(DRX-Ascend and DRX-Revolution* – This value is automatically populated.)
Exposure in µAs	(0018,1153)	3	*(DRX-Ascend and DRX-Revolution* – This value is automatically populated.)
Imager Pixel Spacing	(0018,1164)	3	"0.139\0.139"
Relative X-Ray Exposure	(0018,1405)	3	0 to 4095
Exposure Index	(0018,1411)	3	
Target Exposure Index	(0018,1412)	3	
Deviation Index	(0018,1413)	3	
Sensitivity	(0018,6000)	3	
Contrast/Bolus			
Contrast/Bolus Agent	(0018,0010)	2	Refer to Addendum B
Overlay Plane			Only sent if measurement tools are added to the image and the image is sent to an SCP configured as supports overlays in the DRX-1 System configuration.
Overlay Rows	(6000,0010)	1	
Overlay Columns	(6000,0011)	1	
Overlay Type	(6000,0040)	1	G = GRAPHICS
Overlay Origin	(6000,0050)	1	1/1
Overlay Bits Allocated	(6000,0100)	1	1
Overlay Bit Position	(6000,0102)	1	1
Overlay Data	(6000,3000)	1	
VOI LUT			
VOI LUT Sequence	(0028,3010)	3	
>LUT Descriptor	(0028,3002)	1C	
>LUT Explanation	(0028,3003)	1C	
>LUT Data	(0028,3006)	1C	
Window Center	(0028,1050)	1C	2048
Window Width	(0028,1051)	1C	4096
SOP Common			
SOP Class UID	(0008,0016)	1	

Attribute Name	Tag	DICOM Type	Supported Values
SOP Instance UID	(0008,0018)	1	
Specific Character Set	(0008,0005)	1C	

3.5.3 Grayscale Softcopy Presentation State IOD

The *DRX-1 System* provides standard conformance to the Grayscale Softcopy Presentation State Storage SOP Class as an SCU.

Table 3.15   Grayscale Softcopy Presentation State SOP Class

SOP Class	SOP Class UID
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1

Table 3.16   Grayscale Softcopy Presentation State SOP Class Attributes

Attribute Name	Tag	DICOM Type	Supported Values
Patient Module			
Patient Name	(0010,0010)	2	Refer to Addendum B
Patient ID	(0010,0020)	2	Refer to Addendum B
Patient Birth Date	(0010,0030)	2	Refer to Addendum B
Patient Sex	(0010,0040)	2	Refer to Addendum B
Patient Birth Time	(0010,0032)	3	
Other Patient IDs	(0010,1000)	3	This value will be sent only if it has been received from the DICOM modality work list (MWL).
Other Patient Names	(0010,1001)	3	This value will be sent only if it has been received from the DICOM modality work list (MWL).
Ethnic Group	(0010,2160)	3	This value will be sent only if it has been received from the DICOM modality work list (MWL).
Patient Comments	(0010,4000)	3	Refer to Addendum B
General Study			
Study Instance UID	(0020,000D)	1	
Study Date	(0008,0020)	2	Refer to Addendum B
Study Time	(0008,0030)	2	Refer to Addendum B
Referring Physician Name	(0008,0090)	2	Refer to Addendum B
Study ID	(0020,0010)	2	

Attribute Name	Tag	DICOM Type	Supported Values
Accession Number	(0008,0050)	2	Refer to Addendum B
Study Description	(0008,1030)	3	Refer to Addendum B
Referenced Study Sequence	(0008,1110)	3	
>Referenced SOP Class UID	(0008,1150)	1C	
>Referenced SOP Instance UID	(0008,1155)	1C	
Procedure Code Sequence	(0008,1032)	3	Refer to Addendum B
> Code Value	(0008,0100)	1C	
> Coding Scheme Designator	(0008,0102)	1C	
> Coding Scheme Version	(0008,0103)	1C	
> Code Meaning	(0008,0104)	1C	
Patient Study			
Admitting Diagnoses Description	(0008,1080)	3	
Patient's Age	(0010,1010)	3	Refer to Addendum B
Patient's Size	(0010,1020)	3	
Patient's Weight	(0010,1030)	3	
Occupation	(0010,2180)	3	
Additional Patient's History	(0010,21B0)	3	
General Series			
Modality	(0008,0060)	1	PR
Series Instance UID	(0020,000E)	1	
Series Number	(0020,0011)	2	
Laterality	(0020,0060)	2C	L R Refer to Addendum B
Series Date	(0008,0021)	3	
Protocol Name	(0008,1030)	3	
Series Time	(0008,0031)	3	
Operator Name	(0008,1070)	3	Refer to Addendum B
Performed Procedure Step Start Date	(0040,0244)	3	Refer to Addendum B
Performed Procedure Step Start Time	(0040,0245)	3	Refer to Addendum B
Performed Procedure Step ID	(0040,0253)	3	

Attribute Name	Tag	DICOM Type	Supported Values
Performed Procedure Step Description	(0040,0254)	3	Refer to Addendum B
Request Attributes Sequence	(0040,0275)	3	
>Requested Procedure Description	(0032,1060)	3	
>Scheduled Procedure Step Description	(0040,0007)	3	
>Scheduled Protocol Code Sequence	(0040,0008)	3	
>> Code Value	(0008,0100)	1C	
>> Coding Scheme Designator	(0008,0102)	1C	
>> Coding Scheme Version	(0008,0103)	1C	
>> Code Meaning	(0008,0104)	1C	
>Scheduled Procedure Step ID	(0040,0009)	1C	
>Requested Procedure ID	(0040,1001)	1C	Refer to Addendum B
Presentation Series			
Modality	(0008,0060)	1	
View Position	(0018,5101)	2	
General Equipment			
Manufacturer	(0008,0070)	2	Carestream Health
Institution Name	(0008,0080)	3	For this value to be populated and sent, the *DRX-1 System* user needs to enter the value on the *Delivery Preferences* screen.
Institution Address	(0008,0081)	3	For this value to be populated and sent, the *DRX-1 System* user needs to enter the value on the *Delivery Preferences* screen.
Station Name	(0008,1010)	3	
Institutional Department Name	(0008,1040)	3	Refer to Addendum B
Manufacturer Model Name	(0008,1090)	3	DRX-1
Device Serial Number	(0018,1000)	3	
Software Versions	(0018,1020)	3	
Presentation State			
Instance Number	(0020,0013)	1	

Attribute Name	Tag	DICOM Type	Supported Values
Content Label	(0070,0080)	1	
Content Description	(0070,0081)	2	
Presentation Creation Date	(0070,0082)	1	
Presentation Creation Time	(0070,0083)	1	
Content Creator's Name	(0070,0084)	2	
Reference Series Sequence	(0008,1115)	1	
> Series Instance UID	(0020,000E)	1	
> Referenced Image Sequence	(0008,1140)	1	
>> Referenced SOP Class UID	(0008,1150)	1	
>> Referenced SOP Instance UID	(0008,1155)	1	
>> Referenced Frame Number	(0008,1160)	1	
Shutter Presentation Value	(0018,1622)	1C	
Display Shutter			
Shutter Shape	(0018,1600)	1	POLYGONAL
Vertices of the Polygonal Shutter	(0018,1620)	1C	
Shutter Presentation Value	(0018,1622)	3	
Overlay Plane			
Overlay Rows	(60xx,0010)	1	
Overlay Columns	(60xx,0011)	1	
Overlay Type	(60xx,0040)	1	
Overlay Origin	(60xx,0050)	1	
Overlay Bits Allocated	(60xx,0040)	1	
Overlay Bit Position	(60xx,0102)	1	
Overlay Data	(60xx,3000)	1C	
Displayed Area			
Displayed Area Selection Sequence	(0070,005A)	1	
> Referenced Image Sequence	(0008,1140)	1C	
> > Referenced SOP Class UID	(0008,1150)	1C	
>> Referenced SOP Instance UID	(0008,1155)	1C	

Attribute Name	Tag	DICOM Type	Supported Values
>> Referenced Frame Number	(0008,1160)	1C	
> Displayed Area Top Left Hand Corner	(0070,0052)	1	
> Displayed Area Bottom Hand Corner	(0070,0053)	1	
> Presentation Size Mode	(0070,0100)	1	
> Presentation Pixel Spacing	(0070,0101)	1C	
> Presentation Pixel Aspect Ratio	(0070,0102)	1C	
Spatial Transformation			
Image Rotation	(0070,0042)	1	Always 0 (no rotation)
Image Horizontal Flip	(0070,0041)	1	Always N (no flip)
Softcopy VOI LUT			
Softcopy VOI LUT Sequence	(0028,3110)	1	
> Referenced Image Sequence	(0008,1140)	1C	
>> Referenced SOP Class UID	(0008,1150)	1C	
>> Referenced SOP Instance UID	(0008,1155)	1C	
>> Referenced Frame Number	(0008,1160)	1C	
> VOI LUT Sequence	(0028,3010)	1C	
>> LUT Descriptor	(0028,3002)	1C	
>> LUT Explanation	(0028,3003)	3	
>> LUT Data	(0028,3006)	1C	
> Window Center	(0028,1050)	1C	
> Window Width	(0028,1051)	1C	
Softcopy Presentation LUT			
Presentation LUT Sequence	(2050,0010)	1C	
Presentation LUT Shape	(2050,0020)	1C	
SOP Common			
SOP Class UID	(0008,0016)	1	
SOP Instance UID	(0008,0018)	1	

Attribute Name	Tag	DICOM Type	Supported Values
Specific Character Set	(0008,0005)	1C	

3.6   Basic Work List Service

The C-FIND request for a Modality Work List sends an Identifier object that contains all the attributes of the Modality Work List Information Model. Table 3.17 shows the Matching Key attributes that may optionally contain a non-NULL value in the request.

Table 3.17   Matching Key Attributes

Attribute name	Tag
Accession Number	(0008,0050)
Modality	(0008,0060)
Patient's Name	(0010,0010)
Patient ID	(0010,0020)
Scheduled Station AE Title	(0040,0001)
Scheduled Procedure Step Start Date	(0040,0002)
Scheduled Procedure Step Start Time	(0040,0003)
Requested Procedure ID	(0040,0101)
Scheduled Station Name	(0040,0010)

This is intended to produce a series of responses from the Work List SCP for all matching Scheduled Procedures on the said Station.

The system can be configured to send this request periodically at an interval of 1 to 720 minutes. The user may also issue a non-periodic C-FIND request to obtain information for a patient recently added by the site's information system.

3.6.1   Modality Work List IOD

The *DRX-1 System* provides standard conformance to the Modality Work List Information Model – FIND SOP Class as an SCU.

For additional information on the Modality Work List Information Model, refer to the DICOM specification, Part 4, Table K.6-1. The *DRX-1 System* will accept any valid character set for the Specific Character Set attribute (0008,0005).

Table 3.18   Modality Work List SOP Class

SOP Class	SOP Class UID

Table 3.19   Modality Work List SOP Class – Required Attributes

Attribute Name	Tag	Matching Key
SOP Common		
SOP Class UID	(0008,0016)	
SOP Instance UID	(0008,0018)	
Specific Character Set	(0008,0005)	
Scheduled Procedure Step		
Scheduled Procedure Step Sequence	(0040,0100)	Required
> Scheduled Station AE Title	(0040,0001)	Required
> Scheduled Procedure Step Start Date	(0040,0002)	Required
> Scheduled Procedure Step Start Time	(0040,0003)	Required
> Modality	(0008,0060)	Required
>Requested Contrast Agent	(0032,1070)	
> Scheduled Performing Physician's Name	(0040,0006)	Required
>Scheduled Procedure Step Description	(0040,0007)	
>Scheduled Station Name	(0040,0010)	
>Scheduled Protocol Code Sequence	(0040,0008)	
>>Code Value	(0008,0100)	
>>Coding Scheme Designator	(0008,0102)	
>>Code Meaning	(0008,0104)	
>Scheduled Procedure Step ID	(0040,0009)	
Requested Procedure		
Requested Procedure ID	(0040,1001)	
Requested Procedure Description	(0032,1060)	
Requested Procedure Code Sequence	(0032,0164)	

Attribute Name	Tag	Matching Key
>Code Value	(0008,0100)	
>Coding Scheme Designator	(0008,0102)	
>Code Meaning	(0008,0104)	
Study Instance UID	(0020,000D)	
Referenced Study Sequence	(0008,1110)	
>Referenced SOP Class UID	(0008,1150)	
>Referenced SOP Instance UID	(0008,1155)	
Requested Procedure Priority	(0040,1003)	
Requested Procedure Location	(0040,1005)	
Imaging Service Request		
Referring Physicians Name	(0008,0090)	
Accession Number	(0008,0050)	
Requesting Service	(0032,1033)	
Visit Status		
Visit Status ID	(0038,0008)	
Patient's Institution Residence	(0038,0400)	
Patient Identification		
Patient's Name	(0010,0010)	
Patient ID	(0010,0020)	
Other Patient Ids*	(0010,1000)	
Other Patient Names	(0010,1001)	
Patient Demographic		
Patient's Birth Date	(0010,0030)	
Patient's Birth Time	(0010,0032)	
Patient's Sex	(0010,0040)	
Patient's Age	(0010,1010)	
Patient's Size	(0010,1020)	
Patient's Weight	(0010,1030)	
Ethnic Group	(0010,2160)	
Occupation	(0010,2180)	

Attribute Name	Tag	Matching Key
Patient Medical		
Additional Patient's History	(0010,21B0)	

* Accepts only one value (the first value) from the Modality Work List with a maximum length of 64 characters

3.6.2 Procedure Mapping

The procedure mapping feature of the *DRX-1 System* automatically builds the image icons and pre-populates fields such as body/part and projections from information supplied by the key operator. This eliminates the need for the technologists to supply this information for every image created.

For the procedure mapping to function properly the *DRX-1 System* must receive the correct code in any of the following:

- Code value (0008,0100) element of the requested procedure code sequence (0032,1064) – this is the factory default

- Requested procedure ID (0040, 1001)

- Code value (0008,0100) element of the performed code sequence (0040,0008) of the scheduled procedure step sequence (0040, 0100)

3.7 Modality Performed Procedure Step Notification SOP Class

The Modality Performed Procedure Step (MPPS) commands N-CREATE and N-SET will be sent to the HIS/RIS or PACS by the *DRX-1 System* operator to signal the start and end of a study, respectively.

3.7.1 Modality Performed Procedure Step Notification IOD

The *DRX-1 System* provides standard conformance to the Modality Performed Procedure Step SOP Class as an SCU.

Table 3.20   Modality Performed Procedure Step SOP Class

SOP Class	SOP Class UID
Modality Performed Procedure Step Notification	1.2.840.10008.3.1.2.3.5

Table 3.21   Modality Performed Procedure Step Attributes

Attribute Name	Tag	DICOM Type	Supported Values

Attribute Name	Tag	DICOM Type	Supported Values
SOP Common			
SOP Class UID	(0008,0016)	1	
SOP Instance UID	(0008,0018)	1	
Specific Character Set	(0008,0005)	1C	
Performed Procedure Step Relationship			
Patient Name	(0010,0010)	2	
Patient ID	(0010,0020)	2	
Patient Birth Date	(0010,0030)	2	
Patient Sex	(0010,0040)	2	
Scheduled Step Attribute Sequence	(0040,0270)	1	
> Study Instance UID	(0020,000D)	1	
> Referenced Study Sequence	(0008,1110)	2	
>> Referenced SOP Class UID	(0008,1150)	1C	
>> Referenced SOP Instance UID	(0008,1155)	1C	
> Accession Number	(0008,0050)	2	
> Requested Procedure ID	(0040,1001)	2	
> Requested Procedure Description	(0032,1060)	2	
> Scheduled Procedure Step ID	(0040,0009)	2	
> Scheduled Procedure Step Description	(0040,0007)	2	
> Scheduled Protocol Code Sequence	(0040,0008)	2	
>> Code Value	(0008,0100)	1C	
>> Coding Scheme Designator	(0008,0102)	1C	
>> Coding Scheme Version	(0008,0103)	3	
>> Code Meaning	(0008,0104)	3	
Referenced Patient Sequence	(0008,1120)	2	Empty Sequence
Performed Procedure Step Information			
Performed Procedure Step ID	(0040,0253)	1	

Attribute Name	Tag	DICOM Type	Supported Values
Performed Station AE Title	(0040,0241)	1	
Performed Station Name	(0040,0242)	2	
Performed Location	(0040,0243)	2	
Performed Procedure Step Start Date	(0040,0244)	1	
Performed Procedure Step Start Time	(0040,0245)	1	
Performed Procedure Step Status	(0040,0252)	1	
Performed Procedure Step Description	(0040,0254)	2	
Performed Procedure Type Description	(0040,0255)	2	
Procedure Code Sequence	(0008,1032)	2	
> Code Value	(0008,0100)	1C	
> Coding Scheme Designator	(0008,0102)	1C	
> Code Meaning	(0008,0104)	3	
Performed Procedure Step End Date	(0040,0250)	2	
Performed Procedure Step End Time	(0040,0251)	2	
Image Acquisition Results			
Modality	(0008,0060)	1	
Study ID	(0020,0010)	3	
Performed Protocol Code Sequence	(0040,0260)	2	
> Code Value	(0008,0100)	1C	
> Coding Scheme Designator	(0008,0102)	1C	
> Code Meaning	(0008,0104)	3	
Performed Series Sequence	(0040,0340)	2	
> Performing Physician's Name	(0008,1050)	2C	
> Protocol Name	(0008,1050)	1C	
> Operator's Name	(0008,1070)	2C	
> Series Instance UID	(0020,000E)	1C	

Attribute Name	Tag	DICOM Type	Supported Values
> Series Description	(0008,103E)	2C	
> Retrieve AE Title	(0008,0054)	2C	
> Referenced Image Sequence	(0008,1140)	2C	
>> Referenced SOP Class UID	(0008,1150)	1C	
>> Referenced SOP Instance UID	(0008,1155)	1C	
Radiation Dose			
Anatomic Structure Sequence	(0008,2229)		Refer to Context Identifier 4031 in Addendum A for supported SNOMED Code Values
>Code Value	(0008,0100)		
>Coding Scheme Designator	(0008,0102)		
>Coding Scheme Version	(0008,0103)		
>Code Meaning	(0008,0104)		
>Mapping Resource	(0008,0105)		
>Context Group Version	(0008,0106)		
>Context Identifier	(0008,010f)		
Total Number of Exposures	(0040,0301)		
Distance Source to Detector	(0018,1110)		
Distance Source to Entrance	(0040,0306)		
Entrance Dose	(0040,0302)		
Entrance Dose in mGy	(0040,8302)		
Exposed Area	(0040,0303)		
Image Dose Product	(0018,115E)		
Exposure Dose Sequence	(0040,030E)		
>Radiation Mode	(0018,115A)		
>KVp	(0018,0060)		
>X-ray Tube Current in uA	(0018,8151)		
>Exposure Time	(0018,1150)		

3.8   Storage Commitment Push Model SOP Class

The *DRX-1 System* provides standard conformance to the Storage Commitment Push Model SOP Class as an SCU.

Table 3.22   Storage Commitment SOP Class

SOP Class	SOP Class UID
Storage Commitment Push Model	1.2.840.10008.1.20.1

The SCPM N-Action command is sent by the *DRX-1 System* at the end of a storage session or at a separate session if configured to do so. The Storage Commitment N-Event-Report is received and processed anytime providing the Port Number is configured correctly between the *DRX-1 System* and the Storage SCP.

3.8.1   DIMSE Service N-ACTION

The *DRX-1 System* uses the N-ACTION to instruct the Storage SCP to commit the images of the study.

3.8.1.1 Storage Commitment N-ACTION IOD

Table 3.23   Storage Commitment N-ACTION Attributes

Attribute	Tag
Transaction UID	(0008,1195)
Referenced SOP Sequence	(0008,1199)
>Referenced SOP Class UID	(0008,1150)
> Referenced SOP Instance UID	(0008,1155)

3.8.2   DIMSE Service N-EVENT-REPORT

The *DRX-1 System* will process the indication of the N-EVENT-REPORT from the Storage Commitment operation. Table 3.24 lists the attributes that are processed by the DR.

3.8.1.1 Storage Commitment N-EVENT-REPORT IOD

Table 3.24   Storage Commitment N-EVENT-REPORT Attributes

Attribute	Tag
Transaction UID	(0008,1195)
Failed SOP Sequence*	(0008,1198)
> Referenced SOP Class UID	(0008,1150)
> Referenced SOP Instance UID	(0008,1155)
> Failure Reason	(0008, 1197)
Referenced SOP Sequence	(0008,1199)
> Referenced SOP Class UID	(0008,1150)
> Referenced SOP Instance UID	(0008,1155)

* For Event Type ID 2 only.

3.9 Priors

The Priors feature will send separate C-FIND and C-MOVE commands N- to the PACS to request a list of studies/images for a given patient, and to them request the transfer of those images respectively.

3.9.1 DICOM Query C-FIND

SOP Class	SOP Class UID
Study Root Query Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.2.1

Study Level Key Attributes (C-Find):
First we look for studies that we might be interested in.

Attribute Name	Tag	Value
Specific Character Set *e.g. ISO_IR 100, GB18030*	*(0008,0005)*	*Used by the device to properly decode DICOM fields subject to this value, e.g. Patient Name.*
Study Date	(0008,0020)	We populate this field with the date range of interest in the format: yyyyMMdd-yyyyMMdd. This is a required field by the DICOM standard. We expect matching to occur on this field. i.e. We expect any C-Find response to have study dates within this range.
Study Time	(0008,0030)	We populate this field with an empty string. This is a required field by the DICOM standard, so this should be filled in by the PACS in the response. If not filled in, we can still handle this.
Accession Number	(0008,0050)	We populate this field with an empty string. This is a required field by the DICOM standard, so this should be filled in by the PACS in the response. We do not currently use this field.
Query/Retrieve Level	(0008,0052)	We populate this field with: "STUDY"
Patient Name	(0010,0010)	We fill this field with the Patient's Last Name + '*' (wild card). e.g. If the Patient's Last Name is Smith, we fill this value with "Smith*". This is a required field by the DICOM standard, and it is expected that the PACS will match on this value.
Patient Id	(0010,0020)	We fill this field with the Patient Id. This is a required field by the DICOM standard, and it is expected that the PACS will match on this value.
Patient's Birth Date	(0010,0030)	This is an optional tag by the DICOM standard. We will only pass this tag if the "Date of Birth" must match checkbox is checked on the Key Op Configuration for priors. If we pass this tag, we fill this in the patient's birth date. We will then look at the value in the response returned to see if it matches the patient's birth date. A device could treat this as a matching field.
Study Instance UID	(0020,000D)	This is defined as a "Unique Key" by the DICOM standard. In this case, this uniquely identifies an instance of a study. We populate this field with an empty string. The PACS will fill in this value in the response.

Study Id	(0020,0010)	We populate this field with an empty string. This is a required field by the DICOM standard, so this should be filled in by the PACS in the response.
Modalities in Study	(0008,0061)	We populate this field with an empty string. This is an optional tag by the DICOM standard. If supported by the PACS, the PACS will return the list of modalities used in the study.
Study Description	(0008,1030)	We populate this field with an empty string. This is an optional tag by the DICOM standard. If supported by the PACS, the PACS will return the list of modalities used in the study.

<u>Series Level Key Attributes (C-Find):</u>
From the list of matching studies found, we look for matching series.

Attribute Name	Tag	Value
Specific Character Set e.g. ISO_IR 100, GB18030	(0008,0005)	Used by the device to properly decode DICOM fields subject to this value, e.g. Patient Name.
Modality	(0008,0060)	We populate this field with an empty string. This is a required field by the DICOM standard, so this should be filled in by the PACS in the response. The returned value is then used to determine whether this series is associated with one of the modalities that we are configured to retrieve priors for. If so, we will continue to query on this series. If not, we won't.
Query/Retrieve Level	(0008,0052)	We populate this field with "SERIES".
Body Part Examined	(0018,0015)	We populate this field with an empty string. This is an optional tag by the DICOM standard, but the prior image retrieval feature will not work optimally if this tag is not supported. If returned by the PACS, this tag is used to determine if this series is for the body part that we are interested in. If this field is empty or not returned we will treat this as a body part match even though we really don't know if it is.
Patient Position	(0018,5100)	We populate this field with an empty string. This is an optional tag by the DICOM standard. If supported by the PACS, the PACS will return the Patient Position.
View Position	(0018,5101)	We populate this field with an empty string. This is an optional tag by the DICOM standard. If supported by the PACS, the PACS will return the View Position. If this series is retrieved, the view position value will be used for determining how well the prior matches the image for which it was retrieved. It will also be displayed with the Body Part on the Prior Information Panel.
Study Instance UID	(0020,000D)	This is the Study Instance UID returned in the Study Level C-Find command. This value is treated as a matching value. The PACS will only return responses to this query that match this Study Instance UID.
Series Instance UID	(0020,000E)	This is defined as a "Unique Key" by the DICOM standard. In this case, this uniquely identifies an instance of a series. We populate this field with an empty string. The PACS will fill in this value in the response.
Series Number	(0020,0011)	We populate this field with an empty string. This is a required field

Attribute Name	Tag	Value
		by the DICOM standard, so this should be filled in by the PACS in the response. This is used to help us determine which series record is most recent.
Series Description	(0008,103E)	We populate this field with an empty string. This is an optional tag by the DICOM standard. If supported by the PACS, the PACS will return the list of modalities used in the study.

<u>Image Level Key Attributes (C-Find):</u>
From the list of matching series, we look for matching images.

Attribute Name	Tag	Value
Specific Character Set e.g. ISO_IR 100, GB18030	(0008,0005)	Used by the device to properly decode DICOM fields subject to this value, e.g. Patient Name.
Query/Retrieve Level	(0008,0052)	We populate this field with "IMAGE".
Study Instance UID	(0020,000D)	This is the Study Instance UID returned in the Study Level C-Find command. This value is treated as a matching value. The PACS will only return responses to this query that match this Study Instance UID.
Series Instance UID	(0020,000E)	This is the Series Instance UID returned in the Series Level C-Find command. This value is treated as a matching value. The PACS will only return responses to this query that match this Series Instance UID.
SOP Instance UID	(0008,0018)	This is defined as a "Unique Key" by the DICOM standard. In this case, this uniquely identifies an instance of an image. We populate this field with an empty string. The PACS will fill in this value in the response.
Acquisition Date	(0008,0022)	We populate this field with an empty string. This is an optional tag by the DICOM standard. If supported by the PACS, the PACS will return the acquisition date of the image.
Acquisition Time	(0008,0032)	We populate this field with an empty string. This is an optional tag by the DICOM standard. If supported by the PACS, the PACS will return the acquisition time of the image.
Instance Number	(0020,0013)	We populate this field with an empty string. This is a required field by the DICOM standard, so this should be filled in by the PACS in the response. This is used to help us determine which image record is most recent.
SOP Class UID	(0008,0016)	We populate this field with an empty string. This is an optional tag by the DICOM standard. If supported by the PACS, the PACS will return the SOP Class UID of the image. This helps us to determine whether or not we are interested in this image. Perhaps this is a type of image that we do not support, e.g. Secondary Capture.

3.9.2 DICOM Retrieve C-MOVE

SOP Class	SOP Class UID
Study Root Query Retrieve Information Model - MOVE	1.2.840.10008.5.1.4.1.2.2.2

From the list of matching images, will send a C-MOVE command for each image:

Description	Tag	Usage
Query/Retrieve Level	(0008,0052)	"IMAGE"
Study Instance UID	(0020,000D)	Study Instance UID associated with this image.
Series Instance UID	(0020,000E)	Series Instance UID associated with this image.
SOP Instance UID	(0008,0018)	SOP Instance UID that uniquely identifies this image.

Act as a Store SCP for the following Store Services:

SOP Class	UID	Transfer Syntax Name	Transfer Syntax UID	Role
Computed Radiography Image Storage SOP Class UID	1.2.840.10008.5.1.4.1.1.1	Implicit VR Little Endian (Default Transfer Syntax for DICOM)	1.2.840.10008.1.2	SCP
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1	Implicit VR Little Endian (Default Transfer Syntax for DICOM)	1.2.840.10008.1.2	SCP
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP
Digital X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.1	Implicit VR Little Endian (Default Transfer Syntax for DICOM)	1.2.840.10008.1.2	SCP
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP
Digital Mammography Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.2	Implicit VR Little Endian (Default Transfer Syntax for DICOM)	1.2.840.10008.1.2	SCP
		Explicit VR Little Endian	1.2.840.10008.1.2.1	

4   Communication Profiles

4.1   Supported Communications Stacks

The *DRX-1 System* provides TCP/IP Network Communication Support as defined in Part 8 of the DICOM standard.

The *DRX-1 System* normally issues a network echo prior to delivering a job to a qualified DICOM Print or DICOM Store destination to ensure that the device is active.

4.2   Physical Media Support

The *DRX-1 System* supports Ethernet with the following physical connectors:

- Unshielded Twisted pair (10BaseT, 100BaseT and 1000BaseT).

- DRX-Revolution, DRX-Mobile and DRX-Transportable provide an additional 802.11a/b/g wireless network interface.

5   Extensions/Specializations/Privatizations

Tables 5.1 and 5.2 list a number of extensions to the DICOM Store Service Class, which the *DRX-1 System* supports. The extensions are all optional attributes.

5.1   Computed Radiography IOD

5.1.1   Specialization of Pixel Spacing

The *DRX-1 System* optionally allows the Pixel Spacing (0028,0030) attribute to be used from the Image Plane Module. This is done to support workstations that incorrectly use this field rather than Imager Pixel Spacing (0018,1164), as defined in the DICOM standard. If this field is used, the actual size of any objects displayed on the workstation (scales, etc.) may be in error.

5.1.2   Alternate Image Display Spaces

In addition to supporting P-Values (DICOM Grayscale Display Function perceptually linear output), the DRX-1 Systems also support the following display spaces:

- **Density**

    Pixel data is linearly related to optical film density. With a photometric interpretation of MONOCHROME1, a value of 0 represents minimum density and a value of 4095 represents maximum density.

- **Luminance**

Pixel data is perceptually linear in brightness according to a proprietary model of the human visual system response developed by Kodak. Despite the name used, the pixel data is not linearly related to luminance or log luminance.

This option should only be used in support of legacy Kodak display products.

The *DRX-1 System* supports the use of the Density, Luminance or P-Value display spaces with the CR IOD, DX IOD.

5.1.3 Extension for P-Value Encoding

If the destination supports VOI LUT, a VOI LUT converting image pixel values to P-Values will be sent. Otherwise, the VOI LUT will be rendered into the image.

The Photometric Interpretation will be always MONOCHROME2 and an additional tag of Presentation LUT Shape as IDENTITY will be sent.

Table 5.2   Extension Attributes for P-Value Encoding

Attribute Name	Tag	DICOM Type	*DRX-1 System* Type	Supported Values
Photometric Interpretation	(0028,0004)	1	1	MONOCHROME2 Only MONOCHROME2 is sent when P-Value Encoding flag is turned on
Presentation LUT Shape	(2050,0020)	N/A	1C	IDENTITY Sent only when P-Value Encoding flag is turned on

5.1.4 Extension to Body part Examined, View Position and Patient Position

The user may define additional labels that may be used to populate the Body Part Examined (0018,0015), View Position (0018,5101) attributes. The software enforces the use of valid characters for the additional labels created by the user.

6 Configuration

Table 6.1 lists the network attributes that are configurable by a qualified service provider.

Table 6.1   Configurable Network Attributes

3.9.2.1 Configurable Network Attributes
IP address
Subnet Mask
Local Network Host Name (*DRX-1 System* AE Title)
SCP DICOM Called Application Entity Title
Socket number
Router Address (Gateway)
DICOM Service(s) available
Private Tag Support
P-Value Encoding Support
Other destination properties
SCPM separate association support
GSPS support
Alternate IOD (Secondary Capture) for the SCP that does not support CR

7 Support of Extended Character Sets

The *DRX-1 System* will support any valid character set for the Specific Character Set attribute (0008,0005).

Possible Values of (0008,0005)	Description
blank ISO 2022 IR 6	ISO-IR 6 the Default character set
ISO_IR 100 ISO 2022 IR 100	Latin 1 character set
GB18030	Simplified and Traditional Chinese
ISO 2022 IR 13	Japanese (JIS X 0201: Katakana and Romaji)
ISO 2022 IR 87	Japanese (JIS X 0208: Kanji)
ISO_IR 101	Polish, Hungarian, Romanian, and Czech
ISO_IR 126	Greek (Supplementary set of ISO 8859)
ISO_IR 144	Ukrainian and Russian
ISO_IR 148	Turkish

Possible Values of (0008,0005)	Description
ISO 2022 IR 149	Korean (KS X 1001: Hangul and Hanja)
ISO 2022 IR 159	Japanese (JIS X 0212: Supplemental Kanji set)

Note: The Extended Character Sets mentioned above do not apply to the Work List.

8 Error Handling

If communication errors are encountered, retries will be attempted based on configurable retry intervals and maximum number of retries. If the communication cannot be achieved, the job will be considered failed and set for retrial after a configurable time period (default of 5 minutes).

All errors and warnings received from the SCPs will be logged and job status will be reported to the user.

Addendum A   Supported SNOMED Code Values

Table A.1 describes the SNOMED Code Values that are supported by the *DRX-1 System*.

Table A.1   Supported SNOMED Code Values

Context Identifier	
19	
Coding Scheme Designator (0008,0102)	**Coding Scheme Version (0008,0103)**
SNM3	20020904
Code Value (0008,0100)	**Code Meaning (0008,0104)**
F-10440	erect
F-10450	recumbent
F-10460	semi-erect
Context Identifier	
20	
Coding Scheme Designator (0008,0102)	**Coding Scheme Version (0008,0103)**

SNM3	20020904
Code Value (0008,0100)	**Code Meaning (0008,0104)**
F-10310	prone
F-10316	semi-prone
F-10317	right lateral decubitus
F-10318	lateral decubitus
F-10319	left lateral decubitus
F-10320	standing
F-10326	anatomical
F-10330	kneeling
F-10336	knee-chest
F-10340	supine
F-10346	lithotomy
F-10348	Trendelenburg
F-10349	inverse Trendelenburg
F-10380	frog
F-10390	stooped-over
F-103A0	sitting
F-10410	curled-up

Context Identifier	
4010	
Coding Scheme Designator (0008,0102)	**Coding Scheme Version (0008,0103)**
SNM3	20040322
Code Value (0008,0100)	**Code Meaning (0008,0104)**
R-10202	frontal
R-10206	antero-posterior
R-10204	frontal oblique
R-10208	antero-posterior oblique

R-10210	right posterior oblique
R-10212	left posterior oblique
R-10214	postero-anterior
R-10216	postero-anterior oblique
R-10218	right anterior oblique
R-10220	left anterior oblique
R-10222	sagittal
R-10224	medial-lateral
R-10228	lateral-medial
R-10232	right lateral
R-10234	right oblique
R-10236	left lateral
R-10238	left oblique
R-10241	axial
R-10242	cranio-caudal
R-10244	caudo-cranial
R-10246	oblique axial
R-10248	oblique cranio-caudal
R-10250	oblique caudo-cranial
R-10252	frontal-oblique axial
R-10254	sagittal-oblique axial
R-10256	submentovertical
R-10257	verticosubmental
R-102C1	oblique
R-102C2	tangential
R-102C3	plantodorsal
R-102C4	dorsoplantar
R-102C5	parietoacanthal

R-102C6	acanthoparietal
R-102C7	orbitoparietal
R-102C8	parieto-orbital
R-102CD	lateral
R-40782	medial oblique
R-40783	lateral oblique

Context Identifier	
4011	
Coding Scheme Designator (0008,0102)	**Coding Scheme Version (0008,0103)**
SNM3	20040322
Code Value (0008,0100)	**Code Meaning (0008,0104)**
G-D00B	transoral
R-10242	caudad
R-10244	cephalad
R-40554	transorbital
R-40799	Lordotic
R-4087B	transforamenal
R-40885	transthoracic

Context Identifier	
4014	
Coding Scheme Designator (0008,0102)	**Coding Scheme Version (0008,0103)**
SNM3	20040322
Code Value (0008,0100)	**Code Meaning (0008,0104)**
R-10226	medio-lateral oblique
R-10230	latero-medial oblique
R-1024A	cranio-caudal exaggerated laterally
R-1024B	cranio-caudal exaggerated medially
R-102CF	exaggerated cranio-caudal

Context Identifier	
4015	
Coding Scheme Designator (0008,0102)	**Coding Scheme Version (0008,0103)**
SNM3	20050321
Code Value (0008,0100)	**Code Meaning (0008,0104)**
R-102D6	Magnification

Context Identifier	
4031	
Coding Scheme Designator (0008,0102)	**Coding Scheme Version (0008,0103)**
SNM3	20020904
Code Value (0008,0100)	**Code Meaning (0008,0104)**
T-04000	Breast
T-11100	Skull
T-11102	Optic canal
T-11133	Mastoid bone
T-11149	Nasal bone
T-11167	Zygomatic arch
T-11170	Maxilla
T-11180	Mandible
T-11196	Facial bones
T-11210	Sternum
T-11300	Rib
T-11500	Spine
T-11501	Cervical spine
T-11502	Thoracic spine
T-11503	Lumbar spine
T-11AD0	Sacrum
T-11BF0	Coccyx

T-12280	Scapula
T-12310	Clavicle
T-12402	Forearm bone
T-12410	Humerus
T-12710	Femur
T-12730	Patella
T-12770	Calcaneus
T-12980	Sesamoid bones of foot
T-15290	Temporomandibular joint
T-15420	Acromioclavicular joint
T-15610	Sternoclavicular joint
T-15680	Sacroiliac joint
T-15710	Hip joint
T-15750	Ankle joint
T-15770	Tarsal joint
T-22000	Paranasal sinus
T-24100	Larynx
T-25000	Trachea
T-26000	Bronchus
T-280A0	Apex of Lung
T-32000	Heart
T-56000	Esophagus
T-57000	Stomach
T-58000	Small intestine
T-58200	Duodenum
T-59000	Large intestine
T-59600	Rectum
T-60610	Bile duct

T-61100	Parotid gland
T-61300	Submandibular gland
T-63000	Gall bladder
T-70010	Upper urinary tract
T-74000	Bladder
T-75000	Urethra
T-88920	Uterus and fallopian tubes
T-D0300	Extremity
T-D0801	Orbital region
T-D1100	Head
T-D1213	Jaw region
T-D1460	Sella turcica
T-D1600	Neck
T-D2220	Shoulder
T-D3000	Chest
T-D3300	Mediastinum
T-D4000	Abdomen
T-D8200	Arm
T-D8300	Elbow
T-D8600	Wrist
T-D8700	Hand
T-D8800	Finger
T-D8810	Thumb
T-D9200	Knee
T-D9400	Leg
T-D9700	Foot
T-D9800	Toe

Addendum B   Input Field/DICOM Tag Cross Reference

Table B.1 describes the DICOM Image attributes and Patient/Exam information flow through the product. The first column describes the Patient/Exam information fields supported by the DR products. The second column indicates the MWL IOD Attribute that the system will use to populate the field if a DICOM Work List SCP is present. The third column identifies the CR Image IOD Attribute containing the data in the system's output.

Table B.1   Patient/Exam Input and MWL/CR Image Attributes Cross Reference

User Interface Input field Label	Associated DICOM MWL IOD Element	Associated DICOM IOD Element
Accession Number	Accession Number (0008,0050)	Accession Number (0008,0050)
Body Part	NA	Body Part Examined (0018,0015)
Cassette ID input via bar code scanner	NA	Plate ID (0018,1004)
Contrast Agent	Requested Contrast Agent (0032,1070)	Contrast/Bolus Agent (0018,0010)
Date Of Birth	Patient's Birth Date (0010,0030)	Patient's Birth Date (0010,0030)
Department Name	Requesting Service (0032,1033)	Institutional Department Name (0008,1040)
Gender	Patient Sex (0010,0040)	Patient Sex (0010,0040)
Image Comments	NA	Image Comments (0020,4000)
Laterality	NA	Laterality (0020,0060)
Modality	Modality (0008,0060)	Modality (0008,0060)
Orientation	NA	Cassette Orientation (0018,1402)
Patient Age Read only value	Patient's age (0010,1010)	Patient's age (0010,1010)
Patient Comments	NA	Patient Comments (0010,4000)

User Interface Input field Label	Associated DICOM MWL IOD Element	Associated DICOM IOD Element
Patient First Name **Patient Last Name** **Patient Middle Name**	Patient's Name (0010,0010)	Patient's Name (0010,0010)
Patient Location	Patient's Institution Residence (0038,0400)	Patient's Institution Residence (0038,0400)
Patient Position	NA	NA
Priority	Requested Procedure Priority (0040,1003)	N/A
Study Date & Time Read only value	Initial Value: Scheduled Procedure Step Start Date (0040,0002) Scheduled Procedure Step Start Time (0040,0003) These values will be updated to the time/date that the technologist began the first procedure step for a study.	Study Date (0008,0020) Study Time (0008,0030) Performed Procedure Step Start Date (0040,0244) Performed Procedure Step Start Time (0040,0245)
Tech ID	NA	Operator's Name (0008,1070)
Patient ID	Patient ID (0010,0020)	Patient ID (0010,0020)
Procedure Code	Requested Procedure ID (0040,1001) or Requested Procedure Code Sequence (0032,1064) > code value (0008,0100) or Scheduled Protocol Code Sequence (0040,0008) > code Value (0008,0100)	Procedure Code Sequence (0008,1032) > code value (0008,0100)
Procedure ID	Requested Procedure ID (0040,1001)	Requested Procedure ID (0040,1001)

User Interface Input field Label	Associated DICOM MWL IOD Element	Associated DICOM IOD Element
Procedure Name	Requested Procedure Description (0032,1060) wil be used if Requested Procedure ID or Requested Procedure Code Sequence (0032,1064) > code value is used to populate the Procedure code field or Scheduled Procedure Step Sequence (0040,0100) > Scheduled Protocol Code Sequence (0040,0008) > Code Meaning (0008,0104) will be used if Scheduled Protocol Code Sequence > code Value is used to populate Procedure Code field) if the above fields are blank, the first non-blank field in the following list will be used. Requested Procedure Description (0032,1060) or Scheduled Procedure Step Sequence (0040,100) > Scheduled Procedure Step Description (0040,0007) or Procedure Code Sequence (0008,1032) > code value (0008,0100)	Procedure Code Sequence (0008,1032) > code meaning (0008,0104)
Procedure Step Description	Scheduled Procedure Step Sequence (0040,0100) >Scheduled Procedure Step Description (0040,0007)	Request Attributes Sequence (0040,0275 >Scheduled Procedure Step Description (0040,0007) If the Procedure Step Description field is modified by the user the changes will be stored in: Performed Procedure Step Description (0040,0254)
Referring Physician	Referring Physician's Name (0008,0090)	Referring Physician's Name (0008,0090)
Requested Procedure Description	Requested Procedure Description (0032,1060)	Study Description (0008,1030)
Source to Image (cm)	NA	Distance Source to Detector (SID) (0018,1110) * value converted to mm

User Interface Input field Label	Associated DICOM MWL IOD Element	Associated DICOM IOD Element
Source to Patient (cm)	NA	Distance Source to Patient (SOD) (0018,1111) * value converted to mm
Study Date	Initial Value: Scheduled Procedure Step Start Date (0040,0002) Scheduled Procedure Step Start Time (0040,0003) These values will be updated to the time/date that the technologist began the first procedure step for a study.	Study Date (0008,0020) Study Time (0008,0030)
View Name	NA	NA
View Position	NA	View Position (0018,5101)