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Introduction

1.1 Executive Overview

This document applies to the *Carestream* DRX-1 Family of products operating Capture Console version 5.6 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

1.2 Supported DICOM SOP Classes

Table 1.2A  Supported DICOM SOP Classes for Verification

<table>
<thead>
<tr>
<th>SOP Class Name</th>
<th>SOP Class UID</th>
<th>Service Class Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verification SOP Class</td>
<td>1.2.840.10008.1.1</td>
<td>SCU, SCP</td>
</tr>
</tbody>
</table>

Table 1.2B  Supported DICOM SOP Classes for Image Delivery

<table>
<thead>
<tr>
<th>SOP Class Name</th>
<th>SOP Class UID</th>
<th>Service Class Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Grayscale Print Management Meta SOP Class</td>
<td>1.2.840.10008.5.1.1.9</td>
<td>SCU</td>
</tr>
<tr>
<td>Computed Radiography Image Storage</td>
<td>1.2.840.10008.5.1.4.1.1.1</td>
<td>SCU</td>
</tr>
<tr>
<td>Digital X-Ray Image Storage – For Presentation</td>
<td>1.2.840.10008.5.1.4.1.1.1.1</td>
<td>SCU</td>
</tr>
<tr>
<td>Digital X-Ray Image Storage – For Processing</td>
<td>1.2.840.10008.5.1.4.1.1.1.1.1</td>
<td>SCU</td>
</tr>
<tr>
<td>Grayscale Softcopy Presentation State Storage SOP Class</td>
<td>1.2.840.10008.5.1.4.1.1.11.1</td>
<td>SCU</td>
</tr>
</tbody>
</table>

Table 1.2C  Supported DICOM SOP Classes for Modality Work List

<table>
<thead>
<tr>
<th>SOP Class Name</th>
<th>SOP Class UID</th>
<th>Service Class Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modality Work List Information Model – FIND</td>
<td>1.2.840.10008.5.1.4.31</td>
<td>SCU</td>
</tr>
<tr>
<td>--------------------------------------------</td>
<td>------------------------</td>
<td>-----</td>
</tr>
</tbody>
</table>

Table 1.2D  Supported DICOM SOP Classes for MPPS

<table>
<thead>
<tr>
<th>SOP Class Name</th>
<th>SOP Class UID</th>
<th>Service Class Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modality Performed Procedure Step SOP Class</td>
<td>1.2.840.10008.3.1.2.3.3</td>
<td>SCU</td>
</tr>
</tbody>
</table>

Table 1.2E  Supported DICOM SOP Classes for Storage Commit

<table>
<thead>
<tr>
<th>SOP Class Name</th>
<th>SOP Class UID</th>
<th>Service Class Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage Commitment Push Model SOP Class</td>
<td>1.2.840.10008.1.20.1</td>
<td>SCU</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>SOP Class Name</th>
<th>SOP Class UID</th>
<th>Service Class Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study Root Query Retrieve Information Model - FIND</td>
<td>1.2.840.10008.5.1.4.1.2.2.1</td>
<td>SCU</td>
</tr>
<tr>
<td>Study Root Query Retrieve Information Model - MOVE</td>
<td>1.2.840.10008.5.1.4.1.2.2.2</td>
<td>SCU</td>
</tr>
<tr>
<td>CR Image Storage</td>
<td>1.2.840.10008.5.1.4.1.1.1.1</td>
<td>SCP</td>
</tr>
<tr>
<td>Digital X-Ray Image Storage – For Presentation</td>
<td>1.2.840.10008.5.1.4.1.1.1</td>
<td>SCP</td>
</tr>
<tr>
<td>Grayscale Softcopy Presentation State Storage SOP Class</td>
<td>1.2.840.10008.5.1.4.1.111.1</td>
<td>SCP</td>
</tr>
</tbody>
</table>

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, or a Varian PaxScan 3434R 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.

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

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 \textit{DRX-1 System} has polling enabled, the \textit{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 \textit{DRX-1 System} establishes an association with a selected SCP when \textit{it} has collected sufficient information to begin sending images.

3 Application Entity Specifications

The \textit{DRX-1 System} provides Standard Conformance to the SOP Classes depicted in Table \ref{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 \textit{DRX-1 System} will negotiate, is 128 Kbytes.

3.1.1.2 HIS/RIS

The \textit{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 \textit{DRX-1 System} application is started and then periodically thereafter.

3.1.1.3 Priors

The \textit{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**

<table>
<thead>
<tr>
<th>Name</th>
<th>Abstract Syntax</th>
<th>UID</th>
<th>Name List</th>
<th>Transfer Syntax</th>
<th>UID</th>
<th>Role</th>
<th>Negot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verification</td>
<td></td>
<td>1.2.840.10008.1.1</td>
<td>DICOM Implicit VR Little Endian</td>
<td>1.2.840.10008.1.2</td>
<td>SCU</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>Basic Grayscale Print Management</td>
<td></td>
<td>1.2.840.10008.5.1.1.9</td>
<td>DICOM Implicit VR Little Endian</td>
<td>1.2.840.10008.1.2.1</td>
<td>SCU</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>DICOM Implicit VR Little Endian</td>
<td>1.2.840.10008.1.2.1</td>
<td>SCU</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.2.840.10008.1.2</td>
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<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.2.840.10008.1.2.1</td>
<td>SCU</td>
<td>None</td>
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<td></td>
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<td>1.2.840.10008.1.2.1</td>
<td>SCU</td>
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<td></td>
<td>1.2.840.10008.1.2.1</td>
<td>SCU</td>
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<td></td>
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<td>1.2.840.10008.1.2</td>
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<td></td>
<td></td>
<td>1.2.840.10008.1.2.1</td>
<td>SCU</td>
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<td>1.2.840.10008.1.2</td>
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<td>1.2.840.10008.1.2.1</td>
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<td>1.2.840.10008.1.2</td>
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<td>1.2.840.10008.1.2.1</td>
<td>SCU</td>
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<td>SCU</td>
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<td></td>
<td></td>
<td>1.2.840.10008.1.2</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### 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

<table>
<thead>
<tr>
<th>SOP Class</th>
<th>UID Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Film Session SOP Class</td>
<td>1.2.840.10008.5.1.1.1</td>
</tr>
</tbody>
</table>
### 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

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

#### 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
<table>
<thead>
<tr>
<th>Attribute</th>
<th>SCU Usage</th>
<th>Tag</th>
<th>Possible Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Image Display Format</td>
<td>M</td>
<td>(2010,0010)</td>
<td>With no annotation being present, these formats may be used:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>STANDARD/C.R</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>For <strong>LANDSCAPE</strong> Film Orientation, (C,R) may = (1,1), (1,2), (2,1), (2,2), (1,3), (3,1), (2,3), (3,2), (3,3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>For <strong>PORTRAIT</strong> Film Orientation, (C,R) may = (1,1), (1,2), (2,1), (2,2), (3,1), (2,3), (3,2), (3,3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>With annotation, the <strong>ROW Symmetric</strong> format is being used as following:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>With Image annotations alone: ROW(n,m\ldots, (n,m\ldots) may = (1,1), (1,1,1,1), (1,1,1,1,1), (2,2), (2,2,2,2,2), (3,3), (3,3,3,3,3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>With Page annotations alone: ROW(n,m\ldots, (n,m\ldots) may = (1,1,1,1), (2,1), (2,2,1), (3,1), (3,3,1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>With Image and Page annotation combined: ROW(n,m\ldots, (n,m\ldots) may = (1,1,1,1,1,1), (2,2,1), (2,2,2,2,2,1), (3,3,3,3,3,3)</td>
</tr>
<tr>
<td>Referenced Film Session Sequence</td>
<td>M</td>
<td>(2010,0500)</td>
<td></td>
</tr>
<tr>
<td>&gt;Referenced SOP Class UID</td>
<td>M</td>
<td>(0008,1150)</td>
<td></td>
</tr>
<tr>
<td>&gt;Referenced SOP Instance UID</td>
<td>M</td>
<td>(0008,1155)</td>
<td></td>
</tr>
<tr>
<td>Referenced Basic Image Box Sequence</td>
<td>-</td>
<td>(2010,0510)</td>
<td>Not sent.</td>
</tr>
<tr>
<td>Referenced Basic Annotation Box Sequence</td>
<td>-</td>
<td>(2010,0520)</td>
<td>Not used.</td>
</tr>
<tr>
<td>Film Orientation</td>
<td>U</td>
<td>(2010,0040)</td>
<td><strong>PORTRAIT, LANDSCAPE</strong></td>
</tr>
<tr>
<td>Film Size ID</td>
<td>U</td>
<td>(2010,0050)</td>
<td><strong>8INX10IN\ldots</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>8.5INX11IN</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>8.5INX12IN</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>10INX12IN</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>11INX14IN</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>14INX14IN</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>14INX17IN</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>10INX12IN</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>A4</strong></td>
</tr>
<tr>
<td>Magnification Type</td>
<td>U</td>
<td>(2010,0060)</td>
<td><strong>REPLICATE, BILINEAR, CUBIC, NONE</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Will be constant for the entire Film Box.</td>
</tr>
<tr>
<td>Max Density</td>
<td>U</td>
<td>(2010,0130)</td>
<td>0-450 Configurable for Destination</td>
</tr>
<tr>
<td>Configuration Information</td>
<td>U</td>
<td>(2010,0150)</td>
<td>Not used.</td>
</tr>
<tr>
<td>Annotation Display Format ID</td>
<td>U</td>
<td>(2010,0030)</td>
<td>Not used</td>
</tr>
<tr>
<td>Smoothing Type</td>
<td>U</td>
<td>(2010,0080)</td>
<td><strong>NORMAL (minimum cubic convolution error)</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>ENHANCED</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>ENHANCED1</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Valid only for Magnification Type CUBIC.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0-15</td>
</tr>
<tr>
<td>Border Density</td>
<td>U</td>
<td>(2010,0100)</td>
<td>410 Configurable for Destination</td>
</tr>
</tbody>
</table>
### 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>
<thead>
<tr>
<th>Attribute &amp; Usage</th>
<th>SCU Usage</th>
<th>Tag</th>
<th>Supported Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Image Position</td>
<td>M</td>
<td>(2020,0010)</td>
<td>All values within the range of Image Display Format</td>
</tr>
<tr>
<td>Preformatted Grayscale Image Sequence</td>
<td>M</td>
<td>(2020,0110)</td>
<td></td>
</tr>
<tr>
<td>&gt;Samples Per Pixel</td>
<td>M</td>
<td>(0028,0002)</td>
<td>1</td>
</tr>
<tr>
<td>&gt;Photometric Interpretation</td>
<td>M</td>
<td>(0028,0004)</td>
<td>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.)</td>
</tr>
<tr>
<td>&gt;Rows</td>
<td>M</td>
<td>(0028,0010)</td>
<td>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.</td>
</tr>
</tbody>
</table>
### Attribute & Usage

<table>
<thead>
<tr>
<th>Attribute &amp; Usage</th>
<th>SCU Usage</th>
<th>Tag</th>
<th>Supported Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;Columns</td>
<td>M</td>
<td>(0028,0011)</td>
<td>Minimum Value 64</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Maximum Values:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>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.</td>
</tr>
<tr>
<td>&gt;Pixel Aspect Ratio</td>
<td>MC</td>
<td>(0028,0034)</td>
<td>R:C</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>R, C = 1 to 9999 (Integer)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>Note:</strong> This attribute is always included, even if it is 1/1. It’s value will always be 1/1 if Magnification Type is NONE.</td>
</tr>
<tr>
<td>&gt;Bits Allocated</td>
<td>M</td>
<td>(0028,0101)</td>
<td>16</td>
</tr>
<tr>
<td>&gt;Bits Stored</td>
<td>M</td>
<td>(0028,0102)</td>
<td>12</td>
</tr>
<tr>
<td>&gt;High Bit</td>
<td>M</td>
<td>(0028,0102)</td>
<td>Bits Stored -1</td>
</tr>
<tr>
<td>&gt;Pixel Representation</td>
<td>M</td>
<td>(0028,0103)</td>
<td>0000H (unsigned integer)</td>
</tr>
<tr>
<td>&gt;Pixel Data</td>
<td>M</td>
<td>(7FE0,0010)</td>
<td>All values consistent with Bits Stored</td>
</tr>
<tr>
<td>Polarity</td>
<td>U</td>
<td>(2020,0020)</td>
<td>NORMAL</td>
</tr>
<tr>
<td>Magnification Type</td>
<td>U</td>
<td>(2010,0060)</td>
<td>REPPLICATE, BILINEAR, CUBIC, NONE</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>Note:</strong> Is always the same as the Magnification Type specified for the Film Box.</td>
</tr>
<tr>
<td>Smoothing Type</td>
<td>U</td>
<td>(2010,0080)</td>
<td>NORMAL, ENHANCED, ENHANCED1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Valid only for Magnification Type CUBIC.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0-15</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Must be the same as the Smoothing Type specified for the Film Box.</td>
</tr>
<tr>
<td>Configuration Information</td>
<td>U</td>
<td>(2010,0150)</td>
<td>Not used.</td>
</tr>
<tr>
<td>Requested Image Size</td>
<td>U</td>
<td>(2020,0030)</td>
<td>Row length in mm up to the size of the printable image, which is a function of Image Display Format and Film Size ID.</td>
</tr>
</tbody>
</table>

### 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**

<table>
<thead>
<tr>
<th>Attribute</th>
<th>SCU Usage</th>
<th>Tag</th>
<th>Expected Values</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attribute</td>
<td>SCU Usage</td>
<td>Tag</td>
<td>Expected Values</td>
</tr>
<tr>
<td>--------------------</td>
<td>-----------</td>
<td>--------------</td>
<td>------------------------------------------------------</td>
</tr>
<tr>
<td>Printer Status</td>
<td>U</td>
<td>(2110,0010)</td>
<td>NORMAL, WARNING, FAILURE</td>
</tr>
<tr>
<td>Printer Status Info</td>
<td>U</td>
<td>(2110,0020)</td>
<td>Any valid string including the following.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>for NORMAL conditions:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>“NORMAL”</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>for WARNING conditions:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>“RECEIVER FULL”, “FILM JAM”, “PRINTER NOT RDY”,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>“PROCESSOR DOWN”, “CHECK PROCESSOR”, “PROC NOT</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>READY”, “NO RECEIVE MGZ”, “NO SUPPLY MGZ”,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>“NO TONER”, “NO STATE”, “CHECK RIBBON”, “PRINTER</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>BUSY”, “OFFLINE”, “PRINTER STOPPED”, “CHECK SUPPLY</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>MAG”, “COVER OPEN”, “PRINTER OFFLINE”, “EXPOSURE</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>FAILURE”, “CHECK R MAG”, “PROC NOT RDY”, “STATE</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>UNKNOWN”, “CHECK INK CART”, “INK OUT”, “QUEUED”,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>“SUPPLY EMPTY”, “SUPPLY LOW”, “BAD RECEIVE MGZ”,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>“BAD SUPPLY MGZ”, “FILM TRANSP ERR”, “CHECK CHEMISTRY”</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>“CHECK SORTER”, “CHEMICALS LOW”, “CHEMICALS EMPTY”</td>
</tr>
<tr>
<td>Attribute</td>
<td>SCU Usage</td>
<td>Tag</td>
<td>Expected Values</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>-----------</td>
<td>------------</td>
<td>---------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Printer Name</td>
<td>U</td>
<td>(2110,0030)</td>
<td>Any valid string</td>
</tr>
<tr>
<td>Manufacturer</td>
<td>U</td>
<td>(0008,0070)</td>
<td>Any valid string</td>
</tr>
<tr>
<td>Manufacturer Model Name</td>
<td>U</td>
<td>(0008,1090)</td>
<td>Any valid string</td>
</tr>
<tr>
<td>Device Serial Number</td>
<td>U</td>
<td>(0018,1000)</td>
<td>Any valid string</td>
</tr>
<tr>
<td>Software Version</td>
<td>U</td>
<td>(0018,1020)</td>
<td>Any valid string</td>
</tr>
<tr>
<td>Date of Last Calibration</td>
<td>U</td>
<td>(0018,1200)</td>
<td>Ignored</td>
</tr>
<tr>
<td>Time of Last Calibration</td>
<td>U</td>
<td>(0018,1201)</td>
<td>Ignored</td>
</tr>
</tbody>
</table>

### 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

<table>
<thead>
<tr>
<th>SOP Class</th>
<th>SOP Class UID</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital X-Ray Image Storage – For Presentation</td>
<td>1.2.840.10008.5.1.4.1.1.1.1</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>SOP Class</th>
<th>SOP Class UID</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital X-Ray Image Storage – For Processing</td>
<td>1.2.840.10008.5.1.4.1.1.1.1</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Attribute Name</th>
<th>Tag</th>
<th>DICOM Type</th>
<th>Supported Values</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Patient Module</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patient Name</td>
<td>(0010,0010)</td>
<td>2</td>
<td>Refer to Addendum [B]</td>
</tr>
<tr>
<td>Patient ID</td>
<td>(0010,0020)</td>
<td>2</td>
<td>Refer to Addendum [B]</td>
</tr>
<tr>
<td>Patient Birth Date</td>
<td>(0010,0030)</td>
<td>2</td>
<td>Refer Addendum [B]</td>
</tr>
<tr>
<td>Patient Sex</td>
<td>(0010,0040)</td>
<td>2</td>
<td>Refer to Addendum [B]</td>
</tr>
<tr>
<td>Patient Birth Time</td>
<td>(0010,0032)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Other Patient IDs</td>
<td>(0010,1000)</td>
<td>3</td>
<td>This value will be sent only if it has been received from the DICOM modality work list (MWL).</td>
</tr>
<tr>
<td>Other Patient Names</td>
<td>(0010,1001)</td>
<td>3</td>
<td>This value will be sent only if it has been received from the DICOM modality work list (MWL).</td>
</tr>
<tr>
<td>Ethnic Group</td>
<td>(0010,2160)</td>
<td>3</td>
<td>This value will be sent only if it has been received from the DICOM modality work list (MWL).</td>
</tr>
<tr>
<td>Patient Comments</td>
<td>(0010,4000)</td>
<td>3</td>
<td>Refer to Addendum [B]</td>
</tr>
<tr>
<td><strong>General Study</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Study Instance UID</td>
<td>(0020,000D)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Study Date</td>
<td>(0008,0020)</td>
<td>2</td>
<td>Refer to Addendum [B]</td>
</tr>
<tr>
<td>Study Time</td>
<td>(0008,0030)</td>
<td>2</td>
<td>Refer to Addendum [B]</td>
</tr>
<tr>
<td>Referring Physician Name</td>
<td>(0008,0090)</td>
<td>2</td>
<td>Refer to Addendum [B]</td>
</tr>
<tr>
<td>Study ID</td>
<td>(0020,0010)</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Accession Number</td>
<td>(0008,0050)</td>
<td>2</td>
<td>Refer to Addendum [B]</td>
</tr>
<tr>
<td>Attribute Name</td>
<td>Tag</td>
<td>DICOM Type</td>
<td>Supported Values</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>----------------</td>
<td>------------</td>
<td>-----------------------------------------</td>
</tr>
<tr>
<td>Study Description</td>
<td>(0008,1030)</td>
<td>3</td>
<td>Refer to Addendum B</td>
</tr>
<tr>
<td>Referenced Study Sequence</td>
<td>(0008,1110)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>&gt;Referenced SOP Class UID</td>
<td>(0008,1150)</td>
<td>1C</td>
<td></td>
</tr>
<tr>
<td>&gt;Referenced SOP Instance UID</td>
<td>(0008,1155)</td>
<td>1C</td>
<td></td>
</tr>
<tr>
<td>Procedure Code Sequence</td>
<td>(0008,1032)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>&gt; Code Value</td>
<td>(0008,0100)</td>
<td>1C</td>
<td>Refer to Addendum B</td>
</tr>
<tr>
<td>&gt; Coding Scheme Designator</td>
<td>(0008,0102)</td>
<td>1C</td>
<td></td>
</tr>
<tr>
<td>&gt; Code Meaning</td>
<td>(0008,0104)</td>
<td>1C</td>
<td></td>
</tr>
<tr>
<td>Patient Study</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Admitting Diagnoses Description</td>
<td>(0008,1080)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Patient’s Age</td>
<td>(0010,1010)</td>
<td>3</td>
<td>Refer to Addendum B</td>
</tr>
<tr>
<td>Patient’s Size</td>
<td>(0010,1020)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Patient’s Weight</td>
<td>(0010,1030)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Occupation</td>
<td>(0010,2180)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Additional Patient’s History</td>
<td>(0010,21B0)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>General Series</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Modality</td>
<td>(0008,0060)</td>
<td>1</td>
<td>DX</td>
</tr>
<tr>
<td>Series Instance UID</td>
<td>(0020,000E)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Series Number</td>
<td>(0020,0011)</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Laterality</td>
<td>(0020,0060)</td>
<td>2C</td>
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**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**

<p>| 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. |</p>
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<th>Attribute Name</th>
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<th>Supported Values</th>
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<td>Institutional Department Name</td>
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<td>Manufacturer Model Name</td>
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<td>Software Versions</td>
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<td>Image Type</td>
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<tr>
<td>Content Date</td>
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<td>Source Image Sequence</td>
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<td>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.</td>
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<td>&gt;Referenced SOP Instance UID</td>
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<td>Image Comments</td>
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<td>Lossy Image Compression</td>
<td>(0028,2110)</td>
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<td><strong>Image Pixel</strong></td>
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<tr>
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<table>
<thead>
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<th>Attribute Name</th>
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<tr>
<td>Photometric Interpretation</td>
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<tr>
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<td>1</td>
<td>Max Value for a DRX-1 (GOS) is 3056&lt;br&gt;Max Value for a DRX-1C (CsI) is 3032&lt;br&gt;Max Value for a V4343R is 3024&lt;br&gt;(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.)</td>
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<tr>
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<tr>
<td>High Bit</td>
<td>(0028,0102)</td>
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<td>Smallest Image Pixel Value</td>
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**X-Ray Acquisition Dose**

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<td>DRX-Ascend – This value is automatically populated.</td>
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**X-Ray Filtration**

**X-Ray Grid**

**Overlay Plane**

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<td>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.</td>
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**VOI LUT**

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**Acquisition Context**

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**SOP Common**

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<tr>
<td>SOP Instance UID</td>
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### 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

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#### Table 3.14 Computed Radiography Image SOP Class – Supported Attributes

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<td>Patient ID</td>
<td>(0010,0020)</td>
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<td>Patient Birth Date</td>
<td>(0010,0030)</td>
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**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 |
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<td>(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.)</td>
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<td>Max Value for a DRX-1 (GOS) is 3056&lt;br&gt;Max Value for a DRX-1C (CsI) is 3032&lt;br&gt;Max Value for a V4343R is 3024&lt;br&gt; (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.)</td>
</tr>
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<td>Max Value for a DRX-1 (GOS) is 2544&lt;br&gt;Max Value for a DRX-1C (CsI) is 2520&lt;br&gt;Max Value for a V4343R is 3024&lt;br&gt; (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.)</td>
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<td><strong>CR Image</strong></td>
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<td>KVP</td>
<td>(0018,0060)</td>
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<td><strong>DRX-Ascend</strong> – This value is automatically populated.</td>
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<td>(0018,1110)</td>
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<td>Distance Source to Patient</td>
<td>(0018,1111)</td>
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<td>If LLI Feature is enabled Refer to Addendum B</td>
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<td>Supported Values</td>
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**Contrast/Bolus**

- Contrast/Bolus Agent: (0018,0010) 2 Refer to Addendum B.

**Overlay Plane**

- 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
- 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

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Table 3.16  Grayscale Softcopy Presentation State SOP Class Attributes

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<tr>
<th>Attribute Name</th>
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<th>Supported Values</th>
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<tr>
<td><strong>Patient Module</strong></td>
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</tr>
<tr>
<td>Patient Name</td>
<td>(0010,0010)</td>
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<td>Refer to Addendum B</td>
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<td>Patient ID</td>
<td>(0010,0020)</td>
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<td>Refer to Addendum B</td>
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<td>Patient Birth Date</td>
<td>(0010,0030)</td>
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<td>Refer to Addendum B</td>
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<td>Patient Sex</td>
<td>(0010,0040)</td>
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<td>Patient Birth Time</td>
<td>(0010,0032)</td>
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<td>Other Patient IDs</td>
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<td>This value will be sent only if it has been received from the DICOM modality work list (MWL).</td>
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<td>&gt; Displayed Area Top Left Hand Corner</td>
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<td>&gt; Displayed Area Bottom Hand Corner</td>
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<td>&gt; Presentation Pixel Spacing</td>
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</table>
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

<table>
<thead>
<tr>
<th>Attribute Name</th>
<th>Tag</th>
<th>DICOM Type</th>
<th>Supported Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; Presentation Pixel Aspect Ratio</td>
<td>(0070,0102)</td>
<td>1C</td>
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<tr>
<td>Spatial Transformation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Image Rotation</td>
<td>(0070,0042)</td>
<td>1</td>
<td>Always 0 (no rotation)</td>
</tr>
<tr>
<td>Image Horizontal Flip</td>
<td>(0070,0041)</td>
<td>1</td>
<td>Always N (no flip)</td>
</tr>
<tr>
<td>Softcopy VOI LUT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Softcopy VOI LUT Sequence</td>
<td>(0028,3110)</td>
<td>1</td>
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</tr>
<tr>
<td>&gt; Referenced Image Sequence</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>&gt;&gt; Referenced SOP Instance UID</td>
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<td>1C</td>
<td></td>
</tr>
<tr>
<td>&gt;&gt; Referenced Frame Number</td>
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<tr>
<td>&gt; VOI LUT Sequence</td>
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<td>&gt;&gt; LUT Data</td>
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<td>&gt; Window Center</td>
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<td>&gt; Window Width</td>
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<tr>
<td>Softcopy Presentation LUT</td>
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<tr>
<td>Presentation LUT Sequence</td>
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<tr>
<td>Presentation LUT Shape</td>
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<td>SOP Instance UID</td>
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<td>Specific Character Set</td>
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<td>Attribute name</td>
<td>Tag</td>
<td></td>
<td></td>
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<tr>
<td>------------------------------------</td>
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<td></td>
<td></td>
</tr>
<tr>
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<td></td>
<td></td>
</tr>
<tr>
<td>Modality</td>
<td>(0008,0060)</td>
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<td></td>
</tr>
<tr>
<td>Patient’s Name</td>
<td>(0010,0010)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patient ID</td>
<td>(0010,0020)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scheduled Station AE Title</td>
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<td></td>
</tr>
<tr>
<td>Scheduled Procedure Step Start Date</td>
<td>(0040,0002)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scheduled Procedure Step Start Time</td>
<td>(0040,0003)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Requested Procedure ID</td>
<td>(0040,0101)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scheduled Station Name</td>
<td>(0040,0010)</td>
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<td></td>
</tr>
</tbody>
</table>

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>
<thead>
<tr>
<th>SOP Class</th>
<th>SOP Class UID</th>
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<tbody>
<tr>
<td>Modality Work List Information Model – FIND</td>
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<table>
<thead>
<tr>
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<th>Tag</th>
<th>Matching Key</th>
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<tr>
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<td></td>
</tr>
<tr>
<td>SOP Class UID</td>
<td>(0008,0016)</td>
<td></td>
</tr>
<tr>
<td>SOP Instance UID</td>
<td>(0008,0018)</td>
<td></td>
</tr>
<tr>
<td>Specific Character Set</td>
<td>(0008,0005)</td>
<td></td>
</tr>
<tr>
<td>Attribute Name</td>
<td>Tag</td>
<td>Matching Key</td>
</tr>
<tr>
<td>------------------------</td>
<td>----------------</td>
<td>--------------</td>
</tr>
<tr>
<td><strong>Scheduled Procedure Step</strong></td>
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<tr>
<td>Scheduled Procedure Step Sequence</td>
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<td>Required</td>
</tr>
<tr>
<td>&gt; Scheduled Procedure Step Start Time</td>
<td>(0040,0003)</td>
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</tr>
<tr>
<td>&gt; Modality</td>
<td>(0008,0060)</td>
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<tr>
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<td>&gt;&gt;Code Meaning</td>
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<tr>
<td><strong>Requested Procedure</strong></td>
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<td>Requested Procedure ID</td>
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<tr>
<td>Requested Procedure Description</td>
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<td>&gt;Code Meaning</td>
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<td>Referenced Study Sequence</td>
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<tr>
<td>&gt;Referenced SOP Instance UID</td>
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<tr>
<td>Attribute Name</td>
<td>Tag</td>
<td>Matching Key</td>
</tr>
<tr>
<td>----------------------------------------</td>
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<td>----------------------</td>
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<td>Requested Procedure Priority</td>
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<td>Requested Procedure Location</td>
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<td>Referring Physicians Name</td>
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<tr>
<td>Accession Number</td>
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<td></td>
</tr>
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<td>Requesting Service</td>
<td>(0032,1033)</td>
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<tr>
<td>Visit Status ID</td>
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<td>Patient’s Institution Residence</td>
<td>(0038,0400)</td>
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<td>Patient’s Name</td>
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<tr>
<td>Patient ID</td>
<td>(0010,0020)</td>
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<tr>
<td>Other Patient Ids*</td>
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<tr>
<td>Other Patient Names</td>
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<td><strong>Patient Demographic</strong></td>
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<td>Patient’s Birth Date</td>
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<td>Patient’s Birth Time</td>
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<td>Patient’s Sex</td>
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<td>Patient’s Age</td>
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<td>Patient’s Size</td>
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<td>Patient’s Weight</td>
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<td>Ethnic Group</td>
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<td>Occupation</td>
<td>(0010,2180)</td>
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<tr>
<td><strong>Patient Medical</strong></td>
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<td></td>
</tr>
<tr>
<td>Additional Patient’s History</td>
<td>(0010,21B0)</td>
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</tr>
</tbody>
</table>

* 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-I 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-I 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-I System operator to signal the start and end of a study, respectively.

3.7.1 Modality Performed Procedure Step Notification IOD

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

Table 3.20 Modality Performed Procedure Step SOP Class

<table>
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Table 3.21 Modality Performed Procedure Step Attributes

<table>
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<th>Attribute Name</th>
<th>Tag</th>
<th>DICOM Type</th>
<th>Supported Values</th>
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<tbody>
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<td>SOP Common</td>
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<td></td>
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</tr>
<tr>
<td>SOP Class UID</td>
<td>(0008,0016)</td>
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</tr>
<tr>
<td>SOP Instance UID</td>
<td>(0008,0018)</td>
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</tr>
<tr>
<td>Specific Character Set</td>
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<tr>
<td>Performed Procedure Step Relationship</td>
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<tr>
<td>Patient Name</td>
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<td>Patient ID</td>
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<td>Patient Birth Date</td>
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<tr>
<td>Attribute Name</td>
<td>Tag</td>
<td>DICOM Type</td>
<td>Supported Values</td>
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<td>Empty Sequence</td>
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**Performed Procedure Step Information**

<p>| Performs Procedure Step ID     | (0040,0253)        | 1          |                  |
| 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          |                  |</p>
<table>
<thead>
<tr>
<th>Attribute Name</th>
<th>Tag</th>
<th>DICOM Type</th>
<th>Supported Values</th>
</tr>
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<tr>
<td>&gt; Coding Scheme Designator</td>
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</tr>
<tr>
<td>&gt; Code Meaning</td>
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<td>Performed Procedure Step End Date</td>
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<td></td>
</tr>
<tr>
<td>&gt; Code Meaning</td>
<td>(0008,0104)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Performed Series Sequence</td>
<td>(0040,0340)</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>&gt; Performing Physician’s Name</td>
<td>(0008,1050)</td>
<td>2C</td>
<td></td>
</tr>
<tr>
<td>&gt; Protocol Name</td>
<td>(0008,1050)</td>
<td>1C</td>
<td></td>
</tr>
<tr>
<td>&gt; Operator’s Name</td>
<td>(0008,1070)</td>
<td>2C</td>
<td></td>
</tr>
<tr>
<td>&gt; Series Instance UID</td>
<td>(0020,000E)</td>
<td>1C</td>
<td></td>
</tr>
<tr>
<td>&gt; Series Description</td>
<td>(0008,103E)</td>
<td>2C</td>
<td></td>
</tr>
<tr>
<td>&gt; Retrieve AE Title</td>
<td>(0008,0054)</td>
<td>2C</td>
<td></td>
</tr>
<tr>
<td>&gt; Referenced Image Sequence</td>
<td>(0008,1140)</td>
<td>2C</td>
<td></td>
</tr>
<tr>
<td>&gt;&gt; Referenced SOP Class UID</td>
<td>(0008,1150)</td>
<td>1C</td>
<td></td>
</tr>
<tr>
<td>&gt;&gt; Referenced SOP Instance UID</td>
<td>(0008,1155)</td>
<td>1C</td>
<td></td>
</tr>
<tr>
<td><strong>Radiation Dose</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### 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

<table>
<thead>
<tr>
<th>SOP Class</th>
<th>SOP Class UID</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage Commitment Push Model</td>
<td>1.2.840.10008.1.20.1</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Tag</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transaction UID</td>
<td>(0008,1195)</td>
</tr>
<tr>
<td>Referenced SOP Sequence</td>
<td>(0008,1199)</td>
</tr>
<tr>
<td>&gt;Referenced SOP Class UID</td>
<td>(0008,1150)</td>
</tr>
<tr>
<td>&gt;Referenced SOP Instance UID</td>
<td>(0008,1155)</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Tag</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transaction UID</td>
<td>(0008,1195)</td>
</tr>
<tr>
<td>Failed SOP Sequence*</td>
<td>(0008,1198)</td>
</tr>
<tr>
<td>&gt;Referenced SOP Class UID</td>
<td>(0008,1150)</td>
</tr>
<tr>
<td>&gt;Referenced SOP Instance UID</td>
<td>(0008,1155)</td>
</tr>
<tr>
<td>&gt;Failure Reason</td>
<td>(0008,1197)</td>
</tr>
<tr>
<td>Referenced SOP Sequence</td>
<td>(0008,1199)</td>
</tr>
<tr>
<td>&gt;Referenced SOP Class UID</td>
<td>(0008,1150)</td>
</tr>
<tr>
<td>&gt;Referenced SOP Instance UID</td>
<td>(0008,1155)</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Attribute Name</th>
<th>Tag</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Specific Character Set</strong></td>
<td>(0008,0005)</td>
<td>Used by the device to properly decode DICOM fields subject to this value, e.g. Patient Name.</td>
</tr>
<tr>
<td>Study Date</td>
<td>(0008,0020)</td>
<td>We populate this field with the date range of interest in the format: yyyyMMdd-yyMMdd. 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.</td>
</tr>
<tr>
<td>Study Time</td>
<td>(0008,0030)</td>
<td>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.</td>
</tr>
<tr>
<td>Accession Number</td>
<td>(0008,0050)</td>
<td>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.</td>
</tr>
<tr>
<td>Query/Retrieve Level</td>
<td>(0008,0052)</td>
<td>We populate this field with: &quot;STUDY&quot;</td>
</tr>
<tr>
<td>Patient Name</td>
<td>(0010,0010)</td>
<td>We fill this field with the Patient's Last Name + &quot;<em>&quot; (wild card). e.g. If the Patient's Last Name is Smith, we fill this value with &quot;Smith</em>&quot;. This is a required field by the DICOM standard, and it is expected that the PACS will match on this value.</td>
</tr>
<tr>
<td>Patient Id</td>
<td>(0010,0020)</td>
<td>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.</td>
</tr>
<tr>
<td>Patient's Birth Date</td>
<td>(0010,0030)</td>
<td>This is an optional tag by the DICOM standard. We will only pass this tag if the &quot;Date of Birth&quot; 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.</td>
</tr>
<tr>
<td>Study Instance UID</td>
<td>(0020,000D)</td>
<td>This is defined as a &quot;Unique Key&quot; 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.</td>
</tr>
<tr>
<td>Study Id</td>
<td>(0020,0010)</td>
<td>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.</td>
</tr>
<tr>
<td>Modalities in Study</td>
<td>(0008,0061)</td>
<td>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.</td>
</tr>
<tr>
<td>Study Description</td>
<td>(0008,1030)</td>
<td>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.</td>
</tr>
</tbody>
</table>

### Series Level Key Attributes (C-Find):
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 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.

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

### Attribute Name | Tag | Value
### Specific Character Set

<table>
<thead>
<tr>
<th>Tag</th>
<th>Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>(0008,0005)</td>
<td>Used by the device to properly decode DICOM fields subject to this value, e.g. Patient Name.</td>
</tr>
</tbody>
</table>

### Query/Retrieve Level

<table>
<thead>
<tr>
<th>Tag</th>
<th>Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>(0008,0052)</td>
<td>We populate this field with &quot;IMAGE&quot;.</td>
</tr>
</tbody>
</table>

### Study Instance UID

<table>
<thead>
<tr>
<th>Tag</th>
<th>Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>(0020,000D)</td>
<td>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.</td>
</tr>
</tbody>
</table>

### Series Instance UID

<table>
<thead>
<tr>
<th>Tag</th>
<th>Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>(0020,000E)</td>
<td>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.</td>
</tr>
</tbody>
</table>

### SOP Instance UID

<table>
<thead>
<tr>
<th>Tag</th>
<th>Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>(0008,0018)</td>
<td>This is defined as a &quot;Unique Key&quot; 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.</td>
</tr>
</tbody>
</table>

### Acquisition Date

<table>
<thead>
<tr>
<th>Tag</th>
<th>Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>(0008,0022)</td>
<td>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.</td>
</tr>
</tbody>
</table>

### Acquisition Time

<table>
<thead>
<tr>
<th>Tag</th>
<th>Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>(0008,0032)</td>
<td>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.</td>
</tr>
</tbody>
</table>

### Instance Number

<table>
<thead>
<tr>
<th>Tag</th>
<th>Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>(0020,0013)</td>
<td>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.</td>
</tr>
</tbody>
</table>

### SOP Class UID

<table>
<thead>
<tr>
<th>Tag</th>
<th>Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>(0008,0016)</td>
<td>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.</td>
</tr>
</tbody>
</table>

### 3.9.2 DICOM Retrieve C-MOVE

<table>
<thead>
<tr>
<th>SOP Class</th>
<th>SOP Class UID</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study Root Query Retrieve Information Model - MOVE</td>
<td>1.2.840.10008.5.1.4.1.2.2.2</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Description</th>
<th>Tag</th>
<th>Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Query/Retrieve Level</td>
<td>(0008,0052)</td>
<td>&quot;IMAGE&quot;</td>
</tr>
<tr>
<td>Study Instance UID</td>
<td>(0020,000D)</td>
<td>Study Instance UID associated with this image.</td>
</tr>
<tr>
<td>Series Instance UID</td>
<td>(0020,000E)</td>
<td>Series Instance UID associated with this image.</td>
</tr>
<tr>
<td>SOP Instance UID</td>
<td>(0008,0018)</td>
<td>SOP Instance UID that uniquely identifies this image.</td>
</tr>
</tbody>
</table>
Act as a Store SCP for the following Store Services:

<table>
<thead>
<tr>
<th>SOP Class</th>
<th>UID</th>
<th>Transfer Syntax Name</th>
<th>Transfer Syntax UID</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computed Radiography Image Storage SOP Class</td>
<td>1.2.840.10008.5.1.4.1.1.1</td>
<td>Implicit VR Little Endian (Default Transfer Syntax for DICOM)</td>
<td>1.2.840.10008.1.2</td>
<td>SCP</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Explicit VR Little Endian</td>
<td>1.2.840.10008.1.2.1</td>
<td>SCP</td>
</tr>
<tr>
<td>Grayscale Softcopy Presentation State Storage</td>
<td>1.2.840.10008.5.1.4.1.1.1.1</td>
<td>Implicit VR Little Endian (Default Transfer Syntax for DICOM)</td>
<td>1.2.840.10008.1.2</td>
<td>SCP</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Explicit VR Little Endian</td>
<td>1.2.840.10008.1.2.1</td>
<td>SCP</td>
</tr>
<tr>
<td>Digital X-Ray Image Storage - For Presentation</td>
<td>1.2.840.10008.5.1.4.1.1.1</td>
<td>Implicit VR Little Endian (Default Transfer Syntax for DICOM)</td>
<td>1.2.840.10008.1.2</td>
<td>SCP</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Explicit VR Little Endian</td>
<td>1.2.840.10008.1.2.1</td>
<td>SCP</td>
</tr>
<tr>
<td>Digital Mammography Image Storage - For</td>
<td>1.2.840.10008.5.1.4.1.1.2</td>
<td>Implicit VR Little Endian (Default Transfer Syntax for DICOM)</td>
<td>1.2.840.10008.1.2</td>
<td>SCP</td>
</tr>
<tr>
<td>Presentation</td>
<td></td>
<td>Explicit VR Little Endian</td>
<td>1.2.840.10008.1.2.1</td>
<td>SCP</td>
</tr>
</tbody>
</table>
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-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 Private Tags

These Private Tags are used to enhance the General Image Module. The DRX-1 System only sends these tags if the Storage SCP has been configured to support Private Tag.

Table 5.1 Private Attributes for enhancing the General Image Module

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Tag</th>
<th>VR</th>
<th>VM</th>
</tr>
</thead>
<tbody>
<tr>
<td>privateDirectviewGroup</td>
<td>(0029, 0010)</td>
<td>LO</td>
<td>1</td>
</tr>
<tr>
<td>privateIPLViewName</td>
<td>(0029, 1015)</td>
<td>LO</td>
<td>1</td>
</tr>
<tr>
<td>privateIPLViewGuid</td>
<td>(0029, 1016)</td>
<td>LO</td>
<td>1</td>
</tr>
<tr>
<td>privateIPLProcessingViewGuid</td>
<td>(0029, 1017)</td>
<td>LO</td>
<td>1</td>
</tr>
</tbody>
</table>
5.1.3 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.

5.1.4 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

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

5.1.5  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

<table>
<thead>
<tr>
<th>3.9.2.1 Configurable Network Attributes</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP address</td>
</tr>
<tr>
<td>Subnet Mask</td>
</tr>
<tr>
<td>Local Network Host Name (DRX-1 System AE Title)</td>
</tr>
<tr>
<td>SCP DICOM Called Application Entity Title</td>
</tr>
<tr>
<td>Socket number</td>
</tr>
<tr>
<td>Router Address (Gateway)</td>
</tr>
<tr>
<td>DICOM Service(s) available</td>
</tr>
<tr>
<td>Private Tag Support</td>
</tr>
<tr>
<td>P-Value Encoding Support</td>
</tr>
<tr>
<td>Other destination properties</td>
</tr>
<tr>
<td>SCPMI separate association support</td>
</tr>
</tbody>
</table>
3.9.2.1 Configurable Network Attributes

<table>
<thead>
<tr>
<th>Attribute</th>
</tr>
</thead>
<tbody>
<tr>
<td>GSPS support</td>
</tr>
<tr>
<td>Alternate IOD (Secondary Capture) for the SCP that does not support CR</td>
</tr>
</tbody>
</table>

7 Support of Extended Character Sets

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

<table>
<thead>
<tr>
<th>Possible Values of (0008,0005)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>blank</td>
<td>ISO-IR 6 the Default character set</td>
</tr>
<tr>
<td>ISO 2022 IR 6</td>
<td></td>
</tr>
<tr>
<td>ISO_IR 100</td>
<td>Latin 1 character set</td>
</tr>
<tr>
<td>ISO 2022 IR 100</td>
<td></td>
</tr>
<tr>
<td>GB18030</td>
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<td>Japanese (JIS X 0208: Kanji)</td>
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<td>ISO 2022 IR 159</td>
<td>Japanese (JIS X 0212: Supplemental Kanji set)</td>
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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**

<table>
<thead>
<tr>
<th>Context Identifier</th>
<th>Coding Scheme Designator (0008,0102)</th>
<th>Coding Scheme Version (0008,0103)</th>
<th>SNM3</th>
<th>Code Value (0008,0100)</th>
<th>Code Meaning (0008,0104)</th>
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**Context Identifier**

4010

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<td>frontal oblique</td>
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<tr>
<td>R-10208</td>
<td>antero-posterior oblique</td>
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<td>postero-anterior</td>
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<tr>
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<tr>
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**Context Identifier**

4011

**Coding Scheme Designator (0008,0102)**

SNM3

**Coding Scheme Version (0008,0103)**

20040322
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<td>R-4087B</td>
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<th>Code Meaning (0008,0104)</th>
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<td>R-1024A</td>
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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

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<th>Associated DICOM IOD Element</th>
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<td>Contrast/Bolus Agent (0018,0010)</td>
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<td>User Interface Input field Label</td>
<td>Associated DICOM MWL IOD Element</td>
<td>Associated DICOM IOD Element</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>---------------------------------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td><strong>Patient Location</strong></td>
<td>Patient’s Institution Residence (0038,0400)</td>
<td>Patient’s Institution Residence (0038,0400)</td>
</tr>
<tr>
<td><strong>Patient Position</strong></td>
<td>NA</td>
<td>NA</td>
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<tr>
<td><strong>Priority</strong></td>
<td>Requested Procedure Priority (0040,1003)</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Study Date &amp; Time</strong></td>
<td>Initial Value:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Scheduled Procedure Step Start Date (0040,0002)</td>
<td>Study Date (0008,0020)</td>
</tr>
<tr>
<td></td>
<td>Scheduled Procedure Step Start Time (0040,0003)</td>
<td>Study Time (0008,0030)</td>
</tr>
<tr>
<td></td>
<td>These values will be updated to the time/date that the technologist began the first procedure step for a study.</td>
<td>Performed Procedure Step Start Date (0040,0244)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Performed Procedure Step Start Time (0040,0245)</td>
</tr>
<tr>
<td><strong>Tech ID</strong></td>
<td>NA</td>
<td>Operator’s Name (0008,1070)</td>
</tr>
<tr>
<td><strong>Patient ID</strong></td>
<td>Patient ID (0010,0020)</td>
<td>Patient ID (0010,0020)</td>
</tr>
<tr>
<td><strong>Procedure Code</strong></td>
<td>Requested Procedure ID (0040,1001)</td>
<td>Procedure Code Sequence (0008,1032) &gt; code value (0008,0100)</td>
</tr>
<tr>
<td></td>
<td>or Requested Procedure Code Sequence (0032,1064) &gt; code value (0008,0100)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>or Scheduled Protocol Code Sequence (0040,0008) &gt; code Value (0008,0100)</td>
<td></td>
</tr>
<tr>
<td><strong>Procedure ID</strong></td>
<td>Requested Procedure ID (0040,1001)</td>
<td>Requested Procedure ID (0040,1001)</td>
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<td>User Interface Input field Label</td>
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<td>Associated DICOM IOD Element</td>
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<tr>
<td>---------------------------------</td>
<td>----------------------------------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td><strong>Procedure Name</strong></td>
<td>Requested Procedure Description (0032,1060) will be used if Requested Procedure ID or Requested Procedure Code Sequence (0032,1064) &gt; code value is used to populate the Procedure code field or Scheduled Procedure Step Sequence (0040,0100) &gt; Scheduled Protocol Code Sequence (0040,0008) &gt; Code Meaning (0008,0104) will be used if Scheduled Protocol Code Sequence &gt; 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) &gt; Scheduled Procedure Step Description (0040,0007) or Procedure Code Sequence (0008,1032) &gt; code value (0008,0100)</td>
<td>Procedure Code Sequence (0008,1032) &gt; code meaning (0008,0104)</td>
</tr>
<tr>
<td><strong>Procedure Step Description</strong></td>
<td>Scheduled Procedure Step Sequence (0040,0100) &gt; Scheduled Procedure Step Description (0040,0007)</td>
<td>Request Attributes Sequence (0040,0275) &gt; 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)</td>
</tr>
<tr>
<td><strong>Referring Physician</strong></td>
<td>Referring Physician’s Name (0008,0090)</td>
<td>Referring Physician’s Name (0008,0090)</td>
</tr>
<tr>
<td><strong>Requested Procedure Description</strong></td>
<td>Requested Procedure Description (0032,1060)</td>
<td>Study Description (0008,1030)</td>
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<tr>
<td><strong>Source to Image (cm)</strong></td>
<td>NA</td>
<td>Distance Source to Detector (SID) (0018,1110) * value converted to mm</td>
</tr>
<tr>
<td><strong>Source to Patient (cm)</strong></td>
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<td>Distance Source to Patient (SOD) (0018,1111) * value converted to mm</td>
</tr>
<tr>
<td>User Interface Input field Label</td>
<td>Associated DICOM MWL IOD Element</td>
<td>Associated DICOM IOD Element</td>
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<tr>
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<td>----------------------------------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td><strong>Study Date</strong></td>
<td>Initial Value:</td>
<td>Study Date</td>
</tr>
<tr>
<td></td>
<td>Scheduled Procedure Step Start</td>
<td>(0008,0020)</td>
</tr>
<tr>
<td></td>
<td>Date</td>
<td>Study Time</td>
</tr>
<tr>
<td></td>
<td>(0040,0002)</td>
<td>(0008,0030)</td>
</tr>
<tr>
<td></td>
<td>Scheduled Procedure Step Start</td>
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</tr>
<tr>
<td></td>
<td>Time</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0040,0003)</td>
<td></td>
</tr>
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<td></td>
<td>These values will be updated to</td>
<td></td>
</tr>
<tr>
<td></td>
<td>the time/date that the technologist began</td>
<td></td>
</tr>
<tr>
<td></td>
<td>the first procedure step for a study.</td>
<td></td>
</tr>
<tr>
<td><strong>View Name</strong></td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td><strong>View Position</strong></td>
<td>NA</td>
<td>View Position (0018,5101)</td>
</tr>
</tbody>
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