



***Kodak* PACS Link Medical Image Manager 200
Kodak PACS Link 25 Print Server
as
Print Server (SCP)
Software Version 6.1.1**

DICOM Conformance Statement

June 30, 2005

Document # 3E5252, Rev. J

Revision History

Revision	Date	Author	Description
A	9/13/2001	Kevin Mantooth	Software version 5.0. Initial version. Based off of the DICOM Conformance Statements for MIM -200 with 2180, 1120, DMI, 160, 8200 printers. This document consolidates the previous documents.
B	9/21/2001	Kevin Mantooth	Software version 5.0. Clarify exceptions to 64 character annotations.
C	1/23/2002	Ross Parasiliti	Software version 5.0. Corrected errors in Annex D and added column illustrating max image size with annotation. Updated implementation class UID.
D	8/30/2002	Trac Tran	Software version 5.2. Added association rejection, added 8600, added status code tables to print commands, added decimate/crop elements, updated printer status.
E	11/26/2002	Trac Tran	Software version 5.2. Updated Implementation Class UID. Added references to DICOM Standard, added note on ability to configure DICOM Port#, added Annex E, updated Annex D, max image area for 8300 landscape, updated requested image size for fractional millimeters.
F	5/14/2003	Trac Tran	Software version 6.0. Removed references to DPS, DMI and DMIS (1200,3600) printers, removed Verification SCU, added Explicit Little Endian and Big Endian to Presentation Context Table, updated Modality and Body Part list.
G	10/17/2003	Trac Tran	Software version 6.1. Change Annex A to specify that the macros of %PRINTDAT% and %TIM% have been changed from Printing Date/Time to Acquisition Date/Time. Review all trademark and copyright names.
H	2/5/2004	Kerry Orywal	No technical changes. Made corrections to <i>Kodak</i> trademarks per Corporate Branding for web posting.
J	6/30/2005	Trac Tran	Add Annex F Maximum Imageable Area for Multiple Page Format



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1 Introduction

1.1 Executive Overview

This document covers the following products:

- *Kodak PACS Link Medical Image Manager 200 (MIM 200)*
- *Kodak PACS Link 25 Print Server (25 Print Server)*

This print server supports the following laser printers and imagers:

- *Kodak Ektascan 2180 Laser Printer*
- *Kodak Ektascan 1120 Laser Printer*
- *Kodak Ektascan 160 Laser Imager*
- *Kodak DryView 8100, 8200, 8300, 8500, 8600, 8610, and 8700 Laser Imagers*
- *Kodak DryView 969 HQ and 969 HQT Laser Imagers*

The following DICOM SOP Classes are supported:

SOP Class Name	SOP Class UID	Service Class Role
Verification SOP Class	1.2.840.10008.1.1	SCP
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9	SCP
Basic Color Print Management Meta SOP Class	1.2.840.10008.5.1.1.18	SCP
Basic Annotation Box SOP Class	1.2.840.10008.5.1.1.15	SCP
Presentation LUT SOP Class	1.2.840.10008.5.1.1.23	SCP

1.2 Scope and Field of Application

This document describes the DICOM functionality of the *Kodak PACS Link Medical Image Manager 200* and the *Kodak PACS Link 25 Print Server* (hereafter, the MIM 200 and 25 Print Server are referred to collectively as MIM). The *Kodak* printing system is composed of the MIM connected to a *Kodak* imager. The MIM captures exam images from DICOM sources and prints the images on *Kodak* imagers. The MIM acts as a DICOM Service Class Provider (SCP). The MIM performs transactions over a TCP/IP network via the DICOM messages exchange protocol. The MIM software captures and distributes images and data.

1.3 Important Considerations for the Reader

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

- The integration of equipment from different vendors (including Kodak) goes beyond the scope of the DICOM 3.0 standard and the DICOM Conformance Statements from Kodak 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 *Kodak* 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 performing validation tests and checking that all required functionality (such as cut lines) are met.
- With regard to the future evolution of the DICOM 3.0 standard, Eastman Kodak Company reserves the right to make changes to the MIM architecture described in this document. The user (or user's agent) should ensure that any equipment connected via DICOM to *Kodak* equipment also follows the future evolution of the DICOM 3.0 standard. Failure to do so may result in (partial) loss of connectivity.
- This implementation is based on the DICOM Standard, publication PS 3.x-2001.
- For all DICOM attributes of type M (shown in the column of SCP Usage), the SCU must send a valid value within the published range. We guarantee to support all published values. A missing attribute would result in returning an error of Missing Attribute, an invalid value would result in returning an error of Invalid Value and an out of range value would result in returning an error of Out of Range. It is up to the SCU to retry with a new value or to abort the association.
- For all DICOM attributes of type U (shown in the column of SCP Usage), the Default Value (shown in the default column or a value configured by MIM Service Application) is used for all cases of Missing Attribute, Invalid Value or Out of Range. No error would be generated from this type. We will send back the value being used to the SCU. It is up to the SCU to accept, to decline (abort) or to resend a new value at this point.
- Attributes received at the Image Box level will override the same attribute received at the Film Box level for a particular image.

1.4 Accessing this Conformance Statement on the World Wide Web

As the MIM 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 (case sensitive):

<http://www.kodak.com/global/en/health/serviceAndSupport/dicom.jhtml>

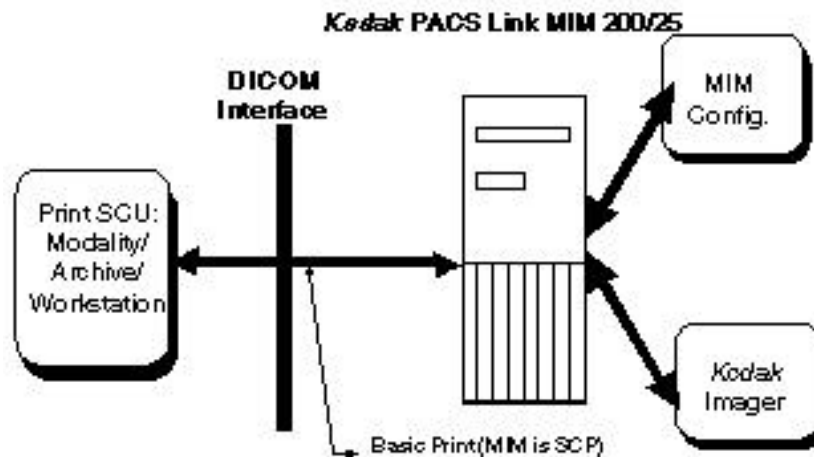
1.5 Definitions, Acronyms, Abbreviations

The following abbreviations and acronyms are used in this document:

AE	Application Entity
ASCII	American Standard Code for Information Interchange
DICOM	Digital Imaging and Communications in Medicine
DIMSE	DICOM Message Service Element
IOD	Information Object Definition.
ISO	International Standards Organization
LUT	Look-up Table
MIM	<i>Kodak PACS Link Medical Image Manager 200 and Kodak PACS Link 25 Print Server</i>
PDU	Protocol Data Unit
PLUT	Presentation Look-Up Table
SCP	Service Class Provider
SCU	Service Class User
SOP	Service-Object Pair
TCP/IP	Transmission Control Protocol/Internet Protocol
TFT/ULUT	Transfer Function Table
UID	Unique Identifier

2 Implementation Model

This implementation model uses the DICOM Basic Print Management Meta SOP Class to receive studies for the MIM. Associations from multiple SCUs are supported.



2.1 Functional Definitions

The MIM acquires images from the connected device(s). Studies are temporarily stored on disk. The images are then formatted and sent to the imager to be printed to film.

2.2 Sequencing of Real-World Activities

The MIM prints images to film after receiving all required information from an SCU. It operates as required to meet the definition of the Print Management Service Class.

3 Application Entity Specifications

The MIM provides Standard Conformance to the following SOP Classes as an SCP:

SOP Class Name	SOP Class UID
Verification SOP Class	1.2.840.10008.1.1
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9
Basic Color Print Management Meta SOP Class	1.2.840.10008.5.1.1.18
Basic Annotation Box SOP Class	1.2.840.10008.5.1.1.15
Presentation LUT SOP Class	1.2.840.10008.5.1.1.23

3.1 Association Establishment Policies

3.1.1 General

3.1.1.1 Delivery–Basic Grayscale/Color Print Management SCP

The maximum PDU size of the MIM is 128 Kbytes.

The Basic Color Print Management SCP will be rejected by default but can be turned ON at the MIM Keypad.

3.1.2 Number of Associations

3.1.2.1 Delivery–Basic Grayscale/Color Print Management SCP

By default the MIM will accept up to 12 simultaneous SCP delivery associations but is configurable. If an attempt is made to open more than 12 simultaneous associations, the MIM will reject the additional associations (A-ASSOCIATE-RJ).

3.1.3 Asynchronous Nature

The MIM allows up to 1 invoked and 1 performed operation on an Association (it is synchronous, e.g. the SCU/SCP can send only 1 Request and must wait for the corresponding Response before sending the next Request).

3.1.4 Implementation Identifying Information

The MIM provides the Implementation Class UID of “1.2.840.113564.3.1.8”.

The implementation version name attribute is of the form of “MIMyyvxxx” where *yy* is the Released Year and *xxx* is the Version Number. (i.e. MIM03v6.0 stands for Medical Image Manager software, released in 2003, of version 6.0)

The MIM establishes an Association using its network node name for the calling DICOM Application Entity title. The network node name is configurable through the MIM Service Application.

3.2 Association Acceptance Policy

3.2.1 Associated Real–World Activity

3.2.1.1 Delivery–Basic Grayscale/Color Print Management SCP

The MIM accepts Associations for the purpose of acquiring images and printing them on a local printer.

When an association has been established:

- The SCU can request the MIM to create a Film Session, a Film Box, and Image Boxes.
- The SCU can request to change the attributes that are allowed for these boxes.

The port number is configurable and the default setting is 5040.

3.2.1.2 Application Entity Titles (AE_TITLE)

The Called AE Title is used to select the destination from the MIM. The AE_TITLE should be configured at the SCU to ensure proper functionality with the MIM. The total length of the Called AE Title must be no longer than 16 characters and may not contain spaces.

The name of the destination or model type should also be contained in the Called AE Title. This name can be the printer’s logical name as configured by the MIM service application, or contain the model type (“2180”, “KELP2180”, “K2180”, “DV8700”, etc.), or “ANY” to select an arbitrary printer.

The Called AE Title may be used to select behavior which is unique to *Kodak* legacy products for backwards compatibility:

- Prefix NER_ option of the AE Title

If the Called AE Title begins with “NER_”, the MIM will explicitly enable N-Event-Report and provide status changes as they occur. The SCU must have the capability to receive the unsolicited N-Event-Report.

- Suffix Underscore option of the destination name

A user-defined suffix may be added to this name to distinguish destinations. This is usually done using an underscore and the user’s choice of identifier (e.g. “DV8700_US”, “DV8700_B”).

- Suffix “/1.9” option of the AE Title

The MIM has the ability to select a specific sorter bin at the 2180 Laser Printer. If the Called AE Title contains a suffix “/” followed by a single digit, the number specified will be used to select the output bin (e.g. “/1” will select bin 1, “/9” will select bin 9). All print jobs submitted during this association will be routed to the selected bin. If no bin is selected or “/0” is selected, the films shall be routed to the default bin. Destination (2000,0040) in Film Session will override this option.

- Suffix “/M” and “/P” option of the AE Title

The MIM has the ability to select the magazine or processor for the *Kodak DryView* 969 HQ and 969 HQT Laser Printers. If the Called AE Title contains a suffix “/M”, the printed images will be stored in the magazine. If the Called AE Title contains a suffix “/P”, the printed images will be delivered to the processor.

- Suffix “/C” option of the AE Title

Curve shape tone scaling values are usually interpreted in standard 0-999 range. However, to support *Kodak* legacy devices, the MIM Print Server can be configured to accept the curve shape in the 0-690 range. If the Called AE Title contains a suffix “/C”, the 0-690 range shall be used.

3.2.1.3 Association Negotiation

If the association is accepted, the list of requested Presentation Context items is returned with each item marked as accepted or rejected with the Result/Reason field containing the values specified in PS 3.8 Table 9-18 of the DICOM Standard, Release 03 Oct 2001.

3.2.1.4 Association Rejection

If the association is rejected, the Result, Source, and Reason/Diagnostic fields in the response message contain the values show below:

Condition	Result	Source	Reason/Diagnostic
Limit on simultaneous associations exceeded.	2 - Rejected Transient	3 - DICOM UL Service Provider (Presentation)	3 - local limit exceeded
The called AE title does not correspond to a recognized printer.	1 - Rejected Permanent	1 - DICOM UL Service User	7 - called AE title not recognized
The IP Connection could not be established.	2 - Rejected Transient	3 - DICOM UL Service Provider (Presentation)	1 - temporary congestion
The destination printer is recognized, but not installed.	1 - Rejected Permanent	1 - DICOM UL Service User	1 - no reason given
No Implementation UID.	1 - Rejected Permanent	2 - DICOM UL Service Provider (ACSE)	1 - no reason given
No Application Context Name.	1 - Rejected Permanent	2 - DICOM UL Service Provider (ACSE)	1 - no reason given

Condition	Result	Source	Reason/Diagnostic
DICOM protocol version is not supported.	1 - Rejected Permanent	2 - DICOM UL Service Provider (ACSE)	2 - protocol version not supported
No Presentation Context items given.	1 - Rejected Permanent	2 - DICOM UL Service Provider (ACSE)	1 - no reason given
No Presentation Context items accepted.	1 - Rejected Permanent	1 - DICOM UL Service User	1 - no reason given

3.2.2 Presentation Context Table

The MIM accepts the Presentation Contexts shown below.

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Negot.
Name	UID	Name List	UID		
Verification	1.2.840.10008.1.1	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		DICOM Explicit VR Little Endian	1.2.840.10008.1.2.1		
		DICOM Explicit VR Big Endian	1.2.840.10008.1.2.2		
Basic Grayscale Print Management	1.2.840.10008.5.1.1.9	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		DICOM Explicit VR Little Endian	1.2.840.10008.1.2.1		
		DICOM Explicit VR Big Endian	1.2.840.10008.1.2.2		
Basic Color Print Management	1.2.840.10008.5.1.1.18	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		DICOM Explicit VR Little Endian	1.2.840.10008.1.2.1		
		DICOM Explicit VR Big Endian	1.2.840.10008.1.2.2		

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Negot.
Name	UID	Name List	UID		
Basic Annotation Box	1.2.840.10008.5.1.1.15	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		DICOM Explicit VR Little Endian	1.2.840.10008.1.2.1		
		DICOM Explicit VR Big Endian	1.2.840.10008.1.2.2		
Presentation LUT	1.2.840.10008.5.1.1.23	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		DICOM Explicit VR Little Endian	1.2.840.10008.1.2.1		
		DICOM Explicit VR Big Endian	1.2.840.10008.1.2.2		

3.2.3 SOP Specific Conformance

3.2.3.1 Verification

The MIM provides standard conformance to the DICOM Verification Service Class. Upon receipt from an SCU of a verification of communication request, the MIM will issue confirmation.

3.2.3.2 Delivery–Basic Print Management SCP

The MIM provides standard SCP conformance to the DICOM Basic Print Management SOP Class. Association attempts will be rejected if more than the maximum number of simultaneous delivery SCP associations are attempted. The maximum number of associations is configurable and the default setting is 12.

3.3 Basic Print Management Meta SOP Class

The Meta SOP Class is defined by the following set of supported SOP Classes:

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
Basic Color Image Box SOP Class	1.2.840.10008.5.1.1.4.1
Printer SOP Class	1.2.840.10008.5.1.1.16

The Basic Grayscale Image Box SOP Class or the Basic Color Image Box SOP Class may be used within a Film Box, but the color images will be converted to grayscale to print.

3.3.1 Basic Film Session SOP Class

3.3.1.1 DIMSE Service N-CREATE

Attribute	SCP Usage	Tag	Possible Values	Default Values
Number of Copies	U	(2000,0010)	1 -> 99	1
Print Priority	U	(2000,0020)	HIGH, MED, LOW	MED
Medium Type	U	(2000,0030)	BLUE FILM, CLEAR FILM, PAPER	BLUE FILM Configurable from the MIM keypad.
Film Destination	U	(2000,0040)	MAGAZINE, PROCESSOR, BIN_n (where n=1 to 9) This value must be selected at the printer for some models.	BIN_9 Configurable from the MIM keypad.
Film Session Label	U	(2000,0050)	Up to 64 characters may be provided	Null String
Memory Allocation	U	(2000,0060)	Not used	Not used

3.3.1.2 Film Session N-CREATE Status Code

Code	Status	Action/Meaning
0000H	Success	Film session created. Some attributes may have different values than those that were requested. The changed attributes will be returned with the values that were used. (DICOM ref 3.7.C.1.1)
0110H	Failure	The Error Comment field will contain the detailed description of the error. (DICOM ref 3.7.C.5.21)
0210H	Failure	A film session already exists. Another is not created. (DICOM ref 3.7.C.5.9)

3.3.1.3 DIMSE Service N-ACTION

The MIM uses N-ACTION to accept print commands from the SCU. Once a print command is received, the MIM prints all films in the session. The MIM conforms to the NACTION specification in Part 4 section H.4.1.2.4 of the DICOM standard, and the MIM collates all film boxes when printed.

3.3.1.4 Film Session N-ACTION Status Code

Code	Status	Action/Meaning
0000H	Success	All images in the session are printed as specified. (DICOM ref 3.7.C.1.1)
0112H	Failure	The SOP Instance UID of the requested film session is returned. (DICOM ref 3.7.C.5.19)
0110H	Failure	The Error Comment field will contain the detailed description of the error. (DICOM ref 3.7.C.5.21)
C600H	Failure	Nothing is printed. (DICOM ref 3.4.H.4.1.2.4.2)
B602H	Warning	Nothing is printed. (DICOM ref 3.4.H.4.1.2.4.2)

3.3.1.5 DIMSE Service N-SET

The MIM uses N-SET to update the Film Session values as supplied by the SCU.

3.3.1.6 Film Session N-SET Status Code

Code	Status	Action/Meaning
0000H	Success	Film session data is set. Some attributes may have different values than those that were requested. The changed attributes will be returned with the values that were used. (DICOM ref 3.7.C.1.1)
0112H	Failure	The SOP Instance UID of the requested film session is returned. (DICOM ref 3.7.C.5.19)
0110H	Failure	The Error Comment field will contain the detailed description of the error. (DICOM ref 3.7.C.5.21)

3.3.1.7 Film Session N-DELETE Status Code

Code	Status	Action/Meaning
0000H	Success	The Film session is deleted. (DICOM ref 3.7.C.1.1)
0112H	Failure	The SOP Instance UID of the specified film session was not found. (DICOM ref 3.7.C.5.19)

3.3.2 Basic Film Box SOP Class

3.3.2.1 DIMSE Service N-CREATE

Attribute	SCP Usage	Tag	Possible Values	Default Values
Image Display Format	M	(2010,0010)	<p>STANDARD\C,R For both PORTRAIT and LANDSCAPE Film Orientation, (C,R) may =</p> <p>(1,1) (1,2) (2,1) (2,2) (2,3) (3,2) (2,4) (4,2) (3,3) (3,4) (4,3) (3,5) (5,3) (4,4) (4,5) (5,4) (4,6) (6,4) (5,6) (6,5) (5,7) (7,5)</p> <p>(i.e. support 1-up, 2-up, 4-up, 6-up, 8-up, 9-up, 12-up, 15-up, 16-up, 20-up, 24-up, 30-up, and 35-up standard formats)</p> <p>SLIDE (35 mm) Only valid for PORTRAIT Film Orientation (2010,0040).</p> <p>ROWr1,r2,r3...where r1, r2, r3...is the number of images in each row. The rows are limited to 7 and the number of images in each row is limited to 7.</p> <p>CUSTOMI I = 101, 102 Only valid for PORTRAIT Film Orientation (2010,0040). See Annex B for description</p>	None. SCU must provide.
Referenced Film Session Sequence	M	(2010,0500)		None. SCU must provide.
>Referenced SOP Class UID	M	(0008,1150)		None. SCU must provide.
>Referenced SOP Instance UID	M	(0008,1155)		None. SCU must provide.
Referenced Basic Image Box Sequence	M	(2010,0510)		None. SCU must provide.

Attribute	SCP Usage	Tag	Possible Values	Default Values
Referenced Basic Annotation Box Sequence	MC	(2010,0520)		None.
Film Orientation	U	(2010,0040)	PORTRAIT, LANDSCAPE	PORTRAIT
Film Size ID	U	(2010,0050)	4INX6IN 8INX10IN 8_5INX11IN 11INX14IN 14INX14IN 14INX17IN A4 Not all sizes are available for all printers. See Annex C for detailed explanation	14INX17IN or the largest film size supported by the printer. Configurable from the MIM keypad.
Magnification Type	U	(2010,0060)	REPLICATE, BILINEAR, CUBIC, NONE	CUBIC Configurable from the MIM keypad.
Max Density	U	(2010,0130)	0-399 The value will be mapped within the active calibration range of the printer and less than or equal to the Border Density [2010,0080]	360 Configurable from the MIM keypad.

Attribute	SCP Usage	Tag	Possible Values	Default Values
Configuration Information	U	(2010,0150)	<p>Curve Shape (CS): 000 to 999</p> <p>Contrast Values (CN): -1 to -5 Lower contrast 0 Normal +1 to +5 Higher contrast</p> <p>Pivot Density (PD): 0 to 2.4 in increments of 0.2</p> <p>Perception LUT Selection (LUT): LUT=m, n (m=string, n = 1 to 15) For TFT n = 1 to 15 For ULUT n = 1 to 12</p> <p>Text Macros (TM): %PRNTDAT%, %TIM%, %FOF%, %\$TIMES\$, %SES%</p> <p>Perception LUT cannot be used with Curve Shape, Contrast or Pivot Density. See Annex A for description.</p>	<p>Configurable from the MIM keypad.</p> <p>Configurable from the MIM keypad.</p> <p>1.2</p> <p>LUT=Ver693c0.w87,6</p> <p>None</p>
Referenced Presentation LUT Sequence	MC	(2050,0500)	If the PLUT is received, the tonescaling data from the above Configuration Information will be ignored.	None
>SOP Class UID	MC	(0008,1150)		None
>SOP Instance UID	MC	(0008,1155)		None
Annotation Display Format ID	U	(2010,0030)	<p>0 - No annotation 1 - Text centered at bottom of film 6 – Six annotation positions on two lines, centered at bottom of film.</p> <p>NONE – No annotation LABEL – Annotation at bottom of film. BOTTOM – Text at bottom of images. COMBINED – 1 line at the bottom of the page and 1 line under each image.</p> <p>See Basic Annotation Box SOP (section 2.5) for valid values for Annotation Position (2030,0010) for each of these formats.</p>	0 (No annotation)

Attribute	SCP Usage	Tag	Possible Values	Default Values
Smoothing Type	U	(2010,0080)	NORMAL (minimum cubic convolution error) ENHANCED, ENHANCED1 (Valid only for Magnification Type CUBIC.) 0-15 (Valid only for Magnification Type CUBIC.)	NORMAL Note: See the Annex E for the conversion of values to be used by various printers.
Border Density	U	(2010,0100)	BLACK, WHITE, i where i may = 0 -399	Image Max Density Configurable from the MIM keypad. For the 2180, the value is between the range of 2.6..3.2 or adjustable down to the range of 2.0..2.6
Min Density	U	(2010,0120)	0-399 (Value must be less than Max Density [2010,0130])	21 The minimum value for the 2180 is the Imager's Calibrated Value. The Dmin of the Film is always used for the <i>Kodak 969</i> and <i>DryView</i> imagers.
Illumination	MC	(2010,015E)	Positive integer in units of cd/m^2	2000
Reflective Ambient Light	MC	(2010,0160)	Positive integer in units of cd/m^2	10
Trim	U	(2010,0140)	YES, NO	NO The 1120 printer does not support Trim.

3.3.2.2 Film Box N-CREATE Status Code

Code	Status	Action/Meaning
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Code	Status	Action/Meaning
0000H	Success	Film box created. Some attributes may have different values than those that were requested. The changed attributes will be returned with the values that were used. (DICOM ref 3.7.C.1.1)
0112H	Failure	The film session requested to contain this film box does not exist. (DICOM ref 3.7.C.5.19)
0110H	Failure	The Error Comment field will contain the detailed description of the error. (DICOM ref 3.7.C.5.21)
0213H	Failure	Page limit is exceeded. (DICOM ref 3.7.C.5.22)
0120H	Failure	The attribute tag of the missing required attribute is returned. (DICOM ref 3.7.C.5.13)
0121H	Failure	The film box is not created. The required attribute was present, but contained no value. (DICOM ref 3.7.C.5.13)
0106H	Failure	The invalid attribute value is returned in the response data set. (DICOM ref 3.7.C.5.11)

3.3.2.3 DIMSE Service N-ACTION

The MIM uses the N-ACTION to accept print instruction from the SCU. When such an instruction is received, the MIM prints the current film in the session.

3.3.2.4 Film Box N-ACTION Status Code

Code	Status	Action/Meaning
0000H	Success	All images in the film box are printed as specified. (DICOM ref 3.7.C.1.1)
0112H	Failure	The film box does not exist. (DICOM ref 3.7.C.5.19)
0110H	Failure	The Error Comment field will contain the detailed description of the error. (DICOM ref 3.7.C.5.21)
B602H	Warning	Nothing is printed (DICOM ref 3.4.H.4.1.2.42)

3.3.2.5 DIMSE Service N-SET

The MIM uses N-SET to update the Basic Film Box values as supplied by the SCU. The following attributes may be updated:

Attribute	SCP Usage	Tag
Magnification Type	U	(2010,0060)
Max Density	U	(2010,0130)
Configuration Information	U	(2010,0150)
Smoothing Type	U	(2010,0080)
Border Density	U	(2010,0100)
Empty Image Density	U	(2010,0110)
Min Density	U	(2010,0120)
Illumination	MC	(2010,015E)
Reflective Ambient Light	MC	(2010,0160)
Trim	U	(2010,0140)

3.3.2.6 Film Box N-SET Status Code

Code	Status	Action/Meaning
0000H	Success	Film box data is set. Some attributes may have different values than those that were requested. The changed attributes will be returned with the values that were used. (DICOM ref 3.7.C.1.1)
0112H	Failure	The specified film box does not exist. (DICOM ref 3.7.C.5.19)
0110H	Failure	The Error Comment field will contain the detailed description of the error. (DICOM ref 3.7.C.5.21)
0213H	Failure	Page limit is exceeded. (DICOM ref 3.7.C.5.22)
0120H	Failure	The attribute tag of the missing required attribute is returned. (DICOM ref 3.7.C.5.13)
0121H	Failure	The required attribute was present, but contained no value. (DICOM ref 3.7.C.5.13)
0106H	Failure	The invalid attribute value is returned in the response data set. (DICOM ref 3.7.C.5.11)

3.3.2.7 DIMSE Service N-DELETE

Upon receipt of an N-DELETE from the SCU, the MIM removes the individual image boxes from the session.

3.3.2.8 Film Box N-DELETE Status Code

Code	Status	Action/Meaning
0000H	Success	The film box is deleted. (DICOM ref 3.7.C.1.1)
0112H	Failure	The SOP Instance UID of the specified film session is returned. (DICOM ref 3.7.C.5.19)
0110H	Failure	The Error Comment field will contain the detailed description of the error. (DICOM ref 3.7.C.5.21)

3.3.2.9 Basic Grayscale Image Box SOP Class

3.3.2.10 DIMSE Service N-SET

Attribute & Usage	SCP Usage	Tag	Supported Values	Default Values
Image Position	M	(2020,0010)	All values within the range of Image Display Format	None. SCU must provide.
Preformatted Grayscale Image Sequence	M	(2020,0110)		None. SCU must provide.
>Samples Per Pixel	U	(0028,0002)	1	1
>Photometric Interpretation	U	(0028,0004)	MONOCHROME1, MONOCHROME2	MONOCHROME2
>Rows	M	(0028,0010)	Minimum Value 64 Maximum Values: Depends on film size and printer model. The aspect ratio is used with the printer's page extents, display format, etc. to calculate this value. See Annex D.	None. SCU must provide.
>Columns	M	(0028,0011)	Minimum Value 64 Maximum Values: Depends on film size and printer model. The aspect ratio is used with the printer's page extents, display format, etc. to calculate this value. See Annex D.	None. SCU must provide.
>Pixel Aspect Ratio	MC	(0028,0034)	R/C R, C = 1 to 9999 (Integer)	1\1
>Bits Allocated	M	(0028,0100)	8, 16	None. SCU must provide.
>Bits Stored	M	(0028,0101)	8, 10, 12	None. SCU must provide.

Attribute & Usage	SCP Usage	Tag	Supported Values	Default Values
>High Bit	M	(0028,0102)	Bits Stored -1	None. SCU must provide.
>Pixel Representation	M	(0028,0103)	0000H (unsigned integer)	0000H
>Pixel Data	M	(7FE0,0010)	All values consistent with Bits Stored	None. SCU must provide.
Polarity	U	(2020,0020)	NORMAL, REVERSE	NORMAL
Magnification Type	U	(2010,0060)	REPLICATE, BILINEAR, CUBIC, NONE	CUBIC Configurable from the MIM keypad.
Smoothing Type	U	(2010,0080)	NORMAL (minimum cubic convolution error) ENHANCED, ENHANCED1 (Valid only for Magnification Type CUBIC.) 0-15 (Valid only for Magnification Type CUBIC.)	NORMAL Note: See the Annex E for the conversion of values to be used by various printers.
Configuration Information	U	(2010,0150)	Setting these values will override film box settings for this image position. Curve Shape (CS): 000 to 999 Perception LUT Selection (LUT): LUT=m, n (m=string, n = 0 to 15) Curve Shape and Perception LUT are mutually exclusive. See Annex A for description	Configurable from the MIM keypad. Configurable from the MIM keypad. LUT=Ver693c0.w87, 6

Attribute & Usage	SCP Usage	Tag	Supported Values	Default Values
Requested Image Size	U	(2020,0030)	<p>Width of Image Box in millimeters (fractional millimeters supported)</p> <p>0.00 indicates "Maximize film utilization while maintaining Image aspect ratio".</p> <p>If this value exceeds the available dimensions of the Image Box, it will be accepted only if the Requested Decimate/Crop Behavior value is NOT set to FAIL. An icon will be added to the page indicating that the Requested Image Size was not achieved.</p>	0.00
Requested Decimate/Crop Behavior	U	(2020,0040)	<p>DECIMATE/CROP/FAIL</p> <p>DECIMATE: If the Image Size exceeds the printable area, the Image Size will be reduced while preserving the full view of the Image. An icon will be added to the page indicating that the Image has been decimated.</p> <p>CROP: If the Image Size exceeds the printable area, the Image will be center cropped by removing pixels that fall outside the printable area. An icon will be added to the page indicating that the Image has been cropped.</p> <p>FAIL: If the Image Size exceeds the printable area the Image will be rejected.</p>	DECIMATE Configurable from the MIM keypad.
Referenced Presentation LUT Sequence	U	(2050,0500)	If the PLUT is received, the tonescaling data from the above Configuration Information will be ignored	

Attribute & Usage	SCP Usage	Tag	Supported Values	Default Values
>SOP Class UID	U	(0008,1150)		
>SOP Instance UID	U	(0008,1155)		
Body Part Examined	U	(0018,0015)	ABDOMEN, ANKLE, ARM, BREAST, CHEST, CLAVICLE, COCCYX, CSPINE, ELBOW, EXTREMITY, FOOT, HAND, HEAD, HEART, HIP, JAW, KNEE, LEG, LSPINE, NECK, PELVIS, SHOULDER, SKULL, SSPINE, TSPINE, DEFAULT. See section 4 for more information.	None.
Modality	U	(0008,0060)	CR, CT, Film Digitizer, Kodak CR, MR, Nuclear Me, Ultrasound, Other.OT = Other See section 4 for more information.	None Configurable from the MIM keypad.
Image Tone Adjustment	U	(2011,0170)	-9 to 9 See section 4 for more information.	None.

3.3.2.11 Image Box N-SET Status Code

Code	Status	Action/Meaning
0000H	Success	Image box data is set. Some attributes may have different values than those that were requested. The changed attributes will be returned with the values that were used. (DICOM ref 3.7.C.1.1)
0110H	Failure	The Error Comment field will contain the detailed description of the error. (DICOM ref 3.7.C.5.21)
0112H	Failure	The specified film box does not exist. (DICOM ref 3.7.C.5.19)
0213H	Failure	Page limit is exceeded. (DICOM ref 3.7.C.5.22)
0120H	Failure	The attribute tag of the missing required attribute is returned. (DICOM ref 3.7.C.5.13)

Code	Status	Action/Meaning
0121H	Failure	The required attribute was present, but contained no value. (DICOM ref 3.7.C.5.13)
0106H	Failure	The invalid attribute value is returned in the response data set. (DICOM ref 3.7.C.5.11)

3.3.3 Basic Color Image Box SOP Class

3.3.3.1 DIMSE Service N-SET

Attribute & Usage	SCP Usage	Tag	Supported Values	Default Values
Image Position	M	(2020,0010)	All values within the range of Image Display Format	None. SCU must provide.
Basic Color Image Sequence	M	(2020,0111)		
>Samples Per Pixel	U	(0028,0002)	3	3
>Photometric Interpretation	U	(0028,0004)	RGB	RGB
>Planar Configuration	M	(0028,0006)	000H or 001H 000H – pixels arrive in R ₁ G ₁ B ₁ R ₂ G ₂ B ₂ R ₃ G ₃ B ₃ ... order 001H – pixels arrive in R ₁ R ₂ R ₃ ..., G ₁ G ₂ G ₃ ... B ₁ B ₂ B ₃ ... order	None. SCU must provide.
>Rows	M	(0028,0010)	Minimum Value 64 Maximum Values: Depends on film size and printer model. The aspect ratio is used with the printer's page extents, display format, etc. to calculate this value. See Annex D.	None. SCU must provide.

Attribute & Usage	SCP Usage	Tag	Supported Values	Default Values
>Columns	M	(0028,0011)	Minimum Value 64 Maximum Values: Depends on film size and printer model. The aspect ratio is used with the printer's page extents, display format, etc. to calculate this value. See Annex D.	None. SCU must provide.
>Pixel Aspect Ratio	MC	(0028,0034)	R\C R, C = 1 to 9999 (Integer)	1\1
>Bits Allocated	U	(0028,0100)	8	8
>Bits Stored	U	(0028,0101)	8	8
>High Bit	U	(0028,0102)	7	7
>Pixel Representation	M	(0028,0103)	0000H (unsigned integer)	0000H
>Pixel Data	M	(7FE0,0010)	All values consistent with Bits Stored	None. SCU must provide.
Polarity	U	(2020,0020)	NORMAL, REVERSE	NORMAL
Magnification Type	U	(2010,0060)	REPLICATE, BILINEAR, CUBIC, NONE All values are used only when the printer cannot print color. When the printer prints color, REPLICATE is always used.	CUBIC Configurable from the MIM keypad.
Smoothing Type	U	(2010,0080)	NORMAL (minimum cubic convolution error) ENHANCED, ENHANCED1 (Valid only for Magnification Type CUBIC.) 0-15 (Valid only for Magnification Type CUBIC.) Smoothing Type is used only when the printer cannot print color.	NORMAL See the Annex E for the conversion of values to be used by various printers.

Attribute & Usage	SCP Usage	Tag	Supported Values	Default Values
Configuration Information	U	(2010,0150)	<p>Setting these values will override film box settings for this image position.</p> <p>Curve Shape (CS): 000 to 999</p> <p>Perception LUT Selection (LUT): LUT = m, n (m=string, n = 0 to 15)</p> <p>Curve Shape and Perception LUT are mutually exclusive.</p> <p>Curve Shape or Perception LUT is used only when the printer cannot print color.</p> <p>See Annex A for description</p>	<p>Configurable from the MIM keypad.</p> <p>Configurable from the MIM keypad.</p> <p><i>LUT=Ver693c0.w87,6</i></p>
Requested Image Size	U	(2020,0030)	<p>Width of Image Box in millimeters (fractional millimeters supported)</p> <p>0.00 indicates "Maximize film utilization while maintaining Image aspect ratio".</p> <p>If this value exceeds the available dimensions of the Image Box, it will be accepted only if the Requested Decimate/Crop Behavior value is NOT set to FAIL. An icon will be added to the page indicating that the Requested Image Size was not achieved.</p>	0.00

Attribute & Usage	SCP Usage	Tag	Supported Values	Default Values
Requested Decimate/Crop Behavior	U	(2020,0040)	<p>DECIMATE/CROP/FAIL</p> <p>DECIMATE: If the Image Size exceeds the printable area, the Image Size will be reduced while preserving the full view of the Image. An icon will be added to the page indicating that the Image has been decimated.</p> <p>CROP: If the Image Size exceeds the printable area, the Image will be center cropped by removing pixels that fall outside the printable area. An icon will be added to the page indicating that the Image has been cropped</p> <p>FAIL: If the Image Size exceeds the printable area the Image will be rejected.</p>	<p>DECIMATE</p> <p>Configurable from the MIM keypad.</p>
Color Profile	U	(2011,0160)	<p>DEFAULT1, DEFAULT2, DEFAULT3, DEFAULT4, DEFAULT5, DEFAULT6</p> <p>See section 4 for more information.</p>	None.

3.3.3.2 Basic Color Image Box N-SET Status Code

Code	Status	Action/Meaning
0000H	Success	Image box data is set. Some attributes may have different values than those that were requested. The changed attributes will be returned with the values that were used. (DICOM ref 3.7.C.1.1)
0110H	Failure	The Error Comment field will contain the detailed description of the error. (DICOM ref 3.7.C.5.21)
0112H	Failure	The specified film box does not exist. (DICOM ref 3.7.C.5.19)
0213H	Failure	Page limit is exceeded. (DICOM ref 3.7.C.5.22)
0120H	Failure	The attribute tag of the missing required attribute is returned. (DICOM ref 3.7.C.5.13)
0121H	Failure	The required attribute was present, but contained no value. (DICOM ref 3.7.C.5.13)
0106H	Failure	The invalid attribute value is returned in the response data set. (DICOM ref 3.7.C.5.11)

3.3.4 Printer SOP Class

3.3.4.1 DIMSE Service N-GET

Changes in printer status will be sent when they occur using N-EVENT-REPORT only if the SCU established the association using a called AE title beginning with "NER_". Otherwise, the SCU can use the N-GET to retrieve an instance of the Printer SOP class.

Printer Status (2110,0010) and Printer Status Info (2110,0020) will be returned with all NGET requests of the Printer SOP class.

Attribute	SCP Usage	Tag	Supported Values
Printer Status	M	(2110,0010)	NORMAL, WARNING, FAILURE
Printer Status Info	M	(2110,0020)	for Printer Status of NORMAL: NORMAL

Attribute	SCP Usage	Tag	Supported Values
			for Printer Status of WARNING: BAD SUPPLY MGZ CALIBRATION ERR CHECK CHEMISTRY CHECK PRINTER CHECK PROC CHEMICALS LOW COVER OPEN EMPTY 11X14 EMPTY 11X14 BLUE EMPTY 11X14 CLR EMPTY 14X14 BLUE EMPTY 14X14 CLR EMPTY 14X17 BLUE EMPTY 14X17 CLR EMPTY 8X10 EMPTY 8X10 BLUE FILM JAM FILM TRANS ERR LOW 8X10 LOW 11X14 CLR LOW 14X14 BLUE LOW 14X14 CLR LOW 14X17 BLUE LOW 14X17 CLR LOW 11X14 LOW 11X14 BLUE LOW 8X10 BLUE NO RECEIVE MGZ NO SUPPLY MGZ PRINTER BUSY PRINTER INIT PRINTER OFFLINE PROC DOWN PROC INIT RECEIVER FULL SUPPLY EMPTY SUPPLY LOW
Printer Status Info (continued)			for Printer Status of FAILURE: ELEC DOWN ELEC SW ERROR PRINTER DOWN
Printer Name	U	(2110,0030)	Any value up to 16 characters in length. Chosen by user at time of installation
Printer Manufacturer	U	(0008,0070)	EASTMAN KODAK COMPANY

Attribute	SCP Usage	Tag	Supported Values
Printer Manufacturer Model Name	U	(0008,1090)	Any value up to 16 characters in length. Chosen by user at time of installation.
Printer Device Serial Number	U	(0018,1000)	AAAAAAAA (number up to 8 ASCII characters)
Software Version	U	(0018,1020)	The actual MIM software version (ID up to 6 ASCII characters) as X.y where X is the MIM Release number and y the version number.
Date of Last Calibration	U	(0018,1200)	Not supported
Time of Last Calibration	U	(0018,1201)	Not supported

3.3.4.2 Printer SOP N-GET Status Code

Code	Status	Action/Meaning
0000H	Success	Printer Status and Printer Status Info are always returned along with the requested attribute values. (DICOM ref3.7.C.1.1)
0110H	Failure	The Error Comment field will contain the detailed description of the error. (DICOM ref3.7.C.5.21)

3.4 Basic Annotation Box SOP Class

3.4.1 DIMSE Service N-SET

The Basic Annotation Box SOP Instance is created by the SCP at the time of the Basic Film Box SOP Instance is created, based on the value of the Annotation Display Format ID attribute (2010,0030) of the Basic Film Box.

A maximum of 6 annotation boxes may be received with a film box.

Attribute & Usage	SCP Usage	Tag	Supported Values	Default Values
Annotation Position	M	(2030,0010)	<p>Annotations are placed in order from upper-left to lower-right.</p> <p>If the Annotation Display Format ID is 1, then value must be 1. The text will be printed on one line at the bottom of the film.</p> <p>If the Annotation Display Format ID is 6, then valid range is 1-6. The text will be printed within 2 lines at the bottom of the film, within 6 different positions.</p> <p>If the Annotation Display Format ID is LABEL, the valid range is 0-1. The text will be printed at the bottom of the film on two lines.</p> <p>If the Annotation Display Format ID is BOTTOM, then the valid range is 1 to the number of images in the Film Box. The text will be placed below the images.</p> <p>If the Annotation Display Format ID is COMBINED, then the valid range is 0 to the number of images in the Film Box. Position 0 will be printed at the bottom of the film. The other annotations will be printed below the images.</p> <p>Any annotation box with a position outside the valid range will be ignored.</p>	None
Text String	M	(2030,0020)	Up to 64 characters (see Note)	None

Note: The number of characters displayed may be less than 64 characters depending on the size of the film, the page format, the annotation format and the characters used. This exception does not apply to Annotation Format IDs of LABEL or 1.

3.4.1.1 Annotation N-SET Status Code

Code	Status	Action/Meaning
0000H	Success	The annotation data is set.
0110H	Failure	The Error Comment field will contain the detailed description of the error. (DICOM ref 3.7.C.1.1)
0112H	Failure	The annotation box does not exist. (DICOM ref 3.7.C.5.21)
0116H	Warning	Invalid Position was specified. (DICOM ref 3.7.C.5.19)
0213H	Failure	Page limit is exceeded. (DICOM ref 3.7.C.5.22)

3.5 Presentation LUT SOP Class

3.5.1 DIMSE Service N-CREATE

The Presentation LUT SOP Instance is created by the SCP upon receipt of the N-CREATE action. The Print SCU may create Presentation LUT instance prior to being referenced by the Basic Film Box. Multiple Presentation LUT instances are supported in an association, but only one instance will be supported for each image.

The SCU shall send either Presentation LUT Sequence or the Presentation LUT Shape. These values are mutually exclusive and the action will result in an error if neither or both are present. The presence of the Presentation LUT instance overrides any data set in the Configuration Information attribute (2010,0150) of the Film Box or Image Box.

Attribute & Usage	SCP Usage	Tag	Supported Values	Default Values
Presentation LUT Sequence	M	(2050,0010)		None

Attribute & Usage	SCP Usage	Tag	Supported Values	Default Values
>LUT Descriptor	M	(0028,3002)	<p>The first value is the number of entries in the lookup table. The number of entries shall be equal to the number of possible values in the input. (For 8 bit input it will be 256 entries, for 12 bit input it will be 4096 entries)</p> <p>The second value is the first input value mapped, and shall always be 0.</p> <p>The third value specifies the number of bits for each entry in the LUT Data. It shall be between 10 and 16 inclusive.</p>	None
>LUT Explanation	U	(0028,3003)	Free form text explanation of the meaning of the LUT.	None
>LUT Data	M	(0028,3006)	The LUT Data shall be stored in a format equivalent to 16 bits allocated where the high bit is equal to bits stored - 1, where bits stored is the third value of the LUT Descriptor.	None
Presentation LUT Shape	M	(2050,0020)	Enumerated values IDENTITY and LIN OD.	None

3.5.1.1 Presentation LUT N-CREATE Status Code

Code	Status	Action/Meaning
0000H	Success	The Presentation LUT is created. Some attributes may have different values than those that were requested. The changed attributes will be returned with the values that were used. (DICOM ref 3.7.C.1.1)
0110H	Failure	The Error Comment field will contain the detailed description of the error. (DICOM ref 3.7.C.5.21)

3.5.2 DIMSE Service N-DELETE

Upon receipt of an N-DELETE from the SCU, the MIM removes the Presentation LUT instance.

3.5.2.1 Presentation LUT N-DELETE Status Code

Code	Status	Action/Meaning
0000H	Success	The Presentation LUT is deleted. (DICOM ref 3.7.C.1.1)
0110H	Failure	The Error Comment field will contain the detailed description of the error. (DICOM ref 3.7.C.5.21)

4 Communication Profiles

4.1 Supported Communications Stacks

The MIM provides TCP/IP Network Communication Support as defined in Part 8 of the DICOM standard.

4.2 Physical Media

The MIM supports Ethernet with the following physical connectors:

Standard Twisted pair (10BaseT and 100BaseT)

5 Extensions/Specializations/Privatizations

There are no Extensions/Specializations/Privatizations.

6 Configuration

The following attributes are configurable by a qualified service provider:

- IP address
- DICOM Port number
- Subnet Mask
- Local Network Host Name (MIM AE Title)
- Router Address (Gateway)
- Number of maximum associations
- DICOM Service(s) available
- Basic Color Print Management Association
- Film Sizes available
- Other destination properties as indicated in this document.

7 Support of Extended Character Sets

The MIM supports the ISO-IR 100 Latin 1 character set as well as the ISO-IR 6 default character set.

The MIM also supports the ISO-IR 87 character set. This is part of the JIS X 0208 code table for 2-byte Japanese character sets which supports Kanji (ideograph), Hiragana (phonetic), and Katakana (phonetic).

The MIM also supports the ISO-IR 13 character set. This is part of the JIS X 0201 code table for single-byte Japanese Katakana (phonetic) characters.

The value set in the tag Specific Character Set (0008,0005) must be either:

- "ISO_IR 6" (default repertoire)
- "ISO_IR 100" (Latin 1)
- "ISO_1R 13" (Katakana)
- "ISO 2022 IR 13\ISO 2022 IR 87" (Katakana, Hiragana, Kanji)
- "ISO 2022 IR 159" (supplementary Kanji set)
- or blank (ISO-IR 6 is the default character set)

8 Error Handling

Warnings indicate that the operation/notification has been completed, but an error was detected. Failures convey that the operation/notification failed and was not performed. Refer to the DICOM Specification PS 3.7, Annex C for the Status Types supported by the DIMSE services.

Annex A: Configuration Information

The Configuration Information attribute contains the list of specific values. These attributes are not DICOM standard attributes.

The Configuration Information value is an ordered list. The attribute is specified using the ASCII twocharacter key prefix in the following sequence:

1. Curve Shape, Contrast, Pivot Density or Perception LUT
2. Text Macros

The Film Box Curve Shape value applies to all images in the Film Box except when Curve Shape or Perception LUT is specified for the image in the Image Box.

Attribute	Useage	Description	Default
Curve Shape designated by the ASCII two-character prefix: CS	U/M	000 to 999 Note: 000 = linear, 999 = highest curvature Curve Shape is a tone scale adjustment used to optimize the image on film compared to the image on the operator console monitor. Curve shape is not valid when a Perception LUT is specified.	Film Box: Value set in the Printer by the user Image Box: Basic Film Box Curve Shape
Contrast designated by the ASCII two-character prefix: CN	U/M	-5 to 5 Note: Integer values only. Negative Contrast settings are lower contrast where the amount of data that is represented by medium film densities is increased. Positive settings are higher contrast where the amount of data that is represented by high and low densities is increased.	Value set in the Printer by the user
Pivot Density designated by the ASCII two-character prefix: PD	U/M	0.0 to 2.4 Note: Value must be specified in increments of 0.2. Densities above and below the pivot density will be adjusted up and down by an amount which is a function of the difference between the code value and the pivot density code value.	Value set in the Printer by the user
Perception LUT Selection designated by the ASCII three-character prefix: LUT	U/M	LUT = m, n Allows selection of the LUT that best suits the user's images. M is the name of the TFT set and N specifies a contrast setting within the group. Curve shape will be ignored if the LUT parameter is used. m=string (0=default group) n=0 to 15 (0=use default value set at keypad)	m=0, n=0

Attribute	Useage	Description	Default
Text Macros designated by the ASCII two-character key prefix: TM	M/M	%PRNTDAT% Capture Date* DD-MMM-YY %TIM% Capture Time* HH:MM (HH=0-23) %FOF% Film of Film Count NN/MM %\$TIME\$% Time of Printing HH:MM:SS %SES% Film Session Label AAAAAA (1-64 chars from the Film Session SOP Class) Note: The text macros will be printed on the bottom of the film and will be truncated if necessary.	None

* This is the receiving Date/Time of the first valid image of the first Film Box.

Examples

"CS333"

The curve shape is set to 1/3 of the printer's tone scale range and defaults are applied to contrast and pivot density.

"CS500\CN3\PD2.2"

The curve shape is set to 1/2 the printer's tone scale range, Contrast is set to 3, and pivot density is set to 2.2.

"PD2.0"

The pivot density is set to 2.0, and defaults are applied to curve shape and contrast.

"CS333\CN3\PD2.2\TM%PRNTDAT%%TIM%%FOF%"

The curve shape is set to 1/3 of the range, Contrast is set to 3, and pivot density is set to 2.2.

The following text macros will be printed on the bottom of the page:

Date of Printing, Time of Printing, and Film of Film count.

"LUT=Ver693c0.w87,3"

The Perception LUT TFT set is "Ver693c0.w87" and the Contrast Setting is 3.

"LUT=0,3\ TM%PRNTDAT%%TIM%%FOF%"

The Perception LUT TFT set is 0 (default) and the Contrast Setting is 3.

The following text macros will be printed on the bottom of the page:

Date of Printing, Time of Printing, and Film of Film count.

"TM%PRNTDAT%%TIM%%FOF%"

The following text macros will be printed at the bottom of the page:

Date of Printing, Time of Printing, and Film of Film count.

"PD2.0\CN4\CS333"

This is **invalid** because the attributes are out of order, curve shape must precede pivot density and contrast, and contrast must precede pivot density. It should be "CS333\CN4\PD2.0".

"CS333\PD1.2\LUT=0,3"

This is **invalid** because Curve Shape and Pivot Density cannot be mixed with Perception LUT. In this case, the Perception LUT setting will be used.

Annex B: Custom Formats

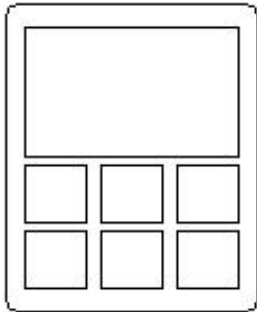
The following formats are expected to be supported by printers manufactured by Kodak and will only be specified to these printers.

Format ID 101

This format consists of 7 image positions, 1 large image in the upper section of the page and 6 smaller images in the lower section of the page. The size and positioning of the images are defined in terms of the standard formats 2 and 12.

Upper Section: 1 frame of a 2-up format.

Lower Section: 6 frames of a 12-up format.

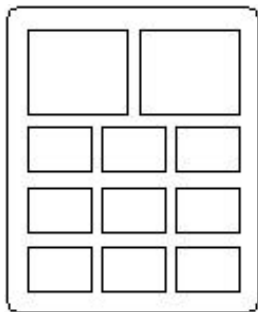


Format ID 102

This format consists of 11 image positions, 2 large images in the upper section of the page and 9 smaller images in the lower section of the page. The size and positioning of the images are defined in terms of the standard formats 6 and 15.

Upper Section: 2 frames occupying top 1/3 of media.

Lower Section: 9 frames occupying bottom 2/3 of media.



Annex C: Unsupported Film Types

The following table illustrates what happens when the MIM receives an unsupported Film Size ID [DICOM element (2010,0050)] or Medium Type ID (2000,0030) from an SCU. This section is added to clarify the MIM behavior when these conditions occur.

The MIM combines the Medium Type and Film Size attributes internally into a composite Film Type. In the event that one or both of these attributes is specified, but does not match a film type that the MIM is configured for, the following evaluation sequence occurs:

1. The highest priority is placed on matching the film base's transparent or reflective property (i.e. Medium Type (2000,0030) of TRANSPARENCY and PAPER).
2. The next priority is granted to the Film Size ID (2010,0050). The MIM will attempt to match the film size to that requested in the N-CREATE Film Box.
3. Finally, an attempt is made to match the Medium Type (2000,0030) of BLUE FILM and CLEAR FILM that was requested.

For the 969 Imagers, if a Film Size cannot be matched, it uses the first media configured in the Supported Media List.

Note: For best results, Print SCU's should either specify films that are installed in the imager or not specify these attributes.

Medium Type Supported	Medium Type Currently Installed	Film Size Supported	Film Size Currently Installed	Result
Yes	Yes	Yes	Yes	The imager prints the page on the specified film type.
Yes	Yes	Yes	No	The imager stores the page in a queue. User must change film magazines to appropriate size to get printout.
Yes	Yes	No	*	The MIM replaces the SCU's Film Size selection with the next largest supported size for the imager. This new Film Size ID is what is passed to the printer. If no larger film size is available, then the next smallest supported film size is selected. In the MIM response to the SCU, the Film Size ID (2010,0050) is modified so that it contains the new Film Size ID. The page is either queued in the imager or printed.
Yes	No	Yes	Yes	The imager will print the page on the currently installed film for that size. The imager has no knowledge of the currently installed film base.

Medium Type Supported	Medium Type Currently Installed	Film Size Supported	Film Size Currently Installed	Result
Yes	No	No	No	The MIM replaces the SCU's Film Size selection with the next largest supported size for the imager. If no larger film size is available, then the next smallest supported film size is selected. This new Film Size ID is what is passed to the imager. In the MIM response to the SCU, the Film Size ID (2010,0050) is modified so that it contains the new Film Size ID. The page is queued in the imager.
No	No	Yes	*	The MIM replaces the SCU's Medium Type selection with the supported medium type for the selected film size for the imager. This new Medium Type ID is what is passed to the imager. The page is queued in the imager.
No	No	No	No	The MIM replaces the SCU's Film Size selection with largest supported size for the destination. This new Film Size ID is what is passed to the imager. The medium type of this new film size will also be selected. In the MIM response to the SCU, the Film Size ID (2010,0050) is modified so that it contains the new Film Size ID. The page is queued in the imager.

Annex D: Printer Specifications

The following tables list the details unique to specific printer models.

Film Size

This table shows the accepted film sizes for each imager. The maximum image size represents the largest image accepted with and without annotation printed on the bottom of the film.

If annotations are printed, some pixel space will be used for the text and the maximum image size will be reduced.

If the minification or crop option is selected, larger images may be printed but some data will be lost in order to fit the images onto the page. In these cases, an icon will be added to the bottom of the page to indicate minification or cropping has been performed.

Imager Model Name	Available Film Sizes	Max Image Size w/o Annotation (Portrait)	Max Image Size w/ Annotation (Portrait)
<i>Kodak Ektascan 2180 Laser Printer</i>	8INX10IN 11INX14IN 14INX14IN 14INX17IN	2286 x 2836 3236 x 4132 4096 x 4132 4096 x 5156**	2286 x 2706 3236 x 4002 4096 x 4002 4096 x 5026**
<i>Kodak Ektascan 1120 Laser Printer</i>	8INX10IN 11INX14IN 14INX14IN 14INX17IN	2304 x 2900 4096 x 3232 4096 x 4108 4096 x 5132	2304 x 2802 4096 x 3134 4096 x 4010 4096 x 5034
<i>Kodak Ektascan 160 Laser Imager</i>	14INX17IN	4361 x 5348	4361 x 5228
<i>Kodak DryView8100 Laser Imager</i>	14INX17IN	4096 x 5217**	4096 x 5133**
<i>Kodak DryView8200 Laser Imager</i>	11INX14IN 14INX14IN 14INX17IN	3272 x 4361 4361 x 4247 4361 x 5223	3272 x 4271 4361 x 4157 4361 x 5133
<i>Kodak DryView8300 Laser Imager</i>	8INX10IN	2256 x 2676**	2256 x 2596
<i>Kodak DryView 8500 Laser Imager</i>	11INX14IN	3388 x 4283	3388 x 4193
<i>Kodak DryView8600 Laser Imager</i>	8INX10IN	5025 x 6200	5025 x 6020

Imager Model Name	Available Film Sizes	Max Image Size w/o Annotation (Portrait)	Max Image Size w/ Annotation (Portrait)
<i>Kodak DryView 8610 Laser Imager</i>	8INX10IN	5025 x 6200	5025 x 6020
<i>Kodak DryView 8700 Laser Imager</i>	14INX17IN	4096 x 5223	4096 x 5133
<i>Kodak DryView 969 HQ Laser Imager</i>	8INX10IN 11INX14IN 14INX17IN	2086 x 2929 3030 x 4096 4096 x 5002	2086 x 2839 3030 x 4006 4096 x 4912
<i>Kodak DryView 969 HQT Laser Imager</i>	14INX17IN	4096 x 5002	4096 x 4912

****Notes:**

Kodak Ektascan 2180 Laser Printer may accept 5196 lines for 14INX17IN film if the imager is configured for extended mode (and corresponding configuration changes made to the Print Server).

Kodak DryView 8100 Laser Imager may accept 4361 pixels if the imager is configured for high resolution mode (and corresponding configuration changes made to the Print Server).

Kodak DryView 8700, 8500 and 969 Laser Imagers will accept 6 less lines for all film sizes when configured to use M952 communications protocol (instead of SuperSet).

The maximum size for *Kodak DryView 8300 Laser Imager* landscape is 2736 x 2136.

Printer Capabilities

This table shows the unique capabilities for each imager.

Imager Model Name	Color / Grayscale	Film Trays	Sorter Bin
<i>Kodak Ektascan 1120 Laser Printer</i>	Grayscale	1	No
<i>Kodak Ektascan 2180 Laser Printer</i>	Grayscale	2	Yes
<i>Kodak Ektascan 160 Laser Imager</i>	Grayscale	1	No
<i>Kodak DryView 8100 Laser Imager</i>	Grayscale	1	No
<i>Kodak DryView 8200 Laser Imager</i>	Grayscale	2	No
<i>Kodak DryView 8300 Laser Imager</i>	Grayscale	1	No
<i>Kodak DryView 8500 Laser Imager</i>	Grayscale	1	No
<i>Kodak DryView 8600 Laser Imager</i>	Grayscale	1	No
<i>Kodak DryView 8610 Laser Imager</i>	Grayscale	1	No
<i>Kodak DryView 8700 Laser Imager</i>	Grayscale	1	No
<i>Kodak DryView 969 HQ and 969 HQT Laser Imagers</i>	Grayscale	1	No

Annex E: Smoothing Type Conversion Table

Conversion from DICOM input:

Input (DICOM)		Output	
Magnification	Smoothing Type	DryView Smoothing Type	Wet Laser Interpolation
None	–	5	None
Replicate	–	0** (Note 1)	Replicate
Bilinear	–	9* (Note 2)	Bilinear
Cubic	0	0** (Note 1)	Cubic1
Cubic	1	1	Cubic1
Cubic	2	2	Cubic1
Cubic	3	3	Cubic1
Cubic	4	4	Cubic1
Cubic	5	5	Cubic1
Cubic	6	6	Cubic2
Cubic	7	7* (Note 2)	Cubic1
Cubic	8	8* (Note 2)	Cubic1
Cubic	9	9* (Note 2)	Cubic1
Cubic	10	10* (Note 2)	Cubic1
Cubic	11	11* (Note 2)	Cubic1
Cubic	12	12* (Note 2)	Cubic1
Cubic	13	13* (Note 2)	Cubic1
Cubic	14	14* (Note 2)	Cubic1
Cubic	15	15* (Note 2)	Cubic1
Cubic	Normal	5	Cubic1
Cubic	Enhanced	6	Cubic2
Cubic	Enhanced1	6	Cubic3

Note 1: For 8600, 8610 and 8300 the Smoothing Type is 1. The 8300 doesn't have replicate.

Note 2: Valid range for smoothing type for 8600, 8610 and 8300 is 1 to 6. Any smoothing type that is greater than 6 will be mapped to 6.

Annex F – Maximum Imageable Area for Multiple Page Format.

The following tables are calculated for portrait formats up to STANDARD\2,3 based on a horizontal and vertical separation of zero and no page or image annotations (received via DICOM Annotation Box or DICOM Film Session Label/Configuration Information).

8600/8610 Laser Imagers w/ MIM

	8INX10IN	
Format	Width	Height
STANDARD\1,1	5025	6200
STANDARD\1,2	5025	3100
STANDARD\2,2	2512	3100
STANDARD\2,3	2512	2066

8700 Laser Imagers w/ MIM

	14INX17IN	
Format	Width	Height
STANDARD\1,1	4096	5223
STANDARD\1,2	4096	2611
STANDARD\2,2	2048	2611
STANDARD\2,3	2048	1741

Notes:

Kodak DryView8700 Laser Imager will accept 6 less lines for all film sizes when configured to use M952 communications protocol (instead of SuperSet).

8100 Laser Imager w/ MIM

	14INX17IN	
Format	Width	Height
STANDARD\1,1	4096	5217
STANDARD\1,2	4096	2608
STANDARD\2,2	2048	2608
STANDARD\2,3	2048	1739

8500 Laser Imager w/ MIM

	11INX14IN	
Format	Width	Height
STANDARD\1,1	3388	4283
STANDARD\1,2	3388	2141
STANDARD\2,2	1694	2141
STANDARD\2,3	1694	1427

Notes:

*Kodak DryView*8500 Laser Imager will accept 6 less lines for all film sizes when configured to use M952 communications protocol (instead of SuperSet).

8300 Laser Imager w/ MIM

	8INX10IN	
Format	Width	Height
STANDARD\1,1	2256	2676
STANDARD\1,2	2256	1338
STANDARD\2,2	1128	1338
STANDARD\2,3	1128	892

8200 Laser Imager w/ MIM

Format	11INX14IN		14INX14IN		14INX17IN	
	Width	Height	Width	Height	Width	Height
STANDARD\1,1	3272	4361	4361	4247	4361	5223
STANDARD\1,2	3272	2180	4361	2123	4361	2611
STANDARD\2,2	1636	2180	2181	2123	2181	2611
STANDARD\2,3	1636	1453	2181	1415	2181	1741

160 Laser Imager w/ MIM

Format	14INX17IN	
	Width	Height
STANDARD\1,1	4361	5348
STANDARD\1,2	4361	2674
STANDARD\2,2	2180	2674
STANDARD\2,3	2180	1782

2180 Laser Printer w/ MIM

Format	8INX10IN		11INX14IN		14INX14IN		14INX17IN	
	Width	Height	Width	Height	Width	Height	Width	Height
STANDARD\1,1	2286	2836	3236	4132	4096	4132	4096	5156
STANDARD\1,2	2286	1418	3236	2066	4096	2066	4096	2578
STANDARD\2,2	1144	1418	1618	2066	2048	2066	2048	2578
STANDARD\2,3	1144	945	1618	1377	2048	1377	2048	1718

1120 Laser Printer w/ MIM:

Format	8INX10IN		11INX14IN		14INX14IN		14INX17IN	
	Width	Height	Width	Height	Width	Height	Width	Height
STANDARD\1,1	2304	2900	4096	3232	4096	4108	4096	5132
STANDARD\1,2	2304	1450	4096	1616	4096	2054	4096	2566
STANDARD\2,2	1152	1450	2048	1616	2048	2054	2048	2566
STANDARD\2,3	1152	966	2048	1077	2048	1369	2048	1710

969HQ Printer w/ MIM

Format	8INX10IN		11INX14IN		14INX17IN	
	Width	Height	Width	Height	Width	Height
STANDARD\1,1	2086	2923	3030	4090	4096	4996
STANDARD\1,2	2086	1461	3030	2045	4096	2498
STANDARD\2,2	1043	1461	1515	2045	2048	2498
STANDARD\2,3	1043	974	1515	1363	2048	1665

969HQT Printer w/ MIM

Format	14INX17IN	
	Width	Height
STANDARD\1,1	4096	4996
STANDARD\1,2	4096	2498
STANDARD\2,2	2048	2498
STANDARD\2,3	2048	1665