

**SIEMENS**

**DICOM 3.0 Conformance Statement**  
**DICOMLink v1.3 for Siemens ICON - Print**

## DICOM Conformance Statement

DICOM 3.0 Conformance Statement — Siemens ICON - Print  
DICOMlink v1.3 for ICON

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MedImage, Inc.

6276 Jackson Road

Ann Arbor, Michigan 48103-9579

Telephone: 734-665-5400

Fax: 734-665-4115

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## 0.0 Introduction

### 0.1 Purpose of This Document

This document states the conformance of the DICOMlink for ICON - Print to the DICOM 3.0 standard. DICOMlink for DELTAMANAGER - Print is one of the two DICOMlink products offered for the ICON. The other product is DICOMlink for ICON - Send/Receive. Any combination of these two products may be purchased.

Siemens ICON is a nuclear medicine acquisition and processing system. DICOMlink is a software option to the ICON system that provides DICOM 3.0 services.

DICOMlink for ICON - Print is a software option to the ICON family of products that provides DICOM 3.0 services. DICOMlink for ICON - Print provides for printing a window or a portion of the computer screen to a DICOM print device. The print is invoked via the keyboard, the key stroke combination is called an Fkey.

#### **DICOMlink for ICON - Print**

(Part number: 900-505)

SCU of the Print Management SOP Classes

C\_ECHO as SCP

Other DICOMlink for ICON options:

#### **DICOMlink for ICON - Send/Receive**

(Part number: 900-501)

## 0.2 Definitions

The following are symbols and abbreviations used within this document.

AE	Application Entity
ACR	American College of Radiology
DICOM	Digital Imaging and Communications in Medicine
DICOMlink	DICOM software application name
DIMSE	DICOM Message Service Element
DIMSE-C	DICOM Message Service Element-Composite
DIMSE-N	DICOM Message Service Element-Normative
Fkey	Keyboard invoked command used to capture a window or portion of screen for printing.
ICON	Siemens Nuclear Medicine Computer system
IOD	Information Object Definition
Media Format	DICOM media format, see part 10 of DICOM standard
NEMA	National Electrical Manufacturers Association
OSI	Open Systems Interconnection
PDU	Protocol Data Unit
SCP	Service Class Provider
SCU	Service Class User
SOP	Service-Object Pair
Tag	A 32 bit integer consisting of a group/element pair
TCP/IP	Transmission Control Protocol/Internet Protocol
UID	Unique Identifier
VR	Value Representation refers to a Tag, see part 5 of NEMA standard
VM	Value Multiplicity of tag, see part 5 of NEMA standard

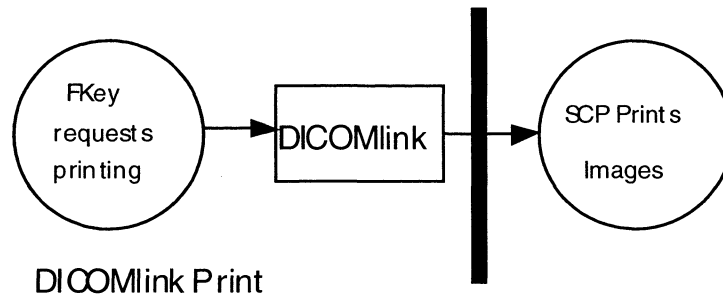
## 1.0 Implementation Model

This implementation acts as a Service Class User (SCU) for sending an image to the DICOM Print Management Service Class Provider. Verification service class is implemented as SCP only.

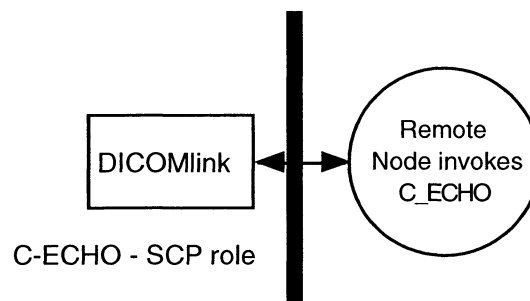
Printing is initiated from the ICON application. The user may print the front window or a portion of the screen. Printing is always 1 up. (Attribute (2010,0010) Image Display Format, Set to STANDARD \ 1,1)

### 1.1 Application Data Flow Diagram

#### 1.1.1 DICOMlink as Print Management SCU - Printing a Picture to a DICOM Printer



#### 1.1.2 DICOMlink as Verification SCP - Servicing remote C\_ECHO request



## 1.2 Functional Definitions of AE's

### 1.2.1 DICOMlink as Print Management SCU - Printing a Picture to a DICOM Printer

DICOMlink manipulates the DICOM Print Management Service Classes to issue a print request to one or more DICOM print devices (SCP's). DICOMlink is implemented as a single Application Entity communicating with an SCP.

### 1.2.2 DICOMlink as Verification SCP - Servicing Remote C\_ECHO Request

DICOMlink response to all C\_ECHO requests.

## 1.3 Sequencing of Real-World Activities

Not applicable.

## 2.0 AE Specifications

DICOMlink acts as a single AE. The operational parameters (including AE title and port number) of DICOMlink are derived from the DICOM Configuration Dialog that is accessible within the DICOMlink Application.

### 2.1 DICOMlink Specification

DICOMlink provides Standard Conformance to the following DICOM V3.0 SOP Storage Classes.

Table 1: Meta SOP Class Conformance as SCU

SOP Class Name	SOP Class UID	Role
Basic Grayscale Print Management Meta	1.2.840.10008.5.1.1.9	SCU
Basic Color Print Management Meta	1.2.840.10008.5.1.1.18	SCU

Table 2: SOP Class Conformance as SCU

SOP Class Name	SOP Class UID	Role
Basic Film Session	1.2.840.10008.5.1.1.1	SCU
Basic Film Box	1.2.840.10008.5.1.1.2	SCU
Basic Grayscale Image Box	1.2.840.10008.5.1.1.4	SCU
Basic Color Image Box	1.2.840.10008.5.1.1.4.1	SCU

Table 3: Verification SOP Class

SOP Class Name	SOP Class UID	Role
Verification - C_ECHO	1.2.840.10008.1.1	SCP

## 2.1.1 Association Establishment Policies

### 2.1.1.1 General

This implementation will generally establish one association per Meta SOP interaction. The operator initiates a print in the ICON application. An association is made for each print.

The default maximum PDU size is 16384 bytes. The operator can adjust this.

### 2.1.1.2 Number of Associations

The DICOMlink software will attempt only one association at a time.

### 2.1.1.3 Asynchronous Nature

There is no asynchronous activity in this implementation. DICOMlink does not handle asynchronous N-EVENT messages.

### 2.1.1.4 Implementation Identifying Information

DICOMlink will provide a single Implementation Class UID (tag [0002,0012]) which is "1.2.124.285.1."  
DICOMlink will provide an implementation version name of "DICOMlink 1.2."

## 2.1.2 Association Initiation Policy

DICOMlink attempts to initiate a new association for each of the following.

Printing a picture supplied by the ICON application.

### 2.1.2.1 Real World Activity 1. Printing a Picture

#### 2.1.2.1.1 Associated Real World Activity

The Associated Real World Activity is the operator selecting the DICOM print Fkey. This Fkey captures either the front window or the user can snap a rectangular region of the console. The picture is placed in the DICOMlink print queue. The Fkey selected determines the printer that will be utilized. As part of the definition of a DICOM print device within the DICOMlink program, the printer is defined as color or grayscale. The appropriate print management meta class is utilized for the given printer.



### 2.1.2.1.2 Proposed Presentation Contexts

Proposed Presentation contexts for DICOMlink

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

### 2.1.2.1.3 SOP Specific Conformance

When a successful response to a print operation is received, a single line of the following form is written to the status window.

<time> Printing to <hostname> (NM): <window name>, OK

If the operation fails, two lines of the following form are written to the status window.

<time> Printing to <hostname> (NM): <studyname> -- Error: <err #>  
in - <error text>

DICOMlink will continue with the next file.

DICOMlink will not attempt any extended negotiation.

For each defined print application entity title, a basic configuration file is provided. This file can be modified to set tags to customize output to a particular printer. The editable elements of the file are provided below.

```
# Sample Printer customization file
#
BASIC_FILM_SESSION # Opening session -CREATE Request
# 20000010 1 # number of copies
# 20000020 # Print Priority one of: 1,0,2 (HIGH(1), MED(0), LOW(2))
# 20000030 # Medium Type one of: PAPER, CLEAR FILM, BLUE FILM
# 20000040 # Film Destination one of: MAGAZINE, PROCESSOR
# 20000050 # Film Session Label
# 20000060 # Memory Allocation
# 21000160 # Reflected Ambient Light
END

BASIC_FILM_BOX # CREATE request
# 20100010 # Image Display Format [DO NOT SET] Note: Only [STANDARD \ 1,1] supported.
# 20100030 # Annotation Display Format ID
# 20100040 LANDSCAPE # Film Orientation one of: PORTRAIT, LANDSCAPE
# 20100050 # Film Size ID one of: 8INX10IN, 10INX14IN,
# 20100060 CUBIC # Magnification Type: REPLICATE, BILINEAR, CUBIC, NONE
# 20100080 NONE # Smoothing Type
# 20100100 BLACK # Border Density one of: BLACK, WHITE
# 20100110 BLACK # Empty Image Density one of: BLACK, WHITE
# 20100120 # Minimum Density
# 20100130 # Maximum Density
# 20100140 YES # Trim one of: YES, NO
# 20100150 # Configuration Information
# 2010015E # Illumination
# 20100160 # Reflected Ambient Light
END

BASIC_COLOR_IMAGE_BOX # SET request
# 20100060 # Magnification Type one of: REPLICATE, BILINEAR, CUBIC, NONE
# 20100080 # Smoothing Type
# 20200010 1 # Image Position [DO NOT SET]
# 20200020 NORMAL # Polarity one of: NORMAL, REVERSE
# 20200030 # Requested Image Size
END

BASIC_COLOR_IMAGE_SEQUENCE # Sequence within BASIC_COLOR_IMAGE_BOX 20200111
# 00280002 3 # Samples per pixel
# 00280004 # Photometric Interpretation [DO NOT SET]
# 00280006 0 # Planar Configuration
# 00280010 # Rows [DO NOT SET]
# 00280011 # Columns [DO NOT SET]
# 00280034 # Pixel Aspect Ratio [DO NOT SET]
# 00280100 # Bits Allocated [DO NOT SET]
# 00280101 # Bits Stored [DO NOT SET]
# 00280102 # High Bit [DO NOT SET]
# 00280103 0 # Pixel Representation
END

BASIC_GRAYSCALE_IMAGE_BOX # SET request
# 20100060 # Magnification Type one of: REPLICATE, BILINEAR, CUBIC, NONE
# 20100080 # Smoothing Type
# 20200010 1 # Image Position [DO NOT SET]
# 20200020 NORMAL # Polarity one of: NORMAL, REVERSE
END

BASIC_GRAYSCALE_IMAGE_SEQUENCE # Sequence within BASIC_GRAYSCALE_IMAGE_BOX 2020,0110
# 00280002 1 # Samples per pixel
# 00280004 # Photometric Interpretation [DO NOT SET]
# 00280010 # Rows [DO NOT SET]
# 00280011 # Columns [DO NOT SET]
# 00280034 # Pixel Aspect Ratio [DO NOT SET]
# 00280100 # Bits Allocated [DO NOT SET]
# 00280101 # Bits Stored [DO NOT SET]
# 00280102 # High Bit [DO NOT SET]
# 00280103 0 # Pixel Representation
END
```

## 2.1.3 Association Acceptance Policy

DICOMlink accepts an association for each of the following real-world activities.

Remote application entity requests an echo. (C\_ECHO)

### 2.1.3.1 Real World Activity 1. Remote Verification

#### 2.1.3.1.1 Associated Real-World Activity - C\_ECHO

Remote node requests an ECHO from the DICOMlink node.

#### 2.1.3.1.2 Presentation Context Table

Verification SCP Presentation Contexts for DICOMlink

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID	DICOM	UID List		
Verification	1.2.840.10008.1.1	Imp. VR Little	1.2.840.10008.1.2	SCP	None
		Exp. VR Big	1.2.840.10008.1.2.2		
		Exp. VR Little	1.2.840.10008.1.2.1		

#### 2.1.3.1.3 SOP Specific Conformance

DICOMlink provides standard conformance to the DICOM Verification Service Class.

#### 2.1.3.1.4 Presentation Context Acceptance Criterion

#### 2.1.3.1.5 Transfer Syntax Selection Policies

DICOMlink accepts all the possible transfer syntaxes. If offered a choice of Transfer Syntaxes in a Presentation Context, it will accept the first matching context.

## 3.0 Communication Profiles

### 3.1 Supported Communications Stacks (Parts 8, 9)

The DICOMlink software provides DICOM V3.0 TCP/IP Network Communications Support as defined in PS 3.8 of the DICOM standard.

### 3.2 TCP/IP Stack

DICOMlink inherits the TCP/IP stack from the Macintosh system upon which it runs. The Macintosh implementation is either through the MacTCP implementation or the Open Transport implementation.

#### 3.2.1 Physical Media Supported

DICOMlink is indifferent to the physical medium over which TCP/IP executes; it inherits this from the Macintosh operating system upon which it operates.

## 4.0 Extensions/Specializations/Privatizations

No specializations, or privatizations are used in this implementation.

## 5.0 Configuration

### 5.1 AE Title/Presentation Address Mapping - Remote Node definition

DICOMlink provides for definition and editing of the remote Application Entities or nodes. For each remote node the operator specifies the host name, service (either Print-Color or Print-B/W), the application entity title, and the port number. The host name must be assigned a TCP/IP address either by the Host file contained within the System Folder or by a name server.

As described in section 2.1.2.1.3, a printer definition file can be customized for each printer defined as a remote node.

## 5.2 Configurable Parameters

### 5.2.1 DICOM Parameters

DICOMlink provides for configuration of the DICOM node within the DICOM application. The following parameters are configurable.

- Application Entity Title
- Port Number
- Maximum Connections (currently 1)
- Maximum PDU size
- DICOM Timeouts for: Connection, Reply, Release and Write
- Low level logging file name and size of logged info
- Selection of logging information

### 5.2.2 Transmit and Receive Parameters

DICOMlink provides for configuration of the DICOM node within the DICOM application. The following parameters are configurable.

- Selection of optional listing file, a file is generated for each print job.
- Message validation checking. One of three levels of validation can be performed: Errors, Errors and warnings, and Errors warning and info.

## 6.0 Support of Extended Character Sets

Extended character sets are not supported by this release.

## NOTES

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