SIEMENS

MEMOSKOP DICOM Bridge

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DICOM Conformance Statement

V 3.2, 22-02-2002

Document ID: 30 99 970-EDS-02S-03

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0 Introduction

This DICOM Conformance Statement of DICOM-Bridge for the Image Storage System MEMOSKOPis written in accordance with Part PS 3.3-1999 of the *Diagnostic Imaging & Communications in Medicine* **(DICOM)** [1] document.

This document is intended to provide the reader with the knowledge of how to integrate this product within a DICOM compliant hospital **network**. It is not applicable to the local removable media such as the Magneto Optical Drive (MOD). MOD (DICOM/TIFF) offline transfer of images which are described in a separate document.

The DICOM-Bridge DICOM Interface acts as a Service Class User (SCU) for Secondary Capture Image Storage and BasicPrint . If the user is unfamiliar with DICOM, it is recommended that they read the DICOM Specification (referenced below) prior to reading this conformance statement. Also note that this document is formatted according to the DICOM Specification, Part 2: Conformance.

0.1 References

[1] Digital Imaging and Communications in Medicine (DICOM), NEMA PS 3.3-13, 1999

[2] ACR-NEMA Digital Imaging and Communications in Medicine, DICOM v3.0. 1996

0.2 Definitions

- **Association Establishment** - An Association Establishment is the first phase of communication between two DICOM Application Entities. The AEs use the Association Establishment to negotiate how data will be encoded and the type of data to be exchanged.
- **Called Application Entity Title** - The Called AE Title defines the intended receiver of an Association.
- **Calling Application Entity Title** - The Calling AE Title defines the requester of an Association.
- **DICOM Message Service Element (DIMSE)** - A DIMSE defines the services and protocols utilized by an Application Entity to exchange messages.
- **Information Object Definition (IOD)** - An IOD is a data model which is an abstraction of real-world information. This data model defines the nature and attributes relevant to the class of real-world objects represented.
- **Service Class Provider (SCP)** - A Service Class Provider plays the "server" role to perform operations and invoke notifications during an Association. An example of a Storage Service Class Provider would be an image storage device. In this case, the image storage device is storing the image that was sent by a Service Class User.
- **Service Class User (SCU)** - A Service Class User plays the "client" role to invoke operations and perform notifications during an Association. An example of a Storage Service Class User would be an image acquisition device. In this case, the image acquisition device will create and send a DICOM image by requesting that a Service Class Provider store that image.
- **Service/Object Pair (SOP) Class** - A SOP Class is defined by the union of an Information Object Definition and a set of DIMSE Services. A DICOM Application Entity may support one or more SOP Classes. Each SOP Class is uniquely identified by a SOP Class UID.
- **SOP Instance** - A specific occurrence of an Information Object.
- **Transfer Syntax** - The Transfer Syntax is a set of encoding rules that allow DICOM Application Entities to negotiate the encoding techniques (e.g. data element structure, byte ordering, compression) they are able to support. The Transfer Syntax is negotiated during Association Negotiation.
- **Unique Identifier (UID)** - A Unique Identifier is a globally unique, ISO compliant, ASCII-numeric string. It guarantees uniqueness across multiple countries, sites, vendors and equipment.

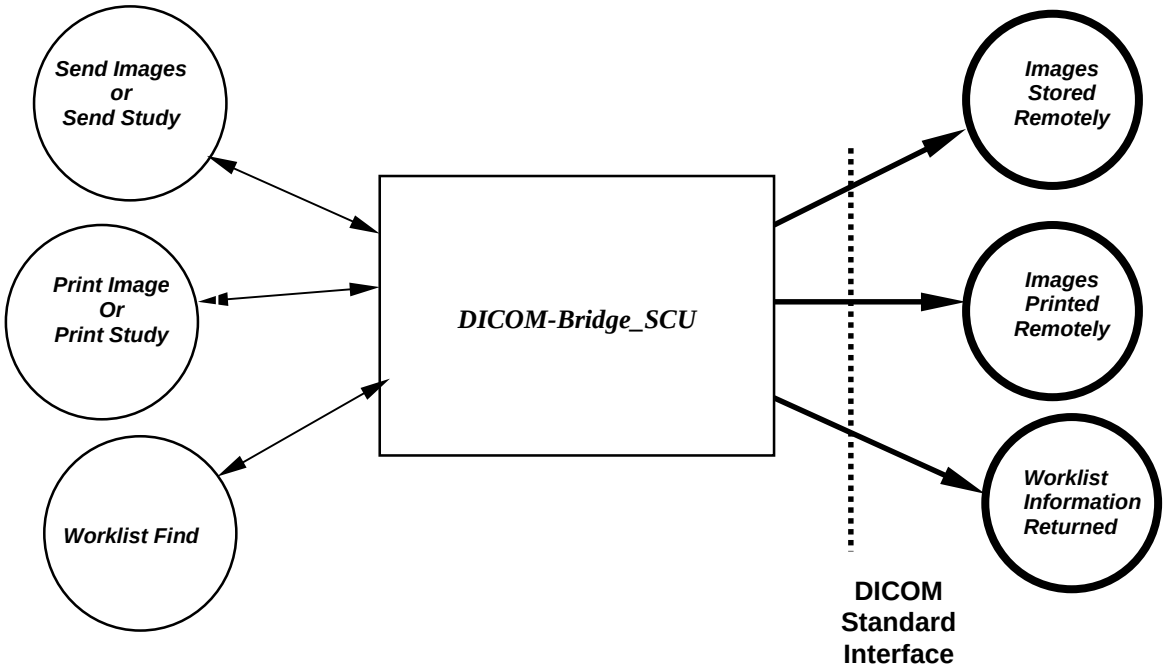
0.3 Acronyms, Abbreviations and Symbols

- ACR — American College of Radiology
- ASCII — American Standard Code for Information Interchange
- AE — Application Entity
- ANSI — American National Standards Institute
- AP — Application Profile.
- DICOM — Digital Imaging and Communications in Medicine
- DIMSE — DICOM Message Service Element
- DIMSE-C — DICOM Message Service Element - Composite
- DIMSE-N — DICOM Message Service Element – Normalized
- IE — Information Entity
- IOD — Information Object Definition
- ISO — International Standards Organization
- MOD — Magnetic-Optical Disk/Drive 90mm (3.5”).
- NEMA — National Electrical Manufacturers Association
- OSI — Open Systems Interconnection
- PDU — Protocol Data Unit
- RIS — Radiology Information System
- RWA — Real-World Activity.
- SCP — Service Class Provider
- SCU — Service Class User
- SOP — Service-Object Pair
- TCP/IP — Transmission Control Protocol/Internet Protocol
- UID — Unique Identifier
- MEMOSKOP — Name of the Image Storage System MEMOSKOP (Type C/C-SUB/FAST) for X-Ray Units

1 Implementation Model

DICOM-Bridge is a **client** application for a **DICOM Service Class User** (**SEND_SCU** for Storage**, PRINT_SCU** for Basic Print). It facilitates image transfer and printing from a **MEMOSKOP** to DICOM v3.0 conformant **Servers and Printers** over a network.

1.1 Application Data Flow Diagram



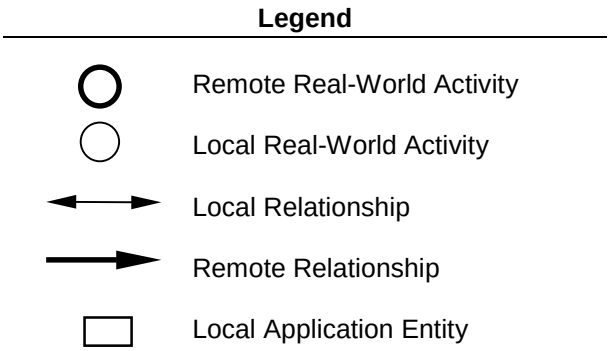


Figure 1.1-1 Implementation Model of DICOM-Bridge

The ***DICOM-Bridge_SCU*** (including ***STORE_SCU, PRINT_SCU*** and ***Worklist_SCU***) provides storage and printer functionality to the X-Ray Unit System. ***STORE_SCU*** requests the **Image Storage Services Class Provider** (**SCP**) of a **DICOM server** over an **association**. On command from the **X-Ray Unit** the ***DICOM-Bridge_SCU*** request an association with the destination that is specified by the **X-Ray Unit** . The destination Application Entity (AE) will be a predefined **DICOM server**, who's node-name and node-address is available to the **DICOM-Bridge** system. Upon receiving an association

acceptance from the server application, this client application will either read images prepared by the **DICOM-Bridge** and **send/print** them over the association or perform a **worklist query**. If errors are encountered during the transfer, the ***DICOM-Bridge_SCU*** will close the association pre-maturely, and the encountered error will be reported to the **X-Ray Unit** . If no errors are encountered, the client application closes the association after the image transfer(s) are completed. A successful completion is reported to the **X-Ray Unit** at that point.

1.1.1 DICOM-Bridge_SCU Store Data Flow Diagram

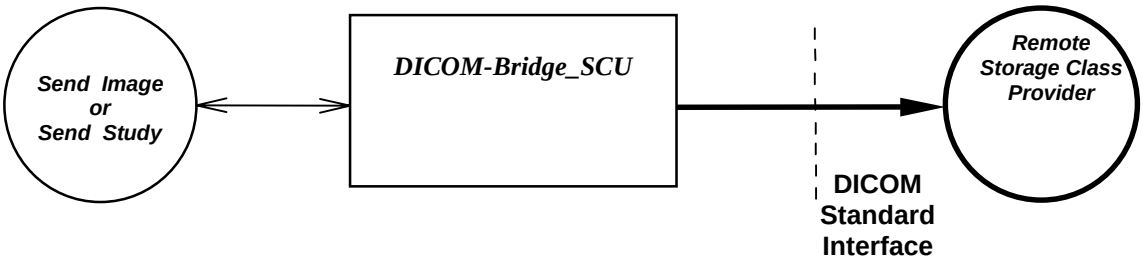


Figure 1.1.1-1 ***DICOM-Bridge_SCU*** Store Implementation Model

1.1.2 DICOM-Bridge_SCU Print Data Flow Diagram

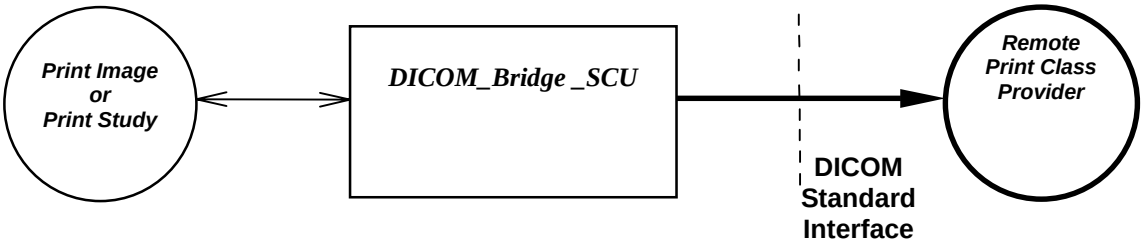


Figure 1.1.2-1 ***DICOM_Bridge _SCU*** Print Implementation Model

1.1.3 DICOM-Bridge_SCU Worklist Query Data Flow Diagram

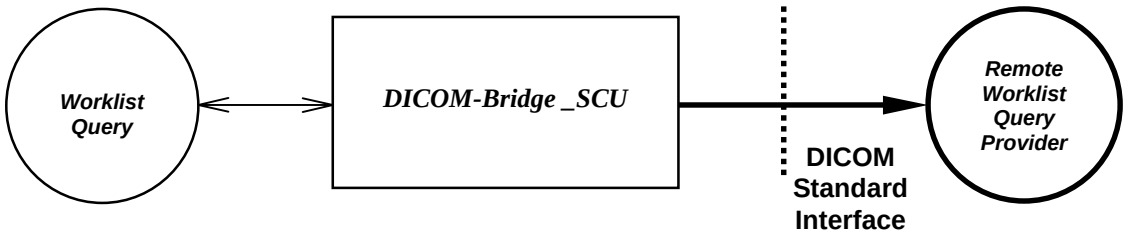


Figure 1.1.3-1 ***DICOM-Bridge _SCU*** Worklist Query Implementation Model

1.2 Functional Definition of AE's

1.2.1 DICOM-Bridge_SCU AE (Storage)

When a command is received from the **MEMOSKOP** to store images the ***DICOM-Bridge_SCU*** uses a pre-determined **Presentation Context** for the destination system, to request an association with the specified destination's **Application Entity**. When the image transfers are complete the ***DICOM-Bridge_SCU*** closes the association and then informs the **MEMOSKOP**, or if an error is encountered then an error code will be sent to the **MEMOSKOP**.

1.2.2 DICOM-Bridge_SCU AE (Printing)

For printing the Basic Grayscale Print Mgt Meta SOP Class and Printer SOP Class are used. The DICOM-Bridge_SCU is configured to access a single Application Entity for printing. Upon receiving a print request from the MEMOSKOP DICOM-Bridge_SCU initatites an association with the Application Entity designated for printing. When the image printing is complete the DICOM-Bridge notifies the MEMOSKOP. If an error is encountered then a code representing the error is sent to the MEMOSKOP.

1.2.3 DICOM-Bridge_SCU AE (Worklist)

For worklist query the Basic Worklist Management Service SOP Class is used. The DICOM-Bridge_SCU is configured to access a single Application Entity for worklist query. Upon receiving a worklist query request from the X-Ray Unit the DICOM-Bridge_SCU initatites an association with the Application Entity designated for worklist query. When the query is complete the DICOM-Bridge notifies the X-Ray Unit . If an error is encountered then a code representing the error is sent to the X-Ray Unit . Otherwise a sorted list of query responses are sent to the X-Ray Unit .

1.3 Sequencing of Real-World Activities

Not Applicable.

2 AE Specifications

AE Specifications for ***DICOM-Bridge_SCU*** as Client mode is given in the section **2.1**. **Data-dictionary** is given in the Appendix.

2.1 DICOM-Bridge_SCU Specification

DICOM-Bridge_SCU AE provides Standard Conformance to the following DICOM SOP Classes as an SCU:

SOP Class Name	SOP Class UID
Storage	
Secondary Capture Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.7
Print	
Print Job SOP Class	1.2.840.10008.5.1.1.14
Basic Grayscale Print Management Meta SOP class	1.2.840.10008.5.1.1.9
Worklist	
Modality Worklist Information Model - FIND	1.2.840.10008.5.1.4.31

Table 2.1-1: Standard SOP Classes supported

2.1.1 DICOM-Bridge_SCU Association Establishment Policies

2.1.1.1 DICOM-Bridge_SCU General

DICOM-Bridge_SCU will attempt to establish an association whenever the MEMOSKOP requests the services of a remote **DICOM server (SCP)**. The application will use a **PDU** size of **16,384 (16K)** bytes. This is however, configurable in the ASSOC_PARMS section of the MERGECOM.PRO file to be 4K, 8K, 16K or greater than 16K bytes using the parameter PDU_MAXIMUM_LENGTH AE Titles are configured in the MERGECOM.APP, and BRIDGE.CFG file.

2.1.1.2 DICOM-Bridge_SCU Number of Associations

DICOM-Bridge_SCU will attempt only one association establishment at a time.

2.1.1.3 DICOM-Bridge_SCU Asynchronous Nature

DICOM-Bridge_SCU allows a single outstanding operation on any association. Therefore, ***DICOM-Bridge_SCU*** does not support asynchronous operations window

negotiation, other than the default as specified by the DICOM specification.

2.1.1.4 DICOM-Bridge_SCU Implementation Identifying Information

DICOM-Bridge_SCU will specify the following Implementation Identifying Information:

- Implementation Class UID 1.3.12.2.1107.5.12.1
- Implementation Version Name MergeCOM3_222

2.1.2 DICOM-Bridge_SCU Association Initiation by Real-World Activity

DICOM-Bridge_SCU initiates an association when the operator chooses the following activity on the MEMOSKOP server:

- Storage - Create and store an SC image to a remote DICOM device
- Print - Print a Basic Grayscale image to a remote DICOM printer
- Worklist - Request Patient Information from a remote DICOM device

2.1.2.1 DICOM-Bridge_SCU Real-World Activity – Storage

2.1.2.1.1 DICOM-Bridge_SCU Associated Real-World Activity - Storage

Image storage services are requested by the operator of the **MEMOSKOP** for a single image or a collection of images comprising a study. The user also selects a destination alias displayed on the user interface screen. The transfer is invoked at the MEMOSKOP host, when the user selects a destination and an image or study to be dispatched.

The DICOM-BRIDGE assembles the necessary information and commands for the ***DICOM-Bridge_SCU*** to initiate an association with a remote SCP. When an association is successfully established, ***DICOM-Bridge_SCU*** sends the image(s) assembled by the DICOM-BRIDGE.

The transfer is aborted and the association is closed if errors are encountered. In such a case, a message is sent to the MEMOSKOP indicating the type of error. The MEMOSKOP will display an error message on the user interface. Otherwise, the association is closed after the image(s) are transferred successfully and a send done message is sent to the MEMOSKOP.

2.1.2.1.2 DICOM-Bridge_SCU Proposed Presentation Contexts – Storage

DICOM-Bridge_SCU proposes the following Presentation Contexts shown in Table 2.1.2.1.2-1 below:

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

Table 2.1.2.1.2-1 : Presentation Contexts for Image Storage of DICOM-Bridge_ SCU

2.1.2.2 DICOM-Bridge_SCU Real-World Activity – Print

2.1.2.2.1 DICOM-Bridge_SCU Associated Real-World Activity - Print

Image print services are requested by the operator of the **MEMOSKOP** for a single image or a collection of images comprising a study. A single printer destination is preconfigured in the DICOM-Bridge configuration files. The user can select the film size, film format, and number of copies on the MEMOSKOP. The transfer is invoked at the MEMOSKOP when the user selects an image or study to be printed.

The DICOM-BRIDGE assembles the necessary information and commands for the ***DICOM-Bridge_SCU*** to initiate an association with a remote printer SCP. When an association is successfully established, ***DICOM-Bridge_SCU*** sends the image(s) assembled by the DICOM-BRIDGE.

The transfer is aborted and the association is closed if errors are encountered. In such a case, a message is sent to the MEMOSKOP indicating the type of error. The MEMOSKOP will display an error message on the user interface. Otherwise, the association is closed after the image(s) are transferred successfully and a print done message is sent to the MEMOSKOP.

2.1.2.2.2 DICOM-Bridge_SCU Proposed Presentation Contexts - Print

DICOM-Bridge_SCU proposes the following Presentation Contexts shown in Table 2.1.2.2.2-1 below:

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**			**Extended**
Name	**UID**	**Name List**	**UID List**	**Role**	**Negotiation**
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9	Implicit VR Little Endian Transfer Syntax Explicit VR Big Endian Transfer Syntax Explicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1	SCU	None
Print Job SOP Class	1.2.840.10008.5.1.1.14	Implicit VR Little Endian Transfer Syntax Explicit VR Big Endian Transfer Syntax Explicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1	SCU	None

Table 2.1.2.2.2-1: Presentation Contexts for Print of DICOM-Bridge_ SCU

2.1.2.3 DICOM-Bridge_SCU Real-World Activity – Worklist Query

2.1.2.3.1 DICOM-Bridge_SCU Associated Real-World Activity – Worklist Query

A worklist query is requested by the operator of the **X-Ray Unit** during patient information entry. A single worklist query provider is preconfigured in the DICOM-Bridge configuration files. The user can restrict the responses by entering partial or complete values for the patient information. The user can also use wild cards to expand the query. The Scheduled Station Name, Date, and Time ranges can be also configured in the user setup menu on the X-Ray Unit . The query is invoked at the X-Ray Unit when the user selects the All Pat key during patient information entry.

The DICOM-BRIDGE assembles the necessary information and commands for the ***DICOM-Bridge_SCU*** to initiate an association with a remote worklist SCP. When an association is successfully established, the ***DICOM-Bridge_SCU*** sends the keys to be matched.

The transfer is aborted and the association is closed if errors are encountered. In such a case, a message is sent to the X-Ray Unit indicating the type of error. The X-Ray Unit will display an error message on the user interface. Otherwise, the responses are received until no more are available or the maximum allowed are received and the association is closed. The responses are sorted by Patient Name and birthdate and sent to the X-Ray Unit . The X-Ray Unit displays the patient information received so the user can select the correct patient information to use in the patient entry screen.

2.1.2.3.2 DICOM-Bridge_SCU Proposed Presentation Contexts – Worklist Query

DICOM-Bridge_SCU proposes the following Presentation Contexts shown in Table 2.1.2.3.2-1 below:

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**			**Extended**
Name	**UID**	**Name List**	**UID List**	**Role**	**Negotiation**
Modality Worklist Information Model - FIND	1.2.840.10008.5.1.4.31	Implicit VR Little Endian Transfer Syntax Explicit VR Big Endian Transfer Syntax Explicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1	SCU	None

Table 2.1.2.3.2-1: Presentation Contexts for Worklist of DICOM-Bridge_SCU

3 Communication Profiles

3.1 Supported Communication Stacks

This product provides DICOM TCP/IP Network Communication Support as defined in PS 3.8 of the DICOM Standard.

3.2 OSI Stack

Not applicable to this product.

3.3 TCP/IP Stack

Inherited from Windows NT upon which it executes.

3.3.1 API

Not applicable to this product.

3.3.2 Physical Media Support

The physical media supported is Ethernet 10Base-T, 10Base2, or 10Base5.

3.4 Point-to-Point Stack

Not applicable to this product.

4 Extensions/ Specializations/ Privatizations

Not applicable to this product.

5 Configuration

The ***DICOM-Bridge_SCU*** obtains configuration information partially from the **MERGE.INI, MERGECOM.APP, MERGECOM.PRO,** and **BRIDGE.CFG**. These files are resident in the same directory as the application executable, while other configuration information may be stored in the NT system files. These files specify **DICOM** association parameters for the application.

5.1 AE Title/Presentation Address Mapping

Presentation address mapping is partially configured in the **NT system** files and the **MERGE.INI, MERGECOM.APP, MERGECOM.PRO,** and **BRIDGE.CFG** file.

5.1.1 AE Title/Presentation Address Mapping (NT System setting)

Following AE Titles are configured in the NT system file:

- The environment variable MERGE_INI needs to be configured in System Variable section of the Environment tab of the System application in the Control Panel.
- The MERGE_INI environment variable points to the MERGE.INI file normally located in the same subdirectory as the DICOM-Bridge executable. The Merge.ini file gives the location of the Mergecom.pro and the MERGECOM.APP configuration files.
- The Bridge.cfg file is located in the same subdirectory as the DICOM-Bridge executable.
- The IP addresses and host names need to be configured in the Windows NT HOSTS file.

5.1.2 AE Title/Presentation Address Mapping

Four parameters are required to map an **AE title** of a **DICOM** server to a Presentation address in **TCP/IP**. These are the host-name of the server, the TCP/IP address, the port-number and the AE title. The **TCP/IP** port number at which the server will be addressed can be configured under IP_ADDRESS in the BRIDGE.CFG file. Finally, the AE title of the **DICOM server** will be the one configured as the AE_TITLE in the BRIDGE.CFG file and MERGECOM.APP file.

The AE title of the client application can be configured under APPLICATION_ENTITY_TITLE in the BRIDGE.CFG file***.***

5.2 Configurable Parameters

The Application Entity Titles, host names, IP-Addresses and port numbers.

The PDU size is set to 16384.

Network Timeout : 120 seconds.

Aspect Ratio Correction: „Enabled“ or „Disabled“

Aspect Ratio Interpolation: „Bilinear“ or „Cubic“

Manufactorer model name

Max. Name and ID length

Max. Worklist Entries

6 Support of Extended Character Sets

DICOM-Bridge_SCU supports ISO-IR 100 (ISO 8859-1 Latin 1) character set.

7 APPENDIX: Data-Dictionary

7.1 Secondary Capture IOD

7.1.1 SC Image IOD Module Table

SC Image IOD Modules

IE	Module	Usage	Remark
Patient	Patient	M	
Study [1)]	General Study	M	
Series [1)]	General Series	M	
Equipment	General Equipment	U	
	SC Equipment	M	
Image	General Image	M	
	Image Pixel	M	
	Overlay Plane	U	
	Modality LUT	U	
	VOI LUT	U	
	SOP Common	M	

[1)] When storing patients to MOD the Study Instance UID, Series Instance UID and SOP Instance UID willl contain the timestamp at which the storage was done. This will result in double patients on the MOD when storing the same patient again because the UID´s mentioned above are not identical.

7.1.1.1 Patient Module Attributes

Attribute Name	Tag	Type	Attribute Description	MEMOSKOP-Setting
Patient's Name	(0010,0010)	2	Patient's full legal name.	as entered on new MEMOSKOP patient data mask includes Lastname and Firstname, separated by ^ (Caret) according to PN-definition in [1]
Patient ID	(0010,0020)	2	Primary hospital identification number or code for the patient.	as entered on new MEMOSKOP patient data mask
Patient's Birth Date	(0010,0030)	2	Birth date of the patient.	as entered on new MEMOSKOP patient data mask
Patient's Sex	(0010,0040)	2	Sex of the named patient. Enumerated Values are: M = male F = female O = other	as entered on new MEMOSKOP patient data mask

7.1.1.2 General Study Module Attributes

Attribute Name	Tag	Type	Attribute Description	MEMOSKOP-Setting
Study Instance UID	(0020,000D)	1	Unique identifier for the Study.	See description on side 21
Study Date	(0008,0020)	2	Date the Study started.	Date the Study was created on Imaging System
Study Time	(0008,0030)	2	Time the Study started.	Time the Study was created on Imaging System
Referring Physician's Name	(0008,0090)	2	Patient's referring physician	Always Length Zero.
Study ID	(0020,0010)	2	User or equipment generated Study identifier.	counting value (1 .. n)
Accession Number	(0008,0050)	2	A RIS generated number that identifies the order for the Study.	as entered on new MEMOSKOP patient data mask
Study Description	(0008,1030)	3	Institution-generated description or classification of the Study (component) performed.	Complete patient folder # or Selected images #

7.1.1.3 General Series Module Attributes

Attribute Name	Tag	Type	Attribute Description	MEMOSKOP-Setting
Modality	(0008,0060)	1	Type of equipment that originally acquired the data used to create the images in this Series.	"RF"
Series Instance UID	(0020,000E)	1	Unique identifier of the Series.	See description on side 21
Series Number	(0020,0011)	2	A number that identifies this Series.	counting value (1 .. n)
Series Date	(0008,0021)	3	Date the Series started.	Date the Series was created on Imaging System
Series Time	(0008,0031)	3	Time the Series started.	Time the Series was created on Imaging System
Series Description	(0008,103E)	3	User provided description of the Series	None, Native, Sub, Loop, Selected

7.1.1.4 General Equipment Module Attributes

Attribute Name	Tag	Type	Attribute Description	MEMOSKOP-Setting
Manufacturer	(0008,0070)	2	Manufacturer of the equipment that produced the digital images.	SIEMENS
Institution Name	(0008,0080)	3	Institution where the equipment is located that produced the digital images.	Hospital nameentered on MEMOSKOP
Device Serial Number	(0018,1000)	3	Manufacturer's serial number of the equipment that produced the digital images.	serial number of X-Ray Unit
Software Versions	(0018,1020)	3	Manufacturer's designation of software version of the equipment that produced the digital images.	Software version of MEMOSKOP

7.1.1.5 SC Image Equipment Module Attributes

Attribute Name	Tag	Type	Attribute Description	MEMOSKOP-Setting
Conversion Type	(0008,0064)	1	Describes the kind of image conversion. Defined Terms are DV = Digitized Video DI = Digital Interface DF = Digitized Film WSD = Workstation	"DI"
Modality	(0008,0060)	3	Source equipment for the image.	RF

7.1.1.6 General Image Module Attributes

Attribute Name	Tag	Type	Attribute Description	MEMOSKOP-Setting
Image Number	(0020,0013)	2	A number that identifies this image	counter-value (0 .. n)
Patient Orientation	(0020,0020)	2C	Patient direction of the rows and columns of the image. Required if image does not require Image Orientation (0020,0037) and Image Position (0020,0032). See C.7.6.1.1.1 for further explanation.	Length zero
Image Date	(0008,0023)	2C	The date the image pixel data creation started. Required if image is part of a series in which the images are temporally related.	The date the image pixel data creation started on Imaging System
Image Time	(0008,0033)	2C	The time the image pixel data creation started. Required if image is part of a series in which the images are temporally related.	The time the image pixel data creation started on Imaging System
Image Type	(0008,0008)	3	Image identification characteristics.	ORIGINAL\PRIMARY (for native without aspect ratio correction) DERIVED\PRIMARY (for subtracted without aspect ratio correction) ORIGINAL\PRIMARY\ASPECTCORRECTED (for native with aspect ratio correction) DERIVED\PRIMARY\ASPECTCORRECTED (for subtracted with aspect ratio correction)
Image Comments	(0020,4000)	3	User-defined comments about the image.	*)

*) Structure of Image Comments:
Programname\Mode\Imagenumber\LUT\Scenename\Dose\Annotation_MaxRow\Annotation_MaxCol\Annotation_Line1Annotation_Line2....Annotation_LineMaxRow\FlipFlag\P/s

7.1.1.7 Image Pixel Module Attributes

Attribute Name	Tag	Type	Attribute Description	MEMOSKOP-Setting
Samples per Pixel	(0028,0002)	1	Number of samples (planes) in this image.	1
Photometric Interpretation	(0028,0004)	1	Specifies the intended interpretation of the pixel data. See	MONOCHROME2
Rows	(0028,0010)	1	Number of rows in the image.	512
Columns	(0028,0011)	1	Number of columns in the image	640
Bits Allocated	(0028,0100)	1	Number of bits allocated for each pixel sample. Each sample shall have the same number of bits allocated. See Part 5 of the DICOM Standard for further explanation.	8
Bits Stored	(0028,0101)	1	Number of bits stored for each pixel sample. Each sample shall have the same number of bits stored. See Part 5 of the DICOM Standard for further explanation.	8
High Bit	(0028,0102)	1	Most significant bit for pixel sample data. Each sample shall have the same high bit. See Part 5 of the DICOM Standard for further explanation.	7
Pixel Representation	(0028,0103)	1	Data representation of the pixel samples. Each sample shall have the same pixel representation. Enumerated Values: 0000H = unsigned integer. 0001H = 2's complement	0000H (unsigned)
Pixel Data	(7FE0,0010)	1	A data stream of the pixel samples which comprise the Image.	raw image pixel data as they were stored on Imaging System

Pixel Aspect Ratio	(0028,0034)	1C	Ratio of the real world spacing of the pixels in the image, specified by a numeric pair: row value (delimiter) column value. Required if the aspect ratio is not 1\1 and the Image Plane Module is not applicable to this Image.	10\11 (with 50 Hz) 100\91 (with 60 Hz) if aspect ratio is not corrected 1\1 if aspect ratio is corrected

7.1.3.1 Overlay Plane Module Attributes

Attribute Name	Tag	Type	Attribute Description	MEMOSKOP-Setting
Rows	(6000,0010)	1	Number of rows in Overlay.	512
Columns	(6000,0011)	1	Number of columns in Overlay.	640
Overlay Type	(6000,0040)	1	Indicates whether this overlay represents a region of interest or other graphics. Enumerated Values: G = Graphics R = ROI.	G
Origin	(6000,0050)	1	Location of first overlay point with respect to pixels in the image, given as row and column.	1,1
Bits Allocated	(6000,0100)	1	Number of bits allocated in the overlay	1
Bit Position	(6000,0102)	1	Bit in which overlay is stored	0
Overlay Data	(6000,3000)	1C	Overlay data shall be contained in this Attribute or imbedded with the image pixel data in Group 7FE0. Required if overlay data are in this Group.	as displayed on MEMOSKOP

7.1.1.8 Modality LUT Module Attributes

Attribute Name	Tag	Type	Attribute Description	MEMOSKOP-Setting
Modality LUT Sequence	(0028,3000)	3	Defines a sequence of Modality LUTs.	add currently active MEMOSKOP-Display-LUT for single image storage; for storage of whole patient image-set use the linear Display-LUT
>LUT Descriptor	(0028,3002)	1C	Specifies the format of the LUT Data in this SequenceRequired if the Modality LUT Sequence(0028,3000) is sent.	add currently active MEMOSKOP-Display-LUT for single image storage; for storage of whole patient image-set use the linear Display-LUT
>LUT Explanation	(0028,3003)	3	Free form text explanation of the meaning of the LUT.	add currently active MEMOSKOP-Display-LUT for single image storage; for storage of whole patient image-set use the linear Display-LUT
>Modality LUT Type	(0028,3004)	1C	Specifies the output values of this Modality LUT. Required if the Modality LUT Sequence(0028,3000) is sent.	add currently active MEMOSKOP-Display-LUT for single image storage; for storage of whole patient image-set use the linear Display-LUT
>LUT Data	(0028,3006)	1C	LUT Data in this Sequence. If padding is required to complete a full word, the padding value shall be 0. Required if the Modality LUT Sequence(0028,3000) is sent.	add currently active MEMOSKOP-Display-LUT for single image storage; for storage of whole patient image-set use the linear Display-LUT

7.1.1.9 VOI LUT Module Attributes

Attribute Name	Tag	Type	Attribute Description	MEMOSKOP-Setting
Window Center	(0028,1050)	3	Window Center for display.	128
Window Width	(0028,1051)	1C	Window Width for display. Required if Window Center (0028,1050) is sent.	255 MSFAST 256 MEMOSKOP C/C-SUB

7.1.1.10 SOP Common Module Attributes

Attribute Name	Tag	Type	Attribute Description	MEMOSKOP-Setting
SOP Class UID	(0008,0016)		Uniquely identifies the SOP Class	"1.2.840.10008.5.1.4.1.1.7"
SOP Instance UID	(0008,0018)		Uniquely identifies the SOP Instance.	"1.3.12.2.1107.5.12.1. serial_number. YYYYMMDD hhmmssnnnnnn" see also description on side 21
Specific Character Set	(0008,0005)	1C	Character Set that expands or replaces the Basic Graphic Set. Required if an expanded or replacement character set is used.	ISO_IR 100
Instance Creation Date	(0008,0012)	3	Date the SOP Instance was created.	Send date
Instance Creation Time	(0008,0013)	3	Time the SOP Instance was created.	Send time
Instance Creator UID	(0008,0014)	3	Uniquely identifies device which created the SOP Instance.	"1.3.12.2.1107.5.12.1"

7.1.2 Basic Grayscale Print Mgt IOD´s

7.1.2.1 Basic Film Session Presentation Module

Attribute name	Tag	Description	MEMOSKOP-Setting
Number of Copies	(2000,0010)	Number of copies to be printed for each film of the film session.	as selected by the user; max. value set in BRIDGE.CFG-file
Print Priority	(2000,0020)	Specifies the priority of the print job; Enumerated Values: HIGH MED LOW	as setup in BRIDGE.CFG-file if set to <none> in BRIDGE.CFG-file the tag is not sent and camera uses default value;
Medium Type	(2000,0030)	Type of medium on which the print job will be printed; Defined Terms: PAPER CLEAR FILM BLUE FILM	as setup in BRIDGE.CFG-file if set to <none> in BRIDGE.CFG-file the tag is not sent and camera uses default value;
Film Destination	(2000,0040)	Film destination; Enumerated Values: MAGAZINE = the exposed film is stored in film magazine PROCESSOR = the exposed film is developed in film processor	as setup in BRIDGE.CFG-file if set to <none> in BRIDGE.CFG-file the tag is not sent and camera uses default value;
Film Session Label	(2000,0050)	Human readable label that identifies the film session	as setup in BRIDGE.CFG-file if set to <none> in BRIDGE.CFG-file the tag is not sent and camera uses default value;

7.1.2.2 Basic Film Box Presentation Module

Attribute Name	Tag	Description	MEMOSKOP-Setting
Image Display Format	(2010,0010)	Type of image display format; Enumerated Values: STANDARD\C,R : film contains equal size rectangular image boxes with R rows of image boxes and C columns of image boxes; C and R are integers	as setup in BRIDGE.CFG-file
Film Orientation	(2010,0040)	Film orientation; Enumerated Values: PORTRAIT = vertical film position LANDSCAPE = horizontal film position	as setup in BRIDGE.CFG-file
Film Size ID	(2010,0050)	Film size identification; Defined Terms: 8INX10IN 10INX12IN 10INX14IN 11INX14IN 14INX14IN 14INX17IN 24CMX24CM 24CMX30CM NOTE: 10INX14IN corresponds with 25.7CMX36.4 CM	as selected by the user; possible values are set in BRIDGE.CFG-file
Magnification Type	(2010,0060)	Interpolation type by which the printer magnifies the image in order to fit the image in the image box on film; Defined Terms: REPLICATE BILINEAR CUBIC NONE	as setup in BRIDGE.CFG-file

Smoothing Type	(2010,0080)	Further specifies the type of the interpolation function; values are defined in Conformance Statement; only valid for Magnification Type (2010,0060) = CUBIC	as setup in BRIDGE.CFG-file
Border Density	(2010,0100)	Density of the film areas surrounding and between images on the film; Defined Terms: BLACK WHITE i where i represents the desired density in hundreds of OD (e.g. 150 corresponds with 1.5 OD)	as setup in BRIDGE.CFG-file
Empty Image Density	(2010,0110)	Density of the image box area on the film that contains no image; Defined Terms: BLACK WHITE i where i represents the desired density in hundreds of OD (e.g. 150 corresponds with 1.5 OD)	as setup in BRIDGE.CFG-file
Min Density	(2010,0120)	Minimum density of the images on the film, expressed in hundreds of OD; if Min Density is lower than minimum printer density than Min Density is set to minimum printer density. See also note	as setup in BRIDGE.CFG-file
Max Density	(2010,0130)	Maximum density of the images on the film, expressed in hundreds of OD; if Max Density is higher than maximum printer density than Max Density is set to maximum printer density. See also note	as setup in BRIDGE.CFG-file
Trim	(2010,0140)	Specifies whether a trim box shall be printed surrounding each image on the film; Enumerated Values: YES NO	as setup in BRIDGE.CFG-file

Configuration Information	(2010,0150)	Character string that contains either the ID of the printer configuration table that contains a set of values for implementation specific print parameters (e.g. perception LUT related parameters) or one or more configuration data values, encoded as characters. If there are multiple configuration data values encoded in the string, they shall be separated by backslashes. The definition of values shall be contained in the SCP's Conformance Statement.	not used
Referenced Film Session Sequence	(2010,0500)	A sequence which provides references to a Film Session SOP Class/Instance pairs. Encoded as a sequence of items : (0008,1150) and (0008,1155)	reference to created film session
>Referenced SOP Class UID	(0008,1150)	Uniquely identifies the referenced SOP Class.	reference to created film session
>Referenced SOP Instance UID	(0008,1155)	Uniquely identifies the referenced SOP Instance.	reference to created film session
Referenced Image Box Sequence	(2010,0510)	A sequence which provides references to a set of Image Box SOP Class/Instance pairs. Encoded as a sequence of items : (0008,1150) and (0008,1155)	reference to created Image Box Sequence
>Referenced SOP Class UID	(0008,1150)	Uniquely identifies the referenced SOP Class.	reference to created Image Box Sequence
>Referenced SOP Instance UID	(0008,1155)	Uniquely identifies the referenced SOP Instance.	reference to created Image Box Sequence

7.1.2.3 Image Box Pixel Presentation Module

Attribute Name	Tag	Description	MEMOSKOP-Setting
Image Position	(2020,0010)	The position of the image on the film, based on Image Display Format (2010,0010).	counted by bridge sw
Polarity	(2020,0020)	Specifies whether minimum pixel values (after VOI LUT transformation) are to printed black or white; Enumerated Values: NORMAL = pixels shall be printed as specified by the Photometric Interpretation (0028,0004) REVERSE = pixels shall be printed with the opposite polarity as specified by the Photometric Interpretation (0028,0004) If Polarity (2020,0020) is not specified by the SCU, the SCP shall print with NORMAL polarity.	as setup in BRIDGE.CFG-file
Preformatted Grayscale Image Sequence	(2020,0110)	A sequence which provides the content of the Preformatted Grayscale Image Pixel Attributes. It is encoded as a sequence of Attributes of the Image Pixel Module.	image data
>Samples Per Pixel	(0028,0002)	Enumerated Value: 1	same as for SC Image Pixel Module
>Photometric Interpretation	(0028,0004)	Enumerated Values: MONOCHROME1 MONOCHROME2	same as for SC Image Pixel Module
>Rows	(0028,0010)	N/A	same as for SC Image Pixel Module
>Columns	(0028,0011)	N/A	same as for SC Image Pixel Module
>Pixel Aspect Ratio	(0028,0034)	N/A	same as for SC Image Pixel Module
>Bits Allocated	(0028,0100)	Enumerated Values: 8 (if Bits Stored = 8) 16 (if Bits Stored = 12)	same as for SC Image Pixel Module
>Bits Stored	(0028,0101)	Enumerated Values: 8, 12	same as for SC Image Pixel Module

>High Bit	(0028,0102)	Enumerated Values: 7 (if BITS STORED = 8) 11 (if BITS STORED = 12)	same as for SC Image Pixel Module
>Pixel Representation	(0028,0103)	Enumerated Value: 0000 (unsigned integer)	same as for SC Image Pixel Module
>Pixel Data	(7FE0,0010)	N/A	same as for SC Image Pixel Module

7.1.2.4 Printer Module

Attribute Name	Tag	Description	MEMOSKOP-Setting
Printer Status	(2110,0010)	Printer device status; Enumerated Values: NORMAL WARNING FAILURE	evaluated by DICOM Bridge
Printer Status Info	(2110,0020)	Additional information when Printer Status (2110,0010) is WARNING or FAILURE. Defined Terms when the Printer Status is equal to WARNING: SUPPLY EMPTY = Printer is out of film SUPPLY LOW = Film supply low RECEIVER FULL = Film receiver magazine full FILM JAM = Film Jam No Defined Terms are currently specified for when the Execution Status is equal to FAILURE.	evaluated by DICOM Bridge
Printer Name	(2110,0030)	User defined name identifying the printer	not evaluated by DICOM Bridge
Manufacturer	(0008,0070)	Manufacturer of the printer	not evaluated by DICOM Bridge
Manufacturer Model Name	(0008,1090)	Manufacturer's model number of the printer	not evaluated by DICOM Bridge
Device Serial Number	(0018,1000)	Manufacturer's serial number of the printer	not evaluated by DICOM Bridge
Software Versions	(0018,1020)	Manufacturer's designation of software version of the printer	not evaluated by DICOM Bridge
Date Of Last Calibration	(0018,1200)	Date when the printer was last calibrated	not evaluated by DICOM Bridge
Time Of Last Calibration	(0018,1201)	Time when the printer was last calibrated	not evaluated by DICOM Bridge

7.1.3 Basic Worklist Mgt IOD´s

7.1.3.1 Search Keys Attributes of Worklist C-FIND

7.1.3.1.1 SOP Common Module

Attribute Name	Tag	Attribute Description	MEMOSKOP-Setting
Specific Character Set	(0008,0005)	Character Set that expands or replaces the Basic Graphic Set.	“ISO_IR 100“

7.1.3.1.2 Scheduled Procedure Step Module

Attribute Name	Tag	Attribute Description	MEMOSKOP-Setting
Scheduled Procedure Step Sequence	(0040,0100)	One or more Scheduled Procedure Steps for one Requested Procedure.	
>Scheduled Station AE Title	(0040,0001)	The AE title of the modality on which the Scheduled Procedure Step is scheduled to be performed.	as selected by the user in the User Setup Menu
>Scheduled Station Name	(0040,0010)	An institution defined name for the modality on which the Scheduled Procedure Step is scheduled to be performed.	as selected by the user in the User Setup Menu
>Scheduled Procedure Step Start Date	(0040,0002)	Date on which the Scheduled Procedure Step is scheduled to start.	as selected by the user in the User Setup Menu
>Scheduled Procedure Step Start Time	(0040,0003)	Time at which the Scheduled Procedure Step is scheduled to start.	as selected by the user in the User Setup Menu
>Scheduled Performing Physician’s Name	(0040,0006)	Name of the physician scheduled to administer the Scheduled Procedure Step.	NULL
>Scheduled Procedure Step Description	(0040,0007)	Institution-generated description or classification of the Scheduled Procedure Step to be performed. Note: The purpose of this attribute is to store a description or classification that is used at a local level (e.g., a hospital or a managed care network), and this description need not comply to an accepted standard.	NULL
>Scheduled Action Item Code Sequence	(0040,0008)	Sequence describing the Scheduled Action Item(s) following a specified coding scheme. This sequence contains one or more Action Items.	NULL
>Scheduled Procedure Step ID	(0040,0009)	Identifier which identifies the Scheduled Procedure Step.	NULL
>Modality	(0008,0060)	Source equipment for the image. See PS 3.3 for Enumerated Values	as selected by the user in the User Setup Menu

7.1.3.1.3 Requested Procedure Module

Attribute Name	Tag	Attribute Description	MEMOSKOP-Setting
Requested Procuedure ID	(0040,1001)	Identifier which identifies the Requested Procedure in the Imaging Service Request	NULL
Requested Procedure Description	(0032,1060)	Institution-generated administrative description or classification of Requested Procedure	NULL
Requested Procedure Code Sequence	(0032,1064)	Institution-generated administrative description or classification of Requested Procedure	NULL
Study Instance UID	(0020,000D)	Unique identifier to be used to identify the Study	NULL
Referenced Study Sequence	(0008,1110)	Uniquely identifies the Study SOP Instances associaated with this SOP Instance	NULL

7.1.3.1.4 Imaging Service Request Module

Attribute Name	Tag	Attribute Description	MEMOSKOP-Setting
Accession Number	(0008,0050)	A departmental IS generated number which identifies the order for the Imaging Service Request	As entered on new patient data mask
Referring Physician's Name	(0008,0090)	Patient‘s primary physician for this Imaging Service Request	NULL

7.1.3.1.5 Patient Identification Module

Attribute Name	Tag	Attribute Description	MEMOSKOP-Setting
Patient's Name	(0010,0010)	Patient's full legal name	as entered on patient data mask Includes Lastname, Firstname, Middlename, Prefix and Suffix separated by ^ (Caret) according to PN-definition in [1] Includes ‘*‘ and ‘?‘ wildcards
Patient ID	(0010,0020)	Primary hospital identification number or code for the patient	As entered on patient data mask

7.1.3.2 Returned Keys Attributes of Worklist C-FIND

7.1.3.2.1 Scheduled Procedure Step Module

Attribute Name	Tag	Attribute Description	Notes
Scheduled Procedure Step Sequence	(0040,0100)	One or more Scheduled Procedure Steps for one Requested Procedure.	

7.1.3.2.2 Imaging Service Request Module

Attribute Name	Tag	Attribute Description	Notes
Accession Number	(0008,0050)	A departmental IS generated number Which identifies the order for the Imaging Service Request	

7.1.3.2.3 Patient Identification Module

Attribute Name	Tag	Attribute Description	Notes
Patient's Name	(0010,0010)	Patient's full legal name	
Patient ID	(0010,0020)	Primary hospital identification number or code for the patient	

7.1.3.2.4 Patient Demographic Module

Attribute Name	Tag	Attribute Description	Notes
Patient's Birth Date	(0010,0030)	Date of birth of the named patient	
Patient's Sex	(0010,0040)	Sex of the named patient. Enumerated values: M=male F=female O=other	