STD-GEN-DVD-JPEG	Create Media (DVD)	FSC	Interchange
STD-GEN-USB-JPEG STD-GEN-USB-J2K	Browse Media (USB) Restore Media (USB)	FSR	Interchange
STD-GEN-USB-JPEG	Create Media (USB)	FSC	Interchange

Note: The supported compressed transfer syntaxes in STD-GEN-DVD-JPEG, STD-GEN-DVD-J2K, STD-GEN-USB-JPEG and STD-GEN-USB-J2K are defined in by Compressed Transfer Group in **Table 2.3–1**

3.3.1.1 File Meta Information for the DICOM MEDIA SERVER Application Entity

See the table in Section 3.2.4 - File Meta Information Options (See PS3.10).

3.3.1.2 Real-World Activities for the DICOM MEDIA SERVER Application Entity

3.3.1.2.1 Real-World Activity (RWA) "Browse Media"

The CD/DVD/USB DICOM Media Server AE acts as an FSR using the interchange option when requested to browse the media.

When the CD/DVD/USB DICOM Media Server AE is requested to provide a directory listing, it reads the File-set and displays the DICOMDIR directory entries, according to the PATIENT, STUDY, SERIES, IMAGE paradigm.

If the DICOMDIR file is not found in the File-set, Free Image Importer is activated to choose individual files to import from the media.

3.3.1.2.1.1 Media Storage Application Profile for the RWA "Browse Media"

For the list of Application Profiles that invoke this AE for the Browse Media RWA, see the Table in Section 3.3.1.2.3.1.

3.3.1.2.1.1.1 Options

Following are the SOP Classes supported by the RWA "Browse Media":

Information Object Definition	SOP Class UID	Transfer Syntax	Transfer Syntax UID
Media Storage Directory Storage	1.2.840.10008.1.3.10	Explicit VR Little Endian	1.2.840.10008.1.2.1

3.3.1.2.2 Real-World Activity (RWA) "Restore Media"

The CD/DVD/USB DICOM Media Server AE acts as an FSR using the interchange option when requested to copy SOP instances from the media to the local database.

The user selects the SOP instances that he wants the CD/DVD/USB DICOM Media Server AE to copy on the local database by a drag and drop on the local browser icon or

by clicking on the suitable restore buttons. Once selected, the SOP instances are copied from the media to the local database.

Only, the SOP classes supported by the station are declared to the database in a transfer syntax supported by the station.

3.3.1.2.2.1 Media Storage Application Profile for the RWA "Restore Media"

For the list of Application Profiles that invoke this AE for the Restore Media RWA, see the Table in Section 3.3.1.2.3.1.

3.3.1.2.2.1.1 Options

Following are the SOP Classes and transfer syntaxes are supported by the RWA "Restore Media":

Information Object Definition	SOP Class UID	Transfer Syntax Group
Computed Radiographic Image Storage	1.2.840.10008.5.1.4.1.1.1	Uncompressed Transfer Group Compressed Transfer Group
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	
Xray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	
Xray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	
Digital X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.1	
Digital X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	
Digital Mammography X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.2	
Digital Mammography X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	
Standalone Curve Storage	1.2.840.10008.5.1.4.1.1.9	
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	
Standalone PET Curve Storage	1.2.840.10008.5.1.4.1.1.129	
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1	
RT Dose Storage	1.2.840.10008.5.1.4.1.1.481.2	
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3	

RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5	
NM Genie Private Data	1.2.840.113619.4.27	
PET Advance Private Data	1.2.840.113619.4.30	
GE Private DICOM 3D object	1.2.840.113619.4.26	
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	
Ultrasound Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6	
Ultrasound Multi-frame Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.3	
Basic Text SR	1.2.840.10008.5.1.4.1.1.88.11	
Enhanced SR	1.2.840.10008.5.1.4.1.1.88.22	
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33	
Mammography CAD SR	1.2.840.10008.5.1.4.1.1.88.50	
Spatial Registration Storage	1.2.840.10008.5.1.4.1.1.66.1	
Deformable Spatial Registration Storage	1.2.840.10008.5.1.4.1.1.66.3	
Key Object Selection Document Storage	1.2.840.10008.5.1.4.1.1.88.59	
X-Ray Radiation Dose SR Storage	1.2.840.10008.5.1.4.1.1.88.67	
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	

Note: SOP instances encoded with an encapsulated Transfer Syntax and which contain encapsulated Pixel Data (7FE0,0010) nested within a Sequence Data element are not copied on the local database.

Note: SOP instances encoded with an encapsulated Transfer Syntax and which contain the Digital Signatures Sequence (FFFA,FFFA) or the Data Set Trailing Padding attribute (FFFC,FFFC) are not copied on the local database.

Note: When copying on the local database a SOP instance encoded with a lossy encapsulated Transfer Syntax on the media, the SOP instance is copied using a non encapsulated Transfer Syntax and the Lossy Image Compression attribute (0028,2110) is added and set to “01”.

Note: Grayscale Softcopy Presentation State Storage (1.2.840.10008.5.1.4.1.1.11.1) and Blending Softcopy Presentation State Storage (1.2.840.10008.5.1.4.1.1.11.4) abstract syntax is received on network / read from media and some properties (image number, date/time, description and creator’s name) are displayed in the BROWSER but the basic Advantage Workstation 4.7 applications cannot display this object in a meaningful way (only black image is visible) and objects content is not taken into account while displaying the referenced images.

Note: SOP instances encoded with an encapsulated Transfer Syntax and which contain encapsulated Pixel Data (7FE0,0010) nested within a Sequence Data element are not copied on the local database.

Note: NM Genie Private Data (1.2.840.113619.4.27), PET Advance Private Data (1.2.840.113619.4.30) and GE Private DICOM 3D object (1.2.840.113619.4.26) Objects are expected as "IMAGE" directory record type.

Note: See **Table 2.3–1** for the list of transfer syntaxes available for the Transfer Syntax Group.

3.3.1.2.3 Real-World Activity (RWA) "Create Media"

The CD/DVD/USB DICOM Media Server AE acts as an FSC using the interchange option when requested to copy SOP Instances from the local database to one or multiple interchange media.

The user selects the entries in the local database that he wants the CD/DVD/USB DICOM Media Server AE to copy onto interchange media.

The graphic interface (CD/DVD/USB Composer) allows the user to select the entries in the local database to be copied onto one or more interchange media. He/she may

- Add patients, studies, series or images from the local database onto the CD/DVD/USB Composer
- Remove patients, studies, series or images from the CD/DVD/USB Composer.

The CD/DVD/USB Composer will create one File Set per generated interchange media.

The user has the opportunity to choose some options before composing the interchange media:

- The type of interchange media: to create: CD, DVD or USB
- The DICOM profile used for writing the interchange media. The user has the opportunity to choose:
  - the "General Purpose option"
    No images are compressed images on the media.
    The following table lists the used media profile selected by Media Type in this case.

Interchange Media	Media profile used
CD	STD-GEN-CD
DVD	STD-GEN-DVD-JPEG
USB	STD-GEN-USB-JPEG

  - the "Compress XA 512 Cardiac option"
    XA 512x512 (8 bits) are always being saved compressed with JPEG lossless Process 14(1.2.840.10008.1.2.4.70).
    The following table lists the used media profile selected by Media Type in this case.

Interchange Media	Only XA 512x512 (8 bits) images selected	Otherwise
CD	STD-XABC-CD	AUG-XABC-CD

DVD	STD-GEN-DVD-JPEG	STD-GEN-DVD-JPEG
USB	STD-GEN-USB-JPEG	STD-GEN-USB-JPEG

- Burn a DICOM Image Viewer along with the images (not for USB).
- Burn a DICOM SR Viewer along with the images (also for USB)
- Reduce the resolution of XA Cardiac images to 512x512x8bits. This procedure is the *downscan processing* and it manages images of the following resolutions: 1000x1000x8bits, 864x864x8bits, 800x800x8bits, 736X736x8bits and 608x608x8bits. The CD/DVD/USB DICOM Media Server AE will generate new images from the input images.

The user has the opportunity to choose some options after composing the interchange media:

- Read after write mode to check the binary integrity of what is written on the interchange media.
- Update the number of copies to generate.

The user has to insert blank CD/DVD disc or any FAT16/32 formatted USB device into the drive. Before writing the disc, the CD/DVD DICOM Media Server AE checks that the inserted media is blank and writable. If the condition is not met, an error is displayed and the disc is ejected.

Before writing to USB media the user has to choose the right partition on media. If the filesystem is not VFAT an error is displayed to the user.

Note: The corresponding SOP instances are set to the Explicit VR Little Endian transfer syntax and copied to the interchange media. Unknown Private Data Elements are encoded with the DICOM unknown Value Representation.

Note: Limitations: Because of resource allocation issues USB Media Composer cannot add more than 60.000 images in a session and maintain more than 300.000 images on the media in total.

3.3.1.2.3.1 Media Storage Application Profile for the RWA "Create Media"

This AE can use the following profiles for the RWA "Create Media":

- STD-GEN-CD
- STD-XABC-CD
- AUG-XABC-CD
- STD-GEN-DVD-JPEG
- STD-GEN-USB-JPEG

Please refer to the Table in Section 3.3.1.

3.3.1.2.3.1.1 Options

Following are the SOP Classes supported by the RWA "Create Media":

Information Object Definition	SOP Class UID	Transfer Syntax	Transfer Syntax UID
Media Storage Directory Storage	1.2.840.10008.1.3.10	Explicit VR Little Endian	1.2.840.10008.1.2.1
Computed Radiographic Image Storage	1.2.840.10008.5.1.4.1.1.1	Explicit VR Little Endian	1.2.840.10008.1.2.1
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	Explicit VR Little Endian	1.2.840.10008.1.2.1
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	Explicit VR Little Endian	1.2.840.10008.1.2.1
Xray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	Explicit VR Little Endian JPEG lossless Process 14 (selection value 1) for images 512x512 (8bits).	1.2.840.10008.1.2.1 1.2.840.10008.1.2.4.70 for images 512x512 (8bits).
Xray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	Explicit VR Little Endian	1.2.840.10008.1.2.1
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Explicit VR Little Endian	1.2.840.10008.1.2.1
Digital X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.1	Explicit VR Little Endian	1.2.840.10008.1.2.1
Digital X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	Explicit VR Little Endian	1.2.840.10008.1.2.1
Digital Mammography X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.2	Explicit VR Little Endian	1.2.840.10008.1.2.1
Digital Mammography X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	Explicit VR Little Endian	1.2.840.10008.1.2.1
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	Explicit VR Little Endian	1.2.840.10008.1.2.1
Standalone Curve Storage	1.2.840.10008.5.1.4.1.1.9	Explicit VR Little Endian	1.2.840.10008.1.2.1
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	Explicit VR Little Endian	1.2.840.10008.1.2.1
Standalone PET Curve Storage	1.2.840.10008.5.1.4.1.1.129	Explicit VR Little Endian	1.2.840.10008.1.2.1
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1	Explicit VR Little Endian	1.2.840.10008.1.2.1
RT Dose Storage	1.2.840.10008.5.1.4.1.1.481.2	Explicit VR Little Endian	1.2.840.10008.1.2.1
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3	Explicit VR Little Endian	1.2.840.10008.1.2.1
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5	Explicit VR Little Endian	1.2.840.10008.1.2.1
GE Private DICOM 3D object	1.2.840.113619.4.26	Explicit VR Little Endian	1.2.840.10008.1.2.1

Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	Explicit VR Little Endian	1.2.840.10008.1.2.1
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	Explicit VR Little Endian	1.2.840.10008.1.2.1
Ultrasound Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6	Explicit VR Little Endian	1.2.840.10008.1.2.1
Ultrasound Multi-frame Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.3	Explicit VR Little Endian	1.2.840.10008.1.2.1
Basic Text SR	1.2.840.10008.5.1.4.1.1.88.11	Explicit VR Little Endian	1.2.840.10008.1.2.1
Enhanced SR	1.2.840.10008.5.1.4.1.1.88.22	Explicit VR Little Endian	1.2.840.10008.1.2.1
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33	Explicit VR Little Endian	1.2.840.10008.1.2.1
Mammography CAD SR	1.2.840.10008.5.1.4.1.1.88.50	Explicit VR Little Endian	1.2.840.10008.1.2.1
Spatial Registration Storage	1.2.840.10008.5.1.4.1.1.66.1	Explicit VR Little Endian	1.2.840.10008.1.2.1
Deformable Spatial Registration Storage	1.2.840.10008.5.1.4.1.1.66.3	Explicit VR Little Endian	1.2.840.10008.1.2.1
Key Object Selection Document Storage	1.2.840.10008.5.1.4.1.1.88.59	Explicit VR Little Endian	1.2.840.10008.1.2.1
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	Explicit VR Little Endian	1.2.840.10008.1.2.1

Note: If the "Compress XA 512 Cardiac option" (AUG-XABC-CD for CDs, STD-GEN-DVD-JPEG for DVDs and STD-GEN-USB-JPEG for USBs) has been chosen by the user, Xray Angiographic Instances which contain Pixel Data (7FE0,0010) nested within a Sequence Data element are not copied onto the CD/DVD/USB.

Note: If the "Compress XA 512 Cardiac option" (AUG-XABC-CD for CDs, STD-GEN-DVD-JPEG for DVDs and STD-GEN-USB-JPEG for USBs) has been chosen by the user, Xray Angiographic Instances which contain the Data Set Trailing Padding attribute (FFFC,FFFC) are not copied onto the CD/DVD/USB.

Note: Grayscale Softcopy Presentation State Storage (1.2.840.10008.5.1.4.1.1.11.1) and Blending Softcopy Presentation State Storage (1.2.840.10008.5.1.4.1.1.11.4) abstract syntax can be written on any media. The referenced images are not pulled automatically.

Note: For NM Genie Private Data (1.2.840.113619.4.27), PET Advance Private Data (1.2.840.113619.4.30) and GE Private DICOM 3D object (1.2.840.113619.4.26) Objects "IMAGE" directory record type is created.

Note: NM Genie Private Data (1.2.840.113619.4.27) and PET Advance Private Data (1.2.840.113619.4.30) can be written only on CD only with STD-GEN-CD Application Profile with Explicit VR Little Endian (1.2.840.10008.1.2.1) transfer syntax.

3.4 AUGMENTED AND PRIVATE APPLICATION PROFILES

One augmented profile is defined to create a CD of XA 512x512 (8bits) images along with other SOP Classes. This profile is defined as the AUG-XABC-CD Application Profile.

3.4.1 Augmented Application Profiles

3.4.1.1 Augmented Application Profile AUG-XABC-CD

The AE defines the augmented profile AUG-XABC-CD derived from the STD-XABC-CD profile.

3.4.1.1.1 SOP Class Augmentations

Information Object Definition	SOP Class UID	Transfer Syntax	Transfer Syntax UID
Computed Radiographic Image Storage	1.2.840.10008.5.1.4.1.1.1	Explicit VR Little Endian	1.2.840.10008.1.2.1
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	Explicit VR Little Endian	1.2.840.10008.1.2.1
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	Explicit VR Little Endian	1.2.840.10008.1.2.1
XRay Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	JPEG lossless Process 14 (selection value 1) for images 512x512 (8bits). Explicit VR Little Endian for other XA images	1.2.840.10008.1.2.4.70 for images 512x512 (8bits). 1.2.840.10008.1.2.1 for other XA images
Xray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	Explicit VR Little Endian	1.2.840.10008.1.2.1
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Explicit VR Little Endian	1.2.840.10008.1.2.1
Digital X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.1	Explicit VR Little Endian	1.2.840.10008.1.2.1
Digital X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	Explicit VR Little Endian	1.2.840.10008.1.2.1
Digital Mammography X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.2	Explicit VR Little Endian	1.2.840.10008.1.2.1
Digital Mammography X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	Explicit VR Little Endian	1.2.840.10008.1.2.1
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	Explicit VR Little Endian	1.2.840.10008.1.2.1

Standalone Curve Storage	1.2.840.10008.5.1.4.1.1.9	Explicit VR Little Endian	1.2.840.10008.1.2.1
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	Explicit VR Little Endian	1.2.840.10008.1.2.1
Standalone PET Curve Storage	1.2.840.10008.5.1.4.1.1.129	Explicit VR Little Endian	1.2.840.10008.1.2.1
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1	Explicit VR Little Endian	1.2.840.10008.1.2.1
RT Dose Storage	1.2.840.10008.5.1.4.1.1.481.2	Explicit VR Little Endian	1.2.840.10008.1.2.1
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3	Explicit VR Little Endian	1.2.840.10008.1.2.1
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5	Explicit VR Little Endian	1.2.840.10008.1.2.1
NM Genie Private Data	1.2.840.113619.4.27	Explicit VR Little Endian	1.2.840.10008.1.2.1
PET Advance Private Data	1.2.840.113619.4.30	Explicit VR Little Endian	1.2.840.10008.1.2.1
GE Private DICOM 3D object	1.2.840.113619.4.26	Explicit VR Little Endian	1.2.840.10008.1.2.1
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	Explicit VR Little Endian	1.2.840.10008.1.2.1
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	Explicit VR Little Endian	1.2.840.10008.1.2.1
Ultrasound Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6	Explicit VR Little Endian	1.2.840.10008.1.2.1
Ultrasound Multi-frame Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.3	Explicit VR Little Endian	1.2.840.10008.1.2.1
Basic Text SR	1.2.840.10008.5.1.4.1.1.88.11	Explicit VR Little Endian	1.2.840.10008.1.2.1
Enhanced SR	1.2.840.10008.5.1.4.1.1.88.22	Explicit VR Little Endian	1.2.840.10008.1.2.1
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33	Explicit VR Little Endian	1.2.840.10008.1.2.1
Mammography CAD SR	1.2.840.10008.5.1.4.1.1.88.50	Explicit VR Little Endian	1.2.840.10008.1.2.1
Spatial Registration Storage	1.2.840.10008.5.1.4.1.1.66.1	Explicit VR Little Endian	1.2.840.10008.1.2.1
Deformable Spatial Registration Storage	1.2.840.10008.5.1.4.1.1.66.3	Explicit VR Little Endian	1.2.840.10008.1.2.1
Key Object Selection Document Storage	1.2.840.10008.5.1.4.1.1.88.59	Explicit VR Little Endian	1.2.840.10008.1.2.1
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	Explicit VR Little Endian	1.2.840.10008.1.2.1

3.4.1.1.2 Directory Augmentations

AUG-XABC-CD Application Profile is implemented and built on STD-XABC-CD Profile with the following keys are added as Type 3 data elements in the Basic Directory IOD compared to the base STD-XABC-CD Application Profile.

Key Attribute	Tag	Directory Record Type
Patient's Birth Date	(0010,0030)	PATIENT
Patient's Sex	(0010,0040)	PATIENT
Series Description	(0008,103E)	SERIES
Manufacturer	(0008,1090)	SERIES
Institution Name	(0008,0080)	SERIES
Institution Address	(0008,0081)	SERIES
Attending Physician's Name	(0008,1050)	SERIES
Image Type	(0008,0008)	IMAGE
Image Date	(0008,0023)	IMAGE
Image Time	(0008, 0033	IMAGE
Recommended Display Frame Rate	(0008,2144)	IMAGE
Radiation Settings	(0018,1155)	IMAGE (See Note below)
Image Comments	(0020,4000)	IMAGE
Number Of Frames	(0028,0008)	IMAGE
Rows	(0028,0010)	IMAGE
Columns	(0028,0011)	IMAGE

Note: Radiation Settings can be valued for XA and RF images only.

The XA images having the following attributes can be *downscanned* to 512x512x8bits:

- SOP Class UID (0008,0016) is "1.2.840.10008.5.1.4.1.1.12.1".
- The "Can Downscan 512" private attribute (0019,xxAA, GEMS_DL_IMG_01) can be found in the data set, and its value is "YES"

  or

  the "Can Downscan 512" private attribute (0019,xxAA, GEMS_DL_IMG_01) cannot be found in the data set

and Manufacturer (0008,0070) is "GE MEDICAL SYSTEMS" and the Manufacturer's Model Name (0008,1090) is "DL"

- Bits Allocated (0028,0100) is equal to 8.
- Bits Stored (0028,0101) is less than or equal to 8.
- Rows (0028,0010) and Columns (0028,0011) attributes have the following values: 1000 x 1000 or 864 x 864 or 800 x 800 or 736 x 736 or 608x608.

All other images cannot be processed. Please refer to section 12 for more information about the downscan.

Note: The meaning of (0019,xxAA, GEMS_DL_IMG_01) is the private element (0019,xxAA) associated with the Private Creator Identification is GEMS_DL_IMG_01.

3.4.1.1.3 Other Augmentations

No Other Augmentations are implemented.

3.4.2 Private Application Profiles

None.

3.5 EXTENSIONS / SPECIALIZATIONS / PRIVATIZATIONS

3.5.1 Standard Extended / Specialized / Private SOP Classes

3.5.1.1 Standard Extended SOP Classes

The product provides Standard Extended Conformance to all supported SOP Classes, through the inclusion of additional Type 3 Data Elements for each supported profile. The extensions are defined in sections below.

3.5.1.2 Private SOP Class NM Genie Private Data

GE private DICOM NM images aka Xeleris/eNTEGRA Protocol Data are described in the GENIE ACQUISITION GENIE DICOM Conformance Statement in the Nuclear Medicine DICOM tab, see 1.6.

3.5.1.3 Private SOP Class PET Advance Private Data

GE private DICOM PET images are described in the Discovery 710/610 and Optima 560 DICOM Conformance Statement in the Positron Emission Tomography (PET) DICOM tab, see 1.6.

3.5.1.4 Private SOP Class GE Private DICOM 3D object

GE Private 3D Model Objects are described in the AW Volume Viewer Applications DICOM Conformance Statement in the Workstation tab, see 1.6.

3.5.2 Private Transfer Syntaxes

No private Transfer Syntax is written on media by the described CD/DVD/USB DICOM SERVER AE of Advantage Workstation 4.7.

3.6 CONFIGURATION

The source AE Title encoded in the File Meta-Information cannot be modified.

3.7 SUPPORT OF EXTENDED CHARACTER SETS

The Advantage Workstation supports extended character sets as specified in Section 2.7, Support of Extended Character Sets of Networking.

4. STORAGE COMMITMENT PUSH MODEL IMPLEMENTATION

4.1 STORAGE COMMITMENT PUSH MODEL INFORMATION OBJECT DEFINITION

Please refer to DICOM Part 3 (Information Object Definitions) for a description of each of the attributes contained within the Storage Commitment Information Object.

The Storage Commitment Information Object is used both for N-ACTION Storage Commitment Requests by the SCU and N-EVENT-REPORT Storage Commitment Notifications by the SCP.

4.1.1 STORAGE COMMITMENT MODULE FOR N-ACTION

TABLE 4-1 STORAGE COMMITMENT MODULE FOR N-ACTION

Attribute Name	Tag	SCU Use
Transaction UID	(0008,1195)	Uses the UID generation service provided by the platform, the algorithm depends on the • UID root of the product (1.2.840.113619.2.350) • MAC Address of the workstation • Unix Process identifier • Date and time.
Storage Media File-Set ID	(0088,0130)	Not used
Storage Media File-Set UID	(0088,0140)	Not used
Referenced SOP Sequence	(0008,1199)	
>Referenced SOP Class UID	(0008,1150)	
>Referenced SOP Instance UID	(0008,1155)	
>Storage Media File-Set ID	(0088,0130)	Not used
>Storage Media File-Set UID	(0088,0140)	Not used

4.1.2 STORAGE COMMITMENT MODULE FOR N-EVENT-REPORT

E 4-2 STORAGE COMMITMENT MODULE FOR N-EVENT-REPORT

Attribute Name	Tag	SCU Use
Transaction UID	(0008,1195)	Not used
Retrieve AE Title	(0008,0054)	Not used
Storage Media File-Set ID	(0088,0130)	Not used
Storage Media File-Set UID	(0088,0140)	Not used
Referenced SOP Sequence	(0008,1199)	Success of storage commitment is registered in the database. If images are removed in the meanwhile the report is ignored.

>Referenced SOP Class UID	(0008,1150)	
>Referenced SOP Instance UID	(0008,1155)	
>Retrieve AE Title	(0008,0054)	Not used
>Storage Media File-Set ID	(0088,0130)	Not used
>Storage Media File-Set UID	(0088,0140)	Not used
Failed SOP Sequence	(0008,1198)	Failure and reason is logged. A general failure is reported to the user.
>Referenced SOP Class UID	(0008,1150)	
>Referenced SOP Instance UID	(0008,1155)	
>Failure Reason	(0008,1197)	See Section 4.1.2.1 for the list of processed values.

4.1.2.1 Processing of Failure Reason when received in a N-Event-Report

When receiving a N-Event-Report request with a Event Type ID equal to 2, meaning that Storage Commitment is complete, but failure exists, following is the set of value that this Storage Commitment SCU AE is able to process:

Failure Reason	Meaning	Application Behavior When Receiving Reason Code
0110H	Processing failure	Failure and reason is logged. A general failure is reported to the user.
0112H	No such object instance	
0213H	Resource limitation	
0122H	Referenced SOP Class not supported	
0119H	Class / Instance conflict	
0131H	Duplicate transaction UID	
*	Other Failure Reason code values	

5. BASIC DIRECTORY INFORMATION OBJECT IMPLEMENTATION

5.1 IOD MODULE TABLE

Table 5-1 identifies the defined modules within the entities which comprise the Basic Directory IOD. Modules are identified by Module Name.

See DICOM Part 3 for a complete definition of the entities, modules, and attributes.

TABLE 5-1 BASIC DIRECTORY IOD MODULES

Module Name	Reference
File Set Identification	5.2.1
Directory Information	5.2.2

FSC of this implementation creates a Directory Information Module and FSR supports it.

5.2 INFORMATION MODULE DEFINITIONS

Please refer to DICOM Standard Part 3 (Information Object Definitions) for a description of each of the modules and directory records contained within the Basic Directory Information Object.

The following modules are included to convey Enumerated Values, Defined Terms, and Optional Attributes supported. Type 1 & Type 2 Attributes are also included for completeness and to define what values they may take and where these values are obtained from. It should be noted that they are the same ones as defined in the DICOM Standard Part 3 (Information Object Definitions). Also note that Attributes not present in tables are not supported.

5.2.1 File Set identification Module

TABLE 5-2 FILE-SET IDENTIFICATION MODULE

Attribute Name	Tag	Type	Attribute Description
File-set ID	(0004,1130)	2	The value is created as follows: GEMS_<day of month>_<month>_<year>, for example: GEMS_20_10_2010
File-set Descriptor File ID	(0004,1141)	1C	Not used by FSR and not filled by FSC.
Specific Character Set of File-set Descriptor File	(0004,1142)	1C	Not used by FSR and not filled by FSC.

5.2.2 Directory Information Module

TABLE 5-3 DIRECTORY INFORMATION MODULE

Attribute Name	Tag	Type	Attribute Description

Offset of the First Directory Record of the Root Directory Entity	(0004,1200)	1	
Offset of the Last Directory Record of the Root Directory Entity	(0004,1202)	1	
File-set Consistency Flag	(0004,1212)	1	FSC sets the value: 0000H: no known inconsistencies
Directory Record Sequence	(0004,1220)	2	FSC creates items in Directory Records sequence.
>Offset of the Next Directory Record	(0004,1400)	1C	
>Record In-use Flag	(0004,1410)	1C	FSC sets only: FFFFH: record is in use Inactive records are not used (0000H)
>Offset of Referenced Lower-Level Directory Entity	(0004,1420)	1C	
>Directory Record Type	(0004,1430)	1C	The following values are supported by FSR, FSC: PATIENT STUDY SERIES IMAGE RT DOSE RT STRUCTURE SET RT PLAN SR DOCUMENT KEY OBJECT DOC REGISTRATION ENCAP DOC CURVE
>Private Record UID	(0004,1432)	1C	No private Records are created
>Referenced File ID	(0004,1500)	1C	Filename is generated to be unique on the media like: DICOM<postfix letters>\PA<number of patient>\ST<number of study>\SE<number of series>\IM<number of image> Field is included if Directory Record Type is not PATIENT/STUDY/SERIES.
>Referenced SOP Class UID in File	(0004,1510)	1C	Field is included if Directory Record Type is not PATIENT/STUDY/SERIES.
>Referenced SOP Instance UID in File	(0004,1511)	1C	Field is included if Directory Record Type is not PATIENT/STUDY/SERIES.
>Referenced Transfer Syntax UID in File	(0004,1512)	1C	Field is included if Directory Record Type is not PATIENT/STUDY/SERIES.
> Referenced Related General SOP Class UID in File	(0004,151A)	1C	Field is included if Directory Record Type is not PATIENT/STUDY/SERIES.
>Record Selection Keys			See 5.2.3

Note: A postfix letter for Referenced File ID can be the English alphabetical characters: A-Z. The first not used directory name is searched in the following order: “DICOM”, “DICOMA”, “DICOMB”, … “DICOMZ”, “DICOMAA”, “DICOMAB”, …, “DICOMAZ”, ….

5.2.3 Definition of Specific Directory Records

5.2.3.1 Patient Directory Record Definition

TABLE 5-4 PATIENT KEYS

Key	Tag	Type	Attribute Description
Specific Character Set	(0008,0005)	1C	FSC copies this value from the first instance of the patient. FSR supports all character sets.
Patient's Name	(0010,0010)	2	FSC copies this value from the first instance of the patient. The patient name in the referenced object instances may be different if Advantage Workstation is configure not to use the patient name in the patient key. In this case multiple different patient names can be in the referenced objects since the original value is kept in the files. FSR uses the patient name from this attribute to show to the user what he would like to restore. When the objects are copied to the database the and shown in the local patient list the value is read from the referenced object instances.
Patient ID	(0010,0020)	1	FSC copies this value from the first instance of the patient. The patient id in the referenced object instances may be different if the referenced object instance holds an empty value. In this case this attribute will be “NOID” and the referenced file will contain an empty value. FSR uses the patient id from this attribute to show to the user what he would like to restore. When the objects are copied to the database the and shown in the local patient list the value is read from the referenced object instances.

Patient's Birth Date	(0010,0030)	STD-GEN-CD: 3 STD-XABC-CD, AUG-XABC-CD: 2 STD-GEN-DVD-JPEG, STD-GEN-USB-JPEG: 1C	FSC copies this value from the first instance of the patient. The patient birth date in the referenced object instances may be different if Advantage Workstation is configure not to use the patient birth date in the patient key. In this case multiple different patient birth dates can be in the referenced objects since the original value is kept in the files. For STD-XABC-CD and AUG-XABC-CD profiles this value always present with non empty value. For STD-GEN-DVD-JPEG and STD-GEN-USB-JPEG profiles this value is 1C: present and non empty if referenced dataset contains it. FSR does not use the value from this attribute to show to the user. When the objects are copied to the database the and shown in the local patient list the value is read from the referenced object instances.
Patient's Sex	(0010,0040)		FSC copies this value from the first instance of the patient. The patient sex in the referenced object instances may be different if Advantage Workstation is configure not to use the patient birth date in the patient key. In this case multiple different patient sexes can be in the referenced objects since the original value is kept in the files. For STD-XABC-CD and AUG-XABC-CD profiles this value always present with non empty value. For STD-GEN-DVD-JPEG and STD-GEN-USB-JPEG profiles this value is 1C: present and non empty if referenced dataset contains it. FSR does not use the value from this attribute to show to the user. When the objects are copied to the database the and shown in the local patient list the value is read from the referenced object instances.

TABLE 5-5 EXTENDED PATIENT KEYS FOR STD-GEN-CD PROFILE

Key	Tag	Type	Attribute Description
Patient's Birth Date	(0010,0030)	2	For STD-GEN-CD profile this value is always present and may be empty.
Patient's Sex	(0010,0040)	2	For STD-GEN-CD profile this value is always present and may be empty.

5.2.3.2 Study Directory Record Definition

TABLE 5-6 STUDY KEYS

Key	Tag	Type	Attribute Description
Specific Character Set	(0008,0005)	1C	FSC copies this value from the first instance of the study. FSR supports all character sets.
Study Date	(0008,0020)	1	FSC sets this value from the first instance of the study in the following order if the value is empty: • Study Date (0008,0020) • Series Date (0008,0021) • Acquisition Date (0008,0022) • Date of Secondary Capture (0018,1012) • Structure Set Date (3006,0008) • RT Plan Date (300A,0006) • Content Date (0008,0023) • Presentation Creation Date (0070,0082) • Instance Creation Date (0008,0012) If the Study Date cannot be determined by these fields the study cannot be written on the media.
Study Time	(0008,0030)	1	FSC sets this value from the first instance of the study in the following order if the value is empty: • Study Time (0008,0030) • Series Time (0008,0031) • Acquisition Time (0008,0032) • Time of Secondary Capture (0018,1014) • Structure Set Time (3006,0009) • RT Plan Time (300A,0007) • Content Time (0008,0033) • Presentation Creation Time (0070,0083) • Instance Creation Time (0008,0013) If the Study Time cannot be determined by these fields the study cannot be written on the media.
Study Description	(0008,1030)	2	Filled by FSC from (0008,1030) from the first instance of the study. Used by an FSR to display the field in the Media Patient List.
Study Instance UID	(0020,000D)	1C	Always used rather than (0004,1511), read from the first image from the study.

Study ID	(0020,0010)	1	Filled by FSC from (0020,0010) from the first instance of the study or "NOID" if not the field is empty.
Accession Number	(0008,0050)	2	Filled by an FSC from (0008,0050) from the first instance of the study. Used by an FSR to display the field in the Media Patient List.

5.2.3.3 Series Directory Record Definition

TABLE 5-7 SERIES KEYS

Key	Tag	Type	Attribute Description
Specific Character Set	(0008,0005)	1C	FSC copies this value from the first instance of the series. FSR supports all character sets.
Modality	(0008,0060)	1	If a series has empty modality (0008,0060) than the series cannot be written on media.
Series Instance UID	(0020,000E)	1	
Series Number	(0020,0011)	1	If a series has empty series number (0020,0011) than the series cannot be written on media.
Icon Image Sequence	(0088,0200)	3	This implementation does not support Icon Image Sequence at series level.
Body Part Examined	(0018,0015)	3	FSC copies this value from the first instance of the series. FSR does not use the value from this attribute to show to the user.

TABLE 5-8 ADDITIONAL SERIES KEYS FOR STD-XABC-CD, AUG-XABC-CD, DVD-JPEG AND STD-GEN-USB-JPEG PROFILES

Key	Tag	Type	Attribute Description
Institution Name	(0008,0080)	STD-GEN-DVD-JPEG, STD-GEN-USB-JPEG: 1C	FSC copies this value from the first instance of the series. FSR does not use the value from this attribute to show to the user.
Institution Address	(0008,0081)	STD-XABC-CD, AUG-XABC-CD: 2	FSC copies this value from the first instance of the series. FSR does not use the value from this attribute to show to the user.
Performing Physicians' Name	(0008,1050)		FSC copies this value from the first instance of the series. FSR does not use the value from this attribute to show to the user.

5.2.3.4 Image Directory Record Definition

TABLE 5-9 IMAGE KEYS

Key	Tag	Type	Attribute Description
Specific Character Set	(0008,0005)	1C	FSC copies this value from the image. FSR supports all character sets.
Instance Number	(0020,0013)	1	An image without instance number cannot be written on the media.

TABLE 5-10 ADDITIONAL IMAGE KEYS FOR STD-GEN-DVD-JPEG AND STD-GEN-USB-JPEG PROFILES

Key	Tag	Type	Attribute Description
Image Type	(0008,0008)	1C	FSC copies this value from the image if present and not empty. FSR displays the value from this attribute to the user.
Calibration Image	(0050,0004)	1C	FSC copies this value from the image if present and not empty. FSR does not use the value from this attribute to show to the user.
Referenced Image Sequence	(0008,1140)	1C	FSC copies this value from the image if present and not empty. FSR does not use the value from this attribute to show to the user.
Lossy Image Compression Ratio	(0028,2112)	1C	FSC copies this value from the image if present and not empty. FSR does not use the value from this attribute to show to the user.
Rows	(0028,0010)	1	FSC copies this value from the image. If the value is not defined or empty the image cannot be written on the media. FSR does not use the value from this attribute to show to the user.
Columns	(0028,0011)	1	FSC copies this value from the image. If the value is not defined or empty the image cannot be written on the media. FSR does not use the value from this attribute to show to the user.

Frame of Reference UID	(0020,0052)	1C	FSC copies this value from the image if present and not empty. If the value defined but empty the image cannot be written on the media. FSR does not use the value from this attribute to show to the user.
Synchronization Frame of Reference UID	(0020,0200)	1C	FSC copies this value from the image if present and not empty. If the value defined but empty the image cannot be written on the media. FSR does not use the value from this attribute to show to the user.
Number of Frames	(0028,0008)	1C	FSC copies this value from the image if present and not empty. If the value defined but empty the image cannot be written on the media. FSR does not use the value from this attribute to show to the user.
Acquisition Time Synchronized	(0018,1800)	1C	FSC copies this value from the image if present and not empty. If the value defined but empty the image cannot be written on the media. FSR does not use the value from this attribute to show to the user.
Acquisition Datetime	(0008,002A)	1C	FSC copies this value from the image if present and not empty. If the value defined but empty the image cannot be written on the media. FSR does not use the value from this attribute to show to the user.
Image Position (Patient)	(0020,0032)	1C	FSC copies this value from the image if present and not empty. If the value defined but empty the image cannot be written on the media. FSR does not use the value from this attribute to show to the user.
Image Orientation (Patient)	(0020,0037)	1C	FSC copies this value from the image if present and not empty. If the value defined but empty the image cannot be written on the media. FSR does not use the value from this attribute to show to the user.
Pixel Spacing	(0028,0030)	1C	FSC copies this value from the image if present and not empty. If the value defined but empty the image cannot be written on the media. FSR does not use the value from this attribute to show to the user.

TABLE 5-11 ADDITIONAL IMAGE KEYS FOR STD-XABC-CD AND AUG-XABC-CD PROFILES

Key	Tag	Type	Attribute Description
Icon Image Sequence	(0088,0200)	1	FSR does no use icon image sequence.
Image Type	(0008,0008)	1	FSC copies this value from the image. FSR displays the value from this attribute to the user.

Calibration Image	(0050,0004)	2	FSC copies this value from the image. If the value is not defined the image cannot be written on the media. FSR does not use the value from this attribute to show to the user.
Referenced Image Sequence	(0008,1140)	1C	FSC copies this value from the image if Image Type is of BIPLANE A or BIPLANE B. FSR does not use the value from this attribute to show to the user.
>Referenced SOP Class UID	(0008,1150)	1C	FSC copies this value from the image if Image Type is of BIPLANE A or BIPLANE B. FSR does not use the value from this attribute to show to the user.
>Referenced SOP Instance UID	(0008,1155)	1C	FSC copies this value from the image if Image Type is of BIPLANE A or BIPLANE B. FSR does not use the value from this attribute to show to the user.

TABLE 5-12
ADDITIONAL IMAGE KEYS FOR STD-GEN-CD

Key	Tag	Type	Attribute Description
Image Type	(0008,0008)	1C	FSC copies this value from the image. FSR displays the value from this attribute to the user.
Referenced Image Sequence	(0008,1140)	1C	FSC copies this value from the image if present and not empty. FSR does not use the value from this attribute to show to the user.
>Referenced SOP Class UID	(0008,1150)	1C	FSC copies this value from the image if Referenced Image Sequence is present. FSR does not use the value from this attribute to show to the user.
>Referenced SOP Instance UID	(0008,1155)	1C	FSC copies this value from the image if Referenced Image Sequence is present. FSR does not use the value from this attribute to show to the user.

5.2.3.4.1 Icon Image Key Definition

- Icons are created from the original XA images by downsampling it to 128x128. The key frame number is read from DICOM Tag “Representative Frame Number” (0028,1060) if present, otherwise calculated by max(1, frame count/3).
- MONOCHROME 1 and 2 Photometric Interpretations (0028,0004) are created
- Size is 128x128

- Bits Allocated (0028,0100) and Bits Stored (0028,0101) is 8
- High Bit is 7

5.2.3.5 RT Dose Directory Record Definition

TABLE 5-13 RT DOSE KEYS

Key	Tag	Type	Attribute Description
Specific Character Set	(0008,0005)	1C	FSC copies this value from the first instance of the series. FSR supports all character sets.
Instance Number	(0020,0013)	1	An image without instance number cannot be written on the media.
Dose Summation Type	(3004,000A)	1	
Icon Image Sequence	(0088,0200)	3	This implementation does not support Icon Image Sequence for RT Dose.

5.2.3.6 RT Structure Set Directory Record Definition

TABLE 5-14 RT STRUCTURE SET KEYS

Key	Tag	Type	Attribute Description
Specific Character Set	(0008,0005)	1C	FSC copies this value from the first instance of the series. FSR supports all character sets.
Instance Number	(0020,0013)	1	An image without instance number cannot be written on the media.
Structure Set Label	(3006,0002)	1	
Structure Set Date	(3006,0008)	2	
Structure Set Time	(3006,0009)	2	

5.2.3.7 RT Plan Directory Record Definition

TABLE 5-15 RT PLAN KEYS

Key	Tag	Type	Attribute Description
Specific Character Set	(0008,0005)	1C	FSC copies this value from the first instance of the series. FSR supports all character sets.
Instance Number	(0020,0013)	1	An image without instance number cannot be written on the media.
RT Plan Label	(300A,0002)	1	
RT Plan Date	(300A,0006)	2	
RT Plan Time	(300A,0007)	2	

5.2.3.8 Presentation State Directory Record Definition

TABLE 5-16 PRESENTATION KEYS

Key	Tag	Type	Attribute Description
Specific Character Set	(0008,0005)	1C	FSC copies this value from the first instance of the series. FSR supports all character sets.
Presentation Creation Date	(0070,0082)	1	
Presentation Creation Time	(0070,0083)	1	
Instance Number	(0020,0013)	1	An image without instance number cannot be written on the media.
Content Label	(0070,0080)	1	
Content Description	(0070,0081)	2	
Content Creator's Name	(0070,0084)	2	
Referenced Series Sequence	(0008,1115)	1C	
>Series Instance UID	(0020,000E)	1	
>Referenced Image Sequence	(0008,1140)	1	
>>Include 'SOP Instance Reference Macro'			
Blending Sequence	(0070,0402)	1C	
>Study Instance UID	(0020,000D)	1	
>Referenced Series Sequence	(0008,1115)	1	
>>Series Instance UID	(0020,000E)	1	
>>Referenced Image Sequence	(0008,1140)	1	
>>>Include 'SOP Instance Reference Macro'			

5.2.3.9 SR Document Directory Record Definition

TABLE 5-17 SR DOCUMENT KEYS

Key	Tag	Type	Attribute Description
Specific Character Set	(0008,0005)	1C	FSC copies this value from the first instance of the series. FSR supports all character sets.
Instance Number	(0020,0013)	1	An image without instance number cannot be written on the media.
Completion Flag	(0040,A491)	1	
Verification Flag	(0040,A493)	1	
Content Date	(0008,0023)	1	
Content Time	(0008,0033)	1	
Verification DateTime	(0040,A030)	1C	The latests datetime found in the verifying observer sequence.
Concept Name Code Sequence	(0040,A043)	1	
>Include 'Code Sequence Macro'			
Content Sequence	(0040,A730)	1C	
>Relationship Type	(0040,A010)	1	All "HAS CONCEPT MOD" relationship type are copied into the sequence of the SR Tree.
>Include 'Document Content Macro'			

5.2.3.10 Key Object Document Directory Record Definition

TABLE 5-18 KEY OBJECT DOCUMENT KEYS

Key	Tag	Type	Attribute Description
Specific Character Set	(0008,0005)	1C	FSC copies this value from the first instance of the series. FSR supports all character sets.
Instance Number	(0020,0013)	1	An image without instance number cannot be written on the media.
Content Date	(0008,0023)	1	
Content Time	(0008,0033)	1	
Concept Name Code Sequence	(0040,A043)	1	
>Include 'Code Sequence Macro'			
Content Sequence	(0040,A730)	1C	
>Relationship Type	(0040,A010)	1	All "HAS CONCEPT MOD" relationship type are copied into the sequence of the SR Tree.
>Include 'Document Content Macro'			

5.2.3.11 Registration Directory Record Definition

TABLE 5-19 REGISTRATION KEYS

Key	Tag	Type	Attribute Description
Specific Character Set	(0008,0005)	1C	FSC copies this value from the first instance of the series. FSR supports all character sets.
Content Date	(0008,0023)	1	
Content Time	(0008,0033)	1	
Instance Number	(0020,0013)	1	
Content Label	(0070,0080)	1	
Content Description	(0070,0081)	2	
Content Creator's Name	(0070,0084)	2	

5.2.3.12 Encapsulated Document Directory Record Definition

TABLE 5-20 ENCAPSULATED DOCUMENT KEYS

Key	Tag	Type	Attribute Description
Specific Character Set	(0008,0005)	1C	FSC copies this value from the first instance of the series. FSR supports all character sets.
Content Date	(0008,0023)	1	
Content Time	(0008,0033)	1	
Instance Number	(0020,0013)	1	An image without instance number cannot be written on the media.
Document Title	(0042,0010)	2	
HL7 Instance Identifier	(0040,E001)	1C	

Concept Name Code Sequence	(0040,A043)	2	
>Include 'Code Sequence Macro'			
MIME Type of Encapsulated Document	(0042,0012)	1	

6. PRINT MANAGEMENT IMPLEMENTATION

6.1 INTRODUCTION

This section of the DICOM Conformance Statement specifies the supported Print Management SOP and Meta SOP Classes, the optional attributes and service elements supported, the valid range of values for mandatory and optional attributes, and the status code behavior.

This section contains:

6.2.1- Basic Film Session SOP Class

6.2.2 - Basic Film Box SOP Class

6.2.3- Image Box SOP Classes

6.2.4 - Printer SOP Class

6.2 PRINT MANAGEMENT SOP CLASS DEFINITIONS

6.2.1 Basic Film Session SOP Class

The DICOM Print SCU AE supports the N-CREATE DIMSE Service Element for the Basic Film Session SOP Class.

- The N-CREATE DIMSE Service element sent by the DICOM Print SCU AE requests the Remote DICOM Print SCP to create an instance of Basic Film Session.

6.2.1.1 IOD Description

6.2.1.1.1 IOD modules

Module	Reference	Module Description
SOP Common	6.2.1.1.2	Contains SOP Common information
Basic Film Session Presentation Module	6.2.1.1.3	Contains Film Session presentations information
Basic Film Session Relationship	6.2.1.1.4	References to related SOPs

6.2.1.1.2 SOP Common Module

Attribute Name	Tag	Type	Attribute Description
SOP Class UID	(0008,0016)	1	1.2.840.10008.5.1.1.1
SOP Instance UID	(0008,0018)	1	Generated from GE Based UID: <station configuration> and timestamp

6.2.1.1.3 Basic Film Session Presentation Module

Attribute name	Tag	Attribute Description
Number of Copies	(2000,0010)	1 to 10, depending of print manager configuration. Default value: 1
Print Priority	(2000,0020)	HIGH or MED or LOW depending of default configuration Default value: LOW
Medium Type	(2000,0030)	PAPER or CLEAR FILM or BLUE FILM depending of configuration of associated Remote DICOM printer Default value: BLUE FILM
Film Destination	(2000,0040)	MAGAZINE or PROCESSOR depending of configuration of associated Remote DICOM printer Default value:PROCESSOR
Film Session Label	(2000,0050)	Configurable by the Field Engineer Not sent by default

Note: Default configuration can be modified during the installation of the Advantage Workstation 4.7.

6.2.1.1.4 Basic Film Session Relationship Module

Attribute Name	Tag	Attribute Description
Referenced Film Box Sequence	(2000,0500)	Not used
>Referenced SOP Class UID	(0008,1150)	Not used
>Referenced SOP Instance UID	(0008,1155)	Not used

6.2.1.2 DIMSE Service Group

DIMSE Service Element	Usage SCU
N-CREATE	M
N-SET	Not used
N-DELETE	Not used
N-ACTION	Not used

6.2.1.2.1 N-CREATE

6.2.1.2.1.1 Attributes

Attribute Name	Tag	Usage SCU
Number of Copies	(2000,0010)	Used
Print Priority	(2000,0020)	Used
Medium Type	(2000,0030)	Used
Film Destination	(2000,0040)	Used
Film Session Label	(2000,0050)	Used, not sent if empty
Memory Alocation	(2000,0060)	Not Used

6.2.1.2.1.2 Status

Service Status	Status Codes	Further Meaning	Application Behavior When receiving Status Codes
Warning	B600	Memory allocation not supported	Association is aborted
Success	0000	Film session successfully created	Next step describe in the sequencing of Real-World Activities paragraph is performed

Note: The association is aborted for all other status.

6.2.1.2.1.3 Behavior

No specific behavior

6.2.1.2.2 N-SET

This service is not used.

6.2.1.2.3 N-DELETE

This service is not used.

6.2.1.2.4 N-ACTION

This service is not used.

6.2.2 Basic Film Box SOP Class

The DICOM Print SCU AE supports the following DIMSE Service Element for the Basic Film Box SOP Class.

- The N-CREATE DIMSE Service element sent by the DICOM Print SCU AE requests the Remote DICOM Print SCP to create an instance of Basic Film Box
- The N-ACTION DIMSE Service element sent by the DICOM Print SCU AE requests the Remote DICOM Print SCP to print the Basic Film Box onto the hard copy printer.
- The N-DELETE DIMSE Service element sent by the DICOM Print SCU AE requests the Remote DICOM Print SCP to release the Basic Film Box instance.

6.2.2.1 IOD Description

6.2.2.1.1 IOD modules

Module	Reference	Module Descripion
SOP Common	6.2.2.1.2	Contains SOP Common information
Basic Film Box Presentation Module	6.2.2.1.3	Contains Film Box presentation information
Basic Film Box Relationship Module	6.2.2.1.4	References to related SOPs

6.2.2.1.2 SOP Common Module

Attribute Name	Tag	Type	Attribute Description
SOP Class UID	(0008,0016)	1	1.2.840.10008.5.1.1.2
SOP Instance UID	(0008,0018)	1	Generated from GE Based UID: <station configuration> and timestamp

6.2.2.1.3 Basic Film Box Presentation Module

Attribute Name	Tag	Attribute Description
Image Display Format	(2010,0010)	STANDARD\C,R [C 1 to 5] and [R 1 to 4] SLIDE SUPERSLIDE Default value: STANDARD (Depending of configuration of associated remote DICOM printer).
Annotation Display Format ID	(2010,0030)	Not sent.
Film Orientation	(2010,0040)	PORTRAIT LANDSCAPE Default value: PORTRAIT (Depending of configuration of associated remote DICOM printer).
Film Size ID	(2010,0050)	8INX10IN 8_5INX11IN(Letter) 10INX12IN 10INX14IN 11INX14IN 11INX17IN 14INX14IN 14INX17IN 24CMX24CM 24CMX30CM A4(210mmx297mm) A3(297mm x 420mm) (Depending of configuration of associated remote DICOM printer). Default value: First selection when declaring printer.
Magnification Type	(2010,0060)	One of the following defined term is sent: REPLICATE BILINEAR CUBIC NONE Default value: CUBIC (Depending of configuration set by user when declaring the printer).
Smoothing Type	(2010,0080)	Sent if Magnification type = CUBIC Default value: "" (Depending of configuration set by user when declaring the printer).
Border density	(2010,0100)	BLACK or WHITE depending of default configuration. Default value: BLACK

Empty Image Density	(2010,0110)	BLACK or WHITE depending of default configuration. Default value: ""
Min Density	(2010,0120)	-1 by default or set to positive integer. Default value depends of configuration set by user when declaring the printer
Max Density	(2010,0130)	-1 by default or set to positive integer. Default value depends of configuration set by user when declaring the printer
Trim	(2010,0140)	Set to YES or NO according to value set by user when declaring the printer. Default value: NO
Configuration Information	(2010,0150)	Empty by default or set to a value defined when declaring the printer.
Illumination	(2010,015E)	Not sent.
Reflected Ambient Light	(2010,0160)	Not sent.
Requested Resolution ID	(2020,0050)	Not sent.
Referenced Presentation LUT Sequence	(2050,0500)	Not sent.

6.2.2.1.4 Basic Film Box Relationship Module

Attribute Name	Tag	Attribute Description
Referenced Film Session Sequence	(2010,0500)	Used (Set)
>Referenced SOP Class UID	(0008,1150)	1.2.840.10008.5.1.1.1
>Referenced SOP Instance UID	(0008,1155)	Used (Set to the Film Session SOP Instance UID)
Referenced Image Box Sequence	(2010,0510)	Used, when received
>Referenced SOP Class UID	(0008,1150)	Used, when received
>Referenced SOP Instance UID	(0008,1155)	Used, when received
Referenced Basic Annotation Box Sequence	(2010,0520)	Not used
>Referenced SOP Class UID	(0008,1150)	Not used
>Referenced SOP Instance UID	(0008,1155)	Not used

6.2.2.2 DIMSE Service Group

DIMSE Service Element	Usage SCU
N-CREATE	M
N-ACTION	M
N-DELETE	Used

6.2.2.2.1 N-CREATE

6.2.2.2.1.1 Attributes

Attribute Name	Tag	Usage SCU
Image Display Format	(2010,0010)	M
Referenced Film Session Sequence	(2010,0500)	M
>Referenced SOP Class UID	(0008,1150)	M
>Referenced SOP Instance UID	(0008,1155)	M
Referenced Image Box Sequence	(2010,0510)	Used (Received)
>Referenced SOP Class UID	(0008,1150)	Used (Received)
>Referenced SOP Instance UID	(0008,1155)	Used (Received)
Referenced Basic Annotation Box Sequence	(2010,0520)	Not used
>Referenced SOP Class UID	(0008,1150)	Not used
>Referenced SOP Instance UID	(0008,1155)	Not used
Film Orientation	(2010,0040)	Used
Film Size ID	(2010,0050)	Used
Magnification Type	(2010,0060)	Used
Max Density	(2010,0130)	Used. Not sent if -1
Configuration Information	(2010,0150)	Used. Not sent if empty
Annotation Display Format ID	(2010,0030)	Not used
Smoothing Type	(2010,0080)	Used. Not sent if magnification different from CUBIC
Border Density	(2010,0100)	Used Not sent if empty
Empty Image Density	(2010,0110)	Used Not sent if empty
Min Density	(2010,0120)	Used Not sent if -1
Trim	(2010,0140)	Used Not sent if empty

6.2.2.2.1.2 Status

Service Status	Status Codes	Further Meaning	Application Behavior When receiving Status Codes
Success	0000	Film Box successfully created	Association goes on
Warning	B605	Requested Min Density or Max Density outside of printer's operating range. The printer will use its respective minimum or maximum density value instead.	Treated as Success
Failure	C616	There is an existing Film Box that has not been printed and N-ACTION at the Film Session level is not supported. A new Film Box will not be created when a previous Film Box has not been printed.	Association is aborted

The association is aborted for all other status.

6.2.2.2.1.3 Behavior

There is no specific behavior.

6.2.2.2.2 N-DELETE

6.2.2.2.2.1 Behavior

The SCU uses the N-DELETE to request the SCP to delete the Basic Film Box SOP Instance hierarchy.

6.2.2.2.2.2 Status

Service Status	Status Codes	Further Meaning	Application Behavior When receiving Status Codes
Failure	0119	Class-instance conflict	Association aborted
	0210	Duplicate invocation	Association aborted
	0117	Invalid SOP instance	Association aborted
	0212	Mistyped argument	Association aborted
	0118	No such SOP Class	Association aborted
	0112	No such SOP Instance	Association aborted
	0110	Processing failure	Association aborted
	0213	Resource limitation	Association aborted
	0211	Unrecognized operation	Association aborted
Success	0000	Film session successfully deleted	Job successfully canceled
*	*	Any other status code.	Ignored

6.2.2.2.3 N-ACTION

N-ACTION is used to print the current film of the film session.

6.2.2.2.3.1 Attributes

Action Type Name	Action Type ID	Attribute	Tag	Usage SCU
Print	1	Referenced Print Job Sequence	(2100,0500)	Not used
		>Referenced SOP Class UID	(0008,1150)	Not used
		>Referenced SOP Instance UID	(0008,1155)	Not used

6.2.2.2.3.2 Status

Service Status	Status Codes	Further Meaning	Application Behavior When receiving Status Codes
Success	0000	Film accepted for printing.	Next step describe in the sequencing of Real-World Activities paragraph is performed
Warning	B603	Film Box SOP Instance hierarchy does not contain Image Box SOP Instances (empty page)	This case should not happen. This warning is considered as an error. Association is aborted.
	B604	Image size is larger than image box size.	This case should not happen. This warning is considered as an error. Association is aborted.
	B609	Image size is larger than the Image Box size. The Image has been cropped to fit.	This case should not happen. This warning is considered as an error. Association is aborted.
	B60A	Image size or Combined Print Image size is larger than the Image Box size. Image or Combined Print Image has been decimated to fit.	This case should not happen. This warning is considered as an error. Association is aborted.
Failure	C602	Unable to create Print Job SOP Instance; print queue is full	Appropriate message is returned to the user. Association is aborted.
	C604	Image position collision: multiple images assigned to single image position	Appropriate message is returned to the user. Association is aborted.
	C603	Image size is larger than image box size (by using the specified magnification value)	Appropriate message is returned to the user. Association is aborted.
	C613	Combined Print Image size is larger than the Image Box size	Appropriate message is returned to the user. Association is aborted.

6.2.2.2.3.3 Behavior

SCU uses the N-ACTION to request the SCP to print one or more copies of a single film of the film session.

6.2.3 Image Box SOP Classes

6.2.3.1 Basic Grayscale Image Box SOP Class

The DICOM Print SCU AE supports the following DIMSE Service Element for the Basic Grayscale Image Box SOP Class.

- The N-SET DIMSE Service element sent by the DICOM Print SCU AE requests the Remote DICOM Print SCP to set the attributes of the Basic Grayscale Image Box Instance.

6.2.3.1.1 IOD description

6.2.3.1.1.1 IOD modules

Module	Reference	Module Description
SOP Common	6.2.3.1.1.2	Contains SOP Common information
Image Box Pixel Presentation Module	6.2.3.1.1.3	Contains Image Box presentation information
Image Box Relationship Module	6.2.3.1.1.4	References to related SOPs

6.2.3.1.1.2 SOP Common Module

Attribute Name	Tag	Type	Attribute Description
SOP Class UID	(0008,0016)	1	1.2.840.10008.5.1.1.4
SOP Instance UID	(0008,0018)	1	Generated from GE Based UID: <station configuration> and timestamp

6.2.3.1.1.3 Image Box Pixel Presentation Module

Attribute Name	Tag	Attribute Description
Image Position	(2020,0010)	Value depends of the position within the Film box (1-N)
Polarity	(2020,0020)	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) Default value: NORMAL (Depending of default configuration)
Magnification Type	(2010,0060)	Same value as defined in the Film box
Smoothing Type	(2010,0080)	Same value as defined in the Film box
Configuration Information	(2010,0150)	Same value as defined in the Film Box.

Requested Image Size	(2020,0030)	Not sent
Requested Decimate/Crop Behavior	(2020,0040)	Not sent
Basic Grayscale Image Sequence	(2020,0110)	This sequence is always included if the Image Box is a Basic Grayscale Image Box
>Samples Per Pixel	(0028,0002)	1
>Photometric Interpretation	(0028,0004)	MONOCHROME1 or MONOCHROME2 depending of default configuration. Default value: MONOCHROME2
>Rows	(0028,0010)	Original image height
>Columns	(0028,0011)	Oiginal image width
>Pixel Aspect Ratio	(0028,0034)	1\1
>Bits Allocated	(0028,0100)	Depends on the image pixel depth (8 or 16)
>Bits Stored	(0028,0101)	Depends on the image pixel depth (8, 12 bits)
>High Bit	(0028,0102)	Depends on the image pixel depth (7, 11)
>Pixel Representation	(0028,0103)	0 (Unsigned Integer)
>Pixel Data	(7FE0,0010)	
Original Image Sequence	(2130,00C0)	Not sent

6.2.3.1.1.4 Image Box Relationship Module

Attribute Name	Tag	Attribute Description
Referenced Image Sequence	(0008,1140)	Not used
>Referenced SOP Class UID	(0008,1150)	Not used
>Referenced SOP Instance UID	(0008,1155)	Not used
>Referenced Frame Number	(0008,1160)	Not used
Referenced Image Overlay Box Sequence	(2020,0130)	Not used
>Referenced SOP Class UID	(0008,1150)	Not used
>Referenced SOP Instance UID	(0008,1155)	Not used
>Referenced Frame Number	(0008,1160)	Not used
Referenced VOI LUT Sequence	(2020,0140)	Not used
>Referenced SOP Class UID	(0008,1150)	Not used
>Referenced SOP Instance UID	(0008,1155)	Not used

6.2.3.1.2 DIMSE Service Group

DIMSE Service Element	Usage SCU
N-SET	M

6.2.3.1.2.1 N-SET

6.2.3.1.2.1.1 Attributes

Attribute Name	Tag	Usage SCU
Image Position	(2020,0010)	M
Basic Grayscale Image Sequence	(2020,0110)	M
>Samples Per Pixel	(0028,0002)	M
>Photometric Interpretation	(0028,0004)	M
>Rows	(0028,0010)	M
>Columns	(0028,0011)	M
>Pixel Aspect Ratio	(0028,0034)	M
>Bits Allocated	(0028,0100)	M
>Bits Stored	(0028,0101)	M
>High Bit	(0028,0102)	M
>Pixel Representation	(0028,0103)	M
>Pixel Data	(7FE0,0010)	M
Polarity	(2020,0020)	Used
Referenced Overlay Sequence	(0008,1130)	Not used
>SOP Class UID	(0008,1150)	Not used
>SOP Instance UID	(0008,1155)	Not used
Magnification Type	(2010,0060)	Used
Smoothing Type	(2010,0080)	Used, not sent if magnfication is different of CUBIC
Configuration Information	(2010,0150)	Used, not sent if empty
Requested Image Size	(2020,0030)	Not used

6.2.3.1.2.1.2 Status

Service Status	Status Codes	Further Meaning	Application Behavior When receiving Status Codes
Failure	C603	Image size is larger than image box size	Appropriate message is returned to the user. Association is aborted.
	C605	Insufficient memory in printer to store the image	Appropriate message is returned to the user. Association is aborted.
	C613	Combined Print Image size is larger than the Image Box size	Appropriate message is returned to the user. Association is aborted.
	0119	Class-instance conflict	Generic error message is returned to the user. Association is aborted.
	0210	Duplicate invocation	Generic error message is returned to the user. Association is aborted.
	0106	Invalid attribute value	Generic error message is returned to the user. Association is aborted.
	0212	Mistyped argument	Generic error message is returned to the user. Association is aborted.

	0117	Invalid SOP instance	Generic error message is returned to the user. Association is aborted.
	0121	Missing attribute value	Generic error message is returned to the user. Association is aborted.
	0105	No such attributes	Generic error message is returned to the user. Association is aborted.
	0118	No such SOP Class	Generic error message is returned to the user. Association is aborted.
	0112	No such SOP Instance	Generic error message is returned to the user. Association is aborted.
	0110	Processing failure	Generic error message is returned to the user. Association is aborted.
	0213	Resource limitation	Generic error message is returned to the user. Association is aborted.
	0211	Unrecognized operation	Generic error message is returned to the user. Association is aborted.
Warning	B604	Image size larger than image box size, the image has been demagnified.	Following printing choice (true size), the warning can be ignored (Association goes on) or considered as a failure (Association is aborted)
	B605	Requested Min Density or Max Density outside of printer's operating range. The printer will use its respective minimum or maximum density value instead.	Considered as Success
	B609	Image size is larger than the Image Box size. The Image has been cropped to fit.	Following printing choice (true size), the warning can be ignored (Association goes on) or considered as a failure (Association is aborted)
	B60A	Image size or Combined Print Image size is larger than the Image Box size. The Image or Combined Print Image has been decimated to fit.	Following printing choice (true size), the warning can be ignored (Association goes on) or considered as a failure (Association is aborted)
Success	0000	Image successfully stored in Image Box	Association goes on
*	*	Any other status code.	Ignored

6.2.3.1.2.1.3 Behavior

There is no specific behavior.

6.2.3.2 Basic Color Image Box SOP Class

The DICOM Print SCU AE supports the following DIMSE Service Element for the Color Image Box SOP Class.

- The N-SET DIMSE Service element sent by the DICOM Print SCU AE requests the Remote DICOM Print SCP to set the attributes of the Color Image Box Instance.