

**Acuson**  
**A Siemens Company**

**Aspen™ Ultrasound System**  
**DICOM Conformance Statement**  
**Aspen 7.0**



## 1. Document History

Rev	Date	Author	Comments
1	10/21/96	JB Wang	Created
2	11/25/96	JB Wang	Updated with feedback from BU's, Legal, Regulatory and Engineering
3	5/15/97	JB Wang	Updated at feature completion of 2.0
4	3/30/98	JB Wang	Updated for Aspen 3.0 release
5	3/31/98	JB Wang	Incorporated input from Dave Block
6	5/7/98	JB Wang	Updated for Aspen 4.0 release
7	8/10/98	JB Wang	Validated contents for Web release
8	8/19/98	JB Wang	Corrected Implementation UID/Name errors
9	6/21/99	JB Wang	Updated for Aspen 5.0
10	10/30/00	Lin Barron	Updated for Aspen 6.0
10.1	1/23/02	Gilbert Haro	Correction made to Site-Customizable Print Parameters table in section 4.3.2.4. Magnification Type parameter had incorrect values.
11	9/13/02	Gilbert Haro	Updated for Aspen 7.0

## 2. Introduction

This document is a DICOM 3.0 Conformance Statement for the Acuson Aspen Ultrasound system release 6.0. The DICOM conformance for other medical devices manufactured by Acuson is not included in this document.

The following DICOM 3.0 functions are supported in Aspen 6.0:

1. Verifying DICOM 3.0 connectivity using Verification service class SCU.
2. Exporting images using DICOM 3.0 Storage service class SCU.
3. Printing images using DICOM 3.0 Print management service class SCU.
4. Querying patient and study scheduling information using DICOM 3.0 Modality Worklist service class SCU.
5. 90mm (3.5")128MB, 230MB, and 540MB DICOM Magneto-Optical disk media.

### 2.1. Source of Information

- Digital Imaging and Communication in Medicine (DICOM), NEMA Standard Publication No. PS 3.1~3.13, NEMA, 1300 North 17th Street, Suite 1847, Rosslyn, VA 22209, phone: (703)-841-3200.
- World Wide Web: <http://www.nema.org/medical/dicom.htm>

### 2.2. Acronyms and Abbreviations

ACR	American College of Radiology
AE	Application Entity
ANSI	American National Standards Institute

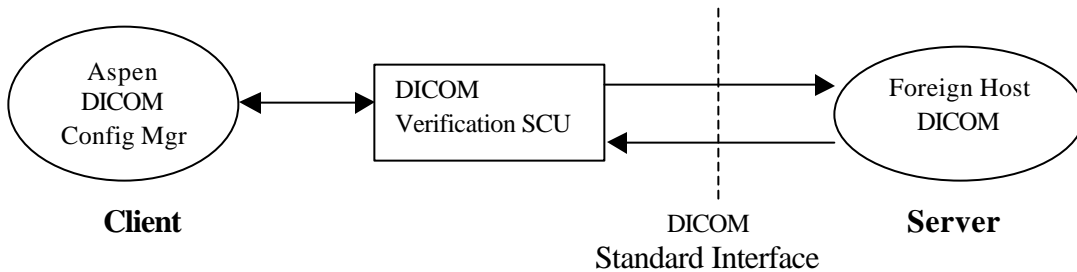
DICOM	Digital Imaging and Communication in Medicine
DIMSE-C	DICOM Message Service Element-Composite
DIMSE-N	DICOM Message Service Element-Normalized
FSC	File-set Creator
FSR	File-set Reader
FSU	File-set Updator
HIS/RIS	Hospital Information System/Radiology Information System
IOD	Information Object Definition
ISO	International Standards Organization
MOD	Magneto-Optical Disk
NEMA	National Electrical Manufacturers Association
OSI	Open Systems Interconnections
PDU	Protocol Data Unit
SCP	Service Class Provider (server)
SCU	Service Class User (client)
SR	Structured Report
TCP/IP	Transmission Control Protocol/Internet Protocol
SOP	Service Object Pair
UID	Unique Identification

### 3. Implementation Model

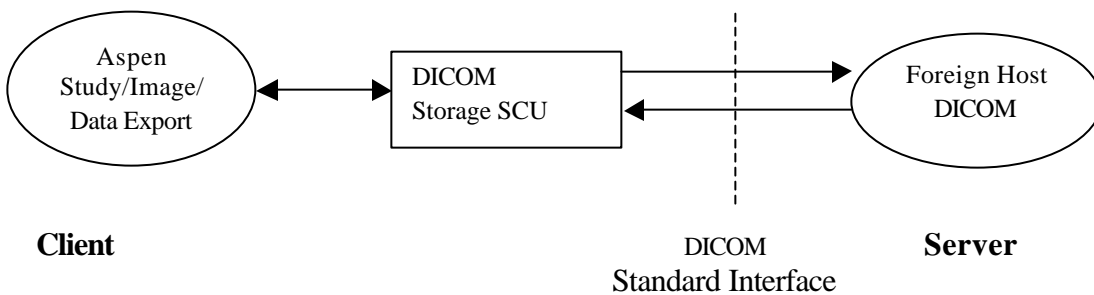
Each DICOM function is an Application Entity (AE).

#### 3.1. Application Data Flow Diagram

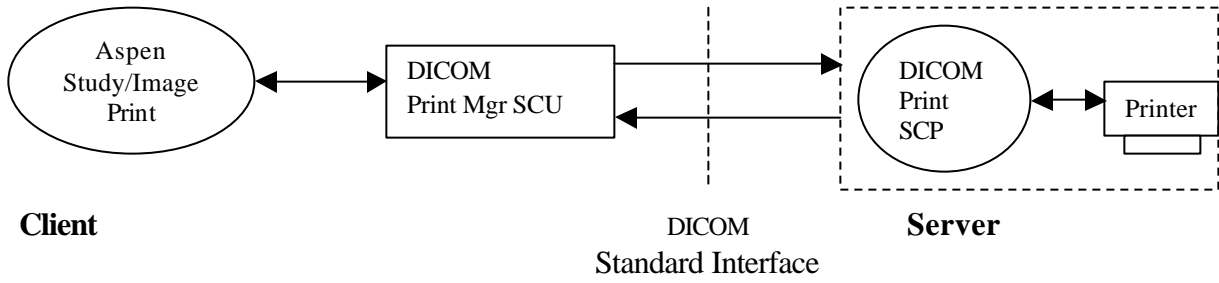
##### 3.1.1. Verification AE



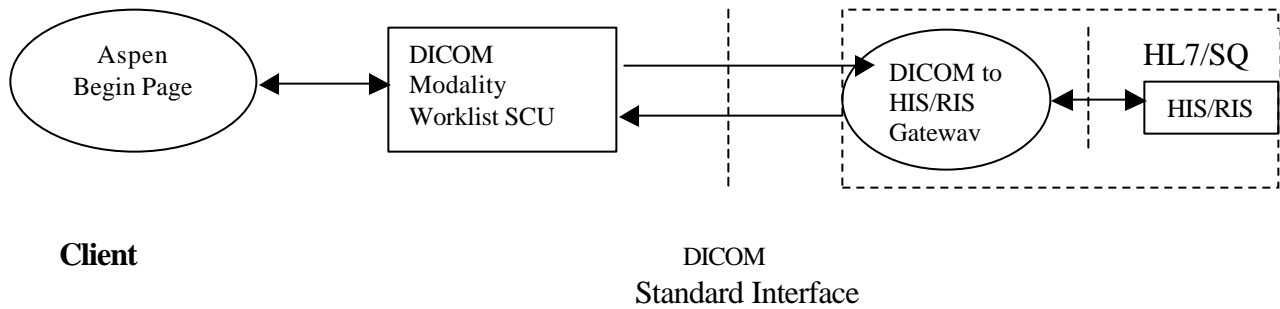
##### 3.1.2. Image Export AE



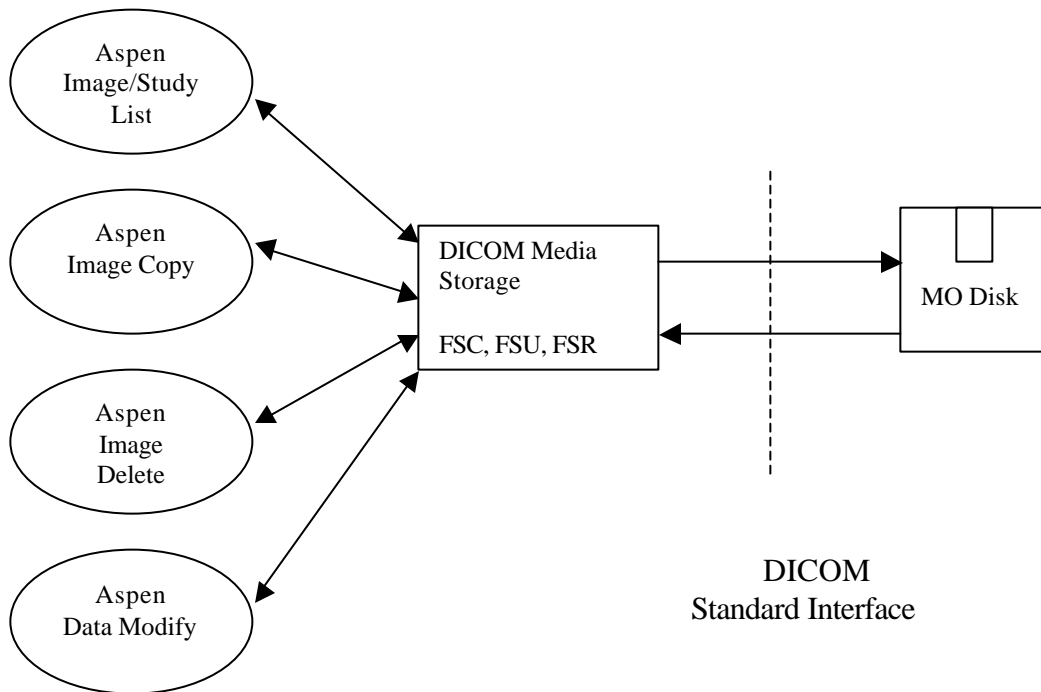
### 3.1.3. DICOM Print AE



### 3.1.4. DICOM Modality Worklist AE



### 3.1.5. DICOM MOD Media Interchange AE



## **3.2. Functional Definitions of AE**

### **3.2.1. Verification AE**

The Verification AE is part of the DICOM configuration manager. It issues a DICOM 3.0 verification request to the remote DICOM server and tries to receive a response (if any) and reports the result.

The result can be either of the following.

1. Success
2. Rejected
3. Time-out

The Calling AE Title and Called AE Title are identical to those used in the Image Export or Print AE.

### **3.2.2. Image Export AE**

The Image Export AE uses DICOM 3.0 Storage service class SCU to export Aspen single frame and multi-frame Ultrasound images to a host which supports the Storage service class SCP role. It also exports a Structured Report object to a host which supports storing this object.

The user can manually use the Study Util UI to select completed studies and export them. The destination is selected from a pop-up selection of pre-configured devices.

Additionally, there are automated background image export methods available. The system can be set to store either “in-progress” or “on study close” where:

- The system automatically exports an image as soon as it is captured and saved to the local disk while the study is currently open and in-progress.
- The system automatically exports all the images belonging to the current study as it closes.
- The system automatically exports one or more studies in the background, acquired while in a portable non-networked mode, once it is powered up on the network.

The “in-progress” method distributes the network load over time and can provide image review at the review station in near real-time (provided the server supports this capability). The “on study close” method lets the user store studies more accurately in the server. It is a common practice in Ultrasound to delete some images or modify demographic data before the study is closed.

If a Storage SCP accepts the Aspen proposed SR object in the Association Negotiation, the Structured Report object is exported with the Study Instance UID.

In the event of a network failure during background export, the Store SCU maintains a queue of failed C-STORE requests. These are periodically retried subsequent to the end of the study. The queue is also retried upon power cycling the Aspen.

To use background export, the user pre-configures the destinations and mode of copy with the Setup Aegis System Wide Setup Function under “Define Servers.” Images can be copied to two destinations.

### **3.2.3 Structured Reporting**

The Aspen system conforms to a Private Structured Report (SR) SOP class as an SCU. It always creates a Structured Reporting object with each study and will automatically export the SR object in a C-STORE if successfully negotiated. The SR Presentation cannot be disabled through a configuration interface on Aspen.

The SR object contains patient information and any measurements or calculations entered into one of the three Aspen calculations package worksheets for OB, Cardiac, or Vascular studies.

The Acuson implementation of Structured Reporting predated the adoption of DICOM Supplement 23 and substantially differs from that final version. Data contained in the Aspen SR object cannot be extracted to populate other Structured Reporting implementations in non-Acuson devices. Acuson uses a Private Structured Reporting SOP Class UID 1.2.840.10008.5.1.4.1.1.88.3.

If a Storage SCP accepts the Aspen proposed SR object in the Association Negotiation, the Structured Report object is exported with the Study Instance UID.

### **3.2.4. Image Print AE**

The Image Print AE uses the DICOM 3.0 Print management service class SCU to print Aspen single frame Ultrasound images to a network DICOM printer.

The user can manually use the Study Util UI to select completed studies for printing. The printers and print formats are determined by the selections made in Aegis System Wide Function Setup under “Define Printers.” It is possible to select one B&W and one color printer to route gray scale images and color Doppler images to separate printers. Print routing to separately print gray scale images from color images only works with the Study Util method or printing.

Additionally, there are automated background printing methods available. The system can be setup to either print a study “in-progress” or “on study close” where:

- The system automatically prints a sheet of film as soon as enough static images have been captured to create a full format while the study is in-progress.
- The system automatically prints all films belonging to the study as soon as the study is closed.
- The system automatically exports one or more studies in the background, acquired while in a portable non-networked mode, once it is powered up on the network.

Since it can take 30 seconds to several minutes to print all films, the “in-progress” setting will print most of the films before the study is closed. However, for ultrasound users who delete images throughout the study, the “on study close” method will give more correct study printouts.

The user can use the “Print Now” button to force a partially formatted film before it is fully populated with images and automatic printing occurs.

In the event of a network failure during background export, the Print SCU maintains a queue of failed print requests. These are periodically retried subsequent to the end of the study. The queue is also retried upon power cycling the Aspen.

### **3.2.5. DICOM Modality Worklist AE**

The Aspen Modality Worklist AE uses the DICOM 3.0 Modality Worklist service class SCU to query a Radiology/Cardiology/Hospital Information System, often via a DICOM-to-HL7 gateway, to obtain patient demographic and scheduled study information.

The DICOM Modality Worklist AE is embedded in the Aspen Begin page (or patient demographic page) application. The user can type in some filters, such as part of the last name or accession number, or do a wild card query. The returned elements populate the Begin page, so that the operator does not need to type in patient name, birth date, ID, etc.

Aspen can serve to itself as a virtual RIS if the scheduled study list is down loaded and saved before the system is disconnected from the network to operate in a portable mode.

### **3.2.6. DICOM MOD Media Interchange AE**

The DICOM MOD Media Interchange AE performs the following DICOM roles:

- File-set creator (FSC): creates a DICOM MOD medium when the user copies studies/images to MO. A DICOM 3.0 conforming DICOMDIR file is created together with the directory structures and image files.
  - Supported MO disk formats are 128MB, 230MB, and 540MB
  - Aspen creates a partitioned MOD if formatted on the system.
  - The Aspen disk drive may be either a 230MB drive or a 640MB drive.
- File-set updatator (FSU): modifies the DICOMDIR file and image files when the user copies or deletes studies/images.
- File-set reader (FSR): reads the DICOMDIR and makes a listing. It also reads and displays images when the user chooses to do so.

Studies/images are copied from the Aspen hard drive to MOD in the following scenarios:

- If the MOD disk is in the drive while a study is being performed, images belonging to the study are automatically copied to the MOD in the background.
- The user selects studies in the Study Util UI to copy them to MOD.
- Note: the SR object is not copied to the MOD with its associated study.

Studies/images are copied from MOD to the Aspen hard drive in the following cases:

- if an Aspen study is restarted from MOD disk.
- if the user uses Study Util UI to select studies and copy them from MOD.

Images are read and displayed if the user selects a study for review with the Study Util user interface. The DICOMDIR file is read and parsed by Study Util to generate the list of studies.

Limitations:

- Aspen created studies can be restarted from MOD on an Aspen system only.
- Only Acuson Aspen and Sequoia studies can be copied to and from MOD. An MOD can contain a mix of Aspen and Sequoia studies.
- Only Acuson Aspen and Sequoia created studies can be reviewed on Aspen.
- The Aspen release version used to create a study must be 3.0 or greater.
- The Sequoia release version used to create a study must be 3.15 or greater.

The level of compatibility of Aspen DICOM MOD with a non-Acuson DICOM 3.0 reader should be determined by the maker of the reader.

### 3.3. Sequencing of Real World Activities

See the previous section.

## 4. Network Transfer Specifications

### 4.1. Supported SOP Classes

This implementation provides standard conformance to the following DICOM 3.0 SOP classes.

TABLE 1. Verification SOP Class

SOP Class Name	SOP Class UID	Role
Verification SOP Class	1.2.840.10008.1.1	SCU

TABLE 2. Storage SOP Classes

SOP Class Name	SOP Class UID	Role
Ultrasound Image	1.2.840.10008.5.1.4.1.1.6 (retired)	SCU
	1.2.840.10008.5.1.4.1.1.6.1	
Multi-frame Ultrasound Image	1.2.840.10008.5.1.4.1.1.3 (retired)	SCU
	1.2.840.10008.5.1.4.1.1.3.1	
Secondary Capture	1.2.840.10008.5.1.4.1.1.7	SCU

TABLE 3. Structured Report SOP Class (Private)

SOP Class Name	SOP Class UID	Role
Structured Report	1.2.840.10008.5.1.4.1.1.88.3 (private)	SCU

**TABLE 4. Print Management SOP Class**

<b>SOP Class Name</b>	<b>SOP Class UID</b>	<b>Role</b>
Basic Grayscale Print Management Meta	1.2.840.10008.5.1.1.9	SCU
Basic Color Print Management Meta	1.2.840.10008.5.1.1.18	SCU

**TABLE 5. Modality Worklist Management SOP Class**

<b>SOP Class Name</b>	<b>SOP Class UID</b>	<b>Role</b>
Modality Worklist Information Model-FIND	1.2.840.10008.5.1.4.31	SCU

## **4.2. Association Establishment Policies**

### **4.2.1. General**

The maximum PDU size is set to 32768 bytes. This value is not configurable but is negotiable during the association negotiation of Aspen and the receiving DICOM device, in which case the value negotiated will be used.

### **4.2.2. Number of Associations**

Multiple associations can be opened for the same or different types of transactions.

### **4.2.3. Asynchronous Nature**

This implementation does not support Asynchronous operation.

### **4.2.4. Implementation Identifying Information**

This implementation will be identified by

- Implementation Class UID = 1.2.840.113680.21.1
- Implementation Version Name = DS21.1\_Aspen5.0

### **4.2.5. Calling and Called AE Titles**

The SCU Calling AE Title is pre-configured at shipment to be:

- ASPEN\_serial#

The user can change the Calling AE Title if necessary.

The Called AE Title is used by a SCP. This release does not contain a SCP.

## **4.3. Association Initiation Policy**

This implementation will initiate the association in the following manner.

- The Verification will open one association.  
It is closed at the end of the transaction.
- In Storage SCU, Aspen opens one association per study regardless of the method used (manual or automated background copy).

- DICOM Print SCU will open one association per film session. Multiple associations occur if background printing is done in-progress.

### 4.3.1. Proposed Presentation Context

TABLE 5. Proposed Presentation Contexts for Sending Data/Request

Presentation Context (SCU)					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
SOP	UID	Name List	UID List		
Tables 1~3	Tables 1~3	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Ultrasound Image	Table 2	RLE Lossless Image	1.2.840.10008.1.2.	SCU	None
Multi-frame Ultrasound	Table 2	JPEG Baseline	1.2.840.10008.1.2.4.50	SCU	None

### 4.3.2. SOP Specific Conformance of SCU

#### 4.3.2.1. Storage SOP Classes: Presentation Contexts

The Image Export AE is implemented in such a way that it negotiates with the peer AE the 7 possible presentation contexts as listed in Table 6 during the association. It selects the SOP Class UID according to the scheme in Table 5. It composes one presentation context for exporting single frame images and one for multi-frame images based on the selected SOP Class UID and Table 6.

TABLE 6. Storage SCU SOP Class UID Selection Scheme

Image Type	Selection order: SOP Class UID
Single Frame Ultrasound Image	1.2.840.10008.5.1.4.1.1.6.1 (new)
	1.2.840.10008.5.1.4.1.1.6 (retired)
	1.2.840.10008.5.1.4.1.1.7 (Secondary Capture)
Multi-frame Ultrasound Image	1.2.840.10008.5.1.4.1.1.3.1 (new)
	1.2.840.10008.5.1.4.1.1.3 (retired)

**TABLE 7. Storage SCU Presentation Context Selection Scheme**

<b>SOP Class UID</b>	<b>Selection order: Transfer Syntax UID</b>
1.2.840.10008.5.1.4.1.1.6.1 (new)	1.2.840.10008.1.2.5 (RLE) 1.2.840.10008.1.2 (DICOM default)
1.2.840.10008.5.1.4.1.1.3.1 (new)	1.2.840.10008.1.2.4.50 (JPEG Baseline) 1.2.840.10008.1.2 (DICOM default)
1.2.840.10008.5.1.4.1.1.6 (ret) 1.2.840.10008.5.1.4.1.1.3 (ret) 1.2.840.10008.5.1.4.1.1.7 (ret)	1.2.840.10008.1.2 (DICOM default)

Aspen sends SOP class UID and transfer syntax UID pairs to negotiate for the supported presentation contexts, i.e.,

- SOP class UID 1 and Transfer Syntax UID 1
- SOP class UID 1 and Transfer Syntax UID 2
- SOP class UID 2 and Transfer Syntax UID 1
- Etc....

### 4.3.2.2. Storage SOP Classes: Photometric Interpretation

Photometric Interpretation, i.e., color mode of the pixel image data, is not a negotiable parameter in DICOM 3.0.

This implementation lets the user configure the color images to be exported as grayscale or RGB color images if the peer AE only accepts uncompressed Implicit VR Little Endian transfer syntax. Images will be exported in a YBR color mode if either RLE or JPEG transfer syntax is used (see Table 8.)

TABLE 8. Photometric Interpretation of Exported Images

Ultrasound Image SOP Class UID	Transfer Syntax and UID	Image Content	User Config	Photometric Interpretation
Single-frame: 1.2.840.10008.5.1.4.1.1.6.1 1.2.840.10008.5.1.4.1.1.6 1.2.840.10008.5.1.4.1.1.7	Implicit VR Little Endian 1.2.840.10008.1.2	B/W	n/a	MONOCHROME2
Multi-frame: 1.2.840.10008.5.1.4.1.1.3.1 1.2.840.10008.5.1.4.1.1.3		Color	B/W	MONOCHROME2
			RGB	RGB
Single-frame: 1.2.840.10008.5.1.4.1.1.6.1	RLE Lossless Image Compression 1.2.840.10008.1.2.5	B/W or Color	B/W or RGB	YBR_FULL
Multi-frame: 1.2.840.10008.5.1.4.1.1.3.1	JPEG Baseline 1.2.840.10008.1.2.4.50	B/W or Color	B/W or RGB	YBR_FULL_422

### 4.3.2.3. Storage SOP Classes: DICOM IOD Specification

This implementation uses DICOM 3.0 Part 3 and Supplement 5 as the DICOM Image IOD specification.

All the Type 1 and 2 elements specified in the DICOM 3.0 standard are encoded and exported. Some Type 3, 1C and 2C elements are also exported.

### 4.3.2.4. Print SOP Class

Printer parameters are found in the Aspen DICOM Configuration Manager and can be customized by Acuson personnel when configuring Aspen for a site's printers. These are listed in Table 9. The actual allowable values should be determined by reading the DICOM 3.0 Conformance Statement for the printer.

Pre-defined templates for some printer models are used to reduce the possibility of an unsupported configuration. Aspen will automatically negotiate for grayscale printing if

the printer does not support color mode (Photometric Interpretation). None of the other parameters are negotiable as per the DICOM 3.0 standard, except for color. For example, if a Display Format is customized, but the printer does not support it, images will not be printed.

Once printers are installed, the user can change the routing of color or B/W images and their display formats between studies by using the “Define Printers” setup under Aegis System Wide Functions.

**TABLE 9. Site-Customizable Print Parameters**

(Acuson-provided defaults are highlighted in **BOLD**.)

<b>Parameter</b>	<b>Tag</b>	<b>Editable Values</b>
Number of Copies	2000,0010	<b>1</b> or more
Print Priority	2000,0020	LOW   <b>MED</b>   HIGH
Film Medium Type	2000,0030	PAPER   <b>BLUE FILM</b>   CLEAR FILM
Min Density	2010,0120	<b>0</b> or higher
Max Density	2010,0130	<b>350</b> or lower
Trim	2010,0140	<b>On</b> or off
Display Format	2010,0010	STANDARD\1,1   STANDARD\1,2   STANDARD\2,2   <b>STANDARD\2,3</b>   STANDARD\3,2   STANDARD\3,5   STANDARD\4,6   STANDARD\4,5   STANDARD\5,6
Film Orientation	2010,0040	<b>PORTRAIT</b>   LANDSCAPE
Film Size ID	2010,0050	<b>8INX10IN</b>   14INX17IN   10INX12IN   10INX14IN   11INX14IN   14INX14IN   24CMX24CM   24CMX30CM
Magnification Type	2010,0060	<b>REPLICATE</b>   BILINEAR   CUBIC   NONE
Photometric Interpretation	0028,0004	RGB (Color)   MONOCHROME1 (Reverse Video)   <b>MONOCHROME2 (B/W)</b>
Border Density	2010,0100	<b>BLACK</b>
Empty Image Density	2010,0110	<b>BLACK</b>

**TABLE 10. Other Supported Print SOP Class Parameters**

<b>Parameter</b>	<b>Tag</b>
Referenced Film Session Sequence	2010,0500
>Referenced SOP Class UID	0008,1150
>Referenced SOP Instance UID	0008,1155
Basic Grayscale Image Sequence	2020,0110
Basic Color Image Sequence	2020,0111
Image Position	2020,0010
Polarity	2020,0020
Samples per Pixel	0028,0002
Rows	0028,0010
Columns	0028,0011
Pixel Aspect Ratio	0028,0034
Bits allocated	0028,0100
Bits Stored	0028,0101
High Bit	0028,0102
Pixel Representation	0028,0103
Pixel Data	7fe0,0010

#### 4.4. SOP Specific Conformance to Modality Worklist SOP Classes

The following table provides the list of attributes requested in the Modality Worklist Query.

TABLE 11. Modality Worklist Information Model Attributes

Module	Attribute Name	Tag	Match Type	Notes
SOP Common	Specific Character Set	(0008,0005)	--	Aspen ignores this attribute.
Scheduled Procedure Step	Scheduled Procedure Step Sequence	(0040,0100)	SQ	
	>Scheduled Station AE title	(0040,0001)	UV	Set to zero length value.
	> <b>Scheduled Procedure Step Start Date</b>	(0040,0002)	SV	From the Begin page screen, Aspen always sets this attribute to today's date. In the Worklist query screen, the user is allowed to select from the following ranges: Today   Tomorrow   3Days   1Week   All
	>Scheduled Procedure Step Start Time	(0040,0003)	UV	Set to "000000-235900"
	> <b>Modality</b>	(0008,0060)	SV	The user may set the value of this attribute under the "Send U/S Study Only" setting located in the Worklist Server setup menu. Possible values are: YES = "US" NO = Any (zero length value)
	>Scheduled Performing Physician's Name	(0040,0006)	UV	
	>Scheduled Procedure Step Description	(0040,0007)	UV	This attribute is mapped to Aspen's "Study Type" field on the Begin page. Aspen ships with a list of study types. The Study Type names can be customized so that RIS and the ultrasound system have the same list to match correctly.
	>Scheduled Station Name	(0040,0010)	UV	
	>Scheduled Procedure Step Location	(0040,0011)	UV	
	>Comments on the Scheduled Procedure Step	(0040,0400)	UV	

Requested Procedure	Requested Procedure ID	(0040,1001)	UV	
	Requested Procedure Description	(0032,1060)	UV	
	Study Instance UID	(0020,000d)	UV	
	Reason for Requested Procedure	(0040,1002)	UV	
	Requested Procedure Priority	(0040,1003)	UV	
Image Service Request	<b>Accession Number</b>	(0008,0050)	SV	Maps to the Accession field in the Begin page
	Requesting Physician	(0032,1032)	UV	Maps to the Referring Physician Name field in the Begin page
	Referring Physician's Name	(0008,0090)	UV	
Visit Identification	Admission ID	(0038,0010)	UV	
Patient Identification	<b>Patient's Name</b>	(0010,0010)	WC	Maps to the Patient Name field in the Begin page
	<b>Patient's ID</b>	(0010,0020)	SV	Maps to the Patient ID field in the Begin page
	Patient Other ID	(0010,1000)	UV	
Patient Demographic	Patient's Birth Date	(0010,0030)	UV	Maps to the Accession Number field in the Begin page
	Patient Sex	(0010,0040)	UV	Maps to the Sex field in the Begin page
	Patient Size	(0010,1020)	UV	Maps to the Height field in the Begin page
	Patient Weight	(0010,1030)	UV	Maps to the Weight field in the Begin page
	Confidentiality Constraint on Patient Data Server	(0040,3001)	UV	
Patient Medical	Pregnancy Status	(0010,21c0)	UV	
	Medical Alerts	(0010,2000)	UV	

Attributes listed in **bold** are items that are available as query criteria from either the Begin page screen, Worklist query screen or the Worklist Server setup screen.

<b>Matching Key Types</b>	
SV	Single Value matching
WC	Wild Card matching
SQ	Sequence matching
UV	Universal matching

#### **4.5. Association Acceptance Policy**

This implementation does not accept an association request.

#### **4.6. Communication Profile**

This implementation supports TCP/IP Protocol stack.

OSI stack is not supported.

DICOM 50-pin physical connection is not supported.

This implementation is indifferent to the underlying physical medium. It only requires TCP/IP in the Transport and Network layers.

### **5. Removable Media Interchange Specifications**

This implementation supports two 3.5" DICOM MOD removable media. It conforms to DICOM 3.0 Part 10, 11 and 12.

#### **5.1. Supported SOP Classes**

This implementation provides standard conformance to the following DICOM 3.0 SOP classes.

**TABLE 12. Media Storage SOP Classes**

<b>SOP Class Name</b>	<b>SOP Class UID</b>	<b>Roles</b>
Ultrasound Image	1.2.840.10008.5.1.4.1.1.6.1	FSC FSU FSR
Multi-frame Ultrasound Image	1.2.840.10008.5.1.4.1.1.3.1	
DICOM Media Storage Directory	1.2.840.10008.1.3.10	

##### **5.1.1. Proposed Transfer Syntaxes**

**TABLE 13. Proposed Transfer Syntaxes for Media Interchange**

Abstract Syntax		Transfer Syntax	
SOP Name	UID	Name list	UID list
Ultrasound Image	Table 12	RLE Lossless Image Compression	1.2.840.10008.1.2.5
Multi-frame Ultrasound Image	Table 12	JPEG Base-line	1.2.840.10008.1.2.4.50
DICOM Media Storage Directory	Table 12	Explicit VR Little Endian	1.2.840.10008.1.2.1

### 5.1.2. Physical Storage Media and Media Formats

The physical storage media are 90mm (3.5") 128MB, 230MB, and 640MB magneto-optical disks.

The disks are formatted in a PC (DOS) file system format. They support a 230MB partition only.

## 6. Data Identification Information

Patient and image data originated from an Aspen system can be identified by the Study Instance UID, Series Instance UID and SOP Instance UID, i.e., DICOM elements (0020, 000D), (0020, 000E) and (0008, 0018) in the IOD.

- Aspen UID root is 1.2.840.113680.2.103, where 1.2.840.113680 is the ANSI registered Acuson UID root.
- The Study Instance UID is composed using the following convention:  
1.2.840.113680.2.103.n.s.t  
where  
n = serial number of the Aspen machine  
s = the UNIX epoch based time since a base time in seconds  
t = microsecond within the second of current UNIX epoch-base time
- The Series Instance UID is composed of the Study Instance UID and the series number:  
1.2.840.113680.2.103.n.s.t.r  
where  
r = 1 for full-screen static and dynamic and quarter-size static images  
r = 2 for quarter-screen dynamic images
- The SOP Instance UID is composed of the Series Instance UID and the image number:  
1.2.840.113680.2.103.n.s.t.r.f  
where  
f = image number

## 7. Extensions, Specializations and Privatizations

The private elements and files listed in this section are primarily intended for Acuson internal use.

### 7.1. Private DICOM Elements

The Acuson private group (7FDF, xxxx) is used in DICOM image IOD files.

## 7. Extensions, Specializations and Privatizations

### 7.1. Private DICOM and Acuson Elements

There are many DICOM and Acuson Private tags used in Acuson proprietary files used internally by Acuson software for image acquisition and image review on the Aspen system and in the private Structured Report SOP object.

These are exported to servers as part of the Store SCU AE configuration on the Aspen system. They are also exported to removable MOD with DICOM FSC, FSR, and FSU:

- ACQ\_SET file: acquisition protocol and acquired image set information.  
DICOM Private Elements, primarily (0009,xxxx)
- DSP\_SET file: image set selected for display.
- CLIPS/IMAGES: Acuson image data  
Acuson private elements (7FDF, xxxx) in “Explicit VR Big Endian” file format
- CALC\_SR: Acuson measurements, calculations and findings for Cardiac, OB, and Vascular reports.  
Various Acuson private, LOINC, and SNOMED elements

### 7.2. Private Files

There are several Acuson private files in the Aspen DICOM MOD study directories. These are in an “Explicit VR Big Endian” file format.

1. DBRECORD file: patient demographic and study information which applies to all the images in the study.
2. ACQ\_SET file: acquisition protocol and acquired image set information.
3. DSP\_SET file: image set selected for display.
4. PRT\_SET files: image set selected for printing.  
Each PRT\_SET file represents a DICOM 3.0 Film Box.

Many private DICOM elements are used in these files. They are not documented here because they are only used internally by Acuson software during image acquisition. A non-Acuson DICOM reader should not attempt to parse these private files.

All DICOM supported data are already in the DICOMDIR and DICOM image files.

## **8. Configuration**

The Aspen DICOM configuration database maintains configuration parameters of remote and local DICOM Application Entities. The parameters include:

- AE identification, i.e., a descriptive name
- Calling AE Title (for Aspen DICOM SCU)
- Called AE Title (for a remote SCP)
- TCP port number (for a remote SCP)
- IP address or host name (for a remote host where the remote SCP resides)
- DICOM print parameters for a DICOM print SCP entry
- Some specialized information

The local Aspen DICOM applications read information from this database. The Aspen DICOM Configuration Manager is the only application that can modify this database.

## **9. Support of Extended Character Sets**

The following character set is supported:  
ISO-IR 100 Latin Alphabet No. 1

## **10. Comments**

Acuson is an active member on the ACR-NEMA DICOM standards committee.