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Terason™ DICOM Conformance Statement

Doc. #:16-2040

Rev 0

Terason DICOM

Terason Ultrasound Imaging System

DICOM Conformance Statement

FILE NAME	LAST ECO #	PRINTED	PAGE
16-2040_0 Terason DICOM Conformance Statement.doc	--	6:08 PM -- 9/25/2003	1 OF 20



Table of Contents

0. Introduction	4
0.1 Scope	4
0.2 Products Applicable	4
1. Implementation Model	4
1.1 Application Data Flow Diagram	4
1.2 Functional Definitions	5
1.2 Functional Definitions	6
1.3 Sequencing of Real-World Activities	6
2. AE Specifications	7
2.1 AE Specification	7
2.1.1 Association Establishment Policies	7
2.1.1.1 General	7
2.1.1.2 Number of Associations	8
2.1.1.3 Asynchronous Nature	8
2.1.1.4 Implementation Identifying Information	8
2.1.2 Association Initiation Policy	8
2.1.2.1.1 Associated Read-World Activity	8
2.1.2.1.2 Proposed Presentation Contexts	9
2.1.2.1.2.1 SOP Specific Conformance for Storage SOP Class	9
2.1.2.3 Verification of a remote AE	9
2.1.2.3.1 Associated Read-World Activity	9
2.1.2.3.2 Proposed Presentation Contexts	10
2.1.2.3.2.1 SOP Specific Conformance for Verification SOP Class	10
2.1.2.4 Image Print to a remote AE	10
2.1.2.4.1 Associated Read-World Activity	10

FILE NAME	LAST ECO #	PRINTED	PAGE
16-2040_0 Terason DICOM Conformance Statement.doc	--	6:08 PM -- 9/25/2003	2 OF 20



2.1.2.4.2 Proposed Presentation Contexts	11
2.1.2.4.2.1 SOP Specific Conformance for Grayscale Print Management Meta SOP Class.....	12
2.1.2.4.2.2 SOP Specific Conformance for Color Print Management Meta SOP Class	13
2.1.2.4.2.3 Basic Film Session SOP Class Attributes	14
2.1.2.4.2.4 Basic Film Box SOP Class Attributes	15
2.1.2.4.2.5 Basic Grayscale Image SOP Class Attributes	16
2.1.2.4.2.6 Basic Color Image SOP Class Attributes	17
2.1.3 Association Acceptance Policy	17
2.1.3.1.1 Associated Read-World Activity.....	17
2.1.3.1.2 Accepted Presentation Context Table	18
2.1.3.1.2.1 SOP Specific Conformance for Verification SOP Class	18
2.1.3.1.3 Presentation Context Acceptance Criterion.....	18
2.1.3.1.4 Transfer Syntax Selection Policies	18
3 Communication Profiles	18
3.1 Supported Communication Stacks	18
3.2 TCP/IP Stacks	18
3.2.1 Physical Media Support	18
4. Extensions / Specializations / Privatizations	19
5. Configuration.....	19
5.1 AE Title / Presentation Address Mapping	19
5.2 Configurable Parameters	19
6. Support For Extended Character Sets	20

FILE NAME	LAST ECO #	PRINTED	PAGE
16-2040_0 Terason DICOM Conformance Statement.doc	--	6:08 PM -- 9/25/2003	3 OF 20



0. Introduction

0.1 Scope

This document is the DICOM 3.0 Conformance Statement for Terason DICOM on the Terason Ultrasound Imaging System product family.

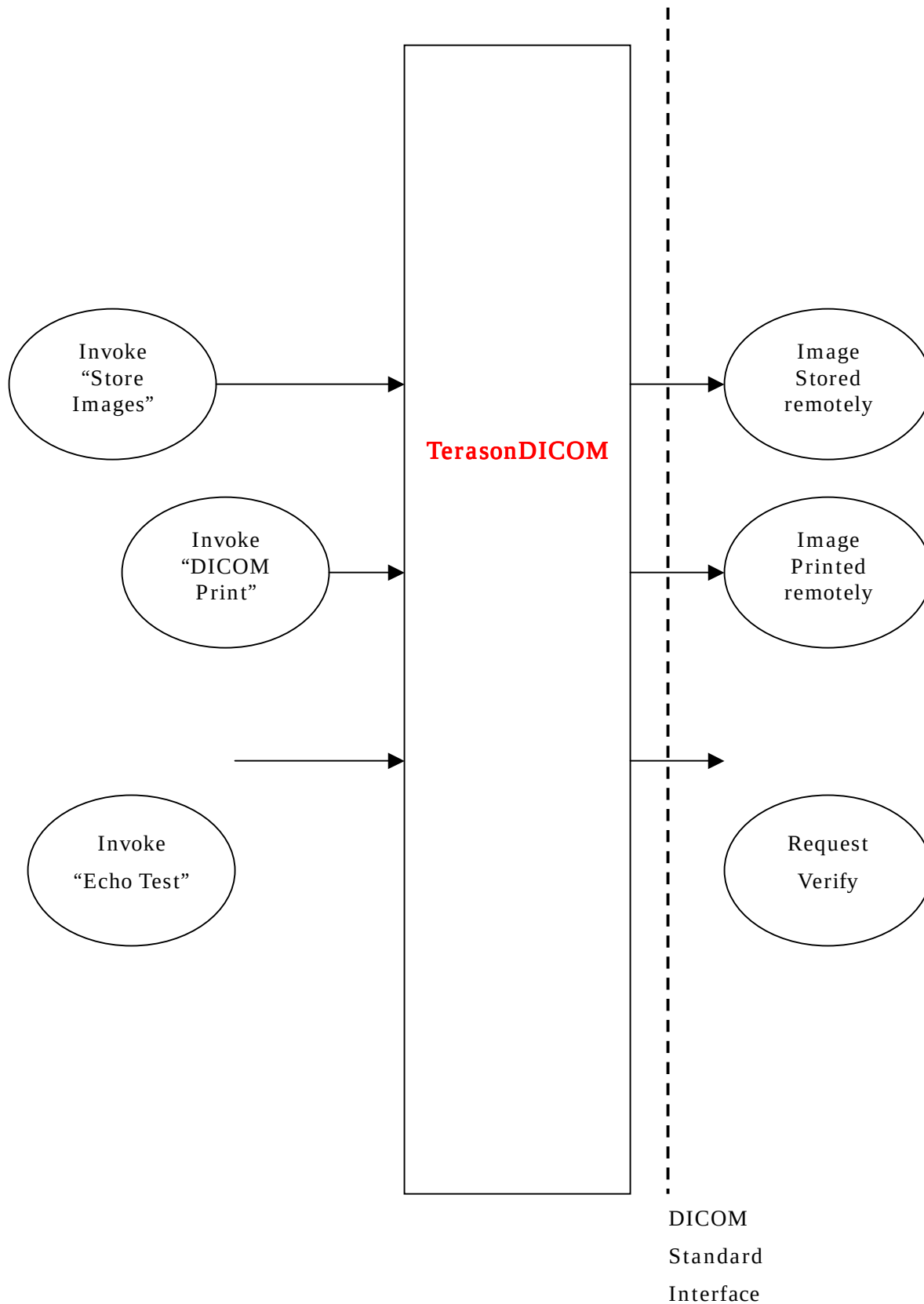
0.2 Products Applicable

The document is applicable to the Terason Ultrasound Imaging System equipped with the Terason DICOM for Windows 2000/XP option. "Terason DICOM" in this document refers to Terason DICOM on the Terason Ultrasound Imaging System.

1. Implementation Model

1.1 Application Data Flow Diagram

FILE NAME	LAST ECO #	PRINTED	PAGE
16-2040_0 Terason DICOM Conformance Statement.doc	--	6:08 PM -- 9/25/2003	4 OF 20



FILE NAME	LAST ECO #	PRINTED	PAGE
16-2040_0 Terason DICOM Conformance Statement.doc	--	6:08 PM -- 9/25/2003	5 OF 20



1.2 Functional Definitions

Terason DICOM has a single Application Entity (AE) for all Service Classes.

Terason DICOM is an SCU for Storage Service Class operation.

Terason DICOM is an SCU for Print Management Service Class operation.

Terason DICOM is an SCU and SCP for Verification Service Class operation.

1.3 Sequencing of Real-World Activities

Terason DICOM can transfer SOP Instances another remote AE automatically. This is accomplished by selecting to send or print DICOM images from the Terason system. Images are transferred asynchronously from a local cache. All configurable parameters are pre-selected by the user.

FILE NAME	LAST ECO #	PRINTED	PAGE
16-2040_0 Terason DICOM Conformance Statement.doc	--	6:08 PM -- 9/25/2003	6 OF 20



2. AE Specifications

2.1 AE Specification

Terason DICOM has only one AE implementation. AE title is user configurable (Default is TERASON_2000). With any AE title specified by user, Terason DICOM (in standard configuration) provides Standard Conformance to the following DICOM V3.0 SOP Classes as an SCU:

Table 2.1.1 **SOP Class Names and UIDs**

SOP Class Name	SOP Class UID	Role
Verification	1.2.840.20008.1.1	SCU SCP
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	SCU
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	SCU

Terason DICOM provides Standard Conformance to the following DICOM V3.0 SOP Classes:

Table 2.1.2 **SOP Class Names and UIDs**

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

2.1.1 Association Establishment Policies

2.1.1.1 General

The maximum PDU size, which Terason DICOM will use, is 16384 bytes. If an SCP does not specify the maximum PDU in association, Terason DICOM sends PDU of maximum size, 16384 bytes. If the SCP specifies the maximum PDU size greater than 16384 bytes, Terason DICOM will send PDU of 16384 bytes or less.



2.1.1.2 Number of Associations

Terason DICOM supports multiple associations. Three simultaneous associations are possible: Storage Service Class operation, Print Management Service Class operation and Verification Service Class operation.

2.1.1.3 Asynchronous Nature

Terason DICOM does not support negotiation of multiple outstanding transactions.

2.1.1.4 Implementation Identifying Information

Implementation Class UID: 1.2.840.113820.2

Implementation Version Name: EBM_DICOM_26

2.1.2 Association Initiation Policy

Terason DICOM initiates associations under the following conditions:

User invokes Image Store to a remote AE.

User invokes Image Print to a remote AE.

User invokes Echo Test to a remote AE.

- 2.1.2.1 Image Store to a remote AE

2.1.2.1.1 Associated Read-World Activity

The associated Real-World activity with the Storage Service is the transfer of images to a remote DICOM Storage SCP selected by the user.

FILE NAME	LAST ECO #	PRINTED	PAGE
16-2040_0 Terason DICOM Conformance Statement.doc	--	6:08 PM -- 9/25/2003	8 OF 20



2.1.2.1.2 Proposed Presentation Contexts

Table 2.1.2.1.2

Proposed Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID	Name	UID		
See Note	See Note	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		

Note: Refer to Tables 2.1.1 and 2.1.2.

If transfer syntax of the SOP Instance to be transferred is not Implicit VR Little Endian, Terason DICOM proposes two transfer syntax's; 1) Transfer syntax of the original SOP Instance and 2) Implicit VR Little Endian. Terason DICOM always includes Implicit Little Endian as proposed transfer syntax for each abstract syntax.

2.1.2.1.2.1 SOP Specific Conformance for Storage SOP Class

Terason DICOM provides standard conformance to the DICOM Storage Service Class.

2.1.2.3 Verification of a remote AE

2.1.2.3.1 Associated Read-World Activity

When a user submits a request to verify a remote AE, Terason DICOM initiates an association to the user specified DICOM Verification SCP.



2.1.2.3.2 Proposed Presentation Contexts

Table 2.1.2.3.2

Proposed Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID	Name	UID		
Verification	1.2.840.20008.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	N/A
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		

2.1.2.3.2.1 SOP Specific Conformance for Verification SOP Class

Terason DICOM provides standard conformance to the DICOM Verification SOP Class SCU role.

2.1.2.4 Image Print to a remote AE

2.1.2.4.1 Associated Read-World Activity

The associated Real-World activity with the Print Management Service is the transfer of images to a remote DICOM Print Management SCP pre-selected by the user.



2.1.2.4.2 Proposed Presentation Contexts

Table 2.1.2.2.2

Proposed Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID	Name	UID		
Basic Grayscale Print Management Meta	1.2.840.10008.5.1. 1.9	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	N/A
Basic Color Print Management Meta	1.2.840.10008.5.1. 1.18	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	N/A



2.1.2.4.2.1 SOP Specific Conformance for Grayscale Print Management Meta SOP Class

Table 2.1.2.4.2.1

DIMSE Service Elements for Grayscale Print Management Meta SOP Class

SOP Class Name and UID	Usage SCU / SCP	Role	DIMSE Service Element
Basic Film Session SOP Class 1.2.840.10008.5.1.1.1	M / M	SCU	N-CREATE
Basic Film Box SOP Class 1.2.840.10008.5.1.1.2	M / M	SCU	N-CREATE N-SET N-ACTION*1 N-DELETE*1
Basic Grayscale Image Box SOP Class 1.2.840.10008.5.1.1.4	M / M	SCU	N-SET
Printer SOP Class 1.2.840.10008.5.1.1.16	M / M	SCU	N-GET*2

*1: No collation is performed.

*2: Terason DICOM sends one N-GET before printing. If the Printer Status is returned and indicates that the printer is on-line, Terason DICOM continues with the print request; otherwise, the print is considered to have failed. After N-ACTION is confirmed by the print server, Terason DICOM considers the print to have succeeded, sends N-DELETE and requests to close the association. Terason DICOM does not wait for an N-EVENT-REPORT before closing the association.



2.1.2.4.2.2 SOP Specific Conformance for Color Print Management Meta SOP Class

Table 2.1.2.4.2.2

DIMSE Service Elements for Color Print Management Meta SOP Class

SOP Class Name and UID	Usage SCU / SCP	Role	DIMSE Service Element
Basic Film Session SOP Class 1.2.840.10008.5.1.1.1	M / M	SCU	N-CREATE
Basic Film Box SOP Class 1.2.840.10008.5.1.1.2	M / M	SCU	N-CREATE N-SET N-ACTION*1 N-DELETE*1
Basic Color Image Box SOP Class 1.2.840.10008.5.1.1.4.1	M / M	SCU	N-SET
Printer SOP Class 1.2.840.10008.5.1.1.16	M / M	SCU	N-GET*2

*1: No collation is performed.

*2: Terason DICOM sends one N-GET before printing. If the Printer Status is returned and indicates that the printer is on-line, Terason DICOM continues with the print request; otherwise, the print is considered to have failed. After N-ACTION is confirmed by the print server, Terason DICOM considers the print to have succeeded, sends N-DELETE and requests to close the association. Terason DICOM does not wait for an N-EVENT-REPORT before closing the association.



2.1.2.4.2.3 Basic Film Session SOP Class Attributes

Attribute Name	Tag	Usage SCU / SCP	Usage and Range
Number of Copies	(2000,0010)	U / M	1 to 9
Print Priority	(2000,0020)	U / M	HIGH MED LOW
Medium Type *	(2000,0030)	U / M	PAPER CLEAR FILM BLUE FILM or no attribute for “Printer Default”
Film Destination *	(2000,0040)	U / M	MAGAZINE PROCESSOR or attribute for “Print Default”
Film Session Label	(2000,0050)	U / U	Max 64 characters (ISO IR-6) Always left blank

* Attributes are not provided, if user selects “Printer Default”.



2.1.2.4.2.4 Basic Film Box SOP Class Attributes

Attribute Name	Tag	Usage SCU / SCP	Usage and Range
Image Display Format	(2010,0010)	M / M	STANDARD¥C,R Where R is 1 and C is 1
Referenced Film Session Sequence	(2010,0500)	M / M	Provided.
> Referenced SOP Class UID	(0008,1150)	M / M	Provided.
> Referenced SOP Instance UID	(0008,1155)	M / M	Provided.
Film Orientation	(2010,0040)	U / M	PORTRAIT LANDSCAPE
Film Size ID *	(2010,0050)	U / M	8INX10IN 10INX12IN 10INX14IN 11INX14IN 14INX14IN 14INX17IN 24CMX24CM 24CMX30CM or no attribute for "Printer default"
Magnification Type *	(2010,0060)	U / M	REPLICATE BILINEAR CUBIC or no attribute for "Printer default"
Border Density *	(2010,0100)	U / U	BLACK WHITE or no attribute for "Printer default"
Empty Image Density *	(2010,0110)	U / U	BLACK WHITE or no attribute for "Printer default"
Trim	(2010,0140)	U / U	NO



* Attributes are not provided, if user selects “Printer Default”.

2.1.2.4.2.5 Basic Grayscale Image SOP Class Attributes

Attribute Name	Tag	Usage SCU / SCP	Usage and Range
Image Position	(2020,0010)	M / M	Provided.
Basic Grayscale Image Sequence	(2020,0110)	M / M	Provided.
> Samples Per Pixel	(0028,0002)	M / M	1
> Photometric Interpretation	(0028,0004)	M / M	MONOCHROME1 MONOCHROME2
> Rows	(0028,0010)	M / M	Provided.
> Columns	(0028,0011)	M / M	Provided.
> Pixel Aspect Ratio	(0028,0034)	MC / M	Always Provided.
> Bits Allocated	(0028,0100)	M / M	8
> Bits Stored	(0028,0101)	M / M	8
> High Bit	(0028,0102)	M / M	7
> Pixel Representation	(0028,0103)	M / M	0000H
> Pixel Data	(7FE0,0010)	M / M	Provided.
Polarity	(2020,0020)	U / M	NORMAL



2.1.2.4.2.6 Basic Color Image SOP Class Attributes

Attribute Name	Tag	Usage SCU / SCP	Usage and Range
Image Position	(2020,0010)	M / M	Provided.
Basic Color Image Sequence	(2020,0111)	M / M	Provided.
> Samples Per Pixel	(0028,0002)	M / M	3
> Photometric Interpretation	(0028,0004)	M / M	RGB
> Planar Configuration	(0028,0006)	M / M	0001H
> Rows	(0028,0010)	M / M	Provided.
> Columns	(0028,0011)	M / M	Provided.
> Pixel Aspect Ratio	(0028,0034)	MC / M	Always provided.
> Bits Allocated	(0028,0100)	M / M	8
> Bits Stored	(0028,0101)	M / M	8
> High Bit	(0028,0102)	M / M	7
> Pixel Representation	(0028,0103)	M / M	0000H
> Pixel Data	(7FE0,0010)	M / M	Provided.

2.1.3 Association Acceptance Policy

Terason DICOM accepts associations initiated by a remote AE under the following conditions:

Association for Verification SOP Class is accepted.

- 2.1.3.1 Verification requested by a remote AE

2.1.3.1.1 Associated Read-World Activity

Associated real-world activity is the verification of the DICOM communications. When Terason DICOM receives C-ECHO-RQ message, it returns C-ECHO-RSP to the SCU.



2.1.3.1.2 Accepted Presentation Context Table

Table 2.1.3.1.2

Acceptable Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID	Name	UID		
Verification	1.2.840.10008.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	N/A
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		

2.1.3.1.2.1 SOP Specific Conformance for Verification SOP Class

Terason DICOM provides standard conformance to the DICOM Verification Service Class.

2.1.3.1.3 Presentation Context Acceptance Criterion

Any of the Presentation Contexts shown in **Table 2.1.3.1.2** are acceptable for Terason DICOM.

2.1.3.1.4 Transfer Syntax Selection Policies

Terason DICOM will use the first transfer syntax proposed by the remote AE in the presentation context. If both big endian and little endian are proposed, Terason DICOM will choose little endian.

3 Communication Profiles

3.1 Supported Communication Stacks

Terason DICOM provides DICOM V3.0 TCT/IP Network Communication Support as defined in PS 3.8.

3.2 TCP/IP Stacks

3.2.1 Physical Media Support

Terason DICOM is indifferent to the physical medium over which TCP/IP executes.



4. Extensions / Specializations / Privatizations

Not applicable.

5. Configuration

5.1 AE Title / Presentation Address Mapping

See paragraph 5.2 for Local AE Title and Port ID settings.

Local IP Address is configured through the Windows 2000 Professional/XP user interfaces.

5.2 Configurable Parameters

The following parameters are user configurable on the Terason DICOM user interface.

Local Settings

- Local AE Title and Port
- Log File Path and size limit (default to 1024KB)

Send Settings

- Server AE Title, IP Address, and Port
- PDU Size (default to 16KB)
- Timeout (default to 180 seconds)
- Retries: 0 to 9 (default to 3)
- Image Path
- Failed Image Path and size limit (default to no limit)

Print Settings

- Server AE Title, IP Address, and Port
- PDU Size (default to 16KB)
- Timeout (default to 180 seconds)
- Retries: 0 to 9 (default to 3)
- Image Path
- Failed Image Path and size limit (default to no limit)
- Copies: 1 to 9 (default to 1)
- Print Priority: High, Med or Low (default to High)
- Film Destination: MAGAZINE or PROCESSOR. (default to printer default)

FILE NAME	LAST ECO #	PRINTED	PAGE
16-2040_0 Terason DICOM Conformance Statement.doc	--	6:08 PM -- 9/25/2003	19 OF 20



- Film Orientation: PORTRAIT or LANDSCAPE. (default to PORTRAIT)
- Border Density: BLACK or WHITE. (default to BLACK)
- Empty Density: BLACK or WHITE. (default to BLACK)
- Medium Type: PAPER, CLEAR FILM or BLUE FILM. (default to printer default)
- Film Size ID: 8 inches x 10 inches, 10 inches x 12 inches, 10 inches x 14 inches, 11 inches x 14 inches, 14 inches x 14 inches, 14 inches x 17 inches, 24 cm x 24 cm, 24 cm x 30 cm. (default to printer default)
- Magnification Type: REPLICATE, BILINEAR, CUBIC, NONE.(Default to BILINEAR)
- Configuration Information: Character string for overriding other configuration values. (default to empty string)

6. Support For Extended Character Sets

No extended character set is supported. Terason DICOM does not rely on the information contained within the Data Elements.

FILE NAME	LAST ECO #	PRINTED	PAGE
16-2040_0 Terason DICOM Conformance Statement.doc	--	6:08 PM -- 9/25/2003	20 OF 20