HOLOGIC®

Digital Imaging and Communications

in Medicine (DICOM) Conformance Statement

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DICOM Conformance Statement

Image Acquisition Software
Vision Software

Updated: October 2019

Foreword

This DICOM Conformance Statement was created by Faxitron Bioptics LLC, a Hologic Company. It is intended to provide enough information to determine the functions for which interoperability can be expected with other devices claiming DICOM conformance.

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SECTION 1
Introduction

1.1.0 Purpose

This document is a DICOM Conformance Statement for the FAXITRON_DR.

FAXITRON_DR is a service class user for DIMSE-C services for:

- Storage of images to a remote DICOM SCP
- Query Worklist from a DICOM compliant HIS/RIS
- Printing of DICOM images to a remote DICOM SCP

1.2.0 Reference Sources

American College of Radiology-National Electrical Manufacturers Association (ACR-NEMA) Digital Imaging and Communications v2.0, 1988.

ACR-NEMA Digital Imaging and Communications in Medicine (DICOM) v3.0, Final Draft, Aug. 1993.

1.3.0 Abbreviations and Acronyms

The following abbreviations and acronyms are used in this document.

- ACR American College of Radiology
- AE Application Entity
- ANSI American National Standards Institute
- DICOM Digital Imaging and Communications in Medicine
- DIMSE DICOM Message Service Element
- DIMSE-C DICOM Message Service Element-Composite
- DIMSE-N DICOM Message Service Element-Normalized
- NEMA National Electrical Manufacturers Association
- PDU Protocol Data Unit
- SCP Service Class Provider
- SCU Service Class User
- SOP Service Object Pair
- TCP/IP Transmission Control Protocol/Internet Protocol
- UID Unique Identifier
- HIS/RIS Hospital Information System / Radiology Information System

1.4.0 Typographical Conventions

This section is designed to assist the reader in understanding the terms and typographical conventions used in this document.

Formatting convention	Type of information
Bold type	DICOM Service Class, DICOM SOP Class, or DIMSE Service
Italic type	Application Entity

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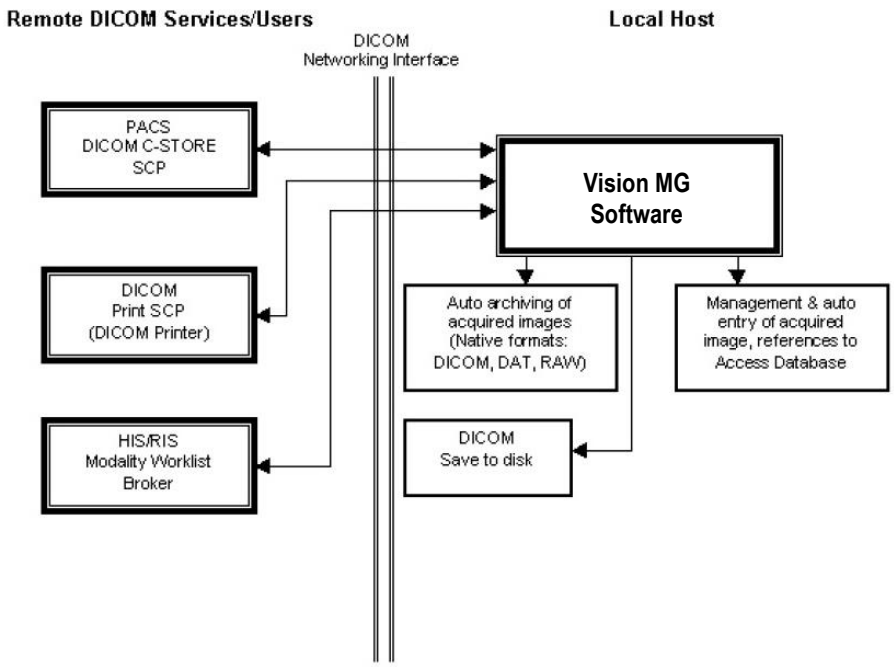
SECTION 2
Implementation Model

2.1.1 Description

FAXITRON_DR is a Windows based application and it acts as a SCU to store images (DICOM CSTORE) to obtain DICOM Modality Worklist (DICOM C-FIND), and to send images to a DICOM printer.

This is accomplished by use of a Graphical User Interface that allows the user to select and control which images to be stored or printed.

2.2.0 Application Data Flow Diagram



2.3.1 Functional Definitions of Application Entities

Image Storage as a Service Class User

FAXITRON_DR will transfer DICOM images to a SCP when the user requests to archive a patient exam. Upon exam selection and when the connection is established the DICOM storage SCP, *FAXITRON_DR* will initiate a negotiation of an association with the requested SCP. If the association is accepted, then images are transferred from the *FAXITRON_DR* application to the SCP over that association. Once the transfer is complete, the user can disconnect, then the *FAXITRON_DR* will close the association with the SCP.

Basic Printing as a Service Class User

FAXITRON_DR will transfer DICOM images to a Print Services provider upon request from the user. When an image is to be printed, FAXITRON_DR will initiate the negotiation of an association with the requested Print Services provider. If the association is accepted, then the images are transferred from the FAXITRON_DR application to the Print Services provider over that association. Once the transfer is complete, FAXITRON_DR will close the association.

2.3.2 Functional Definitions of Application Entities

Query Worklist as a Service Class User

FAXITRON_DR will import DICOM worklist from a HIS/RIS when the user requests to import worklist. FAXITRON_DR will initiate an association with the HIS/RIS. If the association is accepted, then a worklist will be transferred from the HIS/RIS to FAXITRON_DR application over that association. Once the transfer is complete FAXITRON_DR will close the association.

2.3.3 Functional Definitions of Application Entities

Image Archive:

- FAXITRON_DR will initiate a DICOM association.
- FAXITRON_DR will initiate a C-Store to send the IOD.
- The remote AE will respond with a C-Store-RSP upon receipt of the IOD.

2.4.0 Sequencing of Real World Activities

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SECTION 3

Application Entity Specifications

3.1.0 FAXITRON_DR Specifications

FAXITRON_DR provides Standard Conformance to the following DICOM V3.0 SOP Class as a SCU.

Table 1 SCU SOP Class

SOP Class	SOP Class UID
Computed Radiography Image Storage SOP	1.2.840.10008.5.1.4.1.1.1
Digital X-ray Image Storage Presentation	1.2.840.10008.5.1.4.1.1.1.1
Digital X-ray Image Storage Processing	1.2.840.10008.5.1.4.1.1.1.1.1
Digital X-ray Mammography Image Storage Presentation	1.2.840.10008.5.1.4.1.1.1.2
Digital X-ray Mammography Image Storage Processing	1.2.840.10008.5.1.4.1.1.1.2.1
Study Root Query/Retrieve Info. Model -FIND	1.2.840.10008.5.1.4.1.2.2.1
Patient Root Query/Retrieve Info. Model -FIND	1.2.840.10008.5.1.4.1.2.1.1
Modality Worklist information Model-FIND	1.2.840.10008.5.1.4.31
Greyscale Softcopy Presentation Storage	1.2.840.10008.5.1.4.1.1.11.1

FAXITRON_DR provides Standard Conformance to the following DICOM V3.0 **Print Management** SOP Classes as an SCU.

Table 2 Detached Print Management SOP Classes

SOP Class	SOP Class UID
Basic Greyscale Print Management Meta	1.2.840.10008.5.1.1.9
Print Job	1.2.840.10008.5.1.1.14
Basic Annotation Box	1.2.840.10008.5.1.1.15
Printer	1.2.840.10008.5.1.1.16

Note: Support for Basic Greyscale Print Management Meta SOP Class includes by definition support for the following SOP classes: Preformatted Greyscale Image, Basic Film Session, Basic Film Box, Basic Image Box, and Printer SOP Class.

3.1.1
Association Establishment Poli

General

PDU size is set to 100 Kb.

Asynchronous Nature

FAXITRON_DR allows a single outstanding operation on any association. Therefore, *FAXITRON_DR* does not support asynchronous operations window negotiation, other than the default as specified by the DICOM specification.

Implementation Identifying Information

FAXITRON_DR will respond with the following implementation identifying parameters by default:

- Implementation Class UID **1.2.840.114257.1.1**
- Implementation Version Name **BiopticsYYYYMMDD**
  (Date format in YYY/MM/DD)
  (Example: Bioptics20040103)

3.1.2.1
Association Initiation by Real World Activity – Real World Activity-Storage

3.1.2.1.1 Associated Real World Activity-Storage

FAXITRON_DR will issue a C-Store request to a SCP to archive images.

3.1.2.1.2 Presentation Context Table-Storage

FAXITRON_DR supports the transfer syntaxes listed in Table 3. For a **Storage** request, *FAXITRON_DR* supports the Presentation Contexts listed in Table 4.

Table 3 Storage Transfer Syntaxes

Transfer Syntax	UID
DICOM Implicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2

Table 4 Storage Presentation Contexts

Abstract Syntax		Transfer Syntax	Role	Extended Negotiation
SOP Class	**SOP Class UID**			
Computed Radiography Image Storage SOP	1.2.840.10008.5.1.4.1.1.1	see Table 3	SCU	None
Digital X-ray Image Storage Presentation	1.2.840.10008.5.1.4.1.1.1.1	see Table 3	SCU	None
Digital X-ray Image Storage Processing	1.2.840.10008.5.1.4.1.1.1.1.1	see Table 3	SCU	None
Digital X-ray Mammography Image Storage Presentation	1.2.840.10008.5.1.4.1.1.1.2	see Table 3	SCU	None
Digital X-ray Mammography Image Storage Processing	1.2.840.10008.5.1.4.1.1.1.2.1	see Table 3	SCU	None
Greyscale Softcopy Presentation Storage	1.2.840.10008.5.1.4.1.1.11.1	see Table 3	SCU	None

3.1.2.2 Real World Activity-Query Modality Worklist

Associated Real World Activity-Query Modality Worklist

FAXITRON_DR will issue a C-FIND request to a SCP to query the Modality Worklist.

Presentation Context Table-Query Modality Worklist

FAXITRON_DR supports the transfer syntaxes listed in Table 4. For a Find request, FAXITRON_DR supports the Presentation Contexts listed in Table 5.

Table 4 Find Transfer Syntaxes

Transfer Syntax	UID
DICOM Implicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2

Table 5 Find Presentation Contexts

Abstract Syntax		Transfer Syntax	Role	Extended Negotiation
SOP Class	**SOP Class UID**			
Modality Worklist Information Model-Find	1.2.840.10008.5.1.4.31	see Table 4	SCU	None

Details about the worklist queries issued and the worklist information requested and displayed by the *FAXITRON_DR* "Modality Worklist" application are given in Tables 6 and 7.

Table 6 Worklist query issued by the *FAXITRON_DR* "Modality Worklist" application

Attribute Name	Tag	Attribute Matching (*)
Patient's Name	0010,0010	Single value, wild card or no matching
Patient ID	0010,0020	Single value or wild card
Patient's Bithdate	0010,0030	Single value or no matching
Accession Number	0008,0050	Single value or wild card
Scheduled Procedure Step Start Date	0040,0002	Single value or no matching
Scheduled Preforming Physicians's Name	0040,0006	Single value, wild card or no matching
Modality Type	0008,0060	Single value "MG", "DX" or no matching
Scheduled Station AE Title	0040,0001	Single value or no matching
Scheduled Station Name	0040,0010	Single value, wild card or no matching

(*) Actual behavior depends on the Modality Worklist Service Class Provider. The listed attributes are FAXITRON_DR's recommended attributes for matching.

Table 7 Worklist information requested and displaye by the *FAXITRON_DR* "Modality Worklist" application

3.1.2.2 Cont. Real World Activity-Query Modality Worklist

Attribute Name	Tag
Patient's Name	0010,0010
Patient ID	0010,0020
Patient's Birth Date	0010,0030
Patient's Sex	0010,0040
Patient's Age	0010,1010
Patient's Size	0010,1020
Patient's Weight	0010,1030
Patient Comments	0010,4000
Referring Physician's Name	0008,0090
Admitting Diagnosis Description	0008,1080
Accession Number	0008,0050
Requested Procedure ID ("Study ID")	0040,1001
Requested Procedure Description ("Study Name")	0032,1060
Study Instance UID	0020,000D
Scheduled Procedure Step Start Date	0040,0002
Scheduled Procedure Step Start Time	0040,0003
Scheduled Performing Physician's Name	0040,0006
Modality Type	0008,0060
Scheduled Station AE Title	0040,0001
Scheuled Station Name	0040,0010
Referenced Study Sequence	0008,1110
Scheduled Procedure Step Sequence	0040,0100
Scheduled Procedure Step ID	0040,0009
Scheduled Procedure Step Description	0040,0007
Requested Procedure Code Sequence	0032,1064
Scheduled Action Item Code Sequence	0040,0008

3.1.2.3 Real World Activity-Printing

Associated Real World Activity-Printing

FAXITRON_DR will issue Print Management requests to a SCP supporting the DICOM V3.0 Print services, in order to produce hard copy representations of DICOM images.

Presentation Context Table-Printing

FAXITRON_DR supports the following transfer syntaxes listed in Table 8. *FAXITRON_DR* supports any of the Presentation Contexts listed in Table 9 for **Print Managemen**t.

Table 8 Print Management Transfer Syntaxes

Transfer Syntax	UID
DICOM Implicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2

Table 9 Print Management Presentation Contexts

Abstract Syntax		Transfer Syntax	Role	Extended Negotiation
SOP Class	**SOP Class UID**			
Basic Greyscale Print Management Meta	1.2.840.10008.5.1.1.9	All from Table 8	SCU	None
Print Job	1.2.840.10008.5.1.1.14	All from Table 8	SCU	None
Basic Annotation Box	1.2.840.10008.5.1.1.15	All from Table 8	SCU	None
Printer	1.2.840.10008.5.1.1.16	All from Table 8	SCU	None

3.1.2.3 Cont. Real World Activity-Printing

3.1.2.3.3 SOP Specific Conformance-Printing

FAXITRON_DR provides standard conformance to the DICOM **Print Management** Service Class by supporting a number of distinct SOP classes described below.

3.1.2.3.3.1 SOP Specific Conformance to Basic Film Session SOP Class

FAXITRON_DR issues the following DIMSE-N commands for the Basic Film Session SOP Class: **NCreate** and **N-Action Print**.

3.1.2.3.3.2 SOP Conformance to Basic Film Box SOP Class

FAXITRON_DR issues the following DIMSE-N commands for the Basic Film Box SOP Class: **N-Create**, **N-Delete**, and N-**Action Print**.

3.1.2.3.3.3 SOP Conformance to Basic Image Box SOP Class

FAXITRON_DR issues the following DIMSE-N commands for the Basic Image Box SOP Class: **N-Set**.

3.1.2.3.3.4 SOP Conformance to Printer SOP Class

FAXITRON_DR issues the following DIMSE-N commands for the Printer SOP Class: **N-Get**.

3.1.3 Association Acceptance Policy

FAXITRON_DR accepts *only* associations requesting for **C-Store**.

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SECTION 4
Communications Profiles

4.1.0 Communications Profiles

FAXITRON_DR provides DICOM V3.0 TCP/IP Network Communication Support as defined in Part 8 of the DICOM Standard.

TCP/IP Stack
FAXITRON_DR inherits its TCP/IP stack from the computer system upon which it executes.

4.1.1 Physical Media Support

FAXITRON_DR is indifferent to the physical medium over which TCP/IP executes; it inherits the medium from the computer system upon which it executes.

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SECTION 5

Extensions/Specializations/ Privatizations

There are no Extensions, Specializations, or Privatizations applicable to *FAXITRON_DR.*

5.1.0 Extensions/ Specializations/ Privatizations

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SECTION 6
Configuration

6.1.0 Configuration

FAXITRON_DR obtains the following configuration information from the database:

- List of all UIDs known to *FAXITRON_DR*
- Preferred transfer syntaxes for the SOP classes supported by *FAXITRON_DR*.

FAXITRON_DR obtains/saves the following configuration information from the FAXITRON_DR DICOM network configuration files: "DICOMNetSetup.ini"

- Local / Remote Application Entity Title
- Local / Remote IP and port number
- Printer Preferences

Note: *FAXITRON_DR* obtains the security key (when used) from the DICOM network security configuration file: "DICOMNetSecurity.ini"

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SECTION 7

Support for Extended Character Sets

FAXITRON_DR is indifferent to Extended Character Sets, as this application relies on the information contained within the Data Elements.

7.1.0 Support for Extended Character Sets