HOLOGIC®

Faxitron™ CT

Specimen Radiography System

DICOM Conformance Statement

for software version 1.0

HOLOGIC®

Document Number: MAN-06586

Document Version: 001 – March 2020

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Revision History

Revision	Date of Release	Reason for Revision
001	03/03/2020	Initial release

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1. CONFORMANCE STATEMENT OVERVIEW

This DICOM Conformance Statement details the DICOM capabilities of the Faxitron CT specimen radiography system. This product implements the necessary DICOM services to download work list data from an information system Modality Worklist server and save acquired images as CT, Digital X-Ray, or Digital Mammography X-Ray images.

The Faxitron CT system implements the necessary DICOM services to:

- Download worklists from one or more Modality Worklist SCP systems
- Send acquired and created images to a networked Storage SCP device

Refer to the Faxitron CT User's Manual for additional non-DICOM image data storage capabilities.

The table below provides an overview of the DICOM functionality which is detailed in the remainder of this document:

1.1. Network Services

SOP Classes		User of Service (SCU)	Provider of Service (SCP)
Transfer	CT Image Storage	YES	NO
Transfer	Digital X-Ray Image Storage – For Presentation	YES	NO
Workflow Management	Modality Worklist Information Model – FIND	YES	NO

2. TABLE OF CONTENTS

3. INTRODUCTION

The Faxitron CT system is a self-contained 3D breast specimen-designated CT scanner that offers 360-degree imaging of excised lesions and other specimen types. While commonly employed for examination of breast specimens it may also be used for other applications and supports CT and 2D projection X-ray imaging.

3.1. Audience

This document contains the DICOM compliance claim for the Hologic Faxitron CT specimen radiology system. This document is intended to aid in connecting the Faxitron CT system to other components that make use of the DICOM standard for interconnecting networked imaging devices.

This document is intended to be used in conjunction with the Faxitron CT User's Manual. The reader of this document should be familiar with the DICOM standard and the downstream devices that utilize the standard.

3.2. Remarks

A DICOM conformance statement—the structure and content of which are stipulated by the DICOM standard, is intended to aid in determine the suitability of interconnecting digital imaging devices. References to specific functionality in a conformance statement are not sufficient to guarantee interoperability between components. The following should be considered when evaluating interoperability:

- The Faxitron CT conformance statement provides a starting point for ascertaining whether the product can communicate with other systems.
- The only way to know for certain whether the Faxitron CT system can interoperate with other systems is to perform connectivity testing.
- This document represents a best effort to document the functionality of commercial versions of the Faxitron CT and is not a functional specification of a Hologic component or product. Hologic reserves the right to make changes at any time to the functionality of the DICOM components described herein, and is committed to following the evolution of the DICOM standard.

3.3. Definitions, Terms, and Abbreviations

Abstract Syntax	The information agreed to be exchanged between applications, generally equivalent to a Service/Object Pair (SOP) Class. Examples: Verification SOP Class, Modality Worklist Information Model Find SOP Class, Computed Radiography Image Storage SOP Class.
Application Context	The specification of the type of communication used between Application Entities. Example: DICOM network protocol.
Application Entity (AE)	An end point of a DICOM information exchange, including the DICOM network or media interface software; i.e., the software that sends or receives DICOM information objects or messages. A single device may have multiple Application Entities.
Application Entity Title (AET)	The externally known name of an Application Entity, used to identify a DICOM application to other DICOM applications on the network.
Association	A network communication channel set up between Application Entities.
Attribute	A unit of information in an object definition; a data element identified by a tag. The information may be a complex data structure (Sequence), itself composed of lower level data elements. Examples: Patient ID (0010,0020), Accession Number (0008,0050), Photometric Interpretation (0028,0004), Procedure Code Sequence (0008,1032).
CT	Computed Tomography
DICOM	Digital Imaging and Communications in Medicine. The standard for network and media interchange of medical imaging, and related, information. Officially known as NEMA PS3 and as ISO 12052.
DIMSE	DICOM Message Service Element
EVR-BE	DICOM Transfer Syntax: Explicit VR – Big Endian
EVR-LE	DICOM Transfer Syntax: Explicit VR – Little Endian
GUI	Graphical User Interface
Information Object Definition (IOD)	The specified set of Attributes that comprise a type of data object; does not represent a specific instance of the data object, but rather a class of similar data objects that have the

	same properties. The Attributes may be specified as Mandatory (Type 1), Required but possibly unknown (Type 2), or Optional (Type 3), and there may be conditions associated with the use of an Attribute (Types 1C and 2C). Examples: MR Image IOD, CT Image IOD, Print Job IOD.
IVR-BR	DICOM Transfer Syntax: Implicit VR – Big Endian
IVR-LE	DICOM Transfer Syntax: Implicit VR – Little Endian
Module	A set of Attributes within an Information Object Definition that are logically related to each other. Example: Patient Module includes Patient's Name, Patient ID, Patient's Birth Date, and Patient's Sex.
MWL	Modality Worklist
Negotiation	First phase of Association establishment that allows Application Entities to agree on the types of data to be exchanged and how that data is encoded.
NEMA	National Electrical Manufacturers Association
PACS	Picture Archiving and Communication System
Presentation Context	The set of DICOM network services used over an Association, as negotiated between Application Entities; includes Abstract Syntaxes and Transfer Syntaxes.
Protocol Data Unit (PDU)	A packet (piece) of a DICOM message sent across the network. Devices must specify the maximum size packet they can receive for DICOM messages.
Service Class Provider (SCP)	The DICOM entity that is listening for DICOM service requests. Typically, a server that performs operations requested by another Application Entity (Service Class User). Examples: Picture Archiving and Communication System (image storage SCP, and image query/retrieve SCP), Radiology Information System (modality worklist SCP).
Service Class Users (SCU)	The DICOM entity that is initiating a DICOM request of a SCP.
Service Object Pair (SOP)	A Service-Object Pair (SOP) Class is defined by the union of an Information Object Definition (IOD) and a DICOM Service Elements (DIMSE). Services are actions like FIND, STORE, GET, VERIFICATION. The objects are IODs like CT, MG, SR, etc.
Tag	A 32-bit identifier for a data element, represented as a pair of four-digit hexadecimal numbers, the "group" and the "element". If the "group" number is odd, the tag is for a

	private (manufacturer specific) data element. Examples: (0010,0020) [Patient ID], (07FE,0010) [Pixel Data]
TCP/IP	Transmission Control Protocol/Internet Protocol
Transfer Syntax	The encoding used for exchange of DICOM information objects and messages. Examples: JPEG compressed (images), little endian explicit value representation.
UID	Unique Identifier: A globally unique "dotted decimal" string that identifies a specific object or a class of objects; an ISO-8824 Object Identifier. Examples: Study Instance UID, SOP Class UID, SOP Instance UID.
Value Representation (VR)	The format type of an individual DICOM data element, such as text, an integer, a person's name, or a code. DICOM information objects can be transmitted with either explicit identification of the type of each data element (Explicit VR), or without explicit identification

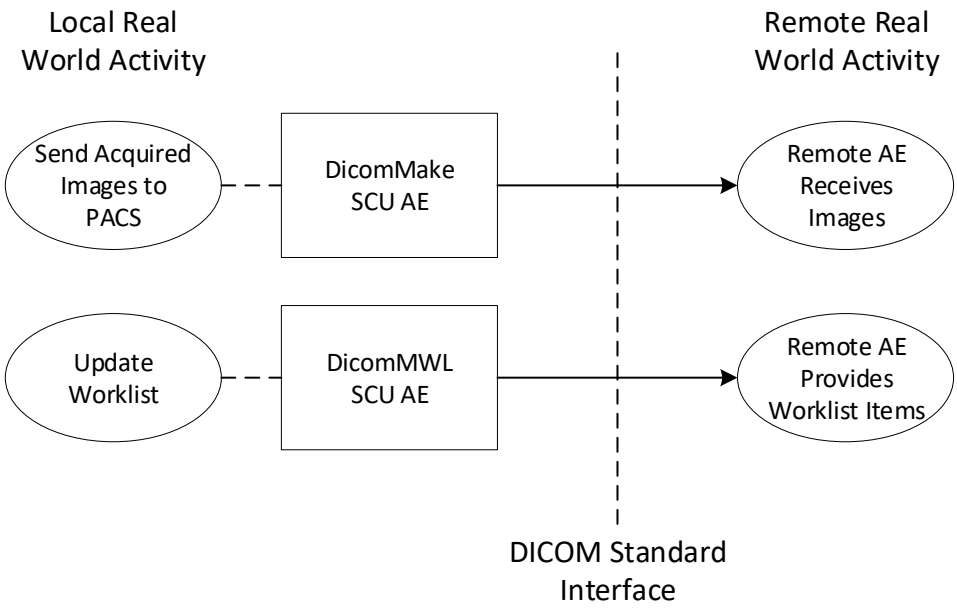
3.4. References

- Faxitron CT User's Manual (5081-9544)
- NEMA PS3 / ISO 12052, Digital Imaging and Communications in Medicine (DICOM) Standard, National Electrical Manufacturers Association, Rosslyn, VA, USA (available free at http://www.dicomstandard.org/)

4. NETWORKING

4.1. Implementation Model

4.1.1. Application Data Flow



- ***DicomMake* SCU AE**

  The *DicomMake* SCU AE creates DICOM CT, Digital X-Ray and Digital Mammography X-Ray Image SOP Instances and sends them to the remote Storage SCP AE. Selecting the "PACS" icon initiates a DICOM send of all images in the currently viewed series.

- ***DicomMWL* SCU AE**

  The *DicomMWL* SCU AE requests scheduled worklist information from a remote MWL provider (SCP). When the "Select from Work List" or "Query" functions are selected the *DicomMWL* SCU AE queries a remote AE for worklist items and provides the set of worklist items matching the query request.

4.1.2. Functional Definitions of AEs

4.1.2.1. Functional Definition of DicomMake SCU AE

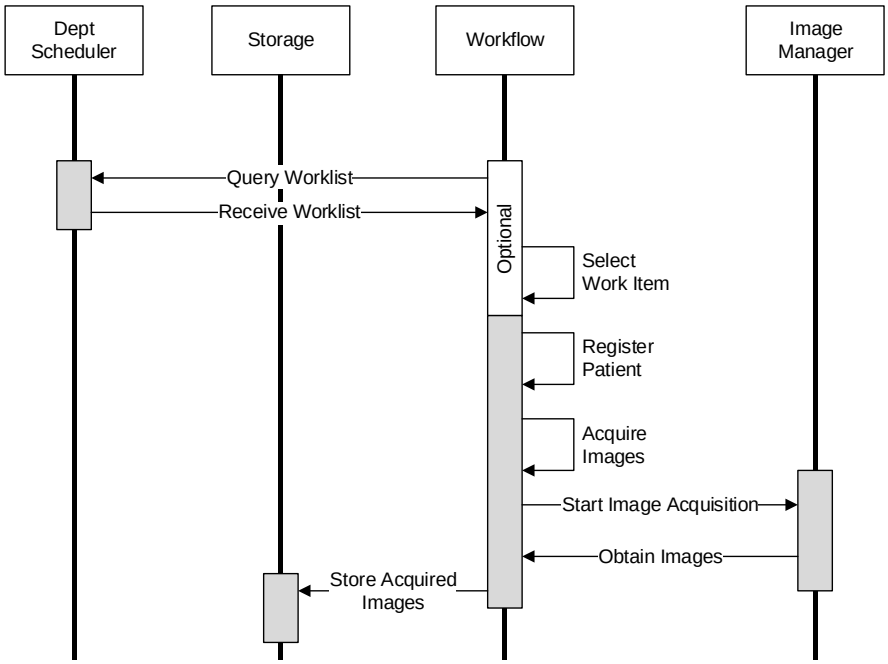
The *DicomMake* SCU AE attempts to send acquired images to a remote image storage SCP AE. The *DicomMake* SCU AE first attempts to establish an Association with the remote SCP AE. If an Association with the remote SCP is accepted, then the *DicomMake* SCU AE sends a C-ECHO request. If successful, it

sends the image(s) to the receiving remote AE by sending a C-STORE request for each image. Only one Association may be active at any given time, but an Association may use multiple accepted presentation contexts (see Section 4.2.1.3.1.2).

4.1.2.2. Functional Definition of DicomMWL SCU AE

The *DicomMWL* SCU AE attempts to download a worklist (a set of scheduled procedures) from a remote MWL provider SCP AE. After an Association is established, *DicomMWL* sends a C-ECHO request. If successful, it obtains patient information and worklist items by sending a C-FIND request and waiting for matching responses on the open Association. The matching results of the MWL query (if any) are displayed on the GUI as a list of scheduled procedures for the operator to select from. The information from the selected scheduled procedure is used for the patient registration.

4.1.3. Sequencing of Real-World Activities



Under typical scheduled workflow conditions the sequence of activities is as follows:

1. Operator queries worklist provider.
2. Operator selects a single work list item from worklist.
3. Operator may overwrite information from the selected work list item or add information.
4. Operator registers patient.
5. Operator starts new acquisition.
6. Acquisition complete.
7. Acquired images are stored to PACS

Note: If MWL is not available at the facility the operator can perform patient data entry manually with the GUI.

4.2. AE Specifications

4.2.1. *DicomMake* SCU AE Specification

4.2.1.1. SOP Classes

DicomMake provides standard conformance to the following SOP Classes:

SOP Class Name	SOP Class UID	SCU	SCP
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	YES	NO
Digital X-Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.1	YES	NO
Digital Mammography X-Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.2	YES	NO
Verification SOP Class	1.2.840.10008.1.1	YES	NO

4.2.1.2. Association Policies

4.2.1.2.1. General

The DICOM standard application context name for DICOM is always proposed:

Application Context Name	1.2.840.10008.3.1.1.1

4.2.1.2.2. Number of Associations

One association is initiated at a time for the *DicomMake* client AE.

4.2.1.2.3. Asynchronous Nature

DicomMake does not support asynchronous communication (multiple outstanding transactions over a single Association).

4.2.1.2.4. Implementation Identifying Information

The implementation information for this Application Entity is:

Implementation Class UID	1.2.276.0.7230010.3.0.3.6.4
Implementation Version Name	OFFIS_DCMTK_364

4.2.1.3. Association Initiation Polity

4.2.1.3.1. Activity – Send Acquired Images to PACS

4.2.1.3.1.1. Description and Sequencing of Activities

With the desired images active in the viewer the user selects the PACS icon to send an image or an entire Series to a PACS. To send multiple Series in a Study, the user must send each Series separately.

The *DicomMake* AE attempts to initiate a new Association in order to issue a C-ECHO request followed by one or more C-STORE requests. If the job contains multiple images, then multiple C-STORE requests are issued over the same Association.

4.2.1.3.1.2. Proposed Presentation Contexts

When establishing an Association the *DicomMake* SCU AE presents three proposed Presentation Contexts to the SCP for each SOP class. By the default the preferred transfer syntax is *Explicit VR – Little Endian* (EVR-LE). The other possibilities are *Implicit VR – Little Endian* (IVR-LE), and *Explicit VR – Big Endian* (EVR-BE).

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	EVR-LE	1.2.840.10008.1.2.1	SCU	None
		IVR-LE	1.2.840.10008.1.2		
		EVR-BE	1.2.840.10008.1.2.2		
Digital X-Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.1	EVR-LE	1.2.840.10008.1.2.1	SCU	None
		IVR-LE	1.2.840.10008.1.2		
		EVR-BE	1.2.840.10008.1.2.2		
Digital Mammography X-Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.2	EVR-LE	1.2.840.10008.1.2.1	SCU	None
		IVR-LE	1.2.840.10008.1.2		
		EVR-BE	1.2.840.10008.1.2.2		
	1.2.840.10008.1.1	EVR-LE	1.2.840.10008.1.2.1	SCU	None

Verification SOP Class		IVR-LE	1.2.840.10008.1.2		
		EVR-BE	1.2.840.10008.1.2.2		

4.2.1.3.1.3. SOP Specific Conformance Image Storage SOP Classes

DicomMake provides standard conformance to the DICOM Storage Service Class as an SCU for the SOP Classes mentioned above. The UID root is "1.2.840.10008".

Multiple C-STORE operations can be performed over a single Association.

Upon receiving a C-ECHO or C-STORE response containing a successful status, this implementation performs the next C-STORE operation. If possible, the Association is kept open until all images selected by the operator have been successfully sent.

Any unsuccessful status (refused, error, or warning), returned in the C-ECHO or C-STORE response, results in termination of sending further C-STORE requests (if any remain) and reporting of the error to the system log file.

There are two timeouts for the Association. One timeout, "Association Timeout" is used to close an idle Association. For C-STORE the default is 120 seconds but it can be configured in the GUI. The other timeout is "Service Timeout" which detects that no data is transmitted over the Association and closes it. The default for C-STORE is 5 minutes.

If the image transfer fails, *DicomMake* SCU AE does not retry the send job automatically.

The behavior of *DicomMake* SCU AE when encountering status codes in a C-ECHO or C-STORE response is summarized in the following table:

Service Status	Code	Further Meaning	Behavior
Success	0000	Success	The receiving SCP has successfully received and stored the SOP Instance (image) sent. If all SOP Instances in the send job receive a status of Success then the job is marked as complete.
Refused	A7xx	Out of resources	The Association is aborted using A-ABORT and the send job is marked as failed. The error is logged and the job failure is reported to the user via the GUI. This is a transient failure.

Error	A9xx	Data Set does not match SOP Class	The Association is aborted using A-ABORT and the send job is marked as failed. The error is logged and the job failure is reported to the user via the GUI.
	Cxxx	Cannot understand	The Association is aborted using A-ABORT and the send job is marked as failed. The error is logged and the job failure is reported to the user via the GUI.
Warning	B000	Coercion of Data Elements	Image transmission is considered successful.
	B007	Data Set does not match SOP Class	Image transmission is considered successful.
	B006	Elements Discarded	Image transmission is considered successful.
*	Any other status code	*	The Association is aborted using A-ABORT and the send job is marked as failed. The error is logged and the job failure is reported to the user via the GUI.

The behavior of *DicomMake* AE during communication failure is summarized in the following table:

Exception	Behavior
Timeout	The Association is aborted using A-ABORT and the send job is marked as failed. The error is logged and the job failure is reported to the user via the GUI.
Association aborted by the SCP or network layers	The Association is aborted using A-ABORT and the send job is marked as failed. The error is logged and the job failure is reported to the user via the GUI.

4.2.1.4. Association Acceptance Policy

DicomMake AE does not accept Association requests.

4.2.2. *DicomMWL* SCU AE Specification

4.2.2.1. SOP Classes

DicomMWL provides standard conformance to the following SOP Classes:

SOP Class Name	SOP Class UID	SCU	SCP
Modality Worklist Information Model - FIND	1.2.840.10008.5.1.4.31	YES	NO
Verification SOP Class	1.2.840.10008.1.1	YES	NO

4.2.2.2. Association Policies

4.2.2.2.1. General

The DICOM standard application context name for DICOM is always proposed:

Application Context Name	1.2.840.10008.3.1.1.1

4.2.2.2.2. Number of Associations

DicomMWL initiates one Association at a time for a Worklist request. The user is not permitted to request another query until the active query is complete.

Maximum number of simultaneous Associations	1

4.2.2.2.3. Asynchronous Nature

DicomMWL does not support asynchronous communication (multiple outstanding transactions over a single Association).

Maximum number of outstanding asynchronous transactions	1

4.2.2.2.4. Implementation Identifying Information

The implementation information for this Application Entity is:

Implementation Class UID	1.2.276.0.7230010.3.0.3.6.4
Implementation Version Name	OFFIS_DCMTK_364

4.2.2.3. Association Initiation Policy

4.2.2.3.1. Activity – Update Worklist

4.2.2.3.1.1. Description and Sequencing of Activities

The request for a Worklist Update is initiated by a user interaction with the GUI. The *DicomMWL* SCU AE attempts to download a worklist (scheduled procedures) from a remote MWL provider SCP AE. By default *DicomMWL* attempts to obtain all MWL data for the current date, but the user can specify other query criteria through the user interface.

If *DicomMWL* establishes an Association to the remote SCP, it sends a C-ECHO request, then obtains the patient information and worklist items by invoking C-FIND-RQ operations and waiting for responses on the open Association. The ACSE timeout is a configurable time period, whereas the DIMSE timeout is preset to 15 seconds. The results of the MWL query (if any) are displayed on the GUI as a list of scheduled procedures for the operator to select from. Up to 32 records may be obtained from the MWL SCP, with up to 22 items displayed to the user in a scrollable list. The user may scroll to see all of the records returned. Returned records are displayed only after the C-FIND query is complete and the associated is released. The information from a selected scheduled procedure is used for the patient registration. The user is allowed to overwrite or correct the results of the selected worklist item prior to patient registration.

4.2.2.3.1.2. Proposed Presentation Contexts

When establishing an Association the *DicomMWL* SCU AE presents three proposed Presentation Contexts to the SCP for each SOP class. By the default the preferred transfer syntax is *Explicit VR – Little Endian* (EVR-LE). The other possibilities are *Implicit VR – Little Endian* (IVR-LE), and *Explicit VR – Big Endian* (EVR-BE).

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Modality Worklist Information Model - FIND	1.2.840.10008.5.1.4.31	EVR-LE	1.2.840.10008.1.2.1	SCU	None
		IVR-LE	1.2.840.10008.1.2		
		EVR-BE	1.2.840.10008.1.2.2		
Verification SOP Class	1.2.840.10008.1.1	EVR-LE	1.2.840.10008.1.2.1	SCU	None
		IVR-LE	1.2.840.10008.1.2		
		EVR-BE	1.2.840.10008.1.2.2		

4.2.2.3.1.3. SOP Specific Conformance

The behavior of *DicomMWL* SCU AE when encountering status codes in a C-ECHO or C-FIND response is summarized in the following table:

Service Status	Code	Further Meaning	Behavior
Success	0000	Matching is complete	The receiving SCP has successfully completed the Worklist matching and has returns its results (may be an empty list). The Worklist Items are available for display and selection by the operator.
Refused	A7xx	Out of resources	The Association is aborted using A-ABORT and the Worklist Query is marked as failed. The status meaning is logged and reported to the user. Any additional error information in the Response is logged.
Failed	A900	Identifier does not match SOP Class	The Association is aborted using A-ABORT and the worklist query is marked as failed. The status meaning is logged and reported to the user. Any additional error information in the Response is logged.
	Cxxx	Unable to Process	The Association is aborted using A-ABORT and the worklist query is marked as failed. The status meaning is logged and reported to the user. Any additional error information in the Response is logged.
Cancel	FE00	Matching terminated due to Cancel request	If the query was canceled due to too many worklist items then the SCP has completed the matches. Worklist items are available for display or further processing. Otherwise, the Association is aborted using A-ABORT and the worklist query is marked as failed. The status meaning is logged and reported to the user if an interactive query.
Pending	FF00	Matches are continuing	The Worklist Item contained in the Identifier is collected for later display or further processing.
	FF01	Matches are continuing - Warning that one or more Optional Keys were not supported	The Worklist Item contained in the Identifier is collected for later display or further processing. The status meaning is logged only once for each C-FIND operation.
*	Any other status code	*	The Association is aborted using A-ABORT and the worklist is marked as failed. The status meaning is logged and reported to the user if an interactive query. Any additional error information in the Response is logged.

The behavior of *DicomMWL* AE during communication failure is summarized in the following table”

Exception	Behavior
Timeout	The Association is aborted using A-ABORT and the Worklist Query is marked as failed. The error is logged and the job failure is reported to the user via the GUI.
Association aborted by the SCP or network layers	The Worklist Query is marked as failed. The error is logged and the job failure is reported to the user via the GUI.
Unexpected attributes	Unexpected attributes returned in a matching C-FIND response are ignored.
Requested return key attributes not supported by the SCP	Requested return key attributes not supported by the SCP are set to have no value.
Non-matching responses	Non-matching responses returned by the SCP due to unsupported optional matching keys are ignored.
Duplicate entries	No attempt is made to filter out duplicate entries.

The attributes included in each C-FIND request are summarized in the following table.

Matching or Return Key Attribute	Tag	Matching Type
AccessionNumber	(0008,0050)	Single Value or Universal
ReferringPhysicianName	(0008,0090)	Single Value or Universal
PatientName	(0010,0010)	Single Value or Universal
PatientID	(0010,0020)	Single Value or Universal
PatientBirthDate	(0010,0030)	Single Value or Universal
PatientSex	(0010,0040)	Universal
PatientWeight	(0010,1030)	Universal
MedicalAlerts	(0010,2000)	Universal
Allergies	(0010,2110)	Universal
PregnancyStatus	(0010,21c0)	Universal
StudyInstanceUID	(0020,000d)	Universal
RequestingPhysician	(0032,1032)	Universal
RequestedProcedureDescription	(0032,1060)	Universal
AdmissionID	(0038,0010)	Universal
SpecialNeeds	(0038,0050)	Universal
PatientState	(0038,0500)	Universal
Modality	(0008,0060)	Single Value
RequestedContrastAgent	(0032,1070)	Universal
ScheduledStationAETitle	(0040,0001)	Single Value or Universal
ScheduledProcedureStepStartDate	(0040,0002)	Single Value
ScheduledProcedureStepStartTime	(0040,0003)	Single Value or Universal

ScheduledProcedureStepEndDate	(0040,0004)	Single Value or Universal
ScheduledProcedureStepEndTime	(0040,0005)	Single Value or Universal
ScheduledPerformingPhysicianName	(0040,0006)	Single Value or Universal
ScheduledProcedureStepDescription	(0040,0007)	Universal
ScheduledProcedureStepID	(0040,0009)	Universal
ScheduledStationName	(0040,0010)	Single Value or Universal
ScheduledProcedureStepLocation	(0040,0011)	Universal
PreMedication	(0040,0012)	Universal
CommentsOnTheScheduledProcedureStep	(0040,0400)	Universal
RequestedProcedureID	(0040,1001)	Universal
RequestedProcedurePriority	(0040,1003)	Universal
PatientTransportArrangements	(0040,1004)	Universal

4.2.2.4. Association Acceptance Policy

DicomMWL AE does not accept Association requests.

4.3. NETWORK INTERFACES

4.3.1. Physical Network Interface

This device supports a single network interface. The TCP/IP stack is inherited from Windows 10 (the operating system).

One of the following physical network interfaces is available depending on installed hardware options:

Physical Network Interface
IEEE 802.3 Ethernet 100baseT
IEEE 802.3 Ethernet 1000baseX

4.3.2. Additional Protocols

- None

4.3.3. IPv4 and IPv6 Support

This product only supports IPv4 connections.

4.4. CONFIGURATION

The Faxitron CT application is configured through the GUI. This is a password protected capability. The customer is provided with the password at time of delivery.

4.4.1. AE Title/Presentation Address Mapping

4.4.1.1. Local AE Titles

All local applications use the AE Titles configured in a configuration data file.

AE	Default AE Title
DicomMake SCU	FAXITRONCT (configurable)
DicomMWL SCU	FAXITRONCT (configurable)

4.4.1.2. Remote AE Title/Presentation Address Mapping

All remote applications use the AE Titles and TCP/IP Ports configured in a configuration data file.

4.4.2. Parameters

Parameter	Configurable	Range	Default Value / Notes
General Parameters			
Max PDU size the AE can receive	YES	1-99999	16 Kbytes
Max PDU size the AE can send	YES	1-99999	16 Kbytes
Time-out waiting for an acceptance or rejection response to an Association Request (Application Level Timeout)	YES	1-99999	30 secs
Time-out waiting for a response to an Association release request (Application Level Timeout)	YES	1-999999	30 secs

Time-out awaiting a Response to a DIMSE Request (Low-Level Timeout)	YES	1-99999	30 secs
Storage SCU Parameters			
Storage SCU time-out waiting for a response to a C-STORE-RQ	YES	1-99999	30 secs
MWL SCU Parameters			
Modality Worklist SCU time-out waiting for the final response to a C-FIND-RQ	YES	1-99999	30 secs

5. MEDIA INTERCHANGE

- The product and its applications do not support any DICOM media services

6. SUPPORT OF CHARACTER SETS

This product supports the following character sets for the values of Data Elements with a VR of SH, LO, ST, PN, or LT:

- ISO-IR 6 (default) ISO 646

7. SECURITY

The Faxitron CT does not support any DICOM specific security measures.

It is assumed that the product is used within a secured environment. It is assumed that a secured environment includes at a minimum:

- Firewall or router protections to ensure that only approved external hosts have network access to the product.
- Firewall or router protections to ensure that the product only has network access to approvedexternal hosts and services.
- Any communication with external hosts and services outside the locally secured environment use appropriate secure network channels (e.g. such as a Virtual Private Network (VPN))

Other network security procedures such as automated intrusion detection may be appropriate in some environments. Additional security features may be established by the local security policy and are beyond the scope of this conformance statement.

8. ANNEXES

8.1. IOD Contents

8.1.1. Created SOP Instances

The following tables use a number of abbreviations. The abbreviations used in the "Presence of …" column are:

VNAP	Value Not Always Present (attribute sent zero length if no value is present)
ANAP	Attribute Not Always Present
ALWAYS	Always Present
EMPTY	Attribute is sent without a value

The abbreviations used in the "Source" column:

MWL	the attribute value source is from Modality Worklist
USER	the attribute value source is from User input
AUTO	the attribute value is generated automatically
CONFIG	the attribute value source is a configurable parameter

8.1.1.1. CT Image IOD

The default attributes that are contained in created SOP Instances are listed in the following tables.

Table 8.1-1
IOD OF CREATED CT IMAGE SOP INSTANCES

IE	Module	Reference	Presence of Module
Patient	Patient	Table 8.1-2	ALWAYS
Study	General Study	Table 8.1-3	ALWAYS
Series	General Series	Table 8.1-4	ALWAYS
Frame of Reference	Frame of Reference	Table 8.1-5	ALWAYS
Equipment	General Equipment	Table 8.1-6	ALWAYS
Image	General Image	Table 8.1-7	ALWAYS
	Image Plane	Table 8.1-8	ALWAYS
	Image Pixel	Table 8.1-9	ALWAYS
	CT Image	Table 8.1-7	ALWAYS
	VOI LUT	Table 8.1-10	ALWAYS
	SOP Common	Table 8.1-11	ALWAYS

Table 8.1-2
PATIENT MODULE OF CREATED SOP INSTANCES

Attribute Name	Tag	Value	Presence of Value	Source
Patient's Name	(0010,0010)		ALWAYS	MWL, USER
Patient ID	(0010,0020)		ALWAYS	MWL, USER
Patient's Birth Date	(0010,0030)		ALWAYS	MWL, USER
Patient's Sex	(0010,0040)		ALWAYS	MWL, USER

Table 8.1-3
GENERAL STUDY MODULE OF CREATED SOP INSTANCES

Attribute Name	Tag	Value	Presence of Value	Source
Study Date	(0008,0020)		ALWAYS	AUTO
Study Time	(0008,0030)		ALWAYS	AUTO
Accession Number	(0008,0050)		VNAP	MWL, USER
Referring Physician's Name	(0008,0090)		VNAP	MWL, USER
Study Description	(0008,1030)		ALWAYS	AUTO
Study Instance UID	(0020,000D)		ALWAYS	MWL, AUTO
Study ID	(0020,0010)		ALWAYS	AUTO

Table 8.1-4
GENERAL SERIES MODULE OF CREATED SOP INSTANCES

Attribute Name	Tag	Value	Presence of Value	Source
Series Date	(0008,0021)		ALWAYS	AUTO
Series Time	(0008,0031)		ALWAYS	AUTO
Modality	(0008,0060)	CT	ALWAYS	AUTO
Series Description	(0008,103E)	Value requested	ALWAYS	AUTO
Operators' Name	(0008,1070)		ALWAYS	AUTO
Body Part Examined	(0018,0015)	BREAST	ALWAYS	AUTO
Series Instance UID	(0020,000E)	Unique value generated	ALWAYS	AUTO
Series Number	(0020,0011)		ALWAYS	AUTO
Laterality	(0020,0060)		ALWAYS	AUTO

Table 8.1-5
FRAME OF REFERENCE MODULE OF CREATED SOP INSTANCES

Attribute Name	Tag	Value	Presence of Value	Source
Frame of Reference UID	(0020,0052)		ALWAYS	AUTO

Table 8.1-6
GENERAL EQUIPMENT MODULE OF CREATED SOP INSTANCES

Attribute Name	Tag	Value	Presence of Value	Source
Manufacturer	(0008,0070)	FAXITRON	ALWAYS	CONFIG
Institution Name	(0008,0080)		ALWAYS	CONFIG
Institution Address	(0008,0081)		ALWAYS	CONFIG

Table 8.1-7
GENERAL AND CT IMAGE MODULES OF CREATED SOP INSTANCES

Attribute Name	Tag	Value	Presence of Value	Source
Image Type	(0008,0008)	ORIGINAL\PRIMARY\AXIAL	ALWAYS	AUTO
Content Date	(0008,0023)		ALWAYS	AUTO
Content Time	(0008,0033)		ALWAYS	AUTO
Anatomic Region Sequence	(0008,2218)	One Item containing (T-04000, SRT, “Breast”)	ALWAYS	AUTO
KVP	(0018,0060)		ALWAYS	AUTO
Distance Source to Detector	(0018,1110)		ALWAYS	AUTO
Distance Source to Patient	(0018,1111)		ALWAYS	AUTO
Rotation Direction	(0018,1140)	CC	ALWAYS	AUTO
Exposure Time	(0018,1150)		ALWAYS	AUTO
Focal Spot(s)	(0018,1190)	From source projections	ALWAYS	AUTO
Convolution Kernel	(0018,1210)	FDK	ALWAYS	AUTO
X-ray Tube Current (in mA)	(0018,9330)		ALWAYS	AUTO
Exposure (in mAs)	(0018,9332)		ALWAYS	AUTO
Instance Number	(0020,0013)		ALWAYS	AUTO
Images in Acquisition	(0020,1002)		ALWAYS	AUTO
Samples Per Pixel	(0028,0002)	1	ALWAYS	AUTO
Photometric Interpretation	(0028,0004)	MONOCHROME2	ALWAYS	AUTO
Bits Allocated	(0028,0100)	16	ALWAYS	AUTO
Bits Stored	(0028,0101)	16	ALWAYS	AUTO
High Bit	(0028,0102)	15	ALWAYS	AUTO
Rescale Intercept	(0028,1052)	-1000	ALWAYS	AUTO
Rescale Slope	(0028,1053)	1	ALWAYS	AUTO
Rescale Type	(0028,1054)	HU	ALWAYS	AUTO

Table 8.1-8
IMAGE PLANE MODULE OF CREATED SOP INSTANCES

Attribute Name	Tag	Value	Presence of Value	Source
Slice Thickness	(0018,0050)	0.1	ALWAYS	AUTO
Image Position (Patient)	(0020,0032)		ALWAYS	AUTO
Image Orientation (Patient)	(0020,0037)		ALWAYS	AUTO
Slice Location	(0020,1041)		ALWAYS	AUTO
Pixel Spacing	(0028,0030)	0.1\0.1	ALWAYS	AUTO

Table 8.1-9
IMAGE PIXEL MODULE OF CREATED SOP INSTANCES

Attribute Name	Tag	Value	Presence of Value	Source
Rows	(0028,0010)	CT; 1120 DX, MG: 1548	ALWAYS	AUTO
Columns	(0028,0011)	CT: 1120 DX, MG: 1548	ALWAYS	AUTO
Pixel Representation	(0028,0103)	0000H	ALWAYS	AUTO
Pixel Data	(7FE0,0010)		ALWAYS	AUTO

Table 8.1-10
VOI LUT MODULE OF CREATED SOP INSTANCES

Attribute Name	Tag	Value	Presence of Value	Source
Window Center	(0028,1050)		ALWAYS	AUTO
Window Width	(0028,1051)		ALWAYS	AUTO

Table 8.1-11
SOP COMMON MODULE OF CREATED SOP INSTANCES

Attribute Name	Tag	Value	Presence of Value	Source
SOP Class UID	(0008,0016)	UID for • Digital X-Ray Image Storage – For Presentation, • Digital Mammography X-Ray Image Storage – For Presentation, or • CT Image Storage	ALWAYS	AUTO
SOP Instance UID	(0008,0018)	Unique value generated	ALWAYS	AUTO

8.1.1.2. Digital X-Ray and Digital Mammography X-Ray Image IODs

The default attributes that are contained in created SOP Instances are listed in the following tables.

Table 8.1-12
IOD OF CREATED DIGITAL X-RAY IMAGE SOP INSTANCES

IE	Module	Reference	Presence of Module
Patient	Patient	Table 8.1-2	ALWAYS
Study	General Study	Table 8.1-3	ALWAYS
Series	General Series	Table 8.1-13	ALWAYS
	DX Series	Table 8.1-13	ALWAYS
Equipment	General Equipment	Table 8.1-6	ALWAYS
	General Image	Table 8.1-14	ALWAYS
	Image Pixel	Table 8.1-9	ALWAYS
	DX Anatomy Imaged	Table 8.1-14	ALWAYS
	DX Image	Table 8.1-14	ALWAYS
	DX Detector	Table 8.1-15	ALWAYS
	X-Ray Acquisition Dose	Table 8.1-16	ALWAYS
	X-Ray Generation	Table 8.1-16	ALWAYS
	VOI LUT	Table 8.1-14	ALWAYS
	Acquisition Context	Table 8.1-17	ALWAYS
	SOP Common	Table 8.1-11	ALWAYS

Table 8.1-13
General / DX Series Modules of Created SOP Instances

Attribute Name	Tag	Value	Presence of Value	Source
Series Date	(0008,0021)		ALWAYS	AUTO
Series Time	(0008,0031)		ALWAYS	AUTO
Modality	(0008,0060)	DX	ALWAYS	AUTO
Series Description	(0008,103E)	'L SPECIMEN', 'R SPECIMEN' or 'SPECIMEN'	ALWAYS	AUTO
Operators' Name	(0008,1070)		ALWAYS	AUTO
Body Part Examined	(0018,0015)	Based on selected procedure, e.g., BREAST	ALWAYS	AUTO/USER
Series Instance UID	(0020,000E)	Unique value generated	ALWAYS	AUTO
Series Number	(0020,0011)	1	ALWAYS	AUTO

Table 8.1-14
General / DX Image / DX Anatomy Imaged / VOI LUT Modules of Created SOP Instances

Attribute Name	Tag	Value	Presence of Value	Source
Image Type	(0008,0008)	Original: ORIGINAL\PRIMARY Enhancement: DERIVED\PRIMARY	ALWAYS	AUTO
Content Date	(0008,0023)		ALWAYS	AUTO
Content Time	(0008,0033)		ALWAYS	AUTO
Anatomic Region Sequence	(0008,2218)	One Item based on selected procedure, e.g., representing (T-04000, SRT, "Breast")	ALWAYS	AUTO/USER
Instance Number	(0020,0013)		ALWAYS	AUTO
Patient Orientation	(0020,0020)		EMPtY	AUTO
Image Laterality	(0020,0062)	Based on selected procedure: R or L	ALWAYS	AUTO/USER
Images in Acquisition	(0020,1002)		ALWAYS	AUTO
Samples per Pixel	(0028,0002)	1	ALWAYS	AUTO
Photometric Interpretation	(0028,0004)	MONOCHROME1	ALWAYS	AUTO
Bits Allocated	(0028,0100)	16	ALWAYS	AUTO
Bits Stored	(0028,0101)	16	ALWAYS	AUTO
High Bit	(0028,0102)	15	ALWAYS	AUTO
Pixel Representation	(0028,0103)	0000H	ALWAYS	AUTO
Burned in Annotation	(0028,0301)	NO	ALWAYS	AUTO
Pixel Intensity Relationship	(0028,1040)	LIN	ALWAYS	AUTO
Pixel Intensity Relationship Sign	(0028,1041)	1	ALWAYS	AUTO
Window Center	(0028,1050)		ALWAYS	AUTO
Window Width	(0028,1051)		ALWAYS	AUTO
Rescale Intercept	(0028,1052)	0	ALWAYS	AUTO
Rescale Slope	(0028,1053)	1	ALWAYS	AUTO
Rescale Type	(0028,1054)	US	ALWAYS	AUTO
Lossy Image Compression	(0028,2110)	00	ALWAYS	AUTO

Table 8.1-15
DX Detector Module of Created SOP Instances

Attribute Name	Tag	Value	Presence of Value	Source
Imager Pixel Spacing	(0018,1164)	0.099\0.099	ALWAYS	AUTO
Pixel Spacing	(0028,0030)		Requested	AUTO

Table 8.1-16
X-Ray Acquisition Dose / X-Ray Generation Modules of Created SOP Instances

Attribute Name	Tag	Value	Presence of Value	Source
KVP	(0018,0060)		ALWAYS	AUTO
Focal Spot(s)	(0018,1190)	0.015	ALWAYS	AUTO

Table 8.1-17
Acquisition Context Module of Created SOP Instances

Attribute Name	Tag	Value	Presence of Value	Source
Acquisition Context Sequence	(0040,0555)		EMPTY	AUTO

8.1.2. Usage of Attributes from Received IOD's

- Not applicable to this product

8.1.3. Attribute Mapping

The attribute values mapped from a Modality Worklist item to each corresponding image SOP instance are summarized in the following table:

Modality Worklist	Image SOP instance
Patient's Name	Patient's Name
Patient ID	Patient ID
Patient's Birth Date	Patient's Birth Date
Patient's Sex	Patient's Sex
Accession Number	Accession Number
Referring Physician's Name	Referring Physician's Name
Requested Procedure Description	Study Description
Study Instance UID	Study Instance UID

8.1.4. Coerced/Modified Fields

- Not applicable to this product

8.2. Data Dictionary of Private Attributes

- Not applicable to this product

8.3. Coded Terminology and Templates

- Not applicable to this product

8.4. Grayscale Image Consistency

- Not applicable to this product

8.5. Standard Extended/Specialized/Private SOP Classes

8.5.1. Standard Extended SOP Class – CT Image Storage

By default the CT Image Storage SOP Class is Standard Extended by the attributes defined in Table 8.5-1.

Table 8.5-1

STANDARD EXTENDED ATTRIBUTES OF CREATED CT IMAGE SOP INSTANCES

Attribute Name	Tag	Value	Presence of Value	Source
Imager Pixel Spacing	(0018,1164)	0.1\0.1	ALWAYS	AUTO
X-Ray Tube Current in mA	(0018,9330)		ALWAYS	AUTO
Exposure in mAs	(0018,9332)		ALWAYS	AUTO

By default the Digital X-Ray Image and Digital Mammography X-Ray Image Storage – For Presentation SOP Classes are Standard Extended by the attributes defined in Table 8.5-2.

Table 8.5-2

STANDARD EXTENDED ATTRIBUTES OF CREATED DX/MG IMAGE SOP INSTANCES

Attribute Name	Tag	Value	Presence of Value	Source
X-Ray Tube Current in mA	(0018,9330)		ALWAYS	AUTO
Exposure in mAs	(0018,9332)		ALWAYS	AUTO

8.6. Private Transfer Syntaxes

- Not applicable to this product