Insignia Medical Systems Ltd
HL7 Conformance Statement

VERSION 1.15: NOVEMBER 2016

Contents

1 Introduction

1.1 Purpose of this Document

This document is an HL7 conformance statement, describing the HL7 message structures supported by the RIS Interface component of the Insignia PACS. The normal mode of operation of the RIS Interface in a standard PACS installation handles incoming HL7 messages only; the only outgoing messages that are discussed here are the acknowledgements to those messages. The name of the RIS Interface does not imply that it can only receive HL7 messages from Radiology Information Systems; any system capable of producing valid HL7 messages can be used to send messages to the RIS Interface.

The reader of this document is assumed to have a working understanding of the concepts that are used in the HL7 2.3.1 standard, and this document should be read in conjunction with that standard.

1.2 Definitions

HL7 – Health Level 7

IMS – Image Management System

MLLP – Minimal Lower Layer Protocol

PACS – Picture Archiving and Communications System

RIS – Radiology Information System

TCP/IP – Transmission Control Protocol/Internet Protocol

1.3 References

HL7 Standard Version 2.3.1

2 Communication Protocols

2.1 Socket Interface

RIS Interface supports a TCP/IP socket based interface, using the Minimal Lower Layer Protocol (MLLP). Messages received via a socket are expected to conform to the MLLP format as follows:

- Each message begins with a Start Block code (0x0B)
- Each segment within the message is terminated with a Carriage Return code (0x0D)
- Each message is terminated by an End Block code (0x1C) followed by a Carriage Return code (0x0D)

The port on which the RIS Interface accepts incoming messages is configurable by the IMS System Administrator.

2.2 File Interface

RIS Interface also supports a file based interface, whereby incoming HL7 messages are stored in individual files and placed into a monitored directory on the Insignia IMS by a suitable file transfer mechanism (for example, ftp or sftp). Files are processed strictly in the order they are written to the directory and do not have to conform to any specific naming convention.

Note that the RIS Interface can be configured to have multiple interfaces which may be any combination of file or socket based, to support multiple incoming HL7 feeds.

2.3 Message Structure

Messages received via either a socket or file based mechanism are structured as specified in the HL7 v2.3.1 standard, with a message consisting of a number of segments, each of which consists of a number of fields. Segments may be terminated as described in section 2.1, or may be terminated with a Line Feed code (0x0A) or a Carriage Return/Line Feed pair (0x0D + 0x0A). Characters are expected to be in 8-bit ASCII format; any characters with a code lower than 0x20 other than file or line terminators are ignored.

2.4 Delimiters and Escape Sequences

The delimiters used when processing HL7 messages are obtained from the Encoding Characters field in the MSH segment as described in the HL7 v2.3.1 standard.

The following Escape Sequences (shown delimited by \ but this may vary if the Escape Character has been defined as another character in the Encoding Characters field) are parsed when reading text fields from messages:

Escape Sequence	Replaced With
\F\	Field Separator
\S\	Component Separator
\T\	Sub-Component Separator
\R\	Repetition Separator
\E\	Escape Character
\.br\[1]	Newline Character

[1] The \.br\ escape sequence only applies to fields of type FT

Any other escape characters, such as highlighting codes, are left unparsed.

3 Acknowledgement Messages

3.1 Acknowledgement Method

Whenever an HL7 message has been successfully received by the RIS Interface and the message has requested an acknowledgement (field MSH-15 *accept acknowledgment type* is empty or has the value **AL** or **SU**), an acknowledgement message is returned. On socket-based interfaces the RIS Interface can be configured to return this message via the same socket the message was received over, or by opening a new output socket to the originating system. On file-based interfaces the RIS Interface can be configured to return this message by placing it in an outgoing directory which it is the responsibility of an external system to monitor.

3.2 Acknowledgement Format

The acknowledgement message has the code **AA** in the MSA-1 field, indicating that the message was successfully received by the RIS Interface.

3.3 Errors

It is important to note that any message received by the RIS Interface is acknowledged as having been acceptable – there is no option for it to return an error code. If messages are found to have an invalid structure or are unable to be processed by the Insignia PACS, errors are raised locally within the PACS.

4 HL7 Messages

4.1 Input Methods

The primary purpose of the Insignia RIS Interface is to update the PACS database with information obtained from the HL7 messages routed to it. The Interface is highly configurable in that any message type and trigger event can be associated with an input method supported by the PACS; the only requirement being that the information needed for that input method can be obtained from fields within the messages.

The input methods supported by the Insignia PACS are:

- Enter/Update Patient Demographics
- Enter/Update Booking
- Enter Report
- Cancel Booking
- Merge Patient

The following sections detail the information that is required for each of the above input methods and the HL7 message types and fields that may be used to supply it. As described above, the interface is configurable and any fields can be used, these are suggestions only. Any HL7 message fields that have not been configured in the RIS Interface are ignored when the message is read. Similarly, if an HL7 message is received with a message type that has not been configured the entire message is ignored.

4.2 Required Fields

There are some fields common to all HL7 messages that are required to be populated for messages to be handled by the RIS Interface.

HL7 Field	Field Name	Notes
MSH-1	Field Separator	Usually |
MSH-2	Encoding Characters	Usually ^~\&
MSH-9	Message Type	Message type is read from component 1, and trigger event from component 2
MSH-10	Message Control ID	An identifier that uniquely identifies the message
ORC-1	Order Control	This is only relevant to Order messages

The accept/application acknowledgement fields (MSH-15 and MSH-16) are optional and described in section 3.

4.3 Enter/Update Patient Demographics

The table below details the information that is required and optional for the enter/update patient demographics input method on the RIS Interface. Suggested HL7 message fields are noted where relevant.

Suitable HL7 message types for supplying this information include (but are not limited to):

- ADT^A01 (Admit A Patient)
- ADT^A04 (Register A Patient)
- ADT^A05 (Pre-Admit A Patient)
- ADT^A08 (Update Patient Information)

RIS Interface Field	(R)equired / (O)ptional	Suggested HL7 Field
Message date/time	R	MSH-7 (date/time of message)
Patient ID	R	PID-3 (patient identifier list)
Alternate Patient ID	O	PID-4 (alternate patient identifier)
External Source ID	R	MSH-3 (sending application)
Address Line 1	O	PID-11 component 1 (patient address / street address)
Address Line 2	O	PID-11 component 2 (patient address / other designation)
Address Line 3	O	PID-11 component 3 (patient address / city)
Address Line 4	O	PID-11 component 4 (patient address / state or province)
Postcode	O	PID-11 component 5 (patient address / zip or postal code)
Patient Title	O	PID-5 component 5 (patient name / prefix)
GP	O	PV1-8 (referring doctor)
Telephone Number	O	PID-13 (phone number)
Date of Birth	O	PID-7 (patient date of birth)
Sex	O	PID-8 (patient sex)
Surname	O	PID-5 component 1 (patient name / family name)
Previous Surname	O	
Forename	O	PID-5 component 2 (patient name / given name)
Deceased	O	PID-30 (patient death indicator)

4.4 Enter/Update Booking

The table below details the information that is required and optional for the enter/update booking input method on the RIS Interface. Suggested HL7 message fields are noted where relevant.

Suitable HL7 message types for supplying this information include (but are not limited to):

- ORM^O01 with NW in ORC-1 (Order message – new order)
- ORM^O01 with XO in ORC-1 (Order message –change order request)

RIS Interface Field	(R)equired / (O)ptional	Suggested HL7 Field
Message date/time	R	MSH-7 (date/time of message)
Patient ID	R	PID-3 (patient identifier list)
Alternate Patient ID	O	PID-4 (alternate patient identifier)
External Source ID	R	MSH-3 (sending application)
Address Line 1	O	PID-11 component 1 (patient address / street address)
Address Line 2	O	PID-11 component 2 (patient address / other designation)
Address Line 3	O	PID-11 component 3 (patient address / city)
Address Line 4	O	PID-11 component 4 (patient address / state or province)
Postcode	O	PID-11 component 5 (patient address / zip or postal code)
Patient Title	O	PID-5 component 5 (patient name / prefix)
Telephone Number	O	PID-13 (phone number)
Date of Birth	O	PID-7 (patient date of birth)
Sex	O	PID-8 (patient sex)
Surname	O	PID-5 component 1 (patient name / family name)

Previous Surname	O	
Forename	O	PID-5 component 2 (patient name / given name)
Deceased	O	PID-30 (patient death indicator)
Referrer	O	PV1-8 (referring doctor)
Consultant	O	PV1-9 (consulting doctor)
Requesting Department	O	PV1-3 (assigned patient location)
Patient Type	O	PV1-2 (patient class)
Visit ID	O	PV1-19 (visit number)
Filler ID	R	OBR-3 (filler order number)
Requested Procedure ID	R	OBR-19 (placer field 2)
Scheduled Procedure Step ID	R	OBR-2 (placer order number)
Step Number	O	
Accession ID	O	OBR-18 (placer field 1)
SPS Code	R	OBR-4 (universal service ID)
Requester	O	OBR-16 (ordering provider)
Examination Room	O	OBR-24 (diagnostic serv sect ID)
Scheduled Date	O	OBR-6 (requested date/time)
Priority	O	OBR-27 component 6 (quantity/timing / priority)
Study Reason	O	ORC-5 (order status)

Note: The *Study Reason* field can be used to convey order status information to the PACS; currently only codes **CM** and **IP** are handled. **IP** (in process) is used to indicate that a patient has arrived and **CM** (order is completed) is used to indicate that an order has been completed.

4.5 Enter Report

The table below details the information that is required and optional for the enter report input method on the RIS Interface. Suggested HL7 message fields are noted where relevant.

The HL7 message type for supplying this information is:

- ORU^R01 (Unsolicited transmission of an observation message)

RIS Interface Field	(R)equired / (O)ptional	Suggested HL7 Field
Message date/time	R	MSH-7 (date/time of message)
External Source ID	R	MSH-3 (sending application)
Patient ID	R	PID-3 (patient identifier list)
Surname	O	PID-5 component 1 (patient name / family name)
Forename	O	PID-5 component 2 (patient name / given name)
Report Status (OBR)	R*	OBR-25 (result status)
Scheduled Procedure Step ID	R†	OBR-2 (placer order number)
Filler ID	R†	OBR-3 (filler order number)
Requested Procedure ID	R†	OBR-19 (placer field 2)
Consultant	R	OBR-32 (principal result interpreter)
Observation Date/Time	R	OBR-7 (observation date/time)
Transcriptionist	O	OBR-35 (transcriptionist)
Transcription Date/Time	O	OBR-22 (results rpt/status chng date/time)
Report Status (OBX)	R*	OBX-11 (observ result status)
Report Text	R	OBX-5 (observation value) – all occurrences

† - only one of the Scheduled Procedure Step ID/Filler ID/Requested Procedure ID fields is required

* - only one of the Report Status (OBR)/Report Status (OBX) is required (if both are supplied, the OBX one takes priority)

4.6 Cancel Booking

The table below details the information that is required for the cancel booking input method on the RIS Interface. Suggested HL7 message fields are noted where relevant.

The HL7 message type for supplying this information is:

- ORM^O01 with CA in ORC-1 (Order message – cancel order request)

RIS Interface Field	(R)equired / (O)ptional	Suggested HL7 Field
Message date/time	R	MSH-7 (date/time of message)
Patient ID	R	PID-3 (patient identifier list)
External Source ID	R	MSH-3 (sending application)
Scheduled Procedure Step ID	R	OBR-2 (placer order number)

4.7 Merge Patient

The table below details the information that is required for the merge patient input method on the RIS Interface. Suggested HL7 message fields are noted where relevant.

Suitable HL7 message types for supplying this information include (but are not limited to):

- ADT^A18 (Merge patient information)
- ADT^A34 (Merge patient information – patient ID only)
- ADT^A35 (Merge patient information - account number only)
- ADT^A36 (Merge patient information - patient ID and account number)
- ADT^A40 (Merge patient - internal ID)

RIS Interface Field	(R)equired / (O)ptional	Suggested HL7 Field
Message date/time	R	MSH-7 (date/time of message)
Patient ID	R	PID-3 (patient identifier list)
Merged Patient ID	R	MRG-1 (prior patient ID)
External Source ID	R	MSH-3 (sending application)

4.8 Merge Patient with Update

There is an additional input method, Merge Patient with Update, which combines both the Merge Patient and Enter/Update Patient Demographics methods. The RIS Interface fields expected for this method are the combination of all fields from both of the input methods as detailed in previous sections. Any HL7 merge message that contains both an MRG segment and a PID segment can be used to supply the information.