RamSoft
RIS PACS Teleradiology

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HL7 Conformance Statement
RamSoft PACS 5.0

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ReadFromAnywhere.com

Rev F, 11/16/2011

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VERSIONS

Version	Revision Notes	Updated by	Reviewed by	Effective Date
Rev F	**Updated for 5.0 R2**	**VK**	**VR**	**11/16/2011**

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HL7 Conformance Statement

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1 Overview

The RamSoft Mirth Channels (**RMC**) facilitates communication between RamSoft PACS products and external systems (such as a RIS or HIS).

RMC conforms to the HL7 2.x specification. The following message types are supported.

1.1 Inbound Messages

Event	Message type	Event type
Patient Create / Update	ADT	A01, A02, A03, A04, A05, A06, A07, A08, A12, A13, A28, A31
Patient Merge	ADT	A30, A34, A35, A39, A40, A44, A47
Patient Cancel / Delete	ADT	A11, A23, A38
Order	ORM	O01
Result	ORU	R01
Scheduling	SIU	S12, S13, S14, S15
Billing Account Create / Update	BAR	P01, P05
Billing Account Cancel	BAR	P06

1.2 Outbound Messages

Event	Message type	Event type
Patient Create / Update	ADT	A08
Patient Merge	ADT	A40
Patient Cancel / Delete	ADT	A23
Order	ORM	O01
Result	ORU	R01
Billing Account Create / Update	BAR	P01, P05
Financial Transaction	DFT	P03

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2 Communication

RMC communicates via Mirth Channels. Standard Mirth Channels include support for real-time interfaces over TCP/IP, and batch interfaces using SFTP file transfers. It can both send and receive messages.

2.1 General Message Format

2.1.1 Syntax

- All our HL7 messages begin with \x0B (ASCII 11) and terminate with \x1C (ASCII 28) and \x0D (ASCII 13).
- Each message segment ends with the carriage return character (\x0D, ASCII 13).
- Field sequences in the message segments are separated by "|" (\xC0, ASCII 124).
- Field components are separated by "^" (\x5E, ASCII 94).
- Field sub-components are separated by "&" (\x26, ASCII 38).
- Repeated fields are separated by "~" (\x7E, ASCII 126).
- Any message segment not listed in our conformance statement will be ignored on inbound messages.

2.1.2 UTC Offsets

- All time fields are processed with UTC Offset, if present. Otherwise, the server UTC Offset is used to interpret time.

2.1.3 Message Header Requirements

- *MSH-10.1* contains the Message ID. Message ID is used to match messages up with their ACK (acknowledgement) messages. This field is mandatory.

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2.2 Deployment Diagram

The following deployment diagram describes a typical RMC setup in the field. The situation depicted in the diagram shows a very simple deployment case where one RIS is sending and receiving HL7 messages to and from the RMC. The Mirth HL7 engine is normally on the same machine as the RamSoft server. Many installations also have the database on the same machine however in this diagram it resides on its own dedicated server. Obviously more complicated setups are supported, this one is provided for clarity.

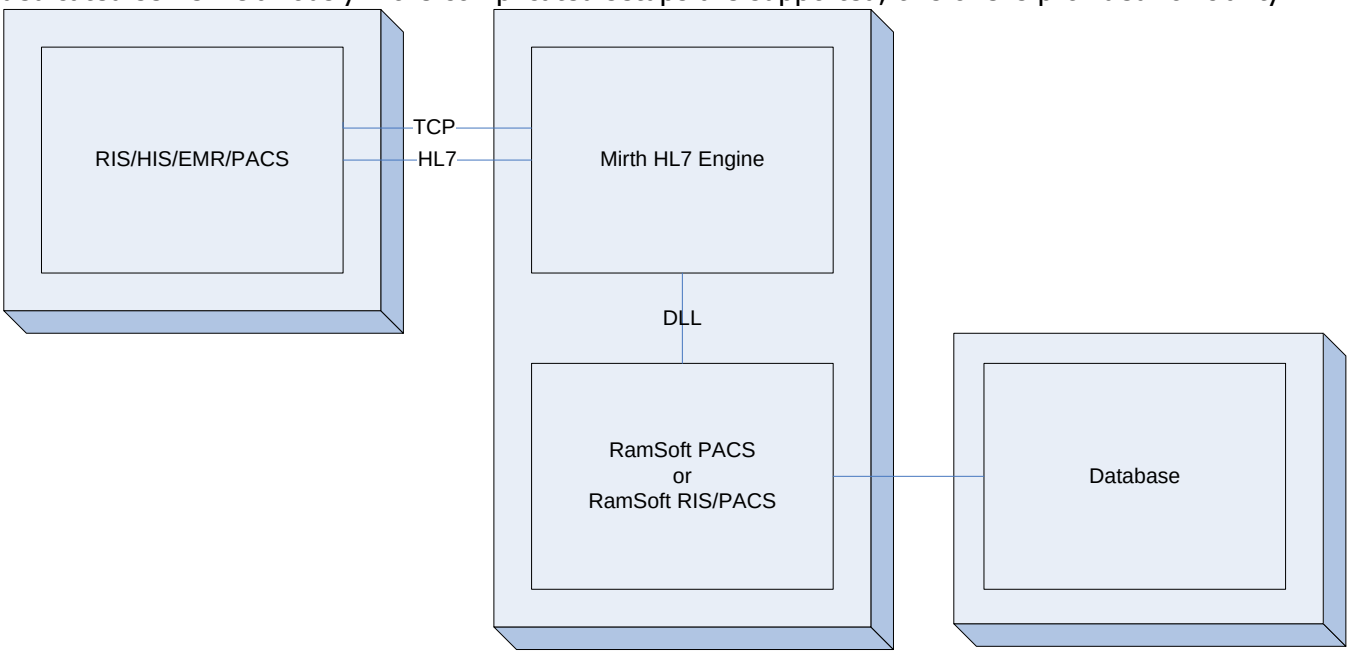

Figure 1: Typical Deployment

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2.3 Message Queuing

RMC uses a set of message queues to manage message transmission. These queues allow the RMC to maintain a backlog of messages in the event that the receiving system is unavailable. When the receiving system comes back online, messages within the queue are still in the queue, waiting to be sent. This ensures that messages do not become lost in the event of network or other IT issues.

2.3.1 Message Queue Data Flow

The following is a data-flow diagram depicting the flow of data through our system. Below the diagram is a detailed explanation of what it means.

1. Events are added to the message queue when they occur.

2. The HL7 service polls the Message Queue at a specified time interval (default: 5 seconds). It passes the list on to the "Send HL7 Message" process.

3. The message queue contents are processed, all data necessary to construct the queued messages is consolidated and HL7 messages are created for each queue entry. These messages are then dispatched to the receiving system.

4. All sent messages have their time of send and *MSA-2 Message Control ID* logged in a "Sent Message List".

5. If the message was delivered, the external system will send an ACK (acknowledgement) HL7 message back to RMC for every message that was sent to it. These ACKs should have the same *MSA-2 Message Control ID* as the messages they are replying to.

6. ACKs are processed to gather the MSA-2 *Message Control ID* field's contents. This is used to delete any entries corresponding to that ID from the "Sent Message List".

7. The "Sent Message List" is periodically polled for any entries that have send times older than a specified timeout (default: 1 minute). These messages are typically those that have been sent, but for which no ACK was received.

8. The information in the expired message is used to construct a new message in the Message Queue. Next time (2) is run, this message will be picked up and undergo the whole send process again. Hopefully this time it will be received successfully.

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3 Messages Definitions

3.1 Acknowledgement ACK

The ACK message is sent whenever another message has been successfully received and processed.

Segment Name	Segment Description
MSH	Message Header
MSA	Message Acknowledgement

3.1.1 ACK Sample Message

MSH|^~\&|RAMSOFT|SENDING FACILITY|RAMSOFT|RECEIVING FACILITY|20101223202939-0400||ACK|101|P|2.3.1||||||||
MSA|AA||||||

3.2 Negative Acknowledgement ACK

The negative ACK message is sent whenever another message has been successfully received but unsuccessfully processed.

Segment Name	Segment Description
MSH	Message Header
MSA	Message Acknowledgement
ERR	Error Comments

When RMC receives a negative ACK it does not try to resend the failed message.

3.2.1 Negative ACK Sample Message

MSH|^~\&|RAMSOFT|SENDING FACILITY|RAMSOFT|RECEIVING FACILITY|20101223202939-0400||ACK|101|P|2.3.1||||||||
MSA|AA||||||
ERR|^^^101&PatientID is Empty

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3.3 Patient Create / Update

Patient Update message is used to register a new patient or update an existing patient's information. Patient Merge must be used when Patient ID or Issuer of Patient ID has changed to avoid duplicate patients.

Segment Name	Segment Description
MSH	Message Header
EVN	Event Type
PID	Patient Identification
PV1	Patient Visit
[{AL1}]	Allergy
[GT1]	Guarantor
[{IN1}]	Insurance

RamSoft Extension: We have a parameter in the outbound channel configuration that allows GT1 and IN1 segments to be sent and received with the ADT^A08 message. The IHE standard requires these segments to be sent only in BAR messages. In this case, IN1 will be processed as described in Billing Account Create / Update.

3.3.1 ADT^A08 Sample Outbound Message

```
MSH|^~\&|RAMSOFT|SENDING FACILITY|RAMSOFT|RECEIVING FACILITY|20101223202939-0400||ADT^A08|101|P|2.3.1||||||||
EVN|A08|20101223202939-0400||||
PID||P12345^^^ISSUER|P12345^^^ISSUER||PATIENT^TEST^M^^^^||19741018|M|||10808 FOOTHILL BLVD^^RANCHO
CUCAMONGA^CA^91730^US||(909)481-5872^^^sales@ramsoft.com|(909)481-5800x1||M||12345|286-50-9510|||
PV1||O|||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
AL1|1||^PORK^|
AL1|2||^PENICILLIN^|
```

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3.4 Patient Merge

Patient Merge message is used to merge two patients together or indicate that the Patient ID or Issuer of Patient ID has changed. The new patient is identified in the PID segment and the old patient is identified in the MRG segment.

Segment Name	Segment Description
MSH	Message Header
EVN	Event Segment
PID	Patient Identification
MRG	Merge Patient Information

3.4.1 ADT^A40 Sample Message

MSH|^~\&|RAMSOFT|SENDING FACILITY|RAMSOFT|RECEIVING FACILITY|20101223202939-0400||ADT^A40|102|P|2.3.1|||||||
EVN|A40|20101223202939-0400||||
PID||P12345^^^ISSUER|P12345^^^ISSUER||PATIENT^TEST^M^^^^||19741018|M|||10808 FOOTHILL BLVD^^RANCHO CUCAMONGA^CA^91730^US||(909)481-5872^^^sales@ramsoft.com|(909)481-5800x1||M||12345|286-50-9510|||
MRG|758026^^^ISSUER|||758026^^^ISSUER|

3.5 Patient Cancel / Delete

Patient cancel / delete message is used to cancel / delete a patient that has been registered. RMC ignores this message if the specified patient record contains any study information to avoid accidental deletion of data.

Segment Name	Segment Description
MSH	Message Header
EVN	Event Type
PID	Patient Identification

3.5.1 ADT^A11 Sample Message

MSH|^~\&|RAMSOFT|SENDING FACILITY|RAMSOFT|RECEIVING FACILITY|20101223202939-0400||ADT^A11|103|P|2.3.1|||||||
EVN|A11|20101223202939-0400||||
PID||P12345^^^ISSUER|P12345^^^ISSUER||PATIENT^TEST^M^^^^|||||||||||||||||
PV1||O|||||||||||||||||||||||||||||||||||||||||||||||||||||||||

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3.6 Order

Order message is used for scheduling and updating orders for imaging. It is strongly recommended to use this message instead of the Scheduling message to perform this task. RMC does not differentiate between order creation and order modification, so the same message is used to accomplish both tasks.

Segment Name	Segment Description
MSH	Message Header
EVN	Event Segment
PID	Patient Identification
PV1	Patient Visit
{	
ORC	Common Order
OBR	Observation Request
[NTE]	Notes and Comments Segment
}	
[ZDS]	Additional identification information (custom for IHE)

The ZDS segment lies outside the repeatable segment group in this message. This ensures that all data within the repeatable segment group must pertain to a single study. RMC will send multiple ORC and OBR segments when multiple procedure codes exist for the study.

3.6.1 Mapping of Orders to Studies

We support a 1:1 mapping between orders and studies. Patient ID, Issuer of Patient ID, and Accession Number uniquely identifies a single study in our system. Study Instance UID also uniquely identifies a single study.

3.6.2 Inbound Algorithm to Match Order to Study

We use the following algorithm to locate the study record to update:

1. If *ZDS-1* contains Study Instance UID, then we use this field exclusively to locate the study to update. Otherwise, proceed to step 2.
2. We locate the patient record based on Patient ID and Issuer of Patient ID as described in the PID segment. If no match is found, then we create a new patient and study.
3. For the located patient, we first attempt to locate the study using *OBR-18* as Accession Number. If no match is found, we search using *OBR-19*, and finally *OBR-3* as Accession Number.
4. If no match is found, then we create a new study.

3.6.3 Inbound Processing

1. We support only one study per ORM message.
2. We store study information based on the first ORC / OBR segment and store procedure information based on the remaining segments.
3. If *OBR-4.1* matches a valid Study Type Code in our database, then we create the study using the Study Description and Procedure Codes from our Database.

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4. Otherwise, we create the study leaving Study Type blank and using *OBR-4.2* as Study Description.
5. Procedure Codes are processed from all OBR segments.

3.6.4 ORM^O01 Sample Message

MSH|^~\&|RAMSOFT|SENDING FACILITY|RAMSOFT|RECEIVING FACILITY|20101223202939-0400||ORM^O01|104|P|2.3.1|||||||
EVN|O01|20101223202939-0400||||
PID||P12345^^^ISSUER|P12345^^^ISSUER||PATIENT^TEST^M^^^^||19741018|M|||10808 FOOTHILL BLVD^^RANCHO CUCAMONGA^CA^91730^US||(909)481-5872^^^sales@ramsoft.com|(909)481-5800x1||M||12345|286-50-9510|||
PV1||O|ER^ER^^MEDICAL CENTER^^^^^ER||||1234567890^JONES^SAMUEL^^MD^|1234567890^JONES^SAMUEL^^MD^|306507^SMITH^JOHN^^MD^~689789^JONES^ED^^MD^||||||||||||||||||||||||||||||||||||||||||||||||
ORC|SC|A123456|A123456||SC||1^^^20110615025434-0400^^R^^^^||20110704211036-0400|FRONTDESK||1234567890^JONES^SAMUEL^^MD^|^^^MEDICAL CENTER|8883439146|||MEDICAL CENTER|
OBR||A123456|A123456|70100^XRAY JAW < 4 VIEWS^^^|||20110704211036-0400|||||R|Patient was in an altercation||^^^JAW^|1234567890^JONES^SAMUEL^^MD^||A123456|RP890|A123456||||CR|||^^^20110615025434-0400^^R^^^^|||WALK|830.1^DISLOCATION OF JAW; OPEN DISLOCATION^|2345678901&PATEL&APU&&MD&||&LEVINSON&KERRY&K&RT&|&TRANKLIN&KATY&K&&||||PATIENT WAS DRUNK||U|||70100^XRAY JAW < 4 VIEWS^^^||
NTE|1|O|CLINICAL NOTES|RE|
ZDS|1.2.124.113540.0.0.3.725.4^RAMSOFT^Application^DICOM|

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3.7 Result

Report message allows for the transmission of reports. Reports can be sent with a status of "A" for Addendum, "F" for Final and "P for Preliminary report. Reports can be sent and received in various formats as following:

- Plain Text Format
- RTF Format
- Base64Encoded String (Word Format)
- Base64Encoded String (PDF Format)

Segment Name	Segment Description
MSH	Message Header
EVN	Event Type
PID	Patient Identification
[PV1]	Patient Visit Information
{	
[ORC]	Common Order Segment
OBR	Observation Request Segment
[NTE]	Notes and Comments Segment
{OBX}	Observation Result
}	

Report text can be contained within a single OBX segment or multiple consecutive OBX segments. In the latter case each OBX segment corresponds to a single line of text in the report.

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3.7.1 Inbound Processing

1. We use the following algorithm to locate the study record to store the report:
    a. We locate the patient record based on Patient ID and Issuer of Patient ID as described in the PID segment. If no match is found, then we create a new patient and study.
    b. For the located patient, we match *OBR-19* to Accession Number. If no match is found, we match *OBR-3* to Accession Number.
    c. If no match is found, then we create a new patient and study.
2. All reports sent within a single OBX message must belong to the same study.
3. Each ORC, OBR, {OBX} sequence could contain a single report. A single report may consist of multiple OBX segments.
4. Plain text reports
    a. Each OBX segment is treated as a new line.
    b. Each OBX-5 field is treated as a new line.
    c. Each occurrence of '\.br\' is treated as a new line.
    d. Each occurrence of any combination of line feed and carriage return escape sequence '\E\n', '\E\r' is treated as a new line.
    e. Each occurrence of any combination of line feed and carriage return hex sequence '\X0D\', '\X0A\', '\X0D0A\', '\X0A0D\' hex sequence is treated as a new line.

3.7.2 Outbound Processing

1. We send a single report in each ORU message.
2. For plain text reports, line feeds (any combination of line feed and carriage return) are replaced with OBX_LINEBREAK string or denoted by a segment break if OBX_LINEBREAK is NULL.
3. For plain text reports, OBX_SPLIT_DELIMITERS are denoted by segment breaks.
4. Segment breaks are also inserted when the segment size exceeds OBX_SEGMENT_SIZE. Plain text, RTF, and HTML OBX segments are broken at a blank space (word wrapped), unless there is a word that exceeds the segment size.

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3.7.3 ORU^R01 Sample Messages

3.7.3.1 Report in Text Format

MSH|^~\&|RAMSOFT|SENDING FACILITY|RAMSOFT|RECEIVING FACILITY|20101223202939-0400||ORU^R01|104|P|2.3.1||||||||
EVN|R01|20101223202939-0400||||
PID||P12345^^^ISSUER|P12345^^^ISSUER||PATIENT^TEST^M^^^^||19741018|M|||10808 FOOTHILL BLVD^^RANCHO CUCAMONGA^CA^91730^US||(909)481-5872^^^sales@ramsoft.com|(909)481-5800x1||M||12345|286-50-9510|||
PV1||O|ER^ER^^MEDICAL CENTER^^^^^ER||||1234567890^JONES^SAMUEL^^MD^|1234567890^JONES^SAMUEL^^MD^|306507^SMITH^JOHN^^MD^~689789^JONES^ED^^MD^||||||||||||||||||||||||||||||||||||||||||||||||
ORC|SC|A123456|A123456||SC||^^^20110615025434-0400^^R^^^^||20110704211036-0400|FRONTDESK||1234567890^JONES^SAMUEL^^MD^|^^^MEDICAL CENTER|8883439146|||MEDICAL CENTER|
OBR||A123456|A123456|70100^XRAY JAW < 4 VIEWS^^^|||20110704211036-0400|||||R|Patient was in an altercation||^^^JAW^|1234567890^JONES^SAMUEL^MD^||A123456|RP890|A123456||||CR|||^^^20110615025434-0400^^R^^^^|||WALK|830.1^DISLOCATION OF JAW; OPEN DISLOCATION^|2345678901&PATEL&APU&&MD&||&LEVINSON&KERRY&K&RT&|&TRANKLIN&KATY&K&&||||PATIENT WAS DRUNK||U|||70100^XRAY JAW < 4 VIEWS^^^||
OBX|1|FT|1.124.135140.1.2.1^TXT^^1||\.br\Report Status: PRELIMINARY\.br\\.br\Name: PATIENT, TEST M\.br\MRN: P12345\.br\DOB: 10/18/1974\.br\PHONE: (909)481-5800\.br\Referring Physician: JONES, SAMUEL MD\.br\DOS: 2/23/2011 8:00:00 AM\.br\THYROID ULTRASOUND:\.br\INDICATIONS: Multi-nodular goiter. Compare to prior studies.\.br\\.br\Comparison is made to 2/12/08.\.br\\.br\The thyroid gland is within normal limits of size. The right lobe measures 4.4 x 1.2 x 2.0cm. The left lobe measures 4.8 x 1.4 x 1.4cm. Several small nodules are seen in each lobe. There appears to be a new nodule in the left lobe inferior aspect measuring 0.5cm. \.br\\.br\IMPRESSION:\.br\A few small thyroid nodules are seen bilaterally. There is a one new 0.5cm. Nodule in the left lobe inferiorly.\.br\\.br\Radiologist: PATEL, APU MD\.br\\.br\Accession: A123456\.br\Consulting Physicians: SMITH^JOHN MD, JONES^SAMUEL MD \.br\Transcribed by: ET\.br\2/23/2011 10:12:25 AM|||||P|||20110223101024-0400||2345678901^PATEL^APU^^MD^|PRELIMINARY

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3.7.3.2 Report in RTF

MSH|^~\&|RAMSOFT|SENDING FACILITY|RAMSOFT|RECEIVING FACILITY|20101223202939-0400||ORU^R01|105|P|2.3.1|||||||
EVN|R01|20101223202939-0400||||
PID||P12345^^^ISSUER|P12345^^^ISSUER||PATIENT^TEST^M^^^^||19741018|M|||10808 FOOTHILL BLVD^^RANCHO
CUCAMONGA^CA^91730^US||(909)481-5872^^^sales@ramsoft.com|(909)481-5800x1||M||12345|286-50-9510|||
PV1||O|ER^ER^^MEDICAL
CENTER^^^^^ER||||1234567890^JONES^SAMUEL^^MD^|1234567890^JONES^SAMUEL^^MD^|306507^SMITH^JOHN^^MD^~689789^JONES^
ED^^MD^||||||||||||||||||||||||||||||||||||||||||||||||
ORC|SC|A123456|A123456||SC||^^^20110615025434-0400^^R^^^^||20110704211036-
0400|FRONTDESK||1234567890^JONES^SAMUEL^^MD^|^^^MEDICAL CENTER|8883439146|||MEDICAL CENTER|
OBR||A123456|A123456|70100^XRAY JAW < 4 VIEWS^^^|||20110704211036-0400|||||R|Patient was in an
altercation||^^^JAW^|1234567890^JONES^SAMUEL^^MD^||A123456|RP890|A123456||||CR|||^^^20110615025434-
0400^^R^^^^|||WALK|830.1^DISLOCATION OF JAW; OPEN
DISLOCATION^|2345678901&PATEL&APU&&MD&||&LEVINSON&KERRY&K&RT&|&TRANKLIN&KATY&K&&||||PATIENT WAS DRUNK||U|||70100^XRAY
JAW < 4 VIEWS^^^||
OBX|1|FT|1.124.135140.1.2.2^RTF^^1||{\E\rtf1\E\fbidis\E\ansi\E\ansicpg1252\E\deff0\E\deflang1033\E\deflangfe1033{\E\fonttbl{\E\f0\E\froman\E\fp
rq2\E\fcharset0 Times New Roman;}{\E\f1\E\fswiss\E\fprq2\E\fcharset0 Arial;}}{\E\colortbl
;\E\red0\E\green0\E\blue0;}\E\viewkind4\E\uc1\E\pard\E\ltrpar\E\sa200\E\sl276\E\slmult1\E\f0\E\fs22 \E\par \E\pard\E\ltrpar\E\qc\E\b\E\f1\E\fs20
FINAL REPORT\E\par \E\pard\E\ltrpar\E\fi720\E\qc \E\par \E\pard\E\brdrb\E\brdrs\E\brdrw20\E\brdrcf1\E\brsp20 \E\ltrpar\E\fi720\E\qc \E\par
\E\trowd\E\trgaph108\E\trleft120\E\trqc\E\trbrdrb\E\brdrs\E\brdrw20\E\brsp20 \E\cellx2259\E\clbrdrb\E\brdrw15\E\brdrs
\E\cellx5977\E\cellx9696\E\pard\E\intbl\E\ltrpar Patient ID#:\E\cell\E\b0
57277\E\cell\E\cell\E\f0\E\fs22\E\row\E\trowd\E\trgaph108\E\trleft120\E\trqc\E\trbrdrb\E\brdrs\E\brdrw20\E\brsp20
\E\cellx2259\E\clbrdrb\E\brdrw15\E\brdrs \E\cellx4792\E\cellx5898\E\clbrdrb\E\brdrw15\E\brdrs \E\cellx7082\E\cellx8110\E\clbrdrb\E\brdrw15\E\brdrs
\E\cellx9696\E\pard\E\intbl\E\ltrpar\E\b\E\f1\E\fs20 Patient Name: \E\cell\E\b0 WHITLOW, THOMAS1 \E\cell\E\b Gender:\E\cell\E\b0 M\E\cell\E\b
D.O.B.:\E\cell\E\b0 2/11/1948\E\cell\E\f0\E\fs22\E\row\E\trowd\E\trgaph108\E\trleft120\E\trqc\E\trbrdrb\E\brdrs\E\brdrw20\E\brsp20
\E\cellx2259\E\clbrdrt\E\brdrw15\E\brdrs\E\clbrdrb\E\brdrw15\E\brdrs
\E\cellx4792\E\cellx5898\E\clbrdrt\E\brdrw15\E\brdrs\E\clbrdrb\E\brdrw15\E\brdrs \E\cellx7082\E\cellx8110\E\clbrdrb\E\brdrw15\E\brdrs
\E\cellx9696\E\pard\E\intbl\E\ltrpar\E\b\E\f1\E\fs20 Age: \E\cell\E\b0 63 years \E\cell\E\b Height:\E\cell\E\b0\E\cell\E\b
Weight:\E\cell\E\b0\E\cell\E\f0\E\fs22\E\row\E\trowd\E\trgaph108\E\trleft120\E\trqc\E\trbrdrb\E\brdrs\E\brdrw20\E\brsp20
\E\cellx2259\E\clbrdrt\E\brdrw15\E\brdrs\E\clbrdrb\E\brdrw15\E\brdrs \E\cellx4792\E\cellx6543\E\clbrdrb\E\brdrw15\E\brdrs
\E\cellx9696\E\pard\E\intbl\E\ltrpar\E\b\E\f1\E\fs20 Date of Exam:\E\cell\E\b0 6/2/2011 18:23:53\E\cell\E\b Registered By: \E\cell\E\b0
ADMIN\E\cell\E\f0\E\fs22\E\row\E\trowd\E\trgaph108\E\trleft120\E\trqc\E\trbrdrb\E\brdrs\E\brdrw20\E\brsp20
\E\cellx2259\E\clbrdrt\E\brdrw15\E\brdrs\E\clbrdrb\E\brdrw15\E\brdrs
\E\cellx4792\E\cellx6543\E\clbrdrt\E\brdrw15\E\brdrs\E\clbrdrb\E\brdrw15\E\brdrs \E\cellx9696\E\pard\E\intbl\E\ltrpar\E\b\E\f1\E\fs20 Referring
Physician\E\cell\E\b0 SUPPORT, RAMSOFT MD MR.\E\cell\E\b Phone #:\E\cell\E\b0 (888)343-
9146X2\E\cell\E\f0\E\fs22\E\row\E\trowd\E\trgaph108\E\trleft120\E\trqc\E\trbrdrb\E\brdrs\E\brdrw20\E\brsp20
\E\cellx2259\E\clbrdrt\E\brdrw15\E\brdrs\E\clbrdrb\E\brdrw15\E\brdrs \E\cellx4792\E\cellx9696\E\pard\E\intbl\E\ltrpar\E\b\E\f1\E\fs20 Ref. Phys.
Fax\E\cell\E\b0\E\cell\E\b Pt Hand Carried Films:\E\b0 YES NO \E\f0\E\fs22\E\cell\E\row\E\pard\E\brdrb\E\brdrs\E\brdrw20\E\brdrcf1\E\brsp20
\E\ltrpar\E\ul\E\f1\E\fs20 \E\par \E\pard\E\ltrpar \E\par \E\par \E\par \E\trowd\E\trgaph115\E\trleft-115\E\trqc\E\trbrdrb\E\brdrs\E\brdrw10\E\brdrcf1
\E\cellx1253\E\clbrdrb\E\brdrw15\E\brdrs \E\cellx9461\E\pard\E\intbl\E\ltrpar\E\ulnone\E\b Procedure: \E\cell\E\b0 CHEST 2 VIEWS
PA/LAT\E\cell\E\f0\E\fs22\E\row\E\trowd\E\trgaph115\E\trleft-115\E\trqc\E\trbrdrb\E\brdrs\E\brdrw10\E\brdrcf1
\E\cellx4375\E\cellx9461\E\pard\E\intbl\E\ltrpar\E\f1\E\fs20\E\cell\E\cell\E\f0\E\fs22\E\row\E\trowd\E\trgaph115\E\trleft-
115\E\trqc\E\trbrdrb\E\brdrs\E\brdrw10\E\brdrcf1 \E\cellx1253\E\clbrdrb\E\brdrw15\E\brdrs \E\cellx4375\E\cellx5663\E\clbrdrb\E\brdrw15\E\brdrs
\E\cellx9461\E\pard\E\intbl\E\ltrpar\E\b\E\f1\E\fs20 Suspected Diagnosis:\E\cell\E\b0\E\cell\E\b Reason for Study:\E\cell\E\b0 FALL/ RIB
PAIN\E\cell\E\f0\E\fs22\E\row\E\pard\E\ltrpar\E\ul\E\f1\E\fs20 \E\par \E\b Technologist Notes:\E\par \E\b0 \E\par \E\trowd\E\trgaph108\E\trleft-
108\E\trbrdrt\E\brdrs\E\brdrw10\E\brdrcf1 \E\trbrdrb\E\brdrs\E\brdrw10\E\brdrcf1 \E\clbrdrt\E\brdrw15\E\brdrs\E\clbrdrb\E\brdrw15\E\brdrs
\E\cellx9468\E\pard\E\intbl\E\ltrpar\E\ulnone\E\cell\E\f0\E\fs22\E\row\E\f1\E\fs20\E\trowd\E\trgaph108\E\trleft-
108\E\trbrdrt\E\brdrs\E\brdrw10\E\brdrcf1 \E\trbrdrb\E\brdrs\E\brdrw10\E\brdrcf1 \E\clbrdrt\E\brdrw15\E\brdrs\E\clbrdrb\E\brdrw15\E\brdrs
\E\cellx9468\E\intbl\E\cell\E\f0\E\fs22\E\row\E\f1\E\fs20\E\trowd\E\trgaph108\E\trleft-108\E\trbrdrt\E\brdrs\E\brdrw10\E\brdrcf1
\E\trbrdrb\E\brdrs\E\brdrw10\E\brdrcf1 \E\clbrdrt\E\brdrw15\E\brdrs\E\clbrdrb\E\brdrw15\E\brdrs
\E\cellx9468\E\intbl\E\cell\E\f0\E\fs22\E\row\E\pard\E\ltrpar\E\f1\E\fs20 \E\par Technologist:\E\tab RAMSOFTTECH, TECH A MD MR.\E\par \E\par
\E\trowd\E\trgaph108\E\trleft-108\E\cellx2430\E\clbrdrb\E\brdrw15\E\brdrs \E\cellx9468\E\pard\E\intbl\E\ltrpar\E\b Patient return appointment with
referring physician.\E\cell\E\b0\E\cell\E\f0\E\fs22\E\row\E\pard\E\ltrpar\E\f1\E\fs20 \E\par \E\ul If positive, please include image numbers on
report.\E\par \E\ulnone \E\par \E\b \E\par \E\b0 \E\par \E\pard\E\ltrpar\E\sa200\E\sl276\E\slmult1\E\f0\E\fs22 \E\par }||||||A|||20110606190341-
0400||2345678901^PATEL^APU^^MD^|ADDENDUM

Toll Free: +1 888.343.9146
Phone: +1 416.674.1347
Fax: +1 416.674.7147

3.7.3.3 Report in Word Format (Base64Encoded)

MSH|^~\&|RAMSOFT|SENDING FACILITY|RAMSOFT|RECEIVING FACILITY|20101223202939-0400||ORU^R01|106|P|2.3.1||||||||
EVN|R01|20101223202939-0400||||
PID||P12345^^^ISSUER|P12345^^^ISSUER||PATIENT^TEST^M^^^^||19741018|M|||10808 FOOTHILL BLVD^^RANCHO CUCAMONGA^CA^91730^US||(909)481-5872^^^sales@ramsoft.com|(909)481-5800x1||M||12345|286-50-9510|||
PV1||O|ER^ER^^MEDICAL CENTER^^^^^ER||||1234567890^JONES^SAMUEL^^MD^|1234567890^JONES^SAMUEL^^MD^|306507^SMITH^JOHN^^MD^~689789^JONES^ED^^MD^||||||||||||||||||||||||||||||||||||||||||||||
ORC|SC|A123456|A123456||SC||^^^20110615025434-0400^^R^^^^||20110704211036-0400|FRONTDESK||1234567890^JONES^SAMUEL^MD^|^^^MEDICAL CENTER|8883439146|||MEDICAL CENTER|
OBR||A123456|A123456|70100^XRAY JAW < 4 VIEWS^^^|||20110704211036-0400|||||R|Patient was in an altercation||^^^JAW^|1234567890^JONES^SAMUEL^MD^||A123456|RP890|A123456||||CR|||^^^20110615025434-0400^^R^^^^|||WALK|830.1^DISLOCATION OF JAW; OPEN DISLOCATION^|2345678901&PATEL&APU&&MD&||&LEVINSON&KERRY&K&RT&|&TRANKLIN&KATY&K&&||||PATIENT WAS DRUNK||U|||70100^XRAY JAW < 4 VIEWS^^^||
OBX|1|CE|1.124.135140.1.2.2^DOC^^1||0M8R4KGxGuEAAAAAAAAAAAAAAAAAAAAAAPgADAP7/CQAGAAAAAAAAAAAAAAAAABAAAAKQAAAAAAAAAAAEAAAKwAAAAEAAAD+////AAAAACgAAAD//spcEAA4AJBAAA8BK/AAAAAAAAEAAAAAAACAAAhwoAAA4AYmpiarRWtFYAAAAAAAAAAAAAAAAAAAAAAAJBBYANBQAANY8AQDWPAEAhwIAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAD//w8AAAAAAAAAAAAD//w8AAAAAAAAAAAD//w8AAAAAAAAAAAAAAAAAAAAAAALcAAAAAACYGAAAAAAAAAJgYAAGkTAAAAAAAAAaRMAAAAAAAABpEwAAAAAAAGkTAA
... Continuation of Base64Encoded…
////8AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAYAAAAABAAAAAAAAAAFAEQAbwBjAHUAbQBlAG4AdABTAHUAbQBtAGEAcgB5AEkAbgBmAG8AcgBtAGEAdABpAG8AbgAAAAAAAAAAAAAAAAOAACAf///////////////|||||||A|||20110706142027-0400||2345678901^PATEL^APU^^MD^|DIAGNOSTIC REPORT|

3.7.3.4 Report in PDF Format (Base64Encoded)

MSH|^~\&|RAMSOFT|SENDING FACILITY|RAMSOFT|RECEIVING FACILITY|20101223202939-0400||ORU^R01|107|P|2.3.1|||||||
EVN|R01|20101223202939-0400||||
PID||P12345^^^ISSUER|P12345^^^ISSUER||PATIENT^TEST^M^^^^||19741018|M|||10808 FOOTHILL BLVD^^RANCHO
CUCAMONGA^CA^91730^US||(909)481-5872^^^sales@ramsoft.com|(909)481-5800x1||M||12345|286-50-9510|||
PV1||O|ER^ER^^MEDICAL
CENTER^^^^^ER||||1234567890^JONES^SAMUEL^^MD^|1234567890^JONES^SAMUEL^^MD^|306507^SMITH^JOHN^^MD^~689789^JONES^
ED^^MD^|||||||||||||||||||||||||||||||||||||||||||||
ORC|SC|A123456|A123456||SC||^^^20110615025434-0400^^R^^^^||20110704211036-
0400|FRONTDESK||1234567890^JONES^SAMUEL^MD^|^^^MEDICAL CENTER|8883439146|||MEDICAL CENTER|
OBR||A123456|A123456|70100^XRAY JAW < 4 VIEWS^^^|||20110704211036-0400|||||R|Patient was in an
altercation||^^^JAW^|1234567890^JONES^SAMUEL^MD^||A123456|RP890|A123456||||CR|||^^^20110615025434-
0400^^R^^^^|||WALK|830.1^DISLOCATION OF JAW; OPEN
DISLOCATION^|2345678901&PATEL&APU&&MD&||&LEVINSON&KERRY&K&RT&|&TRANKLIN&KATY&K&&||||PATIENT WAS DRUNK||U|||70100^XRAY
JAW < 4 VIEWS^^^||
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yMDExMDcwNjE0MzA0MCkgL01vZERhdGUoRDoyMDExMDcwNjE0MzA0MCkgL1Byb2R1Y2VyKP7/AE0AaQBjAHIAbwBzAG8AZgB0AK4AIABPAGYAZgBpAGM

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AZQAgAFcAbwByAGQAIAAyADAAMAA3KT4+DQplbmRvYmoNCjIwIDAgb2JqDQo8PC9UeXBlL09ialN0bS9OIDUxL0ZpcnN0IDM3OS9GaWx0ZXIvRmxhdGVE
ZWNvZGUvTGVuZ3RoIDcwOT4+DQpzdHJlYW0NCnicjVZNaxsxEL0H8h/m2B7CavQtCIFCLyUQjO1b6MEJS1twnZA60Pz7PlnjsNpKYcFmvbtP772Z0YzMkRRxI
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Kawo11uAbIRjjWcBFwdZ4cAuIUyCZiDWnwsQ5wgvUGHmCITdBwRmwZ1iyuADtEbRMW47mDHwc+j9Q48HssduDzETjoB3jyOXEpkse6iEgRE0cPEPgSImPo
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ruX8XC6zef8KYv34iPLv7+9G/8eb8c30sJ19/r7D6LIfwqyEud/Be9a50Nezmc5KuWUkwNHzgoZ8zKhZTzKZJMZI9NB+lo6UrpB9rGUZlYvL72bDc0ycnnxD75MJC
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MCA1MDAgNTAwXSANCmVuZG9iag0KNjUgMCBvYmoNClsgNzc4IDAgMCAwIDAgMCAwIDAgMCAwIDAgMCAwIDAgMCAwIDAgMCAwIDAgMCAw
IDI1MCAwIDAgNTAwIDAgMCAwIDAgMzMzIDMzMyAwIDAgMjUwIDMzMyAyNTAgMjc4IDUwMCA1MDAgNTAwIDUwMCA1MDAgNTA
wIDUwMCAyNzggMCAwIDAgMCAwIDAgNzIyIDY2NyA2NjcgNzIyIDYxMSA1NTYgNzIyIDcyMiAzMzMgMzg5IDcyMiA3MjIgNTU2IDAgNjY
3IDU1NiA2MTEgNzIyIDcyMiA5NDQgNzIyIDcyMiAwIDAgMCAwIDAgMCAwIDQ0NCA1MDAgNDQ0IDUwMCA0NDQgMzMzIDUwMCA1MDAgMjc4IDAgMCAyN
zggNzc4IDUwMCA1MDAgNTAwIDAgMzMzIDM4OSAyNzggNTAwIDUwMCA3MjIgNTAwIDUwMF0gDQplbmRvYmoNCjY2IDAgb2JqDQo8PC9UeXBlL1hSZWYv
U2l6ZSA2Ni9XWyAxIDQgMl0gL1Jvb3QgMSAwIFIvSW5mbyAxMSAwIFIvSURbPEM4MEEzNzExQUYxRDI5NDQ4MkZBQjBGMTZENTdFMjlFPjxDODBBMzcxMU
FGMUQyOTQ0ODJGQUIwRjE2RDU3RTI5RT5dIC9GaWx0ZXIvRmxhdGVEZWNvZGUvTGVuZ3RoIDE2MT4+DQpzdHJlYW0NCnicPdDJGcFQFIbhkxAykpDEPIt
5bkMbarDTkBZ0oAErtcR1P4+zOO/q2/wi6vLcUD8S+XKDh8a4a5wMXhr3qfGuGv+iCc6a8C1iqjyWPRxgBzMoggG/4Kjy6J8XwAQHSmCBDWWogQcuBOBDFS
oQQQgNiKEOKSQwhBY0oQNt6EEXBtCHDMYwgilMYAVzWMAS1rCBE2zVZomtl08tkQ/2+hKcDQplbmRzdHJlYW0NCmVuZG9iag0KeHJlZg0KMCA2Nw0KMDA
wMDAwMDAxMiA2NTUzNSBmDQowMDAwMDAwMDE3IDAwMDAwIG4NCjAwMDAwMDAxMjUgMDAwMDAgbg0KMDAwMDAwMDE4NyAwMDAwMCBuDQo
wMDAwMDAwNDI2IDAwMDAwIG4NCjAwMDAwMDIzNDEgMDAwMDAgbg0KMDAwMDAwMjUxOSAwMDAwMCBuDQowMDAwMDAyNzYyIDAwMDAwIG4NC
jAwMDAwMDI5MzQgMDAwMDAgbg0KMDAwMDAwMzE3MiAwMDAwMCBuDQowMDAwMDAzNDAzIDAwMDAwIG4NCjAwMDAwMDQzMTcgMDAwMDAgbg0
KMDAwMDAwMDAxMyA2NTUzNSBmDQowMDAwMDAwMDE0IDY1NTM1IGYNCjAwMDAwMDAwMTUgNjU1MzUgZg0KMDAwMDAwMDAxNiA2NTUzNSBmD
QowMDAwMDAwMDE3IDY1NTM1IGYNCjAwMDAwMDAwMTggNjU1MzUgZg0KMDAwMDAwMDAxOSA2NTUzNSBmDQowMDAwMDAwMDIwIDY1NTM1IGY
NCjAwMDAwMDAwMjEgNjU1MzUgZg0KMDAwMDAwMDAyMiA2NTUzNSBmDQowMDAwMDAwMDIzIDY1NTM1IGYNCjAwMDAwMDAwMjQgNjU1MzUgZg0K
MDAwMDAwMDAyNSA2NTUzNSBmDQowMDAwMDAwMDI2IDY1NTM1IGYNCjAwMDAwMDAwMjcgNjU1MzUgZg0KMDAwMDAwMDAyOCA2NTUzNSBmDQo
wMDAwMDAwMDI5IDY1NTM1IGYNCjAwMDAwMDAwMzAgNjU1MzUgZg0KMDAwMDAwMDAzMSA2NTUzNSBmDQowMDAwMDAwMDMyIDY1NTM1IGYNCj
AwMDAwMDAwMzMgNjU1MzUgZg0KMDAwMDAwMDAzNCA2NTUzNSBmDQowMDAwMDAwMDM1IDY1NTM1IGYNCjAwMDAwMDAwMzYgNjU1MzUgZg0K
MDAwMDAwMDAzNyA2NTUzNSBmDQowMDAwMDAwMDM4IDY1NTM1IGYNCjAwMDAwMDAwMzkgNjU1MzUgZg0KMDAwMDAwMDA0MCA2NTUzNSBmDQ
owMDAwMDAwMDQxIDY1NTM1IGYNCjAwMDAwMDAwNDIgNjU1MzUgZg0KMDAwMDAwMDA0MyA2NTUzNSBmDQowMDAwMDAwMDQ0IDY1NTM1IGYN
CjAwMDAwMDAwNDUgNjU1MzUgZg0KMDAwMDAwMDA0NiA2NTUzNSBmDQowMDAwMDAwMDQ3IDY1NTM1IGYNCjAwMDAwMDAwNDggNjU1MzUgZg0K
MDAwMDAwMDA0OSA2NTUzNSBmDQowMDAwMDAwMDUwIDY1NTM1IGYNCjAwMDAwMDAwNTEgNjU1MzUgZg0KMDAwMDAwMDA1MiA2NTUzNSBmDQ
owMDAwMDAwMDUzIDY1NTM1IGYNCjAwMDAwMDAwNTQgNjU1MzUgZg0KMDAwMDAwMDA1NSA2NTUzNSBmDQowMDAwMDAwMDU2IDY1NTM1IGYN
CjAwMDAwMDAwNTcgNjU1MzUgZg0KMDAwMDAwMDA1OCA2NTUzNSBmDQowMDAwMDAwMDU5IDY1NTM1IGYNCjAwMDAwMDAwNjAgNjU1MzUgZg0K
MDAwMDAwMDA2MSA2NTUzNSBmDQowMDAwMDAwMDYyIDY1NTM1IGYNCjAwMDAwMDAwNjMgNjU1MzUgZg0KMDAwMDAwMDA2MCA2NTUzNSBmD
QowMDAwMDA1Mzg0IDAwMDAwIG4NCjAwMDAwMDU2MzcgMDAwMDAgbg0KMDAwMDAwMDAwNjAyMiAwMDAwMCBuDQp0cmFpbGVyDQo8PC9TaXplIDY3L1J
vb3QgMSAwIFIvSW5mbyAxMSAwIFIvSURbPEM4MEEzNzExQUYxRDI5NDQ4MkZBQjBGMTZENTdFMjlFPjxDODBBMzcxMUFGMUQyOTQ0ODJGQUIwRjE2RD
U3RTI5RT5dID4+DQpzdGFydHhyZWYNCjYzODQNCiUlRU9GDQp4cmVmDQowIDANCnRyYWlsZXINCjw8L1NpemUgNjcvUm9vdCAxIDAgUi9JbmZvIDExIDA
gUi9JRFs8QzgwQMjIPg0Kc3RhcnR4cmVmDQo3ODgwDQolJUVPRg==||||||A|||20110706143040-0400||2345678901^PATEL^APU^^MD^|DIAGNOSTIC
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3.8 Scheduling

Scheduling messages may be received from an information system that does not support Order messages.

Segment Name	Segment Description
MSH	Message Header
SCH	Schedule Activity Information
PID	Patient Identification
[PV1]	Patient Visit Information
{RGS	Resource Group
{AIS	Appointment Information – Service
[NTE]	Notes and Comments
}	
}	

3.8.1 Inbound Processing

1. We support only one study per SIU message.
2. In the 1st AIS segment, we read *AIS:4-1* as Study Type Code.
3. If Study Type Code matches a valid Study Type in our database, then we create the new study using the corresponding Study Description and Procedure Codes from our database.
4. Otherwise, we set the Study Description to *AIS:4-2* and set *AIS:4-1* as the Procedure Code.
5. If there are additional AIS segments, they must correspond to Procedure Codes. We set *AIS:4-1* as additional Procedure Codes for the study.
6. We add any Procedure Codes that do not exist to our database.

3.8.2 SIU^S12 Sample Message

```
MSH|^~\&|HIS|SENDING FACILITY|RAMSOFT|RECEIVING FACILITY|201003060953||SIU^S12|20100306953450|P|2.4|||||||
SCH||9402||||^APT|||||1|||||1234567890^JONES^SAMUEL^^MD^|||||||||9402|9402|
PID||P12345^^^ISSUER|P12345^^^ISSUER||PATIENT^TEST^M^^^^||19741018|M|||10808 FOOTHILL BLVD^^RANCHO
CUCAMONGA^CA^91730^US||(909)481-5872^^^sales@ramsoft.com|(909)481-5800x1||M||12345|286-50-9510|||
RGS|1|||
AIS|1|A|70100^XRAY JAW < 4 VIEWS^^^|20110508020000|-0400||10|min|||||
NTE|1|P|Patient was in an altercation|
```

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3.9 Billing Account Create / Update

Billing Account messages (BAR^P01, BAR^P05) are used to create and update insurance information of the patient. Those messages are sent by RMC whenever patient information is created or updated.

Segment Name	Segment Description
MSH	Message Header
EVN	Event Type
PID	Patient Identification
GT1	Guarantor
[{	
IN1	Insurance
}]	

RMC supports up to 3 insurance segments: Primary, Secondary, and Tertiary.

Inbound message:
The order is following:
IN1 segment #1 – Primary Insurance.
IN1 segment #2 – Secondary Insurance
IN1 segment #3 – Tertiary Insurance.
As long as one or more insurance segments contain data, any existing insurance for the patient that is not received in an IN1 segment will be marked as Inactive.

Outbound message: Only active insurance for the patient will be sent in IN1 segments.
If patient has Primary, Secondary and Tertiary active insurances the order of IN1 segments is following:
IN1 segment #1 – Primary Insurance.
IN1 segment #2 – Secondary Insurance
IN1 segment #3 – Tertiary Insurance.

If patient has Secondary and Tertiary active insurances the order of IN1 segments is following:
IN1 segment #1 – Secondary Insurance
IN1 segment #2 – Tertiary Insurance.

If patient has only one type of active insurance this insurance will be sent in first IN1 segment.

3.9.1 BAR^P05 Sample Message

MSH|^~\&|RAMSOFT|SENDING FACILITY|RAMSOFT|RECEIVING FACILITY|20101223202939-0400||BAR^P05|108|P|2.3.1|||||||
EVN|P05|20101223202939-0400||||
PID||P12345^^^ISSUER|P12345^^^ISSUER||PATIENT^TEST^M^^^^||19741018|M|||10808 FOOTHILL BLVD^^RANCHO CUCAMONGA^CA^91730^US||(909)481-5872^^^sales@ramsoft.com|(909)481-5800x1||M||12345|286-50-9510|||
GT1|1||PATIENT^TEST^M^^^^||10808 FOOTHILL BLVD^^RANCHO CUCAMONGA^CA^91730^US|(909)481-5872|(909)481-5800x1||M||SEL|||||RAMSOFT|9480 UTICA AVE^^RANCHO CUCAMONGA^CA^91730^US|(909)481-5800||1|||||||||||||||||||||||BLUGGER^KENT^^^^^|(909)555-5555||OTH|
IN1|1|89765|BCBS|BLUE CROSS BLUE SHIELD|1 SUNSET BLVD^^BEVERLY HILLS^CA^90210^US|^^^^^^|(213)555-5555|G412343|||RAMSOFT|20101006||||PATIENT^TEST^M^^^^|SEL|19741018|10808 FOOTHILL BLVD^^RANCHO CUCAMONGA^CA^91730^US|||||||||||||||||||||||1|M|9480 UTICA AVE^^RANCHO CUCAMONGA^CA^91730^US|||||89765|
IN1|2|34212|AUTOSTATE|STATE FARM|55 MELROSE PLACE^^BEVERLY HILLS^CA^90210^US|^^^^^^|(213)555-1234|NA|||RAMSOFT|20101006||||PATIENT^TEST^M^^^^|SEL|19741018|10808 FOOTHILL BLVD^^RANCHO CUCAMONGA^CA^91730^US|||||||||||||||||||||||1|M|9480 UTICA AVE^^RANCHO CUCAMONGA^CA^91730^US|||||34212|

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3.10 Billing Account Cancel

Billing Account messages (BAR^P06) is used to close the account and delete insurance information of the patient.

Segment Name	Segment Description
MSH	Message Header
EVN	Event Type
PID	Patient Identification
[PV1]	Visit Segment

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3.11 Financial Transaction

The detail financial transaction message allows RMC to send charge information to billing software (Charge Processor). This is normally triggered by clicking the Post Charge button in RamSoft software.

Segment Name	Segment Description
MSH	Message Header
EVN	Event Type
PID	Patient Identification
[PV1]	Patient Visit Information
{FT1}	Financial Transaction
[{PR1}]	Procedure
[GT1]	Guarantor
[{IN1}]	Insurance

RamSoft Extension: We have a parameter in the outbound channel configuration that allows GT1 and IN1 segments to be sent with the DFT^P03 message. The IHE standard requires these segments to be sent only in BAR messages.

3.11.1 DFT^P03 Sample Message

MSH|^~\&|RAMSOFT|SENDING FACILITY|RAMSOFT|RECEIVING FACILITY|20101223202939-0400||DFT^P03|109|P|2.3.1|||||||
EVN|P03|20101223202939-0400||||
PID||P12345^^^ISSUER|P12345^^^ISSUER||PATIENT^TEST^M^^^^||19741018|M|||10808 FOOTHILL BLVD^^RANCHO
CUCAMONGA^CA^91730^US||(909)481-5872^^^sales@ramsoft.com|(909)481-5800x1||M||12345|286-50-9510|||
PV1||O|ER^ER^^MEDICAL
CENTER^^^^^ER||||1234567890^JONES^SAMUEL^^MD^|1234567890^JONES^SAMUEL^^MD^|SMITH^JOHN^^MD^~JONES^ED^^MD^|||||||||
||||||||||||||||||||||||||||||||||||
FT1|1|5832.1||20110609124424-0400|20110614202026-0400|CG|5832.1|XRAY JAW < 4 VIEWS||1|25.00|25.00||89765||ER^ER^^MEDICAL
CENTER^^^^^ER|D|CO|830.1~789.07|2345678901^PATEL^APU^^MD^|1234567890^JONES^SAMUEL^MD^||A123456||70100^XRAY JAW < 4
VIEWS^^^|TC|
GT1|1||PATIENT^TEST^M^^^^||10808 FOOTHILL BLVD^^RANCHO CUCAMONGA^CA^91730^US|(909)481-5872|(909)481-
5800x1||M||SEL|||||RAMSOFT|9480 UTICA AVE^^RANCHO CUCAMONGA^CA^91730^US|(909)481-
5800||1||||||||||||||||||||||||BLUGGER^KENT^^^^^|(909)555-5555||OTH|
IN1|1|89765|BCBS|BLUE CROSS BLUE SHIELD|1 SUNSET BLVD^^BEVERLY HILLS^CA^90210^US|^^^^^^^|(213)555-
5555|G412343|||RAMSOFT|20101006||||PATIENT^TEST^M^^^^|SEL|19741018|10808 FOOTHILL BLVD^^RANCHO
CUCAMONGA^CA^91730^US|||||||||||||||||||||||1|M|9480 UTICA AVE^^RANCHO CUCAMONGA^CA^91730^US|||||89765|
IN1|2|34212|AUTOSTATE|STATE FARM|55 MELROSE PLACE^^BEVERLY HILLS^CA^90210^US|^^^^^^^|(213)555-
1234|NA|||RAMSOFT|20101006||||PATIENT^TEST^M^^^^|SEL|19741018|10808 FOOTHILL BLVD^^RANCHO
CUCAMONGA^CA^91730^US|||||||||||||||||||||||1|M|9480 UTICA AVE^^RANCHO CUCAMONGA^CA^91730^US|||||34212|

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4 Segment Definitions

The following section contains a detailed listing of all segment types used by the RMC for constructing HL7 messages. The sequence number is specified in the left most column and the component contents are enumerated in the right column. Some components contain even more subcomponents. In these cases, the table cell is split into two columns, the left side indicating the components, the right indicating the sub-components. In HL7, subcomponents are separated using & characters.

|component1^subcomponent1&subcomponent2&subcomponent3^component3|

An example of a sequence that contains 3 components with the second component containing 3 subcomponents.

The Inbound and Outbound columns specify which fields are mandatory and which are optional. Mandatory fields are marked by an "R" for "Required", conditional fields are marked by a "C" and non-mandatory ones are marked with "O" for "Optional". Mandatory fields are only required to be present if the sequence they belong to is in the message.

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4.1 MSH

The MSH segment stores message control information. This includes the message type, a unique message identifier, etc.

Seq.	Length	Data Type	Inbound	Outbound	Description	Component
1	1	ST	R	R	Field Separators	Field Separators "|"
2	4	ST	R	R	Encoding Characters	Encoding Characters "^~\&"
3		HD	R	R	Sending Application	**Outbound:** Configurable
4		HD	R	R	Sending Facility	**Inbound:** See *PID:3* **Outbound:** Configurable
5		HD	O	R	Receiving Application	**Outbound:** Configurable
6		HD	O	R	Receiving Facility	**Outbound:** Configurable
7		TS	O	R	Date/Time of Message	
9	1 – 3 2 – 3	MSG	R	R	Message Identifiers	1 – Message Type (e.g. ADT, ORM) 2 – Trigger Event (e.g. A08) **Outbound:** Copy *MSH-9.2* to *EVN-1*
10	10	ST	R	R	Message Control ID	
11	3	PT	O	R	Processing ID	**Outbound:** 'P'
12		VID	O	R	Version ID	**Outbound:** '2.3.1'

The *MSH-5 field* is used in ACK messages to specify the application that sent the message being acknowledged. RMC does not populate this field.

MSH-7 is filled out in ACK messages with the time of acknowledgment.

MSH-9 contains the message type (e.g.: ADT, ORM…) and trigger event (e.g. A08, O01). ACK messages do not have a trigger event.

MSH-10 stores a unique ID identifying a message. The uniqueness of this ID must last until an ACK has been received for the message containing it.

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4.2 MSA

The MSA segment is used to store ACK information. The MSA segment is only used in ACK messages.

Seq	Length	Data Type	Inbound	Outbound	Description	Component
1	2	ST	R	R	Acknowledgement Code	1 – Acknowledgment Code (AA or AR or AE)
2	20	ST	R	R	Message Control ID	1 – Message Control ID

The *MSA-1 field* will contain either "AA" if the message containing it is an ACK or "AR" if the message is a NACK.

MSA-2 contains the *MSH-10* value (message ID) of the message which is being acknowledged.

4.3 ERR

The ERR segment is used to store error information. The ERR segment is only used in ACK messages.

Seq	Length	Data Type	Inbound	Outbound	Description	Component
1	80	ID	R	R	Error code and location	

4.4 EVN

The EVN segment stores event information.

Seq	Length	Data Type	Inbound	Outbound	Description	Component
1	3	ID	O	R	Event Type Code	See *MSH-9.2*
2	26	TS	O	R	Recorded Date/Time	Current date and time

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4.5 PID

The PID segment is used to communicate patient demographic information. It is present in all messages supported by the RMC.

Seq	Length	Data Type	Inbound	Outbound	Description	Component, Database and DICOM Mapping
2	20	CX	C	R	Patient ID	See *PID:3*
3	20	CX	C	R	Patient Identifier List	1 – Patient ID *(0010,0020)* **Inbound:** We read *PID-3.1*, *PID-2.1* in that order. **Outbound:** We copy to *PID-3.1*, *PID-2.1* 4 – Issuer Of Patient ID *(0010,0021)* **Inbound:** We read *PID-3.4*, *PID-2.4*, *MSH-4* in that order; if all are blank, then we set to a configurable value. **Outbound:** We copy to *PID-2.4* **Inbound:** If repeated fields are received, the first field is parsed and the rest are ignored.
5	48	XPN	R	R	Patient Name	1 – Family Name *(0010,0010)* 2 – Given Name *(0010,0010)* 3 – Middle Name *(0010,0010)* 4 – Suffix *(0010,0010)* 5 – Prefix *(0010,0010)*
7	26	TS	O	C	Date / Time of Birth	Date of Birth *(0010,0030)* Time is not stored in our system
8	1	IS	O	C	Sex	Sex *(0010,0040)* 'F' – 'FEMALE' 'M' – 'MALE' 'O' – 'OTHER' 'U' – NULL **Inbound:** We translate all other values to 'OTHER'
11	1 – 256 3 – 24 4 - 3 5 - 10 6 - 2	XAD	O	C	Address	1 – Street Address *(0010,1040)* 3 – City *(0010,1040)* 4 – State/Province *(0010,1040)* 5 – Zip/Postal Code *(0010,1040)* 6 – Country *(0010,2150)*
13	1 – 64 4- 64	XTN	O	C	Home Phone	1 - Phone Number *(0010,2154)* 4 – Email Address – This field is not displayed or editable in our system
14	1 - 64	XTN	O	C	Business Phone	1 – Phone Number *(0010,2154)*

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15	16	CE	O	C	Language	Language *(0010,0101)*
16	1	CE	O	C	Marital Status	'M' – 'MARRIED' 'S' – 'SINGLE' 'D' – 'DIVORCED' 'W' – 'WIDOWED' 'A' – 'LEG. SEP.' 'U' – 'UNKNOWN' **Inbound:** We translate all other values to 'OTHER' **Outbound:** We translate all other values to 'U'
18	16	CX	O	C	Patient Account Number	1 – Account Number *(0010, 0050)*
19	16	ST	O	C	SSN	1 – SSN / Alternate Patient ID *(0010,1000)*

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4.6 PV1

The PV1 segment communicates patient visit information, so it is not needed in any of the ADT messages which only deal with patient demographic info.

Seq	Length	Data Type	Inbound	Outbound	Description	Component, Database and DICOM Mapping
2	1	IS	O	R	Patient Class	Patient Class This field is not displayed or editable in our system. Our default is 'O'
3		PL	O	C	Assigned Patient Location	1 – Department 2 – Room 4 – Imaging Facility / Institution Name (0008, 0080) 6 – Patient's Location Code (not displayed or editable in our system) 9 – Patient's Location *(0038,0300)*
7	60	XCN	O	C	Attending Physician	See *OBR-16*
8	60	XCN	O	C	Referring Physician	See *OBR-16*
9	60 with repeats	XCN	O	C	Consulting Doctors	1 – ID Number **Inbound:** Updates physician's facility Userid Note: Physician's Facility Userid will be displayed only in case if Image Facility and Physicians Names are registered in our System. **Outbound:** Sends physician's facility Userid if non-blank; otherwise uses physician's NPI 2 – Family Name 3 – Given Name 4 – Middle Name 5 – Suffix 6 – Prefix **Outbound:** We send multiple Consulting Physicians delimited with ~ e.g. |12345^SMITH^JOHN^^MD^~89765^JONES^ED^^MD^|
15	2	IS	O	C	Ambulatory Status	This field is not displayed or editable in our system.
19	20	CX	O	C	Visit Number	This field is not displayed or editable in our system.
51	1	IS	O	C	Visit Indicator	**Outbound:** V – if *PV1:19* is present

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Essential Notes: In Inbound messages the sequences of PV1 segment as Assigned Patient Location, Attending Physician, Referring Physician, Consulting Doctors can be stored only in study level messages (e.g. ORM, ORU). In Outbound Messages RMC sends in ADT messages simple PV1 segment including only patient class. In ORM, ORU messages detailed PV1 segment is sent.

4.7 AL1

The AL1 segment is used to specify allergies.

Seq	Length	Data Type	Inbound	Outbound	Description	Component, Database and DICOM Mapping
1	4	SI	O	R	Set ID – AL1	**Outbound:** Auto generated value
3	60	CE	C	R	Allergy	2 – Allergies **Inbound:** If we receive multiple AL1 segments, then we store the Allergies concatenated with a '\' **Outbound:** We split into multiple AL1 segments, when delimited with a '\'

4.8 MRG

The MRG segment is used to specify a patient that is to be merged into another or whenever the Patient ID or Issuer of Patient ID must be changed.

Seq	Length	Data Type	Inbound	Outbound	Description	Component, Database and DICOM Mapping
1	20	CX	C	R	Prior Patient Identifier List	1 – Patient ID *(0010,0020)* **Inbound:** We read *MRG-1.1*, *MRG-4.1* in that order **Outbound:** We copy to *MRG-4.1* 4 – Issuer Of Patient ID *(0010,0021)* **Inbound:** We read *MRG-1.4*, *MRG-4.4*. If both are blank, then we assume that the Prior Patient Issuer is the same as the Current Patient. **Outbound:** We copy to *MRG-4.4*
4	20	CX	C	R	Prior Patient ID	See *MRG:1*

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4.9 ORC

The ORC segment contains Order Control and status information.

Seq.	Length	Data Type	Inbound	Outbound	Description	Component, Database and DICOM Mapping
1	2	ID	R	R	Order Control Code	1 – Order Control Code (mapped to RamSoft Statuses)
2	16	EI	O	R	Placer Order Number	See *OBR-2*
3	16	EI	O	R	Filler Order Number	See *OBR-3*
5	2	ID	O	R	Order Status	1 – Order Status (mapped to RamSoft Statuses)
7	200	TQ	O	R	Quantity / Timing	See *OBR-27*
8	1.1 - 16	EIP	O	R	Parent	See *OBR-29.1.1*
9	26	TS	O	R	Date/Time of Transaction	**Outbound:** Date/time of message
10	16	XCN	O	R	Entered By	**Outbound:** Username that last updated the study
12	60	XCN	O	R	Ordering Provider	See *OBR-16*
13	60	PL	O	R	Enterer's Location	**Outbound:** 4 – We Copy *ORC-17*
14	40	XTN	O	R	Call Back Phone Number	Referring Physician Business Phone Number
17	60	CE	O	R	Entering Organization	Referring Facility

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4.9.1 *ORC-1* and *ORC-5* Status Mappings

RamSoft Status	RamSoft Status Code (Default)	*ORC-1* Value	*ORC-5* Value
ORDERED	<30	SN	SC
SCHEDULED, CONFIRMED, ARRIVED	30 to 79	SC	SC
CANCELLED	80 to 89	OC	CA
READYFORSCAN, STARTED	90 to 104	SC	IP
EXAMCOMPLETED, INPROGRESS, COMPLETED	105 to 109, 115 to 129	SC	CM
DISCONTINUED	110 to 114	DC	CA
HOLD	130 to 139	SC	HD
REJECTED	140 to 149	SC	CA
VERIFIED	150 to 179	SC	ZW
DICTATED	180 to 189	SC	ZX
TRANSCRIBED	190 to 199	SC	ZY
SIGNED, PRIOR	>= 200	SC	ZZ

Inbound: We always set the status code to the lowest code in the range.

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4.10 OBR

The OBR segment contains most of the data necessary to construct an order. Each OBR segment contains only one Study Type Code in *OBR-4.1* and one Procedure Code in *OBR-44.* Multiple OBR segments should be used when the study contains multiple study types or multiple procedure codes.

Seq	Length	Data Type	Inbound	Outbound	Description	Component, Database and DICOM Mapping
2	16	EI	O	R	Placer Order Number	See *OBR-18*
3	16	EI	O	R	Filler Order Number	User-defined Text Field 1 **Inbound:** We read *OBR-3, ORC-3* in that order **Outbound:** If blank, we send Accession Number. We copy to *ORC-3*
4	64	CE	O	R	Universal Service Identifier	1 – Study Type Code 2 – Study Description (0008, 1030)
7	26	TS	O	R	Observation Date/Time	**Outbound:** Date/time of message
12	1	CE	O	R	Danger Code	**Outbound:** We copy *OBR-27.6*
13	300	ST	O	C	Relevant Clinical Info	History
15	4 - 16 5 - 1	CM	O	C	Specimen Source	4 – Body Part *(0018,0015)* 5 – Laterality *(0020,0060)*
16	1 – 16 2-6 – 60	XCN	O	R	Ordering Provider	Referring Physician **Inbound:** We read *OBR-16, ORC-12*, *PV1-8*, *PV1-7* in that order **Outbound:** We copy to *ORC-12*, *PV1-8*, *PV1-7* 1 – ID Number **Inbound:** Updates physician's facility Userid. Note: Physician's Facility Userid will be displayed only in case if Image Facility and Physicians Names are registered in our System. **Outbound:** Sends physician's facility Userid if non-blank; otherwise uses physician's NPI 2 – Family Name *(0008,0090)* 3 – Given Name *(0008,0090)* 4 – Middle Name *(0008,0090)* 5 – Suffix *(0008,0090)* 6 – Prefix *(0008,0090)*
18	16	ST	O	R	Placer Field 1	1 – Accession Number *(0008,0050)* **Inbound:** We read *OBR-18*, *OBR-2*, *ORC-2* in that order **Outbound:** We copy to *OBR-2, OBR-*

						20, ORC-3	
19	16	ST	O	R	Placer Field 2	1 – Requested Procedure ID *(0040, 1001)*	
20	16	ST	O	R	Filler Field 1	See *OBR-18*	
24	10	ID	O	R	Diagnostic Serv Sect ID	1 – Scheduled Modality *(0008,0060)*	
27	200	TQ	O	R	Quantity/Timing	**Inbound:** We read *OBR-27*, *ORC-7* in that order **Outbound:** We copy to *ORC-7* 4 – Study Date Time • Study Date *(0008,0020)* • Study Time *(0008,0030)* 6 – Priority *(0040,1003)* 'S' – 'STAT' 'A' – 'HIGH' 'T' or 'P' – 'MEDIUM' 'R' – 'ROUTINE' 'C' – 'CRITTEST' or 'CRITFIND' All multi-valued priorities are mapped to the first priority listed above.	
29	1.1 - 16	EIP	O	R	Parent	1.1 – Parent's Accession Number **Inbound:** Currently ignored, but study grouping will use this value in the future. **Outbound:** We populate this value for grouped studies. We copy this to *ORC-8.1.1*	
30	20	ID	O	R	Transportation Mode	**Outbound:** Always set to preconfigured variable	
31	300	CE	O	C	Reason for Study	1 – Diagnosis Code 2 – Diagnosis Description **Inbound:** Only update if not blank and if diagnosis code matches one in our database. We handle multiple Reason For Study delimited with ~ e.g. |v02.0^ CARRIER OR SUSPECTED CARRIER OF; CHOLERA^~ v02.0^ CARRIER OR SUSPECTED CARRIER OF; CHOLERA^|	
32	1 – 16 2-6 – 60	CM	O	C	Principal Result Interpreter	1 - Reading Physician	1 – ID Number **Inbound:** Updates physician's facility Userid. Note: Physician's Facility Userid will be

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							displayed only in case if Image Facility and Physicians Names are registered in our System. **Outbound:** Sends physician's facility Userid if non-blank; otherwise uses physician's NPI 2 – Family Name *(0008,1060)* 3 – Given Name *(0008,1060)* 4 – Middle Name *(0008,1060)* 5 – Suffix *(0008,1060)* 6 – Prefix *(0008,1060)*
34	1 – 16 2-6 – 60	CM	O	C	Technician	1 – Performing Technologist	1 – ID Number **Inbound:** Updates technologist's facility Userid. Note: Technologist's Facility Userid will be displayed only in case if Image Facility and Technologist's Names are registered in our System. **Outbound:** Sends technologist's facility Userid 2 – Family Name *(0008,1070)* 3 – Given Name *(0008,1070)* 4 – Middle Name *(0008,1070)* 5 – Suffix *(0008,1070)* 6 – Prefix *(0008,1070)*
35	1 – 16 2-6 – 60	CM	O	C	Transcriptionist	1 - Transcriptionist	1 – ID Number **Inbound:** Updates transcriptionist's facility Userid. Transcriptionist's Facility Userid will be displayed only in case

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							if Image Facility and Transcriptionist's Names are registered in our System. **Outbound:** Sends transcriptionist's facility Userid if non-blank 2 – Family Name *(4008,010a)* 3 – Given Name *(4008,010a)* 4 – Middle Name *(4008,010a)* 5 – Suffix *(4008,010a)* 6 – Prefix *(4008,010a)*
39	200	CE	O	C	Collector's Comments	Comments	
41	30	ID	O	R	Transport Arranged	**Outbound:** Always set to preconfigured variable	
44	80	CE	O	C	Procedure Code	1 – Procedure Code *(0008,1032)* 2 – Procedure Description *(0008,1032)* 3 – Procedure Coding System **Inbound:** Only update if not blank. If procedure code is not in our database, then add it along with procedure code description. Only 1 procedure code is allowed for 1 OBR segment. So, for multiple procedure codes in a study, we expect multiple OBR segments.	
45	80	CE	O	C	Procedure Code Modifier	1 – Procedure Code Modifier Multiple modifiers are sent delimited with ~ **Inbound:** Only update if not blank.	

4.11 NTE

NTE is a segment used to store notes.

Seq	Length	Data Type	Inbound	Outbound	Description	Sub Field and DICOM Element
1	4	SI	O	R	Set ID - NTE	**Outbound:** Always set to '1'
2	8	ID	O	R	Source of Comment	**Outbound:** Always set to 'O'
3	4096	FT	O	C	Comment	Clinical Notes
4	250	CE	O	R	Comment Type	**Outbound:** Always set to 'RE'

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4.12 ZDS

ZDS is a custom segment defined by IHE to store the DICOM Study Instance UID being referred to in an order message. Any system that does not store the DICOM Study Instance UID should omit this segment.

Seq	Length	Data Type	Inbound	Outbound	Description	Component, Database and DICOM Mapping
1	200	RP	O	R	Study Instance UID	1 – Study Instance UID *(0020,000D)* 2 – 'RAMSOFT' 3 – 'Application' 4 – 'DICOM' **Inbound:** Only process this segment if *ZDS:1.3* and *ZDS:1.4* match the above.

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4.13 OBX

The OBX segment contains report data. This segment is normally used when transmitting an SR report created by a reading physician.
We support sending the entire report in a single OBX segment, or multiple consecutive OBX segments. We can break the segments using any configured delimiter such as '\r\n' escape sequence. We also support other delimiters, or we can break the segment by a configurable size. We have configuration option to choose the desired method.

Seq	Length	Data Type	Inbound	Outbound	Description	Component, Database and DICOM Mapping
1	4	SI	O	R	Set ID - OBX	**Outbound:** Sequential number
2	3	ID	O	R	Value Type	**Outbound:** 'FT' for Text, RTF, HTML or 'CE' for binary
3	80	CE	O	R	Observation Identifier	1 – Identifier **Outbound:** SOP Instance UID of report 2 – Document Type **Inbound:** 'TXT', 'RTF', 'PDF', 'DOC', 'DOCX', 'DOCM', 'HTM', 'TIF', 'RTF' **Outbound:** 'TXT', 'RTF', 'PDF', 'DOC', 'DOCX', 'DOCM', 'HTM', 'TIF', 'RTF' 4 – Document Type ID Used to identify the type of document 1 – Diagnostic Report (default) 90000 – Diagnostic Preliminary 90001 – Admin 90002 – Clinical 90004 – Instruction 90005 – Mammo 90006 – RIS 90007 – RX 90008 – Screening 90009 – Referral 91001 – Insurance Card 91002 – Patient Forms 91003 – Labs 91004 – Patient Registration Form 91005 – Patient Insurance Cards 91006 – HIPAA Consent Form 91007 – Medical Records Release Form
5	65536	*	R	R	Observation Value	1 – Report Text *(0040, a160)* Report may be formatted in TXT or RTF without encoding. If report is base64 encoded, it may be formatted in PDF, DOC, DOCX, DOCM, HTML, TIFF
11	3	ID	O	R	Observation Result Status	1 – Result Status; specifies status of the report

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						"A" – Addendum "F" – Final (verified / signed) "P" – Preliminary
14	26	TS	O	C	Date/Time of Observation	1 – Date/Time of Observation *(0008,002A)* Date / time when report was created or verified / signed
16	60	PN	O	C	Responsible Observer	Physician that verified / signed the report. 1 – ID Number *(0040, a088) Sequence > (0008, 0100) Code Value* **Inbound:** Updates physician's NPI if non-blank **Outbound:** Sends physician's NPI 2 – Family Name *(0040, a075)* 3 – Given Name *(0040, a075)* 4 – Middle Name *(0040, a075)* 5 – Suffix *(0040, a075)* 6 – Prefix *(0040, a075)*
17	60	CE	O	C	Observation Method	**Outbound:** 'PRELIMINARY', 'ADDENDUM', or 'FINAL'

4.14 SCH

The SCH segment conveys the appointment request.

Seq	Length	Data Type	Inbound	Description	Component, Database and DICOM Mapping
26	16	EI	C	Placer Order Number	1 – Accession Number *(0008,0050)* **Inbound:** We read *SCH-26, SCH-27* in that order. One of these values are required.
27	16	EI	C	Filler Appointment ID	See *SCH-26*

4.15 AIS

The AIS segment specifies the details of the appointment.

Seq	Length	Data Type	Inbound	Description	Component, Database and DICOM Mapping
3	64	CE	R	Universal Service Identifier	1 – Study Type Code 5 – Study Description (0008, 1030)
4	26	TS	R	Start Date/Time	Study Date Time • Study Date *(0008,0020)* • Study Time *(0008,0030)*

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5	20	NM	O	Start Date/Time Offset	UTC offset of Study Date Time

4.16 GT1

The GT1 segment contains guarantor information.

Seq	Length	Data Type	Inbound	Outbound	Description	Component, Database and DICOM Mapping
1	4	SI	O	R	Set ID – GT1	Sequential number
3	48	XPN	O	R	Guarantor Name	1 – Family Name 2 – Given Name 3 – Middle Name 4 – Suffix 5 – Prefix
5	1 – 256 3 – 24 4 - 3 5 - 10 6 - 2	XAD	O	C	Guarantor Address	1 – Street Address 3 – City 4 – State/Province 5 – Zip/Postal Code 6 – Country
6	1 – 64	XTN	O	C	Guarantor Home Phone	1 - Phone Number
7	1 – 64	XTN	O	C	Guarantor Business Phone	1 – Phone Number
9	1	IS	O	C	Guarantor Sex	'F' – 'FEMALE' 'M' – 'MALE' 'O' – 'OTHER' 'U' – NULL **Inbound:** We translate all other values to 'OTHER'
11	64	CE	O	C	Guarantor Relationship	Guarantor Relation to Patient 'SEL' – 'SELF' 'SPO' – 'SPOUSE' 'CHD' – 'CHILD' 'OTH' – 'OTHER' **Inbound:** All other values will be stored as 'OTHER'
16	130	XPN	O	C	Guarantor Employer Name	1 – Patient's Employer Name
17	1 – 256 3 – 24 4 - 3 5 - 10 6 - 2	XAD	O	C	Guarantor Employer Address	Patient's Employer's Address 1 – Street Address 3 – City 4 – State/Province 5 – Zip/Postal Code 6 – Country
18	1 – 64	XTN	O	C	Guarantor Employer Phone	1 – Patient's Employer's Phone Number

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					Number	
20	2	IS	O	C	Guarantor Employment Status	Patient's Employment Status '1' – 'FULL-TIME' '2' – 'PART-TIME' '3' – 'UNEMPLOYED' '5' – 'RETIRED' 'S' – 'STUDENT' '0' – 'OTHER' (default value used for all others) '9' – NULL
45	48	XPN	O	R	Contact Person's Name	Patient's Emergency Contact 1 – Family Name 2 – Given Name 3 – Middle Name 4 – Suffix 5 – Prefix
46	1 – 64	XTN	O	C	Contact Person's Phone Number	Patient's Emergency Contact Phone Number 1 – Phone Number
48	2	IS	O	C	Contact Relationship	Patient's Emergency Contact's Relationship 'SEL' – 'SELF' 'SPO' – 'SPOUSE' 'CHD' – 'CHILD' 'OTH' – 'OTHER' **Inbound:** All other values will be stored as 'OTHER'

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4.17 IN1

The IN1 segment contains the patient's insurance information.

Seq	Length	Data Type	Inbound	Outbound	Description	Component, Database and DICOM Mapping
1	4	SI	O	R	Set ID – IN1	Sequential number
2	60	CE	R	R	Insurance Plan ID	See *IN1-49*
3	59	CX	R	R	Insurance Company ID	Insurance Company Carrier ID
4	130	XON	O	C	Insurance Company Name	Insurance Company Payer Name
5	1 – 256 3 – 24 4 - 3 5 - 10 6 - 2	XAD	O	O	Insurance Company Address	Insurance Company Address 1 – Street Address 3 – City 4 – State/Province 5 – Zip/Postal Code 6 – Country
6	60	XPN	O	O	Insurance Co Contact Person	Insurance Company Contact Name 1 – Family Name 2 – Given Name 3 – Middle Name 4 – Suffix 5 – Prefix
7	1 – 64	XTN	O	O	Insurance Co Phone Number	1 - Insurance Company Business Phone Number 4 – Insurance Company Email Address 9 – Insurance Company Website
8	12	ST	O	O	Group Number	Insurance Group Number
11	130	XON	O	O	Insured's Group Emp Name	Insured's Employer Name
12	8	DT	O	O	Plan Effective Date	Insurance Effective From
13	8	DT	O	O	Plan Expiration Date	Insurance Effective To
14	55	CM	O	O	Authorization Information	1 – Study's Authorization Number **Inbound:** Currently ignored **Outbound:** We populate this based on the current study for DFT messages
15	3	IS	O	R	Plan Type	Patient's Financial Type 'CA' – 'CAPITATED' 'CO' – 'COMMERCIAL' 'ME' – 'MEDICARE' 'OT' – 'OTHER'

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						If we receive values not listed above, we will store and transmit those values as is.
16	60	XPN	O	O	Name Of Insured	Insured's Name 1 – Family Name 2 – Given Name 3 – Middle Name 4 – Suffix 5 – Prefix
17	80	CE	O	O	Insured's Relationship to Patient	Insured's Relationship to Patient 'SEL' – 'SELF' 'SPO' – 'SPOUSE' 'CHD' – 'CHILD' 'OTH' – 'OTHER' **Inbound:** All other values will be stored as 'OTHER'
18	26	TS	O	O	Insured's Date Of Birth	Insured's Birth Date
19	1 – 256 3 – 24 4 - 3 5 - 10 6 - 2	XAD	O	O	Insured's Address	Insured's Address 1 – Street Address 3 – City 4 – State/Province 5 – Zip/Postal Code 6 – Country
42	60	CE	O	O	Insured's Employment Status	Insured Employment Status '1' – 'FULL-TIME' '2' – 'PART-TIME' '3' – 'UNEMPLOYED' '5' – 'RETIRED' 'S' – 'STUDENT' '0' – 'OTHER' (default value used for all others) '9' – NULL
43	1	IS	O	O	Insured's Sex	Insured Sex 'F' – 'FEMALE' 'M' – 'MALE' 'O' – 'OTHER' 'U' – NULL **Inbound:** We translate all other values to 'OTHER'
44	1 – 256 3 – 24 4 - 3 5 - 10 6 - 2	XAD	O	O	Insured's Employer's Address	Insured's Employer's Address 1 – Street Address 3 – City 4 – State/Province 5 – Zip/Postal Code 6 – Country
49		CX		O	Insured's ID Number	Insured ID **Inbound:** We read *IN1-49, IN1-2* in that

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						order **Outbound:** We copy to *IN1:49*

4.18 FT1

The FT1 segment contains charge details to send to the Charge Processor (billing software). Each FT1 segment contains only one Pro**c**edure Code in *FT1-25.* Multiple FT1 segments are sent when the study contains multiple procedure codes.

Seq	Length	Data Type	Outbound	Description	Component, Database and DICOM Mapping
1	4	SI	R	Set ID – FT1	Sequential number for each FT1 segment
2	12	ST	R	Transaction ID	Unique value for each charge (generated with InternalStudyID + '.' + Set ID)
4	26	TS	R	Transaction Date	Study Date Time • Study Date *(0008,0020)* • Study Time *(0008,0030)*
5	26	TS	R	Transaction Posting Date	Current date and time
6	8	IS	R	Transaction Type	'CG'
7	80	CE	R	Transaction Code	1 – We copy *FT1-2*
8	40	ST	O	Transaction Description	Study Description (0008, 1030)
10	6	NM	R	Transaction Quantity	Quantity of Procedure Code
11	12	CP	O	Transaction Amount - Extended	Charge Amount multiplied by Quantity
12	12	CP	O	Transaction Amount - Unit	Charge Amount
14	60	CE	O	Insurance Plan ID	1 - Insured ID
16		PL	R	Assigned Patient Location	1 – Department 2 – Room 4 – Imaging Facility / Institution Name (0008, 0080) 6 – Patient's Location Code (not displayed or editable in our system) 9 – Patient's Location *(0038,0300)*
17	1	IS	O	Fee Schedule	Patient's Insurance's Fee Schedule Name **Outbound:** We truncate this field to 1 character. Custom mapping is required if this field is required by the Charge Processor.
18	2	IS	R	Patient Type	Patient's Financial Type 'CA' – 'CAPITATED' 'SE' – 'SELF-PAY'

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					'CO' – 'COMMERCIAL' 'ME' – 'MEDICARE' 'OT' – 'OTHER' If we receive values not listed above, we will store and transmit those values as is.
19	60	CE	C	Diagnosis Code	1 – Diagnosis Code 2 – Diagnosis Description Multiple diagnosis codes are sent delimited with ~ character 784.0~789.07 We handle multiple Diagnosis delimited with ~ e.g. |v02.0^ CARRIER OR SUSPECTED CARRIER OF; CHOLERA^~ v02.0^ CARRIER OR SUSPECTED CARRIER OF; CHOLERA^|
20	1 – 16 2-6 - 60	XCN	R	Performed By Code	Reading Physician 1 – ID Number **Outbound:** Sends physician's NPI 2 – Family Name *(0008,1060)* 3 – Given Name *(0008,1060)* 4 – Middle Name *(0008,1060)* 5 – Suffix *(0008,1060)* 6 – Prefix *(0008,1060)*
21	1 – 16 2-6 - 60	XCN	R	Ordered By Code	Referring Physician 1 – ID Number **Outbound:** Sends physician's NPI 2 – Family Name *(0008,0090)* 3 – Given Name *(0008,0090)* 4 – Middle Name *(0008,0090)* 5 – Suffix *(0008,0090)* 6 – Prefix *(0008,0090)*
23	22	EI	R	Filler Order Number	Accession Number *(0008,0050)*
25	80	CE	R	Procedure Code	1 – Procedure Code *(0008,1032)* 2 – Procedure Description *(0008,1032)* 3 – Procedure Coding System
26	80	CE	C	Procedure Code Modifier	1 – Procedure Code Modifier Multiple modifiers are sent delimited with ~ character

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5 Configuration

5.1 General Configuration Options

The following options are configurable for entire Application

Parameter	Description	Default Value
Debug_Set	Debug Option for logging information	false
defaultPatientClass	1. Patient Class in case if Patient Class is not supplied in Inbound Message. 2. Patient Class in Outbound Message if Patient Class is not filled by GUI. (Sent in *PV1-2).*	'O'
RS_Append_Delimiter_Char	Concatenation Character for clinical notes, comments, symptoms in Study	'\\'
defaultIssuerName	Default Issuer of Patient ID if none is received as described in PID segment	'UNKNOWN'
RS_RPM	RamSoft Procedure Coding Method	'CPT 2011'

5.2 Inbound Channel Options

The following options are configurable.

Parameter	Description	Default Value
CREATE_NEW_PATIENT_ORM_MESSAGE	Creates new patient records, as needed, when processing ORM messages	true
CREATE_NEW_PATIENT_ORU_MESSAGE	Creates new patient records, as needed, when processing ORU messages	true
CREATE_NEW_STUDY_ORM_MESSAGE	Creates new study records, as needed, when processing ORM messages	true
CREATE_NEW_STUDY_ORU_MESSAGE	Creates new study records, as needed, when processing ORU messages	true
ENABLE_APPEND_OF_SYMPTOMS	Appends Symptoms received in new ORM or ORU messages to the existing Symptoms. Symptoms are separated with	true

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	RS_Append_Delimiter_Char defined above	
ENABLE_APPEND_OF_COMMENTS	Appends Comments received in new ORM or ORU messages to the existing Comments. Comments are separated with RS_Append_Delimiter_Char defined above	true
ENABLE_APPEND_OF_CLINICAL_NOTES	Appends Clinical Notes received in new ORM or ORU messages to the existing Clinical Notes. Clinical Notes are separated with RS_Append_Delimiter_Char defined above	True
REPORT_CONTENT_TYPE	Define Content Type of the report when storing report into Database. This value is used if *OBX 3-2* is blank or not a supported content type.	Default Value is 2 (Text Format) Possible values as following: RS_REPORT_CONTENT_TYPE_PDF - 1 RS_REPORT_CONTENT_TYPE_TXT - 2 RS_REPORT_CONTENT_TYPE_DOC - 3 RS_REPORT_CONTENT_TYPE_DOCX - 4 RS_REPORT_CONTENT_TYPE_HTML - 5 RS_REPORT_CONTENT_TYPE_JPG - 6 RS_REPORT_CONTENT_TYPE_TIFF - 7 RS_REPORT_CONTENT_TYPE_RTF – 8 RS_REPORT_CONTENT_TYPE_DOCM – 9
REPORT_DOCUMENT_TYPE_ID	Define Document Type of the report when storing report into Database.	Default Value is 1 (Diagnostic Report) Main Possible values as following: RS_DIAGNOSTIC_REPORT - 1 RS_DIAGNOSTIC_PRELIMINARY -90000 RS_ADMIN - 90001 RS_CLINICAL - 90002
REPORT_DOCUMENT_TITLE	Define Report Document Title	By default, diagnostic report title will be set automatically.
REPORT_TEMPLATE_URL	Define Report Document Template to view text report in DOC, DOCX, or DOCM Format.	By default no template is used
ALLOW_DISTRIBUTION_REPORT	Allow to distribute HL7 Received Report	By default, do not distribute the report

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5.3 Outbound Channel Options

The following options are configurable for each outbound channel.

Parameter	Description	Default Value
IS_IHE_IMAGEMANAGER	Disable ADT and BAR messages to comply with IHE Image Manager Actor	false
DEFAULT_SENDING_APPLICATION	Sending Application	'RAMSOFT' Sent in *MSH-3*
DEFAULT_SENDING_FACILITY	Sending Facility	'RAMSOFT' Sent in *MSH-4* 'RAMSOFT'
DEFAULT_RECEIVING_APPLICATION	Receiving Application	'RAMSOFT' Sent in *MSH-5*
DEFAULT_RECEIVING_FACILITY	Receiving Facility	'RAMSOFT' Sent in *MSH-6*
DEFAULT_HL7_VERSIONID	HL7 Version ID	'2.3.1' Sent in *MSH-12*
ALLOW_SEND_FINANCIAL_SEGMENTS_ADT_OUTBOUND	Sends GT1 and IN1 segments in ADT^A08 message	False
ALLOW_SEND_EVENT_SEGMENT_OUTBOUND	Sends EVN segments in all messages	True
ALLOW_SEND_FINANCIAL_SEGMENTS_DFT_OUTBOUND	Sends GT1 and IN1 segments in DFT^P03 message	True
DOCUMENT_OUTPUT_TYPE	Sets Content Type of the report when retrieving report from Database.	Default Value is 25 (Text) Possible values as following: RS_rxtNative - 0 (In this case report is retrieved in existing format of the record) RS_rxtPDF - 1 RS_rxtDOC - 5 RS_rxtDOCBody - 10 RS_rxtRTF - 15 RS_rxtRTFBody - 20 RS_rxtTextBody - 25

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		RS_rxtDOCX - 45 RS_rxtDOCXBody - 50 RS_rxtHTML - 55 RS_rxtJPEG - 60 RS_rxtBMP - 65 RS_rxtTIFF - 70 RS_rxtDOCM - 75
ALLOWED_OUTPUT_DOCUMENT_TYPES	Sets string array of document types to be sent in Outbound ORU^R01 message.	(1,90000)
ALLOW_SEND_UNSIGNED_DIAGNOSTIC	Allow Unsigned Diagnostic report to be sent in Outbound ORU^R01 message	false
OBX_SEGMENT_SIZE	Sets maximum size of OBX Segment	65536 (HL7 Standard) If the document format is plain text, RTF, or HTML, word wrapping will be performed so that segments are not broken in the middle of a word unless the word exceeds the segment size.
OBX_SPLIT_DELIMITERS	Sets delimiter characters for outbound plain text OBX Segment.	Default: NULL A new OBX segment is created each time a delimiter character is encountered in the report text.
OBX_LINEBREAK	Sets string to send a line break in a plain text OBX Segment	Default: '\.br\' Set this to NULL to create a new segment instead of sending a line break string. Typical line break strings are '~', '\E\n', '\X0D\'

6 Normative References

- Health Level Seven, Version 2.3.1, 1999
  http://www.hl7.org/implement/standards/v2messages.cfm

- IHE Radiology Technical Framework Revision 10.0, 2011
  http://www.ihe.net/Technical_Framework/index.cfm#radiology

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- NEMA Digital Imaging and Communications in Medicine (DICOM), Version3 Volumes 1 – 18, 2009 ftp://medical.nema.org/medical/dicom/2009/

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