

# RamSoft

RamSoft PACS 4.7

# HL7 Conformance Statement



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## 1 Overview

The RamSoft HL7 service (**RHS**) facilitates communication between RamSoft PACS products and external systems (such as a RIS or HIS).

RHS conforms to the HL7 2.3.x specification. The following message types are supported.

Event	Message type	Event type	Type
Patient update	ADT	A08	Inbound / Outbound
Patient merge	ADT	A34	Inbound / Outbound
Patient merge	ADT	A39	Inbound / Outbound
Patient merge (Account number only)	ADT	A35	Inbound
Patient delete	ADT	A23	Inbound / Outbound
Order update	ORM	O01	Inbound / Outbound
Observation update	ORU	R01	Inbound / Outbound
Notification of new appointment booking	SIU	S12	Inbound
Notification of new appointment modification	SIU	S14	Inbound
Notification of new appointment cancelation	SIU	S15	Inbound
Add Patient Account	BAR	P01	Outbound
Update Patient Account	BAR	P05	Outbound
Post detail financial transaction	DFT	P03	Outbound

## 2 Communication

RHS communicates via TCP/IP. 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).

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- 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 sub-components are separated by "^" (\x5E, ASCII 94).
- Field sub-sub-components are separated by "&" (\x26, ASCII 38).
- Repeated fields are separated by "~" (\x7E, ASCII 126).

## 2.1.2 Message Header Requirements

The MSH segment of each message contains two identification fields.

- *MSH-5.1* identifies the sending facility. If IssuerOfPatientID is missing from the PID field in the message, the value contained in this field is used.
- *MSH-10.1* contains the message ID. Message ID is used to match messages up with their ACK (acknowledgement) messages. This field is mandatory.

## 2.2 Send Schema

RHS can be configured to send messages in several ways:

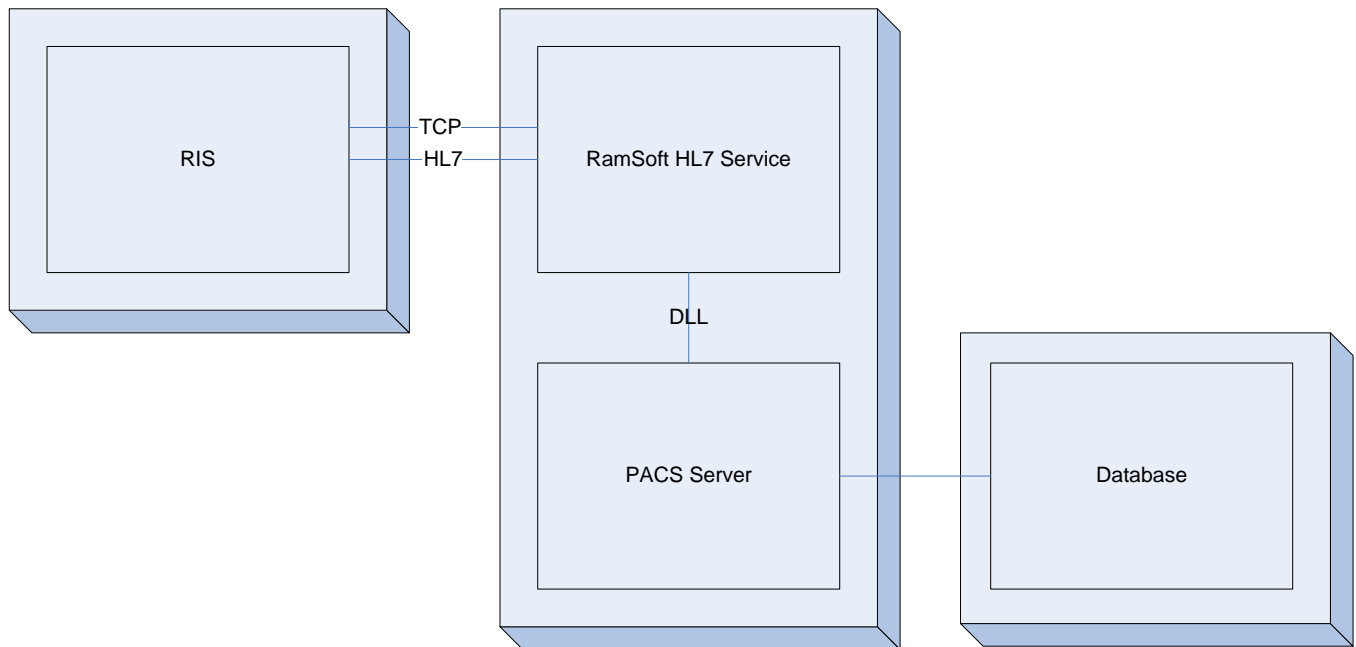
- send to all stations
- send to internal stations only
- send to external stations only

External stations differ from their internal counterparts in that they need to be specifically authorized in the RHS configuration to have messages sent to them. Internal stations are broadcast to without such specification. These configuration details are usually handled during installation by RamSoft.

## 2.3 Deployment Diagram

The following deployment diagram describes a typical RHS 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 RHS. The HL7 service is normally on the same machine as the PACS 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.

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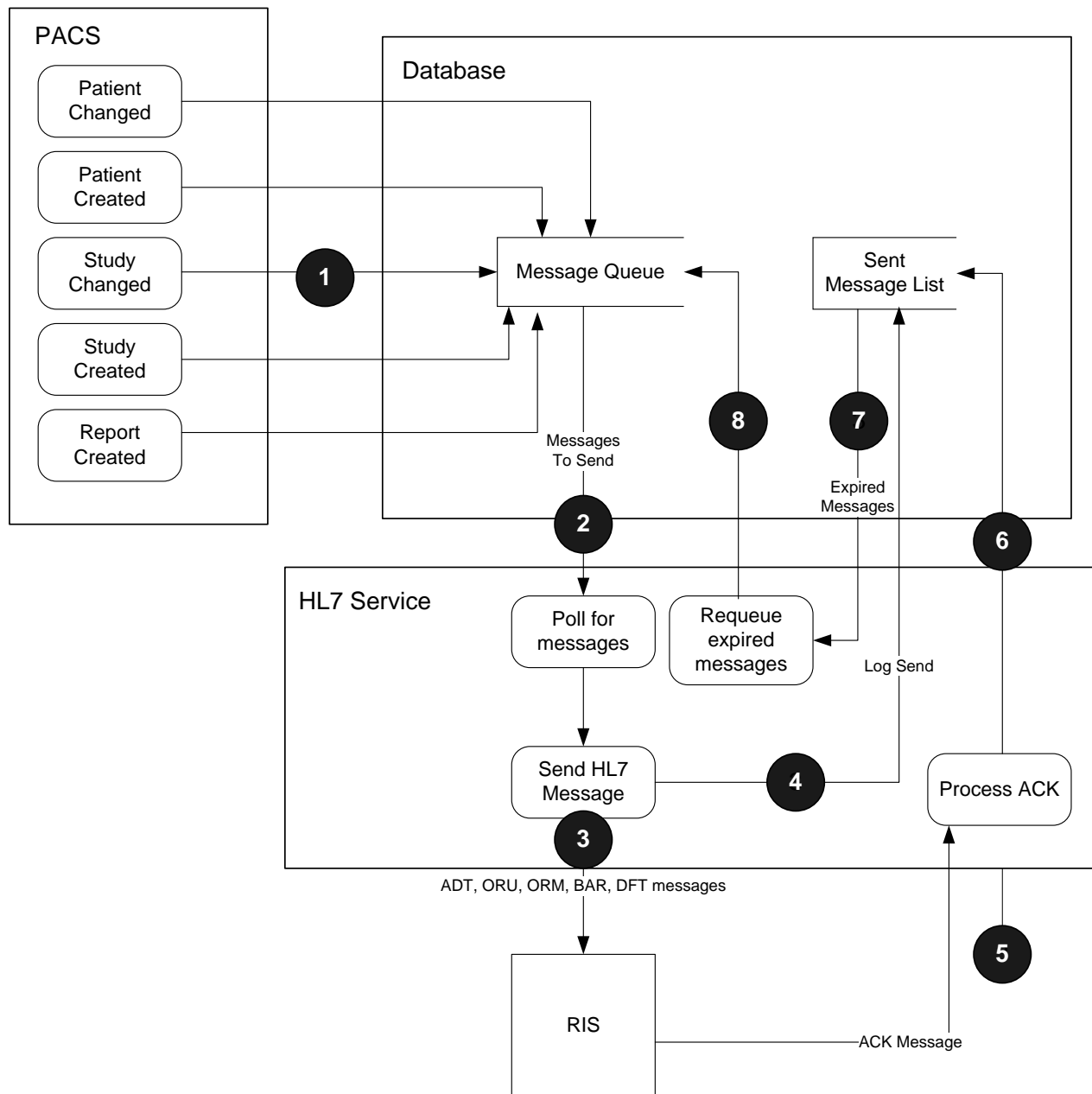
**Figure 1: Typical Deployment**

## 2.4 Message Queuing

RHS uses a set of message queues to manage message transmission. These queues allow the RHS 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.

### 2.4.1 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.



**Figure 2: Data Flow Diagram**

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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 everything worked properly, the external system will send an ACK (acknowledgement) or a NACK (negative acknowledgement) HL7 message back to RHS for every message that was sent to it. These ACKs and NACKs should have the same *MSA-2 Message Control ID* as the messages they are replying to.
6. ACKs and NACKs 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.

## 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 Sample Message

```
MSH|^~\&|RSERVER|POWERSERVER|RAMSOFT|RAMSOFT|20101223202939||ACK|101|P|2.3|||||  
MSA|AA|101|Received ORM001|||
```



## 3.2 Negative Acknowledgement NACK

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

Segment Name	Segment Description
MSH	Message Header
MSA	Message Acknowledgement

When RHS receives a NACK it does not try to resend the failed message.

### 3.2.1 Sample Message

```
MSH|^~\&|RSERVER|POWERSERVER|RAMSOFT|RAMSOFT|20081223202939||NACK|98|P|2.3||||
MSA|AR|96|ADTA39 Failed: No patient to merge to|||
```

## 3.3 Patient Update ADT^A08

The Patient Update message is dispatched whenever a new patient is created or an existing patient's demographic info is changed.

Segment Name	Segment Description
MSH	Message Header
PID	Patient Identification

### 3.3.1 Sample Message:

```
MSH|^~\&||POWERSERVER||201102230742||ADT^A08|20110223742560||2.3||||
PID||511924||SMITH^ADAM^R||19741018|M||1 MARIA RD^^PLAINVILLE^CT^06062||(860)793-2233|(860)331-1033
```

## 3.4 Patient Merge ADT^A34, ADT^A35 and ADT^A39

The ADT^A34, ADT^A35, and ADT^A39 messages merge two patients together. The master patient is identified in the PID segment and the patient it is absorbing is identified in the MRG segment. If multiple merges are specified in a single message they are executed in the order they appear in the message – top to bottom.

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

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Segment Name	Segment Description
}	

### 3.4.1 Sample Messages

#### ADT^A34

```
MSH|^~\&|RSERVER||RAMSOFT|RAMSOFT|20101223202858||ADT^A34|292717|P|2.3|||||
PID|1|817|817||Jonson^Mary^J^^|19661004|F|||678 Fay Ave^^marietta^OH^45750^US|US|
740-434-5427|758026||M|||268-76-9892
MRG|758026
```

#### ADT^A35

```
MSH|^~\&|RSERVER||ramsoft|ramsoft|20101223202858||ADT^A35|292718|P|2.3|||||
PID|1|817|817||Jonson^Mary^J^^|19661004|F|||101 Fay Ave^^marietta^OH^45750^US|US|
740-434-5427|758026||M|||268-76-9892
MRG|758026
```

#### ADT^A39

```
MSH|^~\&|RSERVER||ramsoft|ramsoft|20101223202858||ADT^A39|292719|P|2.3|||||
PID|1|817|817||Jonson^Mary^J^^|19661004|F|||101 Fay Ave^^marietta^OH^45750^US|US|
740-434-5427|758026||M|||268-76-9892
MRG|758026
```

### 3.5 Patient Delete ADT^A23

This message looks identical to the ADT^A08 message. The difference being that the A08 uses the information contained within the message to update a patient whereas the A23 uses the information to identify a patient for deletion.

Segment Name	Segment Description
MSH	Message Header
PID	Patient Identification

#### 3.5.1 Sample Message

```
MSH|^~\&|RSERVER||ramsoft|ramsoft|20081223202858||ADT^A23|492717|P|2.3|||||
PID||64^^^^^UNKNOWN|64^^^^^UNKNOWN||MERGETEST|||||||||||||||||||||
```

### 3.6 Order Update ORM^O01

The order update message is used for scheduling and updating studies. RHS 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
PID	Patient Identification

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Segment Name	Segment Description
[PV1]	Patient Visit Information
{	
ORC	Common Order
[OBR]	Observation Request
}	
[ZDS]	Study UID Information

An especially attentive reader may notice that the ZDS segment lies outside the repeatable segment group in this message. This infers that all data within the repeatable segment group must pertain to a single study. Because of this there will never be a need to send multiple order updates (ORC, OBR) in a single ORM^O01 message although the capability is there for standards compliance purposes.

### 3.6.1 Sample Message

```
MSH|^~\&|RAMSOFT|RAMSOFT|RAMSOFT|POWERSERVER|201102230743||ORM^O01|20110223743560|P|2.3||||||
PID||17^^^^^UNKNOWN|17^^^^UNKNOWN||LASTNAME^MERGE^MIDDLENAME^L.L.B.^MR.||19330804000000+0000|M|||ADDRESS^^CITY^S
T^45678-^US|US|456-789-1234|555-867-5309|||ACCOUNTNUMBER|555-55-5555|
PV1||O|18C^ROOM^^PI^^PATLOCATION^^^PLOCATION|||^^NICOARA^NICK^N^JR^DR|^SDSAD^DSASDA^SAD|
|||||
ORC|NW|||1.2.124.113540.0.0.3.13|30|^^NICOARA^NICK^N^PREFIX^JR|
OBR||13||PROCEDURECODE^STUDY
DESCRIPTION|||20050708102208+0000|||COMMENTS||L^^BODYPART^BODYPART^L||13|||CT||^20|||SUSPECTED
DIAGNOSIS^SYMPTOMS^ALL|^READPHY&READPHY&READPHY&B.A.SC.&MISS^READPHY^READPHY^READPHY^MISS^B.A.SC.||&FNAME&GNA
ME&MNAME&SUFFIX&PREFIX^FNAME^GNAME^MNAME^^SUFFIX|^ADMIN&ADMIN&ADMIN&M.D.&DR.^ADMIN^ADMIN^ADMIN^DR.^M.D.||||
|||PROCEDURECODE^^^STUDY DESCRIPTION||
ZDS|1.2.124.113540.0.0.3.13|
```

## 3.7 Report Update ORU^R01

The report update message allows for the transmission of SR reports to and from the PACS. Reports can be sent with a status of "F" (Final) for a Verified report, and "P" (Preliminary) for an unverified report.

Segment Name	Segment Description
MSH	Message Header
PID	Patient Identification
[PV1]	Patient Visit Information
{	
[ORC]	Common Order Segment
OBR	Observation Request Segment
{[OBX]}	Observation Result
}	
[ZDS]	Study UID Information

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.

Although very unlikely, there is a valid use case for sending multiple reports in a single message. This is accomplished by sending a set of (ORC, OBR, OBX...) segments for each report. The end result is that all the reports are associated with the specified study. The same behaviour can be accomplished by sending multiple ORU messages for each of the reports individually. The latter is our preferred behaviour and the one we use when sending reports, although we maintain the multi-report per message functionality for compatibility purposes.

### 3.7.1 Sample Message

```
MSH|^~&|RAMSOFT|GROVEHILL|WHITEPLUME|GROVEHILL|20110223103911||ORU^R01|379487|P|2.3|||||
PID|1|100569^^^POWERSERVER|100569^^^POWERSERVER||ANDERSON^JUDITH^A||19431125000000|Female|||86 VIBBERTS AVE^^NEW
BRITAIN^CT^06051|||(860)223-3454||
PV1|||||409^ROSEN^J^^MD^DR|^SITTAMBALAM^EARLE^^MD^DR|||||||||||||GROVE HILL MEDICAL CENTER|
ORC|XO||1.2.124.113540.0.20081021489.3.206504|180|
OBR||450132201|^US EXAM, ABDOMEN, COMPLETE||20110223094500+0000|||||ABDOMEN INCREASED LFT // Referring Provider-->> ROSEN
MD,JOSEPH // INSURER==>> MEDICARE CONNECTICUT
CLMS|^ABDOMEN^ABDOMEN|409^ROSEN^JOSEPH^^MD||450132201|||||US||^20|||664&BOURQUE&ANITA&&MD&DR^BOURQUE
^ANITA^^DR^MD||&BROCHU&SUE^BROCHU^SUE|&ET^ET|||||76700^^^US EXAM, ABDOMEN, COMPLETE|
OBX||1||\E\nReport Status: PRELIMINARY\E\n\E\nName: JUDITH A ANDERSON\XOD\MRN: 343876\XOD\DOB: 10/28/1965\XOD\PHONE:
(860)223-3876\XOD\E\nReferring Physician: JOSEPH ROSEN MD\E\nDOS: 2/23/2011 9:45:00 AM\E\n\E\nABDOMINAL ULTRASOUND
COMPLETE:\E\n\E\nINDICATIONS: Elevated liver function tests.\E\n\E\nEvaluation of the liver demonstrates that it is homogeneous. No
convincing fatty infiltration is seen. The gallbladder is normal. The biliary tree is normal with the common bile duct measuring 0.3cm. Both
kidneys are normal with the right measuring 10.0cm. and the left 10.1cm. The spleen is normal measuring 9.7cm. The pancreas is unremarkable.
The aorta and inferior vena cava are unremarkable.\E\n\E\nIMPRESSION:\E\nUnremarkable study.\E\n\E\n\E\nRadiologist: ANITA BOURQUE
MD\XOD\ \XOD\Accession: 450132201\XOD\Consulting Physicians: EARLE SITTAMBALAM MD\XOD\Transcribed by: ET\XOD\2/23/2011 10:39:07
AM\XOD\ \XOD\E\n\E\n\E\n\E\n\E\n||||P|||20110223103722-0500||||PRELIMINARY|
ZDS|1.2.756.113540.0.20081021489.3.206504|
```

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## 3.8 Scheduling Messages SIU^S12, SIU^S14, SIU^S15

The scheduling messages are transmitted from RIS to PACS when an order is scheduled for exam in radiology department or order is canceled. The segment composition for all SIU messages is identical as following:

Segment Name	Segment Description
MSH	Message Header
SCH	Schedule Activity Information
[NTE]	Notes and Comments
{	
PID	Patient Identification
{	
[PV1]	Patient Visit Information
{	
[OBX]	Observation Result
[DG1]	Diagnosis
}	
}	
RGS	Resource Group
{	
AIS	Appointment Information – Service
{NTE}	Notes and Comments
[AIG]	Appointment Information – General Resource
{NTE}	Notes and Comments
[AIL]	Appointment Information – Location Resource
{NTE}	Notes and Comments
[AIP]	Appointment Information – Personal Resource
{NTE}	Notes and Comments
}	

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Segment Name	Segment Description
}	

### 3.8.1 Sample Messages

#### SIU^S12

```
MSH|^~\&| RAMSOFT |RAMSOFT|TEST|RAMSOFT|201003060953||SIU^S12|20100306953450|P|2.3|||||
SCH|00331839401||||58||HLCK^HEALTHCHECK ANY AGE|25|MIN|^201003061000
||||JOHN|||VALERIE|||ARRIVED|
PID|1||489671|0|SMITH^JOHN^|19800205|M||176215TH STREET^HOUSTON^TX^77306^US|US|(832)745-
8278||S||999999999|||||
PV1||O|18C^ROOM^^PI^^PATLOCATION^^^PLOCATION||||^NICOARA^NICK^N^JR^DR|^SDSAD^DSASDA^SAD|||||
|||||
RGS|1|||
AIG|||||20100308000000||10|min||
AIL|1||| NICOARA^NICK^N^JR^DR|||||
NTE|1| |1 MONTH HEALTH CHECK|
AIP|1||PBN^LISAPORTER|60|||||
```

#### SIU^S14

```
MSH|^~\&| RAMSOFT |RAMSOFT|TEST|RAMSOFT|201003060953||SIU^S12|20100306953450|P|2.3|||||
SCH|00331839401||||58||HLCK^HEALTHCHECK ANY AGE|25|MIN|^201003061000
||||JOHN|||VALERIE|||ARRIVED|
PID|1||489671|0|SMITH^JOHN^|19800205|M||176215TH STREET^HOUSTON^TX^77306^US|US|(832)745-
8278||S||999999999|||||
PV1||O|18C^ROOM^^PI^^PATLOCATION^^^PLOCATION||||^NICOARA^NICK^N^JR^DR|^SDSAD^DSASDA^SAD|||||
|||||
RGS|1|||
AIL|1||| NICOARA^NICK^N^JR^DR|||||
NTE|1| |1 MONTH HEALTH CHECK|
AIP|1||PBN^LISAPORTER|60|||||
```

#### SIU^S15

```
MSH|^~\&| RAMSOFT |RAMSOFT|TEST|RAMSOFT|201003060953||SIU^S12|20100306953450|P|2.3|||||
SCH|00331839401||||58||HLCK^HEALTHCHECK ANY AGE|25|MIN|^201003061000
||||JOHN|||VALERIE|||ARRIVED|
PID|1||489671|0|SMITH^JOHN^|19800205|M||176215TH STREET^HOUSTON^TX^77306^US|US|(832)745-
8278||S||999999999|||||
PV1||O|18C^ROOM^^PI^^PATLOCATION^^^PLOCATION||||^NICOARA^NICK^N^JR^DR|^SDSAD^DSASDA^SAD|||||
|||||
RGS|1|||
AIL|1||| NICOARA^NICK^N^JR^DR|||||
AIP|1||PBN^LISAPORTER|60|||||
```

### 3.9 Add Billing Account BAR^P01

Add Billing Account message is used for adding billing account of the patient.  
The segment composition for BAR^P01 message is following:

Segment Name	Segment Description
MSH	Message Header
PID	Patient Identification

Segment Name	Segment Description
GT1	Guarantor
[	
{	
IN1	Insurance
IN2	Insurance Additional Information
}	
]	

### 3.9.1 Sample Message

#### BAR^P01

```

MSH|^~\&|RAMSOFT|RAMSOFT|TEST|RAMSOFT|20110313112701||BAR^P01|422321|P|2.3|||||
PID|1||911911||TEST1^TEST2||20090601000000|Female|||300 TEST AVE.^NEW BRITAIN^CT^06051^US|US|8602246200|
PV1|||||||||||||
GT1|125||TEST1^TEST2||300 TEST AVE.^NEW BRITAIN^CT^06051^US|8602246200||Female||Self|||||||||||||
IN1|1||RAM12345|RAMSOFT INC.|123 SOME
PLACE^^SCHENECTADY^NY^123456777^US|RAMSOFT||12345|||20110311000000|||SOFT^RAM^T|Unknown|20090326000000|300 TEST
AVE^^NEW BRITAIN^CT^06051^US|||||||||||||12345|||||||||12345|
IN2||
IN1|2||RAMSOFT2|RAMSOFT2|123 PLACE SOME^^TORONTO^ON^221312312^CA|SUPPORT
RAMSOFT||1234RAMSOFT|||20110301000000|||RAMSOFT^SUPPORT|Unknown||300 TEST AVE^^NEW
BRITAIN^CT^06051^US|||||||||||||RAMSOFT2312|||||||||RAMSOFT2312|
IN2||
IN1|3||RAMSOFT3|RAMSOFT3|123 RAMSOFT ST^^TORONTO^ON^111111111^CA|RAMSOFT
SUPPORT3||RAS|||20110311000000|||^FDSA|||300 TEST AVE.^NEW
BRITAIN^CT^06051^US|||||||||||||RAMSOFT3|||||||||RAMSOFT3|
IN2||

```

### 3.10 Update Billing Account BAR^P05

Add Billing Account message is used for update billing account of the patient.  
 The segment composition for BAR^P05 message is following:

Segment Name	Segment Description
MSH	Message Header
PID	Patient Identification
GT1	Guarantor
[	
{	

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Segment Name	Segment Description
IN1	Insurance
IN2	Insurance Additional Information
}	
]	

### 3.10.1 Sample Message

#### BAR^P05

```
MSH|^~\&|RAMSOFT|RAMSOFT|TEST|RAMSOFT|20110313112701||BAR^P05|422321|P|2.3|||||
PID|1||911911||TEST1^TEST2||20090601000000|Female|||300 TEST AVE.^^NEW BRITAIN^CT^06051^US|US|8602246200|
PV1|||||||||||||
GT1|125||TEST1^TEST2||300 TEST AVE.^^NEW BRITAIN^CT^06051^US|8602246200||Female||Self|||||||||||||||||
IN1|1||RAM12345|RAMSOFT INC.|123 SOME
PLACE^^SCHENECTADY^NY^123456777^US|RAMSOFT||12345|||20110311000000|||SOFT^RAM^T|Unknown|20090326000000|300 TEST
AVE^^NEW BRITAIN^CT^06051^US|||||||||||||12345|||||||||||||12345|
IN2|
IN1|2||RAMSOFT2|RAMSOFT2|123 PLACE SOME^^TORONTO^ON^221312312^CA|SUPPORT
RAMSOFT||1234RAMSOFT|||20110301000000|||RAMSOFT^SUPPORT|Unknown||300 TEST AVE^^NEW
BRITAIN^CT^06051^US|||||||||||||RAMSOFT2312|||||||||||||RAMSOFT2312|
IN2|
IN1|3||RAMSOFT3|RAMSOFT3|123 RAMSOFT ST^^TORONTO^ON^111111111^CA|RAMSOFT
SUPPORT3||RAS|||20110311000000|||^FDSA|||300 TEST AVE.^^NEW
BRITAIN^CT^06051^US|||||||||||||RAMSOFT3|||||||||||||RAMSOFT3|
IN2|
IN1|4||RAMSOFT4|RAMSOFT4|123 RAMSOFT ST^^TORONTO^ON^111111111^CA|RAMSOFT
SUPPORT4||RAS|||20110311000000|||^FDSA|||300 TEST AVE.^^NEW
BRITAIN^CT^06051^US|||||||||||||RAMSOFT3|||||||||||||RAMSOFT3|
IN2|
```

### 3.11 Post detail financial transaction DFT^P03

The detail financial transaction message describes the financial transaction transmitted between the order Filler and Charge Processor. The segment composition for DFT^P03 message is following:

Segment Name	Segment Description
MSH	Message Header
PID	Patient Identification
[PD1]	Patient Additional Demographic Segment
[PV1]	Patient Visit Information
[PV2]	Patient Visit – Additional Information
[{DB1}]	Disability



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Segment Name	Segment Description
[{OBX}]	Observation Result
{	
{FT1}	Financial Transaction
[	
{	
[{PR1}]	Procedures Segment
[{ROL}]	Role
}	
]	
}	
[{DG1}]	Diagnosis
[DRG]	Diagnosis Related Group
[GT1]	Guarantor
[	
{	
IN1	Insurance
[IN2]	Insurance Additional Information
[IN3]	Insurance Additional Information, Certification
}	
]	
[ACC]	

### 3.11.1 Sample Message

```
MSH|^~\&|RAMSOFT|GROVEHILL|WHITEPLUME|GROVEHILL|20110217132759||DFT^P03|372502|P|2.3|||||
PID|1|275154^^^POWERSERVER|275154^^^POWERSERVER||SMITH^SAMUEL^E||1951022000000|Male|||275 WINTHROP ST^^NEW
BRITAIN^CT^06052|||(860)225-2297||
PV1|||||664^BOURQUE^ANITA^^DR^MD|^CALABRESE^C^^APRN - 304^MS|||||||449219501|||||||GROVE HILL MEDICAL
CENTER|
PV2|||||20110216090000+0000|
```

# RamSoft

```
FT1|1|||20110216090000|20110217132759|CG|||1.000000|0.000000|0.000000|||^|^GROVE HILL MEDICAL CENTER|DEFAULT|SELF
PAY|571.5^CIRRHOSIS OF LIVER WITHOUT MENTION OF ALCOHOL|664^BOURQUE^ANITA^^MD^DR|^CALABRESE^CHRISTINE^^APRN -
304^MS|^449219501||74183^MRI ABDOMEN W/O \T\ W/CONTRAST^^^|
GT1|145||TEST1^TEST2||300 TEST AVE.^^NEW BRITAIN^CT^06051^US|8602246200||Female||Self|
```

## 4 Segment Definitions

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

|subfield1^subsubfield1&subsubfield2&subsubfield3^subfield3|

**An example of a segment sequence that contains 3 subfields with the second subfield containing 3 sub-subfields.**

Some segment definitions contain a section called "Deprecated Sequences". Sequences denoted under that heading are there to provide backwards compatibility with older versions of our HL7 service. Their use should be avoided if at all possible. The values in a deprecated sequence are only used if the contents of the corresponding non-deprecated sequence are empty.

The OPT column dictates which fields are mandatory and which are optional. Mandatory fields are marked by an "R" for "Required" and non-mandatory ones are marked with "O" for "Optional". Mandatory fields are only required to be in a message IF the sequence they belong to is in the message.

### 4.1 MSH Segment

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

SEQ	OPT	Description	Data Type	Sub Field and DICOM Element (if applicable)
1	R	Field Separators	ST	1 – Field Separators " "
2	R	Encoding Characters	ST	1 – Encoding Characters "^~\&"
3	O	Sending Application	HD	1 – Sending Application Name
4	O	Sending Facility	HD	1 – Sending Facility Name
5	O	Receiving Application	HD	1 – Application Name
6	O	Receiving Facility	HD	1 – Application Name
7	O	Timestamp	TS	7 – Time Stamp
8	O	Security	ST	

SEQ	OPT	Description	Data Type	Sub Field and DICOM Element (if applicable)
9	R	Message Identifiers	MSG	1 – Message Type 2 – Trigger Event
10	R	Message Control ID	ST	1 – Message ID
11	R	Processing ID	PT	1 – 'P'
12	R	Version ID	VID	1- '2.3'
13	O	Sequence Number	NM	
14	O	Continuation Pointer	ST	
15	O	Accept Acknowledgment Type	ID	
16	O	Application Acknowledgment Type	ID	
17	O	Country Code	ID	
18	O	Character Set	ID	
19	O	Principal Language Of Message	CE	

The *MSH-4 field* is used when sending messages. It should contain the facility name from where the message is being sent. This field's value will be used as IssuerOfPatientID if no value for that field is supplied in *PID-3.4*, or *PID2.4*.

The *MSH-5 field* is used in ACK messages to specify the application that sent the message being acknowledged. RHS 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.

## 4.2 MSA Segment

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

SEQ	OPT	Description	Data Type	Sub Field and DICOM Element (if applicable)
-----	-----	-------------	-----------	---

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1	R	Acknowledgement Code	ST	1 – Acknowledgment Code (AA or AR or AE)
2	R	Message Control ID	ST	1 – Message Control ID
3	O	Description	ST	1 – Message Description

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 PID Segment

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

SEQ	OPT	Description	Data Type	Sub Field and DICOM Element (if applicable)
3	R	Patient Identifier List	CX	1 – Patient ID (0010,0020) 4 – IssuerOfPatientID (0010,0021)
5	R	Patient Name	XPN	1 – Family Name (0010,0010) 2 – Given Name (0010,0010) 3 – Middle Name (0010,0010) 4 – Suffix (0010,0010) 5 – Prefix (0010,0010)
7	O	Date of Birth	TS	1 – Date of Birth (0010,0030)
8	O	Sex	IS	1 – Sex (0010,0040)
11	O	Address	XAD	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	O	Home Phone	XTN	1 – Phone Number xxx-xxx-xxxx (0010,2154)
14	O	Business Phone	XTN	1 – Phone Number xxx-xxx-xxxx (0010,2154)
15	O	Language	CE	1 – Language (0010,0101)
16	O	Marital Status	CE	1 – Marital Status
18	O	Patient Account Number	CX	1 – Account Number (0010, 0050)
19	O	SSN	ST	1 – SSN (0010,1000)
<b>Deprecated Sequences</b>				
2	C	Patient ID	CX	1 - Patient ID (0010,0020) 4 – IssuerOfPatientID (0010,0021)
12	O	Country	IS	1 – Country Code (0010,2150)

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Phone numbers should be sent in the form ddd-ddd-dddd, where d corresponds to a digit. If you plan on sending them in some other format be sure to let your RamSoft integration contact know. Different formats are available but need to be configured.

## 4.4 PD1 Segment

The PD1 segment is used to communicate additional patient demographic information.

SEQ	OPT	Description	Data Type	Repeats
1	O	Living Dependency	IS	0
2	O	Living Arrangement	IS	0
3	O	Patient Primary Facility	XCN	0
4	O	Patient Primary Care Provider Name & ID No.	XCN	0
5	O	Student Indicator	IS	0
6	O	Handicap	IS	0
7	O	Living Will	IS	0
8	O	Organ Donor	IS	0
9	O	Separate Bill	ID	0
10	O	Duplicate Patient	CX	0
11	O	Publicity Code	CE	0
12	O	Protection Indicator	ID	0

## 4.5 MRG Segment

The MRG segment is used to specify a patient that is to be merged into another. It only occurs in the ADT^A39 (Patient Merge) message in combination with a PID segment.

SEQ	OPT	Description	Data Type	Sub Field and DICOM Element (if applicable)
1	R	Prior Patient Identifier List	CX	1 – Patient ID (0010,0020) 4 – IssuerOfPatientID (0010,0021)

## 4.6 PV1 Segment

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	OPT	Description	Data Type	Sub Field and DICOM Element (if applicable)	
2	0	Patient Class	IS	1 – Patient Class	
3	0	Patient Location	PL	1 – Room Code 2 – Room Description	
				4 Facility	1 – Facility Description 2 – Facility Code
				6 – Patient Location Code 9 – Patient Location Description (0038,0300)	
8	0	Referring Physician	XCN	1 – ID Number 2 – Family Name (0008,0090) 3 – Given Name (0008,0090) 4 – Middle Name (0008,0090) 5 – Suffix (0008,0090) 6 – Prefix (0008,0090)	
9	0	Consulting Doctors	XCN	1 – ID Number 2 – Family Name 3 – Given Name 4 – Middle Name 5 – Suffix 6 – Prefix	
<b>Deprecated Sequences</b>					
3	0	Facility Code	PL	3 – Facility Code	

**PV1-9** can contain up to 3 consulting physicians:

|^Doctor1^Doctor1^Doctor1^Dr^MD~^Doctor1^Doctor1^Doctor1^Dr^MD|  
**A PV1-9 field specifying 2 consulting physicians.**

## 4.7 PV2 Segment

The PV2 segment communicates with additional patient's visit information

SEQ	OPT	Description	Data Type	Repeats
1	0	Prior Pending Location	IS	0
2	0	Accommodation Code	CE	0
3	0	Admit Reason	CE	0
4	0	Transfer Reason	CE	0
5	0	Patient Valuables	ST	0

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SEQ	OPT	Description	Data Type	Repeats
6	0	Patient Valuables Location	ST	0
7	0	Visit User Code	IS	0
8	0	Expected Admit Date/time	TS	0
9	0	Expected Discharge Date/time	TS	0
10	0	Estimated Length Of Inpatient Stay	NM	0
11	0	Actual Length Of Inpatient Stay	NM	0
12	0	Visit Description	ST	0
13	0	Referral Source Code	XCN	0
14	0	Previous Service Date	DT	0
15	0	Employment Illness Related Indicator	ID	0
16	0	Purge Status Code	IS	0
17	0	Purge Status Date	DT	0
18	0	Special Program Code	IS	0
19	0	Retention Indicator	ID	0
20	0	Expected Number Of Insurance Plans	NM	0
21	0	Visit Publicity Code	IS	0
22	0	Visit Protection Indicator	ID	0
23	0	Clinic Organization Name	XON	0
24	0	Patient Status Code	ID	0
25	0	Visit Priority Code	IS	0

SEQ	OPT	Description	Data Type	Repeats
26	O	Previous Treatment Date	DT	0
27	O	Expected Discharge Disposition	IS	0
28	O	Signature On File Date	DT	0
29	O	First Similar Illness Date	DT	0
30	O	Patient Charge Adjustment Code	CE	0
31	O	Recurring Service Code	IS	0
32	O	Billing Media Code	ID	0
33	O	Expected Surgery Date & Time	TS	0
34	O	Military Partnership Code	ID	0
35	O	Military Non-availability Code	ID	0
36	O	Newborn Baby Indicator	ID	0
37	O	Baby Detained Indicator	ID	0

## 4.8 ORC Segment

The ORC segment contains Order Control and status information.

SEQ	OPT	Description	Data Type
1	R	Order Control Code	1 – Order Control Code
5	R	Order Status	1 – Order Status
<b>Deprecated Sequences</b>			
4	O	Study UID	1 – Study Instance UID (0020,000D)
12	O	Referring Physician	1 – ID Number 2 – Family Name (0008,0090) 3 – Given Name (0008,0090) 4 – Middle Name (0008,0090) 5 – Suffix (0008,0090) 6 – Prefix (0008,0090)



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**ORC-1** is always set to XO. We accept any value for incoming messages but internally we always perform an order update. We provide this field for compatibility and for future functionality extensions.

## 4.9 OBR Segment

The OBR segment contains most of the data necessary to construct an order.

SEQ	OPT	Description	Data Type
7	R	Study Date Time	1 – Study Date Time <ul style="list-style-type: none"> <li>• Date (0008,0020)</li> <li>• Time (0008,0030)</li> </ul>
13	O	Comments	1 – Comments (0032,4000)
15	O	Body Part/Laterality	4 – Body Part (0018,0015) 5 – Laterality (0020,0060)
18	R	Accession Number	1 – Accession Number (0008,0050)
24	R	Modality	1 – Scheduled Modality (0008,0060)
27	O	Priority	6 – Priority (0040,1003) and (0040,1003)
31	O	Reason For Study	1 – Suspected Diagnosis 2 – Symptom 3 – Clinical Notes
32	O	Reading Physician	1 – Name <ul style="list-style-type: none"> <li>1 – ID Number</li> <li>2 – Family Name (0008,1060)</li> <li>3 – Given Name (0008,1060)</li> <li>4 – Middle Name (0008,1060)</li> <li>5 – Suffix (0008,1060)</li> <li>6 – Prefix (0008,1060)</li> </ul>
34	O	Technician	1 – Name <ul style="list-style-type: none"> <li>1 – ID Number</li> <li>2 – Family Name (0008,1070)</li> <li>3 – Given Name (0008,1070)</li> <li>4 – Middle Name (0008,1070)</li> <li>5 – Suffix (0008,1070)</li> <li>6 – Prefix (0008,1070)</li> </ul>
35	O	Transcriptionist	1 - Name <ul style="list-style-type: none"> <li>1 – ID Number</li> <li>2 – Family Name (4008,010a)</li> <li>3 – Given Name (4008,010a)</li> <li>4 – Middle Name (4008,010a)</li> <li>5 – Suffix (4008,010a)</li> <li>6 – Prefix (4008,010a)</li> </ul>
44	O	Procedure Code	1 – Procedure Code ID <i>Sequence</i> (0008,1032) > <i>Code Value</i> (0008,0100) 5 – Study Description (0008,1030)
<b>Deprecated Sequences</b>			
2	O	Accession Number	1 – Accession Number
4	O	Procedure Code	1 – Procedure Code 2 – Study Description
15	O	Body Part/Laterality	1 – Laterality 3 – Body Part
32	O	Reading Physician	1 – ID Number

SEQ	OPT	Description	Data Type
			2 – Family Name (0008,1060) 3 – Given Name (0008,1060) 4 – Middle Name (0008,1060) 5 – Suffix (0008,1060) 6 – Prefix (0008,1060)
34	O	Technologist	1 – ID Number 2 – Family Name (0008,1060) 3 – Given Name (0008,1060) 4 – Middle Name (0008,1060) 5 – Suffix (0008,1060) 6 – Prefix (0008,1060)
35	O	Transcriptionist	1 – ID Number 2 – Family Name (0008,1060) 3 – Given Name (0008,1060) 4 – Middle Name (0008,1060) 5 – Suffix (0008,1060) 6 – Prefix (0008,1060)

Fields **OBR-27.6** affects two DICOM fields: *Requested Procedure Priority (0040,1003)* and *Study Priority ID (0040,1003)*.

## 4.10 ZDS Segment

ZDS is a custom segment mandated by IHE to store the Study Instance UID being referred to in an order message. In a PACS/RIS setting messages sent from the RIS will typically not have a Study Instance UID. In these cases this segment should be omitted.

SEQ	OPT	Description	Data Type
1	R	Study Instance UID	1 – Study Instance UID (0020,000D) 3 – "Application" 4 – "DICOM"

Fields **ZDS-1.3 & ZDS1.4** are always assigned the string values "Application" and "DICOM" respectively.

## 4.11 OBX Segment

The OBX segment contains report data. This segment is normally used when transmitting an SR report created by a reading physician. Some systems like to use multiple consecutive OBX segments to represent a report with each segment corresponding to a line of text. Others just put all the text into a single segment and denote line breaks using a \E\n\E escape sequence. Either method is fine. We use the latter when sending messages.

SEQ	OPT	Description	Data Type
3	R	Observation ID	1 – Observation ID (0020,0014)
5	O	Observation Value	1 – Report Text (0040, a160)
11	O	Observation Result Status	1 – Result Status ("F" value assigned "VERIFIED" to (0040, a493))

SEQ	OPT	Description	Data Type
14	O	Date/Time of Observation	1 – Date/Time of Observation (0008,002A)
16	O	Observer ID (PN)	1 – ID Number (0040, a088) Sequence > (0008, 0100) Code Value 2 – Family Name (0040, a075) 3 – Given Name (0040, a075) 4 – Middle Name (0040, a075) 5 – Suffix (0040, a075) 6 – Prefix (0040, a075)

Field **OBX-3** should be unique for every report contained in a study. It does not need to be globally unique. Typically the IDs are numbers 1..n where n is the number of reports contained within the study.

Field **OBX-11** specifies whether or not the report has been verified by a reading physician. Send "P" (short for Preliminary) if that is not the case, and "F" (short for Final) if it has been verified.

Field **OBX-16** should only be filled out for verified reports. Non-verified reports will simply discard the observer data.

## 4.12 AIG – Appointment Information – General Resource Segment

SEQ	OPT	Description	Data Type	Repeats
1	R	Set ID - AIG	SI	0
2	O	Segment Action Code	ID	0
3	O	Resource ID	CE	0
4	R	Resource Type	CE	0
5	O	Resource Group	CE	0
6	O	Resource Quantity	NM	0
7	O	Resource Quantity Units	CE	0
8	O	Start Date/Time	TS	0
9	O	Start Date/Time Offset	NM	0
10	O	Start Date/Time Offset Units	CE	0
11	R	Duration	NM	0
12	O	Duration Units	CE	0

SEQ	OPT	Description	Data Type	Repeats
13	O	Allow Substitution Code	IS	0
14	O	Filler Status Code	CE	0

#### 4.13 AIS – Appointment Information – Service Segment

SEQ	OPT	Description	Data Type	Repeats
1	R	Set ID - AIS	SI	0
2	O	Segment Action Code	ID	0
3	R	Universal Service ID	CE	0
4	O	Start Date/Time	TS	0
5	O	Start Date/Time Offset	NM	0
6	O	Start Date/Time Offset Units	CE	0
7	R	Duration	NM	0
8	O	Duration Units	CE	0
9	O	Allow Substitution Code	IS	0
10	O	Filler Status Code	CE	0

#### 4.14 AIL - Appointment Information - Location Resource Segment

SEQ	OPT	Description	Data Type	Repeats
-----	-----	-------------	-----------	---------

SEQ	OPT	Description	Data Type	Repeats
1	R	Set ID - AIL	SI	0
2	O	Segment Action Code	ID	0
3	O	Location Resource ID	PL	0
4	R	Location Type-AIL	CE	0
5	O	Location Group	CE	
6	O	Start Date/Time	TS	0
7	O	Start Date/Time Offset	NM	0
8	O	Start Date/Time Offset Units	CE	0
9	R	Duration	NM	0
10	O	Duration Units	CE	0
11	O	Allow Substitution Code	IS	0
12	O	Filler Status Code	CE	0

#### 4.15 AIP - Appointment Information - Personnel Resource Segment

SEQ	OPT	Description	Data Type	Repeats
1	R	Set ID - AIP	SI	0
2	O	Segment Action Code	ID	0
3	O	Personnel Resource ID	XCN	0
4	R	Resource Role	CE	0
5	O	Resource Group	CE	

SEQ	OPT	Description	Data Type	Repeats
6	O	Start Date/Time	TS	0
7	O	Start Date/Time Offset	NM	0
8	O	Start Date/Time Offset Units	CE	0
9	R	Duration	NM	0
10	O	Duration Units	CE	0
11	O	Allow Substitution Code	IS	0
12	O	Filler Status Code	CE	0

#### 4.16 SCH – Schedule Activity Information Segment

SEQ	OPT	Description	Data Type	Repeats
1	R	Placer Appointment ID	EI	0
2	O	Filler Appointment ID	EI	0
3	O	Occurrence Number	NM	0
4	O	Placer Group Number	EI	0
5	O	Schedule ID	CE	0
6	R	Event Reason	CE	0
7	O	Appointment Reason	CE	0
8	O	Appointment Type	TS	0
9	O	Appointment Duration	NM	0

SEQ	OPT	Description	Data Type	Repeats
10	O	Appointment Duration Units	CE	0
11	R	Appointment Timing Quantity	TQ	0
12	O	Placer Contact Person	XCN	0
13	O	Placer Contact Phone Number	XTN	0
14	O	Placer Contact Address	XAD	0
15	O	Placer Contact Location	PL	0
16	R	Filler Contact Person	XCN	0
17	O	Filler Contact Phone Number	XTN	0
18	O	Filler Contact Address	XAD	0
19	O	Filler Contact Location	PL	0
20	R	Entered by Person	XCN	0
21	O	Entered by Phone Number	XTN	0
22	O	Entered by Location	PL	0
23	O	Parent Placer Appointment ID	EI	0
24	O	Parent Filler Appointment ID	EI	0
25	O	Filler Status Code	CE	0

## 4.17 RGS – Resource Group Segment

SEQ	OPT	Description	Data Type	Repeats
1	R	Set ID - RGS	SI	0

SEQ	OPT	Description	Data Type	Repeats
2	O	Segment Action Code	ID	0
3	O	Resource Group ID	CE	0

## 4.18 NTE - Notes And Comments Segment

SEQ	OPT	Description	Data Type	Repeats
1	O	Set ID - Nte	SI	0
2	O	Source Of Comment	ID	0
3	O	Comment	FT	0
4	O	Comment Type	CE	0

## 4.19 GT1 – Guarantor Segment

SEQ	OPT	Description	Data Type	Repeats
1	R	Set ID - Gt1	SI	0
2	O	Guarantor Number	CX	0
3	R	Guarantor Name	XPN	0
4	O	Guarantor Spouse Name	XPN	0
5	O	Guarantor Address	XAD	0
6	O	Guarantor Ph Num-home	XTN	0
7	O	Guarantor Ph Num-business	XTN	0



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SEQ	OPT	Description	Data Type	Repeats
8	O	Guarantor Date/time Of Birth	TS	0
9	O	Guarantor Sex	IS	0
10	O	Guarantor Type	IS	0
11	O	Guarantor Relationship	CE	0
12	O	Guarantor Ssn	ST	0
13	O	Guarantor Date - Begin	DT	0
14	O	Guarantor Date - End	DT	0
15	O	Guarantor Priority	NM	0
16	O	Guarantor Employer Name	XPN	0
17	O	Guarantor Employer Address	XAD	0
18	O	Guarantor Employer Phone Number	XTN	0
19	O	Guarantor Employee ID Number	CS	0
20	O	Guarantor Employment Status	IS	0
21	O	Guarantor Organization Name	XON	0
22	O	Guarantor Billing Hold Flag	ID	0
23	O	Guarantor Credit Rating Code	CE	0
24	O	Guarantor Death Date And Time	XCN	0
25	O	Guarantor Death Flag	ID	0
26	O	Guarantor Charge Adjustment Code	CE	0
27	O	Guarantor Household Annual Income	CP	0

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SEQ	OPT	Description	Data Type	Repeats
28	O	Guarantor Household Size	NM	0
29	O	Guarantor Employer ID Number	CX	0
30	O	Guarantor Marital Status Code	CE	0
31	O	Guarantor Hire Effective Date	DT	0
32	O	Employment Stop Date	DT	0
33	O	Living Dependency	IS	0
34	O	Ambulatory Status	IS	0
35	O	Citizenship	CE	0
36	O	Primary Language	CE	0
37	O	Living Arrangement	IS	0
38	O	Publicity Code	CE	0
39	O	Protection Indicator	ID	0
40	O	Student Indicator	IS	0
41	O	Religion	CE	0
42	O	Mother's Maiden Name	XPN	0
43	O	Nationality	CE	0
44	O	Ethnic Group	CE	0
45	O	Contact Person's Name	XPN	0
46	O	Contact Person's Telephone Number	XTN	0
47	O	Contact Reason	CE	0

SEQ	OPT	Description	Data Type	Repeats
48	O	Contact Relationship	IS	0
49	O	Job Title	ST	0
50	O	Job Code/class	JCC	0
51	O	Guarantor Employer's Organization Name	XON	0
52	O	Handicap	IS	0
53	O	Job Status	IS	0
54	O	Guarantor Financial Class	FC	0
55	O	Guarantor Race	CE	0

## 4.20 IN1 – Insurance Segment

SEQ	OPT	Description	Data Type	Repeats
1	R	Set ID – In1	SI	0
2	R	Insurance Plan ID	CE	0
3	R	Insurance Company ID	CX	0
4	O	Insurance Company Name	XON	0
5	O	Insurance Company Address	XAD	0
6	O	Insurance Co Contact Person	XPN	0
7	O	Insurance Co Phone Number	XTN	0
8	O	Group Number	ST	0

# RamSoft

SEQ	OPT	Description	Data Type	Repeats
9	O	Group Name	XON	0
10	O	Insured's Group Emp ID	CX	0
11	O	Insured's Group Emp Name	XON	0
12	O	Plan Effective Date	DT	0
13	O	Plan Expiration Date	DT	0
14	O	Authorization Information	AUI	0
15	O	Plan Type	IS	0
16	O	Name Of Insured	XPN	0
17	O	Insured's Relationship To Patient	CE	0
18	O	Insured's Date Of Birth	TS	0
19	O	Insured's Address	XAD	0
20	O	Assignment Of Benefits	IS	0
21	O	Coordination Of Benefits	IS	0
22	O	Coord Of Ben. Priority	ST	0
23	O	Notice Of Admission Flag	ID	0
24	O	Notice Of Admission Date	DT	0
25	O	Report Of Eligibility Flag	ID	0
26	O	Report Of Eligibility Date	DT	0
27	O	Release Information Code	IS	0
28	O	Pre-admit Cert (pac)	ST	0

# RamSoft

SEQ	OPT	Description	Data Type	Repeats
29	O	Verification Date/time	TS	0
30	O	Verification By	XCN	0
31	O	Type Of Agreement Code	IS	0
32	O	Billing Status	IS	0
33	O	Lifetime Reserve Days	NM	0
34	O	Delay Before L.r. Day	NM	0
35	O	Company Plan Code	IS	0
36	O	Policy Number	ST	0
37	O	Policy Deductible	CP	0
38	O	Policy Limit - Amount	CP	0
39	O	Policy Limit - Days	NM	0
40	O	Room Rate - Semi-private	CP	0
41	O	Room Rate - Private	CP	0
42	O	Insured's Employment Status	CE	0
43	O	Insured's Sex	IS	0
44	O	Insured's Employer's Address	XAD	0
45	O	Verification Status	ST	0
46	O	Prior Insurance Plan ID	IS	0
47	O	Coverage Type	IS	0
48	O	Handicap	IS	0
49	O	Insured's ID Number	CX	0

## 4.21 IN2 – Insurance Additional Information Segment

SEQ	OPT	Description	Data Type	Repeats
1	O	Insured's Employee ID	CX	0
2	O	Insured's Social Security Number	ST	0
3	O	Insured's Employer's Name And ID	XCN	0
4	O	Employer Information Data	IS	0
5	O	Mail Claim Party	IS	0
6	O	Medicare Health Ins Card Number	ST	0
7	O	Medicaid Case Name	XPN	0
8	O	Medicaid Case Number	ST	0
9	O	Military Sponsor Name	XPN	0
10	O	Military ID Number	ST	0
11	O	Dependent Of Military Recipient	XCE	0
12	O	Military Organization	ST	0
13	O	Military Station	ST	0
14	O	Military Service	IS	0
15	O	Military Rank/grade	IS	0
16	O	Military Status	IS	0
17	O	Military Retire Date	DT	0
18	O	Military Retire Date	IS	0

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SEQ	OPT	Description	Data Type	Repeats
19	O	Baby Coverage	ID	0
20	O	Combine Baby Bill	ID	0
21	O	Blood Deductible	ST	0
22	O	Special Coverage Approval Name	XPN	0
23	O	Special Coverage Approval Title	ST	0
24	O	Non-covered Insurance Code	IS	0
25	O	Payor ID	CX	0
26	O	Payor Subscriber ID	CX	0
27	O	Eligibility Source	IS	0
28	O	Room Coverage Type/amount	RMC	0
29	O	Policy Type/amount	PTA	0
30	O	Daily Deductible	DDI	0
31	O	Living Dependency	IS	0
32	O	Ambulatory Status	IS	0
33	O	Citizenship	CE	0
34	O	Primary Language	CE	0
35	O	Living Arrangement	IS	0
36	O	Publicity Code	CE	0
37	O	Protection Indicator	ID	0
38	O	Student Indicator	IS	0

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SEQ	OPT	Description	Data Type	Repeats
39	O	Religion	CE	0
40	O	Mother's Maiden Name	XPN	0
41	O	Nationality	CE	0
42	O	Ethnic Group	CE	0
43	O	Marital Status	CE	0
44	O	Insured's Employment Start Date	DT	0
45	O	Employment Stop Date	DT	0
46	O	Job Title	ST	0
47	O	Job Code/class	JCC	0
48	O	Job Status	IS	0
49	O	Employer Contact Person Name	XPN	0
50	O	Employer Contact Person Phone Number	XTN	0
51	O	Employer Contact Reason	IS	0
52	O	Insured's Contact Person's Name	XPN	0
53	O	Insured's Contact Person Phone Number	XTN	0
54	O	Insured's Contact Person Reason	IS	0
55	O	Relationship To The Patient Start Date	DT	0
56	O	Relationship To The Patient Stop Date	DT	0
57	O	Insurance Co. Contact Reason	IS	0
58	O	Insurance Co Contact Phone	XTN	0



SEQ	OPT	Description	Data Type	Repeats
		Number		
59	O	Policy Scope	IS	0
60	O	Policy Source	IS	0
61	O	Patient Member Number	CX	0
62	O	Guarantor's Relationship To Insured	CE	0
63	O	Insured's Phone Number - Home	XTN	0
64	O	Insured's Employer Phone Number	XTN	0
65	O	Military Handicapped Program	CE	0
66	O	Suspend Flag	ID	0
67	O	Copay Limit Flag	ID	0
68	O	Stoploss Limit Flag	ID	0
69	O	Insured Organization Name And ID	XON	0
70	O	Insured Employer Organization Name And ID	XON	0
71	O	Race	CE	0
72	O	Hcfa Patient's Relationship To Insured	CE	0

## 4.22 IN3 – Insurance Segment

SEQ	OPT	Description	Data Type	Repeats
1	R	Set ID – In3	SI	0

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SEQ	OPT	Description	Data Type	Repeats
2	0	Certification Number	CX	0
3	0	Certified By	XCN	0
4	0	Certification Required	ID	0
5	0	Penalty	PEN	0
6	0	Certification Date/time	XPN	0
7	0	Certification Modify	TS	0
8	0	Operator	XCN	0
9	0	Certification Begin Date	DT	0
10	0	Certification End Date	DT	0
11	0	Days	XON	0
12	0	Non-concur Code/description	CE	0
13	0	Non-concur Effective Date/time	TS	0
14	0	Physician Reviewer	XCN	0
15	0	Certification Contact	ST	0
16	0	Certification Contact Phone Number	XTN	0
17	0	Appeal Reason	CE	0
18	0	Certification Agency	CE	0
19	0	Certification Agency Phone Number	XTN	0
20	0	Pre-certification Req/window	PCF	0
21	0	Case Manager	ST	0

SEQ	OPT	Description	Data Type	Repeats
22	O	Second Opinion Date	DT	0
23	O	Second Opinion Status	IS	0
24	O	Second Opinion Documentation Received	IS	0
25	O	Second Opinion Physician	XCN	0

## 4.23 FT1 – Financial Transaction Segment

SEQ	OPT	Description	Data Type	Repeats
1	R	Set ID – FT1	SI	0
2	O	Transaction ID	ST	0
3	O	Transaction Batch ID	ST	0
4	R	Transaction Date	TS	0
5	O	Transaction Posting Date	PEN	0
6	R	Transaction Type	IS	0
7	R	Transaction Code	CE	0
8	O	Transaction Description	ST	0
9	O	Transaction Description - Alt	ST	0
10	O	Transaction Quantity	NM	0
11	O	Transaction Amount - Extended	CP	0
12	O	Transaction Amount - Unit	CP	0

SEQ	OPT	Description	Data Type	Repeats
13	O	Department Code	CE	0
14	O	Insurance Plan ID	CE	0
15	O	Insurance Amount	CP	0
16	O	Assigned Patient Location	PL	0
17	O	Fee Schedule	IS	0
18	O	Patient Type	IS	0
19	O	Diagnosis Code	CE	11
20	O	Performed By Code	XCN	0
21	O	Ordered By Code	XCN	0
22	O	Unit Cost	CP	0
23	O	Filler Order Number	EI	0
24	O	Entered By Code	XCN	0
25	O	Procedure Code	CE	0
26	O	Procedure Code Modifier	CE	4

## 4.24 ROL – Role Segment

SEQ	OPT	Description	Data Type	Repeats
1	R	Role Instance ID	SI	0
2	R	Action Code	CX	0
3	R	Role-rol	XCN	0

SEQ	OPT	Description	Data Type	Repeats
4	R	Role Person	ID	0
5	O	Role Begin Date/time	PEN	0
6	O	Role End Date/time	XPN	0
7	O	Role Duration	TS	0
8	O	Role action reason	CE	0

## 4.25 DB1 – Disability Segment

SEQ	OPT	Description	Data Type	Repeats
1	R	Set ID – Db1	SI	0
2	O	Disabled Person Code	IS	0
3	O	Disabled Person Identifier	CX	0
4	O	Disabled Indicator	ID	0
5	O	Disability Start Date	DT	0
6	O	Disability End Date	DT	0
7	O	Disability Return To Work Date	DT	0
8	O	Disability Unable To Work Date	DT	0

## 4.26 DG1 – Diagnosis Segment

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SEQ	OPT	Description	Data Type	Repeats
1	R	Set ID – In3	SI	0
2	O	Diagnosis Coding Method	ID	0
3	O	Diagnosis Code - Dg1	CE	0
4	O	Diagnosis Description	ST	0
5	O	Diagnosis Date/time	TS	0
6	R	Diagnosis Type	IS	0
7	O	Major Diagnostic Category	CE	0
8	O	Diagnostic Related Group	CE	0
9	O	Drg Approval Indicator	ID	0
10	O	Drg Grouper Review Code	IS	0
11	O	Outlier Type	CE	0
12	O	Outlier Days	NM	0
13	O	Outlier Cost	CP	0
14	O	Grouper Version And Type	ST	0
15	O	Diagnosis Priority	ID	0
16	O	Diagnosing Clinician	XCN	0
17	O	Diagnosis Classification	IS	0
18	O	Confidential Indicator	ID	0
19	0	Attestation Date/time	TS	0

## 4.27 DRG – Diagnosis Related Group Segment

SEQ	OPT	Description	Data Type	Repeats
1	O	Diagnostic Related Group	SI	0
2	O	Drg Assigned Date/time	TS	0
3	O	Drg Approval Indicator	ID	0
4	O	Drg Grouper Review Code	IS	0
5	O	Outlier Type	CE	0
6	O	Outlier Days	NM	0
7	O	Outlier Cost	CP	0
8	O	Drg Payor	IS	0
9	O	Outlier Reimbursement	CP	0
10	O	Confidential Indicator	ID	0

## 4.28 ACC – Accident Segment

SEQ	OPT	Description	Data Type	Repeats
1	O	Accident Date/time	TS	0
2	O	Accident Code	CE	0
3	O	Accident Location	ST	0
4	O	Auto Accident State	CE	0
5	O	Accident Job Related	ID	0

SEQ	OPT	Description	Data Type	Repeats
6	O	Accident Death Indicator	ID	0

## 4.29 PR1 – Procedures Segment

SEQ	OPT	Description	Data Type	Repeats
1	R	Set ID - Pr1	S1	0
2	O	Procedure Coding Method	IS	0
3	R	Procedure Code	CE	0
4	O	Procedure Description	ST	0
5	R	Procedure Date/time	TS	0
6	R	Procedure Functional Type	IS	0
7	O	Procedure Minutes	NM	0
8	O	Anesthesiologist	XCN	0
9	O	Anesthesia Code	IS	0
10	O	Anesthesia Minutes	NM	0
11	O	Surgeon	XCN	0
12	O	Procedure Practitioner	XCN	0
13	O	Consent Code	CE	0
14	O	Procedure Priority	NM	0
15	O	Associated Diagnosis Code	CE	0



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SEQ	OPT	Description	Data Type	Repeats
16	0	Procedure Code Modifier	CE	0

## 5 Configuration

The RamSoft HL7 Service provides a number of configuration options. They can be accessed via the Settings->System Administration menu in PowerReader if you are an admin user.

**HL7 Delete Empty Cancelled Studies:** When true, if the HL7 service receives a message telling it to set a study's status to CANCELLED, and the study in question has no objects then it will delete the study. If it has objects then it just sets the status to CANCELLED.

**HL7 Delete Institution Name if Empty Received:** If set to true this option will remove a previously assigned Institution Name value if the Institution Name field is empty in an inbound HL7 message. This option is rarely used and should only be enabled if a particular workflow requires this functionality.

**HL7 Convert Word Reports to Text:** If set to true this option will convert Microsoft Word documents to plain text for transmission in outbound ORU^R01 messages.

**HL7 Delete PerTech if Empty Received:** If set to false then if a blank performing technologist is received via HL7, and a study exists that has a performing technologist, then the study's tech will not be deleted. If set to true, then the study is updated to have no tech.

**HL7 Delete ReadPhy if Empty Received:** Same as above.

**HL7 Delete Trans if Empty Received:** Same as above.

**HL7 Delete RefPhy if Empty Received:** Same as above.

**HL7 Log Messages:** If set to true, then the text contents of every message received can be saved to log files.

**HL7 Receive Log:** Path and filename of the log file to save received messages to.

**HL7 Send Log:** Same as above, but for sent messages, and ACKs received.

**HL7 Send ORU for verified reports only:** If this entry is set to False, then we will send out two report creation messages for each study. One at the time of original report creation, and another at the time the report is verified. If it's set to true, only one message will go out. It will be sent at the time when the report is verified. Default value is False.

**HL7 Merge Procedures Under The Same AccessionNumber:** Only use this in special cases where you will be receiving multiple procedure orders for a single study. This typically happens when a site is organizing their procedures such that a procedure can encompass multiple imaging procedures from different modalities (say for example a certain type of mammogram required a CR and an MRI. Then the study would have one accession number, but an order for both a CR and an MRI.) One of our sites had a RIS that would send a single accession number for multiple procedures. When this feature is set

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to true, when new procedures are received for an existing accession number, rather than overwriting the procedure code and study description with whatever is received from the message, it appends it to the study description and procedure code, separated by some delimiter.

**HL7 Merge Procedure Delimiter Char:** If HL7 Merge Procedures Under The Same AccessionNumber is turned on, then this entry defines what character is used to delimit the study descriptions.

For example if this value is set to '/' and we received a message for acc # 12345, desc: XRAY BREAST, a study would be created in our database with those values. If later we received a message for acc# 12345, desc: MRI BREAST then:

- If HL7 Merge Procedures Under The Same AccessionNumber=False: Study 12345 would have a description of MRI BREAST.
- If HL7 Merge Procedures Under The Same AccessionNumber=True: Study 12345 would have a description of XRAY BREAST/MRI BREAST

**Note:** When the above entries are enabled, workflow considerations must be made to take into account that the PACS cannot automatically determine when the imaging procedure is done. Normally studies are advanced to completed status when images are received using station list settings. A composite study consisting of multiple procedures would not work for this. If the automatic status advance was enabled then the study would be advanced to COMPLETED and disappear from the modality worklist before the second procedure takes place. As a result, when HL7 Merge Procedures Under The Same AccessionNumber is enabled, the site technologists must *manually* advance study statuses to COMPLETED when they finish all the necessary procedures.

## 6 Normative References

- Health Level Seven, Version 2.3.1, 1999.
- Integrating the Healthcare Enterprise (IHE) Volumes 1 & 2 Rev. 6, 2005.
- NEMA Digital Imaging and Communications in Medicine (DICOM), Version3 Volumes 1 – 17, 2004.