

PenRad HL7 Interface Specifications

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1. INTERFACE OVERVIEW

PenRad offers many HL7 compliant interfaces for bi-directional transfer of specific information to and from HIS/RIS systems. The PenRad HL7 interface module allows the automatic download of patient demographics and the upload of narrative reports via the industry standard HL7 data packets. The interface module (upload and download) offers a series of options to allow for the customization of the standard and non-standard data transfer elements.

The download function allows the downloading of patient demographics from the HIS/RIS system to the PenRad system. This typically contains PID and OBR elements. The upload function allows the report generated by the radiologist, to be uploaded to the HIS/RIS system by populating OBR and OBX sections. All mammographic data, patient data and practice analysis information resides on the PenRad system for administrative, auditing and report generation.

To facilitate a bi-directional interface to an existing HIS/RIS system, PenRad has delineated the specifications required to interface the RIS/HIS system to the PenRad system. All specifications are HL7 compliant and are designed to provide the HIS/RIS provider a bi-directional transfer of information. Other automatic bi-directional interface modules are available, but are not limited to: Flat File Interface, ASCII Text File with FTP Server.

HL7 Download: The PenRad interface system receives the HL7 messages from the RIS/HIS system. Incoming message is parsed and stored in the PenRad Mammography Database. Various formatting options are available.

HL7 Upload: The interpretive report data is extracted from the PenRad report archive database and is converted to HL7 packets and sent to the RIS/HIS System.

Communication module: The Communication module is a windows socket based program that allows PenRad to connect to the other machine in the network using a TCP/IP address and port, or using a valid host name. PenRad HL7 interface module can be configured to operate as the client for result upload and as the server for patient download. Communication and data transfer is real time between the PenRad and RIS/HIS system. PenRad acts as a client for upload and the data is processed from PenRad system and sent to the Host in HL7 format. PenRad acts as the server for downloads and it will listen for HL7 messages from the RIS/HIS HL7 System.

Configuration file: The PenRad HL7 interface program has a configuration file containing information about the site, IP address, location name, HL7 version, and options. This file is user configurable to accommodate system settings changes.

Connection Details:

TCP/IP address of RIS/HIS xxx.xxx.xxx.xxx
Port xxxx

Sequence of Operations:

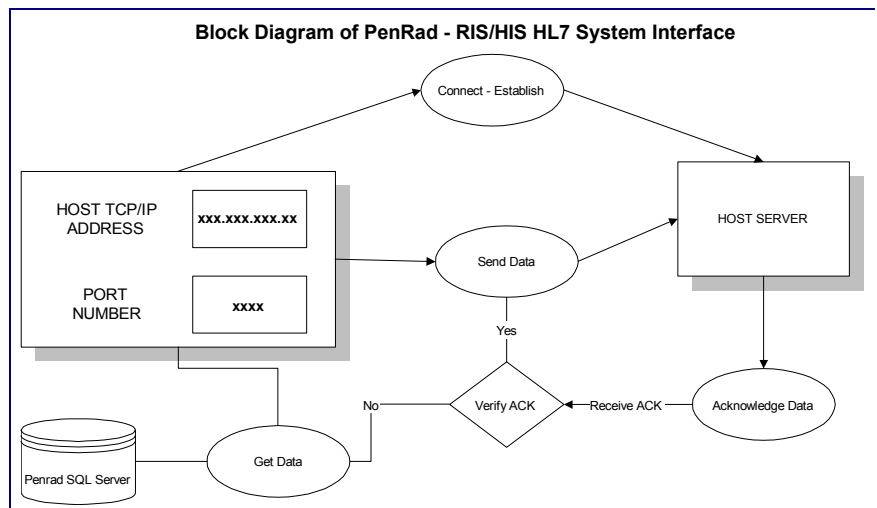
1. The PenRad Client sends a connect request to the RIS/HIS HOST server using the TCP/IP address and port Number.

2. The host server based on the IP address and port number resolves the connect request and sends back an connect established signal.

3. When connection is established, PenRad sends the data. Data is formatted into HL7 packets using the defined standards. An acknowledgment packet is enclosed to ensure a successful transmission.

4. The Host Server then accepts or rejects based on the Message content and validity. The host server sends back an ACK signal for the next messages.

5. The PenRad system receives the ACK and validates it. If the ACK is valid the PenRad system sends the next message. If the ACK is not valid then PenRad system writes to a log file and attempts to send the Message again.



2. HL7 DATA MAPPING

I. INBOUND MESSAGES TO PENRAD FROM HIS\IRIS SYSTEM

A. ADT

PenRad Interface will only accept the following types of ADT messages: **ADT -A04, A08,A31.**

MSH and PID are the only segments required by PenRad for **ADT -A04, A08,A31.** PenRad will process specified doctors in the PV1 segment if required. Other segments sent with ADT messages will be ignored by the PenRad System.

SAMPLE ADT A08

```
<MSH|^~\&|PENRAD|001|HADT|001|199907071324||ADT^A08|03047|P|2.2||AL|NE|
EVN|A08|199907071324|||
PID|0001|T0000000040|1098||TEMPORARY^FOURTH^^MS.^||19090909|F||C|12345 TESTING ADDRESS
ONE^^DEARBORN CITY^MI^48126^USA^^|7172349876|9198761234||S|CA|1602|090999090|||^^^|^^^|^^^|
PV1|0001|O|MM^^^|46400^ABOULAFIA ELIE D MD|91709^ABRASH MICHAEL P
MD|^^^|MED|^^^|2|^^^|G|1602|L|^^^|^^^|A|^^^|19990319133901|19990319133901|0000000.00|0000000.00|0000000.
00|0000000.00|^^^
```

DETAILED ADT MESSAGE LAYOUT

Required fields are in bold.

MSH SEGMENT

Key: S=Segment, P=Position, L= Length, T= Type, R=Required Y/N, N= Name of segment

S	P	L	T	R	N (HL7 Definition)	Value
MSH	0	3	ST		Segment Name	
MSH	1	1	ST		Field separator	
MSH	2	4	ST		Encoding characters	
MSH	3	15	ST		Sending application	
MSH	4	20	ST		Sending facility	
MSH	5	30	ST		Receiving application	
MSH	6	30	ST		Receiving facility	
MSH	7	26	TS		Date/time of message	
MSH	8	40	ST		Security	
MSH	9	7	CM		Message type	
MSH	10	20	ST		Message Control ID	
MSH	11	1	ID		Processing ID	
MSH	12	8	ID		Version ID	
MSH	13	15	NM		Sequence number	
MSH	14	180	ST		Continuation pointer	
MSH	15	2	ID		Accept acknowledgement type	
MSH	16	2	ID		App acknowledgement type	

PID SEGMENT - PATIENT INFORMATION

*PID 2,3 or 4 is required containing the Medical Record Number

Key: S=Segment, P=Position, L= Length, T= Type, R= Required Y/N, N= Name of segment

S	P	L	T	R	N (HL7 Definition)	Value
PID	0	3	ST		Segment Name	
PID	2	16	CK	Y*	Patient ID (External ID)	See note above
PID	3	20	CM	Y*	Patient ID (Internal ID)	See note above
PID	4	12	ST	Y*	Alternate Patient ID	See note above
PID	5	100	PN	Y	Patient Name	Last Name^First Name^Middle^First Title^Last Title
PID	5.1	48	PN		Last Name	
PID	5.2	48	PN		First Name	
PID	5.3	48	PN		Middle Name	
PID	5.4	5	PN		First Title	
PID	5.5	5	PN		Last Title	
PID	7	26	TS	Y	Date of Birth	YYYYMMDD
PID	8	1	ID		Sex	Please Provide Mapping Table

PID	10	1	ID		Race	Please Provide Mapping Table
PID	11	106	AD	Y	Patient Address	Street1^Street2^City^ST^Zip^Country
PID	11.1	50	AD		Street1	
PID	11.2	50	AD		Street2	
PID	11.3	50	AD		City	
PID	11.4	32	AD		State	
PID	11.5	16	AD		Zip	
PID	11.6	32	AD		Country	
PID	13	40	TN		Phone Number - Home	
PID	14	40	TN		Phone Number - Business	
PID	16	1	ID		Marital Status	Please Provide Mapping Table
PID	18	20	CK		Patient Account Number	
PID	19	16	ST		SSN Number	

B. ORDERS (ORM)

MSH,PID,OBR Segments are required. ORC, PV1, ZDOC Segments are optional.

SAMPLE ORDERS:

```
<MSH|^~\&|MARS|RAD|PENRAD||199908100739||ORM^O01|17090|P|2.3
PID||00273433||Last^First^M||19460111|F||C^Caucasian|2442B S 7TH ^^Mpls^WI^5555|(444)111-
8593||||301030037|378503960
PV1||O|INC^ ||||011592^Last^SANDRA^||||FO|||||||199908100705|199908102359
ORC|SC||106A-081099||P|N||||011592^Last^SANDRA^
OBR||106A-081099|Q8005^BI MAMMOGRAM
SCREENING||199908100000||||SCREENING||011592^Last^SANDRA^||||BI|||||199908100745
>
<MSH|^~\&|HBOX|A|PENRAD|A|199905040706||ORM^O01|3349|P|2.2|3349||AL||
PID||00113560|000967190|94180^A1585010|TEST^FIRST^MI^|MCLEOD|19340427|F||4|1111 TURNER HTS
DR^^DECATUR^GA^30032^C||(404)555-5555|^S|^0021304233|428-52-0000|
PV1||O|DBC^^A^^A||||20644^Test^BENJAMIN^H^^MD||OUT|||||20644^TEST^BENJAMIN^H^^MD|NN^A|0021304233^
^^A|||||||A||||199905040703||||
ORC|NW|1438926^HBOX|1438926^HBOX||N||199905040706||20644^TEST^BENJAMIN^H^MD|||||AUTO^^
OBR||1438926^HBOX|1438926^HBOX|41016^DBC SCREENING MAMMO^DBC^SCREEN BREAST
CA||199905040706|||||^B|20644^TEST^BENJAMIN^H^MD|||||^ |||||
>
```

DETAILED ORDER MESSAGE LAYOUT

Required fields are in bold.

MSH SEGMENT

Key: S=Segment, P=Position, L= Length, T= Type, R= Required Y/N, N= Name of segment

S	P	L	T	R	N (HL7 Definition)	Value
MSH	0	3	ST		Segment Name	
MSH	1	1	ST		Field separator	
MSH	2	4	ST		Encoding characters	
MSH	3	15	ST		Sending application	
MSH	4	20	ST		Sending facility	
MSH	5	30	ST		Receiving application	
MSH	6	30	ST		Receiving facility	
MSH	7	26	TS		Date/time of message	
MSH	8	40	ST		Security	
MSH	9	7	CM		Message type	
MSH	10	20	ST		Message Control ID	
MSH	11	1	ID		Processing ID	
MSH	12	8	ID		Version ID	
MSH	13	15	NM		Sequence number	
MSH	14	180	ST		Continuation pointer	

MSH	15	2	ID		Accept acknowledgement type	
MSH	16	2	ID		App acknowledgement type	

PID SEGMENT - PATIENT INFORMATION

*PID 2,3 or 4 is required containing the Medical Record Number.

Key: S=Segment, P=Position, L= Length, T= Type, R= Required Y/N, N= Name of segment

S	P	L	T	R	N (HL7 Definition)	Value
PID	0	3	ST		Segment Name	
PID	2	16	CK	Y*	Patient ID (External ID)	See note above
PID	3	20	CM	Y*	Patient ID (Internal ID)	See note above
PID	4	12	ST	Y*	Alternate Patient ID	See note above
PID	5	100	PN	Y	Patient Name	Last Name^First Name^Middle^First Title^Last Title
PID	5.1	48	PN		Last Name	
PID	5.2	48	PN		First Name	
PID	5.3	48	PN		Middle Name	
PID	5.4	5	PN		First Title	
PID	5.5	5	PN		Last Title	
PID	7	26	TS	Y	Date of Birth	YYYYMMDD
PID	8	1	ID		Sex	Please Provide Mapping Table
PID	10	1	ID		Race	Please Provide Mapping Table
PID	11	106	AD	Y	Patient Address	Street1^Street2^City^ST^Zip^Country
PID	11.1	50	AD		Street1	
PID	11.2	50	AD		Street2	
PID	11.3	50	AD		City	
PID	11.4	32	AD		State	
PID	11.5	16	AD		Zip	
PID	11.6	32	AD		Country	
PID	13	40	TN		Phone Number - Home	
PID	14	40	TN		Phone Number - Business	
PID	16	1	ID		Marital Status	Please Provide Mapping Table
PID	18	20	CK		Patient Account Number	
PID	19	16	ST		SSN Number	

PV1 SEGMENT - PATIENT VISIT

Key: S=Segment, P=Position, L= Length, T= Type, R= Required Y/N, N= Name of segment

S	P	L	T	R	N (HL7 Definition)	Value
PV1	0	3	ST		Segment Name	
PV1	1	4	SI		Set ID - Patient Visit	Exam Number (If Applicable)
PV1	7	60	CN		Attending Doctor	Doctor ID^Last Name^First Name
PV1	8	60	CN		Referring Doctor	Doctor ID^Last Name^First Name
PV1	17	60	CN		Admitting Doctor	Doctor ID^Last Name^First Name
PV1	19	15	NM		Visit Number	Exam Number (If Applicable)

OBR SEGMENT - OBSERVATION REQUEST

OBR 2 or 3 contains the unique exam number.

Key: S=Segment, P=Position, L= Length, T= Type, R= Required Y/N, N= Name of segment

S	P	L	T	R	N (HL7 Definition)	Value
OBR	0	3	ST		Segment Name	
OBR	1	4	SI		Set ID - Observation Request	
OBR	2	75	CM	Y*	Placer Order Number	See note above
OBR	3	75	CM	Y*	Filler Order Number	See note above
OBR	4	200	CE	Y	Universal Service ID	Exam Code^Exam Desc (Provide Mapping Table)

OBR	13	300	ST		Relevant Clinical Info	
OBR	16	60	CN		Ordering Provider	Doctor ID^Last Name^First Name
OBR	31	300	CE		Reason for Study	
OBR	36	26	TS		Scheduled Date/Time	YYYYMMDDHHMM

ORC SEGMENT - ORDER CONTROL

Key: S=Segment, P=Position, L= Length, T= Type, R= Required Y/N, N= Name of segment

S	P	L	T	R	N (HL7 Definition)	Value
ORC	0	3	ST		Segment Name	
ORC	4	75	CM		Placer Group #	
ORC	1	2	ID		Order Control	
ORC	2	75	CM		Placer Order #	
ORC	3	75	CM		Filler Order #	
ORC	5	2	ID		Order Status	
ORC	9	19	TS		Date/Time of Transaction	YYYYMMDDHHMM
ORC	12	80	CN		Ordering Provider	Doctor ID^Last Name^First Name

ZDOC SEGMENT - PRIVATE DOCTOR DEFINITION (Optional)

Key: S=Segment, P=Position, L= Length, T= Type, R= Required Y/N, N= Name of segment

S	P	L	T	R	N (HL7 Definition)	Value
ZDOC	0	3	ST		Segment Name	
ZDOC	1	60	CM	Y	Doctor Name and ID	Dr ID^Last^First^MI^First Title^Last Title
ZDOC	1.1	60	CM	Y	Doctor ID	
ZDOC	1.2	60	CM	Y	Last Name	
ZDOC	1.3	60	CM	Y	First Name	
ZDOC	1.4	60	CM		Middle Name	
ZDOC	1.5	60	CM		First Title	
ZDOC	1.6	60	CM		Last Title	
ZDOC	2	15	ST		Doctor Role	Code (REF, ORD, SUR1, SUR2, ADD)
ZDOC	3	15	CM	Y	Location ID and Location Name	Location ID^Location Name
ZDOC	3.1	15	CM	Y	Location ID (ID for Dr Address)	
ZDOC	3.2	15	CM	Y	Location Name	
ZDOC	5	300	AD	Y	Doctor Address	Street1^Street2^City^ST^Zip^Country
ZDOC	5.1	50	AD		Street1	
ZDOC	5.2	50	AD		Street2	
ZDOC	5.3	50	AD		City	
ZDOC	5.4	32	AD		State	
ZDOC	5.5	16	AD		Zip	
ZDOC	5.6	32	AD		Country	
ZDOC	6	20	TN		Doctor Phone	
ZDOC	7	20	TN		Doctor Fax	

ZDOC SAMPLE:

ZDOC|01081^Last^RICHARD^M.D.|REF|01081^Last,RICHARD\$||11111 W. HWY
22^BARRINGTON^MN^60550^U.S.A|8471111000
ZDOC|04085^Last^JOSH^M.D.|ORD|04085^Last,JOSH\$||5 W. GOLF
ROAD^^SCHAUMBURG^MI^66695^U.S.A|8472222200

C: MFN MO2 Doctor

SAMPLE MO2:

```
<MSH|^~\&|PCSADT|B3|SUNQUEST|B3|200007280852||MFN^M02|DG29AFSC|P|2.3
STF||DR_ID|PHYSICIAN^PENRAD^""|||A||HOSPITAL_ID^HOSPNAME|3098522222|ADDRESS^ADD2^CITY^ST^ZIP>
<MSH|^~\&|PCSADT|B3|SUNQUEST|B3|200008041443||MFN^M02|DG29AFSC|P|2.3
STF||001963|PHYSICIAN^PENRAD^""|||A||ARGA^RFD GASTR|8153977340|ADDRESS^ADDRESS2^CITY^ST^ZIP>
```

DETAILED MFN MO2 MESSAGE LAYOUT

Required fields are in bold.

MSH SEGMENT

Key: S=Segment, P=Position, L= Length, T= Type, R= Required Y/N, N= Name of segment

S	P	L	T	R	N (HL7 Definition)	Value
MSH	0	3	ST		Segment Name	
MSH	1	1	ST		Field separator	
MSH	2	4	ST		Encoding characters	
MSH	3	15	ST		Sending application	
MSH	4	20	ST		Sending facility	
MSH	5	30	ST		Receiving application	
MSH	6	30	ST		Receiving facility	
MSH	7	26	TS		Date/time of message	
MSH	8	40	ST		Security	
MSH	9	7	CM		Message type	
MSH	10	20	ST		Message Control ID	
MSH	11	1	ID		Processing ID	
MSH	12	8	ID		Version ID	
MSH	13	15	NM		Sequence number	
MSH	14	180	ST		Continuation pointer	
MSH	15	2	ID		Accept acknowledgement type	
MSH	16	2	ID		App acknowledgement type	

STF SEGMENT

Key: S=Segment, P=Position, L= Length, T= Type, R= Required Y/N, N= Name of segment

S	P	L	T	R	N (HL7 Definition)	Value
STF	0	3	ST		Segment Name	
STF	2	60	CM	Y	Staff ID Code	Doctor ID
STF	3	48	CM	Y	Staff Name	Last Name^First Name^Middle^First Title^Last Title
STF	3.1	48	PN	Y	Last Name	
STF	3.2	48	PN	Y	First Name	
STF	3.3	48	PN		Middle Name	
STF	3.4	5	PN		First Title	
STF	3.5	5	PN		Last Title	
STF	9	200	CM	Y	Service	Affiliation ID^Affiliation Name
STF	9.1	30	CM	Y	Affiliation ID	
STF	9.2	100	CM	Y	Affiliation name	
STF	10	40	TN		Phone	
STF	11	106	AD	Y	Affiliation Address	Street1^Street2^City^ST^Zip^Country
STF	11.1	50	AD		Street Address	
STF	11.2	50	AD		Street2	
STF	11.3	50	AD		City	
STF	11.4	32	AD		State	
STF	11.5	16	AD		Zip	
STF	11.6	32	AD		Country	

II. OUTBOUND MESSAGES FROM PENRAD TO HIS/IRIS SYSTEM

A. RESULTS

MSH, PID, OBR, OBX Segments will be sent. FT1 is optional.

OBX11 and OBR25 Result Status: F(final), C(corrected or amended), P(preliminary).

SAMPLE RESULT:

```
<MSH|^~\&|PENRAD||RADIOLOGY|199905261733||ORU^R01|333013|P|2.2||A|AL|
PID||000503030^^^A||LASTNAME^Patricia^Maxine^|19330114|||||||0021445713|||||||
OBR||1452203|41016^DBC SCR N MAMMO||199905260000|199905260000|199905261229||||CLINICAL:Screening
Mammogram||5991^LASTNAME^JAY|||||199905261229||F|||||20853^GREER^MICHELLE|5991^LASTNAME^JAY|
OBX|1|TX||#1452203 - DBC SCREENING MAMMO~BILATERAL SCREENING MAMMOGRAM: 5/26/2000~CLINICAL:
Screening Mammogram~~Comparison is made to exam dated: 5/15/1998 XX Medical Center. ~The tissue of both breasts
is heterogeneously dense. This may lower the ~sensitivity of mammography.~Scattered calcifications are present in the
right breast as well as ~scattered benign appearing calcifications in the left breast.~No significant masses, calcifications,
or other findings are seen in ~either breast. ~IMPRESSION:NEGATIVE - MAMMOGRAM~There is no mammographic
evidence of malignancy.~A follow-up mammogram in 12 months is recommended.~~The patient was notified of the
results.~~JAY LASTNAME M.D.~jc/:5/26/1999 letter sent: Benign Findings ~~~Imaging Technologist: MICHELLE
LASTNAME RT(R)(M), XX Medical Center~BiRADS: 2~|||||F||199905260000||
>
```

DETAILED RESULT MESSAGE LAYOUT

MSH SEGMENT

Key: S=Segment, P=Position, L= Length, T= Type, R= Required Y/N, N= Name of segment

S	P	L	T	R	N (HL7 Definition)	Value
MSH	0	3	ST		Segment Name	
MSH	1	1	ST		Field separator	
MSH	2	4	ST		Encoding characters	
MSH	3	15	ST		Sending application	
MSH	4	20	ST		Sending facility	
MSH	5	30	ST		Receiving application	
MSH	6	30	ST		Receiving facility	
MSH	7	26	TS		Date/time of message	
MSH	8	40	ST		Security	
MSH	9	7	CM		Message type	
MSH	10	20	ST		Message Control ID	
MSH	11	1	ID		Processing ID	
MSH	12	8	ID		Version ID	
MSH	13	15	NM		Sequence number	
MSH	14	180	ST		Continuation pointer	
MSH	15	2	ID		Accept acknowledgement type	
MSH	16	2	ID		App acknowledgement type	

PID SEGMENT - PATIENT INFORMATION

Key: S=Segment, P=Position, L= Length, T= Type, R= Required Y/N, N= Name of segment

S	P	L	T	R	N (HL7 Definition)	Value
PID	0	3	ST		Segment Name	
PID	1	4	SI		Set ID - Patient ID	
PID	2	16	CK		Patient ID (External ID)	
PID	3	20	CM		Patient ID (Internal ID)	
PID	4	12	ST		Alternate Patient ID	
PID	5	100	PN		Patient Name	Last Name^First Name^Middle^First Title^Last Title
PID	5.1	48	PN		Last Name	
PID	5.2	48	PN		First Name	
PID	5.3	48	PN		Middle Name	
PID	5.4	5	PN		First Title	
PID	5.5	5	PN		Last Title	
PID	7	26	TS		Date of Birth	YYYYMMDD

PID	18	20	CK		Patient Account Number	
-----	----	----	----	--	------------------------	--

OBR SEGMENT - OBSERVATION REQUEST

OBR 2 or 3 contains the unique exam number(PenRad will replicate the Order).

Key: S=Segment, P=Position, L= Length, T= Type, R= Required Y/N, N= Name of segment

S	P	L	T	R	N (HL7 Definition)	Value
OBR	0	3	ST		Segment Name	
OBR	1	4	SI		Set ID - Observation Request	
OBR	2	75	CM		Placer Order Number	See note above
OBR	3	75	CM		Filler Order Number	See note above
OBR	4	200	CE		Universal Service ID	Exam Code^Exam Desc (Provide Mapping Table)
OBR	6	26	TS		(Imaging) Date/time	Date Time of Tech Completion
OBR	7	26	TS		Observation Date/Time #	Date Time of Tech Completion
OBR	8	26	TS		(Approval) End Date/Time #	Date Time of Radiologist Completion
OBR	13	300	ST		Relevant Clinical Info	
OBR	16	60	CN		Ordering Provider	Referring Doctor ID
OBR	18	60	ST		Placer field 1	
OBR	19	60	ST		Placer field 2	
OBR	20	60	ST		Filler Field 1(ICD9 Codes)	ICD9~ICD9
OBR	21	60	ST		Filler Field 2(CPT Codes)	CPT~CPT
OBR	22	26	TS		Results Rpt/Status Chng D/T	
OBR	25	1	ID		Result Status	F(Final),C(Corrected or Amended), or P(Preliminary)
OBR	31	300	CE		Reason for Study	
OBR	32	60	CM		Principal Result Interpreter	Radiologist1
OBR	33	60	CM		Assistant Result Interpreter	Radiologist2
OBR	34	60	CM		Technician	Technologist
OBR	35	60	CM		Transcriptionist	

OBX SEGMENT - OBSERVATION RESULTS

Key: S=Segment, P=Position, L= Length, T= Type, R= Required Y/N, N= Name of segment

S	P	L	T	R	N (HL7 Definition)	Value
OBX	0	3	ST		Segment Name	
OBX	1	4	SI		Set ID - Observational Simple	
OBX	2	2	ID		Value Type	
OBX	3	80	CE		Observation Identifier	
OBX	4	20	ST		Observation Sub-ID	
OBX	5	9999*			Observation Value	Text of the Report
OBX	11	2	ID		Observ Result Status	F(Final),C(Corrected or Amended), or P(Preliminary)
OBX	14	26	TS		Date/Time of theObservation	

FT1 SEGMENT (Optional)

Key: S=Segment, P=Position, L= Length, T= Type, R= Required Y/N, N= Name of segment

S	P	L	T	R	N (HL7 Definition)	Value
FT1	0	3	ST		Segment Name	
FT1	4	8	DT		Transaction Date	
FT1	7	20	CE		Transaction Code(CPT)	CPT~CPT
FT1	10	4	NM		Transaction Quantity	
FT1	16	12	CM		Assigned Patient Location	Imaging Location
FT1	19	8	CE		Diagnosis Code(ICD9)	ICD9~ICD9
FT1	20	20	CN		Performed by Code	Radiologist1
FT1	21	60	CN		Ordered by Code	Referring Doctor

B: RESULTS COMBINED

MSH, PID, OBR(multiple), OBX Segments will be sent. FT1 is optional.
 OBX11 and OBR25 Result Status: F(final), C(corrected or amended), P(preliminary).

SAMPLE RESULT COMBINED:

```
<MSH|^~\&|PENRAD||RADIOLOGY|199905261736||ORU^R01|338634|P|2.2||A|AL|
PID||000704486||Patient^Claire^^|19250414||||||0021448261||||||
OBR||1452461|41010^DBC MAMMO BILAT||199905260000|199905260000|199905261718||||CLINICAL: Left Breast Lump||5991^RAD^JAY^^^M.D.||||199905261718||F||||14149^TECH^TARA^^^RT(R)|5991^RAD^JAY^^^M.D.|
OBR||1452505|41018L^DBC US BREAST UNILAT||199905260000|199905260000|199905261718||||CLINICAL: Left Breast Lump||5991^RAD^JAY^^^M.D.||||199905261718||F||||14149^TECH^TARA^^^RT(R)|5991^RAD^JAY^^^M.D.|
OBX|1|TX||#1452461 - DBC MAMMO BILAT~BILATERAL DIAGNOSTIC MAMMOGRAM: 5/26/1999~CLINICAL: Left Breast Lump~~No prior exams were available for comparison. ~There are scattered fibroglandular elements in both breasts that could ~obscure a lesion on mammography.~No significant masses, calcifications, or other findings are seen in ~either breast. ~IMPRESSION:NEGATIVE - MAMMOGRAM~There is no mammographic evidence of malignancy.~BiRADS: 1 ~~~~#1452505 - DBC US BREAST UNILAT~ULTRASOUND OF THE LEFT BREAST : 5/26/1999~Doppler ultrasound was performed on the left breast. ~No prior exams were available for comparison. No abnormalities were seen~sonographically in the left breast. ~IMPRESSION : NEGATIVE~A 1 year screening mammogram is recommended. ~JAY RAD M.D.~jc/:5/26/1999 letter sent: Mam Normal Abnormal History ~~~Imaging Technologist: TARA TECH RT(R), ABC Medical Center~||||F||199905260000||
>
```

**DETAILED RESULT COMBINED MESSAGE LAYOUT
 MSH SEGMENT**

PID SEGMENT - PATIENT INFORMATION

OBR SEGMENT - OBERSERVATION REQUEST

OBR 2 or 3 contains the unique exam number(PenRad will replicate the Order)
 Key: S=Segment, P=Position, L= Length, T= Type, R= Required Y/N, N= Name of segment

S	P	L	T	R	N (HL7 Definition)	Value
OBR	0	3	ST		Segment Name	
OBR	1	4	SI		Set ID - Observation Request	
OBR	2	75	CM		Placer Order Number	See note above
OBR	3	75	CM		Filler Order Number	See note above
OBR	4	200	CE		Universal Service ID	Exam Code^Exam Desc (Provide Mapping Table)
OBR	6	26	TS		(Imaging) Date/time	Date Time of Tech Completion
OBR	7	26	TS		Observation Date/Time #	Date Time of Tech Completion
OBR	8	26	TS		(Approval) End Date/Time #	Date Time of Radiologist Completion
OBR	13	300	ST		Relevant Clinical Info	
OBR	16	60	CN		Ordering Provider	Referring Doctor ID
OBR	18	60	ST		Placer field 1	
OBR	19	60	ST		Placer field 2	
OBR	20	60	ST		Filler Field 1(ICD9 Codes)	ICD9~ICD9
OBR	21	60	ST		Filler Field 2(CPT Codes)	CPT~CPT
OBR	22	26	TS		Results Rpt/Status Chng D/T	
OBR	25	1	ID		Result Status	F(Final),C(Corrected or Amended), or P(Preliminary)
OBR	31	300	CE		Reason for Study	
OBR	32	60	CM		Principal Result Interpreter	Radiologist1
OBR	33	60	CM		Assistant Result Interpreter	Radiologist2
OBR	34	60	CM		Technician	Technologist
OBR	35	60	CM		Transcriptionist	

Additional OBR SEGMENTS - OBERSERVATION REQUEST

OBR 2 or 3 contains the unique exam number(PenRad will replicate the Order)
 Key: S=Segment, P=Position, L= Length, T= Type, R= Required Y/N, N= Name of segment

S	P	L	T	R	N (HL7 Definition)	Value
OBR	0	3	ST		Segment Name	

OBR	1	4	SI		Set ID - Observation Request	
OBR	2	75	CM		Placer Order Number	See note above
OBR	3	75	CM		Filler Order Number (linked order)	See note above
OBR	4	200	CE		Linked Order Universal Service ID	Exam Code^Exam Desc (Provide Mapping Table)
OBR	6	26	TS		(Imaging) Date/time	Date Time of Tech Completion
OBR	7	26	TS		Observation Date/Time #	Date Time of Tech Completion
OBR	8	26	TS		(Approval) End Date/Time #	Date Time of Radiologist Completion
OBR	13	300	ST		Relevant Clinical Info	
OBR	16	60	CN		Ordering Provider	Referring Doctor ID
OBR	18	60	ST		Placer field 1	
OBR	19	60	ST		Placer field 2	
OBR	20	60	ST		Filler Field 1(ICD9 Codes)	ICD9~ICD9
OBR	21	60	ST		Filler Field 2(CPT Codes)	CPT~CPT
OBR	22	26	TS		Results Rpt/Status Chng D/T	
OBR	25	1	ID		Result Status	F(Final),C(Corrected or Amended), or P(Preliminary)
OBR	31	300	CE		Reason for Study	
OBR	32	60	CM		Principal Result Interpreter	Radiologist1
OBR	33	60	CM		Assistant Result Interpreter	Radiologist2
OBR	34	60	CM		Technician	Technologist
OBR	35	60	CM		Transcriptionist	

OBX SEGMENT - OBSERVATION RESULTS

FT1 SEGMENT (Optional)

C: ORDER STATUS CHANGE

This message is sent from PenRad at the time of tech completion (when patient is sent to Schedule).

SAMPLE ORDER STATUS CHANGE:

```
<MSH|^~&|HBOC|001|PENRAD|001|199907072041||ORM^O01|03048|P|2.2||AL|NE|
PID||562||LASTNAME^ANN MARIE^^MRS.^||19541029|||||||1734||
ORC|SC|12345||CM|||||||||||||||||
OBR||12345||MAMMO^Screening Mammogram|||||||||||||||||
>
```

DETAILED ORDER STATUS CHANGE MESSAGE LAYOUT

MSH SEGMENT

Key: S=Segment, P=Position, L= Length, T= Type, R= Required Y/N, N= Name of segment

S	P	L	T	R	N (HL7 Definition)	Value
MSH	0	3	ST		Segment Name	
MSH	1	1	ST		Field separator	
MSH	2	4	ST		Encoding characters	
MSH	3	15	ST		Sending application	
MSH	4	20	ST		Sending facility	
MSH	5	30	ST		Receiving application	
MSH	6	30	ST		Receiving facility	
MSH	7	26	TS		Date/time of message	
MSH	8	40	ST		Security	
MSH	9	7	CM		Message type	ORM^O01
MSH	10	20	ST		Message Control ID	
MSH	11	1	ID		Processing ID	
MSH	12	8	ID		Version ID	
MSH	13	15	NM		Sequence number	
MSH	14	180	ST		Continuation pointer	
MSH	15	2	ID		Accept acknowledgement type	

MSH	16	2	ID		App acknowledgement type	
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PID SEGMENT - PATIENT INFORMATION

Key: S=Segment, P=Position, L= Length, T= Type, R= Required Y/N, N= Name of segment

S	P	L	T	R	N (HL7 Definition)	Value
PID	0	3	ST		Segment Name	
PID	1	4	SI		Set ID - Patient ID	
PID	2	16	CK		Patient ID (External ID)	
PID	3	20	CM		Patient ID (Internal ID)	
PID	4	12	ST		Alternate Patient ID	
PID	5	100	PN		Patient Name	Last Name^First Name^Middle^First Title^Last Title
PID	5.1	48	PN		Last Name	
PID	5.2	48	PN		First Name	
PID	5.3	48	PN		Middle Name	
PID	5.4	5	PN		First Title	
PID	5.5	5	PN		Last Title	
PID	7	26	TS		Date of Birth	YYYYMMDD
PID	18	20	CK		Patient Account Number	

ORC SEGMENT - ORDER CONTROL

Key: S=Segment, P=Position, L= Length, T= Type, R= Required Y/N, N= Name of segment

S	P	L	T	R	N (HL7 Definition)	Value
ORC	0	3	ST		Segment Name	
ORC	1	2	ID		Order Control	SC
ORC	2	75	CM		Placer Order #	
ORC	3	75	CM		Filler Order #	
ORC	5	2	ID		Order Status	CM

OBR SEGMENT - OBSERVATION REQUEST

Key: S=Segment, P=Position, L= Length, T= Type, R= Required Y/N, N= Name of segment

S	P	L	T	R	N (HL7 Definition)	Value
OBR	0	3	ST		Segment Name	
OBR	2	75	CM		Placer Order #	
OBR	3	75	CM		Filler Order #	
OBR	4	200	CE		Universal Service ID	Exam Code^Exam Desc

III. ACK

A. ACK

PenRad will Ack with MSA segment on inbound and outbound.

Acknowledgement Code for MSA segment 1

AA - Original mode: Application Accept Enhanced mode: Application Acknowledgement: Accept

SAMPLE ACK:

```
MSH|^~\`|PENRAD|HL7 Interface|ULTICARE|1|200005180015||ACK|000000690|P|2.2|||NE|NE|
MSA|AA|000000690|||_
MSH|^~\`|PENRAD|HL7 Interface|ULTICARE|1|200005180015||ACK|000000691|P|2.2|||NE|NE|
MSA|AA|000000691|||_
MSH|^~\`|PENRAD|HL7 Interface|ULTICARE|1|200005180811||ACK|000000692|P|2.2|||NE|NE|
MSA|AA|000000692|||_
```

DETAILED ACK MESSAGE LAYOUT

MSA SEGMENT

Key: S=Segment, P=Position, L= Length, T= Type, R= Required Y/N, N= Name of segment

S	P	L	T	R	N (HL7 Definition)	Value
MSA	0	3	ST		Segment Name	

MSA	1	2	ID	Acknowledgement Code	
MSA	2	20	ST	Message Control ID	

Revisions:

Date	Section	Modifications
5/31/2001	Section 2.II.C	Message Type Modified to ORM^O01.
5/31/2001	Section 2.II.C	OBR Segment added.
11/17/2005	Section 2.I.C	MFN fixed wording