Category	Content
Keywords	HL7 Interface Instruction Manual
Abstract	

Revision History

Version	Date	Reason
V1.00	8/27/2015	Create a document
V1.1	12/2/2015	Modify ROL, OBR segment
V1.2	12/12/2015	OBR segment add reagent batch number field
V1.3	3/17/2016	Modify OBR, OBX identifier segment definition
V1.4	11/6/2020	1. Optimize the overall layout of the document and improve the directory structure. 2. Modify the inconsistency between the original MSH segment example and the code actually uploaded. 3. Add a description of the differences before and after FS301 106, and provide a solution. 4. DSP segment, the original project ID, now is changed to the project channel number.
V1.5	12/23/2020	1. Sample test result transmission template, modify ORU^R01^ORU_R01 2. Upload results
V1.6	5/26/2021	1. Update sample test result transmission template, project result unique identifier 2. Update PID-3 patient identification table bit ^ symbol to delimiter sign
V1.7	3/8/2023	1. Updated field definitions (OBX-2, OBX-4, OBX-5) for sample test results transmission with pictures; 2. Supplement examples for sample test results with picture transmission

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• Overview of the Wondfo HL7 Interface

The Wondfo HL7 interface is the interface between management systems and instrument data developed by Wondfo to accommodate today's rapidly evolving laboratory information systems (LIS) and data management systems. When using TCP/IP or serial communication, the LIS server/data management system can receive sample test results, instrument status, instrument events, QC test results, consumable information and instrument logs, and it can also control the instrument remotely. The instrument can upload test results, QC test results, event information, patient information, etc. to the LIS server/data management system in real-time manner and by batch sending. It also supports the LIS system/data management system to obtain them by active query.

The data transfer formats under this interface have been created in accordance with HL7 version 2.4. This interface supports bi-directional transfer between Wondfo instruments and LIS/data management systems.

• Messages Supported by the Wondfo HL7 Interface

HL7 is an electronic data interchange standard for providing care to hospitalized patients. Originally defined in the United States, it is now used in many countries. This interface is defined based on HL7 v2.4. For details, please refer to HL7 Interface Standards Version 2.4.

Since the Wondfo HL7 interface only uses some of the data, only some of the message types, segment types and other data specified in HL7 are used in this interface.

• HL7 Minimal Lower Layer Protocol (MLLP)

Neither TCP/IP nor the serial communication protocols provide message boundaries. As an upper layer protocol, HL7 is message based, but it also does not provide a message termination mechanism. To determine message boundaries, we use the Minimal Lower Layer Protocol (MLLP).

The MLLP protocol is an encapsulation of HL7 messages. The MLLP protocol is defined by the HL7 standard specification, and the HL7 message encapsulation is a single character at the beginning of the message and a double character at the end. The characters used in this interface are the default characters of HL7 standard.

Beginning character: hexadecimal <0B>

End character: hexadecimal <1C><0D>

Communication Layer

Messages are transmitted in the following format:

<SB> ddddd <EB><CR>

Where:

<SB> = Start Block character (1 byte)

ASCII <VT>, i.e. <0x0B>. Not to be confused with the ASCII characters SOH or STX.

ddddd = Data (variable number of bytes)

ddddd is an HL7 message. Use UTF-8 encoding (hexadecimal values 20 - FF) and <CR>.

<EB> = End Block character (1 byte)

ASCII <FS>, i.e. <0x1C>. Not to be confused with the ASCII characters ETX or EOT.

<CR> = Carriage Return (1 byte)

ASCII Carriage Return character, i.e. <0x0D>.

- # Duplex Communication

- # Overview

It consists of two aspects. The instrument can transmit test results, QC results, instrument status, consumable information, instrument events, instrument logs, etc. to the LIS system/data management system. In turn, the LIS system/data management system can send instrument manipulation commands, query test results, QC, consumables, logs, and event commands, and can transmit patient information to the instrument.

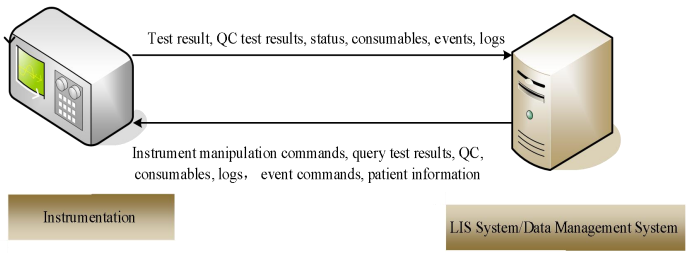


Figure 2.2.1 Communication Diagram between Instrument and LIS/Data Management System

- # Messages Supported by the Wondfo HL7 Interface

The chapter describes several HL7 (version 2.4) messages used by the Wondfo HL7 interface.

Note:

! HL7 supports many message types; here we use only 14 messages.

The common syntax rules are described below.

- # Message Syntax

! For a detailed description of HL7 message syntax, please refer to the HL7 standard.

Each HL7 message consists of a number of segments ending in <CR>.

Each segment consists of a three-character segment name and a variable number of domains

that are composed of components and subcomponents, with the separator for each component unit defined in the MSH segment of each message.

For example: MSH|^~\&|Wondfo|FS-301|||20060427194802||ORU^R01|1|P|2.4||||0||ASCII|||

Where: the five characters following the MSH define the separator used to distinguish between domains, components, and subcomponents. Although these characters can be any non-text characters, the HL7 standard recommends the characters in the table below:

Character	Meaning
|	Domain separator
^	Component separator
&	Subcomponent separator
~	Repetition separator
\	Escape character

Chart 21 Separator

The first domain of MSH includes the individual separator. Some of the latter domains are empty because they are optional and are not used by the Wondfo HL7 interface; refer to the MSH message domain descriptions for details.

For either type of message, the order of the segments following the MSH segment is specified, and the following sections describe these orders specifically. The HL7 standard uses these syntax constructs to indicate that a segment is optional or repeated:

[] indicates that the segments inside are optional

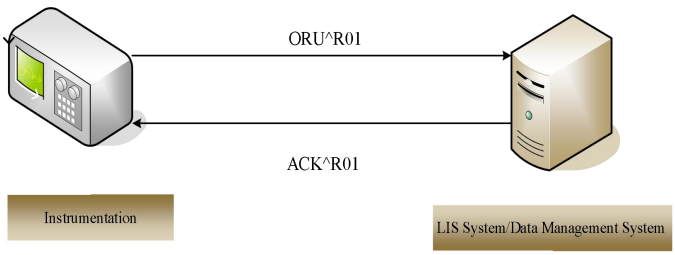
{} indicates that the segments inside can be repeated 0-n times.

• Supported HL7 Messages

The HL7 messages supported by the interface are ORU, ACK, QRY, QCK, DSR, QRF, ESU, ESR, INU, INR, EAC, EAR, LSU, LSR.

The various communication models are listed below:

- **Test Result, QC Result Upload**



ORU/ACK: active transmission of observation messages

ORU^R01 messages are used to transfer lab results in HL7 and are used to transfer sample test results and QC results to the LIS system/data management system in the Wondfo HL7 interface.

ORU-Active Observation Messages (Event **R01**)

ORU messages are fully supported by HL7 to transmit lab results to other systems.

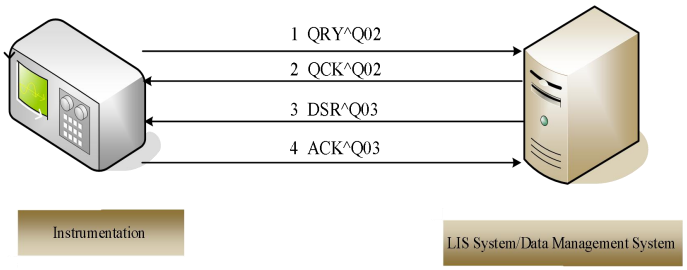
ORU system structure:

ORU^R01 Active Observation Message	Description	Link
MSH	Message Header	MSH (Message Header)
{		
[PID]	Patient Identification Data	PID (Patient Identification Segment)
{		
OBR	Observation Report	OBR (Observation Request Segment)
{[OBX]}	Observation/Result	OBX (Observation/Result Segment)
}		
}		
[DSC]	Continuous Indicator	DSC- Continuation Pointer Segment

The ACK^R01 message is used as a response to an ORU message and is structured as follows:

ACK^R01 Acknowledgement	Description	Link
MSH	Message Header	MSH (Message Header)
MSA	Message Acknowledgment	MSA-Message Acknowledgment Segment
[ERR]	Error Message	ERR- (Error Segment)

Getting sample request information from the LIS System



For simplicity, A represents the system that initiates the query and B represents the system that sends the response. Multiple queries and responses are allowed in a single message. The response to a given query may be discretized into several separate DSR messages. A single DSR message may contain responses to multiple QRYs.

QRY/QCK: Query for Results of Observation/Response (Delayed Query, Event Q02)

The QRY^Q02 message queries the current data and is used to query the LIS system for the required sample request information, which triggers event Q02.

The QCK^Q02 message is used to respond to the QRY message.

The specific structure is as follows:

QRY^Q02 Query Message	Description	Link
MSH	Message Header	MSH (Message Header)
QRD	Query Definition	QRD (Original Style Query Definition Segment)
[QRF]	Query Filter Program	QRF – Original Style Query Filter Segment
[DSC]	Continuous Indicator	DSC-Continuation Pointer Segment

QCK^Q02 Query Acknowledgement	Description	Link
MSH	Message Header	MSH (Message Header)
MSA	Message Acknowledgment	MSA-Message Acknowledgment Segment
[ERR]	Error Message	ERR-(Error Segment)
[QAK]	Query Acknowledgement	QAK –Query Awareness Segment

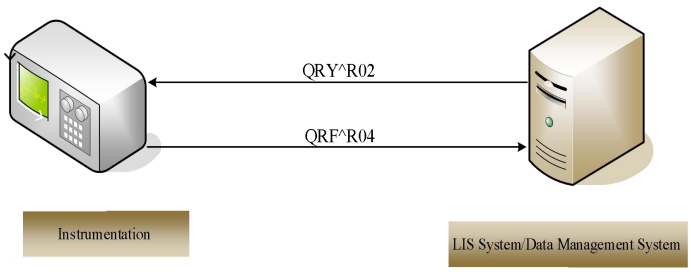
DSR/ACK: Delayed response to a query (Event Q03)

The main function of the DSR^Q03 message is to send for display of the query result, i.e., to allow the LIS to send the required sample request information to the query side. Its structure is as follows:

DSR^Q03 Display Response Information	Description	Link
MSH	Message Header	MSH (Message Header)
[MSA]	Message Acknowledgment	MSA-Message Acknowledgment Segment
[ERR]	Error	ERR-(Error Segment)
[QAK]	Query Acknowledgement	QAK –Query Awareness Segment
QRD	Query Definition	QRD –(Original Style Query Definition Segment)
[QRF]	Query Filter Program	QRF –Original Style Query Filter Segment
{DSP}	Display Data	DSP –Display Data Segment
[DSC]	Continuous Indicator	DSC-Continuation Pointer Segment

ACK^Q03 Acknowledgement	Description	Link
MSH	Message Header	MSH (Message Header)
MSA	Message Acknowledgment	MSA-Message Acknowledgment Segment
[ERR]	Error Message	ERR-(Error Segment)

- # Query Sample Results and QC results



QRY/ORF - Query for Results of Observation (Event R02, R04)

QRY^R02 is used for LIS system/data management system to query test result, QC result with the following structure:

QRY^R02^QRY_R02 Query	Description	Link
MSH	Message Header	MSH (Message Header)
QRD	Query Definition	QRD (Original Style Query Definition Segment)

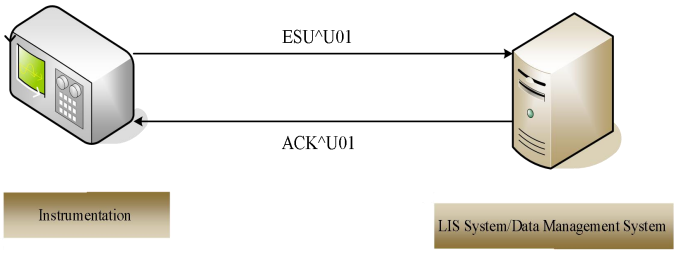
QRF	Query Filter Program	QRF – Original Style Query Filter Segment

ORF^R04 Response to query; transmission of requested observation is structured as follows:

ORF^R04^ORF_R04 Observational Report	Description	Link
MSH	Message Header	MSH (Message Header)
MSA	Message Acknowledgment	MSA-Message Acknowledgment Segment
QRD	Query Definition	QRD –(Original Style Query Definition Segment)
[QRF]	Query Filter Program	QRF –Original Style Query Filter Segment
{		
[PID]	Patient Identification Data	PID (Patient Identification Segment)
{		
OBR	Observation Report	OBR (Observation Request Segment)
{[OBX]}	Observation/Result	OBX (Observation/Result Segment)
}		
}		
[ERR]	Error	ERR-(Error Segment)
[QAK]	Query Acknowledgement	QAK –Query Awareness Segment
[DSC]	Continuous Indicator	DSC-Continuation Pointer Segment

ORF^R04^ORF_R04	Observational Report 观察记录	Chapter
MSH	Message Header 信息头	2
MSA	Message Acknowledgment 信息确认	2
QRD	Query Definition 查询定义	2
[QRF]	Query Filter 查询过滤器	2
{		
[		
PID	Patient ID 病人ID	3
[{NTE}]	Notes and Comments 注解和评论	3
]		
{		
[ORC]	Order common 一般医嘱	
OBR	Observation request 观察请求	7
{[NTE]}	Notes and comments 注解和评论	2
[CTD]	Contact Data 联系资料	11
{		
[OBX]	Observation/Result 观察报告/结果	7
{[NTE]}	Notes and comments 注解和评论	2
}		
{[CTI]}	Clinical Trial Identification 临床试验证明	7
}		
}		
[ERR]	Error 错误	2
[QAK]	Query Acknowledgement 查询确认	5
[DSC]	Continuation Pointer 连续指标	2

- **Instrument Status Update**



The ESU/ACK message is used to send status updates from one application program to another. The status can be sent either actively or in response to an “Instrument Status Request”. The structure of the ESU/ACK message is as follows.

ESU^U01^ESU_U01 Equipment	Description	Link

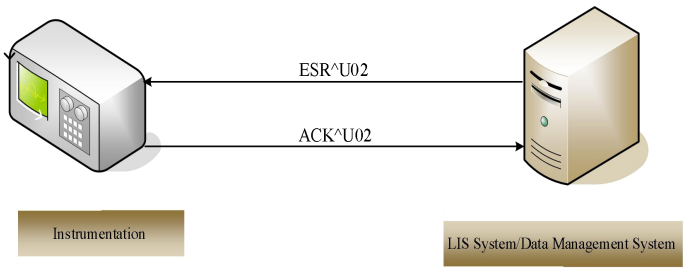
Status Message		
MSH	Message Header	MSH (Message Header)
EQU	Equipment Detail	EQU – Equipment Detail Segment
{ISD}	Interaction Status Detail	ISD– Interaction Status Detail Segment
[ROL]	Role Detail	ROL - Role Segment

ACK^U01^ACK Acknowledgement	Description	Link
MSH	Message Header	MSH (Message Header)
MSA	Message Acknowledgment	MSA-Message Acknowledgment Segment
[ERR]	Error Message	ERR-(Error Segment)

ESU^U01^ESU_U01	Equipment Status Message 设备状况消息	Chapter
MSH	Message Header 消息头	2
EQU	Equipment Detail 设备细节	13
[{ ISD }]	Interaction Status Detail 相互作用状态细节	13
[ROL]	Role Detail 角色细节	12

ACK^U01^ACK	General Acknowledgement 一般认识	Chapter
MSH	Message Header 消息头	2
MSA	Message Acknowledgment 消息认识	2
[ERR]	Error14 错误	2

- # Instrument Status Request



ESR/ACK-Automated Equipment Status Request (Event U02)

This message is used by one application program to request information about the status of a equipment or part of a equipment from another application program. The equipment identified in the EQU terminal shall answer its status using the “Automated Equipment Status Update”, which is structured as follows.

ESR^U02^ESR_U02 Equipment Status Message	Description	Link
MSH	Message Header	MSH (Message Header)
EQU	Equipment Detail	EQU – Equipment Detail

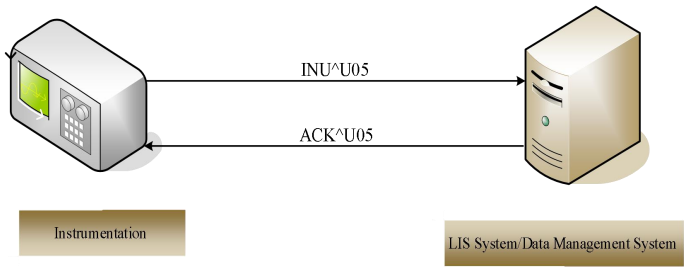
		Segment
[ROL]	Role Detail	ROL - Role Segment

ACK^U02^ACK Acknowledgement	Description	Link
MSH	Message Heade	MSH (Message Header)
MSA	Message Acknowledgment	MSA-Message Acknowledgment Segment
[ERR]	Error Message	ERR-(Error Segment)

ESR^U02^ESR_U02	Equipment Status Message 设备状况消息	Chapter
MSH	Message Header 消息头	2
EQU	Equipment Detail 设备细节	13
[ROL]	Role Detail 角色细节	12

ACK^U02^ACK	General Acknowledgment	Chapter
MSH	Message Header 消息头	2
MSA	Message Acknowledgment 消息认识	2
[ERR]	Error 错误	2

- # Instrument Consumables Update



INU/ACK-Equipment Consumables Update (Event U05)

This message is used by one application to send consumable information to another and is structured as follows:

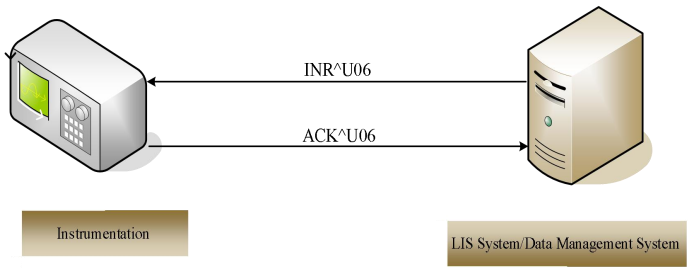
INU^U05^INU_U05 Equipment List Update Message	Description	Link
MSH	Message Header	MSH (Message Header)
EQU	Equipment Detail	EQU – Equipment Detail Segment
{INV}	Inventory Detail	INV Inventory Detail Segment
[ROL]	Role Detail	ROL - Role Segment
ACK^U05^ACK Acknowledgement	Description	Link

MSH	Message Header	MSH (Message Header)
MSA	Message Acknowledgment	MSA-Message Acknowledgment Segment
[ERR]	Error Message	ERR-(Error Segment)

INU^U05^INU_U05	Inventory Update Message	Chapter
MSH	Message Header 消息头	2
EQU	Equipment Detail 设备细节	13
{ INV }	Inventory Detail 总量细节	13
[ROL]	Role Detail 角色细节	12

ACK^U05^ACK	General Acknowledgment	Chapter
MSH	Message Header 消息头	2
MSA	Message Acknowledgment 消息认识	2
[ERR]	Error 错误	2

- # Instrument Consumables Query



INR/ACK-Automated Equipment Inventory Request (Event U06)

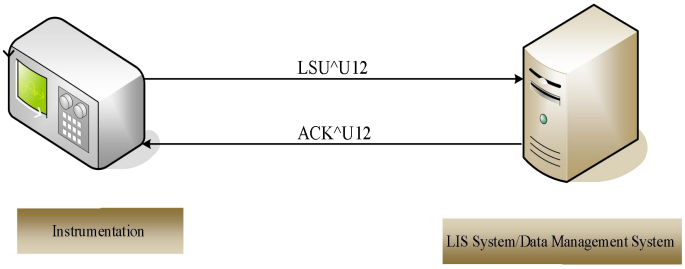
This message is used by one application program to request consumable information from another. The equipment defined in the EQU segment shall answer all consumable information requested in the INV terminal. It is structured as follows:

INR^U06^INU_U06 Equipment List Update Message	Description	Link
MSH	Message Header	MSH (Message Header)
EQU	Equipment Detail	EQU – Equipment Detail Segment
{INV}	Inventory Detail	INV Inventory Detail Segment
[ROL]	Role Detail	ROL - Role Segment
ACK^U06^ACK Acknowledgement	Description	Link
MSH	Message Header	MSH (Message Header)
MSA	Message Acknowledgment	MSA-Message Acknowledgment Segment
[ERR]	Error Message	ERR-(Error Segment)

INR^U06^INR_U06	Inventory Request Message	Chapter
MSH	Message Header 消息头	2
EQU	Equipment Detail 设备细节	13
{ INV }	Inventory Detail 总量细节	13
[ROL]	Role Detail 角色细节	12

ACK^U06^ACK	General Acknowledgment	Chapter
MSH	Message Header 消息头	2
MSA	Message Acknowledgment 消息认识	2
[ERR]	Error 错误	2

- **Instrument Event, Log Update**



LSU/ACK-Automatic Instrument Log, Event Update (Event U12)

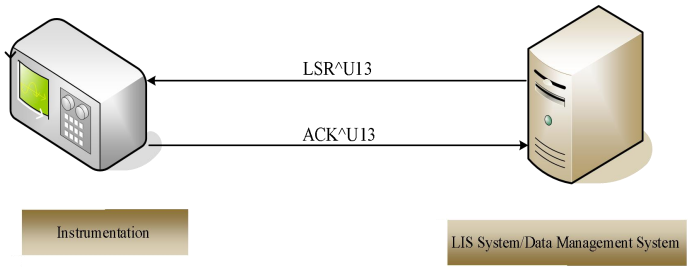
This message is used by one application program to send event and log information to another and is structured as follows:

LSU^U12^LSU_U12 Device Log Event Message	Description	Link
MSH	Message Header	MSH (Message Header)
EQU	Equipment Detail	EQU – Equipment Detail Segment
{EQP}	Equipment Log / Event / Service	EQP Equipment Log/Service Segment
[ROL]	Role Detail	ROL - Role Segment
ACK^U12^ACK Acknowledgement	Description	Link
MSH	Message Heade	MSH (Message Header)
MSA	Message Acknowledgment	MSA-Message Acknowledgment Segment
[ERR]	Error Message	ERR-(Error Segment)

LSU^U12^LSU_U12	Equipment Log/Service Message	Chapter
MSH	Message Header 消息头	2
EQU	Equipment Detail 设备细节	13
{ EQP }	Equipment Log/Service 设备日志文件/服务	13
[ROL]	Role Detail 角色细节	12

ACK^U12^ACK	General Acknowledgment	Chapter
MSH	Message Header 消息头	2
MSA	Message Acknowledgment 消息认识	2
[ERR]	Error 错误	2

- **Instrument Event, Log Query**



LSR/ACK-Instrument Log/Event Request (Event U13)

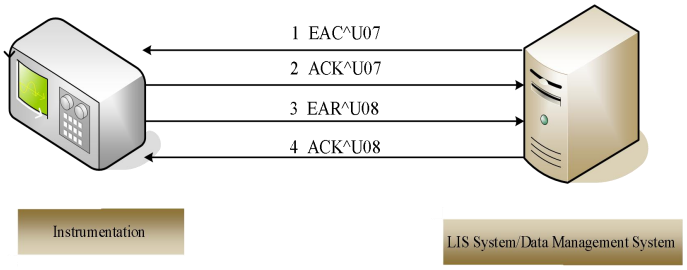
This message is used by one application program to request logs/events from another and is structured as follows:

LSR^U13^LSR_U13 Device Log Event Request	Description	Link
MSH	Message Header	MSH (Message Header)
EQU	Equipment Detail	EQU – Equipment Detail Segment
{EQP}	Equipment Log / Event / Service	EQP Equipment Log/Service Segment
[ROL]	Role Detail	ROL - Role Segment
ACK^U13^ACK Acknowledgement	Description	Link
MSH	Message Heade	MSH (Message Header)
MSA	Message Acknowledgmen	MSA-Message Acknowledgment Segment
[ERR]	Error Message	ERR-(Error Segment)

LSR^U13^LSU_U12	Equipment Log/Service Message	Chapter
MSH	Message Header 消息头	2
EQU	Equipment Detail 设备细节	13
{ EQP }	Equipment Log/Service 设备日志文件/服务	13
[ROL]	Role Detail 角色细节	12

ACK^U13^ACK	General Acknowledgment	Chapter
MSH	Message Header 消息头	2
MSA	Message Acknowledgment 消息认识	2
[ERR]	Error 错误	2

- **LIS System/Data Management Sends Command to Instrument**



EAC/ACK-Automated Equipment Command (Event U07)

This message is used by one application program to send an equipment command to another and is structured as follows:

EAC^U07^EAC_U07 Equipment Command Message	Description	Link
MSH	Message Header	MSH (Message Header)
EQU	Equipment Detail	EQU – Equipment Detail Segment
{ECD}	Equipment Command Detail	ECD - Equipment Command Segment
[ROL]	Role Detail	ROL - Role Segment

ACK^U07^ACK Acknowledgement	Description	Link
MSH	Message Header	MSH (Message Header)
MSA	Message Acknowledgment	MSA-Message Acknowledgment Segment
[ERR]	Error Message	ERR-(Error Segment)

EAC^U07^EAC_U07	Equipment Command Message	Chapter
MSH	Message Header 消息头	2
EQU	Equipment Detail 设备细节	13
{ ECD }	Equipment Command Detail	13
[SAC]	Specimen and Container Detail 标本和容器细节	13
[CNS]	Clear Notification 清晰的通知	13
[ROL]	Role Detail 角色细节	12

ACK^U07^ACK	General Acknowledgment	Chapter
MSH	Message Header 消息头	2
MSA	Message Acknowledgment 消息认识	2
[ERR]	Error 错误	2

EAR/ACK - Automated Equipment Response (Event U08)

This message is used by one application program to send an equipment response message to another program issuing a command, and is structured as follows:

EAR^U08^EAR_U08 Equipment Command Message	Description	Link
MSH	Message Header	MSH (Message Header)
EQU	Equipment Detail	EQU – Equipment Detail Segment
{ECD	Equipment Command Detail	ECD - Equipment Command Segment
ECR}	Equipment Command Response	ECR -Equipment Command Response Segment
[ROL]	Role Detail	ROL - Role Segment
ACK^U08^ACK Acknowledgement	Description	Link
MSH	Message Header	MSH (Message Header)
MSA	Message Acknowledgment	MSA-Message Acknowledgment Segment
[ERR]	Error Message	ERR-(Error Segment)

EAR^U08^EAR_U08	Equipment Command Message	Chapter
MSH	Message Header 消息头	2
EQU	Equipment Detail 设备细节	13
{ ECD	Equipment Command Detail 设备支配细节	13
[SAC]	Specimen and Container Detail 标本和容器细节	13
ECR }	Equipment Command Response 设备支配回应	13
[ROL]	Role Detail 角色细节	12

ACK^U08^ACK	General Acknowledgment	Chapter
MSH	Message Header 消息头	2
MSA	Message Acknowledgment 消息认识	2
[ERR]	Error 错误	2

• Message Segment

The individual components of each segment are described in a table in this section, which lists all the domains used in the message segment. Fields with a # after the serial number are mandatory. Fields with no value are treated as empty by default.

- # MSH - Message Header

For the header message segment of an HL7 message, every HL7 message shall begin with an MSH, typically at the forefront of the message. This message segment is used to define certain details of the intent, source, purpose, and syntax of the message.

MSH|^~\&|Send Application Program|Send Equipment|Receive Application Program|Receive Equipment|Message Sending Time| |Message Type|Message Control ID|Processing ID|2.4|||| Application Program Acknowledgment Types|Country Codes|Character Sets||||

SEQ	LEN	ITEM #	Element name	LINK#
1#	1	00001	Field Separator	MSH-1 Field Separator (ST) 00001
2#	4	00002	Encoded Character	MSH-2 Encoded character (ST) 00002
3	180	00003	Send Application Program	MSH-3 Send Application Program (ST) 00003
4	180	00004	Send Equipment	MSH-4 Send Equipment (HD) 00004
5	180	00005	Receive Application Program	MSH-5 Receive Application Program (ST) 00005
6	180	00006	Receiving Equipment	MSH-6 Receive Equipment (HD) 00006
7	26	00007	Date/Time of Message	MSH-7 Date/Time of Message (TS) 00007
8	40	00008	Confidentiality, **Reserved, Empty**	MSH-8 Confidentiality (ST) 00008
9#	13	00009	Message Types	MSH-9 Message Types (CM) 00009
10#	20	00010	Message Control ID Number	MSH-10 Message Control ID Number (ST) 00010
11#	3	00011	Processing ID Number	MSH-11 Processing ID Number (PT) 00011
12	60	00012	Version ID number, HL7 Protocol Version: 2.4	MSH-12 Version ID Number (VID) 00012
13	15	00013	Serial Number, **Reserved, Empty**	MSH-13 Serial Number (NM) 00013
14	180	00014	Continuation Pointer, **Reserved, Empty**	MSH-14 Continuation Pointer (ST) 00014
15	2	00015	Acceptance Acknowledgement Type, **Reserved, Empty**	MSH-15 Message Acceptance Acknowledgement type (ID) 00015
16	2	00016	Application Program Acknowledgement Type	MSH-16 Application Program Acknowledgement Type (ID) 00016
17	3	00017	Country Code	MSH-17 Country Code (ID) 00017
18	16	00692	Character Set	MSH-18 Character Set (ID) 00692
19	250	00693	Primary Language of Message, **Reserved, Empty**	MSH-19 Primary Language of Message (CE) 00693
20	20	01317	Operation Planning for another character Set, **Reserved, Empty**	MSH-20 Operation Scheme for Different Character Sets (ID) 01317
21	10	01598	ID Consistency Statement ID number,	MSH-21 Consistency Statement ID Number (ID)

			Reserved, Empty	01598

- MSH-1 Field Separator (ST) 00001

Definition: The field is the separator for the message segment ID number from the first field of the fact - the MSH-2 encoded character. It performs the function of a separator and defines the separator for the rest of the message. The recommended value is |, (ASCII value: 124).

- MSH-2 Encoded Character (ST) 00002

Definition: The field contains the following four characters in order: component separator, repetition separator, escape character, and subcomponent separator. The recommended value is "^~\&" (ASCII values are 94, 126, 92, and 38).

- MSH-3 Send Application Program (ST) 00003

Definition: This field identifies the name of the sending application program.

- MSH-4 Send Equipment (HD) 00004

Components:<device name (ST)>^ <device ID (ST)>^ <device type (ST)>

Definition: The field describes the sending equipment information. The field consists of three components: a) Equipment name; b) equipment unique identifier; and c) equipment type.

- MSH-5 Receive Application Program (ST) 00005

Definition: The field identifies the name of the receiving application program.

- MSH-6 Receiving Equipment (HD) 00006

Definition: The field describes the receiving equipment information. The field consists of three components: a) Equipment name; b) equipment unique identifier; and c) equipment type.

- MSH-7 Date/Time of Message (TS) 00007

Definition: The field contains the date/time of the message created by the sending system in "YYYYMMDDHHMMSS" format.

- MSH-8 Confidentiality (ST) 00008

Reserved field.

- MSH-9 Message Types (CM) 00009

Components:<message type (ID)>^ <triggerevent (ID)>^ <message structure (ID)>

The first component is the message type code, which is specified in Chart 31. The table contains the values ORU, ACK, QRY, QCK, DSR, ESU, ESR, and SSU.

Message	Description
ACK	General acknowledgment message
EAC	Automated equipment command message
EAN	Automated equipment notification message
EAR	Automated equipment response message
EQQ	Embedded query language query
ERP	Event replay response
ESR	Automated equipment status update acknowledgment message
ESU	Automated equipment status update message

INR	Automated equipment inventory request message
INU	Automated equipment inventory update message
LSR	Automated equipment log/service request message
LSU	Automated equipment log/service update message
ORF	Query for results of observation
ORU	Unsolicited transmission of an observation message
OUL	Unsolicited laboratory observation message
QCK	Deferred query
QCN	Cancel query
QRY	Query, original mode
RQQ	Event replay query
SSR	Specimen status request message
SSU	Specimen status update message

Chart 31 Message Types

The second component is the Trigger Event Code, which is specified in Chart 32. The table contains values such as: R01, U02, U03.

Value	Description
Q01	QRY/DSR- Query sent for immediate response
Q02	QRY/QCK- Query sent for deferred response
Q03	DSR/ACK- Deferred response to a query
R01	ORU/ACK- Unsolicitedtransmissionof anobservationmessage
R02	QRY-Query for results of observation
R04	ORF -Response to query; transmission of requested observation
R09	ERP- Event Replay Response
U01	ESU/ACK– Automated equipment status update
U02	ESR/ACK– Automated equipment status request
U05	INU/ACK–Automated equipment inventory update
U06	INR/ACK–Automated equipment inventory request
U07	EAC/ACK–Automated equipment command
U08	EAR/ACK–Automated equipment response
U09	EAN/ACK–Automated equipment notification
U12	LSU/ACK–Automated equipment log/service update

U13	LSR/ACK–Automated equipment log/service request LSR/ACK-Automated Device Logging/Service Requests

Chart 32 Triggering Events

The third component is the abstract information structure code, which is specified in Chart 33. This table has two columns. The first column contains the code values, i.e. describes the HL7 "Abstract Message Structure Definition" in the form of message segments. The second column lists the different HL7 triggering events, which utilize a specific Abstract Message Definition.

Value	Events
ACK	Varies
EAC_U07	U07
EAR_U08	U08
ESR_U02	U02
ESU_U01	U01
INR_U06	U06
INU_U05	U05
ORF_R04	R04
ORU_R01	R01
QCK_Q02	Q02
QRY_Q01	Q01
QRY_Q02	Q02
QRY_R02	R02
LSU_U12	U12
LSR_U13	U13

Chart 33 Message Structure

- MSH-10 Message Control ID Number (ST) 00010

Definition: The field contains a number or other identifier that is used to uniquely identify the message. The receiving system returns this ID number to the sending system in the Message Acknowledgment Segment (MSA).

- MSH-11 Processing ID Number (ST) 00011

Components:<processing ID(ID)>

Definition: The field is used to determine whether to process the information defined for the processing rules of the HL7 application (layer 7). Its first component defines whether this message is part of a product, a training, or a debugging system (see Chart 34 for valid values).

Value	Description

D	Debug
P	Product
T	Training

Chart 34 Processing ID Number

- MSH-12 Version ID Number (VID) 00012

Definition: The field records the version information of the message. The Wondfo HL7 interface takes value 2.4 for the field.

- MSH-13 Serial Number (NM) 00013
- MSH-14 Continuation Pointer (ST) 00014
- MSH-15 Message Acceptance Acknowledgement Type (ID) 00015
- MSH-16 Application Program Acknowledgement Type (ID) 00016

Definition: The field is used to calibrate the (message) type.

Value	Description
0	Sample test results
1	Calibration results
2	QC results

Chart 35 Acceptance/Application Program Acknowledgement Conditions (for Message)

- MSH-17 Country Code (ID) 00017

Definition: The field contains the country code of the source of the message. It will be used primarily to identify some default elements, e.g., current naming convention. The values are as specified in ISO 3166, which has been approved by ANSI and is recapitulated below. ISO 3166 has three separate country code lists: HL7 specifies that the country code list is in 3-character format (alphabetical), and commonly used ones are CHN (China), ARM (American), JPN (Japan).

- MSH-18 Character Set (ST) 00692

Definition: The field contains the character set for the entire message. The field takes the value UTF8 and the message is encoded using the UTF8 format.

- MSH-19 Primary Language of Message (CE) 00693
- MSH-20 Operation Scheme for Different Character Sets (ID) 01317
- MSH-21 Consistency Statement ID Number (ID) 01598

• MSA - Message Acknowledgment Segment

The MSA message segment contains an acknowledgement that another message has been sent.

MSA|AA|1|

SEQ	LEN	ITEM #	Element name	LINK#
1#	2	00018	Acknowledgement Code	MSA-1 Acknowledgement Code (ID) 00018
2	20	00010	Message Control ID Number	MSA-2 Message Control ID Number (ST) 00010
3	80	00020	Text Message	MSA-3 Text Message (ST) 00020

4	15	00021	Expected Serial Number, **Reserved, Empty**	MSA-4 Expected Serial Number (NM) 00021
5	1	00022	Delayed Acknowledgement Type, **Reserved, Empty**	MSA-5 Delayed Acknowledgement Type (ID) 00022
6	250	00023	Error Condition	MSA-6 Error Condition (CE) 00023

- MSA-1 Acknowledgement Code (ID) 00018

Definition: The field contains an acknowledgement code. See message processing rules.

Value	Description
AA	Original Mode: Application Program Acceptance - Enhanced Mode: Application Program Acknowledgement Accept
AE	Original Mode: Application Program Error - Enhanced Mode: Application Program Acknowledgement: There is an error
AR	Original Mode: Application Program Reject - Enhanced Mode: Application Program Acknowledgement: Reject
CA	Enhanced Mode: Accept Acknowledgement: Indicates Acceptence
CE	Enhanced Mode: Accept Acknowledgement: Indicates there is an error
CR	Enhanced Mode: Accept Acknowledgement: Indicates Rejection

- MSA-2 Message Control ID Number (ST) 00010

Definition: The field contains the message control ID number of the message sent by the system. It enables the message sending system to establish a link to the destination feedback message, the same as the sender's MSH-10.

- MSA-3 Text Message (ST) 00020

Definition: The optional field further describes the errors. The text can be printed in the error log or made available to the end user.

- MSA-4 Expected Serial Number (NM) 00021
- MSA-5 Delayed Acknowledgement Type (ID) 00022
- MSA-6 Error Condition (CE) 00023

Definition: The field allows the acknowledgement system to use a user-defined error code to further identify an AR or AE type acknowledgement, and is typically used in place of the – MSA -3 text message. See Chart 315 for message error codes.

• PID - Patient Identification Segment

Pid|Incremental ID|ID Number|Record Number^Hospitalization Number^Bed Number||Name||Date of Birth|Gender|Blood Type||Patient Address||Home Phone Number|Private Phone Number |||||Social Security Number||Ethnicity|Origin ||||||||||||

SEQ	LEN	ITEM #	Element name	LINK#
1	4	00104	Setting	PID-1 Setting ID-PID (SI) 00104
2	20	00105	Patient	PID-2 Patient ID (ST) 00105
3#	250	00106	Patient Identification Table	PID-3 Patient Identification Table (CX) 00106

4	20	00107	Alternate Patient, **Reserved, Empty**	PID-4 Alternate Patient ID - PID (CX) 00107
5#	250	00108	Patient Name	PID-5 Patient Name (ST) 00108
6	26	00109	Mother's Maiden Name, **Reserved, Empty**	PID-6 Mother's Maiden Name (XPN) 00109
7	1	00110	Date/Time of Birth	PID-7 Date/Time of Birth (TS) 00110
8	250	00111	Gender, M/F/O (Male/Female/Other)	PID-8 Gender (IS) 00111
9	250	00112	Patient's Alias, Blood Type	PID-9 Patient's Alias (XPN) 00112
10	250	00113	Race, **Reserved, Empty**	PID-10 Race (CE) 00113
11	250	00114	Patient Address	PID-11 Patient Address (ST) 00114
12	4	00115	Country Code, **Reserved, Empty**	PID-12 Country Code (IS) 00115
13	250	00116	Home Phone Number	PID-13 Home Phone Number (XTN) 00116
14	250	00117	Private Phone Number	PID-14 Phone Number-Mobile Phone Number (XTN) 00117
15	250	00118	Native Language, **Reserved, Empty**	PID-15 Native Language (CE) 00118
16	250	00119	Marital Status, **Reserved, Empty**	PID-16 Marital Status (CE)00119
17	250	00120	Religion Faith, **Reserved, Empty**	PID-17 Religious Faith (CE) 00120
18	250	00121	Patient Account Number, **Reserved, Empty**	PID-18 Account Number (CX)00121
19	16	00122	Patient's SSN Number	PID-19 Social Security Number-Patient (ST)00122
20	25	00123	Patient's Driver's License, **Reserved, Empty**	PID-20 Driver's License Number-Patient (DLN) 00123
21	250	00124	Mother's Identification, **Reserved, Empty**	PID-21 Mother's Identification (CX) 00124
22	250	00125	Ethnicity	PID-22 Ethnicity (ST) 00125
23	250	00126	Place of Birth (Origin)	PID-23 Place of Birth (ST) 00126
24	1	00127	Multiple Birth Identification, **Reserved, Empty**	PID-24 Multiple Birth Identification (ID) 00127
25	2	00128	Birth Order, **Reserved, Empty**	PID-25 Birth Order (NM) 00128
26	250	00129	Citizenship, **Reserved, Empty**	PID-26 Citizenship (CE) 00129
27	250	00130	Veteran Status, **Reserved, Empty**	PID-27 Veteran's Status (CE) 00130
28	250	00739	Nationality, **Reserved, Empty**	PID-28 Nationality (CE) 00739
29	26	00740	Date and Time of Patient's Death, **Reserved, Empty**	PID-29 Date and Time of Patient's Death (TS) 00740

30	1	00741	Patient's Death Identification, **Reserved, Empty**	PID-30 Patient's Death Identification (ID) 00741
31	1	01535	Unknown Identification, **Reserved, Empty**	PID-31Unknown Identification (ID) 01535
32	20	01536	Identity Credibility Code, **Reserved, Empty**	PID-32 Identity Credibility Code (IS) 01536
33	26	01537	Date/Time of Last Update, **Reserved, Empty**	PID-33 Date/Time of Last Update (TS) 01537
34	40	01538	Last Updated Organization, **Reserved, Empty**	PID-34 Last Updated Organization (HD) 01538
38	250	01542	Product Category Code, **Reserved, Empty**	PID-35 Product Category Code (CE) 01542

- PID-1 Setting ID-PID (SI) 00104

Definition: The field records the data that identifies the message. For the first occurrence of the segment, the serial number shall be 1; for the second occurrence, the serial number shall be 2, and so on.

- PID-2 Patient ID (ST) 00105

Definition: The field holds the patient's ID number.

- PID-3 Patient Identification Table (CX) 00106

Component: Record Number^Hospitalization Number^Bed Number

Definition: The field records the unique Identification that identifies the patient (consists of the record number, hospitalization number, bed number, or null if there is no hospitalization number or bed number).

- PID-4 Alternate Patient ID - PID (CX) 00107
- PID-5 Patient Name (ST) 00108

Definition: The field records the patient's name.

- PID-6 Mother's Maiden Name (XPN) 00109
- PID-7 Date/Time of Birth (TS) 00110

Definition: The field records the patient's date and time of birth, organized in the format “year/month/day”.

- PID-8 Gender (IS) 00111

Value	Description
F	Female
M	Male
O	Other
U	Unknown
A	Ambiguous
N	Not applicable

Use this definition to indicate gender

- PID-9 Patient’s Alias (ST) 00112

  Definition: The field records the patient's blood type: A, B, O, AB.

- PID-10 Race (CE) 00113
- PID-11 Patient Address (ST) 00114

  Definition: The field records the patient's contact address.

- PID-12 Country Code (IS) 00115
- PID-13 Home Phone Number (ST) 00116

  Component: area code - phone number

  Definition: The field records the patient's home phone number.

- PID-14 Phone Number-Mobile Phone Number (ST) 00117

  Definition: The area records the patient's cell phone number.

- PID-15 Native Language (CE) 00118
- PID-16 Marital Status (CE)00119
- PID-17 Religious Faith (CE) 00120
- PID-18 Account Number (CX)00121
- PID-19 Social Security Number-Patient (ST)00122

Definition: The field records the patient's social security number. This number may also be an RR retirement number.

- PID-20 Driver's License Number-Patient (DLN) 00123
- PID-21 Mother's Identification (CX) 00124
- PID-22 Ethnicity (ST) 00125

  Definition: The field further defines the patient's ethnicity.

- PID-23 Place of Birth (ST) 00126

  Definition: The field indicates the patient's place of origin.

- PID-24 Multiple Birth Identification (ID) 00127
- PID-25 Birth Order (NM) 00128
- PID-26 Citizenship (CE) 00129
- PID-27 Veteran’s Status (CE) 00130
- PID-28 Nationality (CE) 00739
- PID-29 Date and Time of Patient's Death (TS) 00740
- PID-30 Patient's Death Identification (ID) 00741
- PID-31 Identity Unknown Identifier (ID) 01535
- PID-32 Identity Credibility Code (IS) 01536
- PID-33 Date/Time of Last Update (TS) 01537
- PID-34 Last Updated Organization (HD) 01538
- PID-35 Product Category Code (CE) 01542

• OBR - Observation Request Segment

When reporting clinical information, the OBR serves as the report header. The OBR labels the observation set consisting of the observations detailed below. When applicable, the OBR also includes the associated medical order information and contains a number of attributes that are typically

applied to the full set of records contained.

Sample Results: OBR|OBR Identifier|Reagent Card Barcode|Sample Number (Sample Barcode) |||| Test Date|||||| Patient Diagnostic Information|Delivery Time|Sample Type|Delivery Doctor|Delivery Department||Attending Physician|Treatment Department||||||||||||||||||||||||

QC Results:OBR|1|Project Number|Project Name||||QC Date||||Number of QC solutions|QC Number|QC Solution Name|QC Batch Number|QC Solution Expiration Date|QC Range|QC Solution Concentration Level|QC Solution Mean (Average Concentration)|QC Solution Standard Deviation|QC Test Result (Concentration)||||||||||||||||||||||||

SEQ	LEN	Element name	LINK#
1	4	ID Set-OBR	OBR-1 ID Set-OBR (SI) 00237
2	22	**Reagent Card Barcode or Reagent Batch Number/Item Number**	OBR-2 Prescription Number of People Who Make Medical Orders (EI) 00216
3	22	**Sample Number (Specimen Barcode)/Item Name**	OBR-3 Prescription Number of Executor (EI) 00217
4	250	Full Name of Sharing Organization, **Reserved, Empty**	OBR-4 Sharing Organization Name (CE) 00238
5	2	Priority - OBR, **Reserved, Empty**	OBR-5 Priority -OBR (ID) 00239
6	26	Date/Time of Request, **Reserved, Empty**	OBR-6 Date/Time of Request (TS) 00240
7	26	**Date of Test/QC**	OBR-7 Date/Time of Observation (TS) 00241
8	26	Date/Time of Observation End#, **Reserved, Empty**	OBR-8Date/Time of Observation End (TS) 00242
9	20	Collection Volume*, **Reserved, Empty**	OBR-9 Collection Volume (CQ) 00243
10	250	Collector Identification*, **Reserved, Empty**	OBR-10 Collector Identification (XCN) 00244
11	1	**Reserved, Empty/Quantity for QC Solution**	OBR-11 Specimen Processing Code (ID) 00245
12	250	**Reserved, Empty//Number of QC Solution**	OBR-12 Hazardous Material Code (CE) 00246
13	300	**Patient Clinical Diagnosis Information/QC Solution Name**	OBR-13 Related Clinical Information (ST) 00247
14	26	**Delivery Time/QC Solution Expiration Date**	OBR-14 Date/Time of Receipt of Specimen (TS) 00248
15	300	**Sample Type/QC Solution Batch Number**	OBR-15 Source of Specimen (CM) 00249
16	250	**Delivery Doctor/QC scope**	OBR-16 Order Provider (XCN) 00226
17	250	**Delivery Department/QC Solution Concentration Level**	OBR-17 Telephone Number to Reply to Orders (XTN) 00250
18	60	**Empty, Reserved/QC Solution Mean (Average Concentration)**	OBR-18 Placeholder Field 1 (ST) 00251
19	60	**Empty, Reserved/QC Solution Standard Deviation**	OBR-19 Placeholder Field 2 (ST) 00252
20	60	**Attending Physician/QC Test Result (Concentration)**	OBR-20 Executor Field 1 (ST) 00253

21	60	**Treatment Department/Reagent Batch Number**	OBR-21 Executor Field 2 (ST) 00254
22	26	Result Report/Change of Status-Date/Time+, **Empty, Reserved**	OBR-22 Result Report/Implementation Changes - Date/Time (TS) 00255
23	40	Implementation of Toll +, **Reserved, Empty**	OBR-23 Toll (CM) 00256
24	10	Diagnostic Department ID Number, **Reserved, Empty**	OBR-24 Diagnostic Department ID (ID) 00257
25	1	Result Status +, **Reserved, Empty**	OBR-25 Result Status (ID) 00258
26	400	Father Result+, **Reserved, Empty**	OBR-26 Father Result (CM) 00259
27	200	Quantity/Timing, **Reserved, Empty**	OBR-27 Quantity/Timing (TQ) 00221
28	250	Result Copy To, **Reserved, Empty**	OBR-28 Result Copy To (XCN) 00260
29	200	Father Number, **Reserved, Empty**	OBR-29 Father Number (CM) 00261
30	20	Shipping Method, **Reserved, Empty**	OBR-30 Shipping Method (ID) 00262
31	250	Reason for Check, **Reserved, Empty**	OBR-31 Reason for Check (CE) 00263
32	200	Primary Result Expositor+, **Reserved, Empty**	OBR-32 Primary Result Expositor (CM)00264
33	200	Assistant Result Expositor+, **Reserved, Empty**	OBR-33 Assistant Result Expositor
34	200	Technician+, **Reserved, Empty**	OBR-34 Technician (CM) 00266
35	200	Recorder+, **Reserved, Empty**	OBR-35 Recorder (CM) 00267
36	26	Target Date/Time, **Reserved, Empty**	OBR-36 Target Date/Time (TS)00268
37	4	Scheduled Date/Time, **Reserved, Empty**	OBR-37 Specimen Container Number (NM)01028
38	250	Specimen Container Number, **Reserved, Empty**	OBR-38 Transportation Logistics for Collected Specimens (CE) 01029
39	250	Logistics for Transportation of Collected Specimens, **Reserved, Empty**	OBR-39 Collector Evaluation (CE)01030
40	250	Collector Evaluation, **Reserved, Empty**	OBR-40 Transportation Arrangement Tasks (CE)01031
41	30	Transportation Arrangement Tasks, **Reserved, Empty**	OBR-41 Arrangement of Transportation (ID) 01032
42	1	Arrangement of Transportation, **Reserved, Empty**	OBR-42 Request for Transportation (ID)01033
43	250	Request for Transportation, **Reserved, Empty**	OBR-43 Notes on planned patient transport (CE) 01034
44	250	Evaluation of Planned Patient Transportation, **Reserved, Empty**	OBR-44 Program Code (CE)00393
45	250	Check Code, **Reserved, Empty**	OBR-45 Program code modifier (CE) 01316
46	250	Check Code Modifier, **Reserved, Empty**	OBR-46 Placeholder Supplemental Service Information
47	250	Information on Supplemental Services for People Who Make Medical Orders, **Reserved, Empty**	OBR-47 Executor Supplemental Service Information (CE) 01475

HL7 Induction Table-OBR-Observation Request

- OBR-1 ID Set-OBR (SI) 00237

Definition: A unique identifier for the transmitted sample, Composition: A unique identifier for device_sample number_sample detection time (yyyyMMddhhmmss).

- OBR-2 Prescription Number of People Who Make Medical Orders (EI) 00216

Definition: When the **MSH-16 takes 0** to transmit sample results, this field is the bar code number of the reagent card or the batch number of the reagent. When the MSH-16 takes 2 to transmit QC test results, the modified field transmits the project number.

- OBR-3 Prescription Number of Executor (EI) 00217

Definition: When MSH-16 takes 0 to transmit sample results, this field is the sample number (sample bar code). When the MSH-16 takes 2 to transmit QC test results, the modified field transmits the project name.

- OBR-4 Sharing Organization Name (CE) 00238
- OBR-5 Priority -OBR (ID) 00239
- OBR-6 Date/Time of Request (TS) 00240
- OBR-7 Date/Time of Observation (TS) 00241

Definition: When the **MSH-16 takes 0** to transmit sample results, this field is **the sample testing time**. When the **MSH-16 takes 2** to transmit QC test results, the modified field transmits **the QC time of the sample.**

- OBR-8 Observation End Date/Time (TS) 00242
- OBR-9 Collection Volume (CQ) 00243
- OBR-10 Collector Identification (XCN) 00244
- OBR-11 Specimen Processing Code (ID) 00245

Definition: when **MSH-16 takes 2** as **the number of QC Solution.** Otherwise **empty, reserved.**

- OBR-12 Hazardous Material Code (CE) 00246

Definition: when **MSH-16 takes 2** as **the numbering of QC Solution.** Otherwise **empty, reserved.**

- OBR-13 Related Clinical Information (ST) 00247

Definition: when **MSH-16 takes 0**, this field is used as the patient's clinical diagnosis information, and when **MSH-16 takes 2**, this field is used as **the name of the QC Solution**.

- OBR-14 Date/Time of Receipt of Specimen (TS) 00248

Definition: when **MSH-16 takes 0**, this field is used as **the time of delivery**, and when **MSH-16 takes 2**, this field is used as **the validity period of the QC Solution**.

- OBR-15 Sources of Specimens (ST) 00249

Definition: when **MSH-16 takes 0**, this field is used as **the type of sample**, Types of samples include: whole blood, serum, plasma, urine, etc. When **MSH-16 takes 2**, this field is used as **the batch number of the QC fluid.**

- OBR-16 Order Provider (St) 00226

Definition: when **MSH-16 takes 0**, this field points the person who provided the order for the examination, using ID code or name or both. When **MSH-16 takes 2**, this field is used **as the**

scope of QC.

- OBR-17 Telephone Number to Reply to Orders (ST) 00250

Definition: when **MSH-16 takes 0**, this field is used as the **delivery department**. When **MSH-16 takes 2**, this field is used as **the concentration level of the QC fluid.** High: H, Mid: M, Low: L.

- OBR-18 Placeholder Field 1 (ST) 00251

Definition: when **MSH-16 takes 0**, this field is **empty and reserved**. When **MSH-16 takes 2**, this field is used as **the average concentration of the QC fluid.**

- OBR-19 Placeholder Field 2 (ST) 00252

Definition: when **MSH-16 takes 0**, this field is **empty and reserved**. When **MSH-16 takes 2**, this field is used as **the standard deviation of the QC fluid.**

- OBR-20 Executor Field 1 (ST) 00253

Definition: when **MSH-16 takes 0**, this field is used as **attending physician.** When **MSH-16 takes 2**, this field is used as **the QC test result value (concentration).**

- OBR-21 Executor Field 2 (ST) 00254

Definition: when **MSH-16 takes 0**, this field is used as **the therapeutic department**. When **MSH-16 takes 2**, this field is used as **the batch number of the reagent.**

- OBR-22 Result Report s/Implementation changes - date/Time (TS) 00255
- OBR-23 Toll (CM) 00256
- OBR-24 Diagnostic Department ID (ID) 00257
- OBR-25 Result Status (ID) 00258
- OBR-26 Father Result (CM) 00259
- OBR-27 Quantity/Timing (TQ) 00221
- OBR-28 Result Copy To (XCN) 00260
- OBR-29 Parent Number (CM) 00261
- OBR-30 Shipping Method (ID) 00262
- OBR-31 Reason for Check (CE) 00263
- OBR-32 Primary Result Expositor (CM)00264
- OBR-33 Assistant Result Expositor
- OBR-34 Technician (CM) 00266
- OBR-35 Recorder (CM) 00267
- OBR-36 Target Date/Time (TS)00268
- OBR-37 Specimen Container Number (NM) 01028
- OBR-38 Logistics for the Shipment of Specimens Received (CE) 01029
- OBR-39 Collector Evaluation (CE)01030
- OBR-40 Transportation Arrangement Tasks (CE)01031
- OBR-41 Arrangement of Transportation (ID) 01032
- OBR-42 Request for Transportation (ID)01033
- OBR-43 Notes on Planned Patient Transport (CE) 01034
- OBR-44 Program Code (CE)00393
- OBR-45 Program Code Modifier (CE) 01316
- OBR-46 Placeholder Supplemental Service Information
- OBR-47 Executor Supplemental Service Information (CE) 01475

• OBX - Observation/Result Segment

The OBX is used to transmit a single observation or observation segment that represents the smallest indivisible reporting unit in a report. The main task is to add observation-related information to the content of the report, but the OBX can also be part of the order for observation. At this point, the OBX takes the required clinical information that the performer needs in order to interpret the observations made by the performer.

OBX|OBX Unique Identifier|Value Type|Project ID|Project Name|Results|Units|Reference Value Range|Abnormal Flag||Result Status||Original Result|Test Time| |Testing Doctor ||||

SEQ	LEN	Element name	LINK#
1	4	ID Set-OBX	OBX-1 ID Set-OBX (SI) 00569
2	2	Value Type	OBX-2 Value Type (ID) 00570
3	250	Observation Identifier	OBX-3 Observation Identification Number
4	20	Observstion ID	OBX-4 Observstion ID (ST) 00572
5	655361	Observstion Value	OBX-5 Observstion Value (ST) 00573
6	250	Unit	OBX-6 Unit (ST) 00574
7	60	Reference Value Range	OBX-7 Reference Value Range (ST) 00575
8	5	Abnormal Flag	OBX-8 Abnormal Flag (IS) 00576
9	5	Probability, **Empty, Reserved**	OBX-9 Probability (NM) 00577
10	2	Characteristics of Anomalous Checks, **Empty, Reserved**	OBX-10 Characteristics of Anomalous Checks
11	1	Observation Result Status	OBX-11 Observation Result Status (ID) 00579
12	26	Time of Last Normal Value Recording, **Empty, Reserved**	OBX-12 Date of Last Observed Normal Value (TS) 00580
13	20	User-defined Pathway Checking **as Raw Results**	OBX-13 User-defined Pathway Checking (ST) 00581
14	26	Date/Time of Observation	OBX-14 Date/time of observation (TS) 00582
15	250	Producer ID, **Empty, Reserved**	OBX-15 Manufacturer's ID (CE) 00583
16	250	Observation Leader	OBX-16 Responsible observer (ST) 00584
17	250	Observation Methods, **Empty, Reserved**	OBX-17 Observation methods (CE) 00936
18	22	Device Identifier, **Empty, Reserved**	OBX-18 Device identifier (EI)01479
19	26	Date/Time Analysed, **Empty, Reserved**	OBX-19 Incorrect date/time analysed (TS) 01480

HL7 Induction Table-OBX-Observation Result

- OBX-1 ID Set-OBX (SI) 00569

Definition: this field defines the unique identifier of the detection result, Components of the composition: device unique identifier SN_sample number_detection time (yyyyMMddhhmmss)_Pipeline number (pipeline number starts from 0, the OBXs within each

OBR are counted from 0, and the Nth OBX has a pipeline number of N-1).

- OBX-2 Value Type (ID) 00570

Definition: this field contains the format of the observations in the OBX. If the OBX-11-Observation Result Status value is not 'X', this field shall have a value, and if the value is CE then the result must be a code item. When this value type is TX or FT, the result will be a large amount of text, which 34 lists the effective values of the observed value type.

Value	Description
NM	Numeric Numerical values, for quantitative projects
ST	String Indicates strings to be used for qualitative and semi-quantitative projects
ED	Encapsulate Data Indicates that encapsulate data is used for projects involving image transfer

Chart 36 Value types

- OBX-3 Observation Identification Number

Definition: this field is used as the project ID.

- OBX-4 Observstion ID (ST) 00572

Definition: this field is used as the project name, and project abbreviation.

When the OBX-2 value type takes the value 'ED', this field is used as the name of the image to distinguish and identify the image file.

- OBX-5 Observation Value (CE) 00573

Definition: this field contains the value generated by the observation generator observation. Resulting concentration or qualitative result (negative, positive)

Components: <Results (ST)>^<Reagent Card Batch No. (ST)>^<Code Card Batch No. (ST)>

If the OBX-2 value type takes the value "ED", the data field takes the form "^Image^BMP^Base64^..... encapsulate data.....". The "Image" indicates that the image data is transmitted, "BMP" is the type of the image (also can use the common JPG, PNG, etc.), and "Base64" indicates the code of the encapsulate data. "Encapsulate Data" stores the Base64 encoded data of the image.

- OBX-6 Unit (ST) 00574

Definition: when the observation is measured on a continuum scale, the unit of measure must be recorded in the OBX unit segment.

- OBX-7 Reference Value Range (ST) 00575

Composition: Values are in the following format:

Lower limit value - upper limit value (both upper and lower limit values are used sometimes, e.g. potassium 3.5-4.5)

>lower limit value (no upper limit value, e.g. >10)

< upper limit value (no lower limit value, e.g. < 15)

Alphabetical values: normal values can be recorded in this range.

Definition: When observations are made to quantify a toxic substance, the upper limit of the range refers to the bounding value at which toxicity is produced. If a drug is quantified, the lower limit value indicates a lower therapeutic amount and the upper limit value refers to a higher therapeutic amount, above which toxic side effects are common.

- OBX-8 Abnormal Flag (IS) 00576

Definition: This field includes the lookup table that indicates the status of the resultant criteria. It is recommended that the value of this field be transmitted at the appropriate time. (For more details, please refer to ASTM. The instrument is used as a channel number here, the project is shortened to ^Project ID, e.g. CRP^0.

1238) See Chart 37 for valid values.

When the laboratory can recognise the normal status of a textual report, such as a chest radiograph report or a microbiological culture, the N should be used to indicate normal and the A to indicate abnormal. Multiple codes, such as abnormal and deteriorating, should be separated by a repeating delimiter, e.g. A~W.

Value	Description
L	Below low normal
H	Above high normal
LL	Below lower panic limits
HH	Below lower panic limits
<	Below absolute low-off instrument scale
>	Above absolute high-off instrument scale
N	Normal (applies tonon-numeric results)
A	Abnormal (applies to non-numeric results)
AA	Very abnormal (applies to non-numericunits, analogous to panic limits for numeric units)
null	No range defined, or normal ranges don't apply
U	Significant change up
D	Significant change up
B	Better--use when direction not relevant
W	Worse--use when direction not relevant
S	Susceptible. Indicates for microbiology susceptibilities only.
R	Resistant. Indicates for microbiology susceptibilities only.
I	Intermediate. Indicates for microbiology susceptibilities only.

MS	Moderately susceptible. Indicates for microbiology susceptibilities only.
VS	Very susceptible. Indicates for microbiology susceptibilities only.

Chart 37 Abnormal Flag

The result may also be recorded in shorthand, which records the normal state of the result or not, without indicating a definite value. This shorthand is very common in clinical records, and internists usually simply state that the glucose results are normal. Such shorthand reports can also be seen in medication administration records. In these cases, the normal status code of the result is recorded with the OBX-8-Abnormal Flag, instead of the OBX-5-Observed Value marked value.

- OBX-9 Probability (NM) 00577
- OBX-10 Characteristics of Aanomalous Checks
- OBX-11 Observation Result Status (ID) 00579

Definition: this field records the observation result status See Chart 38 for valid values. This field reflects the current completion status of an observation identifier result.

This field is mandatory and versions prior to HL7 indicated this with the default value “F”. Specify with F that the result proves to be correct and final. The W indicates that the result is confirmed to be wrong (incorrect) and the alternative (corrected) result is subsequently transmitted. The C indicates the replacement of (confirmed sum) final data from a previously transmitted result with data in the OBX-5-observation field which has the same observation ID (including prefixes) and observation sub-ID in the result field, usually due to an incorrect result from a previous result. The D indicates data that should be deleted from a previous transmission which has the same observation ID (including prefixes) and observation sub-ID in the result segment. When changing or deleting results, multiple OBX segments with the same observation ID and observation sub-ID shall be replaced or deleted as a whole. The normal course of a result that is mediated (e.g., “Gram-positive coccus”) to a final state (e.g., “Staphylococcus aureus”), this result should not be transmitted with C (corrected) but rather with P or S (depending on the specific case) before reaching the final state.

At the time of the order, there is a comprehensive examination required in the doctor’s order that needs to be dynamically specified. That is, this comprehensive examination is defined by the OBX segment transmitted with the order and it is generated by the placement system. For example, the timed measurement of serum glucose tolerance tests may vary from laboratory to laboratory. One lab measured at -30, -15, 0, 30, 60 and 120 minutes, while another lab recorded -30, 0, 30, 60, 90 and 120 minutes. The master file documents each specific element of the comprehensive examination, not the comprehensive examination itself. Another example is the hypertensive proteolytic enzyme test, which is determined by order and there is no master file to define the arrangement of possible projects. The OBX segment in ORM can be used to generate dynamic projects that contain these alignments without defining the master file used to illustrate the synthesis tests. The status of the result in the OBX can be used to indicate whether the OBX in the ORM message is being used to provide a dynamic description or to transmit the result as part of a order. The O is used to indicate that: the OBX segment is being used to provide the resultant dynamic request; the OBX used for the dynamic request shall include details of the test code, device, etc., and the OBX-11 has a value of O. OBX-2 and OBX-5 are empty.

Value	Description

C	The resulting record is a corrected value and therefore replaces the final result
D	Delete OBX records
F	Final results; only exchangeable with corrected results
I	Laboratory specimen; results pending
N	No requirement, used to confirm that the observation was not found in OBX when the generic department ID to be found is indicated in OBR-4.
O	Detailed narrative only required (no results)
P	Initial results
R	Result input - not confirmed
S	Partial results
X	Observations not available
U	The result has been changed to a final result, but the content that was transmitted as a preliminary result has not been retransmitted.E.g., the status of a radiological result has changed from expected to final.
W	Transmission errors, e.g. transmission to another patient

Chart 38 Observation Status Code Description

- OBX-12 Date of last observed normal value (TS) 00580
- OBX-13 User-defined pathway checking (ST) 00581

  Definition: This field refers to the original result without truncation to decimal places.
- OBX-14 Date/time of observation (TS) 00582

  Definition: this field refers to the test time.
- OBX-15 Manufacturer's ID (CE) 00583
- OBX-16 Responsible observer (ST) 00584

  Definition: This field refers to the testing doctor.
- OBX-17 Observation methods (CE) 00936
- OBX-18 Device identifier (EI)01479
- OBX-19 Date/Time Analysed (TS) 01480

• QRD - Query Definition Segment (Original Style Query Definition Segment)

The QRD information segment is used to define the query.

QRD|Query Date|R|D|Incremental ID||RD|Sample Barcode|whatever Subject Screening Procedure|||T|

SEQ	LEN	Element name	LINK#
1	26	Query Date/Time	OBX-1 Query Date/Time (TS) 00025
2	1	Query Format Code, **Take R**	QRD-2 Query format code (ID) 00026
3	1	Query Priority, **Take D**	QRD-3 Query priority (ID) 00027

4	10	Query ID	QRD-4 Query ID (ST) 00028
5	1	Delayed Response Type, **Empty, Reserved**	QRD-5 Delayed response type (ID) 00029
6	26	Delayed Response Date/Time, **Empty, Reserved**	ORD-6 Delayed Response Date/Time (TS) 00030
7	10	Quantity Limit Requests, Take RD	QRD-7 Quantity Limit Requests (CQ) 00031
8	250	Who theme screening procedures **as sample barcodes, batch query is empty**	QRD-8 Who theme screening procedures (XCN) 00032
9	250	Subject Screening Procedures, **the query is set to OTH, cancelled to take CAN**	QRD-9 What Subject Screening Procedures
10	250	What Departmental Data Code, **Empty, Reserved**	QRD-10 What Departmental Data Code
11	20	What data code value eligibility, **Empty, Reserved**	QRD-11 What data code value eligibility (CM) 00035
12	1	Query result level, **default takes T value**	QRD-12 Query result level (ID) 00036

HL7 Attribute Table-QRD-Original Style Query Definition

- OBX-1 Query Date/Time (TS) 00025

  Definition: this field refers to the time of this query, taken from the system time.

- QRD-2 Query Format Code (ID) 00026

  Definition: See Chart 39 for valid values of fields. **This protocol takes the value of R.**

Value	Description
D	Display Format Response
R	Response in record-orientated format
T	Response in tabular format

Chart 39 Query/Response Format Codes

- QRD-3 Query Priority (ID) 00027

Definition: this field contains the time frame in which the response is desired to occur. Definition: See Chart 310 for valid values of fields. The form value and the fields that follow specify the time frame for the response. **This protocol takes the value of D.**

Value	Description
D	Delayed
I	Immediate

Chart 310 Query Priority

- QRD-4 Query ID (ST) 00028

Definition: this field contains a unique query identifier assigned by the querying application. Returned as is by the responding application. Increments from 1 with the number of queries.

- QRD-5 Delayed Response Type (ID) 00029

  Definition: See Chart 311 for valid inputs to the field.

Value	Description
B	Before Specified Date/Time
L	After Specified Date/Time

Chart 311 Delayed Response Type

- ORD-6 Delayed Response Date/Time (TS) 00030

Definition: This field contains the date/time before or after which the delayed response was sent. If this field is not available, the response can be sent when this field is available. (See Chart 311 above.)

- QRD-7 Quantity Limit Request (CQ) 00031

Component: <quantity (NM)>^<unit (CE)>

Definition: this field contains the maximum length of the response that can be accepted by the requesting system. The valid response is the numeric value given in the unit specified in the second component (in the first component). See Valid Inputs for the Second Component in Chart 312. The default value for this protocol is RD (record).

Value	Description
CH	Character
LI	Line
PG	Page
RD	Record
ZO	Local Definition

Chart 312 Quantity Limit Requests

- QRD-8 Who Theme Screening Procedures (ST) 00032

Definition: this field is used as the sample barcode for the patient.

- QRD-9 Who Theme Screening Procedures

Definition: this field describes the type of information required to fulfil the request. The valid values define the type of query to be processed and can be locally extended during execution. **This protocol takes OTH for queries and CAN for cancellations.**

Value	Description
ADV	Recommendation/Diagnosis
ANU	Nursing unit lookup (returns bedridden patients, except empty beds)
APN	Patient Name Lookup
APP	Internist lookup
ARN	Nursing unit lookup (returns bedridden patients, except empty beds)
APM	Medical Record Number Lookup, returning visit records for a medical record number
APA	Account Number Lookup, returning matching visit records
CAN	Cancel. Used to cancel a query

DEM	Demographic Information
FIN	Financial
GID	Start new identifier
GOL	Target
MRI	Recent Inpatients
MRO	Recent Outpatients
NCK	Network Clock
NSC	Network status changes
NST	Network Statistics
ORD	Purchase Orders
OTH	Other
PRB	Problems
PRO	Processes
RES	Result
RAR	Pharmacy Management Information
RER	Pharmacy Coding Order Information
RDR	Pharmacy Dispensing Information
RGR	Pharmacy Drug Delivery Information
ROR	Pharmacy Prescription Information
SAL	All timetable related information, including open, booked and closed slots
SBK	Booking slots on identified schedules
SBL	Closed time slots on the identified schedule
SOF	The first open slot on the identified schedule after the start date/time
SOP	Open slots on the identified schedule
SSA	Individually scheduled availability
SSR	Available slots on a recurring schedule
STA	Status
VXI	Vaccine information
XID	Obtaining cross-referenced identifiers

Chart 313 What Subject Screening Procedure

- QRD-10 What Departmental Data Code
- QRD-11 What Data Code Value Eligibility (CM) 00035
- QRD-12 Query Result Level (ID) 00036

Definition: this field is used to control the level of detail of the results. Definition: See Chart

314 for valid values of fields**. This protocol takes the T value by default.**

Value	Description
O	Purchase Order Plus Purchase Order Status
R	Results without block text
S	Only Status
T	Complete results

Chart 314 Query Result Levels

- # QRF - Original Style Query Filter Segment

The QRF segment is used in conjunction with the QRD segment to further refine the content of the original style query.

QRF|Query System/Device|Start Date|End Date||Time Qualifiers|Status Qualifiers|Time Selection Qualifiers|||

SEQ	LEN	Element name	LINK#
1	20	Where subject filtering procedure	QRF-1 Where Subject Filtering Procedure (ST) 00037
2	26	Date/Time of Data Start	QRF-2 Date/Time of Data Start (TS) 00038
3	26	Date/Time of Data End	QRF-3 Date/Time of Data End (TS) 00039
4	60	What user qualifier, **empty, reserved**	QRF-4 What user qualifier (ST) 00040
5	60	Other QRY Subject Filtering Procedure, **empty, reserved**	QRF-5 Other QRY Subject Filtering Procedure (ST) 00041
6	12	Which date/time qualifier, **defaults to RC value**	QRF-6 Which date/time qualifier (ID) 00042
7	12	Which date/time status qualifier, **defaults to COR value**	QRF-7 Which date/time status qualifier (ID) 00043
8	12	Date/time selection qualifier, **defaults to ALL value**	QRF-8 Date/time selection qualifier (ID) 00044
9	60	When quantity/timing qualifier, **empty, reserved**	QRF-9 When Quantity/Timing Qualifier (TQ) 00694
10	10	Find confidence threshold, **empty, reserved**	QRF-10 Find Confidence Threshold (NM) 01442

HL7 Attribute Table-QRF – Original Style Query Filter Program

- QRF-1 Where Subject Screening Procedure (ST) 00037

  Definition: this field records the query system/device performed.
- QRF-2 Date/Time of Data Start (TS) 00038

  Definition: this field records the start time.
- QRF-3 Date/Time of Data End (TS) 00039

  Definition: this field records the end time.
- QRF-4 What User Qualifier (ST) 00040

- QRF-5 Other QRY Subject Filtering Procedure (ST) 00041
- QRF-6 Which Date/Time Qualifier (ID) 00042

Definition: this field specifies the type of data referenced in QRF-2 Date/Time of Data Start (TS) 00038 and QRF-3 Date/Time of Data End (TS) 00039. **This protocol takes the RC value by default.**

Value	Description
ANY	Any date/time within a range
COL	Collection date/time, equivalent to film or specimen, collection date/time
ORD	Date/time of the purchase order
RCT	Date/time of receipt of specimen, the receipt of the specimen by the archiving auxiliary (i.e., the laboratory).
REP	Date/time of report, date/time of report from archiving auxiliary (i.e., the laboratory)
SCHED	Date/time of schedule

HL7 Form 0156-Which Date/Time Qualifier

- QRF-7 Which Date/Time Status Qualifier (ID) 00043

Definition: this field specifies the condition type of the object selected in the date range defined by and QRF-3 Date/Time of Data End (TS) 00039. **This protocol takes the COR value by default.**

Value	Description
ANY	Any Status
CFN	Current final value, either final or corrected
COR	Only corrected value (final value without correction)
FIN	Only final value (without corrections)
PRE	Preliminary
REP	Date/time of report completion

HL7 Form 0157-Which Date/Time Status Qualifier

- QRF-8 Date/Time Selection Qualifier (ID) 00044

Definition: this field allows some type of specification for values in the date/time range. This protocol takes ALL values by default.

Value	Description
1ST	First value in the range
ALL	All values in the range
LST	Last value in the range
REV	All values in the range returned in reverse chronological order (this is the default value if not otherwise specified)

HL7 Table 0158-Date/Time Selection Qualifier

- QRF-9 When Quantity/Timing Qualifier (TQ) 00694
- QRF-10 Find Confidence Threshold (NM) 01442

• DSP - Display Data Segment

The DSP segment is used to contain data that has been pre-formatted by the sender for display. The semantic connotations of this data are discarded, and the data is simply processed as lines of text.

SEQ	LEN	Element name	LINK#
1	4	Setting ID-DSP	DSP-1 Setting ID-DSP (SI) 00061
2	4	Display level	DSP-2 Display level (SI) 00062
3	300	Data line, queried content	DSP-3 Data line (TX) 00063
4	2	Logical Breakpoint	DSP-4 Logical Breakpoint (ST) 00064
5	20	Result ID	DSP-5 Result ID (TX) 00065

HL7 Attribute Table - DSP - Display Data

- DSP-1 Setup ID-DSP (SI) 00061

Definition: this field can optionally be used to number the given multiple display segments.

- DSP-2 Display Level (SI) 00062

Definition: this field contains the numbering method to define groups of fields assigned by individual locations or applications.

- DSP-3 Data Line (TX) 00063

Definition: this field contains a valid line to be displayed. As described for the TX data type, this includes highlighting with other specific display features.

- DSP-4 Logical Breakpoint (ST) 00064

Definition: this field is non-null if the line is the last line of a logical breakpoint in a response as defined by the response system.

Displayed lines of text are often divided into logical groups that differ from the physical size of the screen or printer page. For example, although a complete **collation** or a complete radiographic report may have a minimum of 6 lines and a maximum of 120 lines, it may be considered to contain one logical group. Understanding logical breakpoints in displayed data is useful for applications that display or print data. Use the DSP-4-Logical Breakpoints for this reason. The sending program (the program that formats the data) places logical breakpoints in the appropriate places. If there is a special subsidiary result ID associated with the data depicted via the DSP-4-Logical Breakpoint, then the value of this ID can also be returned in the DSP-5-Result ID. Then, if the user selects the display area depicted by the DSP-4-Logic Breakpoint, then the display system can be queried for the associated DSP-5-Result ID.

- DSP-5 Result ID (TX) 00065

Definition: when the user selects a result ID (as defined by the DSP-4- Logical Breakpoint) from the screen display corresponding to a non-null record for the DSP-5-Result ID, the program

may initiate another query (stand-alone process) for the auxiliary system with the QRD-10-Ho Sector Data Code populated with this non-zero value (e.g., the auxiliary's increase value or its equivalent). The auxiliary response will contain the report referenced with this result ID (e.g., increase value). The Auxiliary will associate the Result ID with the DSP-4-Logical Breakpoints as shown below: if more than one line of text is sent for each result, then the DSP-5-Result ID is non-null only for the DSP Message Segment containing the non-null DSP-4-Logical Breakpoints. This field may be divided into different components by the local protocol. The common examples include the depositor sequence number, the loader sequence number, and the universal service identifier. Whenever such fields are used as components of a result ID, their components are sent as subcomponents.

- **Explanation of data fields**

The third field "DataLine" is used to display the sample request information downloaded from the LIS server. The details and order of the sample request information are shown in the table below. The barcode number and the project number are mandatory, the rest of the information can be empty.

Order	Content	Type and value
1	Hospitalization Number	String
2	Bed Number	String
3	Patient Name	String
4	Date of Birth	String, in the format YYYYYMMDDHHmmSS (year, month, day, hour, minute and second)
5	Gender	String, Male/M; Female/F; Other/O
6	Blood Type	String,O,A,B,AB
7	Medical record number	String, blank
8	Address	String
9	County Code (Zip Code)	String
10	Home Phone	String
11	Mobile Phone Number	String, blank
12	ID card No.	String
13	Marital Status (not used)	String, blank
14	Religion (not used)	String, blank
15	Patient Category	String, Outpatient; Inpatient; Other
16	Social Security Number Medicare Account Number	String
17	Toll Type	String, own; insurance
18	Ethnicity	String
19	Place of Birth (Origin)	String

20	Country	String
21	Reagent Card Barcode	String
22	Sample Barcode	String
23	Date time of sample receipt i.e. time of delivery	String, same format as 4
24	Whether emergency treatment	String, yes: Y; no: N; if empty, defaults to N
25	Collection volume (not used)	float, blank
26	Sample Type	String, serum; plasma; whole blood; urine;
27	Delivery Doctor	String
28	Delivery Department	String
29	Project id^Project name abbreviation^Unit^Reference range	String
30	Project Name	String
31	Unit	String
32	Reference Range	String

- # QAK - Query Acknowldegment Segment

The QAK segment contains the information sent with the query response. Although the QAK information segment is required for responses to enhanced modal queries, it may be shown as an optional information segment placed after the (optional) ERR information segment in the response (message) to any initial modal query.

QAK|SR|Response Status |||||

SEQ	LEN	Element name	LINK#
1	32	Query identifier, **take SR (Sample Request).**	QAK-1 Query Identifier (ST) 00696
2	2	Query Response Status	QAK-2 Query Response Status (ID) 00708
3	250	Information query name, **reserved, empty**	QAK-3 Information query name (CE) 01375
4	10	Click Count, **Reserved, Empty**	QAK-4 Click Count All (NM) 01434
5	10	This Payload, **Reserved, Empty**	QAK-5 This Payload (NM) 01622
6	10	Click to retain, reserved, empty	QAK-6 Click to retain (NM) 01623

HL7 Attribute Table-QAK-Query Acknowledgement

- QAK-1 Query Identifier (ST) 00696

  Definition: this field refers to the query identification, take SR.

- QAK-2 Query Response Status (ID) 00708

Definition: this field allows the response system to return an exact response status. This field is particularly useful when no data matching the query parameters can be found and there are no errors. This field is defined using HL7 table 0208 - Query Response Status.

Value	Description
OK	Data found, no errors (default)
NF	Data not found, no errors
AE	Procedure error
AR	Procedure rejected

HL7 Table 0208-Query Response Status

- QAK-3 Information Query Name (CE) 01375
- QAK-4 Click Count All (NM) 01434
- QAK-5 Current Payload (NM) 01622
- QAK-6 Click to Retain (NM) 01623

• ERR - Error Segment

The ERR segment is used to add an error description to the acknowledgement segment.

SEQ	LEN	Element name	LINK#
1	80	Error Code and Location	ERR-1 Error code and location (CM) 00024

• ERR - 1 Error code and location (CM) 00024

Composition:<Segment ID (ST)> ^ <Serial Number (NM)> ^ <Domain Location (NM)> ^ <Error Code (CE)>

Definition: this field identifies an error segment in another message. If there is more than one message segment type (message segment ID number), the second component of this field is an identifier. For the system which uses the HL7 encoding rules, this project number can be used for the third component. The fourth component (CE data type), see Chart 315, cannot be made up of any subcomponents, since the subcomponent separator is already a CE type component separator.

Error Condition Code	Error Condition Text	Description/Explanation
Success		
0	Message Accepted	S Success. Optional, i.e., AA transmission was successful, for use in systems where a status code must be returned.
Error		
100	Error in Message Serial Number	The information segments in the message are in the incorrect order, or a mandatory field is missing.
101	Required Field Missing	A mandatory field of a message segment is missing
102	Data Type Error	The field contains the wrong data type. For example, a numeric (NM) field contains “FOO”.
103	The Corresponding Value in the Table is Not Found	A field of data type ID or IS is compared to the corresponding table of values and no matching values are found.
Rejected		

200	Unsupported Message Type	This message type is not supported
201	Unsupported Event Code	This event code is not supported
202	Unsupported Processing ID Number	This processing ID number is not supported
203	Unsupported Version ID Number	This version ID number is not supported
204	Unrecognised Key Identifier	The ID number of a patient, booking, etc. is not found. It is used when processing a patient instead of adding a patient, e.g. trying to transfer data for a patient that does not exist.
205	Duplication of Key Identifiers	The ID number of the patient, appointment, etc. already exists. It is used when adding a patient (e.g., admission, new appointment, etc.).
206	Application Record Lock	Processing cannot be executed while the programme is working on storage. e.g. Database is locked.
207	Application Program Internal Error	Other internal errors not covered by the above error codes

Chart 315 Information Error Codes

• EQU - Equipment Detail Segment

The equipment detail segment contains the information necessary to identify and maintain a piece of equipment used in a laboratory automation system.

SEQ	LEN	Element name	LINK#
1	22	Equipment Instance Identifier	EQU-1 Equipment Instance Identifier (EI) 01479
2	26	Date/Time of Event	EQU-2 Date/Time of Event (TS) 01322
3	250	Equipment Status	EQU-3 Equipment Status (CE) 01323
4	250	Local/Remote Control Status	EQU-4 Local/remote control status (CE) 01324
5	250	Warning Level	EQU-5 Warning level (CE) 01325

HL7 Attribute Table - EQU - Equipment Details

• EQU-1 Equipment Instance Identifier (EI) 01479

Component:<Device Identifier (ST)>^<Device Name (ST)>^<Organisation ID (ST)>

Definition: this field defines the device. This is an identifier from the master list of device agencies.

• EQU-2 Date/Time of Event (TS) 01322

Definition: this field defines the time at which the event (status change, command issued, command execution completed) occurred.

• EQU-3 Equipment Status (CE) 01323

Component:<identifier (ST)> ^ <text (ST)>

Definition: this field defines the state of the device at the beginning of the transaction. <Device Status> See Chart 316 for a legal value. The device status is used in ESU messages and is an optional field.

Value	Description
PU	PoweredUp
IN	Initialising
ID	Idle
CO	Configuring
OP	Normal Operation
CL	Clearing
PA	Pausing
PD	Paused
ES	E-stopped
	(null) No state change (null)

Chart 316 Device Status

- EQU-4 Local/remote control status (CE) 01324

Components:<Identifier (ST)>^<Text (ST)> ^<Code Card Version (ST)>^<Application Version (ST)>^ [, Test Items, Number of Items Tested] (ST)>^<Total Tests (SI)>

Definition: this field defines the current state of the controls associated with the device. A device can either work autonomously (local control state) or be controlled by another system (e.g., LAS computer) (remote control state). See Chart 317 for the correct value.

Value	Description
L	Local
R	Remote
	(null) No state change (null)

Chart 317 Local/Remote Control State

- EQU-5 Warning level (CE) 01325

Component: <Identifier (ST)>^<Text (ST)>,

Definition: this field defines the level of warning status (e.g., Maximum Warning) associated with the device indicated in events such as Processing Events, Manifest Events, QC Events, and so on. Refer to Chart 318 for the correct value.

Value	Description	Remarks
N	Normal	No corrective behaviour required

W	Warning	Expect corrective behaviour
S	Serious	Require corrective behaviour
C	Critical	Shut down, fix the problem and initialization
	(null) No state change	

Chart 318 Warning Levels

- # INV Inventory Detail Segment

The inventory detail segment is required to track the quantity of substances (e.g., reagents, waste) in a facility.

SEQ	LEN	Element name	LINK#
1	250	Substance Identifier	INV-1 Substance Identifier (CE) 01372
2	250	Substance Status	INV-2 Substance Status (CE) 01373
3	250	Substance Type	INV-3Substance Type (CE) 01374
4	250	Inventory List Container Identifier	INV-4 Inventory List Container Identifier (CE) 01532
5	250	Container Rack Identifier	INV-5 Container Rack Identifier (CE) 01376
6	250	Position on Container Shelf	INV-6 Position on Shelf (CE) 01377
7	20	Initial Quantity	INV-7 Initial Quantity (NM) 01378
8	20	Current Quantity	INV-8 Current Quantity (NM) 01379
9	20	Available Quantity	INV-9 Available Quantity (NM) 01380
10	20	Consumed Quantity	INV-10 Consumed Quantity (NM) 01381
11	250	Unit of Quantity	INV-11 Unit of Quantity (CE) 01382
12	26	Date/Time of Expiry	INV-12 Date/Time of Expiry (TS) 01383
13	26	Date/Time of First Use, **Empty, Reserved**	INV-13 Date/Time of First Use (TS) 01384
14	200	Sample Stabilisation Duration, **Empty, Reserved**	INV-14 Stabilisation Duration (TQ) 01385
15	250	Test/Flow Identifier, **Empty, Reserved**	INV-15 Test/Flow Identifier (CE) 01386
16	200	Manufacturer's Label Number	INV-16 Manufacturer's Label Number (ST) 01387
17	250	Manufacturer's Identifier	INV-17 Manufacturer's Identifier (CE) 00286
18	250	Supplier Identifier	INV-18 Supplier Identifier (CE) 01389

Chart 319 Attribute Table - INV - Inventory Details

- INV-1 Substance Identifier (CE) 01372

Definition: A unique identifier that identifies a substance in the inventory list. This is a vendor-assigned identifier.

Value	Description
ALL	It is used to search for all inventory list projects

Chart 320 Substance identifiers

- INV-2 Substance status (CE) 01373

Component: <identifier (ST)> ^<text (ST)>

Definition: The status of the inventory project. This status indicates the current condition of the substance. See the legal values in the list

Value	Description
EW	Expired Warning
EE	Expired Error
CW	Calibration Warning
CE	Calibration Error
QW	QC Warning
QE	QC Error
NW	Not Available Warning
NE	Not Available Error
OW	Other Warning
OE	Other Error
OK	OK Status

Chart 321 Substance Status

- INV-3 Substance type (CE) 01374

Component: <identifier (ST)> ^<text (ST)>

Definition: Defines the substance type. See legal values listed in Chart 322.

Value	Description
SR	Single Test Reagent
MR	Multiple Test Reagent (consumption cannot be tied to orders for single test)
DI	Diluent
PT	Pretreatment
RC	Reagent Calibrator
CO	Control
PW	Purified Water
LW	Liquid Waste
SW	Solid Waste
SC	Countable Solid Item (e.g., Tip, etc.)
LI	Measurable Liquid Item
OT	Other

Chart 322 Substance type

- INV-4 Inventory List Container Identifier (CE) 01532

Component: <identifier (ST)> ^<text (ST)>

Definition: An identifier that distinguishes a stock list container, e.g. a unique identifier for a special package of a special substance. This is a vendor-assigned identifier.

- INV-5 Container rack identifier (CE) 01376

Component: <identifier (ST)> ^<text (ST)>

Definition: The shelf used to transport the container containing the substance (e.g. a movable rotating body with reagent bottles).

- INV-6 Position on shelf (CE) 01377

Component: <identifier (ST)> ^<text (ST)>

Definition: this field indicates the position on the shelf (e.g. a pointer).

- INV-7 Initial quantity (NM) 01378

Definition: this field indicates the original quantity of the substance in the inventory list.

- INV-8 Current quantity (NM) 01379

Definition: this field indicates the current quantity of the substance in the inventory, e.g., the original quantity of the substance that remains because it has been used is the current quantity.

- INV-9 Available Quantity (NM) 01380

Definition: this field indicates the quantity of a substance in the inventory that is available for use. It refers to the current quantity minus any quantity that is scheduled to be consumed (e.g., in an inspection).

- INV-10 Consumed quantity (NM) 01381

Definition: this field indicates the substance to be consumed by the equipment each time that it is used.

- INV-11 Unit of Quantity (CE) 01382

Definition: this field indicates the unit to be used when measuring the available quantity of a substance in inventory.

- INV-12 Date/time of expiry (TS) 01383

Definition: this field indicates the expiration date/time of the substance.

- INV-13 Date/Time of First Use (TS) 01384
- INV-14 Duration of stable use (TQ) 01385
- INV-15 Test/Flow Identifier (CE) 01386
- INV-16 Manufacturer’s Label Number (ST) 01387

Definition: this field describes a label number assigned by the manufacturer during the production of the substance.

- INV-17 Manufacturer's Identifier (CE) 00286

Definition: this field is used to distinguish the manufacturer who produced a particular substance.

- INV-18 Supplier Identifier (CE) 01389

Definition: This field is used to identify the supplier of a substance.

• ECD - Equipment Command Segment

The equipment command segment contains the information needed to notify the receiving component of what is going to happen.

SEQ	LEN	Element name	LINK#
1	20	Reference Command Number	ECD-1 Reference Command Number (NM) 01390
2	250	Remote Control Command	ECD-2 Remote Control Command (CE) 01391
3	80	Necessary Response	ECD-3 Necessary Response (ID) 01392
4	200	Required Completion Time	ECD-4 Required completion time (TQ) 01393
5	65536	Parameter	ECD-5 Parameter (ST) 01394

HL7 Attribute Table-ECD-Equipment Command Segment

- ECD-1 Reference Command Number (NM) 01390

Definition: this field indicates a unique identifier for special commands used for different components. It is the same as the “Message Control ID” defined in the MSH-10 segment, but it is in the Device Command or Response layer. This command number is defined by the initiator.

- ECD-2 Remote Control Command (CE) 01391

Component: <identifier (ST)> ^<text (ST)>

Definition: this command is used for component Initialising. See Chart 323 for a list of legal values. Detailed information can be obtained from the LECIS standard.

Value	Description
SA	Sampling
LO	Load
UN	Unload
LK	Lock
UC	Unlock
TT	Transport To
CN	Clear Notification
IN	Initialize/Initiate
SU	Setup
CL	Clear
PA	Pause
RE	Resume
ES	Emergency–stop
LC	Local Control Request

RC	Remote Control Request
AB	Abort
EN	Enable Sending Event
DI	Disable Sending Event
EX	Execute (command specified in field Parameters (ST)01394)
AU	App Upgrade
CU	Code Upgrade code

Chart 323 Remote Control Commands

- ECD-3 Necessary Response (ID) 01392

Definition: this field indicates whether the command specified in the message needs to be executed immediately after the message response. “Y” (yes) means immediately, “N” (no) means not immediately.

- ECD-4 Required Completion Time (TQ) 01393

Components: <Count (CQ)> ^ <Correlation (CM)> ^ <Duration (ST)> ^ <Start Date/Time (TS)> ^ <End Date/Time (TS)> ^ <Priority (ST)> ^ <Conditions (ST)> ^ <Text (TX)> ^ < Correlation (ID)> ^ <Command Sequence (CM)>

Definition: This field defines the time by which the remote control activity must be completed.

- ECD-5 Parameter (ST) 01394

Definition: this field defines the parameters of the command (if the parameters are not included in the separation segment).

NOTE: The elements of this segment (or other elements not defined in here) are intended for buyer-specified equipment, e.g., centrifuges, splitters, sample sorters, pick-ups, cappers automated storage devices, etc.

• ECR - Equipment Command Response Segment

The equipment command response segment consists of the receiving component’s response to a pre-received command.

SEQ	LEN	Element name	LINK#
1	250	Command Response	ECR-1 Command Response (CE) 01395
2	26	Completion Time	ECR-2 Completion Time (TS) 01396
3	65536	Command Response Parameter	ECR-3 Command Response Parameter (ST) 01397

HL7 Attribute Table-ECR-Device Command Response

- ECR-1 Command Response (CE) 01395

Component: <identifier (ST)>^<text (ST)>^<encoding system name (IS)>^<alternative identifier (ST)>^<alternative text (ST)>^<alternative encoding system name (IS)>

Definition: this field defines the response to a pre-issued command. See the legal values listed in Chart 324.

Value	Description
OK	Command completed successfully
TI	Command cannot be completed within requested completion time
ER	Command cannot be completed because of error condition (see response parameters)
ST	Command cannot be completed because of the status of the requested equipment
UN	Command cannot be completed for unknown reasons

Chart 324 Command Response

- ECR-2 Completion Time (TS) 01396

Definition: this field contains the time that the receiving component completed the requested command.

- ECR-3 Command Response Parameter (ST) 01397

Definition: this field defines any relevant information returned with the response command.

• EQP - Equipment Log/Service Segment

The equipment log/service segment contains sufficient data necessary to maintain a special segment for special equipment accounting trace events that occur.

SEQ	LEN	Element name	LINK#
1	250	Event Types	EQP-1 Event Type (CE) 01430
2	20	Event ID	EQP-2 Identifier ID (ST) 01431
3	26	Start Time	EQP-3 Start Time (TS) 01202
4	26	End Time	EQP-4 End time (TS) 01432
5	65536	Transaction data	EQP-5 Transaction Data (FT) 01433

HL7 Attribute Table-EQP-Device Log/Service

- EQP-1 Event Type (CE) 01430

Component: <identifier (ST)> ^<text (ST)>

Definition: this field defines the type of message event. Refer to the valid values listed in HL7 Table 0450 - Event Types.

Value	Description
LOG	Log Event
SER	Service Event
ALM	Alarm Event

HL7 Table 0450 - Event Types

- EQP-2 Identifier ID (ST) 01431

Definition: this field is the ID used to store information about transmission logs, alarms, and service events.

- EQP-3 Start Time (TS) 01202

Definition: this field defines when the event starts.

- EQP-4 End time (TS) 01432

  Definition: this field defines the time when the event ends.

- EQP-5 Transaction Data (FT) 01433

  Definition: this field is the data that is registered in logs, alarms, and service events.

• ROL - Role Segment

The role segment contains the data necessary to add, update, correct, or delete the person in the record involved and the person corresponding to the function of the action being sent.

SEQ	LEN	Element name	LINK#
1	60	Role Instance	ROL-1 Role Instance ID (ST) 01206
2	2	Behaviour Code	ROL-2 Behaviour Code (ID) 00816
3	250	Role	ROL-3 Role-POL (CE) 01197
4	250	Role Person	ROL-4 Role Person (ST) 01198
5	26	Role Date/Time of Role Start, **empty, reserved**	ROL-5 Role Date/Time of Role Start (TS) 01199
6	26	Date/Time of Role End, **empty, reserved**	ROL-6 Date/Time of Role End (TS) 01200
7	250	Role Duration, **empty, reserved**	ROL-7 Role Duration (CE) 01201
8	250	Role Cause of Action	ROL-8 Role Cause of Action (CE) 01205
9	250	Provider Category, **Empty, Reserved**	ROL-9 Provider Category (CE) 01510
10	250	Unit	ROL-10 Unit (CE) 01461
11	250	Office/Home Address	ROL-11 Office/Home Address (XAD) 00679
12	250	Telephone	ROL-12 Telephone (ST) 00678

HL7 Attribute Table - ROL - Role

- ROL-1 Role instance ID (ST) 01206

  Definition: this field defines a unique identifier for a specific role record.

- ROL-2 Behaviour code (ID) 00816

  Definition: the behaviour code reflects the intent of the message.

- ROL-3 Role-POL (CE) 01197

  Component:<identifier (ST)>^<text (ST)>

Definition: this field defines the person who corresponds to the function of the behaviour being sent.

Value	Description	Used with
AD	Admitting	PV1-17 Admitting doctor
AT	Attending	PV1-7 Attending doctor

CP	ConsultingProvider	
FHCP	Family HealthCare Professional	
PP	PrimaryCare Provider	
RP	Referring Provider	PV1-8Referring doctor
RT	Referred to Provider	

User Defined Table 0443 - Provider Role

- ROL-4 Role Person (ST) 01198

  Definition: this field defines the name of the person assuming the role being sent.

- ROL-5 Role Date/Time of Role Start (TS) 01199
- ROL-6 Date/Time of Role End (TS) 01200
- ROL-7 Role Duration (CE) 01201
- ROL-8 Role Cause of Action (CE) 01205

  Component:<identifier (ST)>^<text (ST)>

Definition: this field defines the reason for assuming or changing the role (e.g., shift, new charge nurse, etc.).

- ROL-9 Provider Category (CE) 01510
- ROL-10 Unit (CE) 01461

  Component:<identifier (ST)>^<text (ST)>

Definition: this field defines the environment in which the person assuming the role defined in ROL-3 is located. See Chart 325.

Value	Description
H	Home
O	Office
1	Hospital
2	Physician Clinic
3	Long Term Care
4	Acute Care
5	Other

Chart 325 Organisational Unit Name

- ROL-11 Office/Home Address (XAD) 00679

  Definition: this field defines the provider's office or home address.

- ROL-12 Telephone (ST) 00678

  Definition: this field defines the phone number of the provider.

• DSC - Continuation Pointer Segment

The DSC segment is used in the continuity (message) protocol.

SEQ	LEN	Element name	LINK#
1	180	Continuation Pointer	DSC-1 Continuation Pointer (ST) 00014
2	1	Continuation Format	DSC-2 Continuation Format (ID) 01354

- DSC-1 Continuation Pointer (ST) 00014

  Definition: this field contains the continuation pointer.

- DSC-2 Continuation Format (ID) 01354

Definition: specifies whether this is a segmented piece of information or part of an interactive continuous message. See HL7 Table 0398-Continuous Format Codes for the corresponding valid values.

Value	Description
F	Split Continuous
I	Interactive Continuous

HL7 Table 0398 - Continuous Format Codes

• ISD - Interaction Status Detail Segment

The interaction detail segment contains status information for the specified interaction (e.g., processing-see Glossary section).

SEQ	LEN	Element name	LINK#
1	20	Interaction code (unique identifier)	ISD-1 Interaction Code (NM) 01326
2	250	Interaction Type Identifier	ISD-2 Interaction Type (CE) 01327
3	250	Interaction Activity Status	ISD-3 Interaction Status (CE) 01328

HL7 Attribute Table - ISD - Interaction Status Details

- ISD-1 Interaction Code (NM) 01326

Definition: this field defines the unique identifier of the interaction. Definition: this field defines a unique identifier for a specific role record. If this interaction is the result of a previous command, the command code shall be used (see ECD-1 Reference Command Number (NM) 01390).

- ISD-2 Interaction Type (CE) 01327

Component: <Identifier (ST)> ^ <Text (ST)> ^ <Name of the coding system (IS)> ^ <Identifier of the alternative system (ST)> ^ <Text of the alternative system (ST)> ^ <Name of the coding system of the alternative system (IS)>

Definition: this field defines the type of interaction. This interaction type (defined in Chart 323) shall be used if this interaction is the result of a previous command.

- ISD-3 Interaction Status (CE) 01328

Component: <Identifier (ST)> ^ <Text (ST)> ^ <Name of the coding system (IS)> ^ <Identifier of the alternative system (ST)> ^ <Text of the alternative system (ST)> ^ <Name of the coding system of the alternative system (IS)>

Definition: this field defines the interaction status. If this interaction is the result of a previous command, the interaction status shall be one of the responses to the command (see Chart 326). If

this interaction is not the result of a command (e.g., Timed Trigger Automated Maintenance), then this status is an interaction detail and should relate to the LECIS interaction status change or User or equipment detail table.

Value	Description
OK	Command completed successfully
TI	Command cannot be completed within requested completion time
ER	Command could not complete due to an error condition
ST	Command cannot be completed because of the status of the requested equipment
UN	Command cannot be completed for unknown reasons

Chart 326 Command Answer

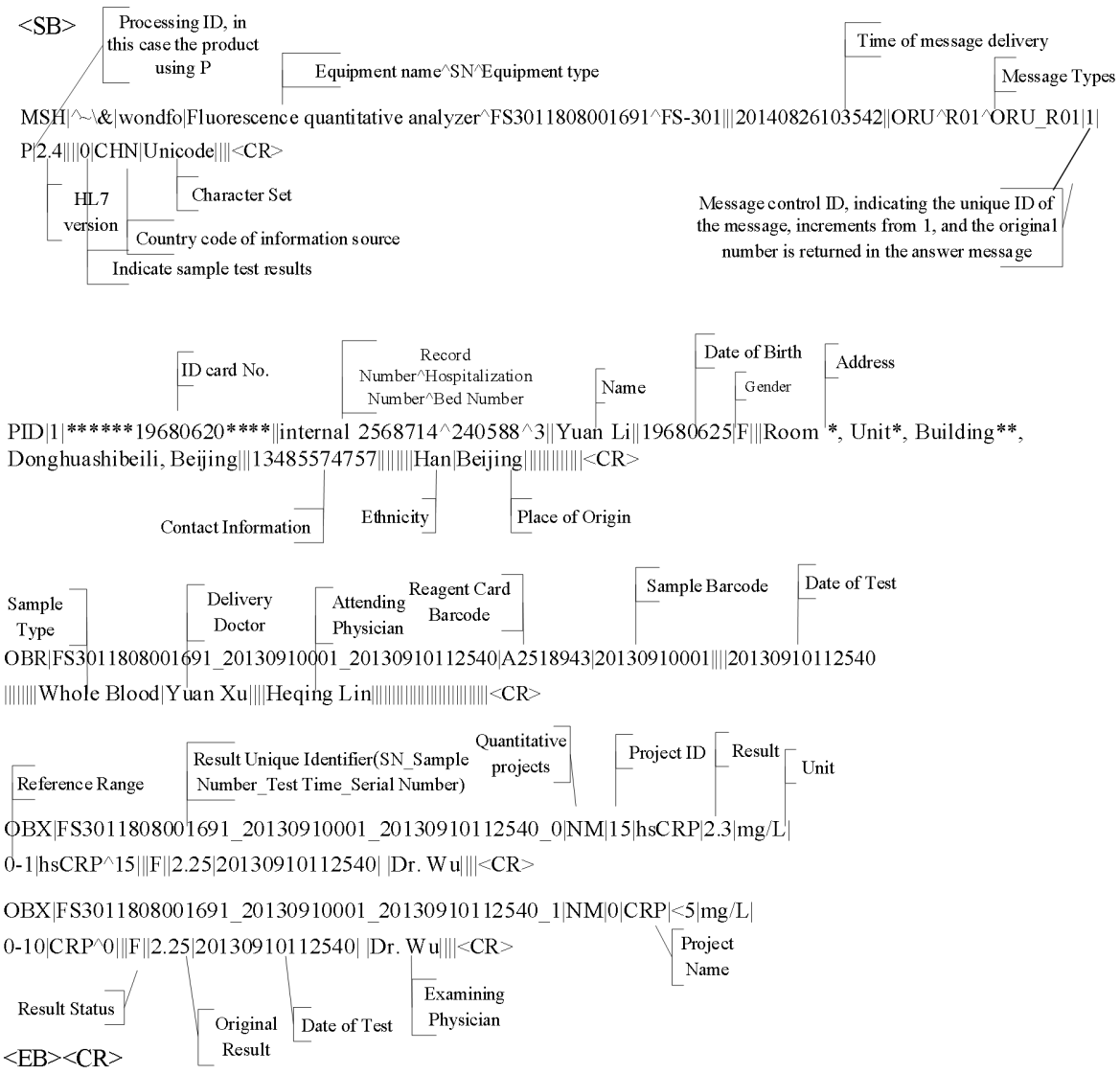
- **Sample Communication Process and Messages**
- **Sample Test Result Transmission**

The ORU^R01 message is used to actively upload sample test results to the LIS/QC management system after instrument testing is completed.

Assume that an existing FS-301 device has a sample test message as shown in the table below:

Field Meaning	VALUE
Patient Name	Yuan Li
Gender	Female
Date of Birth	6/20/1968
ID card No.	******19680620****
Case number	Internal 2568714
Hospitalization Number	240588
Bed Number	3
Reagent Card Barcode	A2518943
Sample Type	Whole Blood
Sample Barcode	20130910001
Project Name	C-reactive protein
Test result	CRP:8.2mg/L&hsCRP:>5.0mg/L
Result unit	mg/L
Patient Address	Room *, Unit*, Building**, Donghuashibeili, Beijing

Then the ORU^R01 message sent to the LIS server/data management system is.



When the LIS server receives the message, it will first judge the legitimacy of the message and the message type, and respond accordingly.

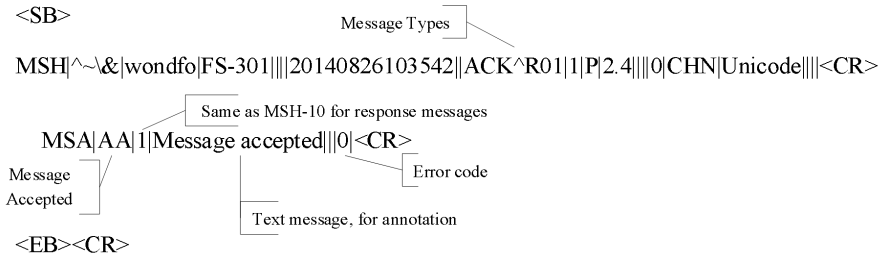
Normal situation answer:

<SB>

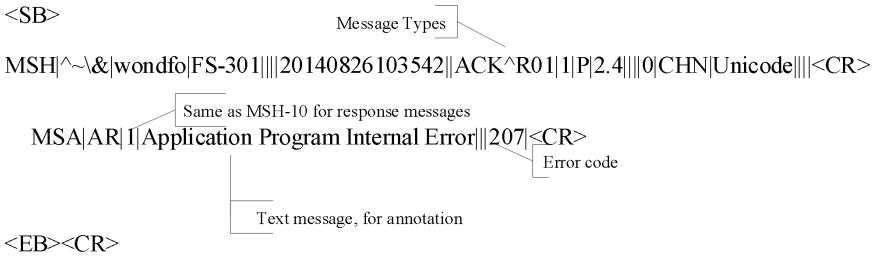
MSH|^~\&|WondfoSoftware|^^FS-301|||20210304172921||ACK^R01|0|P|2.4||||0|CHN|Unicode||||<
CR>

MSA|AA|0|Message Accepted|||0|<CR>

<EB><CR>



Error condition answer:



- **Sample Test Result Transmission (with image)**

<SB>MSH|^~\\&|110.105_Register.205|Thromboelastograph^^TLT-101||^^|20230308152348||O
RU^R01^ORU_R01|4|P|2.4||||0|CHN|UTF-8||||<CR>
PID|5||^^||||20230101|M|||||||||||||||||||||||||<CR>
OBR|_6_20230308145004||6||||20230308145004|||||||20230308145004|Platelet
ADP|||||||||||||||||||||||||||<CR>
OBX|6_20230308145004_0|NM|1|R|0.9^^|min|||||||20230308145004|||||<CR>
OBX|6_20230308145004_1|NM|2|K|4.8^^|min|||||||20230308145004|||||<CR>
OBX|6_20230308145004_2|NM|3|Alpha|42.8^^|deg|||||||20230308145004|||||<CR>
OBX|6_20230308145004_3|NM|4|MA|*55.8*^^|mm|||||||20230308145004|||||<CR>
OBX|6_20230308145004_4|NM|12|A30| ^^|mm|||||||20230308145004|||||<CR>
OBX|6_20230308145004_5|NM|6|ACT| ^^|sec|||||||20230308145004|||||<CR>
OBX|6_20230308145004_6|NM|7|TMA| ^^|min|||||||20230308145004|||||<CR>
OBX|6_20230308145004_7|NM|8|A|55.8^^|mm|||||||20230308145004|||||<CR>
OBX|6_20230308145004_8|NM|9|G|6322.4^^|d/sc|||||||20230308145004|||||<CR>
OBX|6_20230308145004_9|NM|10|E| ^^|d/sc|||||||20230308145004|||||<CR>
OBX|6_20230308145004_10|NM|11|TPI| ^^|/sec|||||||20230308145004|||||<CR>
OBX|6_20230308145004_11|NM|5|CI| ^^||||||||20230308145004|||||<CR>
OBX|6_20230308145004_12|NM|13|LY60| ^^|%|||||||20230308145004|||||<CR>
OBX|6_20230308145004_13|NM|14|LY30| ^^|%|||||||20230308145004|||||<CR>
OBX|6_20230308145004_14|NM|15|A60| ^^|mm|||||||20230308145004|||||<CR>
OBX|6_20230308145004_15|NM|16|CL30| ^^|%|||||||20230308145004|||||<CR>
OBX|6_20230308145004_16|NM|17|CL60| ^^|%|||||||20230308145004|||||<CR>
OBX|6_20230308145004_17|NM|18|EPL| ^^|%|||||||20230308145004|||||<CR>
OBX|6_20230308145004_18|NM|19|CLT| ^^||||||||20230308145004|||||<CR>
OBX|6_20230308145004_19|NM|20|PMA| ^^||||||||20230308145004|||||<CR>
OBX|6_20230308145004_20|NM|21|FLEV| ^^|mg/dl|||||||20230308145004|||||<CR>
OBX|6_20230308145004_21|NM|22|LTE| ^^||||||||20230308145004|||||<CR>

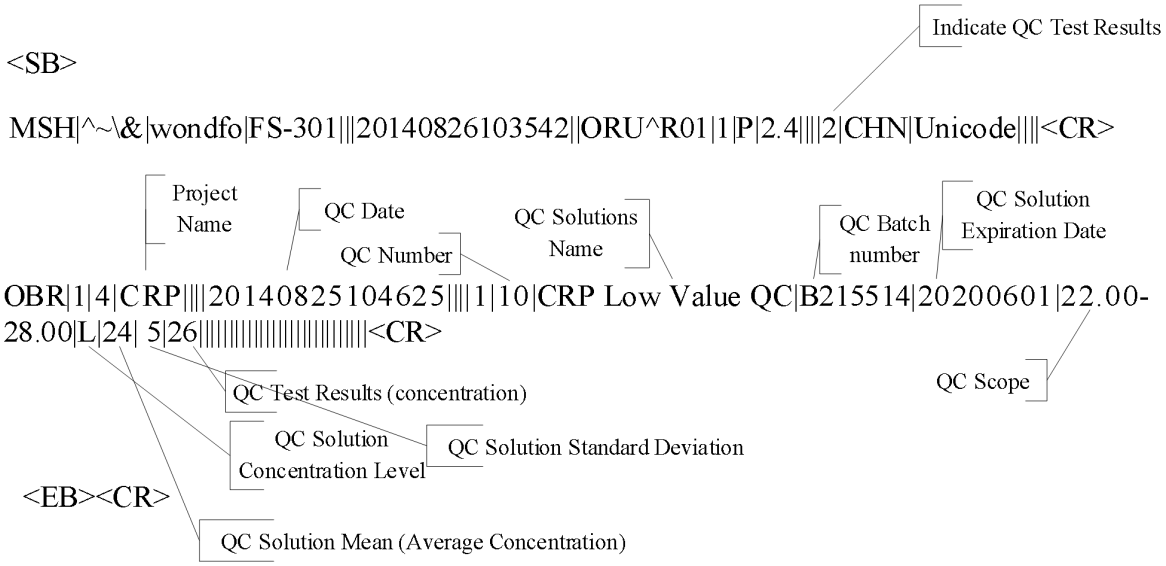
OBX|6_20230308145004_22|ED|23|CommonCup-2023030815480001.jpg|^Image^JPG^Base64^..
....image of base64 encoded data.....|||||||20230308145004||||||<CR><EB><CR>

- # QC Results Transfer

There is currently a QC project with the following information:

Field Meaning	VALUE
Project Number	4
Project Name	CRP
QC Solution Number	10
QC Solution Name	CRP Low Value QC
QC Solution Batch Number	B215514
QC Solution Expiration Date	6/1/2020
QC Solution Concentration Level	Low
QC Solution Average Value	24
QC Solution Standard Deviation	5
QC Results	26

Then the ORU^R01 message sent to the LIS server is:



answer given by the LIS server:

<SB>

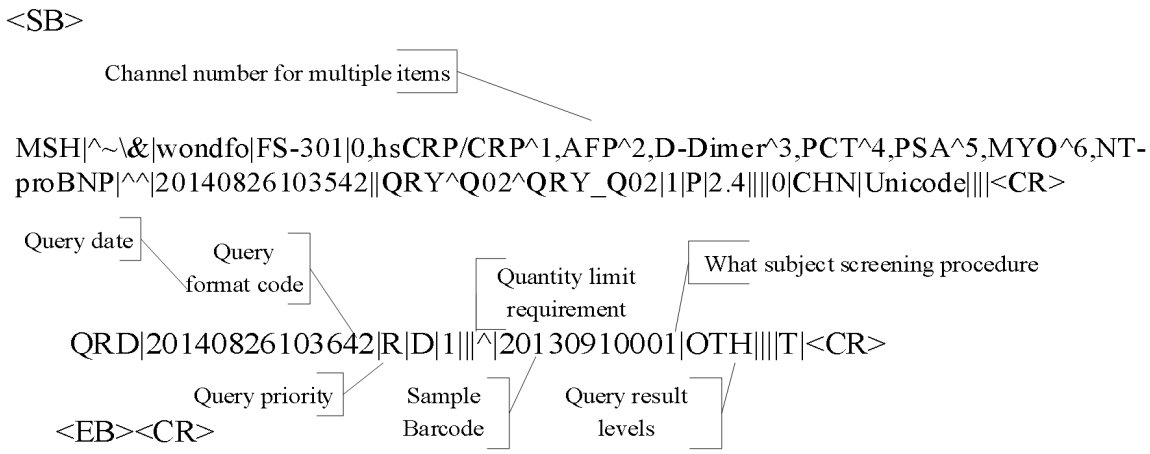
MSH|^~\&|wondfo|FS-301||||20140826103542||ACK^R01|1|P|2.4|||2|CHN|Unicode||||<CR>

MSA|AA|1|Message accepted|||0|<CR>

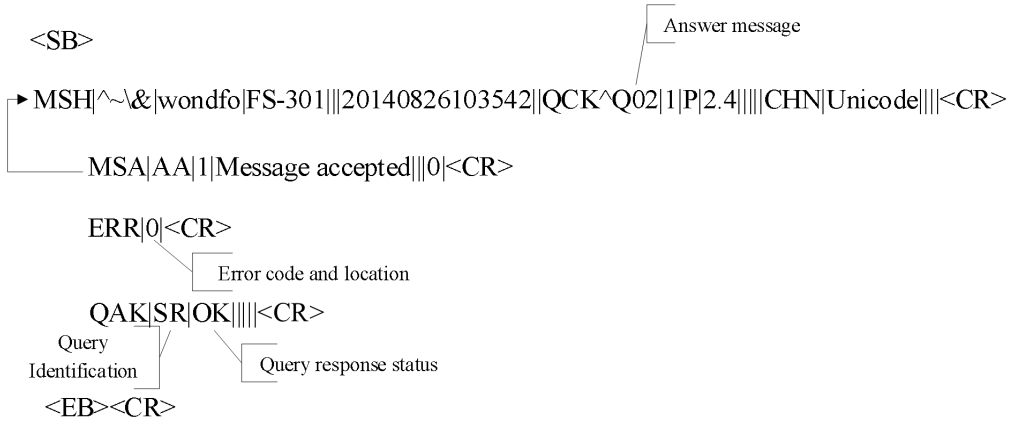
<EB><CR>

- **The instrument queries the LIS system for sample data**

1. assuming that the instrument queries the LIS server for a sample with sample bar code number 20130910001, the QRY^Q02 that will be sent by the instrument is:



2. When the LIS server receives this message, it will return a QCK^Q02 message as an answer. If the corresponding sample is found, the answer message will be:



3. If the corresponding sample cannot be found, the answer message is:

<SB>

MSH|^~\&|wondfo|FS-301||||20140826103542||QCK^Q02|1|P|2.4|||||CHN|Unicode||||<CR>

MSA|AA|1|Message accepted|||0|<CR>

ERR|0|<CR>

QAK|SR|NF|||||<CR>

Query not available

<EB><CR>

4. If the LIS server has found the corresponding sample, it will send DSR^Q03 after returning the QCK^Q02 message to send the relevant patient, sample and item information to the instrument device.

Suppose the queried patient related information is as follows:

Field Meaning	Value
ID card No.	******19680620****
Medical record number	Internal 2568714
Hospitalization Number	240588
Bed Number	3
Name	Yuan Li
Date of Birth	6/20/1968
Gender	Female
Blood Type	O
Address	Room *, Unit*, Building**, Donghuashibeili, Beijing
Contact number	13485574757
Ethnicity	Han
Place of Origin	Beijing
Reagent Card Barcode	A2518943
Sample Barcode	20130910001
Date of Test	20130910112540
Sample Type	Whole Blood
Delivery Doctor	Yuan Xu
Delivery Department	Cardiology
Item Channel No.	3^PCT^^
Project Name	C-reactive protein CRP
Unit	mg/L
Reference Range	5-200

Then the message is:

<SB>
MSH|^~\&|wondfo|FS301|QIAnalyzer|Fluorescence quantitative analyzer^FS3011808001691^FS-301|20180613162528||DSR^Q03^DSR_Q03|1|P|2.4||||0|CHN|Unicode||||<CR>
MSA|AA|1|Message accepted|||0|<CR>
ERR|0|<CR>
QAK|SR|OK|||||<CR>
QRD|20140826103642|R|D|1|||RD|A2518943|OTH|||T|<CR>
QRF|FS-301|||||RC|COR|ALL|||<CR>
DSP|1||240588|||<CR>
No.
Hospitalization number
DSP|2||3|||<CR>
Bed number
DSP|3||Yuan Li|||<CR>
Name
DSP|4||19680620|||<CR>
Date of birth
DSP|5||F|||<CR>
Gender
DSP|6||O|||<CR>
Blood type
DSP|8||Room *Unit*, No.** Building, Donghuashibeili, Beijing|||<CR>
Address
DSP|10||13485574757|||<CR>
Home Phone
DSP|12||******19680620****|||<CR>
ID card No.
DSP|21||A2518943|||<CR>
Reagent Card Barcode
DSP|22||201309100001|||<CR>
Sample Barcode
DSP|23||20130910112540|||<CR>
Delivery Time
DSP|26||Whole Blood|||<CR>
Sample Type
DSP|27||Yuan Xu|||<CR>
Delivery Doctor
DSP|28||Cardiology|||<CR>
Delivery Department
DSP|29||3^PCT^^|||<CR>
Item Channel No.
DSP|30||C-reactive protein CRP|||<CR>
Project Name
DSP|31||mg/L|||<CR>
Unit
DSP|32||5-200|||<CR>
Reference Range
<EB><CR>

Upon receiving the DSR message, the instrument will send an answer message to give an acknowledgement and the answer message will be:

<SB>

MSH|^~\&|wondfo|FS-301|||20140826103542||ACK^Q03|1|P|2.4|||||CHN|Unicode||||<CR>

MSA|AA|1|Message accepted|||0|<CR>

ERR|0|<CR>

<EB><CR>

- # The instrument sends a batch query request to LIS

Set the start time and end time of the QRF and LIS will send all the samples tested from the start time to the end time.

For example, if we request sample data for the whole day of 20th August 2013, the request message would be:

<SB>

MSH|^~\&|wondfo|FS-301|||20140826103542||QRY^Q02|1|P|2.4|||||CHN|Unicode||||<CR>

QRD|20140826103642|R|D|1|||RD||OTH|||T|<CR>

Empty sample number

QRF|FS-301|20130820000000|20130820235959|||RC|COR|ALL|||<CR>

Start Time

End Time

<EB><CR>

As with an individual sample query based on a barcode, the LIS server will answer the query for samples that match the query criteria, and if there is an answer, all eligible samples will be sent at the end of the query. Each sample is transmitted using one DSR message, and the DSC segment of the last DSR is empty. Suppose this query finds 2 eligible samples with the following information:

Field Meaning	Value - Sample 1	Value - Sample 2
ID card No.	******19680620****	******19800808****
Medical record number	Internal 2568714	Internal 1234567
Hospitalization Number	240588	240580
Bed Number	3	2
Name	Yuan Li	Heng Su
Date of Birth	6/20/1968	8/8/1980
Gender	Female	Male

Blood Type	O	A
Address	Room *, Unit*, Building**, Donghuashibeili, Beijing	Room*, Unit*, No.**, Yuquan Road, Haidian District, Beijing
Contact number	13485574757	15558889666
Ethnicity	Han	Han
Place of Origin	Beijing	Beijing
Reagent Card Barcode	A2518985	A2518986
Sample Barcode	20130820001	20130820002
Date of Test	20130820112540	20130820143520
Sample Type	Whole Blood	Whole Blood
Delivery Doctor	Yuan Xu	Yuan Xu
Delivery Department	Cardiology	Respiratory
Item Channel No.	3^PCT^^	6^NT-proBNP^^
Project Name	C-reactive protein CRP	C-reactive protein CRP
Unit	mg/L	mg/L
Reference Range	5-200	5-200

Then the message is:

<SB>
MSH|^~\&|wondfo|FS301|QIAnalyzer|Fluorescence quantitative analyzer^FS3011808001691^FS-301|20180613162528||DSR^Q03^DSR_Q03|1|P|2.4||||0|CHN|Unicode||||<CR>

MSA|AA|1|Message accepted|||0|<CR>

ERR|0|<CR>

QAK|SR|OK|||||<CR>

QRD|20140826103642|R|D|1|||RD||OTH|||T|<CR>

QRF|FS-301|20130820000000|20130820235959|||RC|COR|ALL|||<CR>

DSP|1||240580|||<CR>

DSP|2||2|||<CR>

DSP|3||Heng Su|||<CR>

DSP|4||19800808|||<CR>

DSP|5||M|||<CR>

DSP|6||A|||<CR>

DSP|8||Room*, Unit*, No.**, Yuquan Road, Haidian District, Beijing|||<CR>

DSP|10||15558889666|||<CR>

DSP|12||******1980808****|||<CR>

DSP|21||A2518986|||<CR>

DSP|22||201308200002|||<CR>

DSP|23||20130820143520|||<CR>

DSP|26||Whole Blood|||<CR>

DSP|27||Yuan Xu|||<CR>

DSP|28||Cardiology|||<CR>

DSP|29||6^NT-proBNP^mg/L^5-10|||<CR>

DSP|29||3^PCT^mg/L^5-10|||<CR>

DSP|30||C-reactive protein CRP|||<CR>

DSP|31||mg/L|||<CR>

DSP|32||5-200|||<CR>

DSC||F<CR>

<EB><CR>

Last, empty, indicating the end

In this DSP 29 paragraph, the data format is expressed as: project ID ^ project name ^ unit ^ range (of which the unit and range can be empty, but the ^ symbol needs to be retained, when empty, it is expressed as: project ID ^ project name ^ ^), The correspondence between project ID and name sends out the full channel numbers of the projects we currently support when performing a sweep sample number. The following is an example of some of the project channel numbers:

```
0,hsCRP/CRP^1,AFP^2,D-Dimer^3,PCT^4,PSA^5,MYO^6,NT-proBNP^7,cTnI^8,CK-MB^10,HbA1c^11,cTnI/CK-MB/MYO^12,H-FABP^
13,hsCRP/CRP/PCT^14,Cys-C^15,hsCRP^16,cTnI/NT-proBNP^18,β-HCG^19,CEA^20,S100β^21,NGAL^22,TSH^23,SAA^24,BNP^
25,β2-MG^26,FPSA^27,TT3^28,TT4^29,P^31,Lp-PLA2^39,cTnI/NT-proBNP/D-Dimer^44,ST2
```

The parsing method is: Project 1 ID, Project 1 Name ^ Project 2 ID, Project 2 Name ^ Project 3 ID, Project 3 Name

Currently our channel number is passed to the SetRecvApp interface.

The instrument replies with an ACk message for each DSR message received, and the above two DSR messages reply to the ACK message respectively:

<SB>

MSH|^~\&|wondfo|FS-301|||20140826103542||ACK^Q03|1|P|2.4|||||CHN|Unicode||||<CR>

MSA|AA|1|Message accepted|||0|<CR>

ERR|0|<CR>

<EB><CR>

<SB>

MSH|^~\&|wondfo|FS-301|||20140826103542||ACK^Q03|2|P|2.4|||||CHN|Unicode||||<CR>

MSA|AA|2|Message accepted|||0|<CR>

ERR|0|<CR>

<EB><CR>

- ## Cancellation of Batch Query

After the instrument sends a batch query to the LIS and the LIS is still in the process of querying, the instrument still uses the QRY message if it wants to cancel the query. The specific message is as follows:

<SB>

MSH|^~\&|wondfo|FS-301|||20140826103542||QRY^Q02|1|P|2.4|||||CHN|Unicode||||<CR>

QRD|20140826103642|R|D|1|||RD||CAN|||T|<CR>

Indicate cancellation

QRF|FS-301|20130820000000|20130820235959|||RC|COR|ALL|||<CR>

<EB><CR>

When the LIS server checks that the message is a query cancellation request, it stops sending after it has finished sending the sample it was sending.

- ## Query Sample Results and QC Results

Suppose that the LIS server queries the instrument FS-301 for the checks made on August 20, 2013, from 8:00 to 12:00 pm. Then the query message is as follows:

<SB>

Send message application program

Receiving Equipment

Message types

MSH|^~\&|LIS||Wondfo|FS-301||20140826103542||QRY^R02^QRY_R02|1|P|2.4||||CHN|Unicode||||<CR>

QRD|20140826103642|R|D|1|||RD||OTH|||T|<CR>

QRF|LIS|20130820000000|20130820120000|||RC|COR|ALL|||<CR>

<EB><CR>

When the FS-301 device receives the query message and queries for a single sample result, the reply message is:

<SB>

MSH|^~\&|LIS||Wondfo|FS-301||20140826103542||ORF^R04^ORF_R04|1|P|2.4||||CHN|Unicode||||<CR>

MSA|AA|1|Message accepted|||0|<CR>

QRD|20140826103642|R|D|1|||RD||OTH|||T|<CR>

QRF|LIS|20130820000000|20130820120000|||RC|COR|ALL|||<CR>

PID|1|******19680620****|internal 2568714 & 240588 & 3||Yuan Li||19680625|F|||Room *, Unit*, Building**, Donghuashibeili, Beijing|||13485574757|||||||Han|Beijing||||||||||||<CR>

OBR|1|A2518943|20130820000 1||||20130820112540|||||||Whole Blood|Yuan Xu||||Heqing Lin|||||||||||||||||||||||||<CR>

OBX|1|NM|3|C-reactive protein CRP|8. 2|mg/L|5-200||||F||8. 2|20130820112540| |Dr. Wu||||<CR>

OBX|2|NM|4|C-reactive protein hsCRP|<5|mg/L|5-200||||F||0. 25|20130820112540| |Dr. Wu||||<CR>

ERR|0|<CR>

QAK|SR|OK|||||<CR>

<EB><CR>

Because there is only a single result that does not require DSC segment.

- **Instrument Status Update**

Suppose the FS-301 instrument is initialized successfully, at this time the equipment is in the normal state, and the message fed back to the LIS server from this state is:

<SB>

MSH|^~\&|Wondfo|FS-301|||20140826103542||ESU^U01^ESU_U01|1|P|2.4||||CHN|Unicode||||<CR>

EQU|FS-301^Wondfo Semi-Automatic Immunofluorescence Detector|20140826103500|ES^Stopped|L^Local|S^Serious|<CR>

Equipment Instance Identifier

Date of Event

Equipment Status

Alarm Level

Local remote control status

Interaction Type Identifier

ISD|Command Identifier|IN^INIT|OK|<CR>

Interaction Code Unique Identifier

Interaction Activity Status

<EB><CR>

The LIS server receives this message and replies with an instrument acknowledgement message as:

<SB>

MSH|^~\&|wondfo|FS-301|||20140826103542||ACK^U01^ACK|1|P|2.4|||||CHN|Unicode||||<CR>

MSA|AA|1|Message accepted|||0|<CR>

ERR|0|<CR>

<EB><CR>

- # Instrument Status Request

The LIS system queries the current status of the FS-301 device.

<SB>

Message types

MSH|^~\&|LIS||Wondfo|FS-301||20140826103542||ESR^U02^ESR_U02|1|P|2.4|||||CHN|Unicode||||<CR>

EQU|FS-301^Wondfo Semi-Automatic Immunofluorescence Detector|20140826103500|||<CR>

<EB><CR>

The FS-301 equipment receives the message and replies with an acknowledgement message.

<SB>

MSH|^~\&|LIS||Wondfo|FS-301||20140826103542||ACK^U02^ACK|1|P|2.4|||||CHN|Unicode||||<CR>

MSA|AA|1|Message accepted|||0|<CR>

ERR|0|<CR>

<EB><CR>

And then the instrument replies to the current status to the LIS system. The specific message can be found in the Instrument Status Update.

- # Instrument Consumables Update

There is an FS-301 device. The buffer inside is in a 96/box set, the buffer is valid from December 24, 2010 to December 24, 2020, this buffer was loaded into the machine for use on May 12, 2013, and 32 have been used with 64 remaining. The message updating the current status of the buffer to the LIS is:

<SB>

Message types

MSH|^~\&|Wondfo|FS-301|||20140826103542||INU^U05^INU_U05|1|P|2.4|||||CHN|Unicode||||<CR>

EQU|FS-301^Wondfo Semi-Automatic Immunofluorescence Detector|20140826103500|OP^Normal Operation|L^Local|N^Normal|<CR>

INV|buf001|OK|DI^Diluent|||96|64|||个|20201224|20130512|20101224^20201224|||||

Consumable Identifier | Status | Consumable Type | Initial Quantity | Current Quantity | Date of Expiry | Date of first use | Duration of stable use

<EB><CR>

The acknowledgement message that the LIS system replies to after receiving this message is:

<SB>

MSH|^~\&|LIS||Wondfo|FS-301||20140826103542||ACK^U05^ACK|1|P|2.4|||||CHN|Unicode||||<CR>

MSA|AA|1|Message accepted|||0|<CR>

ERR|0|<CR>

<EB><CR>

- # Instrument Consumables Query

Suppose the LIS system queries the FS-301 equipment for its current buffer quantity, then change the query command to:

<SB>

MSH|^~\&|LIS||Wondfo|FS-301||20140826103542||INR^U06^INR_U06|1|P|2.4||||CHN|Unicode||||<CR>

EQU|FS-301^Wondfo Semi-Automatic Immunofluorescence Detector|20140826103500||||<CR>

INV|buf001|OK|||||||||||||||

<EB><CR>

The instrument receives the command and replies with the acknowledgement message as:

<SB>

MSH|^~\&|Wondfo|FS-301|LIS||20140826103542||ACK^U06^ACK|1|P|2.4||||CHN|Unicode||||<CR>

MSA|AA|1|Message accepted|||0|<CR>

ERR|0|<CR>

<EB><CR>

After replying to the Acknowledgement message, if there is a consumable present in the instrument that is queried, the status of the relevant consumable is replied. For specific messages, refer to Instrument Consumables Update.

- # Instrument Events, Log Updates

Suppose that the instrument FS-301 fails to drop the Tip header resulting in a serious alarm caused by a blockage when the Tip is fetched again. Then the message sent by the instrument to the LIS system is:

<SB>

MSH|^~\&|Wondfo|FS-301|LIS||20140826103542||LSU^U12^LSU_U12|1|P|2.4||||CHN|Unicode||||<CR>

EQU|FS-301^Wondfo Semi-Automatic Immunofluorescence Detector|20140826103500|ES|L^Local|S^Serious|<CR>

EQP|ALM^ALM^Alarm Event|alarm_1548|20140826103245|20140826103245|Pipette arm blocked when TIP discard failed to retrieve|<CR>

Message types

Event Types | Event Identifier | Start Time | End Time | Event Description

<EB><CR>

The LIS system receives the message and sends an acknowledgement message as:

<SB>

MSH|^~\&|Wondfo|FS-301|LIS|||20140826103542||ACK^U12^ACK|1|P|2.4||||CHN|Unicode||||<CR>

MSA|AA|1|Message accepted|||0|<CR>

ERR|0|<CR>

<EB><CR>

- # Instrument Event, Log Query

The LIS system queries the log of the FS-301 instrument for the entire day of August 25, 2014, with the following command:

<SB>
MSH|^~\&|LIS||Wondfo|FS-301||20140826103542||LSR^U13^LSR_U13|1|P|2.4||||CHN|Unicode|||<CR>
EQU|FS-301^Wondfo Semi-Automatic Immunofluorescence Detector|20140826103500|||<CR>
EQP|LOG^Log Event||20140825000000|20140825235959||<CR>
<EB><CR>

Message types
Log
Start Time
End Time

The instrument receives the command and replies with the acknowledgement message as:

<SB>
MSH|^~\&|Wondfo|FS-301|LIS|||20140826103542||ACK^U13^ACK|1|P|2.4||||CHN|Unicode|||<CR>
MSA|AA|1|Message accepted|||0|<CR>
ERR|0|<CR>
<EB><CR>

Message types

And then the instrument sends all the logs of the August 25 to the LIS system. Use multiple EQP segments for multiple logs, and refer to Instrument Events, Log Updates for specific messages.

- # LIS System Sends Command to Instrument

The instrument manipulation commands need to be extended based on the specific device, and the specific format of the message can be found in the LIS System/Data Management Sends Command to Instrument.

Remote LIS sends immediate sampling commands to instrument FS-301 as follows:

<SB>
MSH|^~\&|LIS||Wondfo|FS-301||20140826103542||EAC^U07^EAC_U07|1|P|2.4||||CHN|Unicode|||<CR>
EQU|FS-301^Wondfo Semi-Automatic Immunofluorescence Detector|20140826103500|||<CR>
ECD|89421|SA^ Sampling|Y^YES|||<CR>
<EB><CR>

Message types
Reference Command Number
Remote Control Commands
Immediate implementation or not

The instrument FS-301 receives the command and replies with the acknowledgement message as:

<SB>
MSH|^~\&|Wondfo|FS-301|LIS|||20140826103542||ACK^U07^ACK|1|P|2.4||||CHN|Unicode|||<CR>
MSA|AA|1|Message accepted|||0|<CR>
ERR|0|<CR>
<EB><CR>

Message types

The instrument FS-301 replies with a command response message after executing the sampling command as follows:

<SB>

MSH|^~\&|Wondfo|FS-301|LIS||20140826103542||EAR^U08^EAR_U08|1|P|2.4||||CHN|Unicode|||<CR>

EQU|FS-301^^Wondfo Semi-Automatic Immunofluorescence Detector|20140826103500|||<CR>

ECD|89421|SA^ Sampling|Y^YES|||<CR>

ECR|OK^COMMAND_COMPLETE|20140826103600||<CR>

<EB><CR>

Message types

Command Response Result

Completion Time

LIS system receives the response message and replies with the following command:

<SB>

MSH|^~\&|LIS||Wondfo|FS-301||20140826103542||ACK^U08^ACK|1|P|2.4||||CHN|Unicode|||<CR>

MSA|AA|1|Message accepted|||0|<CR>

ERR|0|<CR>

<EB><CR>

Message types

- **Other**

- **Abnormalities Caused by SN Code and MAC Address**

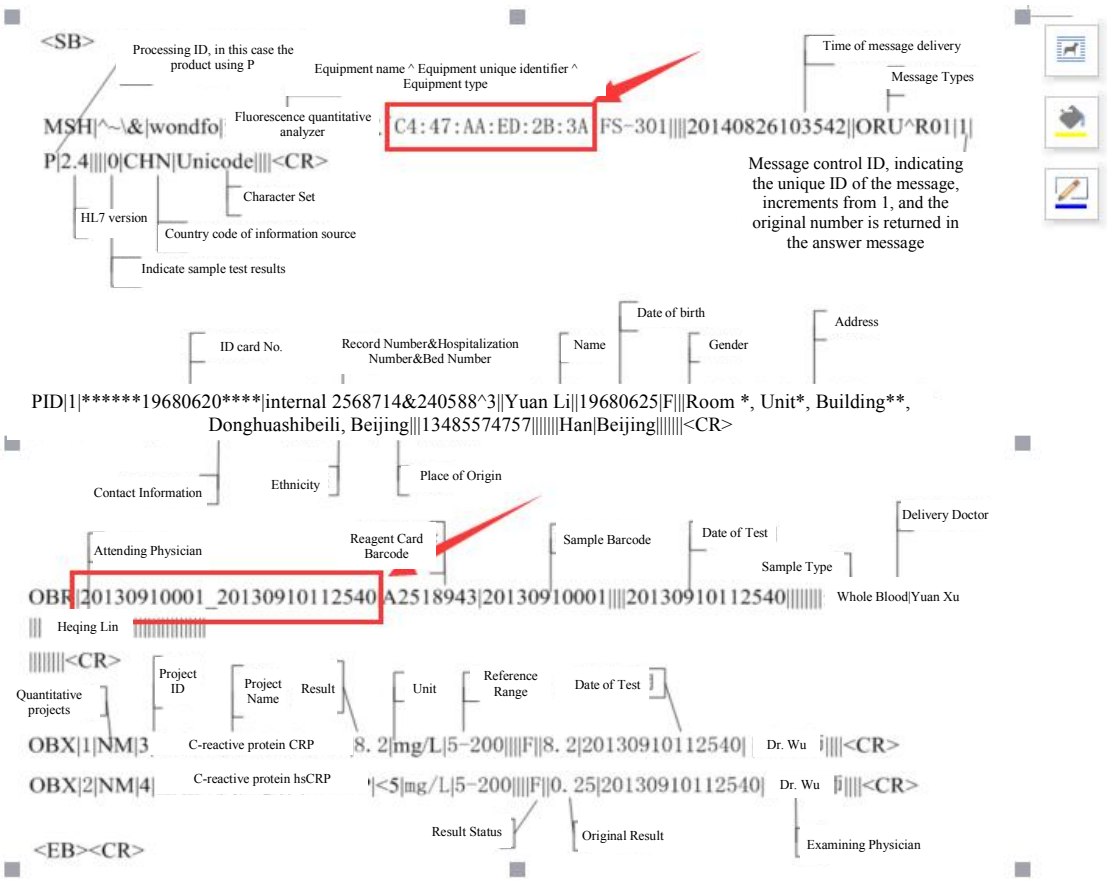
The reason for this situation is that in the very first version of FS301, the MAC address of the instrument has been used as the unique identification of our company's instrument on the LIS terminal. Due to the clearing of the preparation and restoration of the instrument's factory settings during external upgrades, and the fact that our core board MAC addresses are randomly generated, the MAC addresses are not unique. Later, the MAC address that was empty was changed to SN code upload, and the SN code was used as the unique identification of the instrument. The change process, where the corresponding segment is used on the relevant LIS terminal, will have an impact on upgrades. The following solutions are currently available:

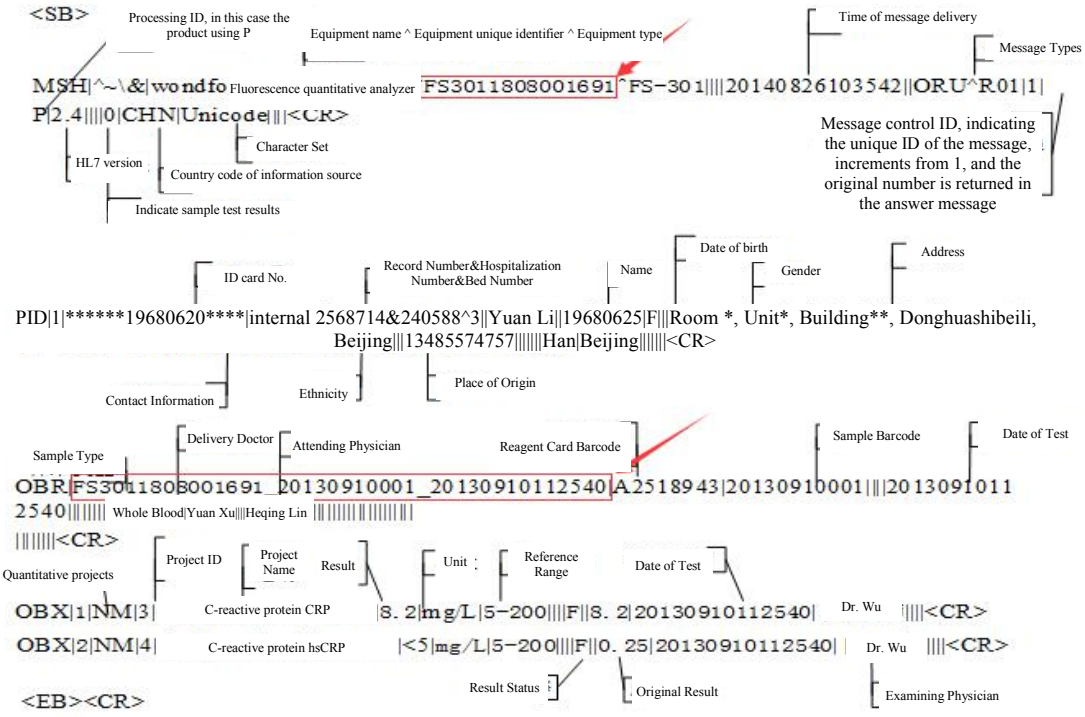
1. The newest software for new and old instruments considers compatibility with the MAC once used and the SN code now in use.

2. When upgrading the latest software of old instruments (referring to 106 and previous versions of instruments), pay attention to the following points:

A. Take a picture of the MAC address before upgrading.

B. After upgrading, choose to use the previous LIS protocol and make sure that the upgraded MAC address remains the same as the original.


<SB>
Processing ID, in this case the product using P
Equipment name ^ Equipment unique identifier ^ Equipment type
Time of message delivery
Message Types
MSH|^~\&|wondfo| Fluorescence quantitative analyzer C4:47:AA:ED:2B:3A FS-301||||20140826103542||ORU^R01|1|
P|2.4||||0|CHN|Unicode||||<CR>
HL7 version
Character Set
Country code of information source
Indicate sample test results
Message control ID, indicating the unique ID of the message, increments from 1, and the original number is returned in the answer message
ID card No.
Record Number&Hospitalization Number&Bed Number
Name
Date of birth
Gender
Address
PID|1|******19680620****|internal 2568714&240588^3||Yuan Li||19680625|F|||Room *, Unit*, Building**, Donghuashibeili, Beijing|||13485574757||||||Han|Beijing||||||<CR>
Contact Information
Ethnicity
Place of Origin
Attending Physician
Reagent Card Barcode
Sample Barcode
Date of Test
Sample Type
Delivery Doctor
OBR|20130910001_20130910112540|A2518943|20130910001||||20130910112540|||||||| Whole Blood|Yuan Xu
||| Heqing Lin
||||||<CR>
Quantitative projects
Project ID
Project Name
Result
Unit
Reference Range
Date of Test
OBX|1|NM|3 C-reactive protein CRP 8.2|mg/L|5-200||||F||8.2|20130910112540| Dr. Wu ||||<CR>
OBX|2|NM|4| C-reactive protein hsCRP |<5|mg/L|5-200||||F||0.25|20130910112540| Dr. Wu ||||<CR>
Result Status
Original Result
Examining Physician
<EB><CR>


<SB>
Processing ID, in this case the product using P
Equipment name ^ Equipment unique identifier ^ Equipment type
Time of message delivery
Message Types
MSH|^~\&|wondfo Fluorescence quantitative analyzer FS3011808001691^FS-301||||20140826103542||ORU^R01|1|
P|2.4||||0|CHN|Unicode|||<CR>
HL7 version
Character Set
Country code of information source
Indicate sample test results
Message control ID, indicating the unique ID of the message, increments from 1, and the original number is returned in the answer message
ID card No.
Record Number&Hospitalization Number&Bed Number
Name
Date of birth
Gender
Address
PID|1|******19680620****|internal 2568714&240588^3||Yuan Li||19680625|F|||Room *, Unit*, Building**, Donghuashibeili, Beijing|||13485574757||||||Han|Beijing||||||<CR>
Contact Information
Ethnicity
Place of Origin
Sample Type
Delivery Doctor
Attending Physician
Reagent Card Barcode
Sample Barcode
Date of Test
OBR|FS3011808001691_20130910001_20130910112540|A2518943|20130910001|||2013091011
2540|||||| Whole Blood|Yuan Xu||||Heqing Lin ||||||||||||||||
||||||<CR>
Quantitative projects
Project ID
Project Name
Result
Unit
Reference Range
Date of Test
OBX|1|NM|3| C-reactive protein CRP |8.2|mg/L|5-200||||F||8.2|20130910112540| Dr. Wu ||||<CR>
OBX|2|NM|4| C-reactive protein hsCRP |<5|mg/L|5-200||||F||0.25|20130910112540| Dr. Wu ||||<CR>
Result Status
Original Result
Examining Physician
<EB><CR>