Automatic biochemical Analyzer

HL7 Interface User's Manual

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Statement

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2 Device complies with the relevant national standards;

3 Product operation in accordance with this manual.

Preface

Before using this system, please carefully read and understand the contents of the manual for the interface, so that the correct use of the system. After reading, keep interface manual, and manual for the interface is placed in accessible locations.

Reader

Readers of this manual for LIS(Laboratory information system) development staff and the need to understand E-LAB HL7Interface. This interface manual to guide the LIS System Developer, LIS interface makes the LIS system to communicate with the biochemical Analyzer, for data transmission. Developers need to have a certain degree of LIS, HL7standards-related knowledge and the ability to network programming. Network layer protocol for TCP/IP or serial ports, application layer protocol for HL7 version 2.3.1 .Recommended Window s platform using Visual C++ or Visual Basic(Not limited to) Interface development tool.

Content

This manual for ES-480/ES-380/ES-200 automatic chemistry analyzer HL7 Interface user manual. This manual introduces the E-LAB HL7 interface protocol-related content. Chapter 1 on E-LAB HL7 interfaces overview. Chapter2 introduces ES-480/ES-380/ES-200 and LIS Duplex communication, which sends test results data and obtain sample application from the LIS workstations functionality. Chapter 3 is about the communication processes and messages and some listed examples.

Conventions

In the following table lists the symbols used in this manual, symbols and words used.

Meaning of symbols

Used to illustrate steps or other important information needed in Note: Wake up user content.

1 E-LAB HL7 Interface Overview

HL7 Automatic biochemistry instruments interface is E-LAB ES-480/ES-380/ES-200 to adapt to today's rapid development of laboratory information systems (LIS) and the development of new features, automatic biochemistry instruments for E-LAB ES-480/ES-380/ES-200 and others are based on IP, Serial port Network protocols provide a channel. Using TCP/IP connections or serial port connection, LIS data server can receive from biochemical Analyzer. Biochemical instrument in real time mode and bulk mode send samples of patient information, information such as test results reported to the LIS Server, Also support users by scanning bar code in real time mode and batch mode to get the sample applications for information on the following specific description respectively, the description of this connection in two ways. The interface data transfer format is in accordance with HL7 version 2.3.1 to create a. This interface supports biochemical Analyzer and LIS bi-directional transmission system.

1.1 E-LAB **HL7** Interface supported message

HL7 is an electronic data interchange standards provide nursing care for hospitalized patients. Originally it was defined by the United States, has now been adopted by many countries. This interface is based on the HL7 v2.3.1 to define, for details please refer to HL7 Interface Standards Version 2.3.1.

E-LAB HL7 Interface using only part of the data, so only a portion of the HL7 The message type specified in, segment type, and other data used in the interface.

1.2 **HL7**The underlying protocol

TCP/IP, Serial port is Byte stream protocol, it does not provide message boundaries. HL7 as the upper layer protocol is a message-based, but it does not provide message termination mechanism. In order to determine message boundaries, we use the smallest of the underlying protocol (HL7 Interface Standards Version2.3.1. Also corresponding to this description).

Communication layer

Messages are transmitted in the following format:

<SB> ddddd <EB><CR>

Which:

<SB> = Start Block character (1 byte)

ASCII <VT>,,<0x0B>. Don't mistake with the ASCII characters in SOH STX.

ddddd = Data (variable number of bytes)

ddddd Is HL7 News. Include only ISO 8859-1 Characters (Hexadecimal value20-FF) <CR>, Not including the other control and nonprintable characters.

<EB> = End Block character (1 byte)

ASCII <FS>,,<0x1C>. Don't mistake with the ASCII characters ETX EOT.

<CR> = Carriage Return (1 byte)

ASCII Carriage returns, that is, <0x0D>.

1.3 Minimal Lower Layer Protocol(MLLP)

This interface supports HL7 Minimal Lower Layer Protocol (MLLP), this interface is a package of messages of HL7. MLLP Protocol defined by the HL7 standard specifications, HL7 Messaging package for messages starting with the use of a single character, ending with two-character. HL7 interface uses the HL7 standard default characters.

Starting characters: hexadecimal <0B>

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

2 Duplex communication

Including 2 parts: transmission of test results and sample applications for access to information. Transmission of test results the main biochemical instrument for transmitting test data to external systems (LIS). Real-time data transmission by means of a test transmission and bulk transfer of historical results. We provide, in system settings, allow real time transmission but bulk transmission is not allowed in the testing process, and other cases can do bulk transmission. Sample application for information access refers to the biochemical analyzer from LIS gets the required sample application information to the local for testing. Access by means of real-time transmission (biochemical analyzer samples can only be configured to scan system used on a sample barcode matching, get after scanning) and fetching (request is issued to the time period of the day samples need to be acquired).

2.1 Introduction

This chapter describes the several HL7 (Version2.3.1) messages E-LAB HL7 Interface used.

Note: HL7 Supports a number of message types, here we use only 5 types of messages.

General syntax rules are described below.

2.2 Message syntax

This chapter will do an introduction of the universal syntax of HL7Interface.

Note:

If you need to understand complete, detailed description of the syntax of HL7 Message, refer to HL7 standard which HL7 standards committee provided.

Each HL7 message consists of some segments, segment end with <CR>.

Each segment is made up of three characters and a variable number of fields, fields consists of component and subcomponent, MSH segment defines the cell separator. For example:

MSH|^~\&|||E-LAB|ES-480|20181024113402||ORU^R01|1|P|2.3.1||||||UNICODE||

Of which:

Five characters after MSH are used to define separators to distinguish the fields, component and subcomponent. Although these characters can be any non-text characters, HL7 standard recommend to use characters in the following table:

Characters	Significance
|	Field delimiter
^	Component delimiter
&	Subcomponent delimiters
~	Repeating delimiter
\	The escape character

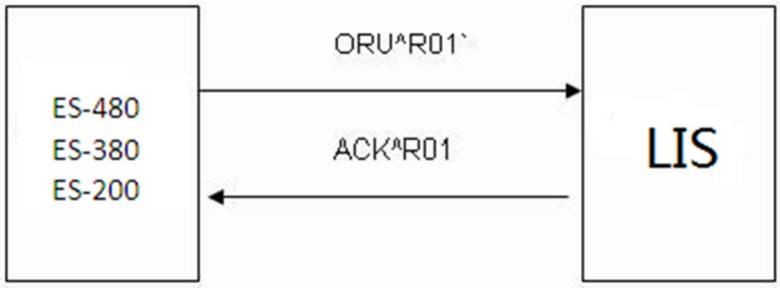
The first field of MSH contains the separator. After MSH field, some of the fields are empty because they are optional and E-LAB HL7 interface does not use it, detailed description of the definition and selection of fields will be listed back.

Domain9:	Contains the message type and event (ORU, R01)
Domain10:	Contains a unique identifier of the message ID
Domain11:	Includes processing ID (P Represents a product)
Domain12:	Define messages using HL7 Version (2.3.1)

For any kind of messages, fields order has its rule after MSH field, the following sections will describe in detail the order of using these grammatical structures to represent the fields optional or repeating: [ ] means fields inside are optional. { } means fields inside can be repeated 0 or 1 or more times.

2.3 SupportedHL7Messages

HL7 messages used in this interface are ORU, ACK, QRY, QCK, DSR. Diagram of uploading the of the test results are as follows:



LIS Server sample application diagram is as follows:

Below is a detailed descriptions.

ORU/ACK: Unsolicited observations/Response

ORU^R01 Message's primary role is in HL7 Used to deliver lab results, we used to transfer Patient sample results, calibration results and quality control results to the LIS system.

Sample test results for patients, including the following information:

- Patients information needed by network data (patient name, sample number, etc.)

- Information (sample type, sends doctors examining doctors, clinical diagnosis, etc.)

- Test results

It is a set of messages, each message matches to a sample test (test results that may have more than one test parameters). LIS system can use the content as needed. Concrete structures are as follows:

ORU Observational Results (Unsolicited)	Description
MSH	Message header
PID	Patient information
OBR	Observation report
{OBX}	Check results

Calibration test results, including the following information:

--Test information (test number, test name)

--Rules-calibration, calibration time

--Calibration solution information (count, number, name, batch number, expiry date, concentration, etc)

--The calibration result values (responsiveness, calibration parameters count, the calibration parameter values)

A message will be sent to include all the calibration test results. LIS system can use the content as needed.

Quality control test results, including the following information:

--Test information (Test number, test name)

--Quality control-related information (count, number, name, batch number, expiry date, mean value)

-Quality control time, test result (concentration)

A message will be sent to include all quality control test results. LIS system can use the content as needed.

Calibration, quality control result structure are as follows:

ORU Observational Results (Unsolicited)	Description
MSH	Message header
OBR	Calibration, quality control of observations

ACK^R01 Messages are used as response message to ORU. Structure is as follows:

ACK Acknowledgment	Description
MSH	Message header
MSA	Message acknowledgement

QRY/QCK: Query results/Response

QRY^Q02: Message querying the current data used to query sample application information required from LIS System, trigger events Q02. Has the following structure:

QRY Query	Description
MSH	Message header
QRD	Query definition
QRF	Query filter

QCK^Q02 Message are used as the response message to QRY message. Structure is as follows:

QRY Query Acknowledgment	Description
MSH	Message header
MSA	Message acknowledgement
ERR	Error message
QAK	Query Confirmation

DSR/ACK : Observation results show/Response

DSR^Q03: Message's main role was to send query results to display, whereby LIS server send sample information required to biochemical analyzer. According to HL7 standard, use the following structure:

DSR Display Response	Description
MSH	Message header
MSA	Message acknowledgement
ERR	Error message
QAK	Query confirmation
QRD	Query definition

QRF	Query filter
{DSP}	Display data
DSC	Repeat pointer

ACK^Q03 Messages are used as response message DSR message. Structure is as follows:

ACK	Acknowledgment	Description
MSH		Message header
MSA		Message acknowledgement
ERR		Error message

2.4 Message segment

This section describes the various components of each segment with tables:

--Field length

--Instructions for use

All fields used in messages are listed in the table. Among them, flag # means it is the mandatory field according to HL7 standard.

Note:

In E-LAB HL7 Interface, for future expansion needs, we do not omit any fields in a message, if the field has no value, then empty it.

1. MSH Message Header

All messages are starts with MSH, generally located in the front of the message. The MSH section is used to define a message of intent, some details of the origin, purpose and message syntax.

E-LAB HL7 Interface MSH Using the following fields:

Serial number	Field name	Length	Introductions
1#	Field Separator	1	Contain message ID and the separator between the first real field, define the field delimiter (|) of rest of the message
2#	Encoding Characters	4	Contains the component separator, the repeating delimiter, escape delimiters, and subcomponent delimiters (^~\&)
3	Sending Application	180	The sending application, take E-LAB
4	Sending Facility	180	Transmitter equipment, take ES-480/ES-380/ES-200
5	Receiving Application	180	Blank, reserved. Receiving application
6	Receiving Facility	180	Blank, reserved. Receiver equipment
7	Date/Time Of Message	26	Time of the current message. Call time information system
8	Security	40	Blank, reserved. Security
9#	Message Type	7	The type of message, such as:ORU^R01
10#	Message Control ID	20	Message control ID That uniquely identifies a message, with 1 increment for each message
11#	Processing ID	3	Processing ID, take **P** as default (Products)
12#	Version ID	60	Version ID, HL7 Protocol version: 2.3.1
13	Sequence Number	15	Blank, reserved. Serial number
14	Continuation Pointer	180	Blank, reserved. Row pointer
15	Accept Acknowledgment Type	2	Blank, reserved. Receives the response type
16	Application Acknowledgment Type	2	Response type for the application, sends the result type. -0-patient samples; 1-calibration results; 2-quality control results

17	Country Code	2	Blank, reserved. Country code
18	Character Set	10	Character sets, take UNICODE as default
19	Principal Language Of Message	60	Blank, reserved. Messages main language
20	Alternate Character Set Handling Scheme	20	Blank, reserved. Alternate character set solutions

Note: this field appears in all messages. In HL7 Messages sent from LIS systems to biochemical analyzer, field 3, field 4 value are defined by LIS Developer, 5, 6 fields default values are "E-LAB""ES-480/ES-380/ES-200". 10 and 16 field uses an integer; All other fields use a string type.

2. MSA - message acknowledgment segment

E-LAB HL7 Interface MSA Use the following domains:

Serial number	Field name	Length	Introductions
1#	Acknowledgment Code	2	Confirmation code, AA means Acceptance; AE means an error; AR means Rejected
2#	Message Control ID	20	Message control ID, same as the sender's MSH-10
3	Text Message	80	Text message, when failed or refused, a text description of the event. Matches the field 6. Can be used to write to the error log
4	Expected Sequence Number	15	Blank, reserved. Expected sequence number
5	Delayed Acknowledgment Type	1	Blank, reserved. Confirmation of the delay types
6	Error Condition	100	Error conditions (status code)

Description: MSA-6 field value shown in the table below

Status code (**MSA-6**)	The status text (**MSA-3**)	Description/Notes
Success:		AA
0	Message accepted	Success

Error status codes:		AE
100	Segment sequence error	Messages out of sequence, or key segment missed
101	Required field missing	Key segment missed
102	Data type error	Data type error, such as number becomes characters
103	Table value not found	Value is not found, temporarily not used
Reject status codes:		AR
200	Unsupported message type	Message type not supported
201	Unsupported event code	Event codes ot supported
202	Unsupported processing ID	Processing ID Does not support
203	Unsupported version id	Version ID not support supported
204	Unknown key identifier	Unknown keyword identification, such as the transmission of a patient information which does not exist
205	Duplicate key identifier	Duplicate keyword
206	Application record locked	Cannot perform transaction in the application store, such as the database is locked
207	Application internal error	Application of unknown internal error

Note: this message may appear in ACK^R01, QCK^Q02, ACK^Q03 message. Field 4, field 6 use an integer; Other fields that use the string type.

3. PID Patient Identification

PID Mainly used to build a patient's personal information. E-LAB HL7 interfaces using the following fields:

Serial number	Field	Length	Introductions
1	Set ID – PID	10	Identify different patient message
2	Patient ID	20	The patient's Hospital
3#	Patient Identifier List	20	Medical record number
4	Alternate Patient ID – PID	20	Bed number
5#	Patient Name	48	Patient's name
6	Mother's Maiden Name	48	Ward
7	Date/Time of Birth	26	Patient date of birth
8	Sex	1	Gender male, send M, woman sends F, Otherwise, send O
9	Patient Alias	48	Blood group
10	Race	80	Blank, reserved. Race
11	Patient Address	106	Patient address
12	County Code	4	County Code (post code)
13	Phone Number - Home	40	Phone number
14	Phone Number - Business	40	Blank, reserved. Phone number-the company
15	Primary Language	60	Blank, reserved. Main language
16	Marital Status	80	Blank, reserved. Marital status
17	Religion	80	Blank, reserved. Religion
18	Patient Account Number	20	Patient categories
19	SSN Number -Patient	16	Health care account
20	Driver's License Number – Patient	25	Fee type
21	Mother's Identifier	20	Blank, reserved. Mother ID
22	Ethnic Group	80	National

23	Birth Place	60	Place of birth (origin)
24	Multiple Birth Indicator	1	Blank, reserved. Multiple birth indicator is Y, otherwise N
25	Birth Order	2	Blank, reserved. Birth order is greater than0integer
26	Citizenship	80	Notes
27	Veterans Military Status	60	Blank, reserved. Veteran status
28	Nationality	80	Country
29	Patient Death Date and Time	26	Blank, reserved. Death time
30	Patient Death Indicator	1	Blank, reserved. Death indicator is Y, Otherwise N

Note: this message is used only in ORU^R01 message. Field 1 and field 25 use integer data type; Field 24and field 30 use the boolean data type; Other fields use the string data type.

4. OBR Observation Request

OBR used for the transmission of related information on the inspection report. When transferring a patient sample test results information (MSH-16 set as 0), in E-LAB HL7 interface, use the following fields:

Serial number	Field	Length	Introductions
1	Set ID – OBR	10	Identifier for different OBR Field
2	Placer Order Number	22	Request medical advice, as the bar code number
3	Filler Order Number	22	Executive orders number, used as the sample number
4#	Universal Service ID	200	Universal service identifier, E-LAB^ES-480/ES-380/ES-200
5	Priority	2	Whether is the emergency, if yes use Y, otherwise use N
6	Requested Date/time	26	Blank, reserved. Time/date
7	Observation Date/Time	26	Observation date/Time for testing time

8	Observation End Date/Time	26	Blank, reserved. Observe the end date/time
9	Collection Volume	20	Blank, reserved. Collection Volume
10	Collector Identifier	60	Blank, reserved. Collector mark
11	Specimen Action Code	1	Blank, reserved. Sample-handling code
12	Danger Code	60	Blank, reserved. Danger code
13	Relevant Clinical Info.	300	Relevant clinical information for Clinical Diagnostics
14	Specimen Received Date/Time	26	Sending time
15	Specimen Source	300	Sample source, used as a sample type, such as serum, plasma, urine, etc.
16	Ordering Provider	120	Advice providers, as sending doctors
17	Order Callback Phone Number	40	Inspection Department
18	Placer Field 1	60	Sample characteristics (jaundice icterus and hemolytic hemolysis, Blood lipid lipemia)
19	Placer Field 2	60	Blood bag number
20	Filler Field 1	60	Attending physician
21	Filler Field 2	60	Treatment departments
22	Result Rpt/Status Change – Date/Time	26	Blank, reserved. Results/status changed-date/time
23	Charge to Practice	40	Blank, reserved. Implementation costs
24	Diagnostic Serv Sect ID	10	Blank, reserved. Diagnostics section ID
25	Result Status	1	Blank, reserved. Result status
26	Parent Result	200	Blank, reserved. Parent advice results
27	Quantity/Timing	200	Blank, reserved. Volume/time
28	Result Copies To	150	Blank, reserved. Results of CC
29	Parent	150	Blank, reserved. Parent advice
30	Transportation Mode	20	Blank, reserved. Transfer mode
31	Reason for Study	300	Blank, reserved. Study on reasons

32	Principal Result Interpreter	200	Blank, reserved. The main interpreter for results
33	Assistant Result Interpreter	200	Blank, reserved. Assistant result interpreter
34	Technician	200	Blank, reserved. Technician
35	Transcriptionist	200	Blank, reserved. Transcription
36	Scheduled Date/Time	26	Blank, reserved. Due date/time
37	Number of Sample Containers	4	Blank, reserved. Number of sample containers
38	Transport Logistics of Collected Sample	60	Blank, reserved. Sample transport logistics
39	Collector's Comment	200	Blank, reserved. Collector comments
40	Transport	60	Blank, reserved. Transport arrangements responsibility
	Arrangement Responsibility		
41	Transport Arranged	30	Blank, reserved. Transport arrangement
42	Escort Required	1	Blank, reserved. Escorts
43	Planned Patient Transport Comment	200	Blank, reserved. Planned patient transport comment
44	Ordering Facility Name	60	Blank, reserved. Requester's name
45	Ordering Facility Address	106	Blank, reserved. Requester's address
46	Ordering Facility Phone Number	48	Blank, reserved. Requester's phone number
47	Ordering Provider Address	106	Blank, reserved. Provider address of person requesting

Note: this message is used only in ORU^R01 message. Field 1, Field 3, Field 37 field use integer data type; Field 9 use floating point data type; other fields use the string data type.

When transmitting the calibration test results (MSH-16 set as 1). The fields are defined as follows:

Serial number	Field	Length	Introductions
1	Set ID – OBR	10	Identifier for different OBR Field

2	Placer Order Number	22	Request medical advice, is used as the test number
3	Filler Order Number	22	Executive orders number, used as the test name
4#	Universal Service ID	200	Universal service identifier, E-LAB^ES-480/ES-380/ES-200
5	Priority	2	Blank, reserved. Priority
6	Requested Date/time	26	Blank, reserved. Time/date
7	Observation Date/Time	26	Observation date/Time, used as a calibration time
8	Observation End Date/Time	26	Blank, reserved. Observe the end date/time
9	Collection Volume	20	Used as a calibration rule. 0-one point linear; 1-two-point linear; 2-multi-point linear; 3-Logistic-Log4P; 4-Logistic-Log5P; 5-Exponential 5P; 6-Polynomial 5P; 7-Parabola; 8-Spline.
10	Collector Identifier	60	Blank, reserved. Collection ID
11	Specimen Action Code	1	Number of calibration solution
12	Danger Code	60	Calibration solution number
13	Relevant Clinical Info.	300	Calibration solution name
14	Specimen Received Date/Time	26	Expiry date of the calibration solution
15	Specimen Source	300	Calibration solution batch number
16	Ordering Provider	120	Concentration of standard
17	Order Callback Phone Number	40	Calibration solution concentration levels. High-H; Middle-M; Low-L
18	Placer Field 1	60	Responsiveness
19	Placer Field 2	60	Number of calibration parameters
20	Filler Field 1	60	Calibration parameter values
21	Filler Field 2	60	Blank, reserved.
22	Result Rpt/Status Change – Date/Time	26	Blank, reserved. Results/status changed-date/time

23	Charge to Practice	40	Blank, reserved. Implementation costs
24	Diagnostic Serv Sect ID	10	Blank, reserved. Diagnostics section ID
25	Result Status	1	Blank, reserved. Result status
26	Parent Result	200	Blank, reserved. Parent advice results
27	Quantity/Timing	200	Blank, reserved. Volume/time
28	Result Copies To	150	Blank, reserved. Results of CC
29	Parent	150	Blank, reserved. Parent advice
30	Transportation Mode	20	Blank, reserved. Transfer mode
31	Reason for Study	300	Blank, reserved. Study on reasons
32	Principal Result Interpreter	200	Blank, reserved. Main interpreter for results
33	Assistant Result Interpreter	200	Blank, reserved. Auxiliary interpreters for results
34	Technician	200	Blank, reserved. Technician
35	Transcriptionist	200	Blank, reserved. Transcription
36	Scheduled Date/Time	26	Blank, reserved. Due date/time
37	Number of Sample Containers	4	Blank, reserved. Number of sample containers
38	Transport Logistics of Collected Sample	60	Blank, reserved. Sample transport logistics
39	Collector's Comment	200	Blank, reserved. Collector comments
40	Transport Arrangement Responsibility	60	Blank, reserved. Transport arrangements responsibility
41	Transport Arranged	30	Blank, reserved. Transport arrangement
42	Escort Required	1	Blank, reserved. Escorts
43	Planned Patient Transport Comment	200	Blank, reserved. Arranging patient transport notes
44	Ordering Facility Name	60	Blank, reserved. Requester's name

45	Ordering Facility Address	106	Blank, reserved. Requester's address
46	Ordering Facility Phone Number	48	Blank, reserved. Requester's phone number
47	Ordering Provider Address	106	Blank, reserved. Provider's address of person requesting

Note: this message is only used ORU^R01 message. Filed 1, filed 9, filed11, filed 19, filed 37 use integer data type; Filed 10 use floating point data type; Other fields use the string data type. Field 12~18 based on the number of the calibration solution, format is V1^V2^ ... Vi . Field 20 according to the calibration parameters, different values seperate with ^ separator.

Different rules have different calibration parameters.

For one-point linear calibration and two-point linear and multi-point linear calibration, there are 2 calibration parameters K, R0.

Logistic-Log 4P, there are 4 calibration parameters K, R0, a, b.
Logistic-Log 5P, Exponential 5P, there are 5 calibration parameters K, R0, a, b, c.
Polynomial 5P, there are 5A calibration parameter R0, a, b, c, d.
Spline, there are 4*(n-1) calibration parameters R0i, ai, bi, ci. N is number of calibration solution.

If you transfer quality control test results (MSH-16 set as 2). The fields are defined as follows:

Serial number	Field	Length	Introductions
1	Set ID – OBR	10	Identifier for different OBR Field
2	Placer Order Number	22	Request medical advice, is used as the test number
3	Filler Order Number	22	Executive orders number, used as the test name
4#	Universal Service ID	200	Universal service identifier, E-LAB^ES-480/ES-380/ES-200
5	Priority	2	Blank, reserved. Priority
6	Requested Date/time	26	Blank, reserved. Time/date

7	Observation Date/Time	26	Observation date/Time for quality control
8	Observation End Date/Time	26	Blank, reserved. Observe the end date/time
9	Collection Volume	20	Blank, reserved.
10	Collector Identifier	60	Blank, reserved.
11	Specimen Action Code	1	Number of quality control liquid
12	Danger Code	60	Quality control number
13	Relevant Clinical Info.	300	Quality control liquid name
14	Specimen Received Date/Time	26	Expiry date of quality control liquid
15	Specimen Source	300	Quality control liquid batch number
16	Ordering Provider	120	Blank, reserved.
17	Order Callback Phone Number	40	Concentration levels of quality control. High-H; Middle-M; Low-L
18	Placer Field 1	60	Quality control liquid mean value (mean concentration)
19	Placer Field 2	60	Standard deviation of quality control liquid
20	Filler Field 1	60	Test result values (concentration)
21	Filler Field 2	60	Blank, reserved.
22	Result Rpt/Status Change – Date/Time	26	Blank, reserved. Results/status change-date/time
23	Charge to Practice	40	Blank, reserved. Implementation costs
24	Diagnostic Serv Sect ID	10	Blank, reserved. Diagnostics section ID
25	Result Status	1	Blank, reserved. Result status
26	Parent Result	200	Blank, reserved. Parent advice results
27	Quantity/Timing	200	Blank, reserved. Volume/time
28	Result Copies To	150	Blank, reserved. Results of CC
29	Parent	150	Blank, reserved. Parent advice

30	Transportation Mode	20	Blank, reserved. Transfer mode
31	Reason for Study	300	Blank, reserved. Study on reasons
32	Principal Result Interpreter	200	Blank, reserved. Main interpreter for results
33	Assistant Result Interpreter	200	Blank, reserved. Auxiliary interpreters for results
34	Technician	200	Blank, reserved. Technician
35	Transcriptionist	200	Blank, reserved. Transcription
36	Scheduled Date/Time	26	Blank, reserved. Due date/time
37	Number of Sample Containers	4	Blank, reserved. Number of sample containers
38	Transport Logistics of Collected Sample	60	Blank, reserved. Sample transport logistics
39	Collector's Comment	200	Blank, reserved. Collector comments
40	Transport Arrangement Responsibility	60	Blank, reserved. Transport arrangements responsibility
41	Transport Arranged	30	Blank, reserved. Transport arrangement
42	Escort Required	1	Blank, reserved. Escorts
43	Planned Patient Transport Comment	200	Blank, reserved. Planned patient transport comment
44	Ordering Facility Name	60	Blank, reserved. Requester's name
45	Ordering Facility Address	106	Blank, reserved. Requester's address
46	Ordering Facility Phone Number	48	Blank, reserved. Requester's phone number
47	Ordering Provider Address	106	Blank, reserved. Provider's address of person requesting

Note: this message is used only in ORU^R01 message. Field 1, field 11, and field 37 field use integer data type; Other fields use string data type. Field 12, field 13, field 14, field 15, field 17,field 18,field 19,field 20 based on the number of quality control liquid, formats are V1^V2^... Vi .Please note that, for quality control

during the day, each quality control test is sent as a message. Real-time and Intraday quality control, each message is composed of several quality control tests.

5. OBX Observation

OBX Mainly used in information messages for transmitting the observation in the report. If the transmitted patient samples testing information (MSH-16 set as 0)– one patient may have more OBX, this interface does not provide inspection data reproducibility testing, customer systems deal with the data on their own.

E-LAB HL7 Interface OBX Using the following fields:

Serial number	Field	Length	Introductions
1	Set ID – OBX	10	Identifier for different OBX Field
2	Value Type	3	Value types, the type used to identify test results **NM** (numeric) Numeric values for quantitative tests, **ST** (string) Indicates a string value for qualitative tests
3#	Observation Identifier	590	Observation identifier used as test ID
4	Observation Sub-ID	20	Observation Sub-ID, used as test name
5	Observation Value	65536	Observations used as test result values (concentration, positive or negative results, etc.)
6	Units	90	Units as the result value of units
7	References Range	90	Reference ranges, test result values the normal range
8	Abnormal Flags	5	Abnormal signs, the test results are normal (description) L-Low H-High N-Normal
9	Probability	5	Blank, reserved. The possibility
10	Nature of Abnormal Test	2	Blank, reserved. Exception testing causes
11#	Observe Result Status	1	Observation status, take F-final results

12	Date Last Observe Normal Values	26	Blank, reserved. Date of last observation of normal
13	User Defined Access Checks	20	User-defined access checking, as raw results
14	Date/Time of the Observation	28	Observation date/Time for testing time
15	Producer's ID	60	Blank, reserved. Result ID
16	Responsible Observer	80	Responsible for the observer, for examining doctors
17	Observation Method	60	Blank, reserved. Observation methods

Note: this message appears only in ORU^R01 message. Field 1, field 3, field 9 use integer data type; Field 5, field 13 use float data type; Other fields use the string data type. Please note that: after SI testing, field 5, field 13 formats are results 1^ results 2^ results 3 which results 1 is for turbidity (L), result 2 is for Hemolysis (H), result 3 is for Jaundice (I), respectively three results for SI test.

6. QRD - query definition segment

E-LAB HL7 Interface QRD use the following fields:

Serial number	Field	Length	Introductions
1#	Query Date/Time	26	Query time, use system time
2#	Query Format Code	1	Query format codes, use R(record-oriented format)
3#	Query Priority	1	Query priority, use D(deferred)
4#	Query ID	10	Query ID, represents different query, with the number of queries, starts from 1 with 1 increment each time
5	Deferred Response Type	1	Blank, reserved. Delayed response type
6	Deferred Response Date/Time	26	Blank, reserved. Delayed response date/time
7#	Quantity Limited Request	10	Quantitative restrictions required, use 900^CH (Characters)
8#	Who Subject Filter	60	Searchers filter, as a patient bar code
9#	What Subject Filter	60	Query content filter, set to OTH when querying. Set to CAN when cancelled

10#	What Department Data Code	60	Blank, reserved. Department data code
11	What Data Code Value Qual.	20	Blank, reserved. Data code value limit
12	Query Results Level	1	Blank, reserved. Level of query results, use T (Full results)

Note: this message may appear in the QRY^Q02 messages and DSR^Q03. In field 8, in real time mode, it is sample bar code, in batch mode, it is null. Field 4 is integer data type; Other fields use the string data type.

7. QRF - query filter segment

QRF and QRD used in conjunction will further refine the contents of the original query. E-LAB HL7 interface QRF segment uses the following fields:

Serial number	Field	Length	Introductions
1#	Where Subject Filter	20	Query place filter, use ES-480/ES-380/ES-200
2	When Data Start Date/Time	26	Record start date/Time, used as beginning of time of sample receiving when querying
3	When Data End Date/Time	26	Record end date/Time, used as ending of time of sample receiving when querying
4	What User Qualifier	60	Blank, reserved. User certificate
5	Other QRY Subject Filter	60	Blank, reserved. Other QRF filter characters
6	Which Date/Time Qualifier	12	The target type, use RCT (Specimen receipt date/time, receipt of specimen in filling ancillary (Lab))
7	Which Date/Time Status Qualifier	12	Target state, use COR (Corrected only (no final with corrections))
8	Date/Time Selection Qualifier	12	Date/Time qualifier, use ALL (All values within the range)
9	When Quantity/Timing Qualifier	60	Blank, reserved. Time interval

Note: this message appears in QRY^Q02 DSR^Q03 message. Field 3 and field 4 are used to query 0 o'clock and query happened time, used as conditions to query time and time interval. All fields using a string type.

8. ERR - error segment

ERR is used to add a description of the error in the confirmation message, E-LAB HL7 Interface ERR uses the following fields:

Serial number	Field	Length	Introductions
1#	Error and CodeLocation	80	Error codes and locations

Note: this message may appear in QCK^Q02, DSR^Q03 or ACK^Q03 message (For specific content, please check message error state scde table). The message has only one field, use the integer data type.

9. QAK - query acknowledgment segment

QAK contains information that follows a query response, E-LAB HL7 Interface QAK uses the following fields:

Serial number	Field	Length	Introductions
1	Query Tag	32	Query mark, use SR(Means Sample application information)
2	Query Response Status	2	Query response status OK: Data found, no errors NF: No data found, no errors AE: Application error AR: Application reject

Note: this message will appear in QCK^Q02 DSR^Q03 message. All fields use string data type.

10. DSP - display data segment

DSP used to display the query sample application information and patient information, can be repeated. E-LAB HL7 interface DSP uses the following fields:

Serial number	Field	Length	Introductions
1	Set ID - DSP	4	Identifier for different DSP
2	Display Level	4	Display Level
3#	Data Line	300	Rows of data, content for the queries
4	Logical Break Point	2	Logical break point
5	Result ID	20	Results ID

Note: this message appears only in DSR^Q03 message. Field 1 uses integer data type, other fields use string data type.

Field 3 "Data Line" used to display downloaded sample application information from LIS server. Sample applications detail and order detail are shown in the table below. Among them, the bar code number and the item number is a must-have, the rest can be empty.

Order	Content	Type and value
1	Admission Number(Admission Number)	String
2	Bed Number(Bed Number)	String
3	Patient Name(Name of patient)	String
4	Date of Birth(Date of birth)	String, Grid Type For YYYYMMDDHHmmSS (Year Month Day Hours Minutes Seconds) 20061122130540. All time fields are in this format.
5	Sex(Gender)	String, Male/M, Women/F Other/O
6	Patient Alias (Alias (formerly known as)) As a blood type	String, O, A, B, AB
7	Race(Race) (unused)	String, blank
8	Patient Address(Address)	String
9	County Code(County Code (post code))	String
10	Home Phone Number(Home phone)	String
11	Business Phone Number(Phone) (unused)	String, blank
12	Primary Language(Main language) (unused)	String, blank
13	Marital Status(Marital status) (unused)	String, blank
14	Religion(Religion) (unused)	String, blank

15	Patient Account Number(Account number) is used as a type of patients	String Outpatient/Outpatient; Inpatient/ Inpatient; Other/Other
16	Social Security Number(Social security number) health care account	String
17	Driver License Number(Driving licence number (ID number)) as the charge type	String, at his own expense and/own; Security/insurance
18	Ethnic Group(Ethnic Group)	String
19	Birth Place(Birth Place)	String
20	Nationality(Country)	String
21	Bar Code(Bar code)	String
22	Sample ID(Sample ID)	int
23	Sample Time(Sample receiving date time, time of sending sample)	String, same format as 4
24	Whether emergency sample	String, Yes: Y; No: N; If NULL, defaults as N
25	Collection Volume(Collection) (unused)	float, blank
26	Sample Type(Sample type)	String Serum/Serum; Plasma/ Plasma; Urine/Urine
27	Fetch Doctor(Sends doctors)	string
28	Fetch Department(Inspection departments)	string
29	Test ID^Test Name^Unit^Normal Range(Test id^ Test name^^Reference range)	String^string^string^string

Biochemical analyzer uses test number to represent a test, for the same test if biochemical analyzer setting number and LIS setting number on the server are not consistent, you can operate in biochemical analyzer software to edit the test number. Default test number settings on the biochemical analyzer are same as settings on LIS server.

11. DSC - Continuation pointer segment

DSC used in the response message indicates whether it is the last data message.

Serial number	Field	Length	Introductions
1	Continuation pointer	180	Row pointer

Notes: This message is used only in DSR^Q03 message. When DSR^Q03 message is used for batch queries, except for the last one sample application information in DSR message the only value field is empty (as a sign of the data transmission is complete), remaining DSR the only value field is not empty. The message has only one field, its data type uses an integer type.

3 Communication and messaging example

Overall, HL7 Message format: <SB> ddddd <EB><CR>

Among them, the <SB> Represents the start of a message, the corresponding ASCII Characters for<VT>, That is, 0x0B;

<EB> Represents the end of the message, the corresponding ASCII Characters for <FS>, That is, 0x1C;

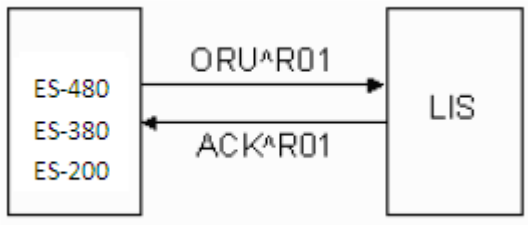
<CR> Confirmed the end of a message, but also separator between different message, which is 0x0D;

ddddd is the actual content which needs to be transferred, consisting of several segments, each segment ends with <CR>, that is,

0x0D.

The following lists a range of message content in accordance with HL7 Formats.

1. Biochemical analyzer sends sample results to **LIS** server, in **ES-480/ES-380 /ES-200**, it is based on the sample unit for transmission which contains a sample test result as a message to send. **LIS** Server gets that the message and makes appropriate responses.



Among them, the ORU Message contains MSH, PID, OBR, OBX (If a sample contains more than one tests, you will have multiple OBX Section). The MSH message header segment, are included in any message, formatted content example is as follows (the bracketed text in the field for interpreted languages, not the field itself):

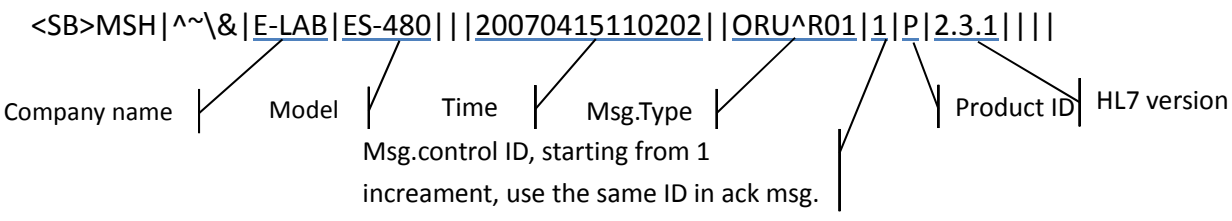
MSH|^~\&| E-LAB (manufacturer name) | ES-480 (device name) | | | 20150423101830 (system time format yyyymmddhhMMss) | | ORU^R01 (message type) | 1 (message control ID, identifying the message, begins from 1 to increase along with the message, added one by one) | P (fixed value, means product) |2.3.1 (The version number of HL7 Protocol) |||| 0 (Sample results use 0, calibration results use 1, quality control results use 2, others empty) || UNICODE (character set) ||

Note: all of the following examples of messages, in the time field, if 14 Digits, the time format for the year (4 digits) month (2 digits) day (2 digits) hour (2 digits) minutes (2 digits) seconds (2 digits); 8 Digits, the time format for the year (4 digits) month (2 digits) day (2 digits).

If there is now a patient, the information in the following table:

Field definition	Value
Patient's name	Mike
Sex	Male
Date of birth	1985, 10, 1
Bar code	12345678
Sample type	Serum
Sample number	10
Whether the emergency	Yes
Test number	2,5,6
Test name	TBil, ALT, AST
Test results	100,98.2,26.4
Results units	umol/L, umol/L, umol/L

ORU^R01 Message send to LIS Server is:



0||UNICODE||<CR>

Represents sample test results | Character Format

PID|1||""||Mike||19851001000000|M|||||||||||||||||||||<CR>

Name | Birth Date | Gender

OBR|1|12345678|10|E-LAB^ES-480|Y|20070413073253|20070413093253

Bar Code | SampleNo. for internal Use, server needn't it | Emergent | Testing time

|||||||| Serum|||||||||||||||||||||||||||||<CR>

Sample Type

OBX|1|NM|2|TBil|100|umol/L|0.00-1.00|H|||F||100|20070413093253|||<CR>

OBX|2|NM|5|ALT|98.2|umol/L|||||||98.2|20070413093253|||<CR>

OBX|3|NM|6|AST|26.4|umol/L|||||||26.4|20070413093253|| |<CR>

Quantitative Tests | Test code, string type, Converted to server code | Test Name,for understanding | Result | Unit | Ori.Rst | Testing Time

<EB><CR>

After LIS server receiving the message, it will first determine the legitimacy of the message and the message type, and make appropriate responses. Following is a normal response in case of:

<SB>MSH|^~\&|||E-LAB|ES-480|20070415110202||ACK^R01|1|P|2.3.1||||0||UNICOD

Message type:ack message for ORU message

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

Means Message Accepeted | Text message for remark | Error code

<EB><CR>

If LIS Server received ORU message has an error, then can set the appropriate error code in MSA which will be returned, biochemical analyzer software will do error handling, alarm is given. For example, code-named 206 refused error response ACK message is:

<SB>MSH|^~\&|||E-LAB|ES-480|20070415110202||ACK^R01|1|P|2.3.1||||0||UNICOD

Message type: ack message for ORU message

MSA|AR|1|Message Reject|||206<CR>

Means Message Accepeted

<EB><CR>

2. Biochemical analyzer sends calibration results to LIS server, in ES-480/ES-380 /ES-200, an ORU message consists of all the calibration results will be sent.

ORU Message containing the contents of the section and the specific section differ a lot with sample test results ORU Messaging. ORU message of sending calibration test result includes only MSH and OBR segment.

If there is an application for calibration tests, related information is displayed in the following table:

Field definition	Value
Test number	6
Test name	ASO
Calibration method	Spline
Calibration solution number	1,2,3
Calibration solution name	WATER, CALIB1, CALIB2
Calibration solution batch number	1111, 2222, 3333
Validity of the calibration solution	2030, 1, 1,2030, 1, 1,2030, 1, 1

Concentration of standard	0,2,3
Calibration fluid levels	low(L), low(L), low(l)
Responsiveness	797.329332,843.143762,1073.672512
Calibration parameters (R0,a,b,c)	797.329332 ,22.907215,-69.207178,34.603589 ; 843.143762,161.321571,138.414356,-69.207178

ORU^R01 Message sent to LIS Server is:

<SB>MSH|^~\&|E-LAB|ES-
480|||20070330143737||ORU^R01|1|P|2.3.1||||0||UNICODE||<CR>

Means Calibration Results

OBR|1|6|ASO|E-LAB^ES-480|||20070330123056||8||3|1^2^3|

Test Code | Test Name | Cal. time | Calibration code, 8 represents Spline | STD Count | STD Number, different STD are separated with^, other fields are same

1111^2222^3333 | WATER^CALIBI^CALIB2| 20300101^2030010120300101

Calibration Batch No. | Calibration Name | Calibration Expiry Date (Year/Month/Day)

|0.0000^2.0000^3.0000|L^L^L|797.329332^843.143762^1073.672512|8

STD Concentration | STD Concentration Level | Reaction Level | STD Count

|797.329332&22.907215&-69.207178&34.603589^843.143762&161.321571&138.414356&

Calibration Value (RO&a&b&c)

-69.207178||||||||||||||||||||||||||<CR>

<EB><CR>

LIS Server's response:

<SB>MSH|^~\&|||E-LAB|ES-480|20181031113230||ACK^R01|1|P|2.3.1||||0||UNICODE||<CR>

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

<EB><CR>

3. Biochemical analyzer send quality control test results sent to LIS server, in **ES-480/ES-380 /ES-200**, for quality control during the day, each quality control test sends a message; For real-time and intraday quality control, multiple quality control tests for one quality control will form one message to be sent.

ORU message contains same message as ORU Message in calibration results.

If there is now a test applied quality control tests, the related information lists in the following table:

Field definition	Value
Test number	7
Test name	AST
Quality control number	1,2
Quality control liquid name	QUAL1,QUAL2
Quality control liquid batch number	1111,2222
Validity of quality control liquid	2030, 1, 1,2030, 1, 1
Quality control of liquid level	Low(L), High(H)
Quality control liquid mean value (mean concentration)	45,55
Standard deviation of quality control liquid	5,5
Measured results value(concentration)	0.130291,0.137470

Send LIS Server ORU^R01 Message is:

<SB>MSH|^~\&|E-LAB|ES-480|||20070416085858||ORU^R01|2|P|2.3.1||||0||UNICODE||<CR>

Means QC Tests Results

OBR|1|7|AST|E-LAB^ES-480|||20070416085729||||2|1^2|QUAL1^QUAL2

Test Number | Test Name | QC time | QC Count | QC Number | QC Name

|20300101^20300101|1111^2222||L^M|45.0000^55.0000

QC Expiry Date | QC Batch Number | QC Concentration Level | QC Mean Value

|5.0000^5.0000|0.130291^0.137470|||||||||||||||||||||||||||<CR>

QC STD Value | Test Results (Concentration)

<EB><CR>

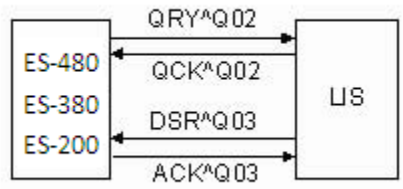
LIS Server's response:

<SB>MSH|^~\&|||E-LAB|ES-480|20070330143737||ACK^R01|1|P|2.3.1||||0||UNICODE||<CR>

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

<EB><CR>

4. Biochemical analyzer issues a query request to LIS Server, based on the specified bar code gets the corresponding sample information, patient information and test information.



For example, to LIS Queries the server to download a bar code number is 0019 Samples will be issued QRY^Q02 Message is:

<SB>MSH|^~\&|E-LAB|ES-480|||20070301193232||QRY^Q02|1|P|2.3.1||||||UNICODE||<CR>

Message Type

QRD|20070301193232|R|D|1|||900^CH|0019|OTH|""||T<CR>

Query time
Query Format Code
Query Priority
Maximum character
Sample Bar code
Query Result Level
Query Content Filter

QRF|ES-480|20070301193241|20070301193241|||RCT|COR|ALL|<CR>

Target Type
Target Status
Time Select Code

<EB><CR>

After LIS server receiving the message, it returns QCK^Q02 message as answers, if there is a corresponding sample, the message:

<SB>

MSH|^~\&|||E-LAB|ES-480|20070301193232||QCK^Q02|1|P|2.3.1||||||UNICODE||<CR>

Ack Message Type

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

ERR|0<CR>

Error Code and Position

QAK|SR|OK<CR>

Query Flag
Query Ack Status

<EB><CR>

Answer without the corresponding sample message is returned:

<SB>MSH|^~\&|||E-LAB|ES-480|20070301193232||QCK^Q02|1|P|2.3.1||||||

UNICODE||<CR>

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

ERR|0<CR>

QAK|SR|NF<CR>

Query Data Not Found

In case LIS Server has a corresponding sample, after returning a query response QCK^Q02, LIS Server will send a data message DSR^Q03, corresponding patients, samples, tests, information are as follows:

Field definition	Value
Patient's name	Tommy
Sex	Male
Date of birth	1962, 8, 24
Blood type	O
Patient categories	Outpatient
Fee type	At his own expense
Hospital number	1212
Bed	27

Bar code	0019
Sample number	3
Sample submission time	2007, 3, 1, 18:35
Whether the emergency	No
Sample type	Serum
Submitting doctor	Mary
Inspection Department	Dept1
Test number	1,2,5

The message should be:

<SB>MSH|^~\&|E-LAB|ES-480|||20070301193232||DSR^Q03|1|P|2.3.1||||||UNICODE||<CR>

Message Type(Data)

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

ERR|0<CR>

QAK|SR|OK<CR>

QRD|20170301193237|R|D|1|||RD|180900034|OTH|||T<CR>

QRF|ES-480|200703011932341|200703011932341||RCT|COR|ALL|<CR>

DSP|1||1212||<CR>

Sequence No. Admission Number

DSP|2||27||<CR>

Bed No.

DSP|3||Tommy||<CR>

Patient Name

DSP|4||19620824000000||<CR>

Birth Date

DSP|5||M||<CR>

Gender

DSP|6||O||<CR>

Blood Type

DSP|7||||<CR>

DSP|8||||<CR>

DSP|9||||<CR>

DSP|10||||<CR>

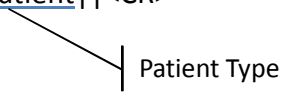
DSP|11||||<CR>

DSP|12||||<CR>

DSP|13||||<CR>

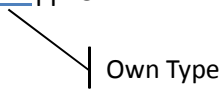
DSP|14||||<CR>

DSP|15||outpatient||<CR>



DSP|16||||<CR>

DSP|17||own||<CR>



DSP|18||||<CR>

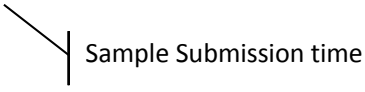
DSP|19||||<CR>

DSP|20||||<CR>

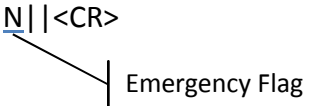
DSP|21||0019||<CR>

DSP|22||3||<CR>

DSP|23||20170301183500||<CR>



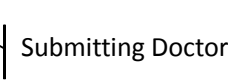
DSP|24||N||<CR>



DSP|25||||<CR>

DSP|26||serum||<CR>

DSP|27||Mary||<CR>

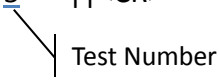


DSP|28||Dept1||<CR>

DSP|29||1^^^||<CR>

DSP|30||2^^^||<CR>

DSP|31||5^^^||<CR>



DSC|<CR>

<EB><CR>

If LIS Server sends QCK^Q02 Message indicating there is no corresponding samples, then no need to send DSR Message.

After biochemical analyzer receiving DSR message, it will respond a confirmation message:

<SB>MSH|^~\&|E-LAB|ES-480|||20070301193242||ACK^Q03|2|P|2.3.1||||||UNICODE||<CR>

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

ERR|0<CR>

<EB><CR>

5. Biochemical analyzer sends batch query request to **LIS** Server, two types, getting all the samples on the day and gets the latest on the day.

We use (start time ~ end time) to distinguish between the two types of requests, as the following table:

Get method	Start time	End time
All day	0 o'clock the	When the request is made to the system time
On the latest	The end of the last query time	When the request is made to the system time

For example: on 2007, 3, 20, 5:00PM, make a batch query request and want all the samples on the day. Request message is:

<SB>MSH|^~\&|E-LAB|ES-480|||20070320170000||QRY^Q02|1|P|2.3.1||||||UNICODE||<CR>

QRD|20070320170000|R|D|1|||900^CH|""|OTH|""||T<CR>

QRF|ES-480|20070320000000|20070320170000|||RCT|COR|ALL|<CR>

Time Span (Start) Time Span (End)

<EB><CR>

Same as getting single sample under the bar code, LIS Servers will give response that whether there is sample matches query conditions. If there is an answer, after sending query answer, LIS Server will send all samples meet the conditions. Each sample information uses a DSR message, and in final DSR message DSC is empty means end of the bulk sample. It is assumed that the LIS Server finds 3 samples, details are as follows:

Field definition	Sample **1** The corresponding value	Sample **2** The corresponding value	Sample **3** The corresponding value

Patient's name	Jacky	Jessica	Anata
Sex	Male	Female	Female
Date of birth	1972, 2, 16	1983, 5, 12	1979, 12, 12
Bar code	1587120	1587121	1587125
Sample number	2	3	9
Sample type	Serum	Plasma	Urine
Whether the emergency	Whether	Yeah	Yeah
Include the test number	1,4	2,3,6	8

The message should be:

<SB>MSH|^~\&|E-LAB|ES-480|||20070320170000||DSR^Q03|1|P|2.3.1||||||UNICODE||<CR>

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

ERR|0<CR>

QAK|SR|OK<CR>

QRD|20070320170000|R|D|1|||900^CH|""|OTH|||T<CR>

QRF|ES-480|20070320000000|20070320170000||RCT|COR|ALL|<CR>

DSP|1||0||<CR>

DSP|2||0||<CR>

DSP|3||Jacky||<CR>

DSP|4||19720216000000||<CR>

DSP|5||M||<CR>

DSP|6||||<CR>

DSP|7||||<CR>

DSP|8||||<CR>

DSP|9||||<CR>

DSP|10||||<CR>

DSP|11||||<CR>

DSP|12||||<CR>

DSP|13||||<CR>

DSP|14||||<CR>

DSP|15|| ||<CR>

DSP|16||||<CR>

DSP|17|| ||<CR>

DSP|18||||<CR>

DSP|19||||<CR>

DSP|20||||<CR>

DSP|21||1587120||<CR>

DSP|22||2||<CR>

DSP|23||20070320160000||<CR>

DSP|24||N||<CR>

DSP|25||||<CR>

DSP|26||serum||<CR>

DSP|27|| ||<CR>

DSP|28|| ||<CR>

DSP|29||1^^^||<CR>

DSP|30||4^^^||<CR>

DSC|1<CR>

<EB><CR>

<SB>MSH|^~\&|E-LAB|ES-480|||20070320170000||DSR^Q03|1|P|2.3.1|||||UNICODE||<CR>

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

ERR|0<CR>

QAK|SR|OK<CR>

QRD|20070320170000|R|D|2|||900^CH|""|OTH|||T<CR>

QRF|ES-480|20070320000000|20070320170000||RCT|COR|ALL|<CR>

DSP|1||0||<CR>

DSP|2||0||<CR>

DSP|3||Jessical||<CR>

DSP|4||19830512000000||<CR>

DSP|5||F||<CR>

DSP|6||O||<CR>

DSP|7||||<CR>

DSP|8||||<CR>

DSP|9||||<CR>

DSP|10||||<CR>

DSP|11||||<CR>

DSP|12||||<CR>

DSP|13||||<CR>

DSP|14||||<CR>

DSP|15|| ||<CR>

DSP|16||||<CR>

DSP|17|| ||<CR>

DSP|18||||<CR>

DSP|19||||<CR>

DSP|20||||<CR>

DSP|21||1587121||<CR>

DSP|22||3||<CR>

DSP|23||20070320160100||<CR>

DSP|24||Y||<CR>

DSP|25||||<CR>

DSP|26|| Plasma ||<CR>

DSP|27|| ||<CR>

DSP|28|| ||<CR>

DSP|29||2^^^||<CR>

DSP|30||3^^^||<CR>

DSP|31||4^^^||<CR>

DSC|2<CR>

Second DSR Message

<EB><CR>

<SB>MSH|^~\&|E-LAB|ES-480|||20070320170000||DSR^Q03|1|P|2.3.1||||||UNICODE||<CR>

MSA|AA|3|Message Accepted|||0<CR>

ERR|0<CR>

QAK|SR|OK<CR>

QRD|20070320170000|R|D|2|||900^CH|""|OTH|||T<CR>

QRF|ES-480|20070320000000|20070320170000||RCT|COR|ALL|<CR>

DSP|1||0||<CR>

DSP|2||0||<CR>

DSP|3|| Anata ||<CR>

DSP|4||19791212000000||<CR>

DSP|5||F||<CR>

DSP|6||O||<CR>

DSP|7||||<CR>

DSP|8||||<CR>

DSP|9||||<CR>

DSP|10||||<CR>

DSP|11||||<CR>

DSP|12||||<CR>

DSP|13||||<CR>

DSP|14||||<CR>

DSP|15|| ||<CR>

DSP|16||||<CR>

DSP|17|| ||<CR>

DSP|18||||<CR>

DSP|19||||<CR>

DSP|20||||<CR>

DSP|21||1587125||<CR>

DSP|22||9||<CR>

DSP|23||20070320160200||<CR>

DSP|24||Y||<CR>

DSP|25||||<CR>

DSP|26|| Urine ||<CR>

DSP|27|| ||<CR>

DSP|28|| ||<CR>

DSP|29||8^^^||<CR>

DSC|__<CR>

Third DSR Message: empty, means transmission completed for multiple sample

<EB><CR>

Each time after biochemical analyzer receiving a DSR Message, it will reply an ACK Message. Three ACK messages related to the above three messages are as follows:

<SB>MSH|^~\&|E-LAB|ES-480|||20070320170000||ACK^Q03|2|P|2.3.1||||||UNICODE||<CR>

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

ERR|0<CR>

<EB><CR>

<SB>MSH|^~\&|E-LAB|ES-480|||20070320170000||ACK^Q03|2|P|2.3.1||||||UNICODE||<CR>

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

ERR|0<CR>

<EB><CR>

<SB>MSH|^~\&|E-LAB|ES-480|||20070320170000||ACK^Q03|2|P|2.3.1||||||UNICODE||<CR>

MSA|AA|3|Message accepted|||0<CR>

ERR|0<CR>

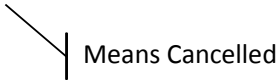
<EB><CR>

6. In a batch query process, biochemical analyzer want to cancel downloading of message, queries are issued using QRY message as follows:

<SB>MSH|^~\&|E-LAB|ES-

480|||20070320170000||QRY^Q02|1|P|2.3.1||||||UNICODE||<CR>

QRD|20070320170000|R|D|1|||900^CH|""|CAN|""||T<CR>



QRF|ES-480|20070320000000|20070320170000|||RCT|COR|ALL|<CR>

<EB><CR>

After LIS Server receiving the message to cancel request, after sending current sample, it will stop follow-up samples sending.