Clinical Chemistry Analyzer CA-270 Host Interface

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REVISION RECORD

REV	DATE	REVISION HIGHLIGHT
—	Sept., 2010	Initial issue
0B	Sept., 2011	Chapter 7: Revised descriptions about barcode.

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Chapter 1   Introduction

This document specifies the communication scheme between the CA-270 Clinical Chemistry Analyzer (hereinafter called Analyzer) and the Host Computer (hereinafter called Host).   The construction of this on-line system enables communication between the Analyzer and the Host, and retrieval of the measurement results from the Analyzer in response to an external order.

For more understanding the operation of the Analyzer, refer to the Operator's manual (or Service manual).

This on-line system defines each item as a protocol within the conformity of the following standards:

  Low level control   :   ASTM E1381-95
  High level control   :   ASTM E1394-91

1.1   System configuration

The communication between the Analyzer and the external Host is conducted with the RS232C interface.   The interconnection between them is shown below:
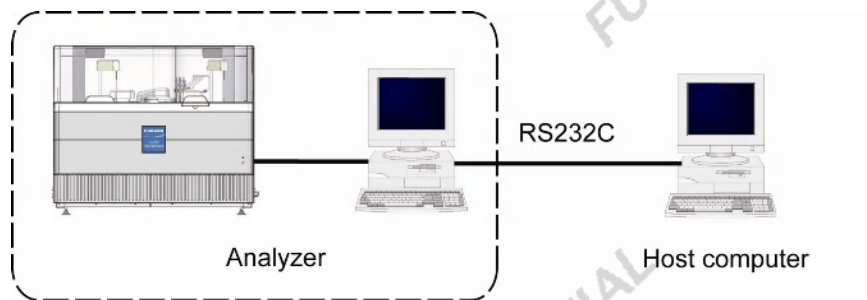
Figure 1.1-1

Chapter 2 Low level control

The specifications such as connectors, cables, and protocol which are necessary for exchange of messages between Host and Analyzer, are given in the following sub clauses.

2.1 Physical Layer

2.1.1 Communication specifications

	Item	Specifications	Default value
1	Transmission mode	Synchronous RS232C start-stop transmission Half-duplex	
2	Transmission rate	300 / 1200 / 2400 / 4800 / 9600 / 19200	9600bps
3	Transmission code	ASCII	
4	Date length	7 bits / 8 bits	8 bits
5	Parity	Odd / even / none	Even parity
6	Stop bit	1 bit / 2 bits	1 bit

2.1.2 Connectors

Connector on the Analyzer is a D-sub 9pin Male.
Connector at the Analyzer side of cable is a D-sub 9pin Female.

2.1.3 Pin assignment

Pin number	Signal designation
1	CD
2	RD
3	TD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI

2.1.4   Interface signals

Table 1 Functions of interface signals

Abbreviation	Signal designation	Function
CD	Carrier Detect	Not monitored.
RD	Receive Data	Pin for data reception
TD	Transmit Data	Pin for data transmission
DTR	Data Terminal Ready	Set to ON when host communication is ready
GND	Signal Ground	Ground
DSR	Data Set Ready	Monitor the host. When this is OFF, host may be turned off or cable is broken.
RTS	Request To Send	Set to ON while data reception is available. Set to OFF when the data buffer is full and cannot receive data.
CTS	Clear To Send	Wait data transmission till this becomes ON.
RI	Ring Indicator	Not monitored.

2.1.5   Cable specifications

The cable for host communication is RS-232C with the following cable connection.

Figure 2.1-1

2.2   Data Link Layer
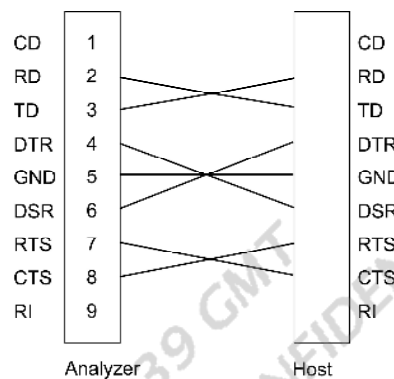
The information necessary to ensure the exchange of messages between Host and Analyzer is shown in the following sub clauses.

2.2.1   Summary of transmission control characters

Designation	Meanings	ASCII code	Remarks
ENQ	Acknowledge	05H	Request for transmission
EOT	End of Transmission	04H	Link opening
ACK	Acknowledge	06H	Positive acknowledgement
NAK	Negative Acknowledge	15H	Negative acknowledgement
STX	Start of Text	02H	Start of text
ETX	End of Text	03H	End of text in the final frame
ETB	End of Transmission Block	17H	End of text in the intermediate frame

2.2.2   Message composition

Field #	1)	2)	3)	4)	5)	6)	7)	8)	9)	
Item	STX	FN	TEXT	CR	ETX	C1	C2	CR	LF	(n≤ 247)

Field #	Item	Data length	Description
1)	STX	1	To indicate the start of frame (ASCII code: 02H)
2)	FN	1	Sequence number of frame (0 – 7) (Note 1)
3)	TEXT	239	Text (Note 2)
4)	CR	1	(ASCII code: 0DH) (Note 2)
5)	ETX	1	To indicate the end of frame (ASCII code: 03H) (Note 3)
6)	C1	1	The upper digit of checksum (Note 4)
7)	C2	1	The lower digit of checksum (Note 4)
8)	CR	1	(ASCII code: 0DH)
9)	LF	1	(ASCII code: 0AH)

Note:
1. FN is the sequence number assigned to each frame and the ASCII text (0, 1, 2, 3, 4, 5, 6, and 7) is cyclically used.   At reception of message with same sequence number, handle as duplicate of re-transmission and discard the message.   Messages divided with ETB will have new sequence number. Initial value shall be "1".
2. TEXT is the division of ASCII text message itself and the number of characters for one text is limited to less than 240 characters (including "CR") and below.
    (Addition of "CR" is optional settings.   Tick on "Send with CR" by clicking

the [Details] button at the Host communications area in the "System Setup 1" screen.)   Add "Send with CR" when conforming ASTM rules.)

3. ETX code (ASCII code: 03H) or ETB code (ASCII code: 17H)
4. In the checksum (Hex) frame, calculate the sum of bits of each message from FN to ETX excluding STX and use last two digits. In the checksum calculation, apply shift JIS code for Kanji code (2-byte characters) and add after breakdown into 1 high byte + 1 low byte.   When the checksum does not match, discard the message.

When the text contains more than 240 bytes, divide into certain blocks by ETB (ASCII code: 17H).

Figure 2.2-1

2.2.3   Transmission procedure

A.   Transmission of data from Analyzer to Host.
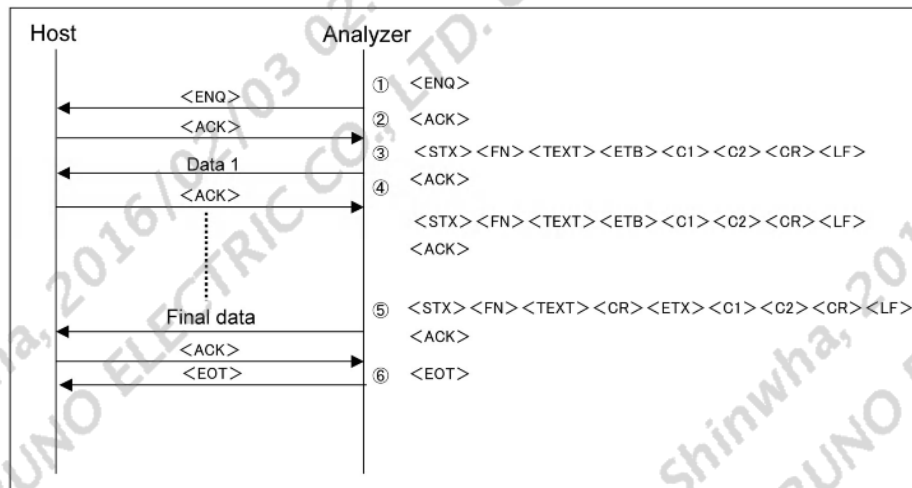

Figure 2.2-2

The control codes are shown in < > in the following figure.

1.   Analyzer transmits <ENQ> in order to establish a data link.

2.   <ACK> is sent from Host after it is ready for communication.

3.   Data 1 (intermediate frame) <ETB>

4.   When Host has received the data correctly, <ACK> is sent to the analyzer.

5.   End of data (last frame) <ETX>

6.   Link is opened.

2.2.4 Host interface specifications

Status transition table

	Sending data exist	No sending data	ENQ reception	ETX, ETB reception	EOT reception	ACK reception	NAK reception	Data reception	Connection established timeout T1 (15sec.)	Data transmission timeout T2 (15sec.)	Data reception timeout T3 (30sec.)	Data reception interruption timeout T4 (15sec.)
Initialization	● Send ENQ. ● Start T1 timer. ● Status to "Establishing connection"	No action	● Send ACK. ● Start T3 timer. ● Status to "Data reception"	No action	No action	No action	No action	No action	No action	No action	No action	No action
Establishing connection	No action	No action	● Stop T1 timer. ● Wait 1 sec. ● Send ENQ. ● Start T1 timer.	No action	No action	● Stop T1 timer. ● Send data. ● Start T2 timer. ● Status to "Waiting response."	● Send ENQ. ● Restart T1 timer.	No action	● Stop T1 timer ● Send EOT. ● Status to "Initialization."	No action	No action	No action
Connected	● Send data. ● Start T2 timer. ● Status to "waiting response".	● Send EOT. ● Status to "Initialization."	No action	No action	No action	No action	No action	No action	No action	No action	No action	No action
Waiting response	No action	No action	No action	No action	● Stop T2 timer. ● Send EOT. ● Start T4 timer. ● Status to "Initialization 2."	● Stop T2 timer. ● Status to "Establishing connection."	● Resend data. ● Restart T2 timer	No action	No action	● Stop T2 timer. ● Send EOT. ● Return data. ● Status to "Initialization."	No action	No action
Data reception	No action	No action	No action	● Restart T3 timer ● Status to "Completing data reception"	● Stop T3 timer. ● Status to "Initialization."	No action	No action	● Restart T3 timer ● Data reception. ● Send ACK/NAK.	No action	No action	● Stop T3 timer. ● Discard corrupted received data. ● Status to "Initialization."	No action
Completing data reception	No action	No action	No action	No action	● Stop T3 timer. ● Status to "Initialization."	No action	No action	No action	No action	No action	● Stop T3 timer. ● Discard corrupted received data. ● Status to "Initialization."	No action
Initialization-2	No action	No action	● Stop T4 timer ● Send ACK. ● Start T3 timer. ● Status to "Data reception"	No action	No action	No action	No action	No action	No action	No action	No action	● Stop T4 timer. ● Status to "Initialization."

Note:

- Wait timer between characters is 100ms.   At time out, the action will be the same as receiving NAK.

- At data re-transmission, sequence number should be the same as original data transmission.

- At data reception, characters before STX and after ETB and ETX should be discarded.

- All received data without sequential sequence number should be discarded.

- Maximum retry of data re-transmission is five times. After the fifth retry, EOT will be sent and change status to initialization.   Error must be displayed in this condition.

- Host should return status to initialization after no connection for 20 seconds from the analyzer.

- Maximum retry for ENQ is ten. After the tenth retry, generate an error then start over.

Chapter 3 High level control

3.1 Command Record

Following table indicates usage of the command record types.

	Type	Function name	Level	Transmission	Reception
1	H	Message Header Record	0	Used	Used
2	P	Patient Information Record	1	Used	Used
3	O	Test Order Record	2	Used	Used
4	R	Results Record	3	Used	Used
5	C	Comment Record	-	Used	Used
6	Q	Request Information Record	-	Used	Not used
7	L	Message Terminator Record	0	Used	Used
8	S	Scientific Record	1	Not used	Not used
9	M	Manufacturer Information Record	-	Not used	Not used

Level: 0 (Higher) > 3 (Lower)

3.2 Data Character Code

Code (Decimal system)	
0-31	7, 9, 11, 12, 13 can be used.
13	Reserved as record terminator.
32-126, 128-254	Allowed.
127,255	Not allowed.

Note: When double quotation (ASCII34) is found, discard it (do not treat as data.)

3.3 Common fields

3.3.1 Sequence number

The sequence number shall be generated for every message.   Initial value shall be "1".
Every transmission increment the number by "1".   The number will set back to "1" at
transmission of separate command with same level or command with higher level.
(Refer to notes below.)

3.4 H: Message header record

The string specifies the Analyzer and the Host between which messages are
exchanged.   This also specifies each delimiter character for field, repeat, component,
and escape delimiters.

Field #	Designation	Max. digits	Process upon reception from Host	This system used/unused	Omission	Process on transmission from Analyzer
1)	Record type	1	Abandoned	used	Disapproved	Record type "H"
2)	Delimiter	4	Abandoned	used	Disapproved	Delimiters established in this system (|, back slash, ^ and &)
3)	Message control ID	0	-	unused	-	-
4)	Access password	0	-	unused	-	-
5)	Name of Analyzer	32	Abandoned	Used	Disapproved	Name of Analyzer defined in this system.
6)	Address of sender	0	-	Unused	-	-
7)	Reserved field	0	-	Unused	-	-
8)	Telephone number of sender	0	-	Unused	-	-
9)	Characteristic of sender	0	-	Unused	-	-
10)	Recipient ID	0	-	unused	-	-
11)	Note or special instruction	0	-	Unused	-	-
12)	Process ID	0	-	Unused	-	-
13)	Version No.	0	-	unused		
14)	Date and Time	14	Abandoned	used	Disapproved	Date and time at transmission. YYYYMMDDHHMMSS

Meaning of "used/unused": Used: Data available at transmit side

Unused:　　No data at transmit side

Meaning of "Omission":　　Disapproved: Omission is not approved.

Approved:　　Omission is approved.

The item is not used in this system and thus must be omitted.

3.5   P: Patient information record

The string is sent from the Host to the Analyzer at ordering test requests.   This is also sent from the Analyzer to the Host when sending test results which as specified by the Host.

Field #	Designation	Max. digits	Process upon reception from Host	This system used/unused	Omission	Process on transmission from Analyzer
1)	Record type	1	Abandoned	used	Disapproved	Record type "P"
2)	Sequence number	6	Abandoned	Used	Disapproved	Refer to "3.3.1".
3)	Patient ID	13	Used for transmission, display, and print.	Used	Disapproved	Send as received.
4)	Laboratory assigned Patient ID	0	-	Unused	-	-
5)	Patient ID # 3	0	-	Unused	-	-
6)	Patient Name	36	Used for transmission, display, and print. Up to 18 characters.	Used	Approved	Send as received.
7)	Mother's Maiden Name	0	-	Unused	-	-
8)	Date of birth	8	Used for transmission, display, and print. YYYYMMDD	Used	Approved (*1)	Send as received.
9)	Gender	1	Used for transmission, display, print, and normal range judgment. M: Male F: Female U: unknown (*2)	used	Approved (*2)	Send as received.
10)	Race	16	Used for transmission, display, and print.	used	Approved	Send as received.
11)	Patient Address	0	-	Unused	-	-

12)	Reservation	0	-	Unused	-	-
13)	Phone Number	0	-	Unused	-	-
14)	Attending Physician ID	32	Used for transmission, display, and print.	Used	Approved	Send as received.
15)	Special Field 1	13	Used for transmission, display, and print.	used	Approved	Send as received.
16)	Special Field 2	0	Used for transmission, display, and print. (*3)	Used	Approved	Send as received.
17)	Patient Height	0	-	Unused	-	-
18)	Patient Weight	0	-	Unused	-	-
19)	Patient Known or Suspected Diagnosis	0	-	Unused	-	-
20)	Patient Active Medications	0	-	Unused	-	-
21)	Patient Diet	0	-	Unused	-	-
22)	Practice Field #1	0	-	Unused	-	-
23)	Practice Field #2	0	-	Unused	-	-
24)	Admission and Discharge Dates	0	-	Unused	-	-
25)	Admission Status	0	-	Unused	-	-
26)	Location	70	Used for transmission, display, and print.	Used	Approved	Send as received.
27)	Nature of Alternative Diagnostic Code and Classifiers	0	-	Unused	-	-
28)	Alternative Diagnostic Code and Classifiers	0	-	Unused	-	-
29)	Patient Religion	0	-	Unused	-	-
30)	Marital Status	0	-	Unused	-	-
31)	Isolation Status	0	-	Unused	-	-

32)	Language	0	-	Unused	-	-
33)	Hospital Service	0	-	Unused	-	-
34)	Hospital Institution	0	-	Unused	-	-
35)	Dosage Category	0	-	Unused	-	-

Note:

1. When "Date of Birth" is omitted, "G2" will be used for normal range.
2. When "Gender" is omitted, "Unknown" will be used for "Gender". When selecting except "F: Female for "Gender", "Male" will be used for normal range.
3. Note 3: Code for "Blood type" is as follows:

Code	Blood type
1	A Rh+
2	A Rh-
3	B Rh+
4	B Rh-
5	O Rh+
6	O Rh-
7	AB Rh+
8	AB Rh-

3.6 O: Test Order Record

Field #	Designation	Max. digits	Process upon reception from Host	This system used/unused	Omission	Process on transmission from Analyzer
1)	Record type	1	Abandoned	used	Disapproved	Record type "O"
2)	Sequence number	6	Abandoned	Used	Disapproved	Refer to "3.3.1".
3)	Sample ID	15	Used for measurement process. Sample ID: 001-999999999999999 (except 89990001-89999999 and 91000001-99999999)	Used	Disapproved	Send as received.
4)	Equipment specimen ID	0	-	Unused	-	-
5)	Universal Test ID	100	Used for measurement process. (*1)	Used	Disapproved	Send as received.
6)	Priority	0	-	Unused	-	-
7)	Date and time of order	0	-	Unused	-	-
8)	Date and time of sample extraction	14	YYYYMMDDHHMMSS	Used	Disapproved	Send as received or inputted.
9)	Date and time of completion of sample extraction	0	-	Unused	-	-
10)	Extracted volume	1	Used for measurement process. 0: Normal 1: High 2: Low others: Normal	Used	Disapproved	Send as received.
11)	Name who extracted sample	0	-	Unused	-	-
12)	Treatment code	0	-	Unused	-	-
13)	Danger code	0	-	Unused	-	-
14)	Relevant clinical	0	-	Unused	-	-

	information					
15)	Date and time of receipt of sample	0	-	Unused	-	-
16)	Sample type	20	Used for measurement process. (*2)	Used	Approved	Send as received.
17)	Sample type	20	Used for measurement process. (*2)	Used	Approved	Send as received.
18)	Specimen Source	0	-	Unused	-	-
19)	Ordering Physician	0	-	Unused	-	-
20)	Physician's Telephone Number	0	-	Unused	-	-
21)	Users Field # 1	0	-	Unused	-	-
22)	Users Field # 2	0	-	Unused	-	-
23)	Date/Time Results Reported or Last Modified	0	-	Unused	-	-
24)	Instrument Charge to Computer System	0	-	Unused	-	-
25)	Instrument Section ID	0	-	Unused	-	-
26)	Report Types	0	-	Unused	-	-
27)	Reserved Field	0	-	Unused	-	-
28)	Location or Ward of Specimen Collection	0	-	Unused	-	-
29)	Nosocomial Infection Flag	0	-	Unused	-	-
30)	Specimen Service	0	-	Unused	-	-
31)	Specimen Institution	0	-	Unused	-	-

Note 1:   Universal Test ID for test order record when ISE of ASTM is separated.

(Tick on "ASTM ISE separation" by clicking the [Details] button at the Host communications area in the "System Setup 1" screen.)

Universal Test ID (2-digit)	Description
00	No order
01-60	Clinical chemistry Analyzer transmits Universal Test ID with zero suppression when the ID # is from "1" to "9".
61	ISE Na
62	ISE K
63	ISE Cl
64	Diluted ISE Na
65	Diluted ISE K
66	Diluted ISE Cl
81	Serum information (H, L, I)

Universal Test ID for test order record when ISE of ASTM is not separated.

Universal Test ID (2-digit)	Description
61	ISE (Na, K, Cl)
62	Diluted ISE (Na, K, Cl)

Use delimiter "^" for delimiting test ID and use "¥" for multiple entry of test ID.

(Example 1) In case of ordering Test ID #1,
　　　　　　O|1|001||^^^01
(Example 2) In case of ordering Test ID #15, 21, and 30,
　　　　　　O|1|001||^^^15¥^^^21¥^^^30

The Test ID # is described at each part delimited by "^" when ASTM is not complied.
(Example 1) In case of ordering Test ID #1,
　　　　　　O|1|001||01
(Example 2) In case of ordering Test ID #15, 21, and 30,
　　　　　　O|1|001||15^21^30

Note 2: Sample type is as follows:

Sample type	Description
01	unused
02	Serum
03	Urine
04	Plasma
05	Others

* When "Sample type" is omitted, the selected sample type as the "default Sample Type" is applied at the Sample Type Setting from the [Details] button at the Host communications area in the "System Setup 1" screen.

3.7 R: Result record

The results of the test items are notified.

Field #	Designation	Max. digits	Process upon reception from Host	This system used/unused	Omission	Process on transmission from Analyzer
1)	Record type	1	Abandoned	used	Disapproved	Record type "R"
2)	Sequence number	6	Abandoned	Used	Disapproved	Refer to "3.3.1".
3)	Universal Test ID	5	Abandoned	used	Disapproved	Method #: 0 to 3999 Refer to the table below.
4)	Test results	17	Abandoned	used	Disapproved	ZZZZZZZZZZ9.99999 Decimal point that specified in the [Chemistry Parameter 1] screen. When the value resulting in the "****", it will be printed as "****".
5)	Unit	8	Abandoned	used	Disapproved	Unit for the test results
6)	Range of reference value	0	-	Unused	-	-
7)	Flag	42	Abandoned	used	Disapproved	Followings are sent: Technical range code, Normal range code, Error flag code, Rerun result flag code, and QC flag code 1-10. Refer to "3.7.1. Test result error flag code."
8)	When it is within the reference range,	0	-	Unused	-	-
9)	Status	0	-	Unused	-	-
10)	Date when the reference value is changed.	0	-	Unused	-	-
11)	Operator identification	0	-	Unused	-	-
12)	Date and time of commencement of test	0	-	Unused	-	-
13)	Date and time of completion of test	14	Abandoned	Used	Disapproved	YYYYMMDDHHMMSS
14)	Instrument identification	0	-	Unused	-	-

Universal Test ID for test result record is as follows:

Universal Test ID (2-digit)	Description
00	No order
01-60	Analyzer transmits Universal Test ID with zero suppression when the ID # has a single digit from "1" to "9".
61	ISE Na
62	ISE K
63	ISE Cl
64	Diluted ISE Na
65	Diluted ISE K
66	Diluted ISE Cl
81	Serum information (H)
82	Serum information (L)
83	Serum information (I)
71-80、3011-3040	Calculated test

In case "Full compliance with ASTM rules",
Use delimiter "^" for delimiting test ID.

   (Example 1) In case of transmission of the result of the test ID # 61 to the Host,
   R|1|^^^61|346|mmol/l||00^01^00||||||20040119143714

In case "Non compliance with ASTM rules",

   (Example 2) In case of transmission of the result of the test ID # 61 to the Host,
   R|1|61|346|mmol/l||00^01^00||||||20040119143714

3.7.1 Test result error flag code

The code of the result abnormal flags is provided to the Host as "Result record".

A. In case "Full compliance with ASTM rules",

One result flag by priorities is provided.

Code	Description	Priority	Display
A	Error occurred	1	Error flag
>	Technical range over "High"	2	>
<	Technical range below "Low"	2	<
HH, LL	Panic range over	3	!
A	Abnormal range over	4	$
H	Normal range over "High"	5	H
L	Normal range below "Low"	5	L
N	Normal	6	No display
LL	Unused.	-	-
HH	Unused.	-	-
U	Unused.	-	-
D	Unused.	-	-
B	Unused.	-	-
W	Unused.	-	-

B. In case "Non compliance with ASTM rules",

1. Format of the flag

   The format of the flag is 99^99^99^99^99^99^99^99^99^99^99^99^99^99 in the order corresponding to Technical range code, Normal range code, Error flag code, Rerun result code, and QC flag code from 1 to 10.

2. Technical range code

Code	Display	Description
00	None	Within Technical range
01	>	Technical range over "High"
02	<	Technical range below "Low"

3. Normal range code

Code	Display	Description
00	None	Within Normal range
01	H	Normal range over "High"
02	L	Normal range below "Low"
03	!	Panic range over
04	$	Abnormal range over

4. Error flag code

Code	Display	Description	Cause
00	-	Normal	-
01	SS	Sample shortage	SPT cannot detect liquid level at ASP.
02	SS	Out of the range of the sample volume	The result of SPT liquid detection at ASP is out of range.
03	SI1	Not detected liquid level in sample dispensing.	SPT cannot detect liquid level at IRU.
04	SI1	Out of detection range in liquid level when sample dispensing.	The result of SPT liquid detection at IRU is out of range.
05	SI2	Diluted sample shortage	SPT cannot detect liquid level at IRU.
06	SI2	Out of detection range in liquid level of diluted sample	The result of SPT liquid detection at IRU is out of range.
07	R1S	R1 reagent shortage	RPT cannot detect liquid level when aspirating RI reagent.
08	R1S	Out of detection range in liquid level due to R1 reagent shortage	The result of RPT liquid detection is out of range when aspirating RI reagent.
09	R2S	R2 reagent shortage	RPT cannot detect liquid level when aspirating R2 reagent.
10	R2S	Out of detection range in liquid level due to R2 reagent shortage	The result of RPT liquid detection is out of range when aspirating R2 reagent.
11-14	Not used.		
15	DS	Diluent shortage	RPT cannot detect liquid level when aspirating diluent.
16	DS	Out of detection range in liquid level due to diluent shortage.	The result of RPT liquid detection is out of range when aspirating diluent.
17	WS	Wash solution shortage	RPT cannot detect liquid level when aspirating wash solution.
18	WS	Out of detection range in liquid level due to wash solution shortage.	The result of RPT liquid detection is out of range when aspirating wash solution.
19	R1B	Not found R1 reagent bottle.	Not registered the relevant R1 reagent bottle.
20	R1S	No remaining volume of R1 reagent.	The remaining volume of the relevant R1 reagent is 0.
21	R2B	Not found R2 reagent bottle.	Not registered the relevant R2 reagent bottle.
22	R2S	No remaining volume of R2 reagent.	The remaining volume of the relevant R2 reagent is 0.
23-26	Not used.		
27	DB	Not found the diluent bottle.	Not registered the relevant

Code	Display	Description	Cause
			diluent bottle.
28	DS	No remaining volume of the diluent bottle.	The remaining volume of the relevant diluent is 0.
29	WB	Not found the wash solution bottle.	Not registered the relevant wash solution bottle.
30	WS	No remaining volume of the wash solution bottle.	The remaining volume of the relevant wash solution is 0.
31	EST	Abnormal condition occurs during measurement.	Sampling stops due to error.
32	LOT	Mismatched in lot number.	The lot information in the reagent actually loaded is not matched with that registered in the [Inventory] screen.
33	SPW	Failed SPT wash.	Failed the SPT wash. Check the alarm screen for solving the problem.
34	R1W	Failed RPT wash before R1 dispensing.	Failed the RPT wash before R1 dispensing. Check the alarm screen for solving the problem.
35	R2W	Failed RPT wash before R2 dispensing.	Failed the RPT wash before R2 dispensing. Check the alarm screen for solving the problem.
36	Not used.		
37	Not used.		
38	SPS	SPT is clogged.	SPT step-out from movable area at IRU. Or detects the pipette clogged.
40	TE1	The temperature at IRU is too low.	Temperature at IRU < 37-2 (ºC)
41	TE2	The temperature at IRU is too high.	Temperature at IRU > 37+2 (ºC)
42	TE3	The temperature at RCU is too high.	Temperature at RCU > 15ºC
43	Not used.		
50	EXP	Expired the valid term of the reagent.	Used the expired reagent in valid term for measurement.
51	STB	Expired the stability term of the reagent.	Used the expired reagent in stability term for measurement.
52	CTO	Calibration valid term expired.	In case when performing measurement for the method that not performed calibration within the specified term.
53	CXP	Expired the valid term of the QC measurement.	In case when performing measurement for the method that not performed QC measurement within the specified term.
54	SXP	Expired the valid term of the calibrator.	Used the expired calibrator in valid term for measurement.
60	IE1	Abnormal response for ISE	No response for measurement

Code	Display	Description	Cause
		measurement request.	request from ISE unit.
61	IE2	Not received the measurement result from ISE unit.	Cannot receive any result from ISE unit.
62	IE	Abnormal condition of ISE unit	Detects abnormal condition of the ISE unit.
70	CA?	Concentration conversion error.	No calibration curves. Or not performed ISE calibration after power ON.
71	OVR	Concentration conversion error in the calibrator.	Concentration value: below S1 or higher than Sn.
72	LIN	Linearity limit error	Linearity limit error
73	PRO	Prozone limit error	Prozone limit error
74	AB1	Absorbance limit error	Under 2 points within the absorbance limit range.
75	AB2	Absorbance limit2 error	One point or more beyond and 2 points or more within the absorbance limit range. (Except that the continuous 8 points or more are within the absorbance limit range.)
76	DUP	Duplicate limit error	Duplicate limit error
77	SEN	Sensitivity limit error	Sensitivity limit error
78	CAL	Calibration failed.	Calibration failed due to the effective points shortage
79-81	Not used.		
82	STM	Mismatched sample type.	Measurement performed applying the methods for the mismatched sample type for the sample.
83	CLT	Mismatched lot number of the reagent at the calibration.	An error occurs when each of the lot numbers for both R1 and R2 reagents at measurement is not matched with that at the calibration.
84	CLM	Mismatched lot number of the reagent at the calibration.	An error occurs when the reagent with the lot number at preparing calibration is not placed in the Reagent container. The error occurs when the auto calibration "Effective" or lot number change of the reagent. No measurement performed.

5. Rerun result code

Code	Description
00	Sample volume was normal at the first result
01	Sample volume was normal at the rerun result
10	Sample volume was low at the first result
11	Sample volume was low at the rerun result
20	Sample volume was high at the first result
21	Sample volume was high at the rerun result

6. QC flag code # 1 to 10

Description	Details	QC flag code
1	Current result exceeds 2SD	00: Normal, 01: Warning, 02: Error
2	Current result exceeds 3SD	00: Normal, 01: Warning, 02: Error
3	Current result exceeds 4SD	00: Normal, 01: Warning, 02: Error
4	Last two results exceed 2SD range	00: Normal, 01: Warning, 02: Error
5	2 results out of 3 last results exceed 2SD.	00: Normal, 01: Warning, 02: Error
6	Range for a defined period exceeds 4SD.	00: Normal, 01: Warning, 02: Error
7	Any 3 results for a defined period exceed 1SD.	00: Normal, 01: Warning, 02: Error
8	Any 4 results for a defined period exceed 1SD.	00: Normal, 01: Warning, 02: Error
9	Last 10 results higher or lower than mean.	00: Normal, 01: Warning (higher), 02: Error (higher), 03: Warning (lower), 04: Error (lower)
10	Last 7 results trend	00: Normal, 01: Warning (increasing), 02: Error (increasing), 03: Warning (decreasing), 04: Error (decreasing)

3.8   C: Comment Record

Comment record can be sent following the records below:
Patient information record, Order record, Result record, Scientific record, and
Manufacturer information record.   The level of the comment record will be one level
higher than the previous level.

Field #	Designation	Max. digits	Process upon reception from Host	This system used/unused	Omission	Process on transmission from Analyzer
1)	Record type	1	Abandoned	Used	Disapproved	Record type "C"
2)	Sequence number	6	Abandoned	Used	Disapproved	Refer to "3.3.1".
3)	Source of comment	1	Fixed to "L"	Used	Disapproved	Fixed to "1"
4)	Text of comment	40	Refer to the table below.	Used	Disapproved	Refer to the table below.
5)	Type of comment	1	Refer to the table below.	Used	Disapproved	Refer to the table below.

Preceding message	Type of comment	Usage of comment text
patient	G	Abandoned
order	G	Reflect sample information. (*1)
result	-	Unused:
scientific	G	Abandoned
manufacture	G	Abandoned

Note 1: The number of characters to be checked in the [Patient information] screen: up
to 40 characters

3.9 Q: Request Information Record

On real time mode, this string will be used on every order inquiry.　On batch mode, this string will be used when acquiring test.

Field #	Designation	Max. digits	Process upon reception from Host	This system used/unused	Omission	Process on transmission from Analyzer
1)	Record type	1	Abandoned	Used	Disapproved	Record type "Q"
2)	Sequence number	1	Abandoned	Used	Disapproved	"1"
3)	Starting Range ID #	12	Abandoned	Used	Disapproved	Sample ID Fixed to "ALL" for batch.
4)	Ending Range ID #	0	-	Unused	-	-
5)	Universal Test ID	0	-	Unused	-	-
6)	Nature of Request Time Limits	0	-	Unused	-	-
7)	Beginning Request Results Date and Time	0	-	Unused	-	-
8)	Ending Request Results Date and Time	0	-	Unused	-	-
9)	Request Physician Name	0	-	Unused	-	-
10)	Request Physician Telephone Number	0	-	Unused	-	-
11)	User Field # 1	0	-	Unused	-	-
12)	User Field # 1	0	-	Unused	-	-
13)	Request Information Status Code	1	Abandoned	Used	Disapproved	Fixed to "N"

3.10   L: Message Terminator Record

This string will be used at the termination of transmission.

Field #	Designation	Max. digits	Process upon reception from Host	This system used/unused	Omission	Process on transmission from Analyzer
1)	Record type	1	Abandoned	Used	Disapproved	Record type "L"
2)	Sequence number	1	Abandoned	Used	Disapproved	"1"
3)	Termination code	0	-	Unused	-	-

3.11   S: Scientific record

Field #	Designation	Max. digits	Process upon reception from Host	This system used/unused	Omission	Process on transmission from Analyzer
1)	Record type	1	Abandoned	Used	Disapproved	Record type "S"
2)	Sequence number	1	Abandoned	Used	Disapproved	"1"
3)	Analytical Method	0	-	Unused	-	-
4)	Instrumentation	0	-	Unused	-	-
5)	Reagents	0	-	Unused	-	-
6)	Units of Measure	0	-	Unused	-	-
7)	Quality Control	0	-	Unused	-	-
8)	Specimen Descriptor	0	-	Unused	-	-
9)	Reserved Field	0	-	Unused	-	-
10)	Container	0	-	Unused	-	-
11)	Specimen ID	0	-	Unused	-	-
12)	Analyte	0	-	Unused	-	-
13)	Result	0	-	Unused	-	-
14)	Result Units	0	-	Unused	-	-
15)	Collection Date and Time	0	-	Unused	-	-
16)	Result Date and Time	0	-	Unused	-	-
17)	Analytical Preprocessing Steps	0	-	Unused	-	-
18)	Patient Diagnosis	0	-	Unused	-	-
19)	Patient Birthdate	0	-	Unused	-	-
20)	Patient Sex	0	-	Unused	-	-
21)	Patient Race	0	-	Unused	-	-

3.12   M: Manufacturer information record

The manufacturer information record can be sent following the records below: Patient information record, Test order record, Result record, Scientific record, and Comment record.   The level of the Manufacturer information record will be one level higher than the previous level.

Field #	Designation	Max. digits	Process upon reception from Host	This system used/unus ed	Omission	Process on transmission from Analyzer
1)	Record type	1	Abandoned	Used	Disapproved	Record type "M"
2)	Sequence number	1	Abandoned	Used	Disapproved	"1"

Chapter 4   Communication mode

The following table describes the test ordering functions for each communication mode.

Mode/Status		Order			Test results		
		Local	Batch	Real time	Local	Batch	Real time
On Line Real time	During RUN	Normal and Emergency samples can be entered manually. Test orders can be edited.	-	Inquire orders for normal samples by one sample. Emergency samples can only be handled locally.	Search, edit, and printout available.	Disapproved	Send result of normal or emergency samples to Host automatically by one sample.
	Stand-by	Normal and Emergency samples can be entered manually. Test orders can be edited.	-	-	Search, edit, and printout available	Send test results to Host by selecting "Host" as destination.	No action.
On Line Batch (with a capability of real time result transmission to the Host.)	During RUN	Normal and Emergency samples can be entered manually. Test orders can be edited.	-	-	Search, edit, and printout available.	Disapproved	Send result of normal or emergency samples to Host automatically by one sample.
	Stand-by	Normal and Emergency samples can be entered manually. Test orders can be edited.	Acquire test orders for normal sample from Host by clicking on the [Acquire] button.	-	Search, edit, and printout available.	Send test results to Host by selecting "Host" as destination.	No action.
Off Line	During RUN	Normal and Emergency samples can be entered manually. Test orders can be edited.	-	-	Search, edit, and printout available.	-	-
	Stand-by	Normal and Emergency samples can be entered manually. Test orders can be edited.	-	-	Search, edit, and printout available.	-	-

Note:

- An emergency sample should be handled locally not via Host.

- The results for normal, emergency, online, and QC samples can be sent to Host.

- All results obtained at Off Line, Batch, and Real Time modes will be stored in one database.

- The batch mode is a batch mode with a capability of real time result transmission to the Host.

Chapter 5   Communication sequence

5.1   Confirmation of connection sequence

5.1.1   Connection confirmation at beginning of each round. (On Line Batch mode/Real time mode)

Analyzer will check communication status with Host at beginning of each round. This is to ensure the communication condition prior to an order inquiry of samples at measurement.   For the Host side, communication status confirmation is required at beginning of each round.

Figure 5.1-1

● When reply from the Host is <NAK> or no response, Analyzer will re-try up to 6 times.   If <NAK> or no reply continues for 6 times, Analyzer will generate error message and will not proceed with the round.

5.2 Batch sequence

5.2.1 Batch transmission of result to Host

Following is the example of communication on On-Line Batch mode with result transmission operation.

Host		Analyzer
	H|\\^&|||Analyzer||||||||20010111055300<CR>	1. Message Header Record
	P|1|PID2734|||Patient Name|19630501|M|Race1||||Physician Name |1234567890123|1||||||||||<CR>	2. Patient Information Record
	O|1|001||^^^1||||||||||||01<CR>	3. Test Order Record
	C|1|I|TestOrder1|G<CR>	4. Comment Record
	R|1|^^^1|15.265|mg/ml||||||||20010110121530<CR>	5. Result Record
	O|2|001||^^^3||||||||||||01<CR>	6. Test Order Record
	R|1|^^^3|18.052|mg/ml||||||||20010110121830<CR>	7. Result Record
	P|2|PID2738|||Patient Name|19870501|M|Race1||||Physician Name|1234567890153|1||||||||||<CR>	8. Patient Information Record
	O|1|890051||^^^5||||||||||||01<CR>	9. Test Order Record
	C|1|I|TestOrder2|G<CR>	10. Comment Record
	R|1|^^^5|5.265|mg/ml||||||||20010110151530<CR>	11. Result Record
	(snip)	
	P|9|PID2755|||Patient Name|19870501|M|Race1||||Physician Name|1234567890553|1||||||||||<CR>	12. Patient Information Record
	O|1|8900171||^^^37||||||||||||01<CR>	13. Test Order Record
	C|1|I|TestOrder3|G<CR>	14. Comment Record
	R|1|^^^37|0.265|mg/ml||||||||20010110171530<CR>	15. Result Record
	L|1<CR>	16. Message Terminator Record

Figure 5.2-1

Note:
- Comment information can be omitted.
- There can be multiple messages of test order and result for one patient information.
- Result record with error flag is not transmitted when it is set not to transmit result record when error occurred.

5.2.2 Inquiry to Host for order and response

The following is an example of communication when test order acquisition operation was done at test ordering screen at On Line Batch mode. The test order acquired will be added or overwritten to the existing order after it is confirmed and edited.

Host		Analyzer
		Inquiry from Analyzer to Host
	H|\^&|||Analyzer|||||||||20010111055300<CR>	1.Message Header Record
	Q|1|ALL||||||||||N<CR>	2. Request Information Record
	L|1<CR>	3. Message Terminator Record
Response from Host		
4.Message Header Record	H|\^&|||Host|||||||||20010111055303<CR>	
5.Patient Information Record	P|1|PID2734|||Patient Name||19630501|M|Race1||||Physician Name|1234567890123|1||||||||||<CR>	
6.Test Order Record	O|1|001||^^^01\^^^03||||||||||||01<CR>	
7. Comment Record	C|1|I|TestOrder1|G<CR>	
8. Patient Information Record	P|2|PID2738|||Patient Name||19870501|M|Race1||||Physician Name|1234567890153|1||||||||||<CR>	
9. Test Order Record	O|1|890051||^^^05||||||||||||01<CR>	
10.Comment Record	C|1|I|TestOrder2|G<CR>	
	（Snip）	
11. Patient Information Record	P|9|PID2755|||Patient Name||19870501|M|Race1||||Physician Name|1234567890553|1||||||||||<CR>	
12. Test Order Record	O|1|8900171||^^^37||||||||||||01<CR>	
13. Comment Record	C|1|I|TestOrder3|G<CR>	
14. Message Terminator Record	L|1<CR>	

Figure 5.2-2

5.3 Real-time sequence

5.3.1 Real-time inquiry to Host for one sample and its response

The inquiry is made at On Line Real-time mode during run to obtain test order from Host.

Figure 5.3-1

Note:

- When there is no order for inquired sample, return order information with empty universal test ID field ("00").

- When rerun is not required at host rerun mode, return order information with empty universal test ID field ("00"). However, auto rerun is performed for the method which is set as auto rerun.

- Comment information can be omitted.

5.3.2 Real-time transmission of result to Host for one sample

The result is transmitted to Host when result for a sample is obtained during run.   This transmission is performed on On-Line Real-time mode and On Line Batch mode.

Host		Analyzer
	H\^&|||Analyzer|||||||||20010111055300<CR>	1. Message Header Record
	P|1|PID2734|||Patient Name||19630501|M|Race1||||Physician Name|1234567890123|1||||||||||<CR>	2. Patient Information Record
	O|1|910000000001||^^^1|||||||||||||01<CR>	3. Test Order Record
	C|1|I|TestOrder1|G<CR>	4. Comment Record
	R|1|^^^1|15.265|mg/ml|||||||||20010110121530<CR>	5. Result Record
	L|1<CR>	6. Message Terminator Record

Figure 5.3-2

Note:

- Result is sent for one method per sample at a time.

- Universal test ID for test order record is transmitted as ID with the result.

- The lines "H" to "L" are not transmitted when it is set not to transmit result record when an error occurred.

5.4 Error handling

5.4.1 Transmission error

When the transmission error occurs, re-transmission of the message will be carried out from high level message.   The buffered data will be saved at reception of higher level message.

Host		Analyzer
	H\^&|||Analyzer||||||||20010111055300<CR>	1. Message Header Record
	P|1|PID2734||Patient Name|19630501|M|Race1||||Physician Name|1234567890123|1|||||||||||<CR>	2. Patient Information Record
	O|1|001||^^^1||||||||||||01<CR>	3. Test Order Record
	C|1|I|TestOrder1|G<CR>	4. Comment Record
	R|1|^^^1|15.265|mg/ml||||||||20010110121530<CR>	5. Result Record
	O|2|001||^^^3||||||||||||01<CR>	6. Test Order Record
	R|2|^^^3|18.052|mg/ml||||||||20010110121830<CR>	7. Result Record
	P|2|PID2738||Patient Name|19870501|M|Race1||||Physician Name|1234567890153|1|||||||||||<CR>	8. Patient Information Record
	O|1|890051||^^^5||||||||||||01<CR>	9. Test Order Record
	C|1|I|TestOrder2|G<CR>	10. Comment Record
	R|1|^^^5|5.265|mg/ml||||||||20010110151530<CR>	11. Result Record
	（snip）	
	P|9|PID2755||Patient Name|19870501|M|Race1||||Physician Name|1234567890553|1||||||||||<CR>	12. Patient Information Record
	O|1|8900171||^^^37|||||||||||01<CR>	13. Test Order Record
	C|1|I|TestOrder3|G<CR>	14. Comment Record
	R|1|^^^37|0.265|mg/ml||||||||20010110171530<CR>	15. Result Record
	L|1<CR>	16. Message Terminator Record

Figure 5.4-1

Error occurring message	Re-transmission message
1)	1)
2)	1) 2)
3)	1) 2) 3)
4)	1) 2) 3) 4)
5)	1) 2) 3) 4) 5)
6)	1) 2) 3) 4) 5) 6)
7)	1) 2) 3) 4) 5) 6) 7)
8)	1) 2) 3) 4) 5) 6) 7) 8)
9)	1) 8) 9)
10)	1) 8) 9) 10)
11)	1) 8) 9) 10) 11)
12)	1) 8) 9) 10) 11) 12)
13)	1) 12) 13)
14)	1) 12) 13) 14)
15)	1) 12) 13) 14) 15)
16)	1) 12) 13) 14) 15) 16)

5.4.2 Reception error

A. Error during batch order Inquiry to Host and its response

When message 4) is not received for T1 time out time after transmitting 3), it will be handled as described on the table below. The messages 5) to 14) will be handled as an error if the message is not received for T2 time out time.

Figure 5.4-2

Error occurring message	Error handling
4) to 14)	Re-transmit 1), 2) and 3).

Note: Perform re-transmission three times (Max.). When re-try over occurs, an alarm message is displayed.

T1: 10 sec., T2: 5 sec.

B. Error during real-time inquiry to Host for one sample and its response

Figure 5.4-3

Error occurring message	Re-transmission message
4) to 8)	Re-transmit 1), 2) and 3).

5.4.3 Abnormal data

Followings are error handlings when abnormal data is found.

A. Sequence Number

A duplicate sequence number will be discarded.
A missing sequence number will be inquired.

B. Abnormal data

Type of Message	Type of Field	Description
Message Header	Delimiter	When invalid character is assigned, the system used default delimiters.
Patient Information	Patient ID	When received an existing patient ID with new information such as name, date of birth, gender, physician name, and SS#, all data process after the reception will be based on the new information.
Test order	Sample ID	Test orders with invalid sample ID will be ignored. No warning or error message is displayed.
	Method	Test orders with methods such as not registered and reagent shortage will not be run. At reception, a warning message is displayed. Other available tests ordered together with invalid methods will be run.

5.4.4 Retry over

Sequence	Process
Batch transmission of result to Host	Displays an error message on the screen. Other operation other than host communication will be continued.
Inquiry to Host for order and response	Displays an error message on the screen. Other operation other than host communication will be continued.
Real-time inquiry to Host for one sample and its response	Generates an alarm message. Transmit "No order" to Analyzer. Other operation other than host communication will be continued.
Real-time transmission of result to Host for one sample	Generates an alarm message. The results that not transmitted to the Host will be saved in database. The saved results can be transmitted manually from the result search screen.

Chapter 6   Supplement

6.1   Supplement for "3.3.1 Sequence number"

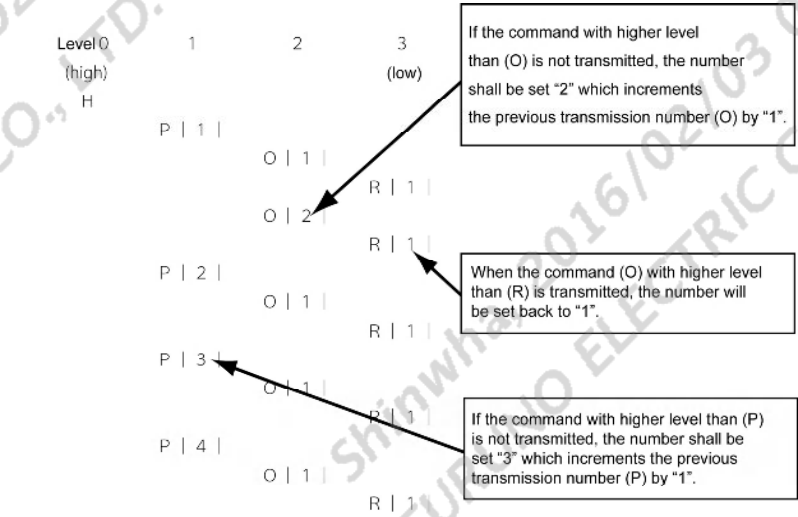Sequence number is generated by command type (H, P, and O).

Figure 6.1-1

Chapter 7   Reference

7.1   Sample identification code

Sample category	Identification code (SID)	Digit No.	General identification code (*)	Details	
Normal sample	xxxxxxxxxxxxxxx	3 - 15	xxxxxxxxxxxxxxx x-nn1	xxxxxxxxxxxxxxx nn	: Sample identification code : Number of measurement
Normal sample (emergency)	xxxxxxxxxxxxxxx	3 - 15	xxxxxxxxxxxxxxx x-nn1	xxxxxxxxxxxxxxx nn	: Sample identification code : Number of measurement
Normal sample (pediatric)	xxxxxxxxxxxxxxx	3 - 15	xxxxxxxxxxxxxxx x-nn1	xxxxxxxxxxxxxxx nn	: Sample identification code : Number of measurement
Online sample	xxxxxxxxxxxxxxx	3 - 15	xxxxxxxxxxxxxxx x-nn1	xxxxxxxxxxxxxxx nn	: Sample identification code : Number of measurement
Online sample (pediatric)	xxxxxxxxxxxxxxx	3 - 15	xxxxxxxxxxxxxxx x-nn1	xxxxxxxxxxxxxxx nn	: Sample identification code : Number of measurement
Emergency sample	99000xxx	8	99000xxx-nn1	xxx nn	: Sample identification code : Number of measurement
Emergency sample (pediatric)	990009xx	8	990009xx-nn1	xx nn	: Sample identification code : Number of measurement
QC sample	970000xx	8	990000xx-nn1	xx nn	: Sample identification code : Number of measurement
Calibrator	98xxxxxy	8	98xxxxxy-nnm	xxxxx y nn m	: Reagent identification code : Classification (1 to 7) : Number of measurement : Number of repetition
Multi-Calibrator	950000xy	8	950000xy-nnm	x y nn m	: Set number : Classification (1 to 7) : Number of measurement : Number of repetition
Diluted Calibration	93xxxxx0	8	93xxxxxy-nnm	xxxxx y nn m	: Reagent identification code : Classification (1 to 7) : Number of measurement : Number of repetition

- The general identification code corresponds to the SID with a suffix added depending on the number of measurements performed on that specific

sample.

● The general identification code is displayed on the SID column in the Round screen.

7.2 Sample barcode label specifications

A. Barcode type

Type	SID digit number	Check digit	Effective characters
UPC-A	10 digits[*1] or 11 digits[*2]	1 digit, Modulus 10	Numbers (0 to 9)
UPC-E	6 digits[*3]	1 digit, Modulus 10	Numbers (0 to 9)
JAN-13	12 digits	1 digit, Modulus 10	Numbers (0 to 9)
JAN-8	7 digits	1 digit, Modulus 10	Numbers (0 to 9)
ITF	3 to 15 digits	1 digit, Modulus 10	Numbers (0 to 9)
NW7 (CODABAR)	3 to 15 digits	1 digit, Modulus 16	Numbers (0 to 9), Symbols (-,$,/,.,+)
CODE39	3 to 8 digits	1 digit, Modulus 43	Alphanumeric (0 to 9, capital letters), Symbols (-,.,&,/,+,%)
CODE128 (set A)	3 to 15 digits	2 digits, Modulus 103	Alphanumeric (0 to 9, capital letters), Symbols (!,#,$,%,(,),+,.,-,/,:,;,<,=,>,?,@,¥)
CODE128 (set B)	3 to 15 digits	2 digits, Modulus 103	Alphanumeric (0 to 9, capital and small letters), Symbols (!,#,$,%,(,),+,-,.,/,:,;,<,=,>,?,@,¥,),{,},~)
CODE128 (set C)	3 to 15 digits	2 digits, Modulus 103	Numbers (0 to 9)

[*1] When using CCD barcode reader and "UPC-A" for the sample barcode type, add "0" digit on the head of SID to make it 11 digits in total..

[*2] When using Laser barcode reader and "UPC-A" for the sample barcode type, use 11 digits for SID.

[*3] When using "UPC-E" for the sample barcode, add "0" on the head of SID to make it 7 digits in total.

B.   Barcode structure
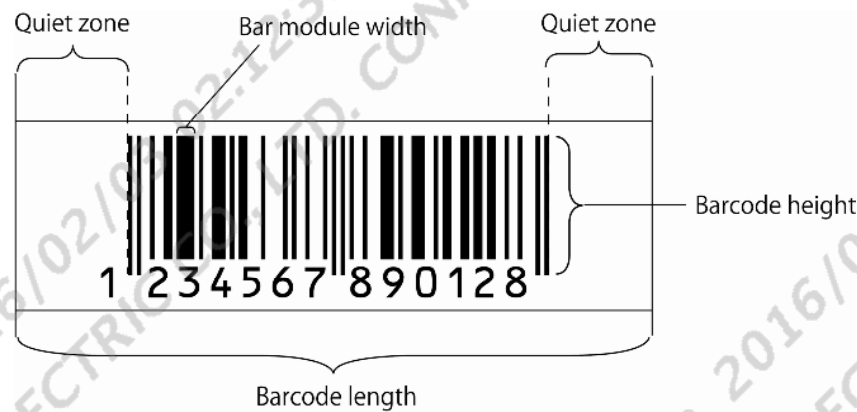

Figure 7.2-1

C.   Sample barcode label specifications

Bar module width	0.20 mm to 1.00 mm (CCD type)
	0.25mm to 1.00mm (Laser type)
Barcode height	12.5 mm or higher
Barcode length	73 mm or shorter, including the quiet zone
Quiet zone	4 mm or 10 times the length of the minimum module width, whichever the greater
Printing	Black on the white background
	Quality standard must comply with the ANSI MH10.8M standard.
Barcode label location	

7.3   User interface settings
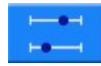
 System (F9) > System Setup 1

7.3.1   Host Communication setting

Figure 7.3-1

A.   Host communication mode <default setting: Off Line>

Select host communication mode from the following:

1.   Off Line

Perform measurement according to the analyzer settings without communication to the Host.

2.   On Line Batch

Perform measurement according to the orders received from the Host.
For the order inquiry to the Host, it needs to operate manually.
The measurement results automatically send to the Host.

3.   On Line Real time

Perform measurement according to the orders received from the Host.
The analyzer reads the barcode labels on the Sample container and automatically inquires the orders to the Host for measurement.
The measurement results automatically send to the Host.

B.   Host details mode <default setting: Auto rerun>

Select the host details mode from the following:
This setting is available only when the "On Line Real time" mode is selected.

1.   Auto rerun

The order inquiry to the Host will not be executed.

2. Confirm host for rerun

    Host rerun will be executed only when the Host requires for rerun after the order inquiry.

3. Inquire host for rerun

    Host rerun will be executed when the Host sends any responses after the order inquiry.

C.   Host communications

Specify the communication setting to the Host.

1. Baud Rate <default setting: 9600>

    Select the rate (19200, 9600, 4800, 2400, 1200, 300) from drop-down menu.

2. Data Bit <default setting: 8bit>

    Select the data bit (7bit or 8bit) from drop-down menu.

3. Stop Bit <default setting: 1bit>

    Select the data bit (1bit or 2bit) from drop-down menu.

4. Parity Bit <default setting: Even>

    Select the parity bit (none, even, odd) from drop-down menu.

5. Protocol (E1381) <default setting: Normal)

    Select the protocol (normal or no handshake) from drop-down menu.

6. [Details] button

Figure 7.3-2

● Full compliance with ASTM rules <default setting: ON>
Specify the transmission format to the Host whether to comply with ASTM rules.
When ticking the checkmark ON, fully complied with ASTM rules.   Under this setting, Rerun flags, QC measurement results, or QC flags will not be transmitted. Calculated test sends the results to the Host.
When not ticking the checkmark, not complied with ASTM rules.   Under this setting, Rerun flags, QC measurement results, or QC flags will be transmitted.

- ASTM ISE Separation <default setting: OFF>
  When ordering ISE tests from the Host, specify the format to separate ISE or not.
  When Checkmark is ON, ISE will be separated into Na, K, and Cl.

- Send with CR <default setting: ON>
  Specify the text from the Host with CR or not.
  When ticking the checkmark ON, it sends with CR.
  When not ticking the checkmark it sends without CR.

- Check CheckSum <default setting: ON>
  Specify the checksum setting for data transmission.
  When ticking the checkmark ON, the checksum setting is active.
  When not ticking the checkmark, the checksum setting is not performed.

- Specimen Type 17 <default setting: ON>
  Specify the command "O" on the 16th or 17th sample type field.
  When ticking the checkmark ON, use the 17th sample type field.
  When not ticking the checkmark, use the 16th sample type field.

- Add sequence number to SID of QC sample <default setting: OFF>
  This setting enables to identify the results when performing QC measurements several times for the specific sample or method at the same round.
  When ticking the checkmark ON, an added SID part is transmitted to the Host when notifying Result record messages.
  When not ticking the checkmark, the added SID part is not transmitted to the Host when notifying Result record messages.

```
2010/09/29 10:03:55:[L-Recv]:<ENQ>
2010/09/29 10:03:55:[L-Send]:<ACK>
2010/09/29 10:03:55:[H-Recv]:H|\^&|||Analyzer|||||||20100929100355<CR>
2010/09/29 10:03:55:[L-Send]:<ACK>
2010/09/29 10:03:55:[H-Recv]:P|1||97000001|||||U|||O|||||||||^^^|<CR>
2010/09/29 10:03:55:[L-Send]:<ACK>
2010/09/29 10:03:55:[H-Recv]:C|1|I|G<CR>
2010/09/29 10:03:55:[L-Send]:<ACK>
```

When ticking the checkmark ON, → 2010/09/29 10:03:55:[H-Recv]: O|1|97000001**011**|^^^02|||20100929000000 |0|||||05<CR>

When NOT ticking the checkmark, → 2010/09/29 10:03:55:[H-Recv]: O|1|97000001| ^^^02|||20100929000000||0|||||05<CR>

} Transmit either of them.

```
2010/09/29 10:03:55:[L-Send]:<ACK>
2010/09/29 10:03:56:[H-Recv]:C|1|I|G<CR>
2010/09/29 10:03:56:[L-Send]:<ACK>
2010/09/29 10:03:56:[H-Recv]:R|1|^^^02|-2045.96|||<|||||20100929100354 <CR>
2010/09/29 10:03:56:[L-Send]:<ACK>
2010/09/29 10:03:56:[H-Recv]:L|1<CR>
2010/09/29 10:03:56:[L-Send]:<ACK>
2010/09/29 10:03:56:[L-Recv]:<EOT>
```

Figure 7.3-3

- Communication Timeover settings
  Specify the timeout setting.
  - Batch order:
  Specify the batch order to the Host from 1 to 60 sec.
  <default setting: 40 sec.>
  - Low Layer ENQ:
  Specify the low layer ENQ from 1 to 60 sec.
  <default setting: 15 sec.>

- Real time order:
Specify the data reception from 1 to 60 sec.
<default setting: 30 sec.>

● Retry settings
Specify the number of each retry for high layer and lower layer.
High layer: select the number (1 to 6) from drop-down menu.
<default setting: 6.>
Lower layer: select the number (1 to 6) from drop-down menu.
<default setting: 3>

● Result unit
Specify the result transmission unit.
Select "By Method" or "By Sample".
<default setting: By Method>

● Sample Type Setting
Specify the default sample type when omitting the sample type in transmission message from the Host.
Select (Serum, Urine, Plasma, or Others) from drop-down menu.

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