

DxC 700 AU

Online Specification

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Information in this document is subject to change without notice. To connect the equipment, consult the Beckman Coulter Technical Support

1. Outline

- 1) This equipment can carry out the following in real-time mode (while the DxC 700 AU is performing measure):
 - (1) Receives sample information from the host.
 - (2) Transmits analysis result data to the host.

- 2) This equipment can perform the following in batch mode (on the screen of the DxC 700 AU):
 - (1) Receives sample information from the host (on the screen).
 - (2) Transmits saved analysis result data to the host (on the screen).

- 3) The equipment can select the following format and protocol on the screen of the DxC 700 AU:
 - (1) Upper and lower layer communication protocols
 - (2) Sample information response message format
 - (3) Data message format

2. Basic Specification

1) Format of transmission

Item	Contents										
Line Type	RS-232C										
Synchronization Method	Asynchronous method										
Data Transfer Mode	Half-duplex										
Bit/Sec	4800 bps, 9600 bps										
Character Format	<table border="1"> <tr> <td>Start Bit</td><td>1 bit</td></tr> <tr> <td>Character Length</td><td>7 or 8 bits</td></tr> <tr> <td>Parity Check</td><td>None, odd or even</td></tr> <tr> <td>Stop Bit</td><td>1 or 2 bits</td></tr> <tr> <td>Total</td><td>9 to 12 bits</td></tr> </table> <p>The above conditions can be selected on the [Online] screen.</p>	Start Bit	1 bit	Character Length	7 or 8 bits	Parity Check	None, odd or even	Stop Bit	1 or 2 bits	Total	9 to 12 bits
Start Bit	1 bit										
Character Length	7 or 8 bits										
Parity Check	None, odd or even										
Stop Bit	1 or 2 bits										
Total	9 to 12 bits										
Confirmation Method	<p>Class A: Message transmission is conducted from the sender to the receiver at regular intervals.</p> <p>Class B: Message transmission is conducted by confirming with ACK (acknowledged) or NAK (not acknowledged) between the sender and the receiver.</p>										
Channel	1 channel (COM 1)										
Retry	<p>Class A: Nothing</p> <p>Class B: Retry times from 0 to 3 (can be selected on the [Online] screen)</p>										

2) Transmission code

Item	Contents	Value Range
Data Code	7 bit code	20H-7EH
	8 bit code	
	1 byte code (JIS code)	20H-7EH A1H-DFH
	2 byte code (Shift-JIS code)	(1 st byte) 81H-9FH E1H-EAH
		(2 nd byte) 40H-FCH (except 7FH)
Control Code	Message start/end code	01H-1FH
	ACK	06H
	NAK	15H
	BCC	00H-FFH

3) Message format

(1) Message configuration

1)	2)	3)	4)	5)	6)
----	----	----	----	----	----

Name	No. of bytes	Contents		Remarks
		Value Range	Meaning	
1) Message start code	1,2	01H-1FH	Start of message	Normally 1 digit 02H
2) Message identification code	2	R□	Sample information request-related message identifier	DxC 700 AU → Host
		RB	Sample information request start	
		R△	First run sample (Routine/Emergency/STAT) request	
		RH	Rerun sample (Routine/Emergency/STAT) request	
		Rh	Automatic Rerun sample (Routine/Emergency/STAT) request	
		RE	Sample information request end	
		S□	Sample information response-related message identifier	Host → DxC 700 AU
		S△	First run sample (Routine/Emergency/STAT) information response	
		SH	Rerun sample (Routine/Emergency/STAT) information response	
		Sh	Rerun sample (Routine/Emergency/STAT) information response	
		SE	Sample information response stop	
		D□	Analysis data-related message identifier	DxC 700 AU → Host
		DB	Analysis data transmission start	
		D△	First run sample (Routine/Emergency/STAT) data	
		DH	Rerun sample (Routine/Emergency/STAT) data	
		DR	Reagent blank sample data	
		DA	Calibration sample data	
		d△	Quick output data	
		dH	Rerun Emergency quick output data	
		DQ	QC sample data	
		DE	Analysis data transmission end	
3) System No.	0,2	00 to 99	No. to identify the message source equipment at the host	
4) Message code	by message		Contents of message For variable length messages, message identification No. is added between the fixed (header) area and the variable area.	
5) Message end code	1,2	01H-1FH	End of messages	Normally 1 digit 03H
6) BCC (Block Check Character)	0,1	00H-FFH	The sum with the exclusive OR logic, from 2} to 5}	

Note: △ indicates a space.

(2) Blocking

a) Definitions of terms

Term	Definition
Message length	It shows total bytes from 1) to 6).
	4) (Message code) shows the number of bytes calculated.
Max message length	It shows the max length of a message in one phase.
	The length of block (256, 512 or 1024) can be selected on the [Online] screen.
Fixed length message	It shows a message constantly transferred at a fixed length.
Variable length message	It shows a message whose length changes depending on the amount of data transferred. It consists of the fixed area where the same information is always edited and the variable area where edited information changes by message. For the position to divide the variable area, see 3. Communication Message Format.

b) Message types and blocking

Type	Message Type	Method of Blocking	
Fixed length message	Sample information request start Sample information request Rerun sample request Automatic Rerun sample request Sample information response stop Sample information request stop Analysis data transmission start Analysis data transmission end	No blocking shall occur.	
Variable length message	First run sample information response Rerun sample information response Automatic Rerun sample information response First run sample data message Rerun sample data message QC sample data message Calibration sample data message Reagent blank sample data message Emergency quick output data	Blocking Use Yes/No	Max message length < Message length
		Block Identification No. (0-9, E) *2	First block → Block Identification No. = 0 Second block → Block Identification No. = 1 : : Last block → Block Identification No. = E
		Message End Code	Message End Code = ETX (03H) → and ETB (17H) Use = Yes *1 Block End Code = ETB Message End Code = ETX
			Message End Code ≠ ETX (03H) → or ETB (17h) Use = No *1 Block End Code = Set value Message End Code = Set value Whether or not to use ETB can be selected on the [Online] screen.

Note 1: When Block Identification No. is set to 0, 1,, only Block End Code shall be added.

When Block Identification No. is set to "E," only Message End Code shall be added.

Note 2: When Block Identification No. is set to 10 or higher, numbers starting from 0 again shall be set; 0, 1, 0, 1,, E.

For the last block, Block Identification No. shall be set to E.

3. Communication Message Format

1) Common and changeable tests

The following can be selected on the [Online] screen of the DxC 700 AU.

Message start code 1)

Equipment No. 3)

Message end code 5)

BCC 6)

2) Sample information request-related message identifier

(1) Sample information request start

1)	R	B	3)	5)	6)
----	---	---	----	----	----

(2) First run sample (Routine/Emergency/STAT) request

1)	R \triangle	3)	Rack No.	Cup Pos.		S. No.		S. ID		5)	6)
					↑						
					Type						

(3) Rerun sample (Routine/Emergency/STAT) request

1)	R H	3)	Rack No.	Cup Pos.		S. No.		S. ID		5)	6)
----	-----	----	----------	-------------	--	--------	--	-------	--	----	----

↑
Type

(4) Automatic Rerun sample (Routine/Emergency/STAT) request

1)	R	h	3)	Rack No.	Cup Pos.		S. No.	S. ID	5)	6)
						↑				
Type										

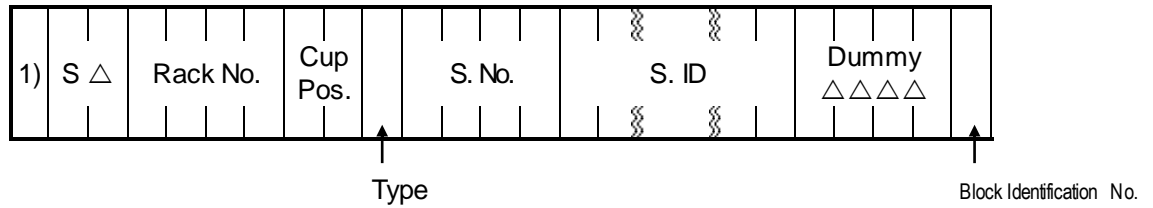
(5) Sample information request end

1)	R	E	3)	5)	6)
----	---	---	----	----	----

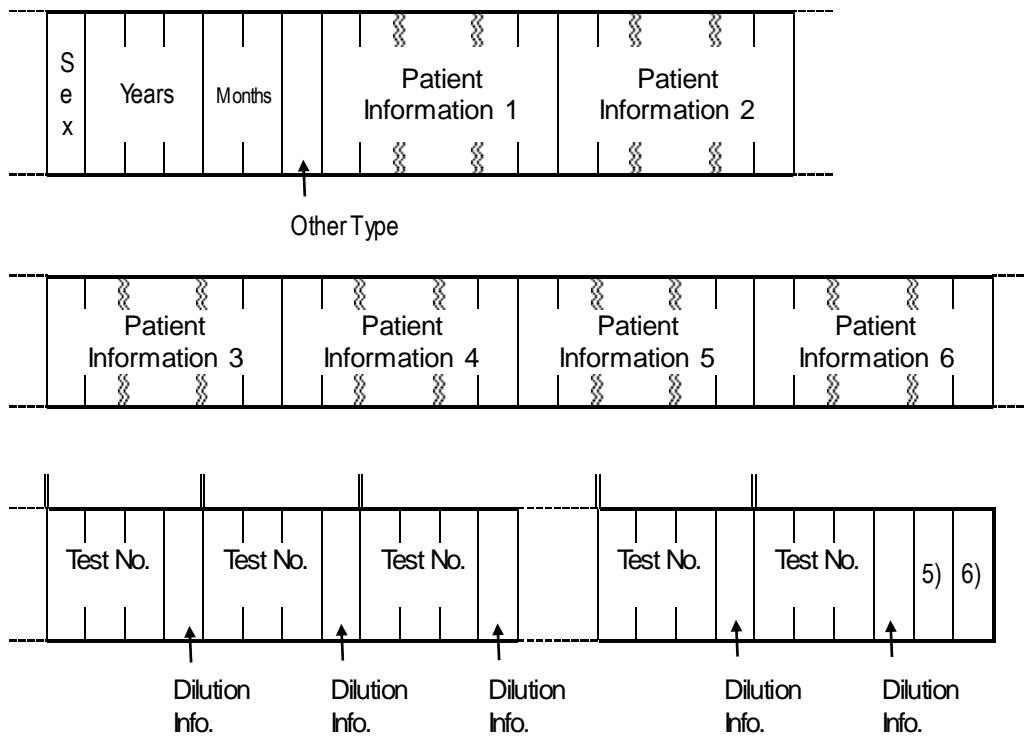
3) Sample information response

(1) First run sample (Routine/Emergency/STAT) information response message

A. Format of fixed area

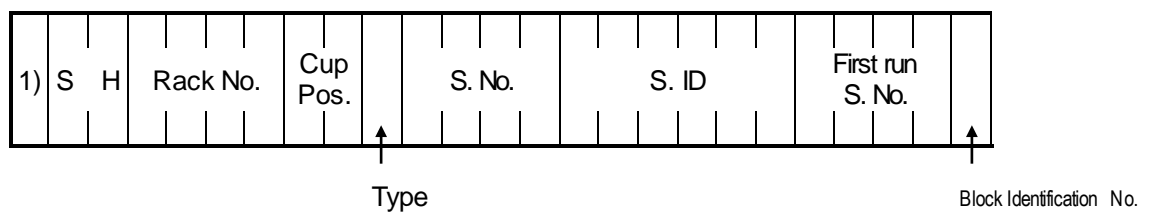


B. Format of variable area (|| indicates blocking.)

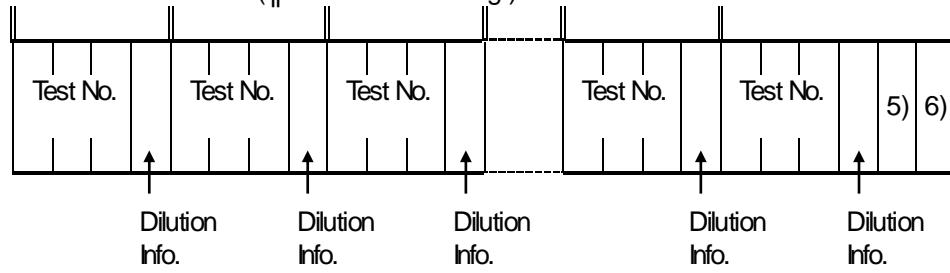


(2) Rerun sample (Routine/Emergency/STAT) information response message

A. Format of fixed area

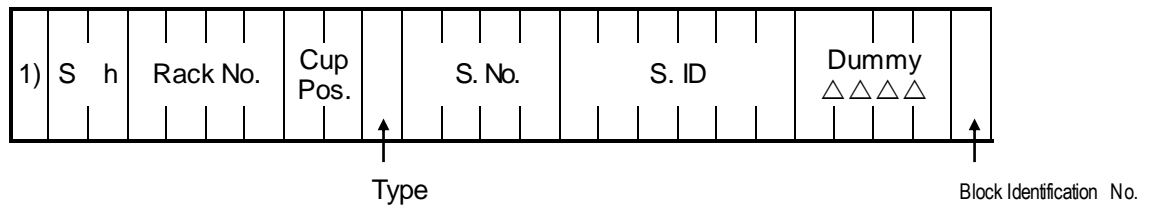


B. Format of variable area (|| indicates blocking.)

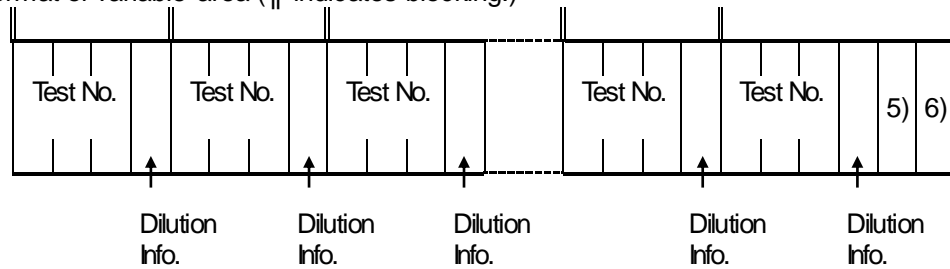


(3) Rerun sample (Routine/Emergency/STAT) information response message

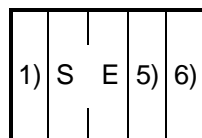
A. Format of fixed area



B. Format of variable area (|| indicates blocking.)

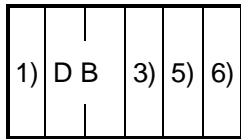


(4) Sample information response stop



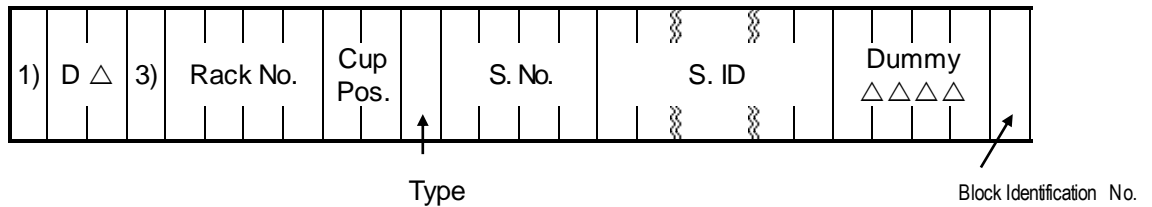
4) Analysis data-related message

(1) Analysis data transmission start

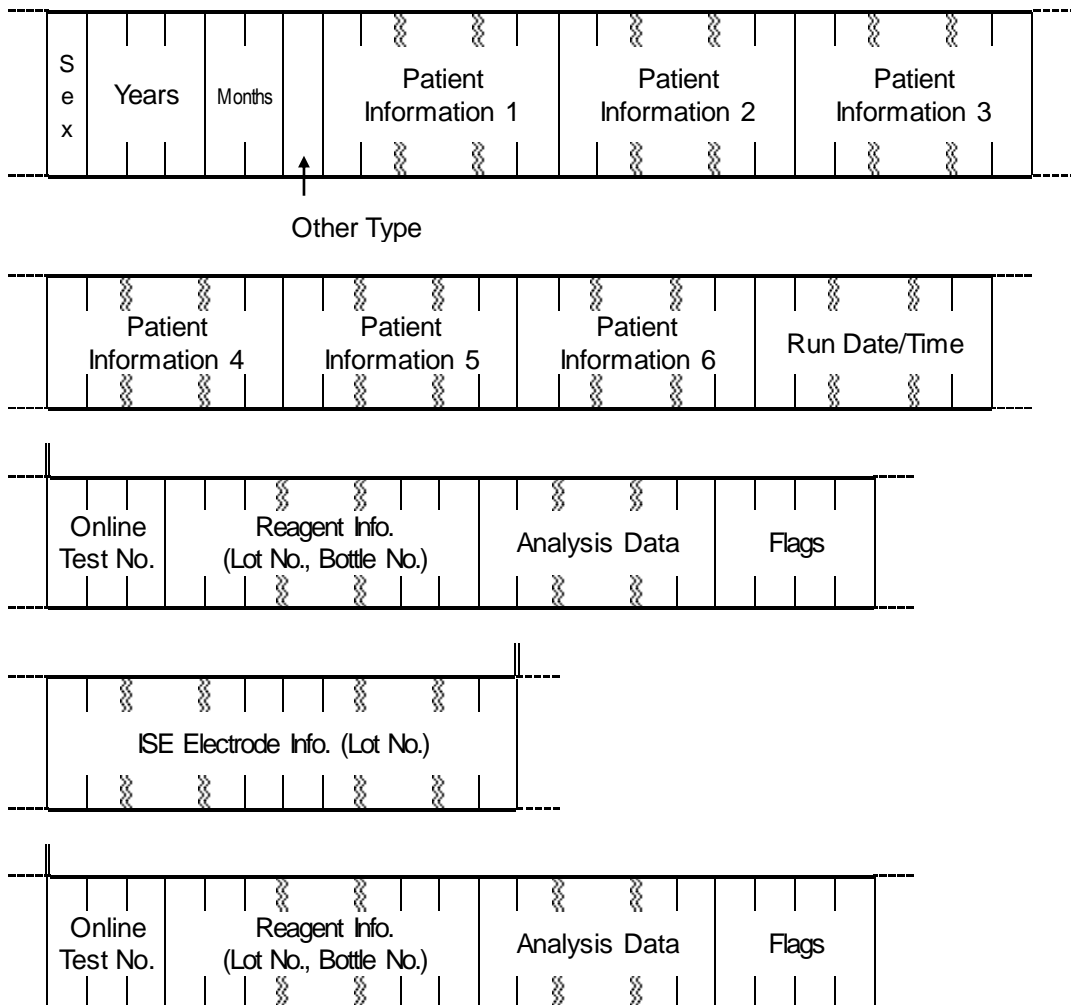


(2) First run sample data message – 1 (Routine/Emergency/STAT)

A. Format of fixed area

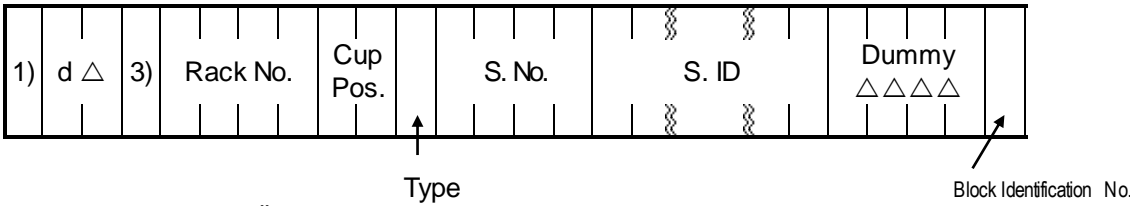


B. Format of variable area (|| indicates blocking.)

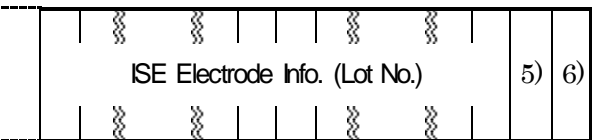
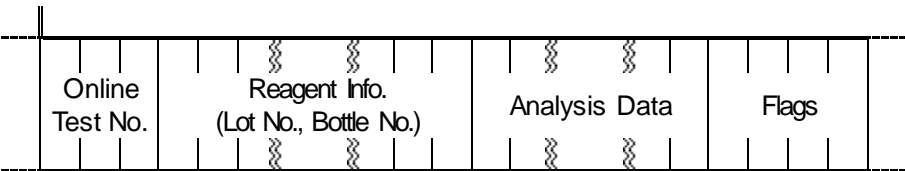
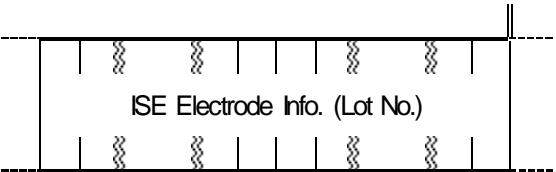
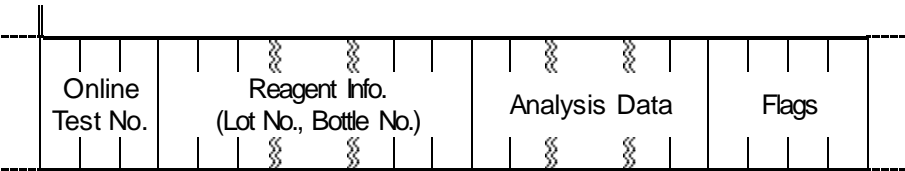
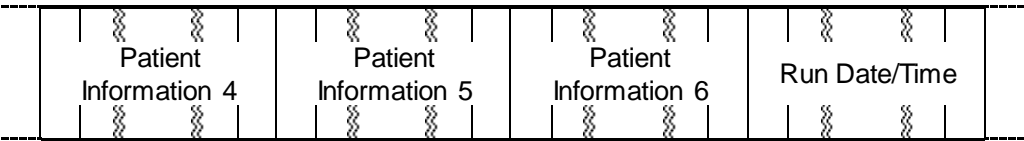
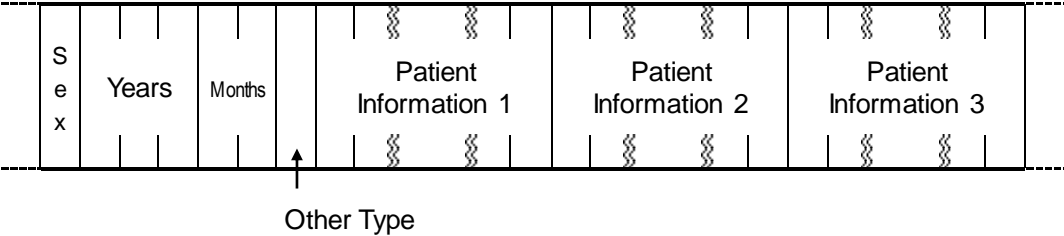


(3) Quick data message – 2 (Emergency/STAT Quick)

A. Format of fixed area

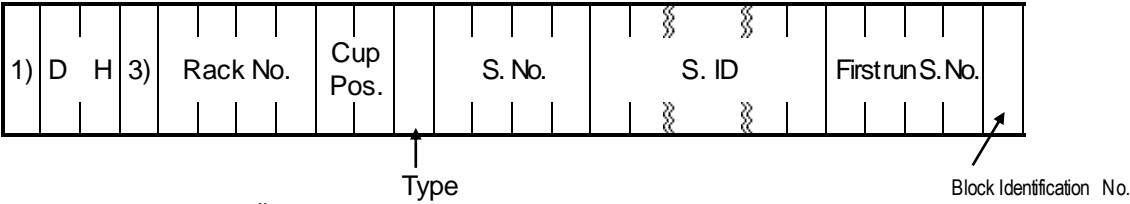


B. Format of variable area (|| indicates blocking.)

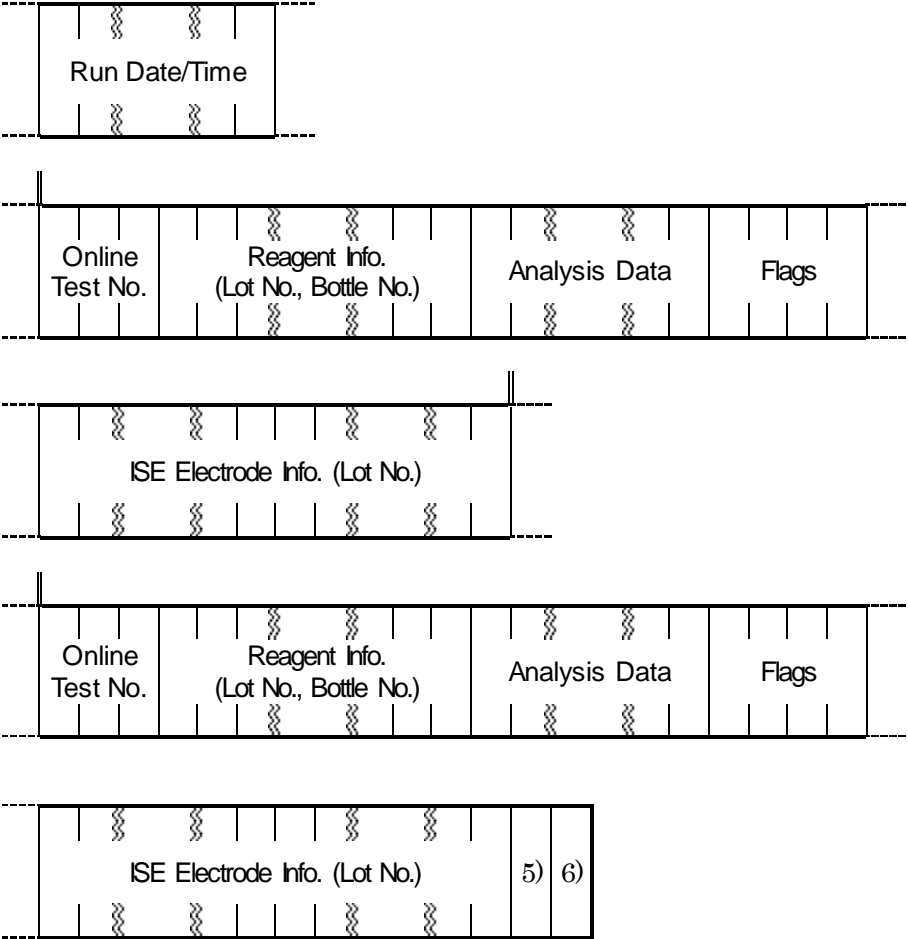


(4) Rerun sample data message – 1 (Routine/Emergency/STAT)

A. Format of fixed area

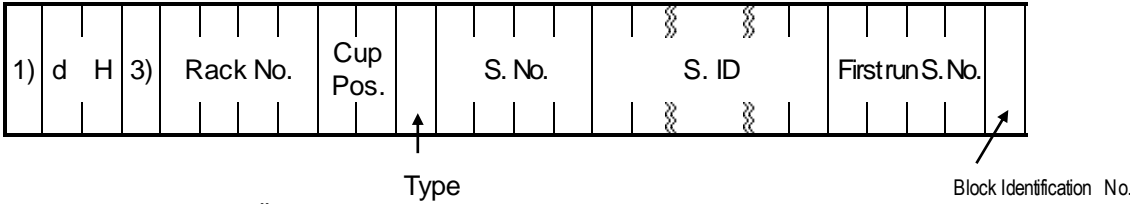


B. Format of variable area (|| indicates blocking.)

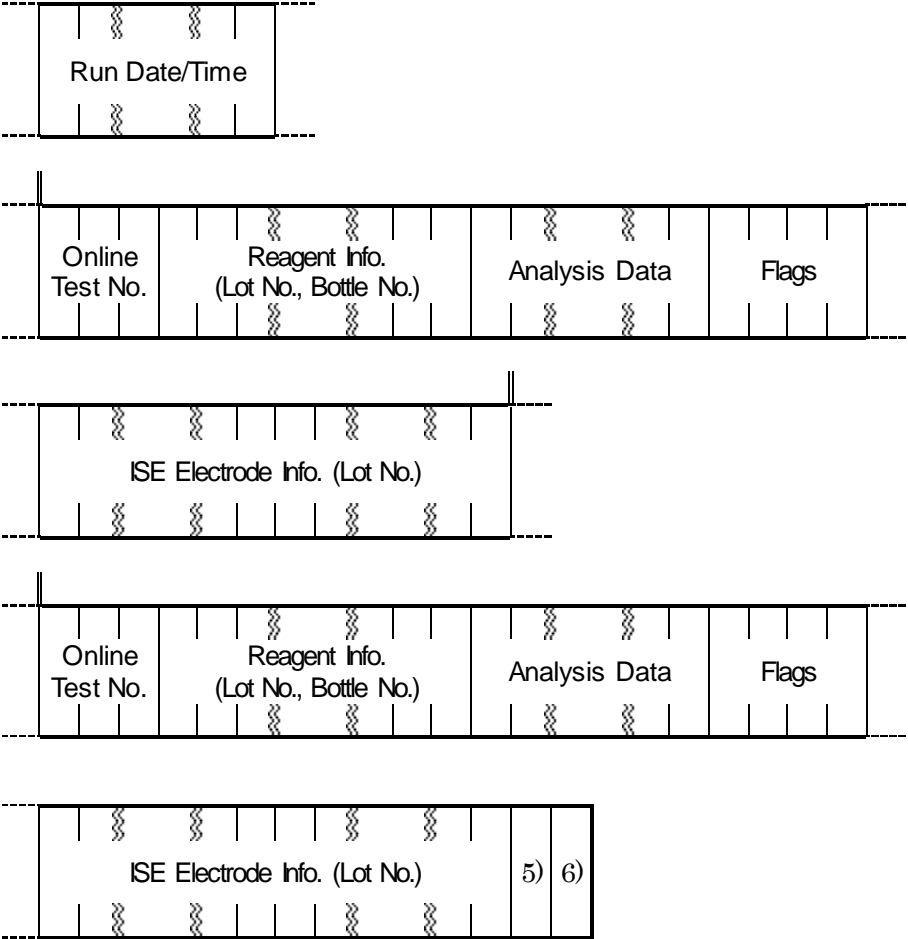


(5) Rerun sample data message – 2 (Emergency/STAT Quick)

A. Format of fixed area

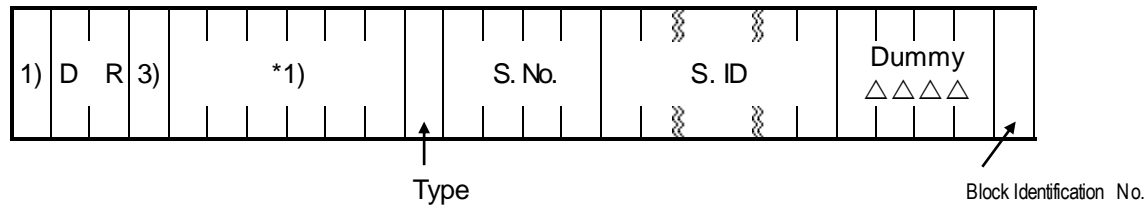


B. Format of variable area (|| indicates blocking.)



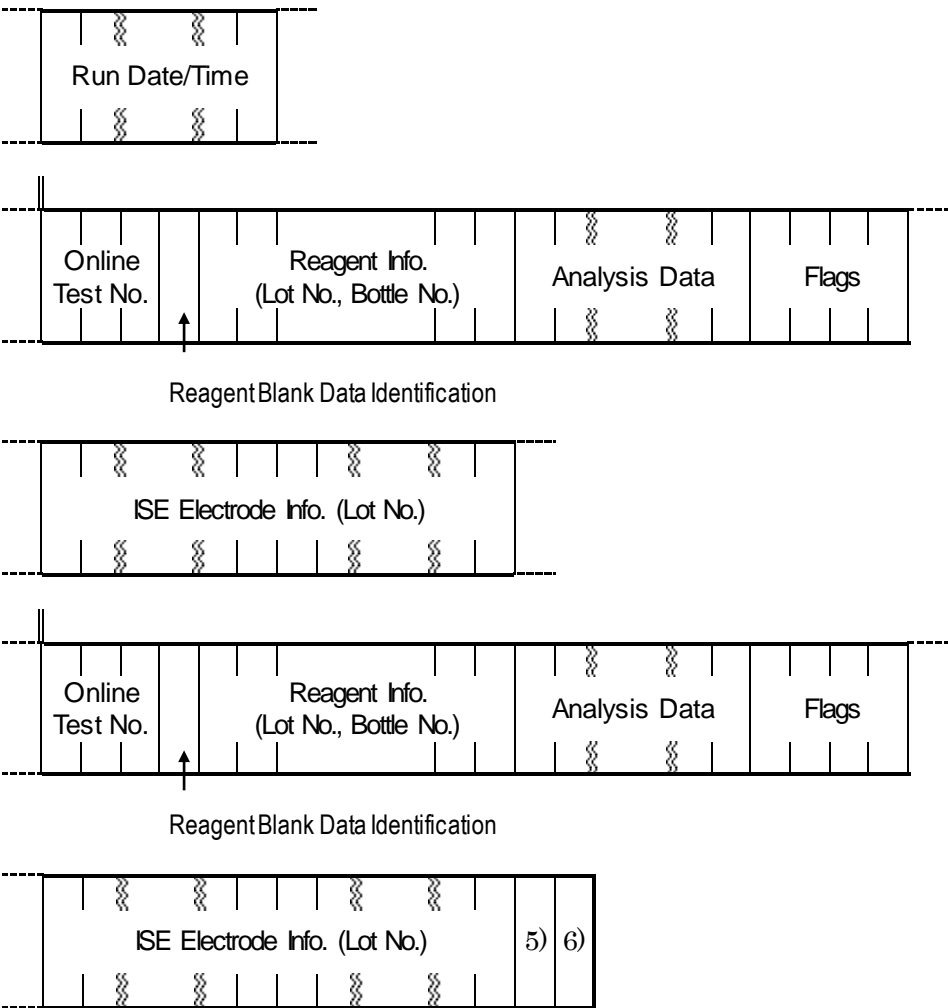
(6) Reagent blank sample data message

A. Format of fixed area



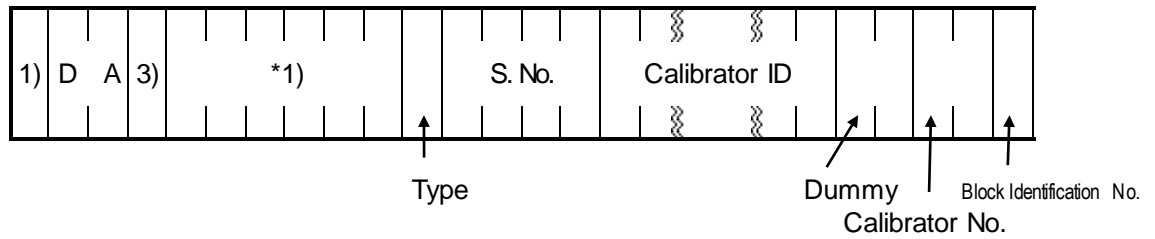
*1) The effectiveness of this area and its size shall depend on the setting of Rack No.
The size shall be made by adding the cup position digits (2) to the rack No. digits.
e.g. When the rack No. is 4 digits, the size of this area is 6 digits.

B. Format of variable area (|| indicates blocking.)



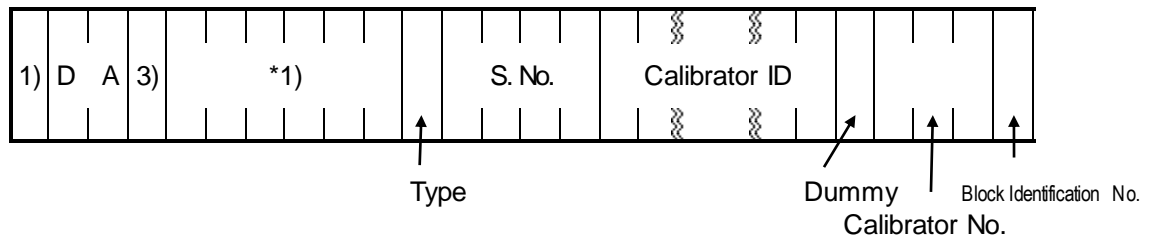
(7) Calibration sample data message

A-1. Format of fixed area (when Calibrator No. is 2 digits)



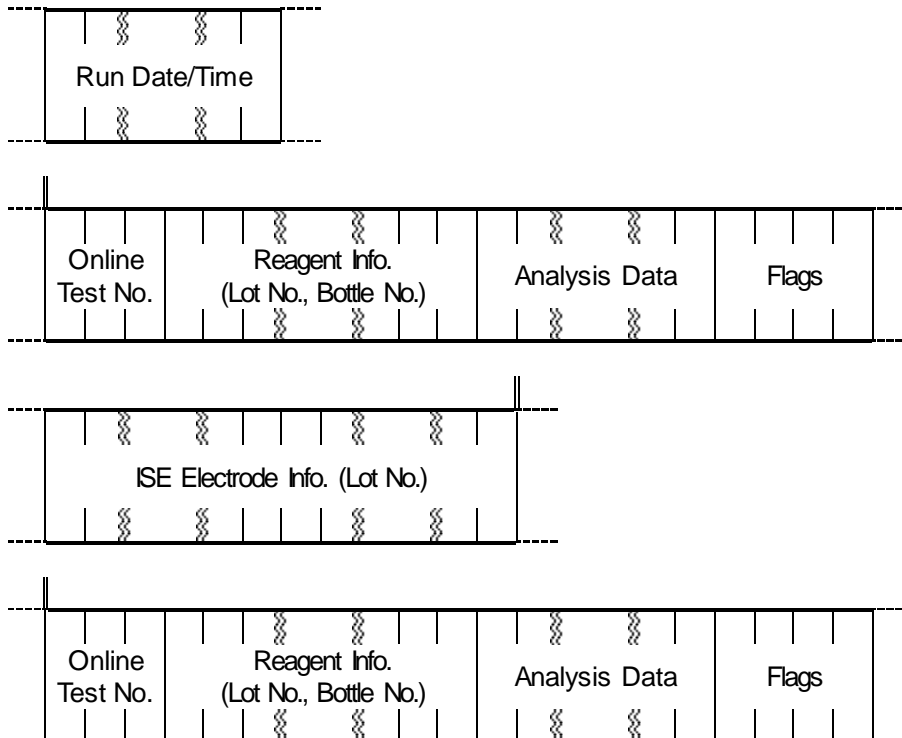
*1) The effectiveness of this area and its size shall depend on the setting of Rack No.
The size shall be made by adding the cup position digits (2) to the rack No. digits.
e.g. When the rack No. is 4 digits, the size of this area is 6 digits.

A-2. Format of fixed area (when Calibrator No. is 3 digits)



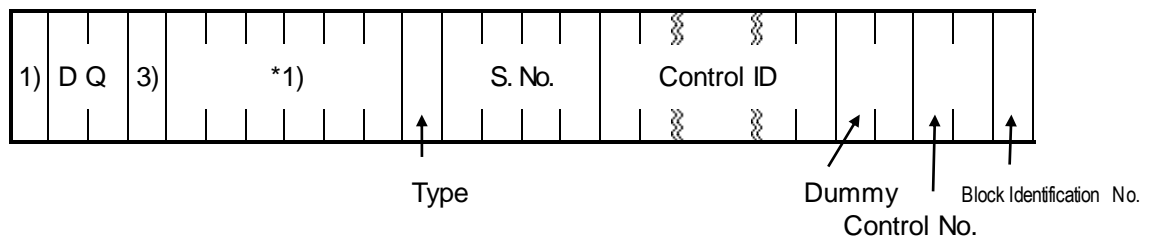
*1) The effectiveness of this area and its size shall depend on the setting of Rack No.
The size shall be made by adding the cup position digits (2) to the rack No. digits.
e.g. When the rack No. is 4 digits, the size of this area is 6 digits.

B. Format of variable area (|| indicates blocking.)



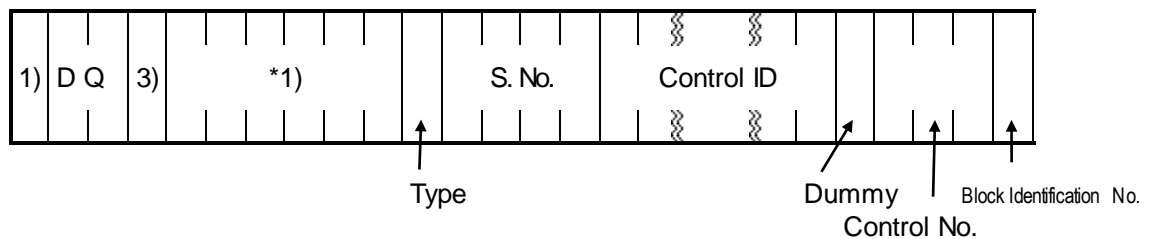
(8) QC sample data message

A-1. Format of fixed area (when Control No. is 2 digits)



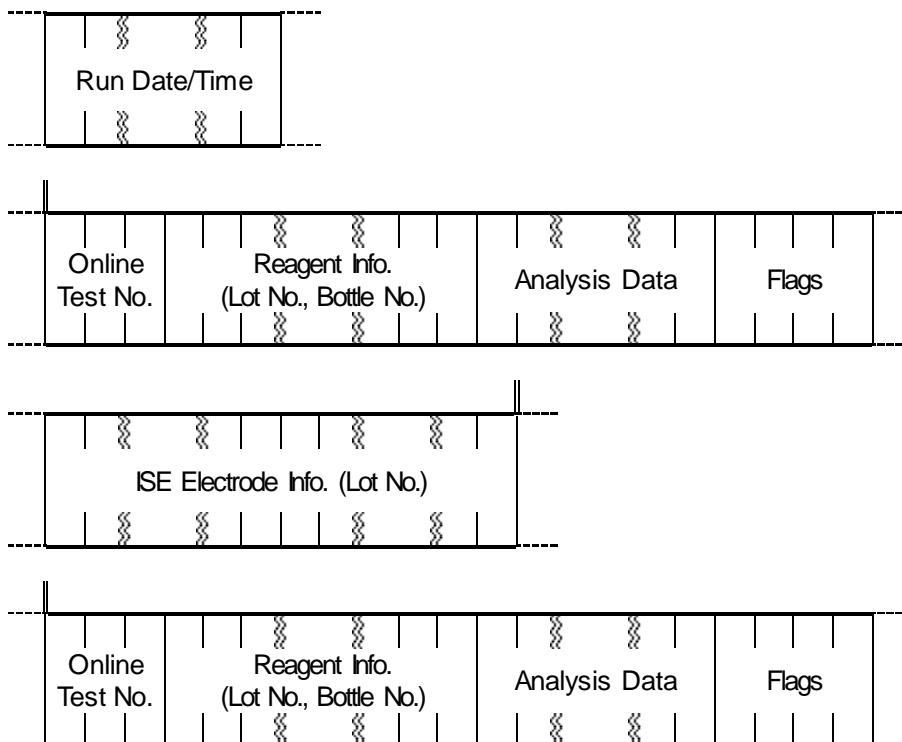
*1) The effectiveness of this area and its size shall depend on the setting of Rack No.
 The size shall be made by adding the cup position digits (2) to the rack No. digits.
 e.g. When the rack No. is 4 digits, the size of this area is 6 digits.

A-2. Format of fixed area (when Control No. is 3 digits)



*1) The effectiveness of this area and its size shall depend on the setting of Rack No.
 The size shall be made by adding the cup position digits (2) to the rack No. digits.
 e.g. When the rack No. is 4 digits, the size of this area is 6 digits.

B. Format of variable area (|| indicates blocking.)



(9) Analysis data transmission end

1)	D	E	3)	5)	6)
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- 5) Relation between real-time/batch mode and messages to be exchanged
- In real-time/batch settings, when realtime is selected, batch communications can be conducted.
 - When batch is selected, real-time communications cannot be conducted.
 - Batch transmission can be started while real time transmission is performed.
Batch requisition cannot be started while real time requisition is performed.

6) Others

(1) Contents and formats in message

Item	Digits	Contents	Remarks
Rack No.	4/5	Rack No. 4 digits: '0001' to '9999' 5 digits: '00001' to '99999'	<ul style="list-style-type: none"> • Whether or not to use this area and the number of digits can be selected on the [Online] screen. <p>For RB samples etc. where the rack No. has not been set, all digits become 0. In case of STAT samples, all digits become Δ [20H]. For all sample types of DxC 700 AU-DTS (the external feed line sampling directly), all digits become Δ [20H]. For sample information request through batch online, all digits become Δ [20H] in each sample type.</p> <p>For sample information response, copy the value set in sample information request message corresponding to the sample.</p> <p>Selected digits > read digits: Zero suppression shall be used. Selected digits < read digits: All following digits shall be dropped.</p>
Cup Position	2	Rack: '01' to '10'	<ul style="list-style-type: none"> • It shall depend on the decision whether or not to add the rack No. on the [Online] screen. <p>When RB, ACAL or QC sample is selected, all digits shall be blank.</p>

Item	Digits	Contents	Remarks
Type	1	Space: Serum 'U': Urine 'X': Other 1 'Y': Other 2 'W': Whole blood 'N': Not specified	When DxC 700 AU cannot specify sample types, transmission shall be performed by selecting [Not specified: 'N'].. Response shall be made after selecting a certain sample type other than [Not specified] on the host. When DxC 700 AU cannot specify sample types, transmission shall be performed by selecting other than [Not specified: 'N'].. Response shall be performed by selecting same Type as the Type selected by DxC 700 AU on the host.
Sample No.	4	'0001'-'9999': Routine sample 'E001'-'E999': Emergency sample 'P001'-'P999': STAT sample 'R001'-'R999': Reagent blank sample 'A001'-'A999': Calibration 'Q001'-'Q999': QC sample	
Sample ID Calibrator ID Control ID	4-26	Numbers and characters	<ul style="list-style-type: none"> Number of digits can be changed on the [Sample Program Format] screen. *1 <p>Selected digits > read digits: The digits shall be right aligned and spaces shall be added to the remaining area.</p> <p>Selected digits < read digits: All following digits shall be dropped.</p>
First Run Sample No.	4	'0001'-'9999': Routine sample 'E001'-'E999': Emergency sample 'P001'-'P999': STAT sample	
Dummy	4	Space	
Block Identification No.	1	'0'-'9': 'E' is set for the last message.	For messages other than the last block message in the variable length message, digits shall be set, starting from 0 to 9. For the last block message, E shall be set. When blocking does not occur in the variable length message, E shall be set.

Item	Digits	Contents	Remarks
Sex	1	'M': Male 'F': Female Space: None sex '0': Not specified	<ul style="list-style-type: none"> Whether or not to add it can be selected on the [Sample Program Format] screen. In Automatic Rerun sample (Routine/Emergency/STAT) request message, this field does not exist.
Years	3	'000'-'150' Space: Not specified *2	
Months	2	'00'-'11' Space: Not specified *2	
Other Type	1	'0': Type1 '1': Type2 '2': Type3 '3': Type4 '4': Type5 '5': Type6 Space: Not specified	
Patient Information	Up to 20	Number or character string	Selected digits > read digits: The digits shall be right aligned and spaces shall be added to the remaining area. Selected digits < read digits: All following digits shall be dropped.
Run Date/Time	14	YYYYMMDDHHMMSS YYYY : Year MM : Month DD : Day HH : Hour MM : Minute SS : Second	Whether or not to use it can be selected on the [Online] screen. When Month, Day, Hour, Minute or Second is 1 digit, it is padded on the left with zero.
Online Test No.	2/3	2 digits: '01' to '99' 3 digits: '001' to '120'	The number of digits can be selected on the [Online] screen.
Dilution Info.	1	'0': Normal '1': Diluted '2': Concentrated	Whether or not to use it can be selected on the [Online] screen.
Reagent Lot No.	4×4	Reagent lot No. used (△ is set to all unused reagent lot Nos.) In the case of ISE; REF/BUF/MID reagent lot No. used	Whether or not to use it can be selected on the [Online] screen. *4 Selected digits > read digits: The digits shall be right aligned but spaces shall not be added to the remaining area. Selected digits < read digits: Spaces for [4-Set] shall be added to the leading area, the lot No. shall be set starting from the leading area and all following excess shall be cut off.
Reagent Bottle No.	4×4	Reagent bottle No. used (△ is set to all unused reagent bottle Nos.) In the case of ISE; REF/BUF/MID reagent lot No. used	Whether or not to use it can be selected on the [Online] screen. *4

Item	Digits	Contents	Remarks
Analysis Result	6/9	Analysis data: 6 digits / 9 digits *3	<ul style="list-style-type: none"> The following can be selected on the [Online] screen: <ul style="list-style-type: none"> Whether or not to use zero suppression Number of digits, 6 or 9
Flags	2/8	For set values, see Appendix A.1 List of Flags. The number of digits of the flag to be transferred shall vary depending on the max output value (2 or 4). For more information, see (3) flags.	The max output value can be selected on the [Online] screen.
ISE Electrode Lot No.	5x4	ISE Electrode Lot No. used	Whether or not to use it can be selected on the [Online] screen. *5
Reagent Blank Data Identification	1	'1': 1 st reagent blank sample data '2': 2 nd reagent blank sample data	
Calibrator No.	2/3	'001' to '200'/'01' to 'K0'	The number of digits can be selected on the [Online] screen.
Control No.	2/3	'001' to '100'/'01' to 'A0'	The number of digits can be selected on the [Online] screen.

Note 1: For the ID shorter than the selected digits, spaces shall be added to the remaining area.

Note 2: When the space is set to Years and any value is set to Months in information transmitted from the host, the DxC 700 AU shall judge such status as an error.
The criteria is listed below:

Host	→ DxC 700 AU		
Pattern	Years	Months	Judgment
1	Space	Space	OK
2	***	Space	OK
3	Space	**	Error
4	***	**	OK

Note 3 When the parameters are changed in [System Maintenance], the DxC 700 AU shall transfer analysis data as a space in the case concentration conversion results in an error or other than the Analytical Measuring Range.

Note 4: The fields of the reagent lot Nos. and reagent bottle Nos. are as follows:

- R1-2 information is used:

R1 (R1-1) Lot No.	R1 (R1-1) Bottle No.	R2 (R2-1) Lot No.	R2 (R2-1) Bottle No.	R1-2 Lot No.	R1-2 Bottle No.	△ △ △ △	△ △ △ △
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- R1-2 information is not used:

R1 (R1-1) Lot No.	R1 (R1-1) Bottle No.	R2 (R2-1) Lot No.	R2 (R2-1) Bottle No.
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- ISE analysis data and ISE Info. is used:

When ISE reagent lot No. is less than 8 digits, spaces shall be added to the remaining area.

e.g. REF Reagent Lot No. is A12345△△, MID Reagent Lot No. is B12345△△, BUF Reagent Lot No. is C12345△△,
A12345△△B12345△△C12345△△△△△△△△

REF Reagent Lot No.	MID Reagent Lot No.	BUF Reagent Lot No.	△ △ △ △	△ △ △ △
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Note 5: The fields of the ISE Electrode Lot Nos. are as follows:

Na Electrode Lot No.	K Electrode Lot No.	Cl Electrode Lot No.	REF Electrode Lot No.
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(2) Data format

△ indicates a space (20H).

a) Analysis data

- The number of digits for transfer is 6 and zero suppression is not used:

0	1	2	3	.	4

- The number of digits for transfer is 9 and zero suppression is not used:

-	0	1	2	3	.	4	5	6

- The number of digits for transfer is 6 and zero suppression is used:

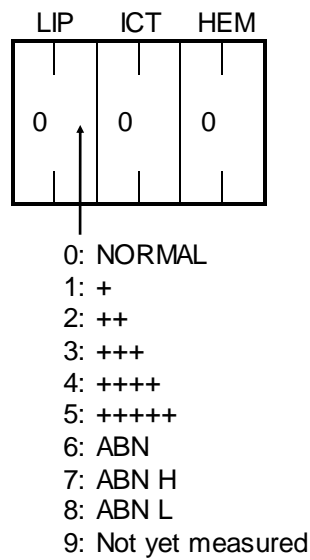
-	△	1	2	3	4

- The number of digits for transfer is 9 and zero suppression is used:

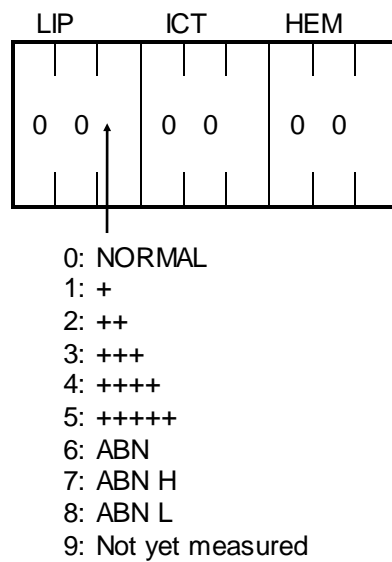
-	△	1	2	3	.	4	5	6

b) LIH analysis data

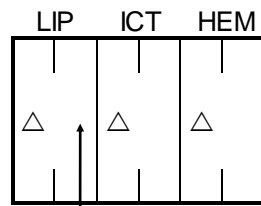
- The number of digits for transfer is 6 and zero suppression is not used:



- The number of digits for transfer is 9 and zero suppression is not used:

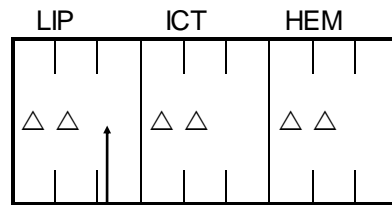


- The number of digits for transfer is 6 and zero suppression is used:



- 0: NORMAL
- 1: +
- 2: ++
- 3: +++
- 4: ++++
- 5: +++++
- 6: ABN
- 7: ABN H
- 8: ABN L
- 9: Not yet measured

- The number of digits for transfer is 9 and zero suppression is used:



- 0: NORMAL
- 1: +
- 2: ++
- 3: +++
- 4: ++++
- 5: +++++
- 6: ABN
- 7: ABN H
- 8: ABN L
- 9: Not yet measured

c) Analysis data exceeding the number of digits in the format

- When the number of digits for transfer is 6 or 9 and analysis data exceeds the number, it shall be transferred in the following formats:

- The number of digits for transfer is 6:

9	9	9	9	9	9

- The number of digits for transfer is 9:

9	9	9	9	9	9	9	9	9

d) Analysis data equal to the OD-value shall be transferred in the following formats:

- The number of digits for transfer is 6:

0	.	1	2	3	4

Note: When OD-value is negative, analysis data exceeding the number of digits shall be shown.

- The number of digits for transfer is 9:

-	△	△	0	.	1	2	3	4

(3) Flags

A) Two types of flags are transferred:



The flag is usually in two digits, however, when the number of digits for transfer is 2, only the first 1 digit shall be used.

e.g. flag: F_, ph
Transfer: Fp

B) Four types of flags are transferred:



Up to four 2-digit flags shall be transferred.

(4) Sample information for calculated tests

- When Test Requisition Information in the sample information response message transmitted from the host contains the calculated test No., tests selected for calculated tests shall be ignored by DxC 700 AU, and the flag shall be calculated and transferred according to the calculated test conditions specified by the DxC 700 AU.

(Relevant screen: CONFIG – Test Volume and Methods – Calculated Tests)

- When all analysis data for calculated tests selected on the calculated test screen are prepared for the sample, the calculated tests shall be calculated and transferred. When any one of the calculated tests has not been measured, or when they have been measured but data calculation is disabled (such as “?”), the calculated tests shall not be transferred.

(5) Sample information for LIH tests

LIH reagent test name	LIH measure	
LIH (exclusive reagent)	All Select	LIH measure shall be performed even on samples, for which sample information received from the host does not contain tests selected for LIH.
	Selectable	LIH measure shall be performed only on samples, for which sample information received from the host contains tests selected for LIH.
Other than LIH (non-exclusive reagent)	All Select	LIH measure shall be performed even on samples, for which sample information received from the host does not contain tests selected for LIH.
	Selectable	LIH measure shall be performed only on samples, for which sample information received from the host contains tests selected for LIH.

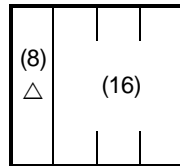
Note: These can be selected on the following screens:

LIH Reagent : CONFIG – Common Test Parameters – Test Name Parameters
LIH Selection : CONFIG – Common Test Parameters – Group of Tests

(6) Calibrator No. format

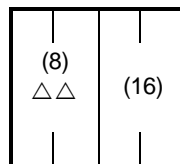
A. The number of digits of calibrator No./control No. is “3”:

The calibrator No. (16) shall edit ‘001’ to ‘200’ and transmit those values.



B. The number of digits of calibrator No./control No. is “2”:

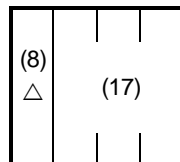
The calibrator No. (16) shall convert 001 to 200 into two-digit numbers as shown in the chart of (8), and transmit those values.



(7) Control No. format

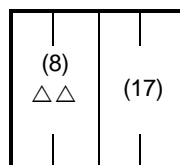
A. The number of digits of calibrator No./control No. is “3”:

The control No. (17) shall edit ‘001’ to ‘100’ and transmit those values.



B. The number of digits of calibrator No./control No. is “2”:

The control No. (17) shall convert 001 to 100 into two-digit numbers as shown in the chart of (8), and transmit those values.



(8) 2-digit conversion chart for calibrator No./control No.

Calibrator No./Control No.	2-digit Number
1 to 99	'01' to '99'
100 to 109	'A0' to 'A9'
110 to 119	'B0' to 'B9'
120 to 129	'C0' to 'C9'
130 to 139	'D0' to 'D9'
140 to 149	'E0' to 'E9'
150 to 159	'F0' to 'F9'
160 to 169	'G0' to 'G9'
170 to 179	'H0' to 'H9'
180 to 189	'I0' to 'I9'
190 to 199	'J0' to 'J9'
200	'K0'

(9) HbA1c measurement for whole blood samples

A. Test selection for sample information response

When HbA1c is selected as a test in the sample information response, only HbA1c% shall be set as a test and transmitted in the message. (The test No. for T-Hb and HbA1c does not need to be set.)

B. Data message output

For Routine/Emergency/STAT/QC samples, only the HbA1c% measure result shall be transferred but no T-Hb and HbA1c results shall be transferred.

For HbA1c% measure result transfer, pretreatment reagent information shall be set in the reagent lot No. and the reagent bottle No. fields. For RB and ACAL samples, only the T-Hb and HbA1c measure results shall be transferred but no HbA1c% result shall be transferred.

(Since the HbA1c% measure result does not exist for RB and ACAL samples, it cannot be transferred.)

4. Lower Layer Communication Protocol

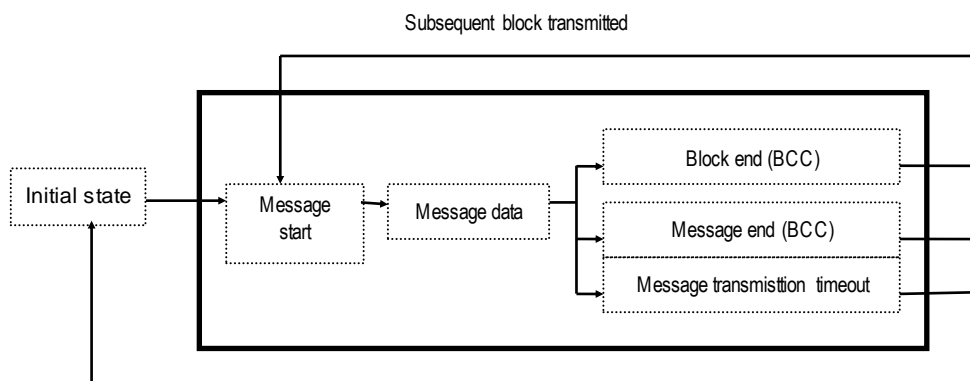
1) Message protocol (at DxC 700 AU)

(1) Class A without ACK/NAK protocol:

a) Transmission

Messages to be transmitted:

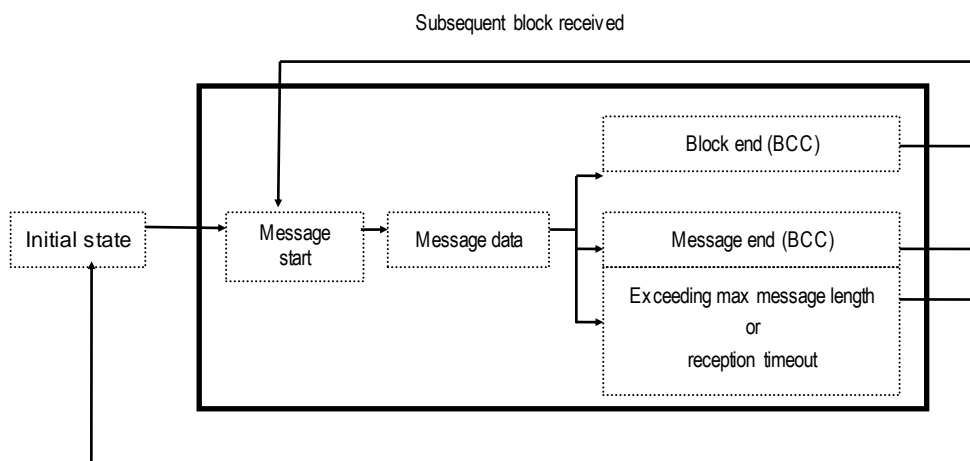
Sample information request start
Sample information request
Sample information request stop
Analysis data transmission start
Analysis data transmission end
Sample data message



4) Reception

Messages to be received:

First run sample information response message
Rerun sample information response message
Sample information response stop

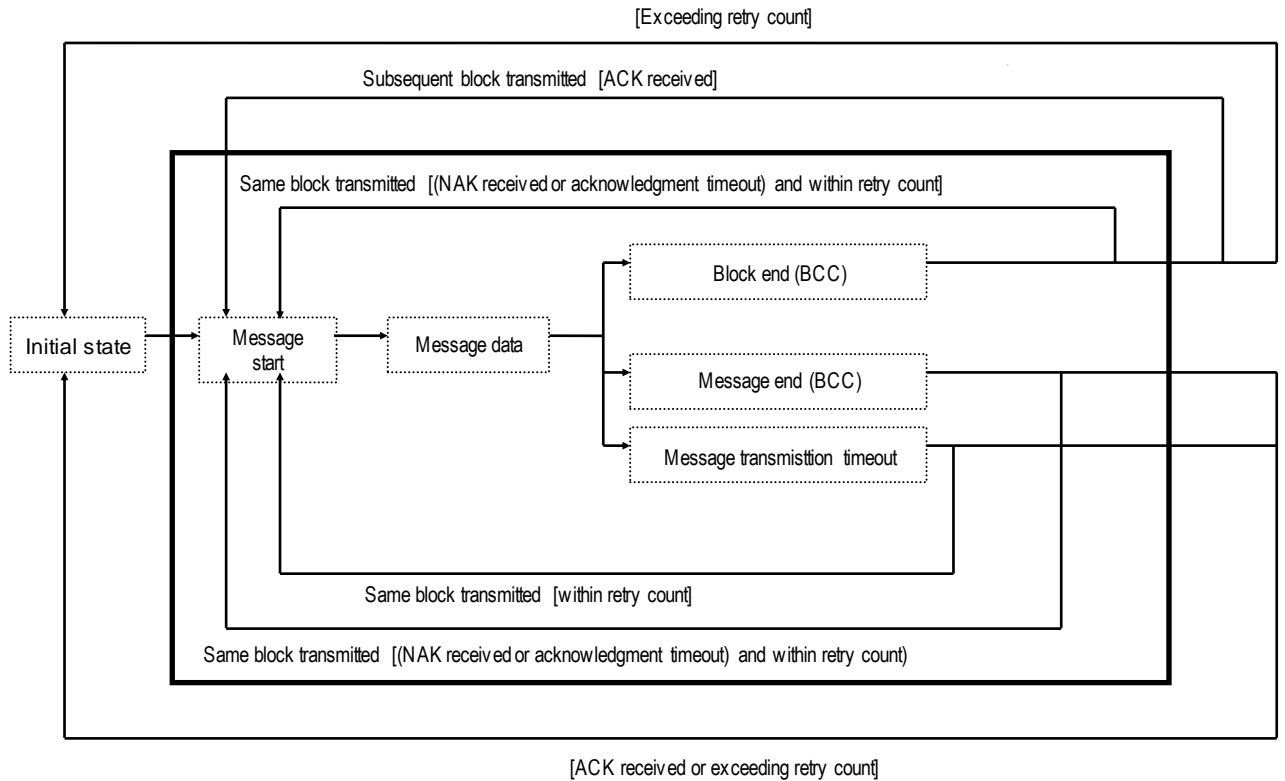


(2) Class B with ACK/NAK protocol:

a) Transmission

Messages to be transmitted:

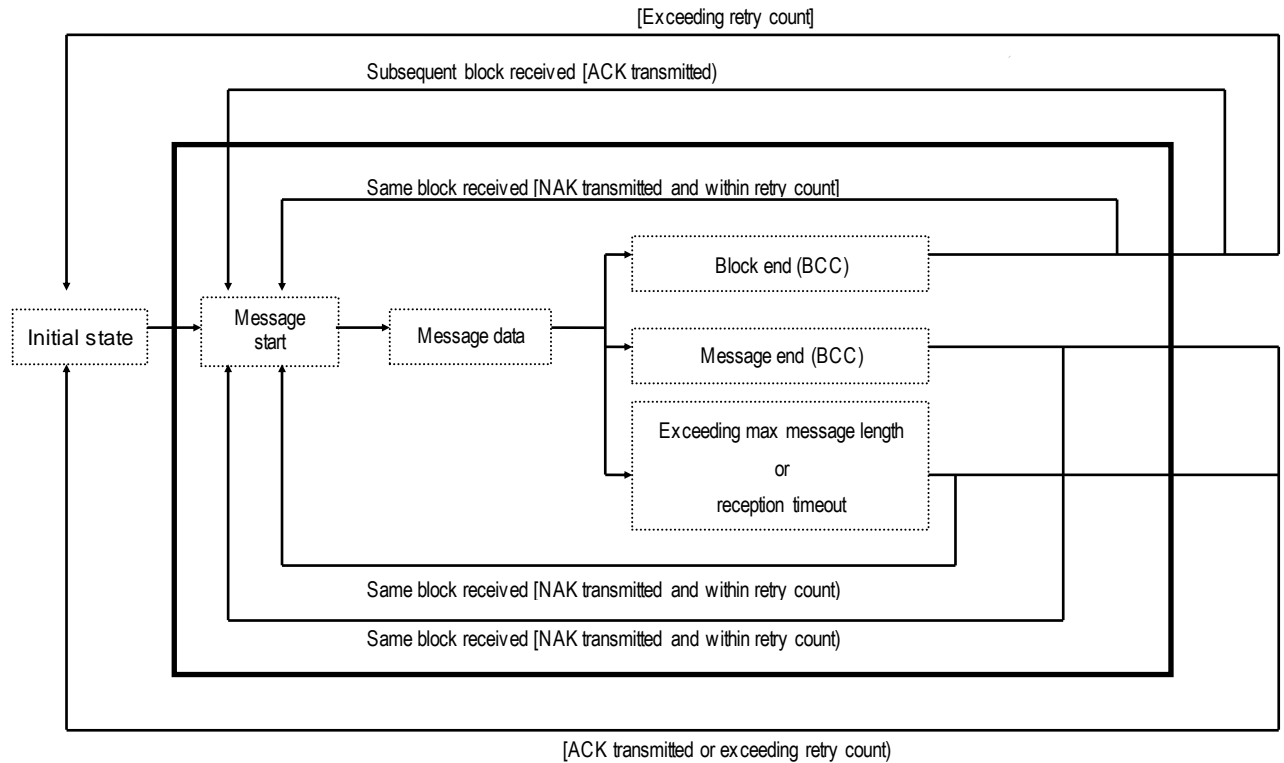
Sample information request start
 Sample information request
 Sample information request stop
 Analysis data transmission start
 Analysis data transmission end
 Sample data message



b) Reception

Messages to be received:

First run sample information response message
 Rerun sample information response message
 Sample information response stop



2) Transmission timeout/timing

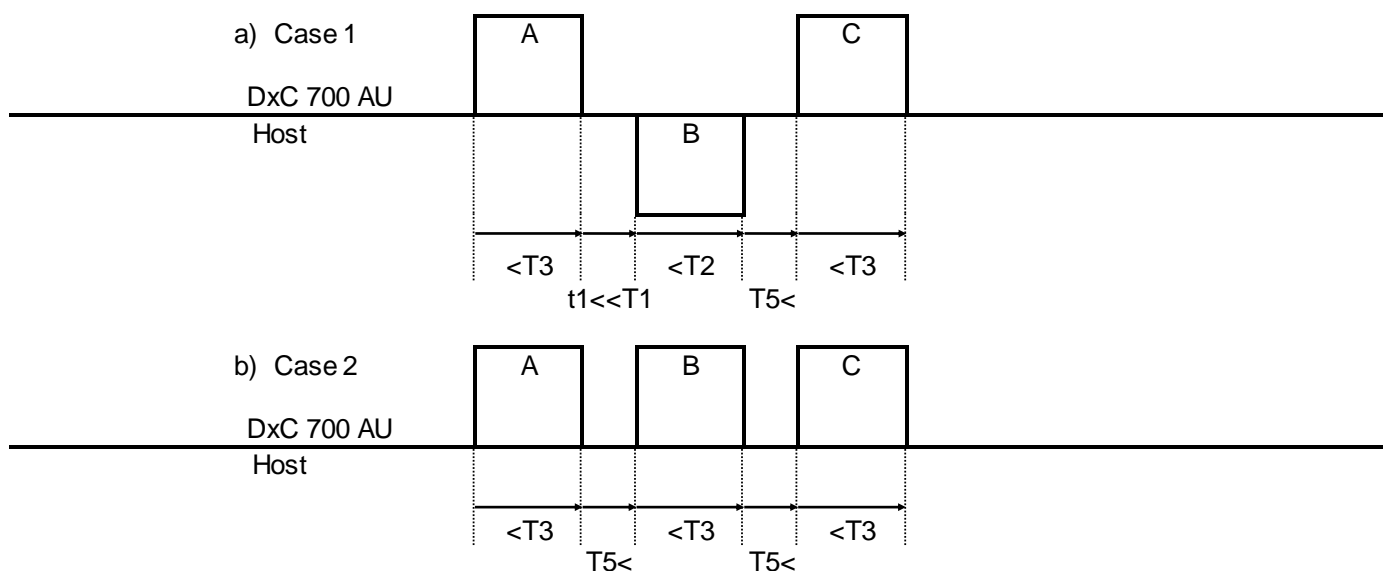
(1) Timeout/timing list

Type ^{*2}	Meaning	Standard Value	Range to be Set
T1	Time-out period from the completion of transmission/reception to the start of message reception	2 seconds	0.1 x n seconds n = 1 to 99
T2	Time-out period from the start to the end of message reception	*1	
T3	Time-out period from the start to the end of message transmission		
T4	Time-out period from the end of message transmission to response reception	2 seconds	
T5	Min period from the completion of message transmission/reception to the start of subsequent message transmission	2 seconds	
T6	Min period from NAC reception to the start of message retransmission	1 second	
T7	Time-out period from NAK transmission to the start of message retransmission	2 seconds	
t1	Min period from the completion of message transmission to the ready for start of subsequent message reception	0.5 seconds	Setting disabled
t2	Min period from the completion of message reception to the ready for start of subsequent message reception	0.5 seconds	
t3	Min period from the end of message transmission to the ready for start of response reception	0.5 seconds	
t4	Min period from the end of message reception to response transmission	0.5 seconds	

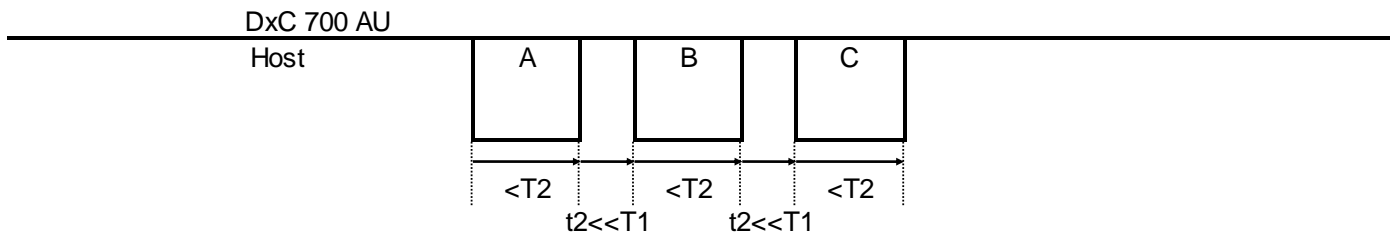
Note 1: ((Max message length x character length)/bit/sec) + 0.5 seconds

Note 2: Types from T1 to T7 can be selected on the [Online] screen.

(2) Rules for class A

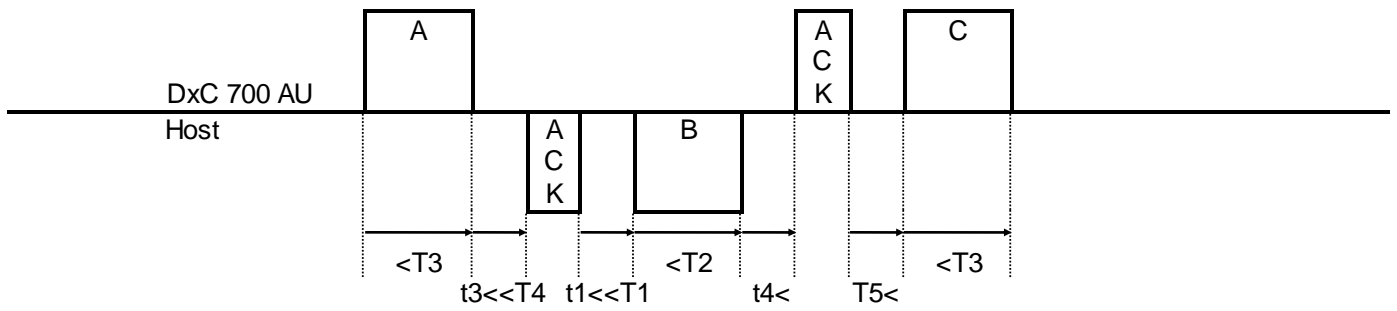


c) Case 3

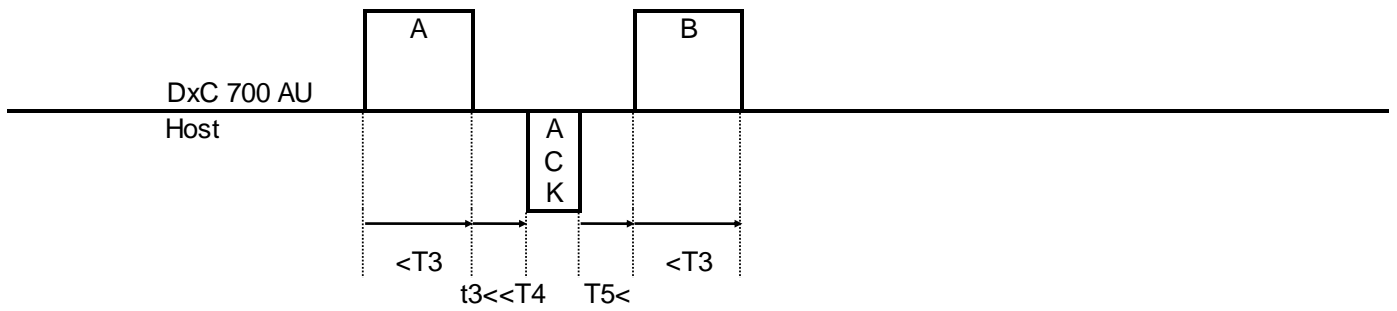


(3) Rules for class B

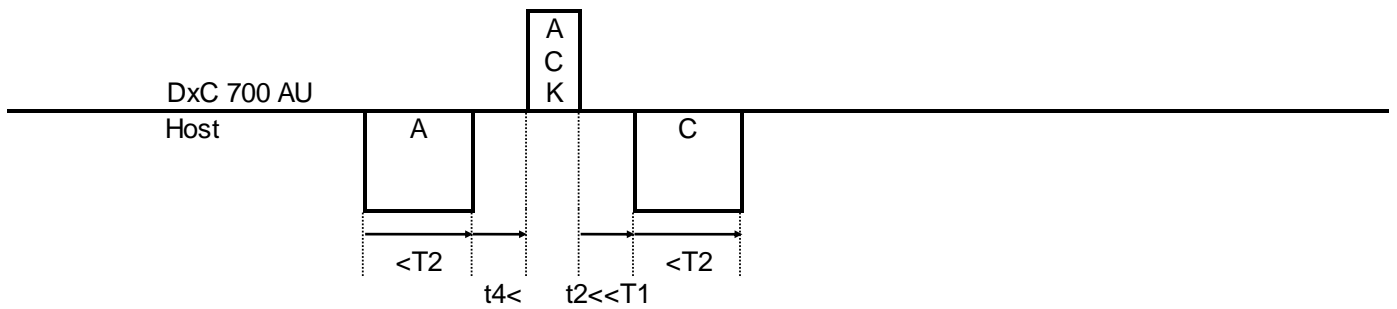
a) Case 1



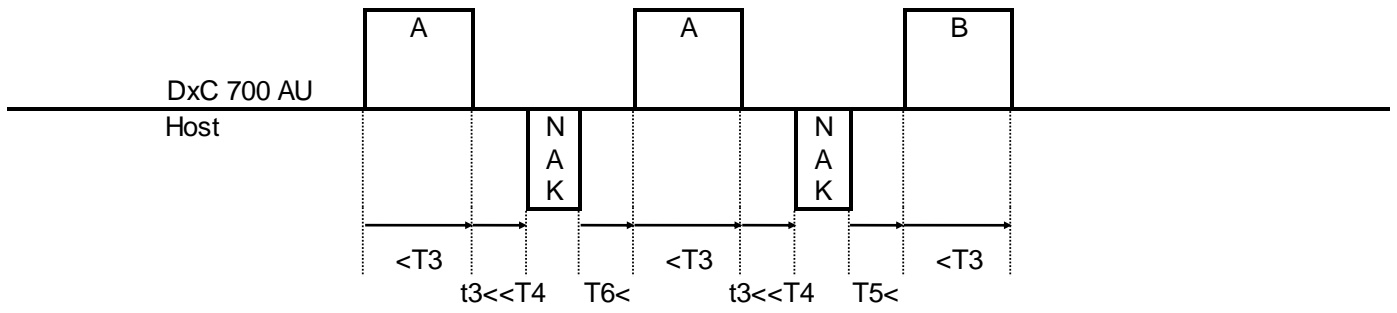
b) Case 2



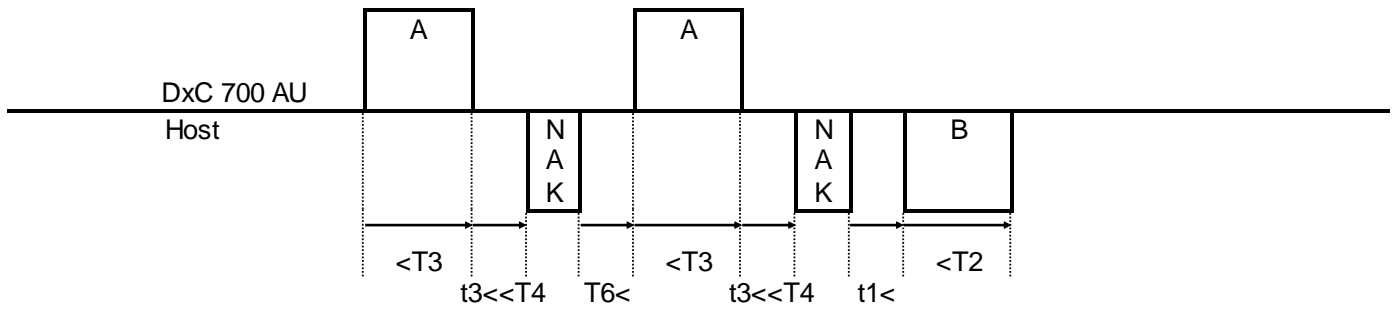
c) Case 3



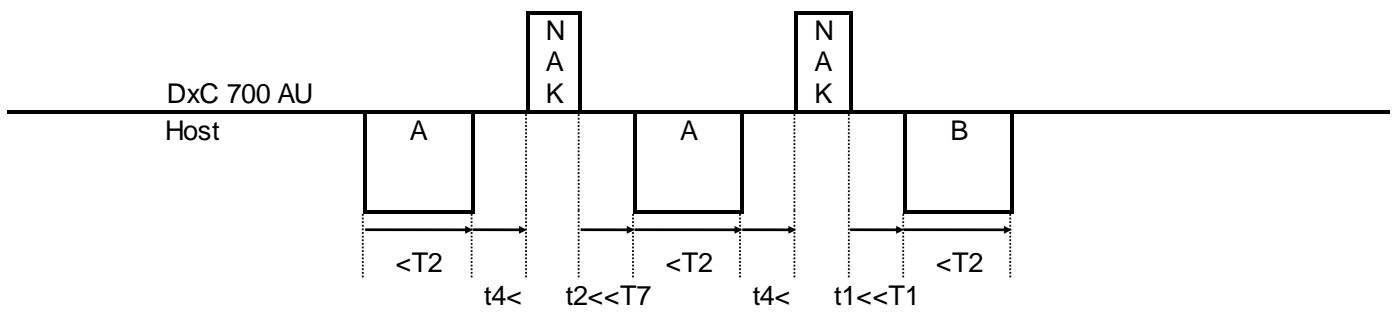
d) Case 4 (NAK response received – 1)



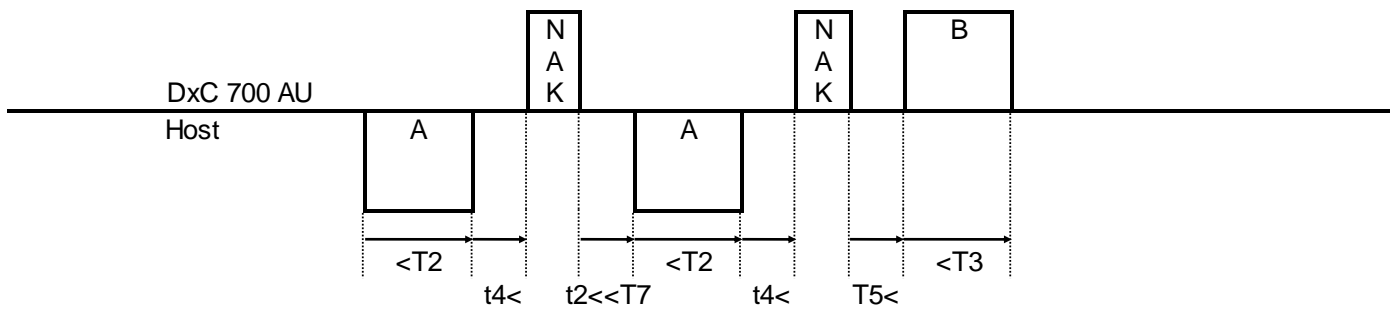
e) Case 5 (NAK response received – 2)



f) Case 6 (abnormal text received – 1)



g) Case 7 (abnormal text received – 2)



5. Upper Layer Communication Protocol

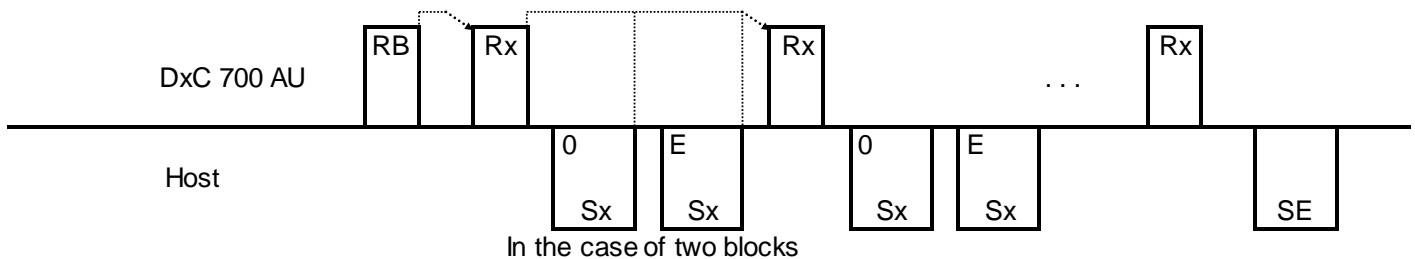
1) Test Requisition Information Receive processing

(1) Message transmission/reception sequence in one session (RB to RE messages)

1) General sequence

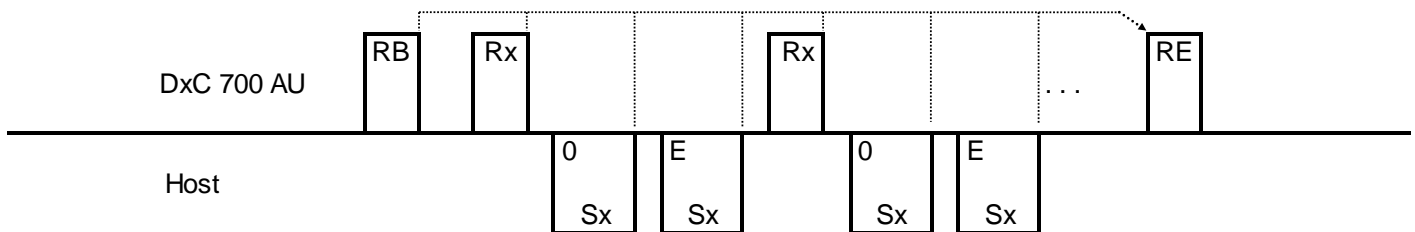
a) Example 1 (when [Continue] is selected in Error Control)

Subsequent Rx shall be continuously transmitted due to an online communication error.



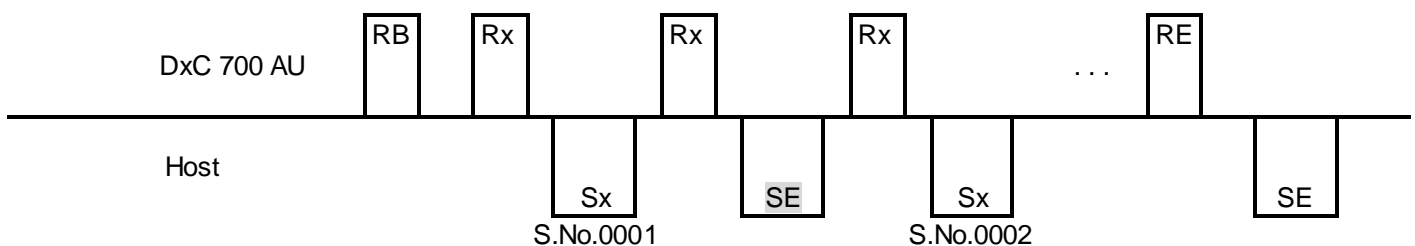
b) Example 2 (when [Stop] is selected in Error Control)

The session shall be cancelled due to an online communication error.



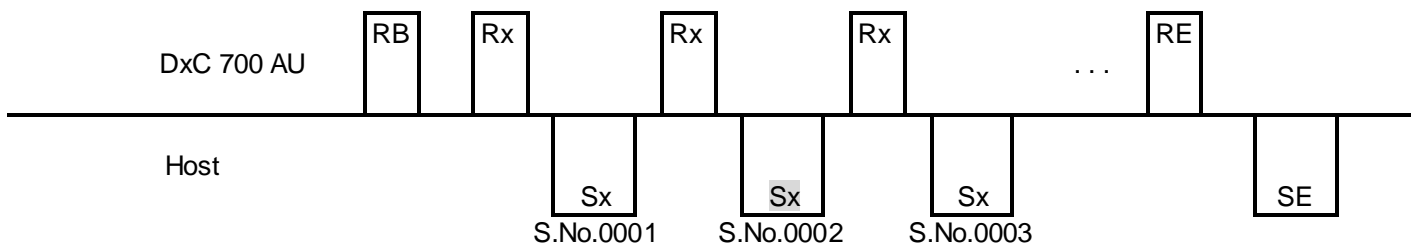
c) Example 3 (when the host has no test requisition information)

• Response in SE message



The sample responded in the SE message shall not be registered by the analyzer.

• Response without test code (no test No. in sample information response)



The sample of S.No.0002 (sample, to which response without test No. was returned) shall be registered as a sample without test requisition information by the analyzer. However, the equipment shall not perform measurement or transfer data for this sample.

2) Detailed processing

Test Requisition Information Receive	Message Type	Transmission/Reception Timing/Conditions
Realtime	RB (Request start)	It shall be transmitted at measure start in STANDBY mode.
	R△ (Request / Normal)	*1 *3
	Sample No. request	It shall be transmitted depending on whether or not to enter sample information about the appropriate No., when a sample cup is detected.
	Sample ID request	It shall be transmitted depending on whether or not to enter sample information about the appropriate ID, when a sample ID is properly read on each cup.
	RH (Request / Rerun)	*3
	Sample No. request	It shall be transmitted regardless of whether or not to enter Rerun sample information about the appropriate sample, when a sample cup is detected.
	Sample ID request	It shall be transmitted regardless of whether or not to enter Rerun sample information about the appropriate sample, when a sample ID is properly read on each cup.
	Sx	It can be received within a specified time after Rx has been transmitted.
	SE	It can be received within a specified time after Rx has been transmitted. (The DXC 700 AU shall continuously inquire subsequent samples.)
	RE (Request end)	It shall be transmitted when the equipment shifts in either of the following operation modes: 1) From OPERATION mode to STANDBY mode 2) From OPERATION mode to STOP mode It shall be transmitted even when communications are disrupted due to an online communication error.
Batch	RB (Request start)	It shall be transmitted when Test Requisition Information Receive processing starts on the [Sample Program Format] screen.
	R△ (Request / Normal)	*1 *4
	Sample No. request	It shall be transmitted for the sample No. in the range specified on the [Sample Program Format] screen, in series at certain intervals.
	RH (Request / Rerun)	*4
	Sample No. request	It shall be transmitted for the sample No. in the range specified on the [Sample Program Format] screen, in series at certain intervals.
	Sx	It can be received within a specified time after Rx has been transmitted.
	SE	It can be received within a specified time after Rx has been transmitted. (The Dx C 700 AU shall continuously inquire subsequent samples.)
	RE (Request end)	It shall be transmitted after the last sample No. specified on the [Sample Program Format] screen has been received, when SE has not been received. It shall be transmitted when the session is forcibly cancelled on the [Sample Program Format] screen. It shall be transmitted even when communications are disrupted due to an online communication error.

Note 1: △ indicates a space.

Note 2: Test Requisition Information Receive and whether or not to receive the information in the event of an error can be set on the [Online] screen.

Note 3: R△ (Request / Normal) and RH (Request / Rerun) may be mixed in the same session and transmitted.

Note 4: R △(Request / Normal) and RH (Request / Rerun) are divided into different sessions and transmitted.

(2) Sample information transmission type

a) First run sample information

Measurement Parameter Settings		Sample Information Request Type	Sample Identification Information used for Transmission/Reception	
Test Requisition Information Receive	Sample Test Requisition		Sample information request	Sample information response
Realtime	Sequential	Sample No. request	Sample No.	Sample No.
	Rack No.		Sample No. (It is calculated according to the rack No. and cup position in the rack.)	
	Sample ID	Sample ID request	Sample ID Sample No. *1	Sample ID Sample No. *1
Batch	Sequential	Sample No. request	Sample No.	Sample No.
	Rack No.			Sample ID Sample No. *1
	Sample ID			

While Test Requisition Information Receive can be set on the [Online] or [Sample Program Format] screen, Test Requisition can be set on the [Analysis mode] screen.

Note1 Set the Sample No. in Sample information response message to the same value as Sample No. in Sample information request message.

b) Rerun sample information

Measurement Parameter Settings		Sample Information Request Type	Sample Identification Information used for Transmission/Reception	
Rerun Test Requisition Information Receive	Sample Test Requisition		Sample information request	Sample information response
Realtime	Sequential	Sample No. request	Sample No.	First run sample No. *1 sample No. *1
	Sample ID	Sample ID request	Sample ID Sample No. *1	Sample ID sample No. *1
Batch	Sequential	Sample No. request	Sample No.	First run sample No. *1
	Sample ID			Sample ID

While Test Requisition Information Receive can be set on the [Online] or [Sample Program Format] screen, Test Requisition can be set on the [Analysis mode] screen.

Note 1: Set the Sample No. and First run sample No. in Sample information response message to the same value as Sample No. in Sample information request message.

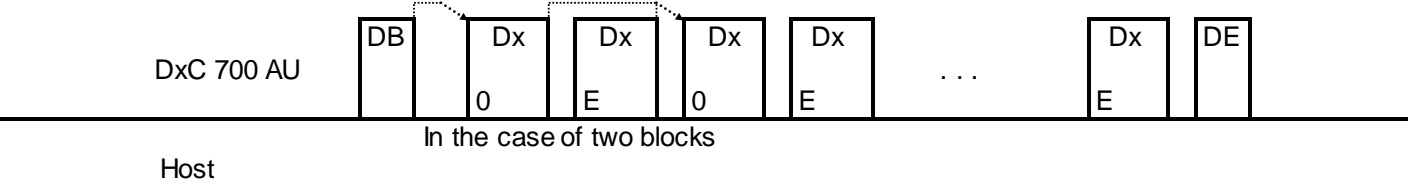
2) Result Transfer processing

(1) Message transmission sequence in one session (DB to DE messages)

1) General sequence

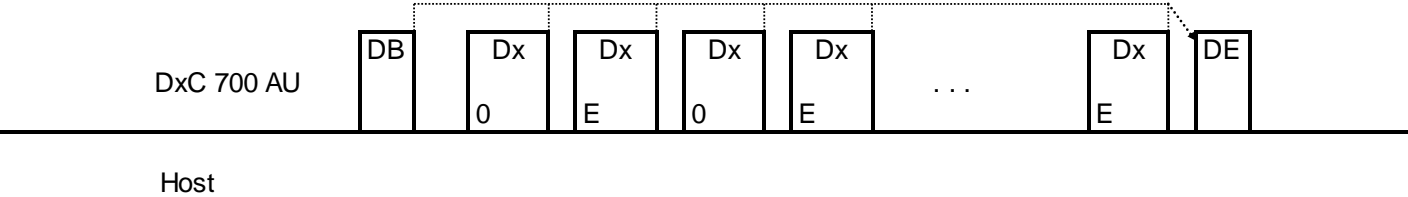
a) Example 1 (when [Continue] is selected in Error Control)

Subsequent Dx shall be continuously transmitted due to an online communication error.



b) Example 1 (when [Stop] is selected in Error Control)

The session shall be cancelled due to an online communication error.



2) Detailed processing

Test Requisition Information Receive	Message Type	Transmission/Reception Timing/Conditions	Normal End Processing	Communication Error Control
Realtime	DB (Transmission start)	It shall be transmitted when the equipment shifts to "MEASURE 1" at measure start in STANDBY mode.	The Result Transfer session shall start and Dx shall be continuously transmitted.	An alarm shall be raised and the following processing shall be done: Results Transfer Error Control *1: Stop -> DE shall be continuously transmitted and the session shall be cancelled.
	Dx (Data transmission)	For analyzed samples, once the analysis results for all accepted test items are ready and DxC 700 AU determines the analysis completion of applicable samples, the data shall be sequentially transmitted.	Subsequent Dx / DE shall be continuously transmitted.	Results Transfer Error Control *1: Continue -> Subsequent Dx / DE shall be continuously transmitted.
	DE (Transmission end)	It shall be transmitted when the DxC 700 AU shifts in either of the following operation modes or subsequently judges all Dx messages to be transmitted have been transmitted: 1) From OPERATION mode to STANDBY 2) From OPERATION mode to STOP It shall be transmitted when the session is cancelled due to an online communication error.	The Result Transfer session shall be terminated.	An alarm shall be raised and the Result Transfer session shall be terminated.

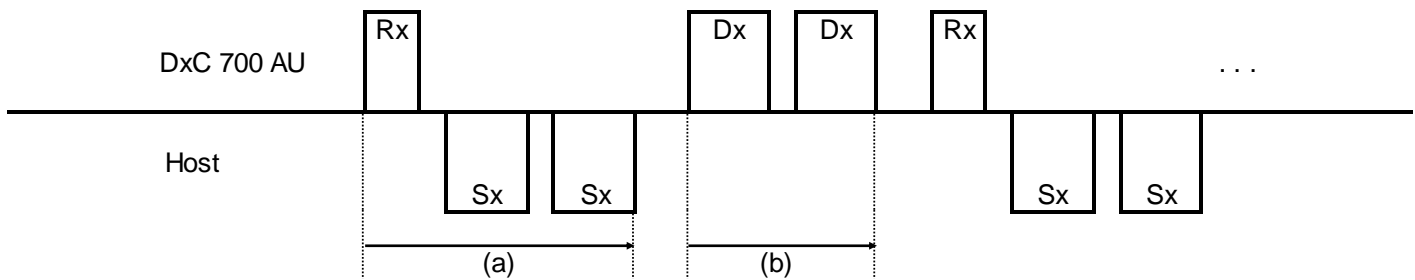
Test Requisition Information Receive	Message Type	Transmission/Reception Timing/Conditions	Normal End Processing	Communication Error Control
Batch	DB (Transmission start)	It shall be transmitted when transmission starts on the [Online] screen.	The Result Transfer session shall start and Dx shall be continuously transmitted.	An alarm shall be raised and the following processing shall be done: Results Transfer Error Control *1: Stop -> DE shall be continuously transmitted and the session shall be cancelled.
	Dx (Data transmission)	It shall be transmitted for the sample in the range specified on the [Online] screen, in series at certain intervals.	Subsequent Dx / DE shall be continuously transmitted.	Results Transfer Error Control *1: Continue -> Subsequent Dx / DE shall be continuously transmitted.
	DE (Transmission end)	It shall be transmitted for the sample in the range specified on the [Online] screen, at certain intervals after the last sample has been transmitted.	The Result Transfer session shall be terminated.	An alarm shall be raised and the Result Transfer session shall be terminated.
		It shall be transmitted when the session is forcibly terminated on the [Online] screen.		
		It shall be transmitted when the session is cancelled due to an online communication error.		

Note1: "Upper Protocol – Results Transfer Error Control" can be selected on the [Online] screen.

3) Other special instructions

(1) Mixing of the Test Requisition Information Receive and Result Transfer sessions

1) General sequence

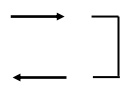


2) Detailed processing

Interval	Definition of Interval	Restriction
(a)	From the start of sample information request transmission to the completion of reception of all blocks composing the sample information response message for the applicable request	No data message shall be transmitted.
(b)	From the start of analysis data transmission to the completion of transmission of all blocks composing the applicable data message	No sample information request shall be transmitted.

6. Connection Specification

1) In/output signals and connection terminals

Signal Name	Abbreviation	DxC 700 AU Terminal No.	Direction
Security ground	FG	-	↔
Transmission data	TxDATA	3	→
Reception data	RxDATA	2	←
Signal ground	SG	5	↔
Transmission request	RTS	7	
Transmission enabled	CTS	8	

Note 1: RTS and CTS shall be always short-circuited.

Note 2: The terminals of Nos., which are not shown above, shall not be connected.

2) Signal level

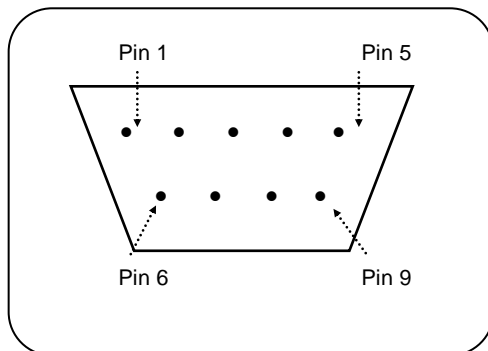
Signal/Signal Format	Signal Level
SPACE (ON)	+3V or higher (HIGH)
MARK (OFF)	-3V or lower (LOW)

3) Connection cable

- 1) The cable between the DxC 700 AU and host is not connected.
- 2) A shielded cable shall be used for connection.
- 3) A 15 m connection cable or shorter shall be used.

4) Connector shape

Connector of the cable at DxC 700 AU: D-SUB 9 Pin female connector



A.1 Appendix: List of Flags

Priority	Flags	Meaning	Remarks
1.	d_	Excluded from QC by user.	
2.	e_	Data edited by user.	
3.	(_	Shortage of detergent for contamination parameters.	
4.	Wa	Result has been analyzed with an erroneous cuvette.	
5.	R_	Insufficient reagent.	
6.	#_	Insufficient sample.	*1)
7.	%_	Clot detected.	*1)
8.	?_	Unable to calculate a result.	
9.	M	Duplicate Sample ID is detected	*1)
10.	n_	LIH test not performed.	
11.	l[Level]	Result may be affected by lipemia (Levels in numbers from 1 to 5).	
12.	i[Level]	Result may be affected by icterus (Levels in numbers from 1 to 5).	
13.	h[Level]	Result may be affected by hemolysis (Levels in numbers from 1 to 5).	
14.	Y_	Reagent blank OD at last photometric point high.	
15.	U_	Reagent blank OD at last photometric point low.	
16.	y_	Reagent blank/routine OD at first photometric point high.	
17.	u_	Reagent blank/routine OD at first photometric point low.	
18.	@_	OD is higher than 3.0.	
19.	\$_	Not enough data to determine linearity of reaction.	
20.	D_	OD of reaction is higher than maximum OD range.	
21.	B_	OD of reaction is lower than minimum OD range.	
22.	*_	Linearity error in rate method.	
23.	&_	Prozone test data is abnormal.	
24.	Z_	Prozone error.	
25.	E_	Overreaction in a rate assay detected.	
26.	Fx	Result (OD) is higher than the Analytical Measuring Range.	
27.	Gx	Result (OD) is lower than the Analytical Measuring Range.	
28.	!_	Unable to calculate concentration.	
29.	)_	Reagent lot no. used at sample analysis is different from that used at calibration analysis.	
30.	a_	Reagent expired.	
31.	ba	Calibration expired.	
32.	bh	No valid calibration used.	
33.	bn	Mastercurve used.	
34.	bz	Calibration curve for Prozone data used.	
35.	F_	Result is higher than the Analytical Measuring Range.	
36.	G_	Result is lower than the Analytical Measuring Range.	
37.	Tx	Result of T-Hb or/and HbA1c is higher than the Analytical Measuring Range.	
38.	ph	Result is higher than the upper panic value.	
39.	pl	Result is lower than the low panic value.	
40.	T_	Abnormality found in inter-chemistry check.	
41.	P_	Positive.	
42.	N_	Negative.	
43.	H_	Result is higher than reference range.	
44.	L_	Result is lower than reference range.	
45.	J_	Result is higher than the rerun decision range.	
46.	K_	Result is lower than the rerun decision range.	

Priority	Flag	Meaning	Remarks
47.	fh	Result is higher than the Rerun reflex range.	
48.	fl	Result is lower than the Rerun reflex range.	
49.	Va	The result of multiple measurement alienation check is NG.	
50.	8Q	QC deviation error.	
51.	xQ	Failure of one control used in a multi-rule QC.	
52.	1Q	QC data exceeds the range entered in the Single Check Level field.	
53.	2Q	QC data exceeds 13S control range.	
54.	3Q	QC data exceeds 22S control range.	
55.	4Q	QC data exceeds R4S control range.	
56.	5Q	QC data exceeds 41S control range.	
57.	6Q	A preset number of consecutive QC results fall on one side of the mean.	
58.	7Q	Consecutive QC results show steadily increasing or decreasing values.	
59.	S_	Sample rerun and first run results replaced by rerun result.	
60.	/_	Test pending or not analyzed.	
61.	r_	Data transmitted to host.	
62.	c_	Data corrected by user.	

*1) The equipment shall not perform automatic Rerun for the sample contained in the first run sample data message, which includes a measure result with any of the flags.
(Automatic Rerun is disabled as a means of saving the reagent because of concerns about sample error.)
However, the equipment transmits an automatic Rerun sample request to the host in order to enter Rerun information. Therefore, be careful when making a response.

A.2 Appendix: Character Code Table (8-bit Code)

High byte Low byte	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL	DLE	(SP)	0	@	P		p				-	タ	ミ		
1	SOH	DC1	!	1	A	Q	a	q			。	ア	チ	ム		
2	STX	DC2	“	2	B	R	b	r			「	イ	ツ	メ		
3	ETX	DC3	#	3	C	S	c	s			」	ウ	テ	モ		
4	EOT	DC4	\$	4	D	T	d	t			、	エ	ト	ヤ		
5	ENQ	NAK	%	5	E	U	e	u			・	オ	ナ	ユ		
6	ACK	SYN	&	6	F	V	f	v			ヲ	カ	ニ	ヨ		
7	BEL	ETB		7	G	W	g	w			ア	キ	ヌ	ラ		
8	BS	CAN	(	8	H	X	h	x			イ	ク	ネ	リ		
9	HT	EM	)	9	I	Y	i	y			ウ	ケ	ノ	ル		
A	LF	SUB	*	:	J	Z	j	z			エ	コ	ハ	レ		
B	VT	ESC	+	;	K	[	k	{			オ	サ	ヒ	ロ		
C	FF	FS	,	<	L	¥	l	|			ヤ	シ	フ	ワ		
D	CR	GS	-	=	M	]	m	}			ユ	ス	ヘ	ン		
E	SO	RS	.	>	N	^	n	~			ヨ	セ	ホ	ゞ		
F	SI	US	/	?	O	_	o	DEL			ッ	ソ	マ	。		

The codes in this area shall be invalid for 7-bit codes.

A.3 Appendix: Online Parameters

Set up	Contents	Menu
Test Requisition Information Receive		
Routine Normal	Realtime / Batch / None	Online
Routine Rerun	Realtime / Batch / None	
Emergency Normal	Realtime / Batch / None	
Emergency Rerun	Realtime / Batch / None	
STAT Normal	Realtime / Batch / None	
STAT Rerun	Realtime / Batch / None	
Result Transfer		
Routine Normal	Realtime / Batch / None	Online
Routine Rerun	Realtime / Batch / None	
Emergency Normal	Realtime / Batch / None	
Emergency Rerun	Realtime / Batch / None	
STAT Normal	Realtime / Batch / None	
STAT Rerun	Realtime / Batch / None	
QC	Realtime / Batch / None	
Calibration	Realtime / Batch / None	
Reagent Blank	Realtime / Batch / None	
STAT Quick	Realtime / None	

Upper Protocol	Contents	Menu
Communication Error Control		
T.R.I Receive Error Control	Continue / Stop	Online
Result Transfer Error Control	Continue / Stop	

Lower Protocol	Contents	Menu
Character Format		
Character Length Parity Bit Stop Bit	7 / 8 Odd / Even / None 1 / 2	Online
Basic Data Format		
Start Code 1 Start Code 2 End Code 1 End Code 2 Text Length Device No. ETB Control	01H to 1FH 00H to 1FH 01H to 1FH 00H to 1FH 256 / 512 / 1024 00-99 Yes / No	Online
Communication Control		
Bit/Sec. Class BCC Check Retry	4800 / 9600 Class A / Class B Yes / No 0 to 3	Online
Timeout		
T1 T2 T3 T4 T5 T6 T7	(1 to 99) (unit: 0.1 sec) (1 to 99) (unit: 0.1 sec) (1 to 99) (unit: 0.1 sec) (1 to 99) (unit: 0.1 sec) (1 to 99) (unit: 0.1 sec) (1 to 99) (unit: 0.1 sec) (1 to 99) (unit: 0.1 sec)	Online

Data Configuration	Contents	Menu
Rack No./Cup pos.	Yes / No	Online
Rack No. Digits	4 / 5	
Type	Yes / No	Online * ¹
Dilution Info. * ²	Yes / No	Online * ¹
Run Date/Time	Yes / No	Online
Reagent Info.	Yes / No	
R1-2 Use	Yes / No	
ISE Info.	Yes / No	
Sex * ²	Yes / No	Sample Program Format
Age * ²	Yes / No	
Other Type * ²	Yes / No	
Patient Information 1 * ²	Yes / No, digits	
Patient Information 2 * ²	Yes / No, digits	
Patient Information 3 * ²	Yes / No, digits	
Patient Information 4 * ²	Yes / No, digits	
Patient Information 5 * ²	Yes / No, digits	
Patient Information 6 * ²	Yes / No, digits	
Sample ID Digits	4 to 26	Online
Zero Suppress	Yes / No	
Online Test No. Digit	2 / 3	Online
Result Digit	6 / 9	Online
No. of Flags	2 / 4	Online
Cal. No./Control No. Digit	2 / 3	Online

Note 1: Messages to which parameter settings are applied are as follows:

	RB	R△	RH	RE	S△	SH	SE	DB	D△	d△	DH	dH	DR	DA	DQ	DE
Type	-	○	x	-	○	x	-	-	○	○	x	x	x	x	x	-
Dilution Info.	-	-	-	-	○	x	-	-	-	-	-	-	-	-	-	-

○: Corresponds to parameter changes

x: Does not correspond to parameter changes

-: Not applicable

Note 2: First run and Rerun sample data messages shall apply. Reagent blank, calibration and QC sample data messages shall not apply.

A.4 DXC 700 AU Online Parameter Sheet

Set up	Contents
Test Requisition Information Receive	
Routine Normal	<input type="checkbox"/> Realtime <input type="checkbox"/> Batch <input type="checkbox"/> None
Routine Rerun	<input type="checkbox"/> Realtime <input type="checkbox"/> Batch <input type="checkbox"/> None
Emergency Normal	<input type="checkbox"/> Realtime <input type="checkbox"/> Batch <input type="checkbox"/> None
Emergency Rerun	<input type="checkbox"/> Realtime <input type="checkbox"/> Batch <input type="checkbox"/> None
STAT Normal	<input type="checkbox"/> Realtime <input type="checkbox"/> Batch <input type="checkbox"/> None
STAT Rerun	<input type="checkbox"/> Realtime <input type="checkbox"/> Batch <input type="checkbox"/> None
Result Transfer	
Routine Normal	<input type="checkbox"/> Realtime <input type="checkbox"/> Batch <input type="checkbox"/> None
Routine Rerun	<input type="checkbox"/> Realtime <input type="checkbox"/> Batch <input type="checkbox"/> None
Emergency Normal	<input type="checkbox"/> Realtime <input type="checkbox"/> Batch <input type="checkbox"/> None
Emergency Rerun	<input type="checkbox"/> Realtime <input type="checkbox"/> Batch <input type="checkbox"/> None
STAT Normal	<input type="checkbox"/> Realtime <input type="checkbox"/> Batch <input type="checkbox"/> None
STAT Rerun	<input type="checkbox"/> Realtime <input type="checkbox"/> Batch <input type="checkbox"/> None
QC	<input type="checkbox"/> Realtime <input type="checkbox"/> Batch <input type="checkbox"/> None
Calibration	<input type="checkbox"/> Realtime <input type="checkbox"/> Batch <input type="checkbox"/> None
Reagent Blank	<input type="checkbox"/> Realtime <input type="checkbox"/> Batch <input type="checkbox"/> None
STAT Quick	<input type="checkbox"/> Realtime <input type="checkbox"/> None <input type="checkbox"/>

Upper Protocol	Contents
Communication Error Control	
T.R.I Receive Error Control	<input type="checkbox"/> Continue <input type="checkbox"/> Stop
Result Transfer Error Control	<input type="checkbox"/> Continue <input type="checkbox"/> Stop

Lower Protocol	Contents
Character Format	
Character Length	<input type="checkbox"/> 7 <input type="checkbox"/> 8
Parity Bit	<input type="checkbox"/> Odd <input type="checkbox"/> Odd <input type="checkbox"/> None
Stop Bit	<input type="checkbox"/> 1 <input type="checkbox"/> 2
Basic Data Format	
Start Code 1	[] (01 to 1F)
Start Code 2	[] (00 to 1F)
End Code 1	[] (01 to 1F)
End Code 2	[] (00 to 1F)
Text Length	<input type="checkbox"/> 256 <input type="checkbox"/> 512 <input type="checkbox"/> 1024
Device No.	[] (00 to 99 / space)
ETB Control	<input type="checkbox"/> Yes <input type="checkbox"/> No
Communication Control	
Bit/Sec	<input type="checkbox"/> 4800 <input type="checkbox"/> 9600
Class	<input type="checkbox"/> Class A <input type="checkbox"/> Class B
BCC Check	<input type="checkbox"/> Yes <input type="checkbox"/> No
Retry	[] (0 to 3)
Timeout	
T1	[] (1 to 99)
T2	[] (1 to 99)
T3	[] (1 to 99)
T4	[] (1 to 99)
T5	[] (1 to 99)
T6	[] (1 to 99)
T7	[] (1 to 99)

Message Info.	Contents	
Rack No./Cup pos.	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Rack No. Digits	<input type="checkbox"/> 4	<input type="checkbox"/> 5
Type	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Dilution Info.	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Run Date/Time	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Reagent Info.	<input type="checkbox"/> Yes	<input type="checkbox"/> No
R1-2 Use	<input type="checkbox"/> Yes	<input type="checkbox"/> No
ISE Info.	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Sex	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Age	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Other Type	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Patient Information 1	<input type="checkbox"/> Yes [] digits	<input type="checkbox"/> No
Patient Information 2	<input type="checkbox"/> Yes <input type="checkbox"/> [] digits	<input type="checkbox"/> No
Patient Information 3	<input type="checkbox"/> Yes <input type="checkbox"/> [] digits	<input type="checkbox"/> No
Patient Information 4	<input type="checkbox"/> Yes <input type="checkbox"/> [] digits	<input type="checkbox"/> No
Patient Information 5	<input type="checkbox"/> Yes <input type="checkbox"/> [] digits	<input type="checkbox"/> No
Patient Information 6	<input type="checkbox"/> Yes <input type="checkbox"/> [] digits	<input type="checkbox"/> No
Sample ID Digits	[] digits (4 to 26)	
Zero Suppress	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Online Test No. Digit	<input type="checkbox"/> 2	<input type="checkbox"/> 3
Result Digit	<input type="checkbox"/> 6	<input type="checkbox"/> 9
No. of Flags	<input type="checkbox"/> 2	<input type="checkbox"/> 4
Cal. No./Control No. Digit	<input type="checkbox"/> 2	<input type="checkbox"/> 3

A.5 Alarm List related to Online Communication

(1) Alarm No. 6031: ONLINE ERROR (aa) (bb cc dddd ee)

[Processing on the equipment when this alarm is raised]

- (1) When [Stop] is selected in T.R.I Receive Error Control on the [Online] screen, the equipment shall perform the following:
 - 1) The equipment shall stop subsequent Test Requisition Information Receive processing.
 - 2) When the equipment is performing real-time Test Requisition Information Receive processing during measure, the stopped Test Requisition Information Receive state shall remain until the measure is finished. However, when the next measure start is performed, the equipment shall clear the state and perform real-time Test Requisition Information Receive processing again.
- (2) When [Continue] is selected in T.R.I Receive Error Control on the [Online] screen, the equipment shall continuously perform Test Requisition Information Receive processing for subsequent samples:

[Details of the alarm]

- (1) A communication error occurred when the equipment transmitted a sample information request or received a sample information response message online.
- (2) The code contents in brackets and their meanings are as shown below:

aa	Error type	01	Device name error
		02	Framing error
		03	Overrun error
		04	Parity error
		05	Timeout error
		06	NAK received during message transmission
		07	BCC error during message reception
		08	Other communication error
		09	Function error
		10	Unit name error
		11	Parameter error
		12	Request cancelled
bb	Message type	R□	Sample information request-related
		S□	Sample information response-related
		D□	Analysis data-related
cc	Sample/body fluid type	△△	Serum Routine sample
		△E	Serum Emergency sample
		U△	Urine Routine sample
		UE	Urine Emergency sample
		X△	Other 1 Routine sample
		XE	Other 1 Emergency sample
dddd	Sample No. or sample ID		
ee	Timeout factor	T1	Time-out time from completion of transmission or reception until start of message reception
		T2	Reception time-out
		T3	Transmission time-out
		T4	Response reception time-out from transmission completion
		T7	Time-out until reception restart

(2) Alarm No. 6032: ONLINE FORMAT ERROR (without Sample ID)

[Processing on the equipment when this alarm is raised]

- (1) The equipment shall discard the sample information response message received online.
- (2) The equipment shall continue online Test Requisition Information Receive processing.

[Details of the alarm]

- (1) When a sample information response message was received online, necessary information was not set to "Yes" in parameters specifying the message format.

(3) Alarm No. 6033: ONLINE INVALID TEXT CODE (aa)

[Processing on the equipment when this alarm is raised]

- (1) When [Stop] is selected for "Test Requisition Information Receive" in "Error Control" on the [Online] screen, the equipment shall perform the following:
 - 1) The equipment shall discard the sample information response message received online.
 - 2) The equipment shall stop subsequent Test Requisition Information Receive processing.
 - 3) When the equipment is performing real-time Test Requisition Information Receive processing during measure, the stopped Test Requisition Information Receive state shall remain until the measure is finished. However, when the next measure start is performed, the equipment shall clear the state and perform real-time Test Requisition Information Receive processing again.
- (2) When [Continue] is selected for "Test Requisition Information Receive" in "Error Control" on the [Online] screen, the equipment shall perform the following:
 - 1) The equipment shall discard the sample information response message received online.
 - 2) The equipment shall continuously perform Test Requisition Information Receive processing for subsequent samples.

[Details of the alarm]

- (1) When a sample information response message was received online, the message identification code was not within the specified range.
- (2) The code contents in brackets and their meanings are as shown below:

aa	Type of sample information request message DxC 700 AU transmitted before receiving a message	R△	First run sample request
		RH	Rerun sample request

(4) Alarm No. 6034: ONLINE INVALID TEXT BLOCK No. (aa <-> bb)

[Processing on the equipment when this alarm is raised]

- (1) When [Stop] is selected for “Test Requisition Information Receive” in “Error Control” on the [Online] screen, the equipment shall perform the following:
 - 1) The equipment shall discard the sample information response message received online.
 - 2) The equipment shall stop subsequent Test Requisition Information Receive processing.
 - 3) When the equipment is performing real-time Test Requisition Information Receive processing during measure, the stopped Test Requisition Information Receive state shall remain until the measure is finished. However, when the next measure start is performed, the equipment shall clear the state and perform real-time Test Requisition Information Receive processing again.
- (2) When [Continue] is selected for “Test Requisition Information Receive” in “Error Control” on the [Online] screen, the equipment shall perform the following:
 - 1) The equipment shall discard the sample information response message received online.
 - 2) The equipment shall continuously perform Test Requisition Information Receive processing for subsequent samples.

[Details of the alarm]

- (1) When a sample information response message was received online, the block identification No. contained in the message was determined not to be within the specified range.
- (2) The code contents in brackets and their meanings are as shown below:

aa	Block identification No. in the message received last time
bb	Block identification No. in the message last received

(5) Alarm No. 6035: ONLINE INVALID SAMPLE NO. (aa bbbb) cccccc

[Processing on the equipment when this alarm is raised]

- (1) The equipment shall discard the sample information response message received online.
- (2) The equipment shall continue online Test Requisition Information Receive processing.

[Details of the alarm]

- (1) When a sample information response message was received online, the sample No. contained in the message was not within the specified range.
- (2) The code contents in brackets and their meanings are as shown below:

aa	Sample/body fluid type	△△	Serum First run sample
		△U	Urine First run sample
		△X	Other 1 First run sample
		△Y	Other 2 First run sample
		△W	Whole blood First run sample
		H△	Serum Rerun sample
		HU	Urine Rerun sample
		HX	Other 1 Rerun sample
		HY	Other 2 Rerun sample
		HW	Whole blood Rerun sample
bbbb	Sample No.	0001-9999	Routine sample
		E001-E999	Emergency sample
		P001-P999	STAT sample
ccccc	Sample ID		

(6) Alarm No. 6036: ONLINE INVALID RACK NO. (aa bbbb : cccc-dd) eeeee

[Processing on the equipment when this alarm is raised]

- (1) The equipment shall discard the sample information response message received online.
- (2) The equipment shall continue online Test Requisition Information Receive processing.

[Details of the alarm]

- (1) When a sample information response message was received online, the rack No. or position in the rack contained in the message was not within the specified range.
- (2) The code contents in brackets and their meanings are as shown below:

aa	Sample/body fluid type	△△	Serum First run sample
		△U	Urine First run sample
		△X	Other 1 First run sample
		△Y	Other 2 First run sample
		△W	Whole blood First run sample
		H△	Serum Rerun sample
		HU	Urine Rerun sample
		HX	Other 1 Rerun sample
		HY	Other 2 Rerun sample
		HW	Whole blood Rerun sample
bbbb	Sample No.	0001-9999	Routine sample
		E001-E999	Emergency sample
		P001-P999	STAT sample
cccc	Rack No. in the message received		
dd	Position in the rack in the message received		
eeeeee	Sample ID		

(7) Alarm No. 6037: ONLINE INVALID SEX TEXT (aa bbbb : cc) dddddd

[Processing on the equipment when this alarm is raised]

- (1) The equipment shall discard the sample information response message received online.
- (2) The equipment shall continue online Test Requisition Information Receive processing.

[Details of the alarm]

- (1) When a sample information response message was received online, the patient sex contained in the message was not within the specified range.

(2) The code contents in brackets and their meanings are as shown below:

aa	Sample/body fluid type	△△	Serum First run sample
		△U	Urine First run sample
		△X	Other 1 First run sample
		△Y	Other 2 First run sample
		△W	Whole blood First run sample
		H△	Serum Rerun sample
		HU	Urine Rerun sample
		HX	Other 1 Rerun sample
		HY	Other 2 Rerun sample
		HW	Whole blood Rerun sample
bbbb	Sample No.	0001-9999	Routine sample
		E001-E999	Emergency sample
		P001-P999	STAT sample
cc	Patient sex in the message received		
dddddd	Sample ID		

(8) Alarm No. 6038: ONLINE INVALID AGE/MONTH (aa bbbb : ccc dd) eeeee

[Processing on the equipment when this alarm is raised]

- (1) The equipment shall discard the sample information response message received online.
- (2) The equipment shall continue online Test Requisition Information Receive processing.

[Details of the alarm]

- (1) When a sample information response message was received online, the years or months contained in the message was not within the specified range.
- (2) The code contents in brackets and their meanings are as shown below:

aa	Sample/body fluid type	△△	Serum First run sample
		△U	Urine First run sample
		△X	Other 1 First run sample
		△Y	Other 2 First run sample
		△W	Whole blood First run sample
		H△	Serum Rerun sample
		HU	Urine Rerun sample
		HX	Other 1 Rerun sample
		HY	Other 2 Rerun sample
		HW	Whole blood Rerun sample
bbbb	Sample No.	0001-9999	Routine sample
		E001-E999	Emergency sample
		P001-P999	STAT sample
ccc	Years in the message received		
dd	Months in the message received		
eeeeee	Sample ID		

(9) Alarm No. 6039: ONLINE ANALYSIS METHOD MISMATCH (aa bbbb : cc <> dd) eeeee

[Processing on the equipment when this alarm is raised]

- (1) The equipment shall discard the sample information response message received online.
- (2) The equipment shall continue online Test Requisition Information Receive processing.

[Details of the alarm]

- (1) When a sample information response message was received online, the measure type contained in the message was not consistent with the requested data.
- (2) The code contents in brackets and their meanings are as shown below:

aa	Sample/body fluid type	△△	Serum First run sample
		△U	Urine First run sample
		△X	Other 1 First run sample
		△Y	Other 2 First run sample
		△W	Whole blood First run sample
		H△	Serum Rerun sample
		HU	Urine Rerun sample
		HX	Other 1 Rerun sample
		HY	Other 2 Rerun sample
		HW	Whole blood Rerun sample
bbbb	Sample No.	0001-9999	Routine sample
		E001-E999	Emergency sample
		P001-P999	STAT sample
cc	Type of message transmitted	R△	First run sample request
		RH	Rerun sample request
dd	Type of message received	S△	First run sample information
		SH	Rerun sample information
eeeeee	Sample ID		

(10) Alarm No. 6040: ONLINE SAMPLE NO. MISMATCH (aa bbbb <> cc dddd) eeeee

[Processing on the equipment when this alarm is raised]

- (1) The equipment shall discard the sample information response message received online.
- (2) The equipment shall continue online Test Requisition Information Receive processing.

[Details of the alarm]

- (1) When a sample information response message was received online, the sample No. contained in the message was not consistent with the requested data.
- (2) The code contents in brackets and their meanings are as shown below:

aa	Sample/body fluid type in the message transmitted	△△	Serum First run sample
		△U	Urine First run sample
		△X	Other 1 First run sample
		△Y	Other 2 First run sample
		△W	Whole blood First run sample
		H△	Serum Rerun sample
		HU	Urine Rerun sample
		HX	Other 1 Rerun sample
		HY	Other 2 Rerun sample
		HW	Whole blood Rerun sample
bbbb	Sample No.	0001-9999	Routine sample
		E001-E999	Emergency sample
		P001-P999	STAT sample
cc	Sample/body fluid type in the message received	△△	Serum First run sample
		△U	Urine First run sample
		△X	Other 1 First run sample
		△Y	Other 2 First run sample
		△W	Whole blood First run sample
		H△	Serum Rerun sample
		HU	Urine Rerun sample
		HX	Other 1 Rerun sample
		HY	Other 2 Rerun sample
		HW	Whole blood Rerun sample
dddd	Sample No.	0001-9999	Routine sample
		E001-E999	Emergency sample
		P001-P999	STAT sample
eeeeee	Sample ID		

(11) Alarm No. 6041: ONLINE RACK NO. MISMATCH (aa bbbb : cccc-dd <> eeee-ff) gggggg

[Processing on the equipment when this alarm is raised]

- (1) The equipment shall discard the sample information response message received online.
- (2) The equipment shall continue online Test Requisition Information Receive processing.

[Details of the alarm]

- (1) When a sample information response message was received online, the rack No. or position in the rack contained in the message was not consistent with the requested data.
- (2) The code contents in brackets and their meanings are as shown below:

aa	Sample/body fluid type	△△	Serum First run sample
		△U	Urine First run sample
		△X	Other 1 First run sample
		△Y	Other 2 First run sample
		△W	Whole blood First run sample
		H△	Serum Rerun sample
		HU	Urine Rerun sample
		HX	Other 1 Rerun sample
		HY	Other 2 Rerun sample
		HW	Whole blood Rerun sample
bbbb	Sample No.	0001-9999	Routine sample
		E001-E999	Emergency sample
		P001-P999	STAT sample
cccc	Rack No. in the message transmitted		
dd	Position in the rack in the message transmitted		
eeee	Rack No. in the message received		
ff	Position in the rack in the message received		
eeeeee	Sample ID		

(12) Alarm No. 6042: ONLINE MISMATCH aaaaaa <> bbbbbb)

[Processing on the equipment when this alarm is raised]

- (1) The equipment shall discard the sample information response message received online.
- (2) The equipment shall continue online Test Requisition Information Receive processing.

[Details of the alarm]

- (1) When a sample information response message was received online, the sample ID contained in the message was not consistent with the requested data.
- (2) The code contents in brackets and their meanings are as shown below:

aaaaaa	Sample ID in the message transmitted
bbbbbb	Sample ID in the message received

(13) Alarm No. 6043: ONLINE TEST ITEM ERROR (aa bbbb) cccccc ddd

[Processing on the equipment when this alarm is raised]

- (1) The erroneous tests in the corresponding samples shall not be registered as test items.
- (2) The equipment shall continue online Test Requisition Information Receive processing.

[Details of the alarm]

- (1) When a sample information response message was received online, a test was determined to be an error for one of the following reasons:
 - 1) The test item No. in the message was not set in the online test No. (online parameters).
 - 2) For the tests in the Rerun sample information response message received, the value set for the sample measure method was not within the specified range.

- (2) The code contents in brackets and their meanings are as shown below:

aa	Sample/body fluid type	△△	Serum First run sample
		△U	Urine First run sample
		△X	Other 1 First run sample
		△Y	Other 2 First run sample
		△W	Whole blood First run sample
		H△	Serum Rerun sample
		HU	Urine Rerun sample
		HX	Other 1 Rerun sample
		HY	Other 2 Rerun sample
		HW	Whole blood Rerun sample
		△△	Serum First run sample
bbbb	Sample No.	0001-9999	Routine sample
		E001-E999	Emergency sample
		P001-P999	STAT sample
ccccc	Sample ID		
ddd	Online test No.		

(14) Alarm No. 6044: ONLINE RERUN ITEM ERROR (aa bbbb)

[Processing on the equipment when this alarm is raised]

- (1) The equipment shall discard the Rerun sample information response message received online.
- (2) The equipment shall continue online Rerun Test Requisition Information Receive processing.

[Details of the alarm]

- (1) When a Rerun sample information response message was received online, a Rerun sample was not registered for one of the following reasons:
 - 1) The rerun sample specified in the message was processing.
- (2) The code contents in brackets and their meanings are as shown below:

aa	Sample/body fluid type	△△	Serum First run sample
		△U	Urine First run sample
		△X	Other 1 First run sample
		△Y	Other 2 First run sample
		△W	Whole blood Rerun sample
		H△	Serum Rerun sample
		HU	Urine Rerun sample
		HX	Other 1 Rerun sample
		HY	Other 2 Rerun sample
		HW	Whole blood Rerun sample
bbbb	Sample No.	0001-9999	Routine sample
		E001-E999	Emergency sample
		P001-P999	STAT sample

(15) Alarm No. 6045: ONLINE INVALID OTHER TYPE (aa bbbb : c) dddddd

[Processing on the equipment when this alarm is raised]

- (1) The equipment shall discard the sample information response message received online.
- (2) The equipment shall continue online Test Requisition Information Receive processing.

[Details of the alarm]

- (1) When a sample information response message was received online, the other type contained in the message was not within the specified range.
- (2) The code contents in brackets and their meanings are as shown below:

aa	Sample/body fluid type	△△	Serum First run sample
		△U	Urine First run sample
		△X	Other 1 First run sample
		△Y	Other 2 First run sample
		△W	Whole blood First run sample
		H△	Serum Rerun sample
		HU	Urine Rerun sample
		HX	Other 1 Rerun sample
		HY	Other 2 Rerun sample
		HW	Whole blood Rerun sample
bbbb	Sample No.	0001-9999	Routine sample
		E001-E999	Emergency sample
		P001-P999	STAT sample
c	Other Type in the message received		
ddddd	Sample ID		

A.6 Comparison of AU680 and DxC 700 AU

No.	Difference	AU680	DxC 700 AU	Remarks
1	Handling of rerun samples	<p>1) When samples are run using orange racks, or samples already analyzed as STAT samples are re-run, they shall be handled as the message identification codes of "RH" and "SH".</p> <p>2) Auto rerun samples shall be handled as "Rh" and "Sh".</p> <p>3) First run sample numbers and rerun sample numbers are not the always same value. Host computers will need to memorize first run sample numbers, which will need to be set for sample information messages of rerun samples.</p>	<p>1) When samples already analyzed using white racks or red racks, or as STAT samples are rerun, they shall be handled as the message identification codes of "RH" and "SH".</p> <p>2) Auto rerun samples shall be handled as "Rh" and "Sh".</p> <p>3) First run sample numbers and rerun sample numbers are the always same value. Host computers will not need to memorize any first run sample numbers. Set the same values for rerun sample numbers and first run sample numbers.</p>	There are no differences in the message format from that of AU680.
2	Batch sending in real-time transit	No batch sending will be started in real-time transit.	Batch sending will be able to be started in real-time transit	
3	Sample Type	<p>[System Maintenance] - [Setup Parameters] - [SystemParameter1] - [For Inquiry] - [Sample Kind Mix.] - "Unity" allowed shall be the default setting for the instrument.</p> <p>The instrument will set and send specified sample type in "First run sample request message".</p>	<p>[System Maintenance] - [Setup Parameters] - [SystemParameter1] - [For Inquiry] - [Sample Kind Mix.] - "Mix" allowed shall be the default setting for the instrument.</p> <p>The instrument, when no sample types can be specified, will set and send "Not specified: 'N'" in "First run sample request message". Reply with any one of other specified sample types than "Not specified" set on the host computer.</p> <p>When samples are analyzed using racks, the settings of "Mix" and "Unity" of [System Maintenance] - [Setup Parameters] - [SystemParameter1] - [For Inquiry] - [Sample Kind Mix.] allowed will be selectable. However, when samples are analyzed as STAT samples, "Mix" allowed shall be fixed.</p>	The host computer which was used with AU680 may be unable to communicate with DxC 700 AU when [Online] - [Setup] - [Test Order Information Receive] - [STAT First-Run] is set to "Realtime".

No.	Difference	AU680	DxC 700 AU	Remarks
4	Other Type	Not used	<p>If set to “used” on the [Sample Program Format] screen, it is required on sample information messages from host computers and it will be output onto analysis data messages.</p> <p>The instrument, according to the information of the other type, will conduct the set range checking on the [Range] screen of conditions per analysis item. If any abnormal checking result, an analysis data message with error flags added will be sent to host computers. If any no abnormal checking result, an analysis data message containing the result with no error flags added will be sent to host computers.</p>	<p>This information will be used when range checking is desired per animal type at veterinary hospitals.</p> <p>By setting up [Sample Program Format] - [Other Type] to uncheck, it can communicate in the same format as AU680.</p>
5	Run Date/Time	Not used	<p>If set to “used” on the [Online] screen, it will be output onto analysis data messages.</p> <p>The output descriptions will include the termination time of sample measurements. All sample kinds shall be targeted.</p>	<p>By setting up [Online] - [Format Configuration] - [Run Date/Time] to uncheck, it can communicate in the same format as AU680.</p>
6	ISE Info.	Not used	<p>If set to “used” on the [Online] screen, it will be output onto analysis data messages.</p> <p>The output descriptions will include ISE reagent lot numbers and ISE electrode lot Numbers.</p>	<p>By setting up [Online] - [Format Configuration] - [ISE Info.] to uncheck, it can communicate in the same format as AU680.</p>

DxC 700 AU Online Specification Revision History Table

Version flag A: Analyzer, B: Parts, S: Program, V: Document version number

DATE	DESCRIPTION	PAGE	CHANGE METHOD	VERSION	CONFIRM
24. Aug, 2016	New publication	All page		1 st Edition	