AU5800

Online Specification

4th Edition issued on: 2011.08.18

Beckman Coulter K.K.

Table of Contents

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 AU5800 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 AU5800):

   (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 AU5800:

   (1) Upper and lower layer communication protocols
   (2) Sample information response message format
   (3) Data message format

2. Basic Specification

1) Format of transmission

<table>
<tr><th>Item</th><th>Contents</th></tr>
<tr><td>Line Type</td><td>RS-232C</td></tr>
<tr><td>Synchronization Method</td><td>Asynchronous method</td></tr>
<tr><td>Data Transfer Mode</td><td>Half-duplex</td></tr>
<tr><td>Bit/Sec</td><td>4800 bps, 9600 bps</td></tr>
<tr><td>Character Format</td><td><table><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>The above conditions can be selected on the [Online] screen.</td></tr>
<tr><td rowspan="2">Confirmation Method</td><td>Class A: Message transmission is conducted from the sender to the receiver at regular intervals.</td></tr>
<tr><td>Class B: Message transmission is conducted by confirming with ACK (acknowledged) or NAK (not acknowledged) between the sender and the receiver.</td></tr>
<tr><td>Channel</td><td>1 channel (COM 1)</td></tr>
<tr><td>Retry</td><td>Class A: Nothing
Class B: Retry times from 0 to 3 (can be selected on the [Online] screen)</td></tr>
</table>

2) Transmission code

<table>
<tr><th>Item</th><th colspan="2">Contents</th><th colspan="2">Value Range</th></tr>
<tr><td rowspan="5">Data Code</td><td colspan="2">7 bit code</td><td colspan="2">20H-7EH</td></tr>
<tr><td colspan="2">8 bit code</td><td colspan="2"></td></tr>
<tr><td rowspan="3"></td><td>1 byte code
(JIS code)</td><td colspan="2">20H-7EH
A1H-DFH</td></tr>
<tr><td rowspan="2">2 byte code
(Shift-JIS code)</td><td>(1st byte)</td><td>81H-9FH
E1H-EAH</td></tr>
<tr><td>(2nd byte)</td><td>40H-FCH
(except 7FH)</td></tr>
<tr><td rowspan="4">Control Code</td><td colspan="2">Message start/end code</td><td colspan="2">01H-1FH</td></tr>
<tr><td colspan="2">ACK</td><td colspan="2">06H</td></tr>
<tr><td colspan="2">NAK</td><td colspan="2">15H</td></tr>
<tr><td colspan="2">BCC</td><td colspan="2">00H-FFH</td></tr>
</table>

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	AU5800
		RB	Sample information request start	–> Host
		R△	Normal sample (Routine/Emergency) request	
		RH	Repeat run sample (Routine/Emergency) request	
		Rh	Automatic repeat run sample (Routine/Emergency) request	
		RE	Sample information request end	
		S□	Sample information response-related message identifier	Host
		S△	Normal sample (Routine/Emergency) information response	→ AU5800
		SH	Repeat run sample (Routine/Emergency) information response	
		Sh	Repeat run sample (Routine/Emergency) information response	
		SE	Sample information response stop	
		D□	Analysis data-related message identifier	AU5800
		DB	Analysis data transmission start	→ Host
		D△	Normal sample (Routine/Emergency) data	
		DH	Repeat run sample (Routine/Emergency) data	
		DR	Reagent blank sample data	
		DA	Calibration sample data	
		d△	Emergency quick output data	
		dH	Repeat run Emergency quick output data	
		DQ	QC sample data	
		DE	Analysis data transmission end	
3) Unit 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

<table>
<tr><th>Type</th><th>Message Type</th><th colspan="2">Method of Blocking</th></tr>
<tr><td>Fixed length message</td><td>Sample information request start
Sample information request
Repeat run sample request
Automatic repeat run sample request
Sample information response stop
Sample information request stop
Analysis data transmission start
Analysis data transmission end</td><td colspan="2">No blocking shall occur.</td></tr>
<tr><td rowspan="4">Variable length message</td><td rowspan="4">Normal sample information response
Repeat run sample information response
Automatic repeat run sample information response
Normal sample data message
Repeat run sample data message

QC sample data message
Calibration sample data message
Reagent blank sample data message
Emergency quick output data</td><td>Blocking Use Yes/No</td><td>Max message length < Message length</td></tr>
<tr><td>Block Identification No.
(0-9, E)
*2</td><td>First block ⟶

Block Identification No. = 0
Second block ⟶
Block Identification No. = 1

:
:
Last block ⟶
Block Identification No. = E</td></tr>
<tr><td rowspan="2">Message End Code</td><td>Message End Code = ETX (03H)
→ and ETB (17H) Use = Yes *1
Block End Code = ETB
Message End Code = ETX</td></tr>
<tr><td>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.</td></tr>
</table>

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.

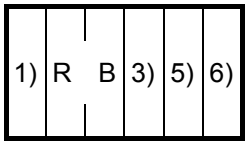
3. Communication Message Format

1) Common and changeable tests
The following can be selected on the [Online] screen of the AU5800.

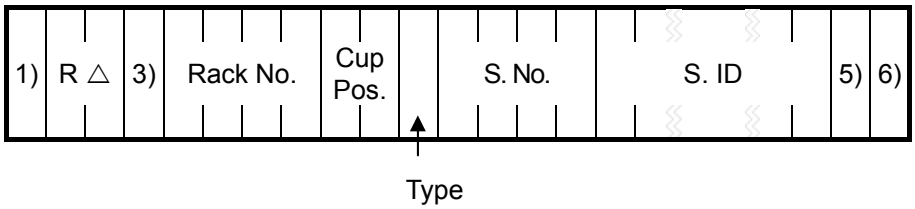
Message start code	1)
Equipment No.	3)
Message end code	5)
BCC	6)

2) Sample information request-related message identifier

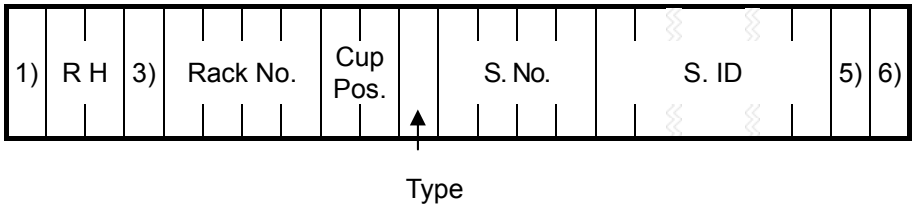
(1) Sample information request start



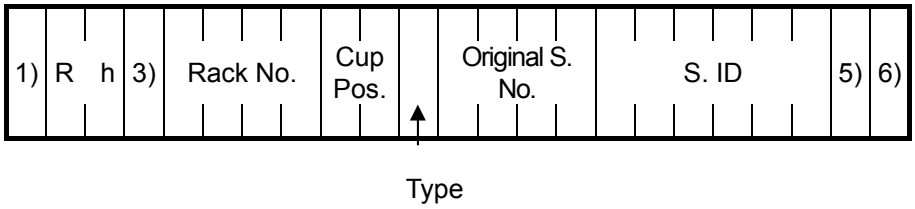
(2) Normal sample (Routine/Emergency) request



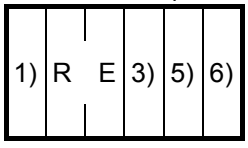
(3) Repeat run sample (Routine/Emergency) request



(4) Automatic repeat run sample (Routine/Emergency) request



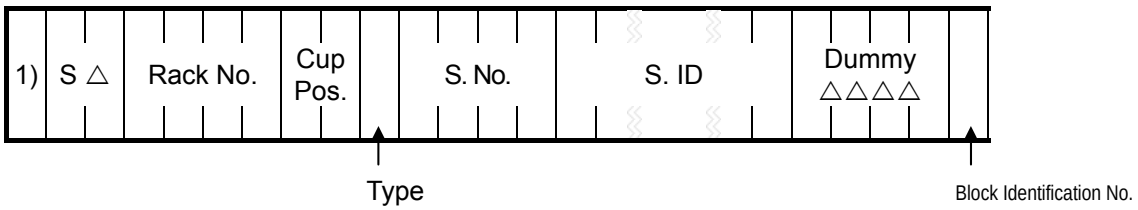
(5) Sample information request end



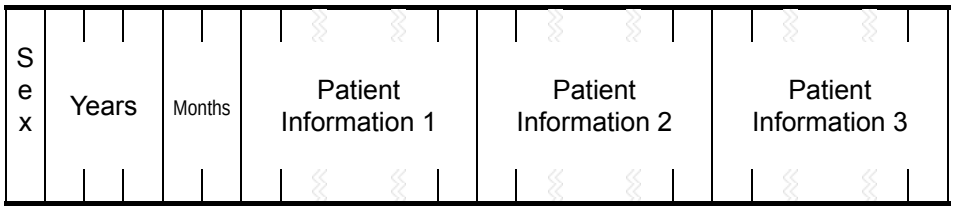
2) Sample information response

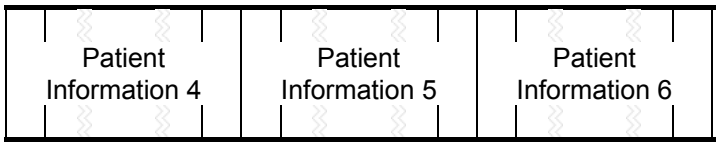
(1) Normal sample (Routine/Emergency) information response message

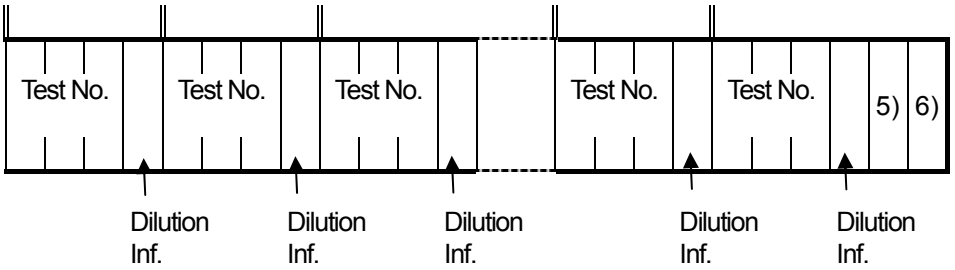
A. Format of fixed area



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

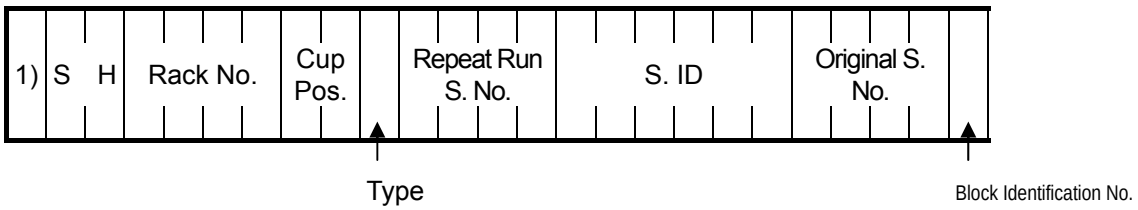




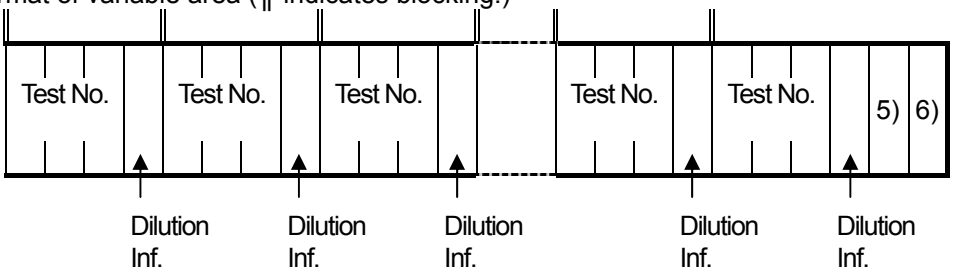


(2) Repeat run sample (Routine/Emergency) information response message

A. Format of fixed area

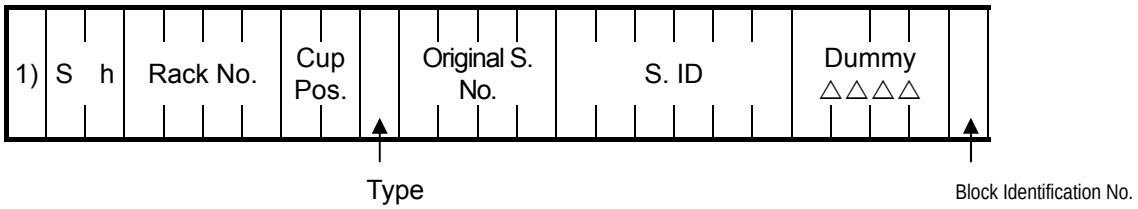


B. Format of variable area (‖ indicates blocking.)

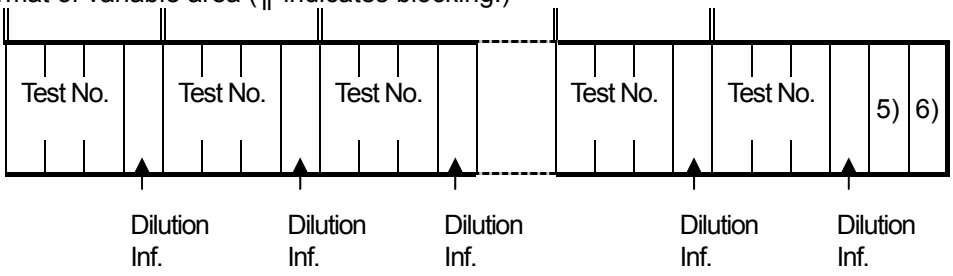


(3) Repeat run sample (Routine/Emergency) information response message

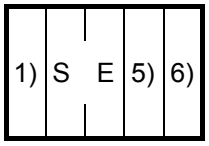
A. Format of fixed area



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

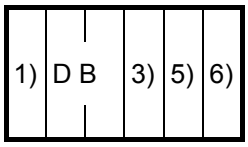


(4) Sample information response stop



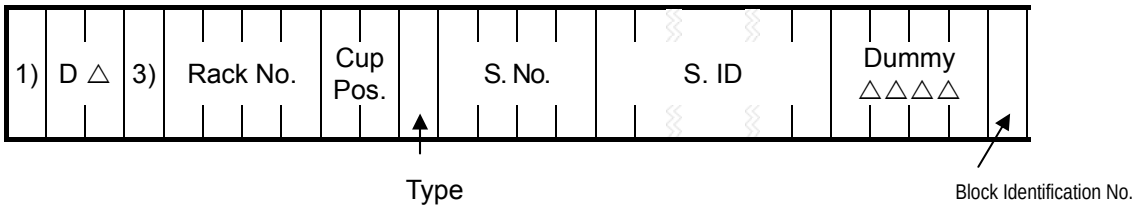
4) Analysis data-related message

(1) Analysis data transmission start

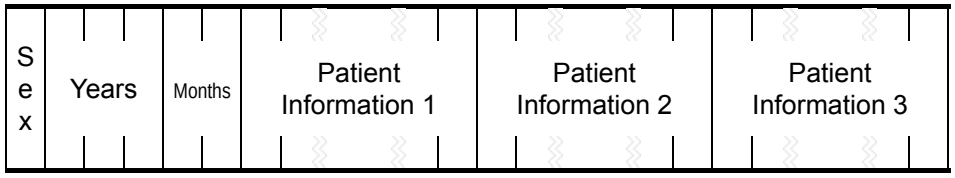


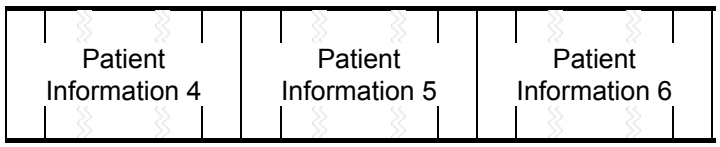
(2) Normal sample data message - 1 (Routine/Emergency)

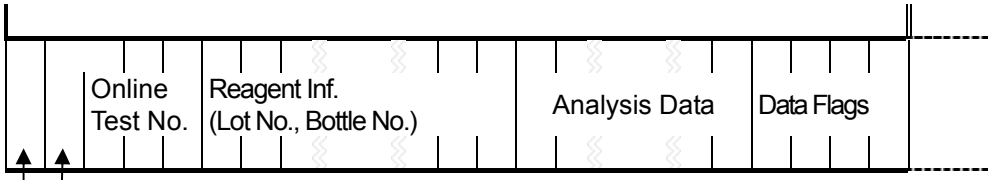
A. Format of fixed area

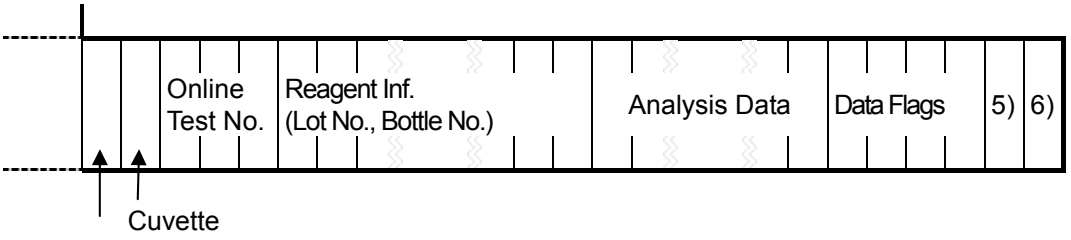


B. Format of variable area (‖ indicates blocking.)



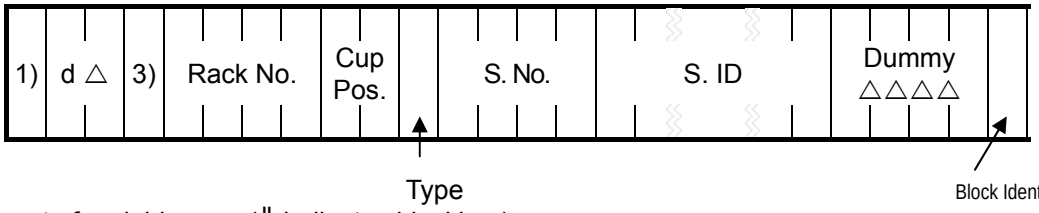




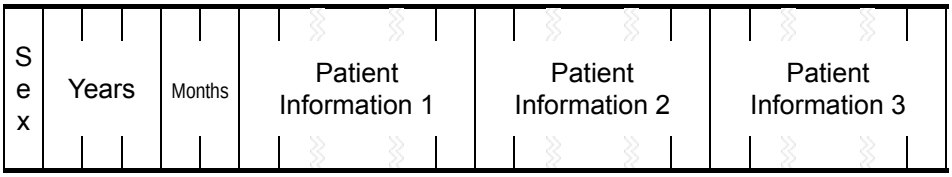


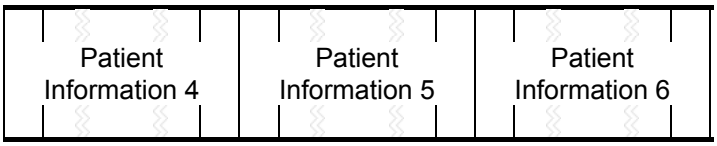
(3) Normal sample data message - 2 (Emergency/Quick)

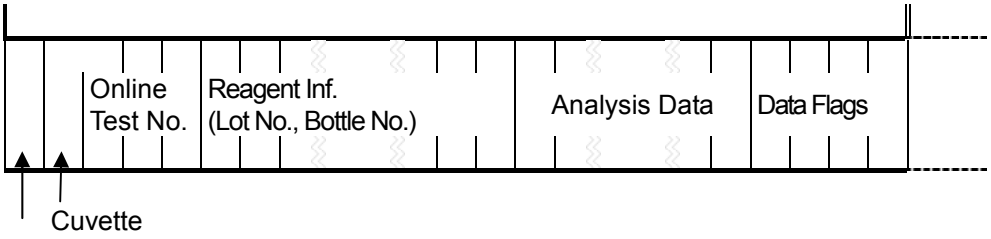
A. Format of fixed area

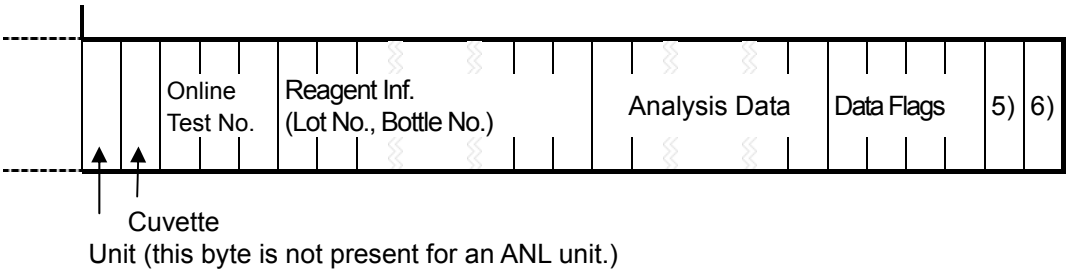


B. Format of variable area (‖ indicates blocking.)



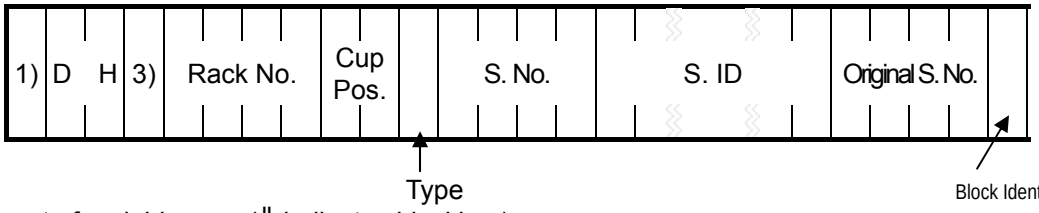




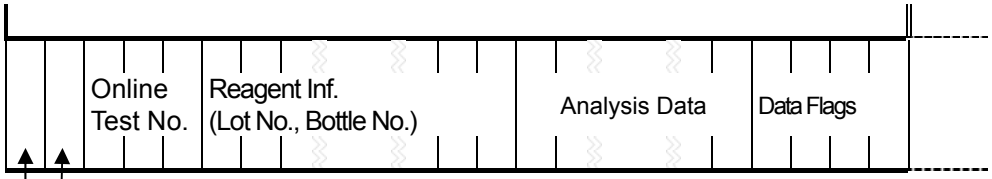


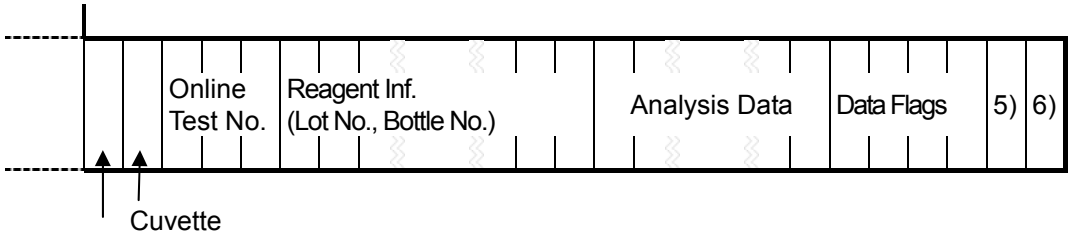
(4) Repeat run sample data message - 1 (Routine/Emergency)

A. Format of fixed area



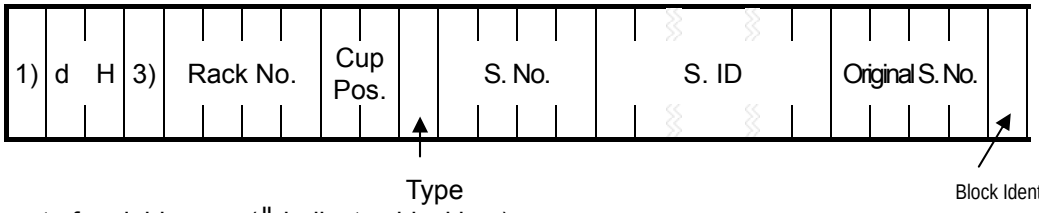
B. Format of variable area (‖ indicates blocking.)



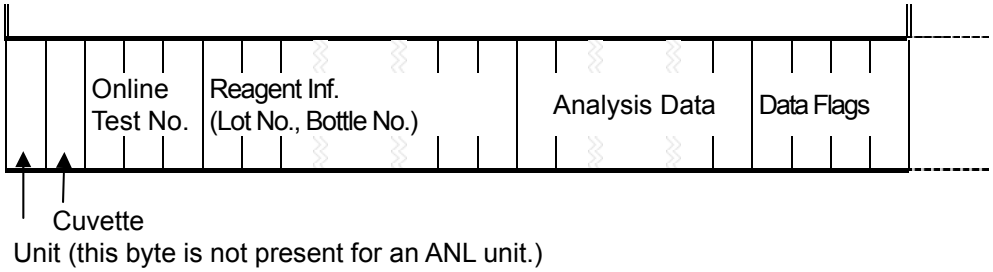


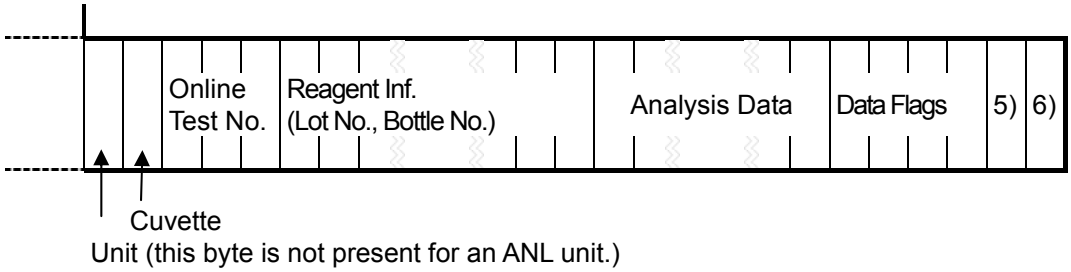
(5) Repeat run sample data message - 2 (Emergency/Quick)

A. Format of fixed area



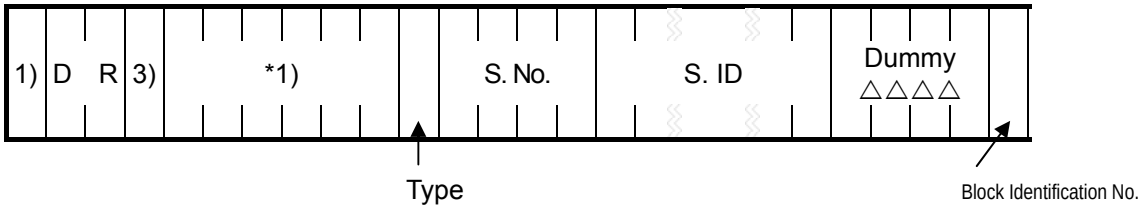
B. Format of variable area (‖ indicates blocking.)





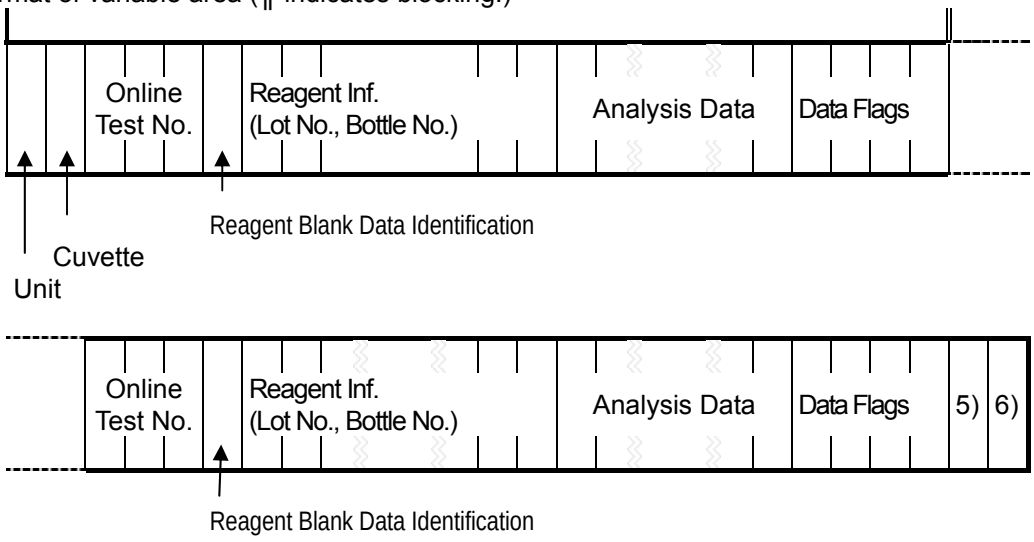
(6) Reagent blank sample data message

A. Format of fixed area



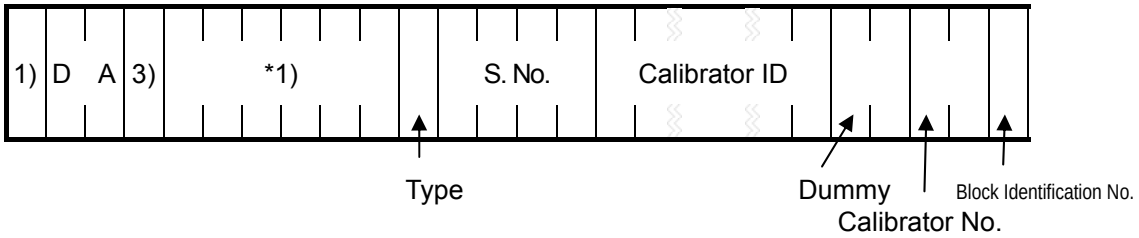
*1) The effectiveness of this area and its size shall depend on the setting of Rack No. The size shall be made by adding the cup position digits (2) to the rack No. digits.
e.g. When the rack No. is 4 digits, the size of this area is 6 digits.

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



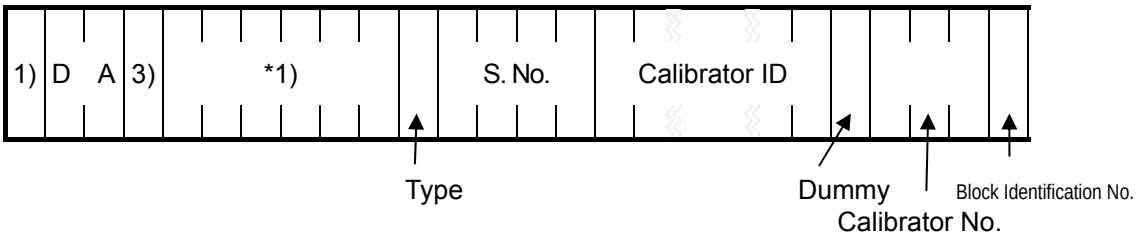
(7) Calibration sample data message

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



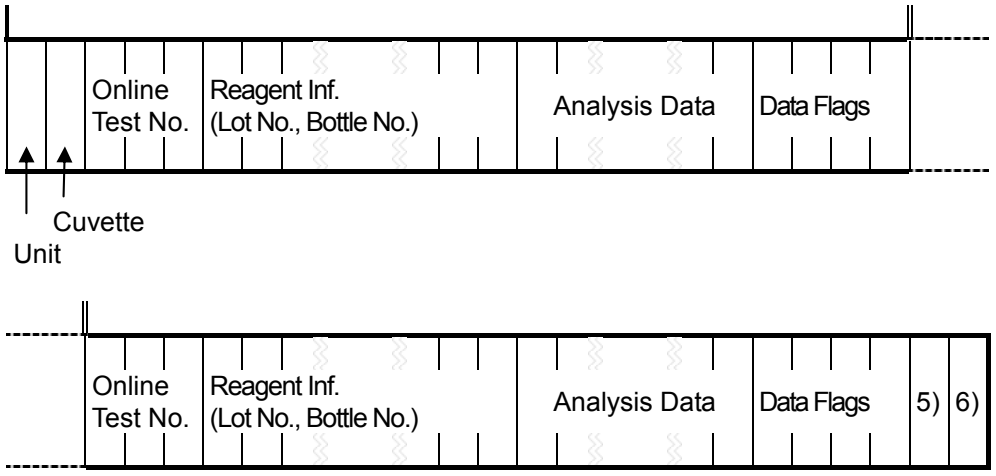
*1) The effectiveness of this area and its size shall depend on the setting of Rack No. The size shall be made by adding the cup position digits (2) to the rack No. digits. e.g. When the rack No. is 4 digits, the size of this area is 6 digits.

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



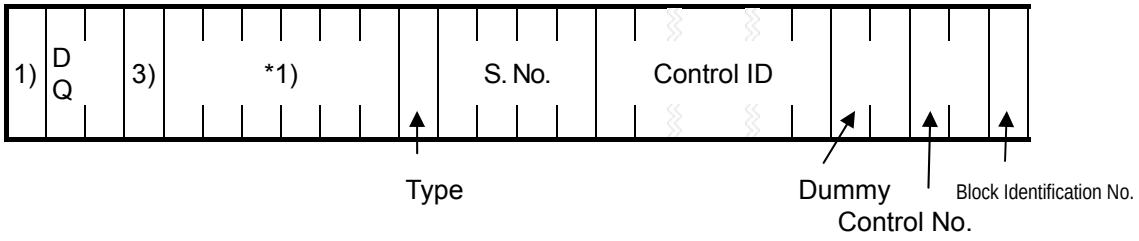
*1) The effectiveness of this area and its size shall depend on the setting of Rack No. The size shall be made by adding the cup position digits (2) to the rack No. digits. e.g. When the rack No. is 4 digits, the size of this area is 6 digits.

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



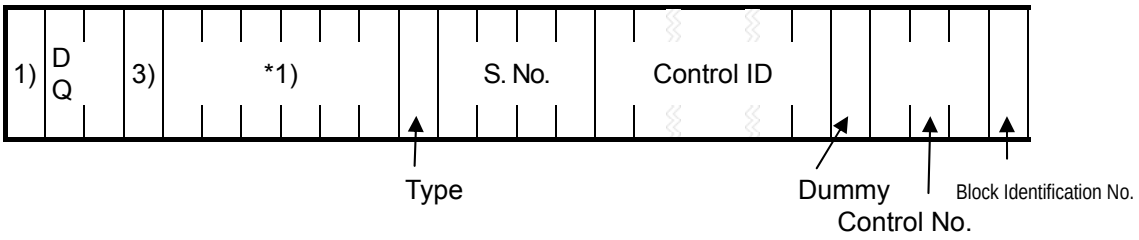
(8) QC sample data message

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



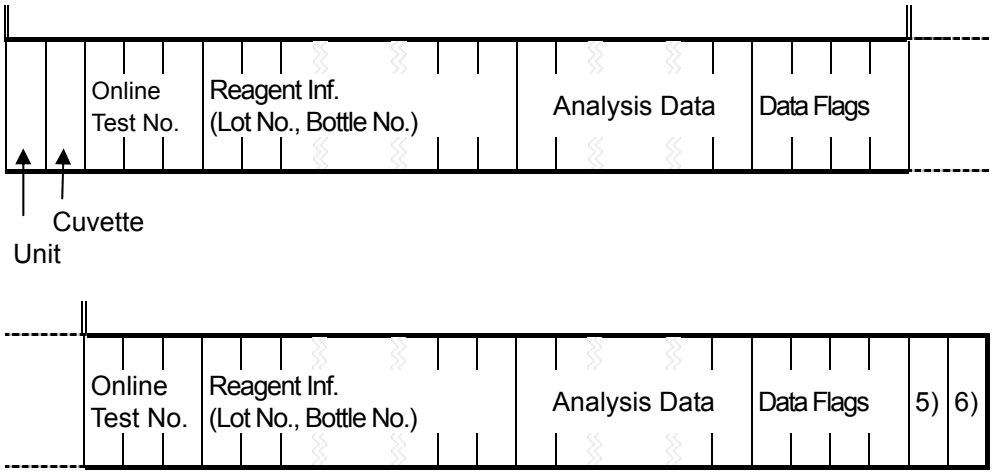
*1) The effectiveness of this area and its size shall depend on the setting of Rack No. The size shall be made by adding the cup position digits (2) to the rack No. digits. e.g. When the rack No. is 4 digits, the size of this area is 6 digits.

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

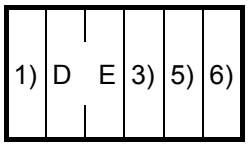


*1) The effectiveness of this area and its size shall depend on the setting of Rack No. The size shall be made by adding the cup position digits (2) to the rack No. digits. e.g. When the rack No. is 4 digits, the size of this area is 6 digits.

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



(9) Analysis data transmission end



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. However, batch transmission cannot start while real-time transmission is performed.
- When batch is selected, real-time communications cannot be conducted.

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'	• Whether or not to use this area and the number of digits can be selected on the [Online] screen. When RB, ACAL, QC sample or rack No. is not selected, all digits shall be blank. Selected digits > read digits: Zero suppression shall be used. Selected digits < read digits: All following digits shall be dropped.
Cup Position	2	Rack: '01' to '10'	• It shall depend on the decision whether or not to add the rack No. on the [Online] screen. When RB, ACAL or QC sample is selected, all digits shall be blank.
Type	1	Space: Serum 'U': Urine 'X': Other 1 'Y': Other 2 'W': Whole blood 'N': Not specified	In the case of setup with mixed sample types permitted and when sample types cannot be specified, 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.
Sample No.	4	'0001' -'9999': Routine sample 'E001'-'E999': Emergency sample 'R001'-'R999': Reagent blank sample 'A001'-'A999': Calibration 'Q001'-'Q999': QC sample	In the case of setup with Automation Ready connection, the host is judge the sample type (Routine or Emergency). *2

Sample ID Calibrator ID Control ID	4-26	Numbers and characters	• Number of digits can be changed on the [Requisition Format] screen. *1 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.
Original Sample No.	4	'0001'-'9999': Routine sample 'E001'-'E999': Emergency 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.
Unit	1	For an ANL unit (with areas for RB/ACAL/QC only) Space: All additional data For multiple units (with areas for all samples) '1': Unit 1 / ISE '2': Unit 2 '3': Unit 3 '4': Unit 4	• It shall be added to the header of RB, Calibration and QC sample data. • It shall be added to the normal/repeat run sample data message; however, a space shall be added to the calculated test value. • Whether or not to add it to the analysis data of normal/repeat run sample can be selected on the [Online] screen. However, for an ANL unit other than RB/ACAL/QC sample types, transfer shall not be carried out.
Cuvette	1	For an ANL unit '0': Inner cuvette (ISE) '1': Outer cuvette For multiple units '0': Inner cuvette (ISE Cell 1) '1': Outer cuvette (ISE Cell 2)	• It shall be added to the header of RB, Calibration and QC sample data. • It shall be added to the normal/repeat run sample data message; however, a space shall be added to the calculated test value. • Whether or not to add it to the normal/repeat run sample data message can be selected on the [Online] screen.
Sex	1	'M': Male 'F': Female Space: None sex '0': Not specified	• Whether or not to add it can be selected on the [Requisition Format] screen.
Years	3	'000'-'150' Space: Not specified * 3	
Months	2	'00'-'11' Space: Not specified * 3	
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.
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 inf.	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.)	Whether or not to use it can be selected on the [Online] screen. 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.)	Whether or not to use it can be selected on the [Online] screen.
Analysis Result	6/9	Analysis data: 6 digits / 9 digits *4	• The following can be selected on the [Online] screen: • Whether or not to use zero suppression • Number of digits, 6 or 9
Data Flags	2/8	For set values, see Appendix A.1 List of Data 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) Data flag.	The max output value can be selected on the [Online] screen.
Reagent Blank Data Identification	1	'1': 1st reagent blank sample data '2': 2nd 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: Handling for the sample No. at automation ready

Special operation is required for sample No. of sample on normal rack if routine and emergency sample are available to be set together onto normal rack as automation ready (for example: Power Processor). When running this operation, it is assumed that the parameter of AU5800 is below;

- Test Requisition Information Receive (Routine Normal) : Real-time
- Test Requisition (Routine/Emergency) : Sample ID

AU5800 recognizes analyzes sample class (Routine/Emergency) regarding routine on normal rack by sending normal sample request with all routine sample No. to host and receiving sample No. of normal sample information from host. The details of sample No. for routine on normal rack is as following. No change for handling sample No. on emergency rack.

Handling sample No. for routine on normal rack:

Message Type	Sample No.	Remarks
R△ Normal sample (Routine) request	"0001" (Fixed)	AU5800 queries with fixed value due to sample No. is not determined at the time of transfer R□ normal sample.
S△ Normal sample (Routine/Emergency) information response	Routine: "0001" Emergency: "E001"	The host should set sample No. by using sample ID and evaluate sample class (Routine / Emergency).
D△ Normal sample (Routine/Emergency) data	As well as normal operation	AU5800 transfers determined sample No. which set up to host.

< Precaution for this operation >

The host is required to be controlled analysis data by only sample ID due to there are differences between sample No. which set up onto R△ message and D△ message.

Note 3: When the space is set to Years and any value is set to Months in information transmitted from the host, the AU5800 shall judge such status as an error.
The criteria is listed below:

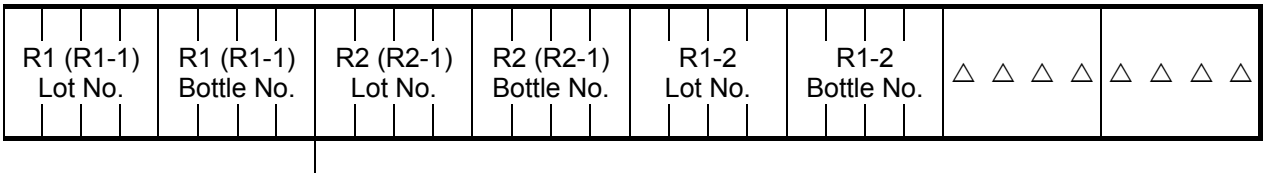
Host ⟶ AU5800

Pattern	Years	Months	Judgment
1	Space	Space	OK
2	***	Space	OK
3	Space	**	Error
4	***	**	OK

Note 4: When the parameters are changed in [System Maintenance], the AU5800 shall transfer analysis data as a space in the case concentration conversion results in an error or other than the dynamic range.

Note 5: The fields of the reagent lot Nos. and reagent bottle Nos. are as follows:

- R1-2 information is used:



- R1-2 information is not used (R2 (R2-1) is present):

R1 (R1-1) Lot No.	R1 (R1-1) Bottle No.	R2 (R2-1) Lot No.	R2 (R2-1) Bottle No.	△ △ △ △	△ △ △ △	△ △ △ △	△ △ △ △

- R1-2 information is not used (R2 (R2-1) is not present):

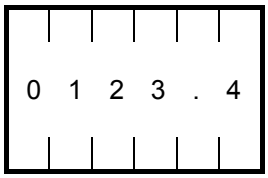
R1 (R1-1) Lot No.	R1 (R1-1) Bottle No.	△ △ △ △	△ △ △ △	△ △ △ △	△ △ △ △	△ △ △ △	△ △ △ △

(2) Data format

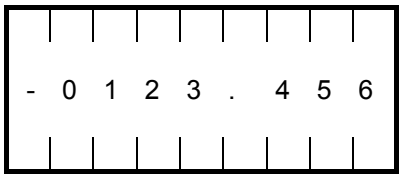
△ indicates a space (20H).

a) Analysis data

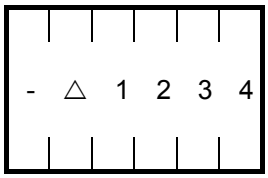
- The number of digits for transfer is 6 and zero suppression is not used:



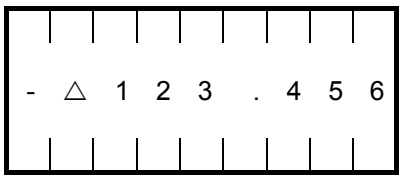
- The number of digits for transfer is 9 and zero suppression is not used:



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

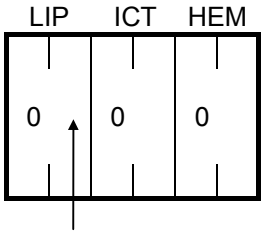


- The number of digits for transfer is 9 and zero suppression is used:



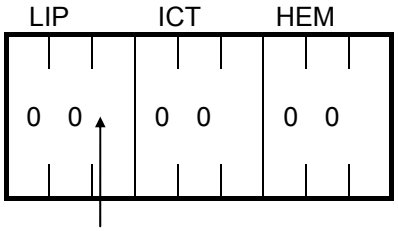
b) LIH analysis data

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



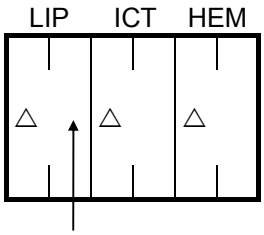
0: NORMAL
1: +
2: ++
3: +++
4: ++++
5: +++++
6: ABN
7: ABN H
8: ABN L
9: Not yet measured

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



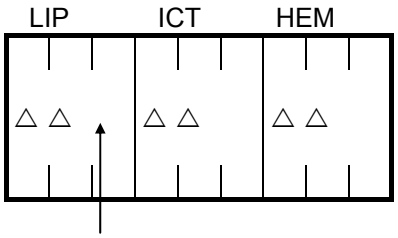
0: NORMAL
1: +
2: ++
3: +++
4: ++++
5: +++++
6: ABN
7: ABN H
8: ABN L
9: Not yet measured

- The number of digits for transfer is 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:

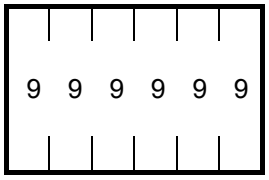


0: NORMAL
1: +
2: ++
3: +++
4: ++++
5: +++++
6: ABN
7: ABN H
8: ABN L
9: Not yet measured

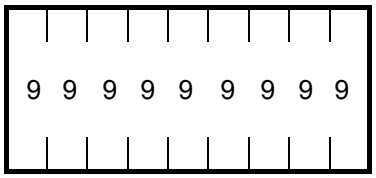
c) Analysis data exceeding the number of digits in the format

- 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:

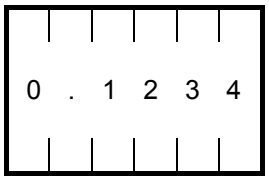


  - The number of digits for transfer is 9:



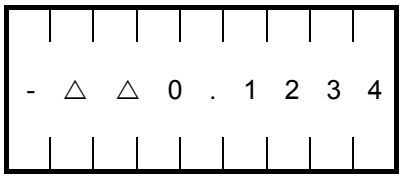
d) Analysis data equal to the OD-value shall be transferred in the following formats:

  - The number of digits for transfer is 6:



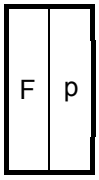
Note: When OD-value is negative, analysis data exceeding the number of digits shall be shown.

  - The number of digits for transfer is 9:



(3) Data flag

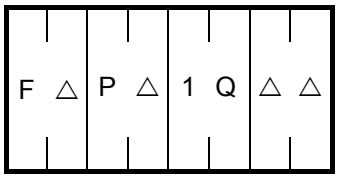
A) Two types of data flags are transferred:



The data 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. Data flag: F_, ph
Transfer: Fp

B) Four types of data flags are transferred:



Up to four 2-digit data 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 DPR, and the data flag shall be calculated and transferred according to the calculated test conditions specified by the AU5800.
  (Relevant screen: Parameters - Specific Test Parameters - Calculation)

- When all analysis data for calculated tests selected on the calculated test screen are prepared for the sample, the calculated tests shall 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.

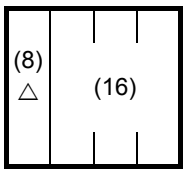
(5) Sample information for LIH tests

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.

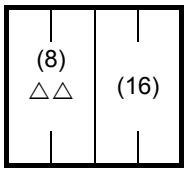
Note: These can be selected on the following screens:
LIH reagent test name: Parameters - Common Test Parameters - Test Name
LIH measure: Parameters - Common Test Parameters - Group of Tests

(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.

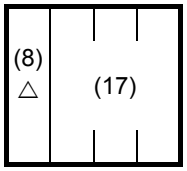


B. The number of digits of calibrator No./control No. is "2":
The calibrator No. (16) shall convert 001 to 200 into two-digit numbers as shown in the chart of (8), and transmit those values.

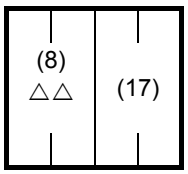


(7) Control No. format

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/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

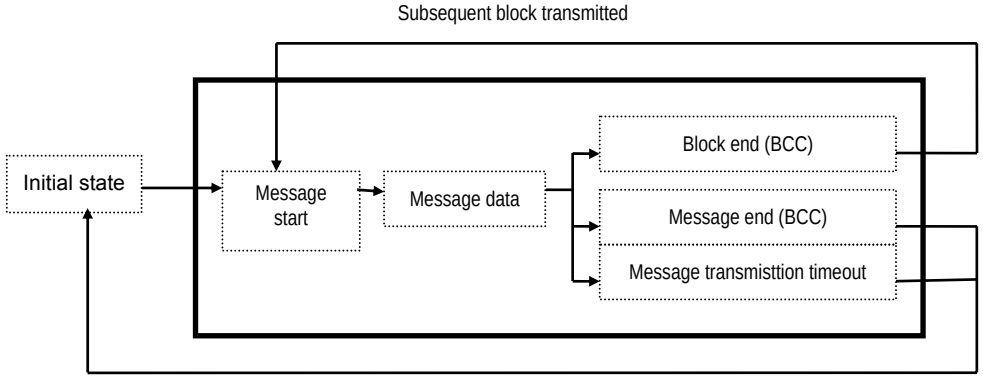
1) Message protocol (at AU5800)

(1) Class A without ACK/NAK protocol:

a) Transmission

Messages to be transmitted:

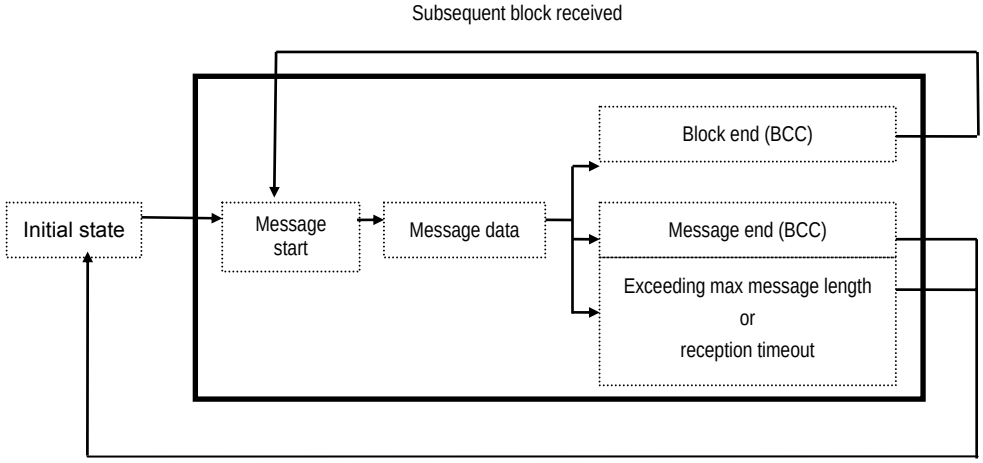
Sample information request start
Sample information request
Sample information request stop
Analysis data transmission start
Analysis data transmission end
Sample data message



4) Reception

Messages to be received:

Normal sample information response message
Repeat run sample information response message
Sample information response stop

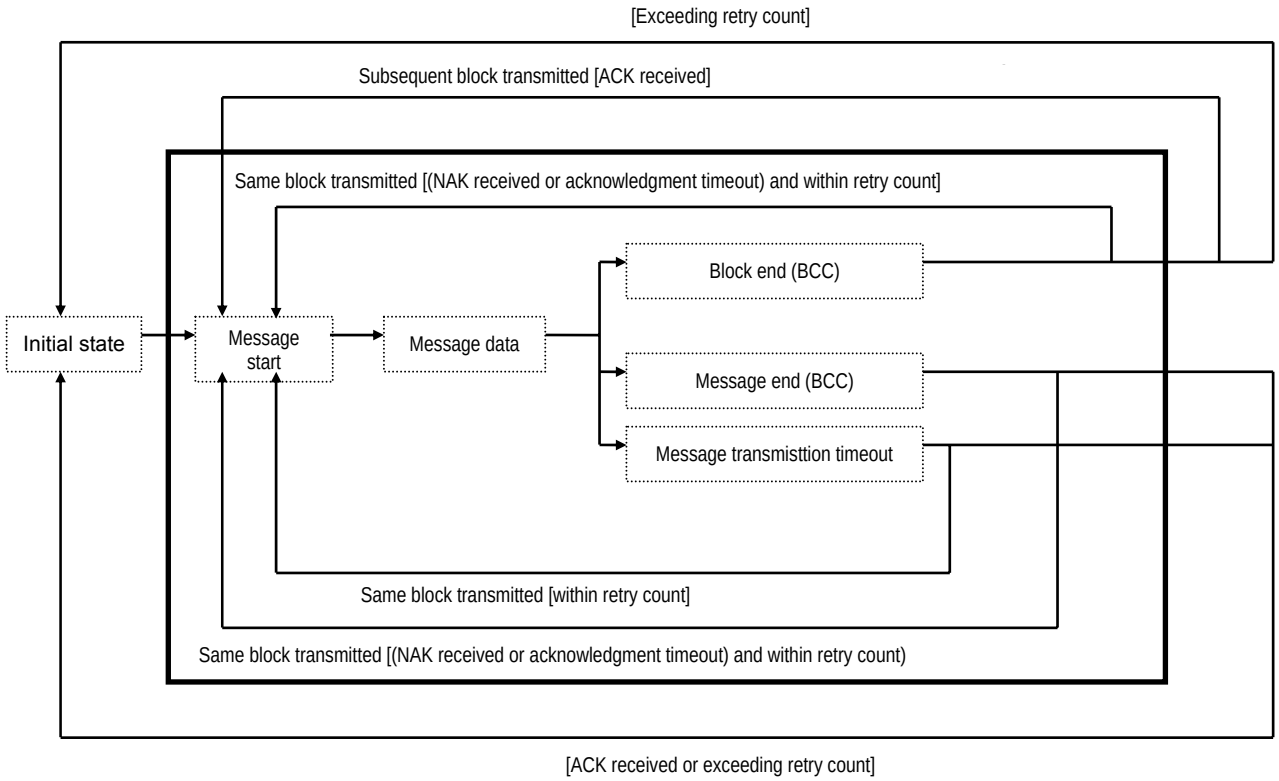


(2) Class B with ACK/NAK protocol:

a) Transmission

Messages to be transmitted:

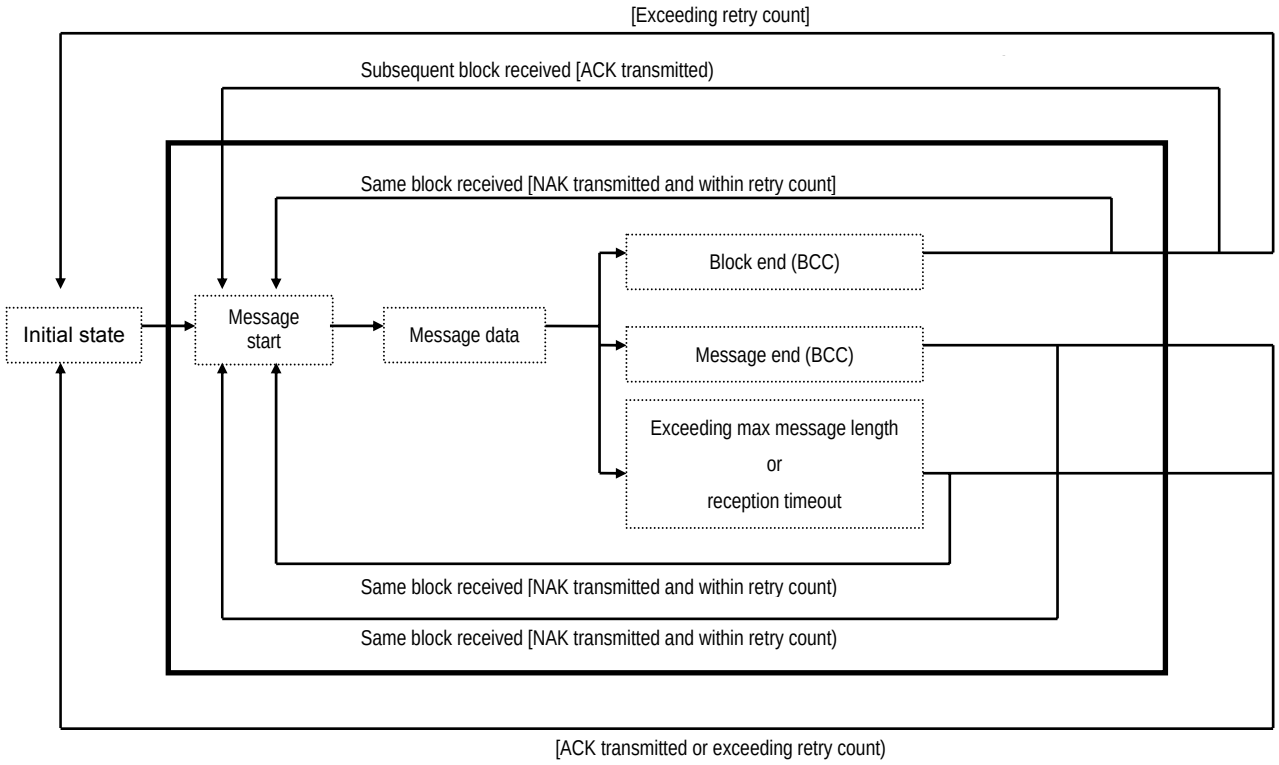
Sample information request start
Sample information request
Sample information request stop
Analysis data transmission start
Analysis data transmission end
Sample data message



b) Reception

Messages to be received:

Normal sample information response message
Repeat run sample information response message
Sample information response stop



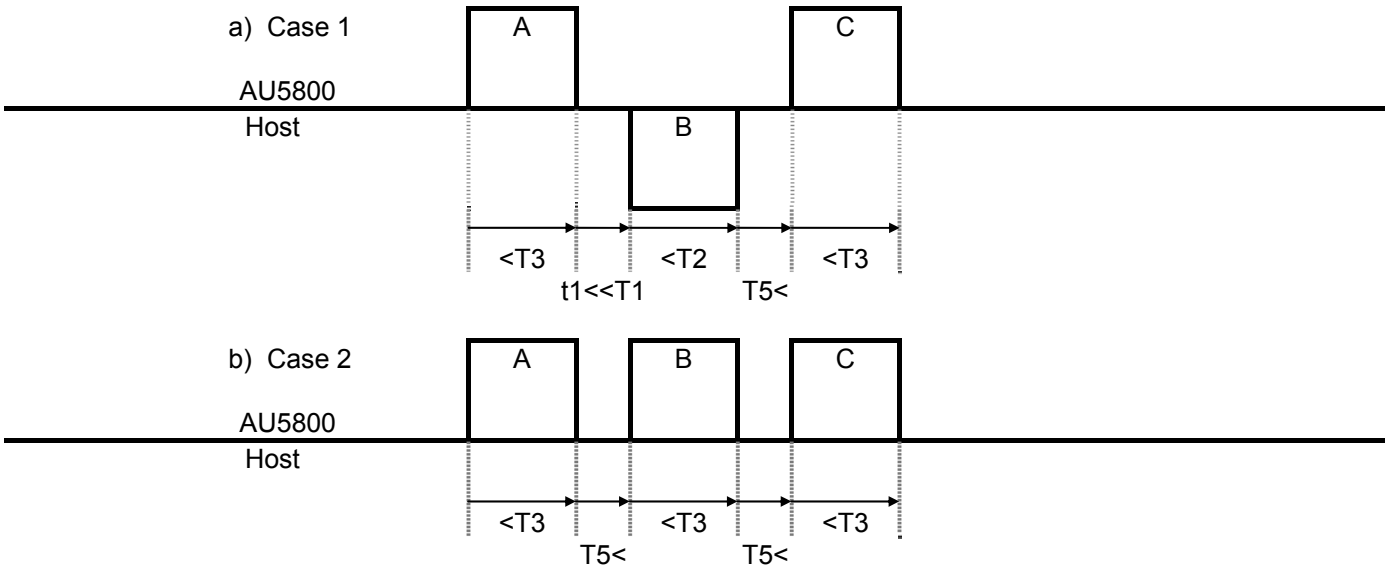
2) Transmission timeout/timing

(1) Timeout/timing list

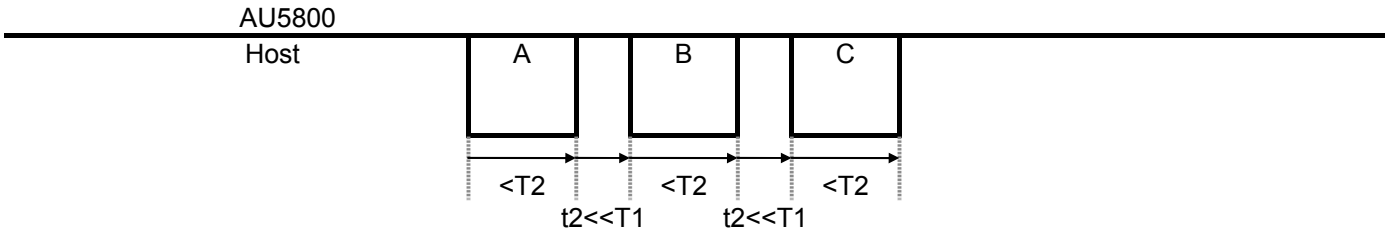
Type	Meaning	Standard Value	Range to be Set
T1	Time-out period from the completion of transmission/reception to the start of message reception	2 seconds	0.1 x n seconds
T2	Time-out period from the start to the end of message reception	*1	
T3	Time-out period from the start to the end of message transmission		n = 1 to 99
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

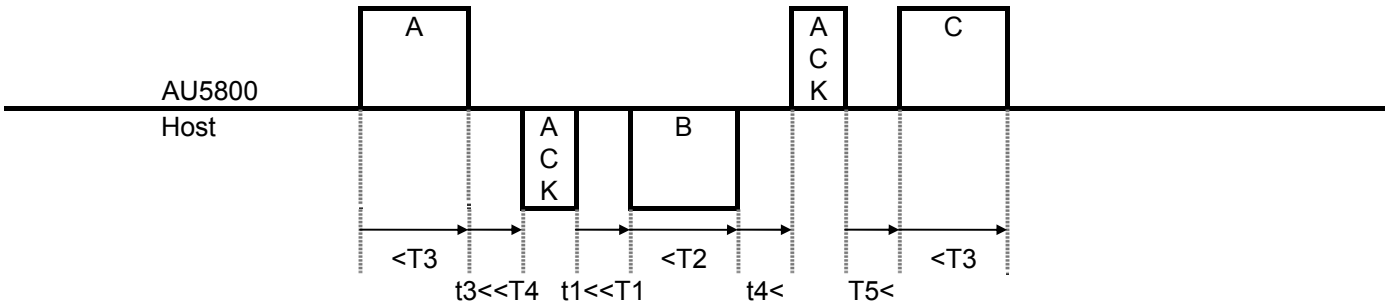


c) Case 3

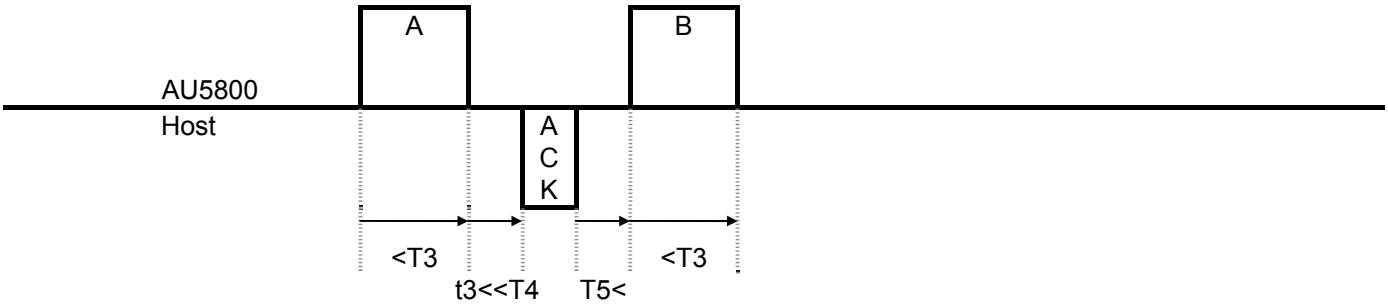


(3) Rules for class B

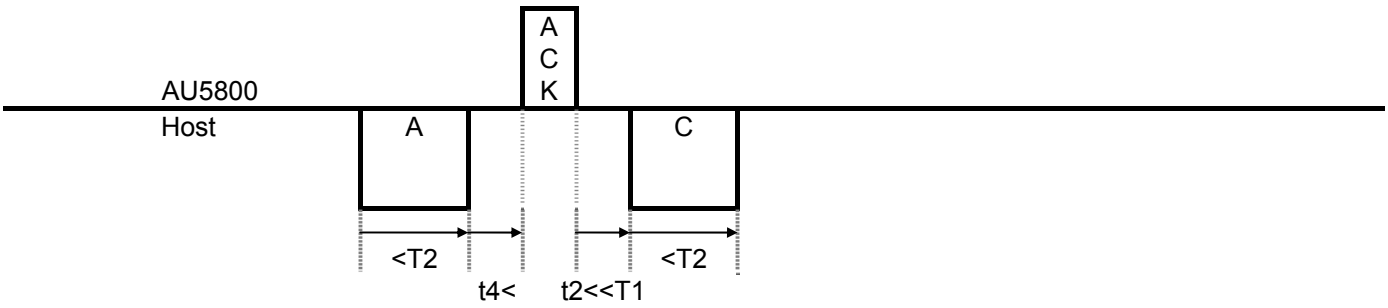
a) Case 1



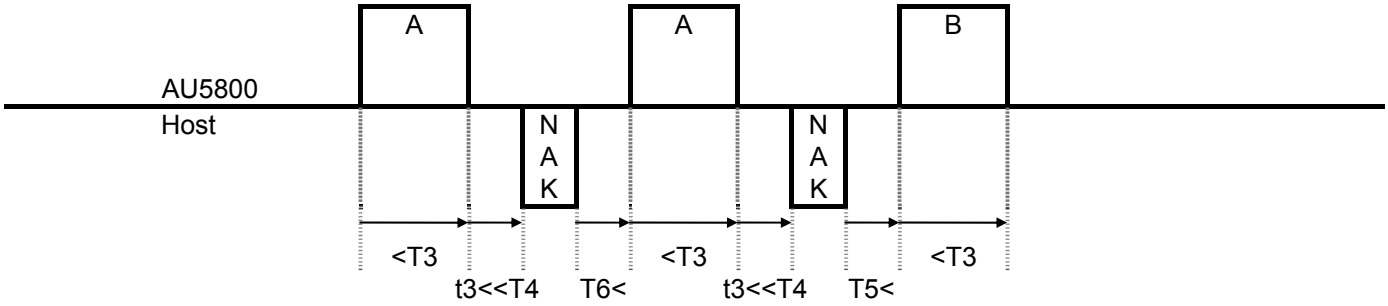
b) Case 2



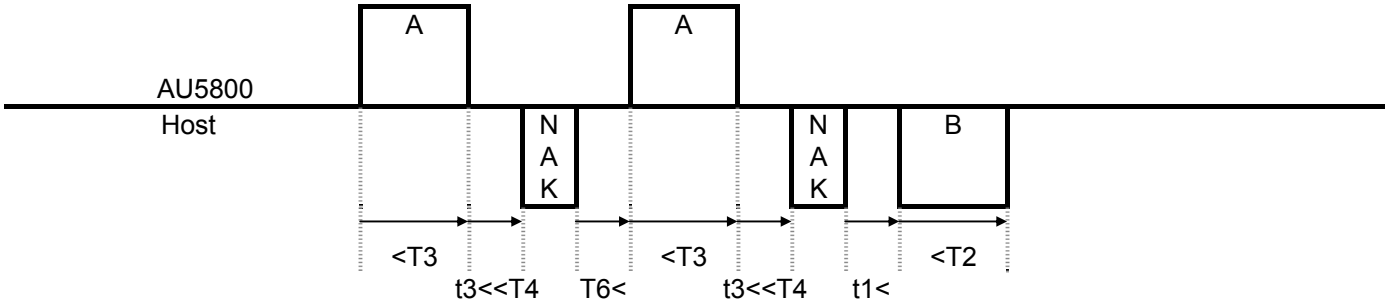
c) Case 3



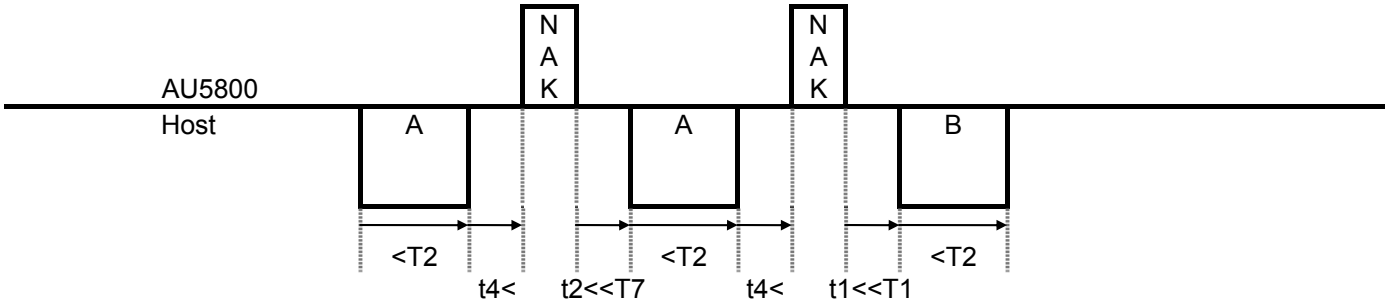
d) Case 4 (NAK response received - 1)



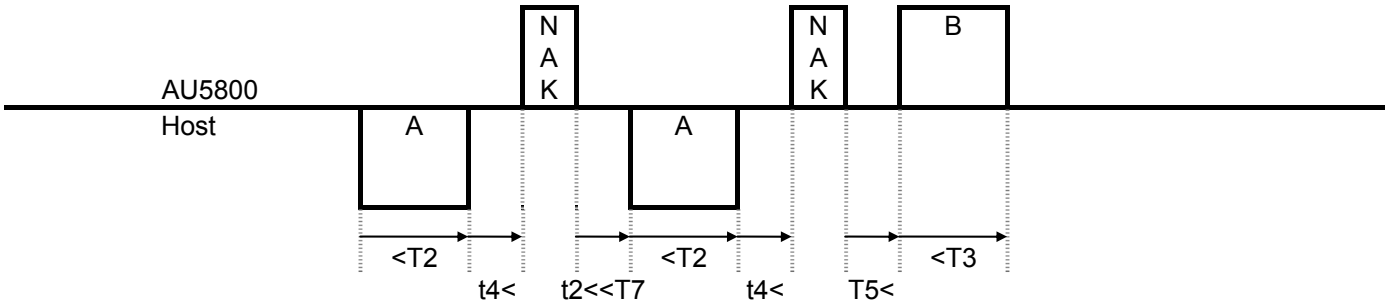
e) Case 5 (NAK response received - 2)



f) Case 6 (abnormal text received - 1)



g) Case 7 (abnormal text received - 2)



5. Upper Layer Communication Protocol

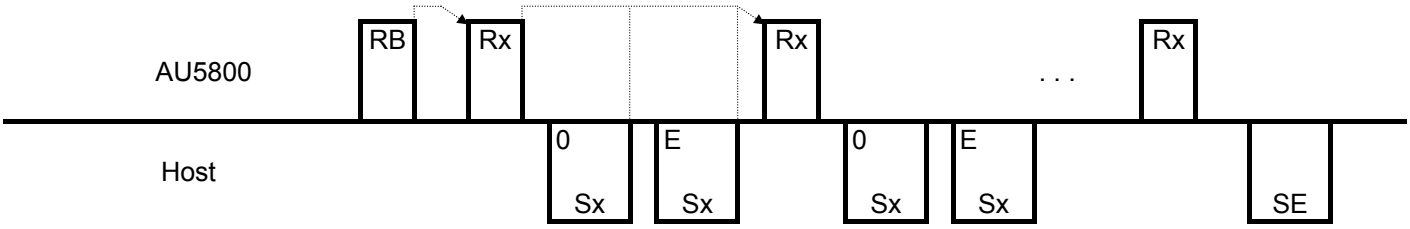
1) Test Requisition Information Receive processing

(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)

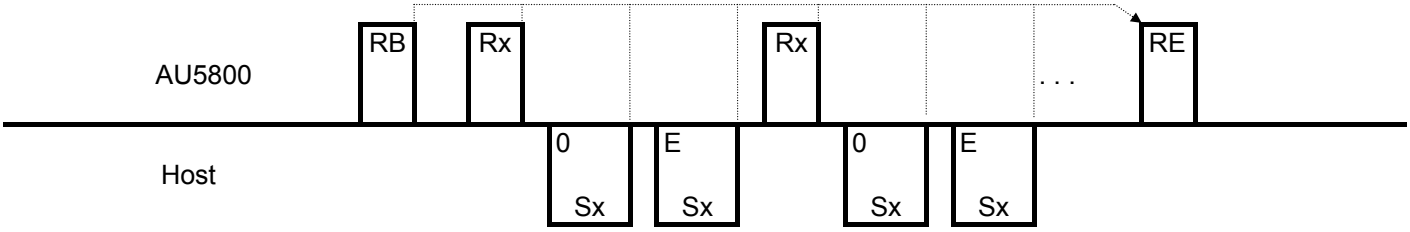
Subsequent Rx shall be continuously transmitted due to an online communication error.



In the case of two blocks

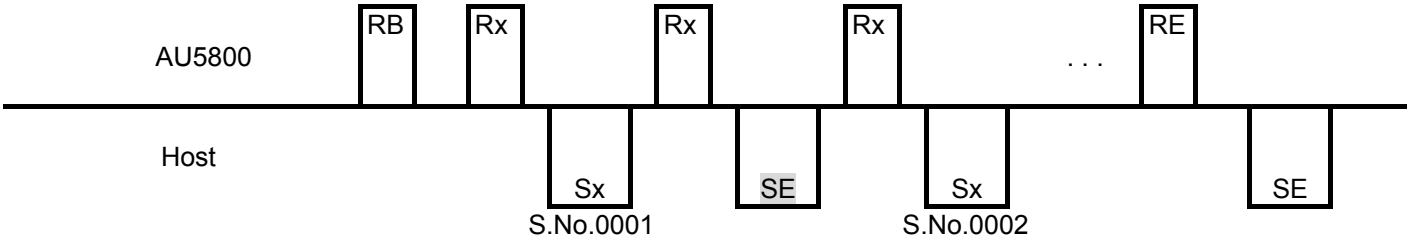
b) Example 2 (when [Stop] is selected in Error Control)

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



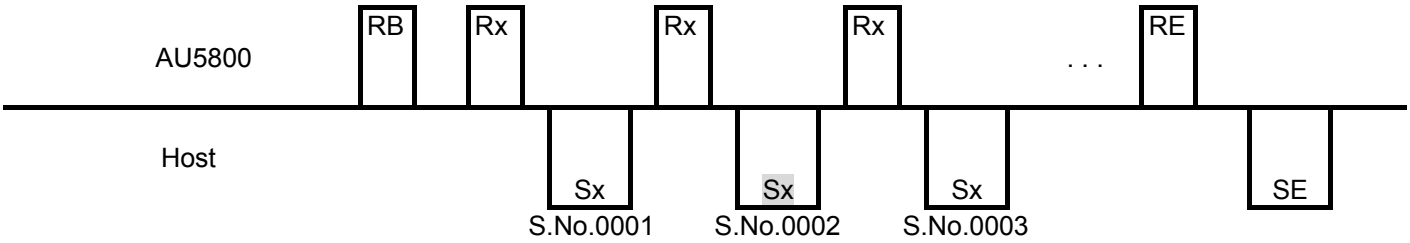
c) Example 3 (when the host has no test requisition information)

- 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)	*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 / Repeat)	*3
	Sample No. request	It shall be transmitted regardless of whether or not to enter repeat run 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 repeat run 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 AU5800 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 [Requisition Format] screen.
	R△ (Request / Normal)	*4
	Sample No. request	It shall be transmitted for the sample No. in the range specified on the [Requisition Format] screen, in series at certain intervals.
	RH (Request / Repeat)	*4
	Sample No. request	It shall be transmitted for the sample No. in the range specified on the [Requisition 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 AU5800 shall continuously inquire subsequent samples.)
	RE (Request end)	It shall be transmitted after the last sample No. specified on the [Requisition Format] screen has been received, when SE has not been received.
		It shall be transmitted when the session is forcibly cancelled on the [Requisition 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 / Repeat) may be mixed in the same session and transmitted.

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

(2) Sample information transmission type

a) Normal 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 ID Sample No. *1

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

Note1 The sample No. in sample information request shall correspond to the sample No. in sample information response.

b) Repeat run sample information

Measurement Parameter Settings			Sample Information Request Type	Sample Identification Information used for Transmission/Reception	
Repeat Run Test Requisition Information Receive	Repeat run rack	Sample Test Requisition		Sample information request	Sample information response
Realtime	Used	Sequential Rack No.	Sample No. request	Repeat run sample No.	Original sample No. Repeat run sample No. *1
		Sample ID	Sample ID request	Sample ID Repeat run sample No. *1	Sample ID Repeat run sample No. *1
Batch	-	Sequential Rack No.	Sample No. request	Repeat run sample No.	Original sample No.
		Sample ID			Sample ID

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

Note 1: The repeat run sample No. in repeat run sample information request shall correspond to the repeat run sample No. in repeat run sample information response.

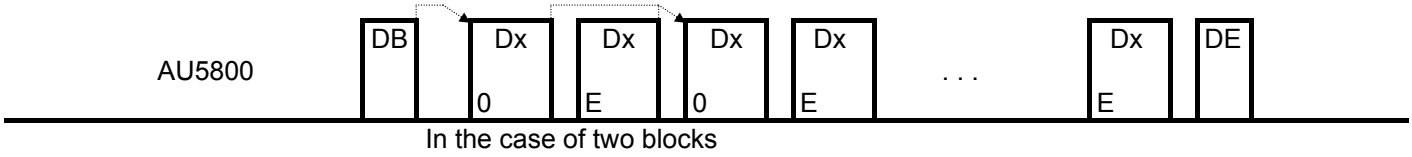
2) Result Transfer processing

(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.

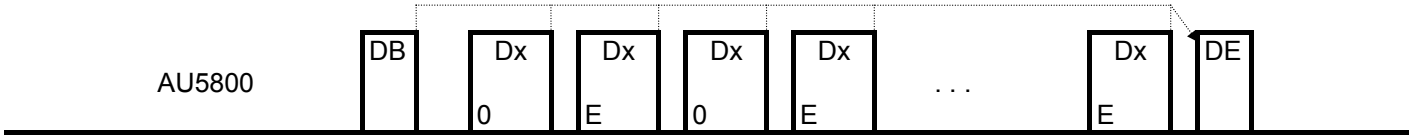


In the case of two blocks

Host

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

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



Host

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: Transmission error control: Stop -> DE shall be continuously transmitted and the session shall be cancelled.
	Dx (Data transmission)	It shall be transmitted in sequence when all analysis results of the measured sample are prepared and the AU5800 judges the sample has been measured.	Subsequent Dx / DE shall be continuously transmitted.	Transmission error control: Continue -> Subsequent Dx / DE shall be continuously transmitted.
	DE (Transmission end)	It shall be transmitted when the AU5800 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	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 cancelled due to an online communication error.		

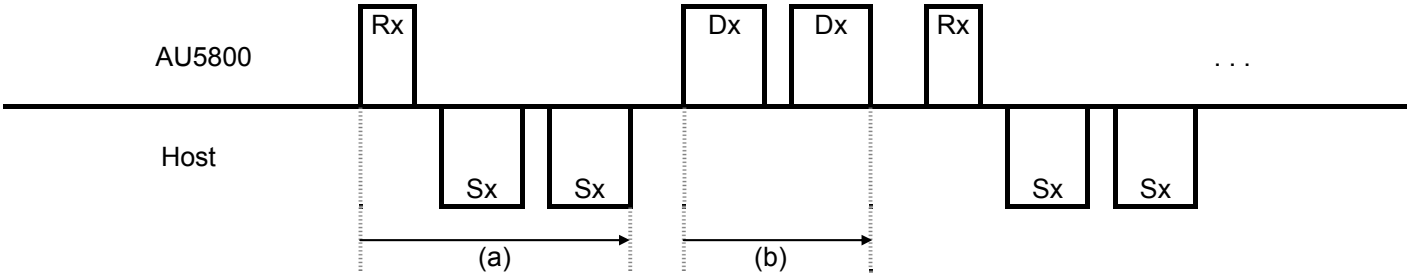
Test Requisition Information Receive	Message Type	Transmission/Reception Timing/Conditions	Normal End Processing	Communication Error Control
Batch	DB (Transmission start)	It shall be transmitted when transmission starts on the [Online] screen.	The Result Transfer session shall start and Dx shall be continuously transmitted.	An alarm shall be raised and the following processing shall be done: Transmission error control: Stop -> DE shall be continuously transmitted and the session shall be cancelled. Transmission error control: Continue -> Subsequent Dx / DE shall be continuously transmitted.
	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.	
	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.		

Note: "Communication Error Control (Transmission) 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	AU5800 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	→

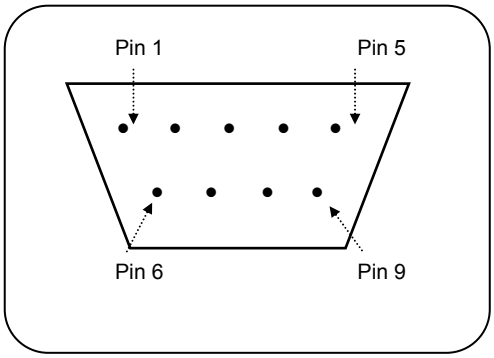
Note 1: RTS and CTS shall be always short-circuited.
Note 2: The terminals of Nos., which are not shown above, shall not be connected.

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 AU5800 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 AU5800: D-SUB 9 Pin female connector



A.1 Appendix: List of Data Flags

Priority	Flag	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	?a	Error in detection of reagent or sample.	
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 dynamic range.	
27	Gx	Result (OD) is lower than the dynamic 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 dynamic range.	
36	G_	Result is lower than the dynamic range.	
37	Tx	Result of T-Hb or/and HbA1c is higher than the dynamic 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 repeat decision range.	
46	K_	Result is lower than the repeat decision range.	

Priority	Flag	Meaning	Remarks
47	fh	Result is higher than the repeat run reflex range.	
48	fl	Result is lower than the repeat run 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 multirule 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 repeated and original results replaced by repeat 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 repeat run for the sample contained in the normal sample data message, which includes a measure result with any of the data flags.
(Automatic repeat run is disabled as a means of saving the reagent because of concerns about sample error.)
However, the equipment transmits an automatic repeat run sample request to the host in order to enter repeat run 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				ー	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			ァ	キ	ヌ	ラ		
8	BS	CAN	(	8	H	X	h	x			ィ	ク	ネ	リ		
9	HT	EM	)	9	I	Y	i	y			ゥ	ケ	ノ	ル		
A	LF	SUB	*	:	J	Z	j	z			ェ	コ	ハ	レ		
B	VT	ESC	+	;	K	[	k	{			ォ	サ	ヒ	ロ		
C	FF	FS	,	<	L	¥	l	|			ャ	シ	フ	ワ		
D	CR	GS	-	=	M	]	m	}			ュ	ス	ヘ	ン		
E	SO	RS	.	>	N	^	n	~			ョ	セ	ホ	゛		
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 Condition Parameters

Set up	Contents	Menu
Test Requisition Information Receive		
Routine Normal	Realtime / Batch / None	Online
Routine Repeat	Realtime / Batch / None	
Emergency Normal	Realtime / Batch / None	
Emergency Repeat	Realtime / Batch / None	
Result Transfer		
Routine Normal	Realtime / Batch / None	Online
Routine Repeat	Realtime / Batch / None	
Emergency Normal	Realtime / Batch / None	
Emergency Repeat	Realtime / Batch / None	
QC	Realtime / Batch / None	
Calibration	Realtime / Batch / None	
Reagent Blank	Realtime / Batch / None	
Emergency 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	7 / 8	Online
Parity Bit	Odd / Even / None	
Stop Bit	1 / 2	
Basic Data Format		
Start Code 1	01H to 1FH	Online
Start Code 2	00H to 1FH	
End Code 1	01H to 1FH	
End Code 2	00H to 1FH	
Text Length	256 / 512 / 1024	
Device No.	00-99	
ETB Control	Yes / No	
Communication Control		
Bit/Sec.	4800 / 9600	Online
Class	Class A / Class B	
BCC Check	Yes / No	
Retry	0 to 3	
Timeout		
T1	(1 to 99) (unit: 0.1 sec)	Online
T2	(1 to 99) (unit: 0.1 sec)	
T3	(1 to 99) (unit: 0.1 sec)	
T4	(1 to 99) (unit: 0.1 sec)	
T5	(1 to 99) (unit: 0.1 sec)	
T6	(1 to 99) (unit: 0.1 sec)	
T7	(1 to 99) (unit: 0.1 sec)	

Data Configuration	Contents	Menu
Rack No./Cup pos.	Yes / No	Online
Rack No. Digits	4 / 5	
Type	Yes / No	Online *1
Dilution Info.	Yes / No	Online *1
Reagent Info.	Yes / No	Online
R1-2 Use	Yes / No	
Sex	Yes / No	Requisition Format
Age	Yes / No	
Patient Information 1	Yes / No, digits	
Patient Information 2	Yes / No, digits	
Patient Information 3	Yes / No, digits	
Patient Information 4	Yes / No, digits	
Patient Information 5	Yes / No, digits	
Patient Information 6	Yes / No, digits	
Sample ID Digits	4 to 26	
Zero Suppress	Yes / No	Online
Cuvette	Yes / No *2	Online *1
Unit (for multiple units only)	Yes / No *2	Online *1
Online Test No. Digit	2 / 3	Online
Result Digit	6 / 9	Online
No. of Data 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.	-	-	-	-	◯	×	-	-	-	-	-	-	-	-	-	-
Unit	-	-	-	-	-	-	-	-	○	○	○	○	x	x	x	-
Cuvette	-	-	-	-	-	-	-	-	○	○	○	○	x	x	x	-

○: Corresponds to parameter changes
x: Does not correspond to parameter changes
-: Not applicable

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

A.4 AU5800 Online Condition Parameter Sheet

Set up	Contents
Test Requisition Information Receive	
Routine Normal	□ Realtime □ Batch □ None
Routine Repeat	□ Realtime □ Batch □ None
Emergency Normal	□ Realtime □ Batch □ None
Emergency Repeat	□ Realtime □ Batch □ None
Result Transfer	
Routine Normal	□ Realtime □ Batch □ None
Routine Repeat	□ Realtime □ Batch □ None
Emergency Normal	□ Realtime □ Batch □ None
Emergency Repeat	□ Realtime □ Batch □ None
QC	□ Realtime □ Batch □ None
Calibration	□ Realtime □ Batch □ None
Reagent Blank	□ Realtime □ Batch □ None
Emergency Quick	□ Realtime □ None

Upper Protocol	Contents
Communication Error Control	
T.R.I Receive Error Control	□ Continue □ Stop
Result Transfer Error Control	□ Continue □ Stop

Lower Protocol	Contents
Character Format	
Character Length	□ 7 □ 8
Parity Bit	□ Odd □ Odd □ None
Stop Bit	□ 1 □ 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	□ 256 □ 512 □ 1024
Device No.	[ ] (00 to 99 / space)
ETB Control	□ Yes □ No
Communication Control	
Bit/Sec	□ 4800 □ 9600
Class	□ Class A □ Class B
BCC Check	□ Yes □ 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.	□ Yes	□ No	
Rack No. Digits	□ 4	□ 5	
Type	□ Yes	□ No	
Dilution Info.	□ Yes	□ No	
Reagent Info.	□ Yes	□ No	
R1-2 Use	□ Yes	□ No	
Sex	□ Yes	□ No	
Age	□ Yes	□ No	
Patient Information 1	□ Yes [ ] digits	□ No	
Patient Information 2	□ Yes [ ] digits	□ No	
Patient Information 3	□ Yes [ ] digits	□ No	
Patient Information 4	□ Yes [ ] digits	□ No	
Patient Information 5	□ Yes [ ] digits	□ No	
Patient Information 6	□ Yes [ ] digits	□ No	
Sample ID Digits	[ ] digits (4 to 26)		
Zero Suppress	□ Yes	□ No	
Cuvette	□ Yes	□ No	
Unit (for multiple units only)	□ Yes	□ No	
Online Test No. Digit	□ 2	□ 3	
Result Digit	□ 6	□ 9	
No. of Data Flags	□ 2	□ 4	
Cal. No./Control No. Digit	□ 2	□ 3	

A.5 Alarm List related to Online Communication

(1) Alarm No. 6031: Online Error (aa) (bb cc dddd)

[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 Illegal 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 the DPR transmitted before receiving a message	R△ RH	Normal sample request Repeat run sample request

(4) Alarm No. 6034: Online Illegal 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 Illegal 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 Normal sample
		△U	Urine Normal sample
		△X	Other 1 Normal sample
		△Y	Other 2 Normal sample
		△W	Whole blood Normal sample
		H△	Serum Repeat run sample
		HU	Urine Repeat run sample
		HX	Other 1 Repeat run sample
		HY	Other 2 Repeat run sample
		XW	Whole blood Repeat run sample
bbbb	Sample No.	0001-9999	Routine sample
		E001-E999	Emergency sample
cccccc	Sample ID		

(6) Alarm No. 6036: Online Illegal Rack No. (aa bbbb : cccc-dd) eeeeee

[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 Normal sample
		△U	Urine Normal sample
		△X	Other 1 Normal sample
		△Y	Other 2 Normal sample
		△W	Whole blood Normal sample
		H△	Serum Repeat run sample
		HU	Urine Repeat run sample
		HX	Other 1 Repeat run sample
		HY	Other 2 Repeat run sample
		XW	Whole blood Repeat run sample
bbbb	Sample No.	0001-9999	Routine sample
		E001-E999	Emergency 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 Illegal Gender 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 Normal sample
		△U	Urine Normal sample
		△X	Other 1 Normal sample
		△Y	Other 2 Normal sample
		△W	Whole blood Normal sample
		H△	Serum Repeat run sample
		HU	Urine Repeat run sample
		HX	Other 1 Repeat run sample
		HY	Other 2 Repeat run sample
		XW	Whole blood Repeat run sample
bbbb	Sample No.	0001-9999	Routine sample
		E001-E999	Emergency sample
cc	Patient sex in the message received		
dddddd	Sample ID		

(8) Alarm No. 6038: Online Illegal Age/Month (aa bbbb : ccc dd) eeeeee

[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 Normal sample
		△U	Urine Normal sample
		△X	Other 1 Normal sample
		△Y	Other 2 Normal sample
		△W	Whole blood Normal sample
		H△	Serum Repeat run sample
		HU	Urine Repeat run sample
		HX	Other 1 Repeat run sample
		HY	Other 2 Repeat run sample
		XW	Whole blood Repeat run sample
bbbb	Sample No.	0001-9999	Routine sample
		E001-E999	Emergency 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) eeeeee

[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 Normal sample
		△U	Urine Normal sample
		△X	Other 1 Normal sample
		△Y	Other 2 Normal sample
		△W	Whole blood Normal sample
		H△	Serum Repeat run sample
		HU	Urine Repeat run sample
		HX	Other 1 Repeat run sample
		HY	Other 2 Repeat run sample
		XW	Whole blood Repeat run sample
bbbb	Sample No.	0001-9999	Routine sample
		E001-E999	Emergency sample
cc	Type of message transmitted	R△	Normal sample request
		RH	Repeat run sample request
dd	Type of message received	S△	Normal sample information
		SH	Repeat run sample information
eeeeee	Sample ID		

(10) Alarm No. 6040: Online Sample No. Mismatch (aa bbbb <> cc dddd) eeeeee

[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 Normal sample
		△U	Urine Normal sample
		△X	Other 1 Normal sample
		△Y	Other 2 Normal sample
		△W	Whole blood Normal sample
		H△	Serum Repeat run sample
		HU	Urine Repeat run sample
		HX	Other 1 Repeat run sample
		HY	Other 2 Repeat run sample
		XW	Whole blood Repeat run sample
bbbb	Sample No. in the message transmitted	0001-9999	Routine sample
		E001-E999	Emergency sample
cc	Sample/body fluid type in the message received	△△	Serum Normal sample
		△U	Urine Normal sample
		△X	Other 1 Normal sample
		△Y	Other 2 Normal sample
		△W	Whole blood Normal sample
		H△	Serum Repeat run sample
		HU	Urine Repeat run sample
		HX	Other 1 Repeat run sample
		HY	Other 2 Repeat run sample
		XW	Whole blood Repeat run sample
dddd	Sample No. in the message received	0001-9999	Routine sample
		E001-E999	Emergency 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 Normal sample
		△U	Urine Normal sample
		△X	Other 1 Normal sample
		△Y	Other 2 Normal sample
		△W	Whole blood Normal sample
		H△	Serum Repeat run sample
		HU	Urine Repeat run sample
		HX	Other 1 Repeat run sample
		HY	Other 2 Repeat run sample
		XW	Whole blood Repeat run sample
bbbb	Sample No.	0001-9999	Routine sample
		E001-E999	Emergency 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 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 condition parameters).

2) For the tests in the repeat run 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 Normal sample
		△U	Urine Normal sample
		△X	Other 1 Normal sample
		△Y	Other 2 Normal sample
		△W	Whole blood Normal sample
		H△	Serum Repeat run sample
		HU	Urine Repeat run sample
		HX	Other 1 Repeat run sample
		HY	Other 2 Repeat run sample
		XW	Whole blood Repeat run sample
		△△	Serum Normal sample
bbbb	Sample No.	0001-9999	Routine sample
		E001-E999	Emergency sample
cccccc	Sample ID		
ddd	Online test No.		

(14) Alarm No. 6044: Online Repeat Run Item Error (aa bbbb)

[Processing on the equipment when this alarm is raised]

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

[Details of the alarm]

(1) When a repeat run sample information response message was received online, a repeat run sample was not registered for one of the following reasons:
   1) The original sample specified in the message was not registered in normal sample information.
   2) A sample No. was not set for the original sample specified in the message.
   3) The original sample specified in the message was not measured.
   4) Another repeat run sample was registered for the original sample specified in the message.

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

aa	Sample/body fluid type	△△	Serum Normal sample
		△U	Urine Normal sample
		△X	Other 1 Normal sample
		△Y	Other 2 Normal sample
		△W	Whole blood Repeat run sample
		H△	Serum Repeat run sample
		HU	Urine Repeat run sample
		HX	Other 1 Repeat run sample
		HY	Other 2 Repeat run sample
		XW	Whole blood Repeat run sample
bbbb	Sample No.	0001-9999	Routine sample
		E001-E999	Emergency sample

AU5800 Online Specification Revision History Table

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

DATE	DESCRIPTION	PAGE	CHANGE METHOD	VERSION	CONFIRM
22. Jan, 2010	New publication	All page		1st Edition	
7. Jul, 2010	Clerical errors corrected.	20, 26, 47, 50	Change	V2	
19. Jan, 2011	Brand name changed.	Cover	Change	V3	
18. Aug, 2011	Clerical errors corrected, descriptions added and Revision History Table added.	Revision History Table 17, 18, 21	Change	V4	