

AU400 & AU640

Online Specifications

	AU400	AU640
Issued:	1997.6.30	1998.9.18
	1998.3.20	

	AU400 & AU640
Issued	1999. 2.3

Olympus Optical Co., Ltd.

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1. Outline

1) The following data is exchanged between the AU400,AU640 and the host computer system.

- (1) Test Requisition Information (T.R.I.)
- (2) Test Results

2) The data transmission is conducted in either of the following mode:

- (1) Transmission without synchronizing with analysis (Real Time)
- (2) Transmission with synchronizing with analysis during the analytical operation (Batch)

3) The Following format and protocol can be select by menu.

- (1) Communication protocol
- (2) T.R.I. inquiry text format
- (3) Test result text format

2. Basic specification

1) Format of Transmission

Item	Contents										
Transmission line	RS-232C										
Synchronization	Synchronization										
Data transmission mode	Half-Duplex										
Bit/sec	2400bps, 4800bps, 9600bps										
Configuration	<table border="1"> <tr> <td>start bit</td><td>1 bit</td></tr> <tr> <td>data bit</td><td>7 or 8 bit</td></tr> <tr> <td>parity bit</td><td>none, odd or even</td></tr> <tr> <td>stop bit</td><td>1 or 2 bit</td></tr> <tr> <td>total</td><td>9-12 bit</td></tr> </table> <p>these can be select by menu</p>	start bit	1 bit	data bit	7 or 8 bit	parity bit	none, odd or even	stop bit	1 or 2 bit	total	9-12 bit
start bit	1 bit										
data bit	7 or 8 bit										
parity bit	none, odd or even										
stop bit	1 or 2 bit										
total	9-12 bit										
Form of transmission	<p>class A Transmission are conducted from the sender to the receiver in a certain time interval.</p> <p>class B Transmission are conducted by confirming with ACK (receipt acknowledged)or NAK (not acknowledged) between the sender and the receiver.</p>										
Use channel	1 channel										
Retry	<p>class A: None</p> <p>class B: 0-3 can be selected by menu.</p>										

2) Transmission code

Item	Contents	Limit of value
Data code	7 bit code ASCII CODE	20H-7EH
	8 bit code	
	1 byte code	20H-7EH A1H-DFH
Control code	start code/terminate code	01H-1FH
	ACK	06H
	NAK	15H
	BCC	00H-FFH

3) Text format

(1) Basic configuration as follows:

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

Name	Digit	Contents		Remarks
1) Text start code	1,2	01h-1Fh	Data start code	Normally 02h
2) Text classification	2	R#	T.R.I. inquiry	AU400,AU640 → Host
		RB	Start of T.R.I inquiry	
		R_*	T.R.I inquiry of normal sample	
		RH	T.R.I inquiry rerun sample	
		RE	End of T.R.I inquiry	
		S#	T.R.I.	Host → AU400,AU640
		S_*	T.R.I. of normal sample	
		SH	T.R.I. of rerun sample	
		SE	STOP of T.R.I	
		D#		AU400,AU640 → Host
		DB	Start of transfer result	
		D_*	Normal sample result	
		DH	Rerun sample result	
		DR	Reagent blank sample result	
		DA	Calibration result	
		d_*	Stat fast result	
		dH	Stat fast rerun result	
		DQ	QC sample result	
		DE	End of result transfer	
3) Unit No.	0,2	00-99		
4) Text code			Contents of Text	
			Data No. is added behind text of Header parts.	
5) text end code	1,2	01h-1Fh	End of text code	
6) BCC (Block Check Character)	1	00h-FFh	The sum with the Exclusive "or" logic including 2 and 5 and between 2 and 5.	

remarks * _ is space.

(2) Blocking

a) Definition of Term

Term	Definition
Text length	It is the total bytes from 1) to 6). .
Max block length	It is shown Max length of text in one phase.
	The length of block can be selected in online parameter menu.

b) Kind of text and blocking

Kind	Kind of text	Method of Blocking	
Fixed length text	Start of T.R.I. inquiry T.R.I. inquiry text End of T.R.I. transmission text Stop of T.R.I. inquiry Start of transfer result transmission text End of result transfer transmission text	Non-blocking	
Variable length text	T.R.I. text Rerun T.R.I. text Test result text Rerun result text QC result text Acal result text Reagent blank result text STAT(fast) result text	Using blocking	Max block length < text length
		Block Identification No. (0-9,E) (see page 9)	first block Block Identification No. =0 second block Block Identification No. =1 last block Block Identification No. =E
		Text end code	Text end code = ETX(03H) and using ETB = yes *1 End of block = ETB End of text = ETX
			Text end code <>ETX(03H) or ETB(17h) is no-use *1 End of block is designated in menu. End of text is designated in menu. Using ETB can be selected in online parameters.

Remark *1: When Block Identification No. is numeric(0,1,...), Only "End of Block" is used.
When Block Identification No. is "E", Only "End of Text" is used.

3. Transmission text format

0) Common item

The use of the following can be selected by online parameter menu.

- 1) Text start code
- 3) Unit No.
- 5) Text end code
- 6) BCC

1) T.R.I. inquiry text

(1) Start text to inquiry test requisition

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

(2) Normal run inquiry test requisition

1)	R	_	3)	rack no.	cup posi- tion	sample no.	sample id	5)	6)
----	---	---	----	----------	----------------------	------------	-----------	----	----

sample type

(3) Rerun inquiry test requisition

1)	R	H	3)	rack no.	cup posi- tion	sample no.	sample id	5)	6)
----	---	---	----	----------	----------------------	------------	-----------	----	----

sample type

(4) End text to inquiry test requisition

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

2) T.R.I. text

(1) Normal sample test requisition information text

1)	S _	rack no.	cup posi- tion	sample no.	sample id	dummy	
			sample type				Block Identification No.

s e x	age	month	Patient information 1	Patient information 2	Patient information 3
-------------	-----	-------	--------------------------	--------------------------	--------------------------

Patient information 4	Patient information 5	Patient information 6
--------------------------	--------------------------	--------------------------

test code	test code	test code	test code	test code	test code	test code	test code	5)	6)
--------------	--------------	--------------	--------------	--------------	--------------	--------------	--------------	----	----

(2) Rerun sample test requisition information text

1)	S H	rack no.	cup posi- tion	sample no.	sample id	original sample no.	
			sample type				Block Identification No.

test code	me th od	test code	me th od	test code	me th od	test code	me th od	test code	me th od	5)	6)
--------------	----------------	--------------	----------------	--------------	----------------	--------------	----------------	--------------	----------------	----	----

(3) End of T.R.I. transmission text

1)	S	E	5)	6)
----	---	---	----	----

3) Test result transmission text

(1) Start of test result transmission text

1)	D	B	3)	5)	6)
----	---	---	----	----	----

(2) Normal sample test result text

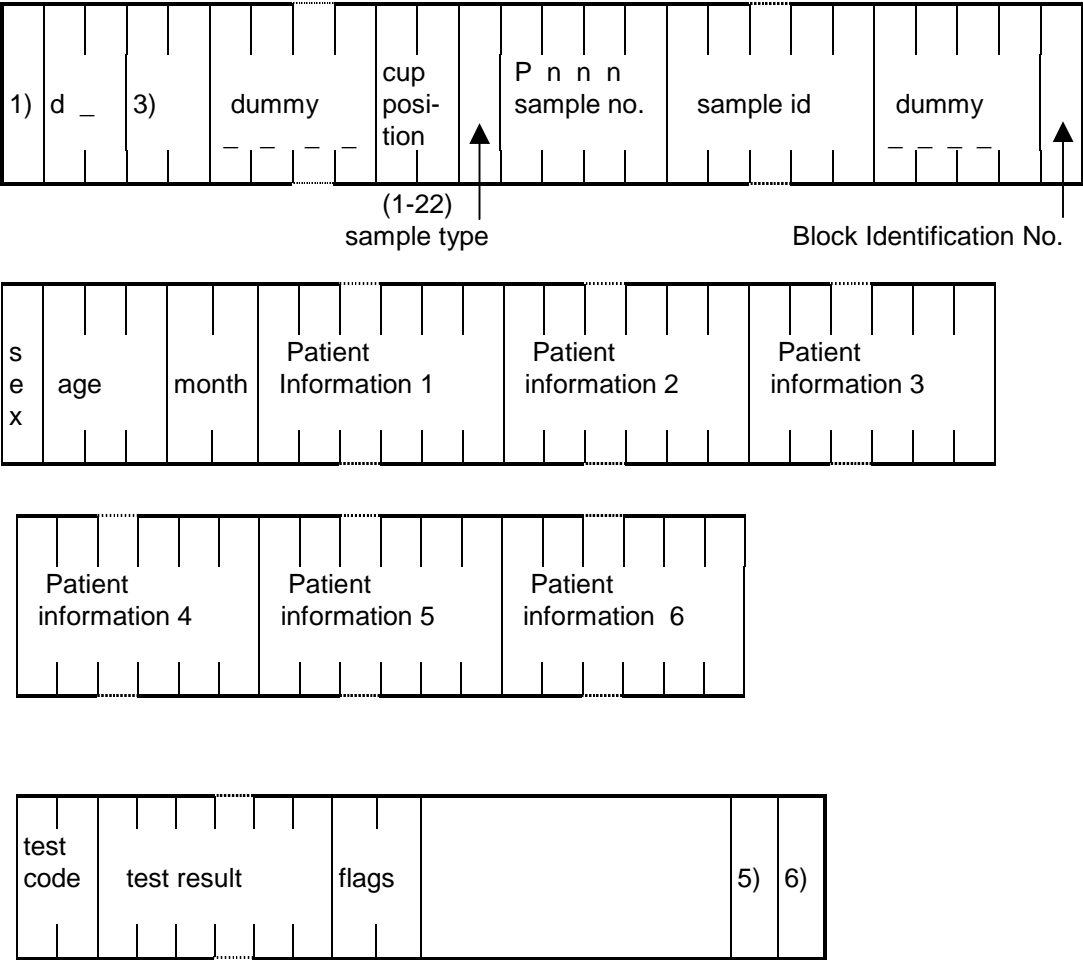
1)	D	_	3)	rack no.	cup posi- tion	sample no.	sample id	dummy
					sample type	Block Identification No.		

s e x	age	month	Patient information 1	Patient information 2	Patient information 3
-------------	-----	-------	--------------------------	--------------------------	--------------------------

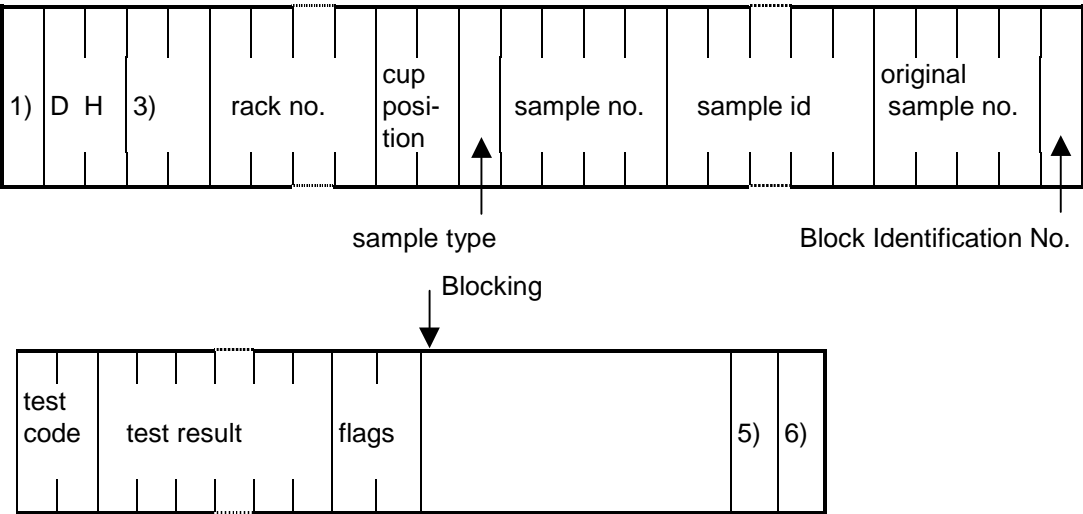
Patient information 4	Patient information 5	Patient information 6
--------------------------	--------------------------	--------------------------

test code	test result	flags	Blocking		5)	6)
--------------	-------------	-------	----------	--	----	----

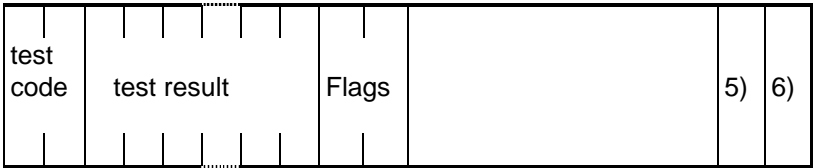
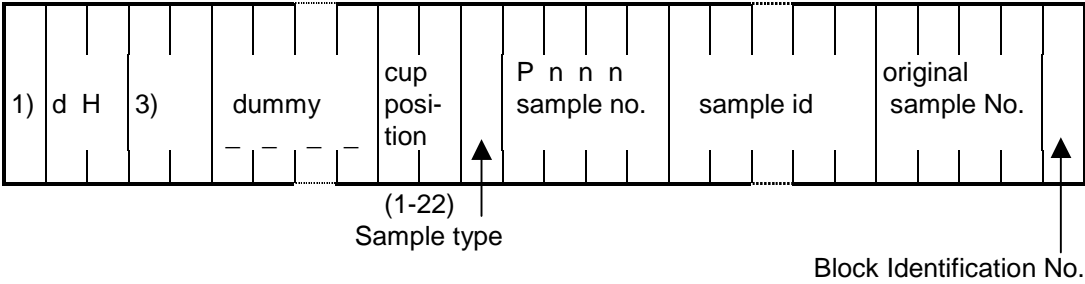
(3) Stat(fast) test result text



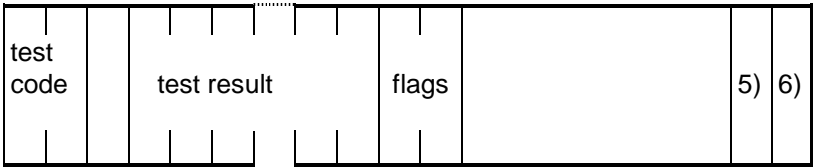
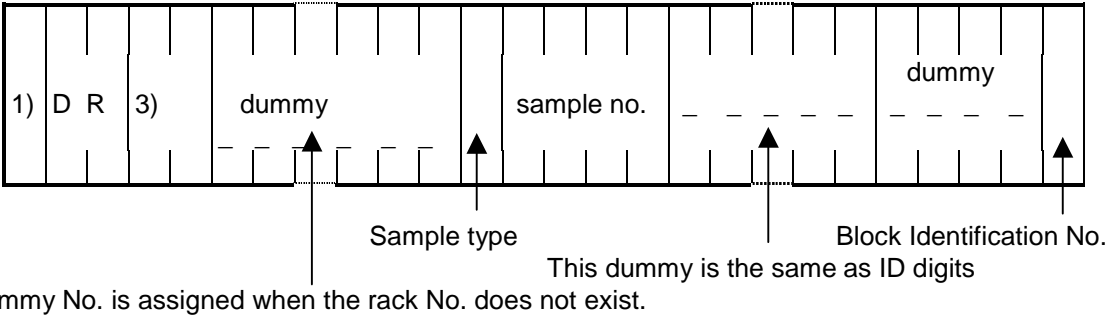
(4) Rerun result text -1



(5) Rerun result text -2(stat fast sample)

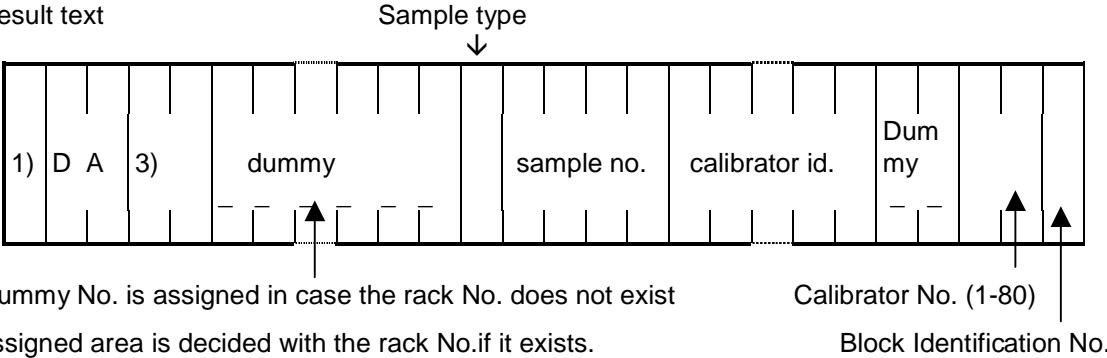


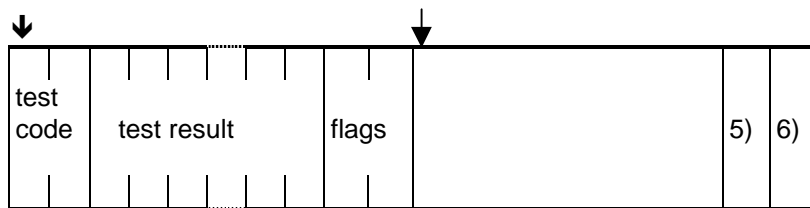
(6) Reagent blank result text



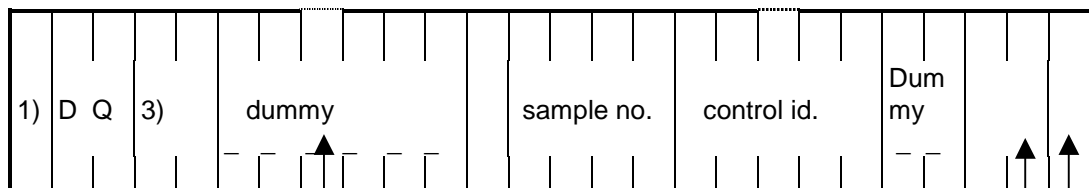
1:first data
2:second data

(7) Acal result text



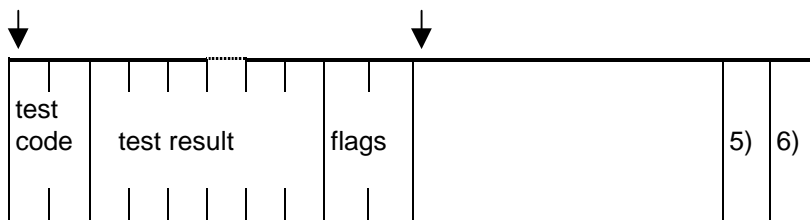


(8) QC result text

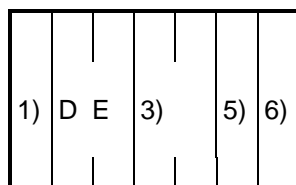


This dummy No. is assigned in case the rack No. does not exists and assigned area is decided with the rack No. if it exists.

Control No.
Block Identification No.



(9) End of test result transfer text



4) Relation between real-time/batch and Transmission text

T.R.I. inquiry and T.R.I. of Routine and Emergency and Stat and Rerun is selectable real-time or batch.
Test result of all sample is selectable real-time or batch.

5) Others

(1) Contents and formats of text

Item	Digit	Contents	Remarks
1. Rack No. and...	0,4 or 5	'0001'-'9999' or '00001'-'99999' STAT sample is space When Rack no. is no setting, Rack No. is '00000'.	The digit of rack no. and cup pos. and these using is changeable in online parameters menu. in case ,receive T.R.I. in batch
2. Cup position	0,2	rack : '01'-'10' STAT : '01'-'22'	This is automatically assigned associated with the rack No. in menu.
3. Sample type	1	space : serum U : urine X : other	
4. Sample No.	4	'0001'-'9999' : Routine sample 'E001'-'E999' : Emergency sample 'P001'-'P999' : Stat sample 'R001'-'R999' : Reagent blank 'A001'-'A999' : Calibration sample 'Q001'-'Q999' : QC sample	
5. Sample id	1-20	number or character	Number of digits can be changed in format menu.
6. Original sample No.	4	'0001'-'9999' : normal sample 'E001'-'E999' : emergency sample 'P001'-'P999' : stat sample	
7. Reserved	4	space	
8. Block Identification No.	1	'0'-'9' Last text is 'E'	
9. Sex	0,1	M : male F : female SP : none sex 0 : no-set	These items can be selected/canceled in Requisition format menu.
10. Age and...	0,3	'000'-'150' space : no-set	
11. Month	0,2	'00'-'11' space : no-set	
12. Patient information	0-20	number or character	
13. Online test No.	2	'01'-'99'	This number can be changeable in online parameter menu.
14. Method	1	'0':normal '1':dilution '2':condense	
15. Test result	8 or 11	Test result digit 6 or 9 flags digit 2 refer to A.1 Flags list	0 suppress can be selected/canceled in online parameter menu Number of digit can be changed 6 or 9 in online parameter menu.

(2) Test result format

a) Test result

Data digit is 6 and 0 suppress is not used.

0	1	2	3	4	5

Data digit is 9 and 0 suppress is not used.

-	0	1	2	3	4	5	6	7

Data digit is 6 and 0 suppress is used.

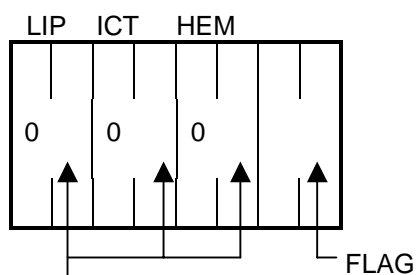
-	_	1	2	3	4

Data digit is 9 and 0 suppress is used.

-	_	1	2	3	.	4	5	6

b) LIH result

Data digit is 6 and 0 suppress is not used.



0 NORMAL

1 +

2 ++

3 +++

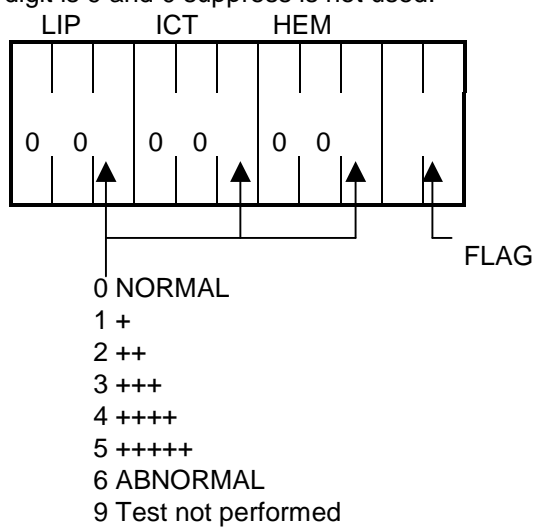
4 ++++

5 +++++

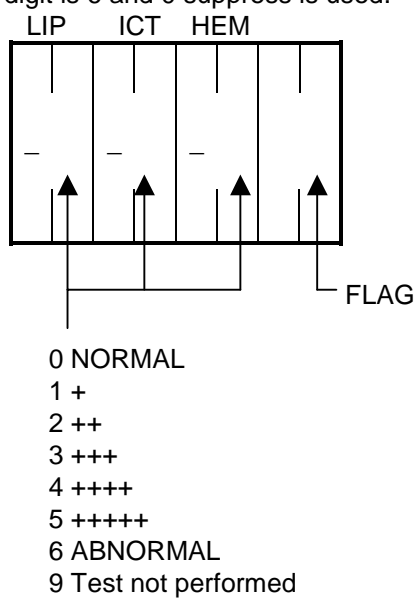
6 ABNORMAL

9 Test not performed

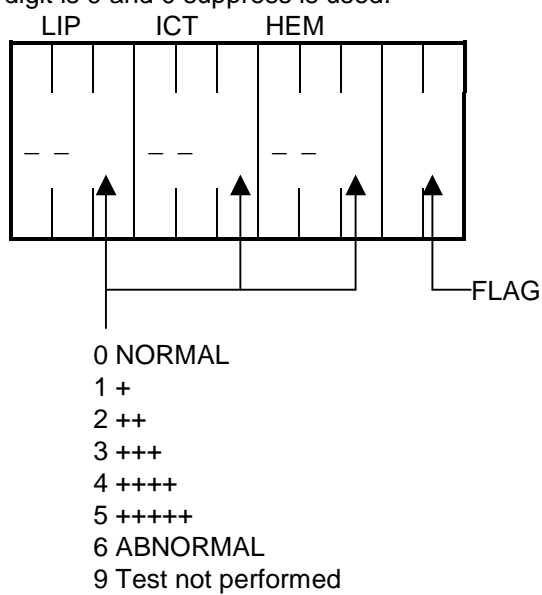
Data digit is 9 and 0 suppress is not used.



Data digit is 6 and 0 suppress is used.



Data digit is 9 and 0 suppress is used.



3) T.R.I. of calculated tests

Calculated Test No. in T.R.I. from Host is ignored.

4) Data format with the Test result data is a digit over.

Data digit is 6.

9	9	9	9	9	9

Data digit is 9.

9	9	9	9	9	9	9	9	9	9

5) Data format that the Test result data is a OD-value.

Data digit is 6.

0	.	1	2	3	4

When the data is a negative OD-value, it is the same as digit over.

Data digit is 9.

-	-	-	0	.	1	2	3	4	

6) T.R.I of LIH.

In any case, LIH test no. in T.R.I from Host is necessary for LIH analysis.

4. Transmission protocols

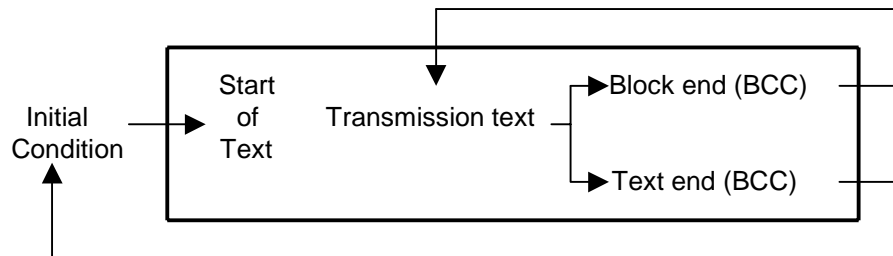
1) Protocols at AU400,AU640

A. Class A: without ACK/NAK exchange

a. Sending

Text to be sent:

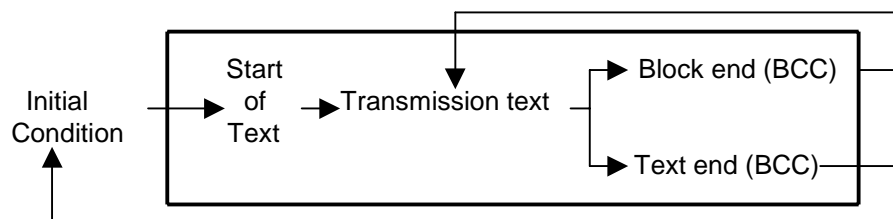
T.R.I. Inquiry text
Repeat Run T.R.I. inquiry text
Start of Test Result Transmission text
Test Result text
Repeat Run Result text
End of Test Result Transmission text



b. Receiving

Text to be received:

T.R.I. text
Repeat Run T.R.I. text
End of T.R.I. Transmission text

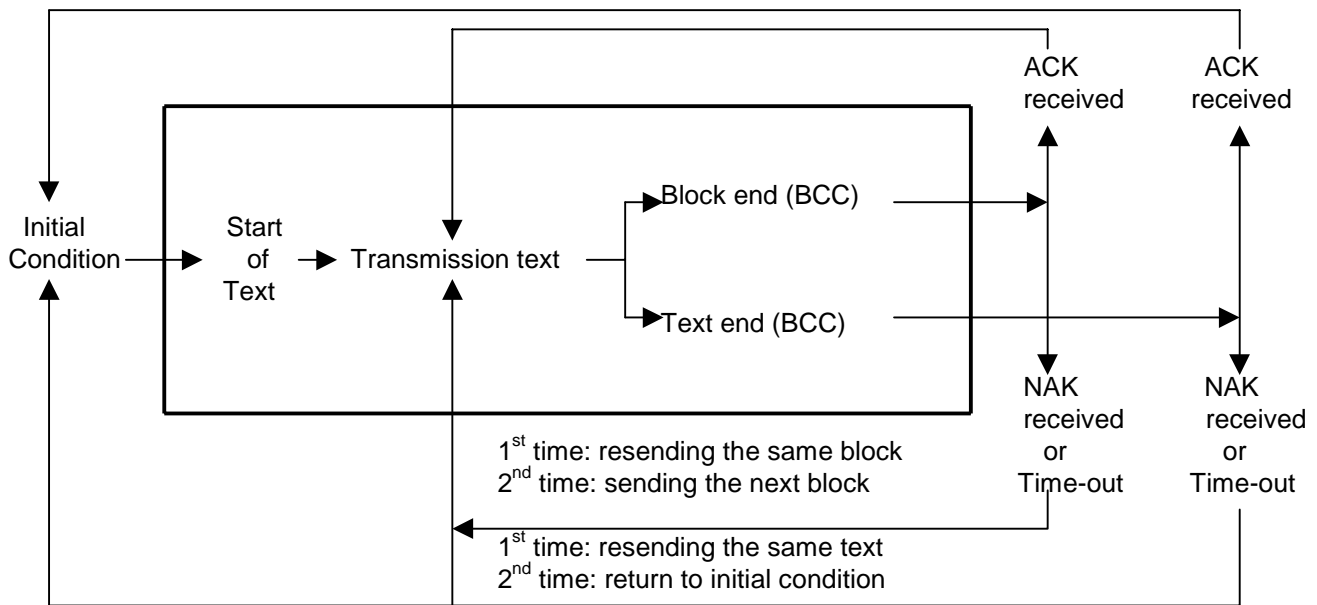


B. Class B: with ACK/NAK protocol

a. Sending

Text to be sent:

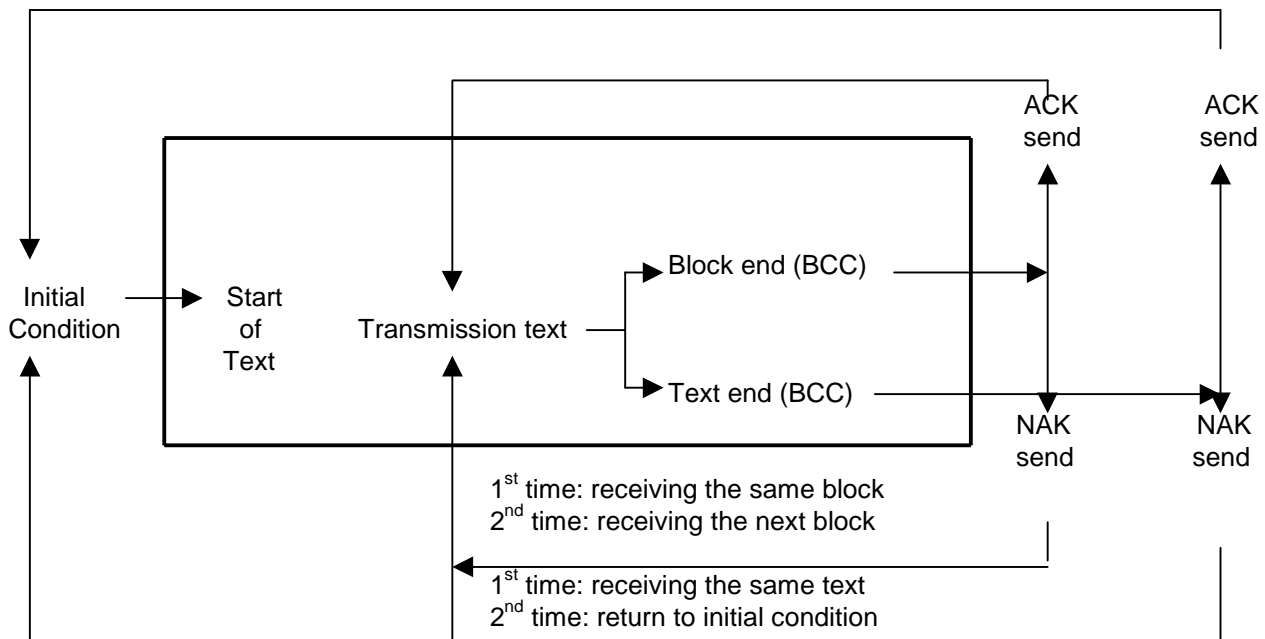
T.R.I. Inquiry text
Repeat Run T.R.I. Inquiry text
Start of Test Result Transmission text
Test Result text
Repeat Run Result text
End of Test Result Transmission text



b. Receiving

Text to be received:

T.R.I. text
Repeat Run T.R.I. text
End of T.R.I. Transmission text



2) Timing/time-out

(1) time-out/timing list

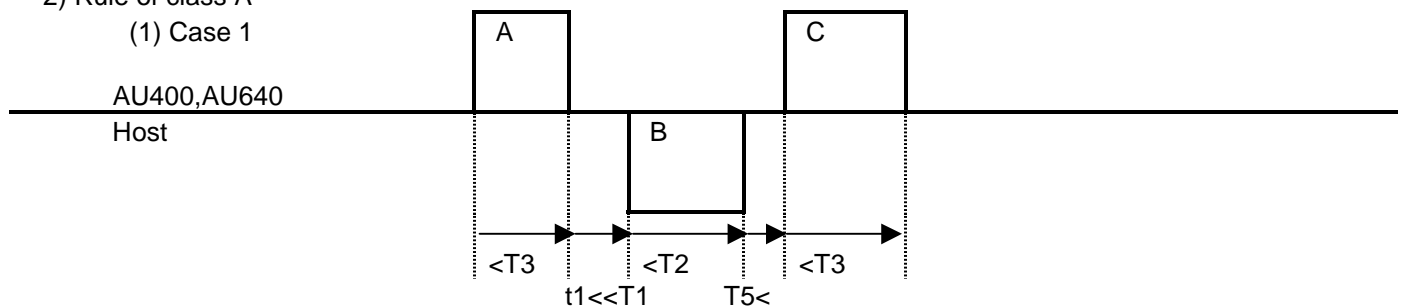
Kind	Description	Default	Remarks
T1	Limit time from end of transfer/receive to start of text receive.	2 s	0.1 x n sec n=1-99
T2	Limit time from start of text receive to end of text receive.	note 1	
T3	Limit time from start of text transfer to end of text transfer.		
T4	Limit time from end of text transfer to response of receive.	2 s	
T5	Interval time of transmission	2 s	
T6	Min. time from receive	1 s	
T7	Limit time from NAK response to start receive of retry text.	2 s	
t1	Min. time from end of transfer text to receivable text.	0.5 s	not changeable
t2	Min. time from end of transfer text to next receivable text.	0.5 s	
t3	Min. time from end of transfer text to receivable response.	0.5 s	
t4	Min. time from end of receiving text to transfer response.	0.5 s	

note 1) $((\text{Max text length} \times \text{Character length})/\text{Bit/sec}) + 0.5 \text{ s}$

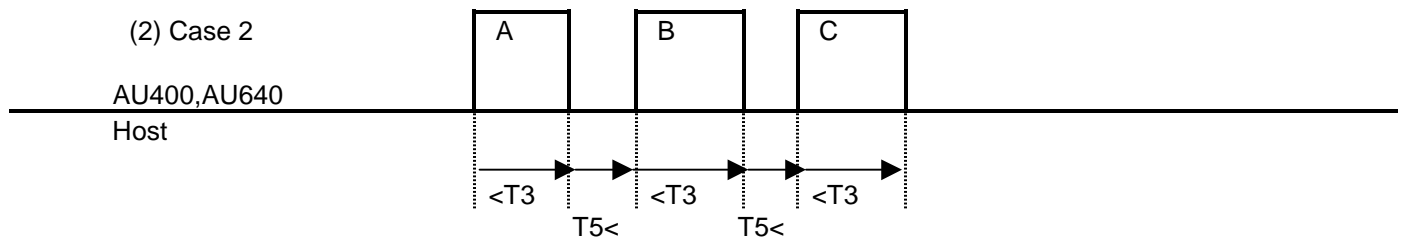
note 2) These time-outs can be changed in the online parameters menu.

2) Rule of class A

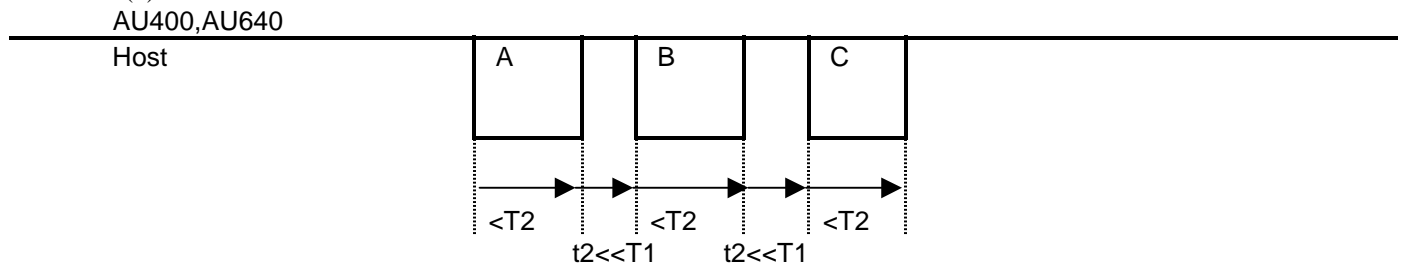
(1) Case 1



(2) Case 2

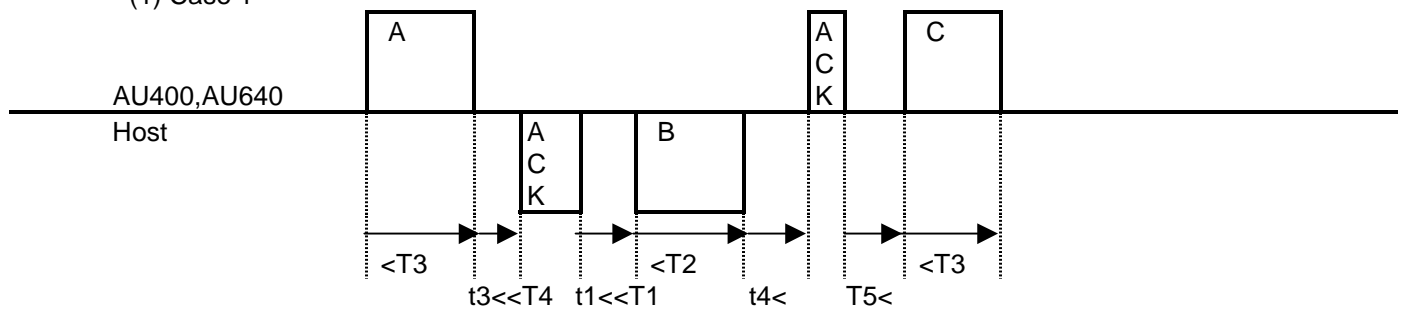


(3) Case 3

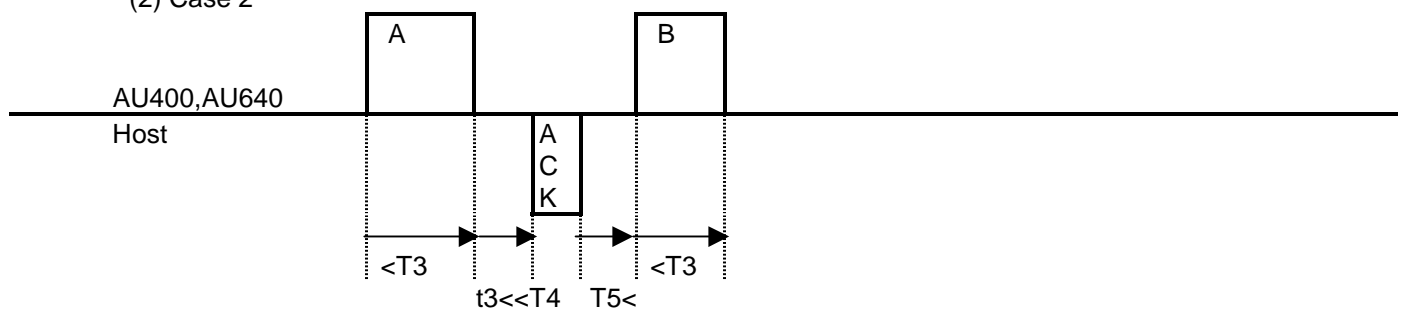


3) Rule of class B

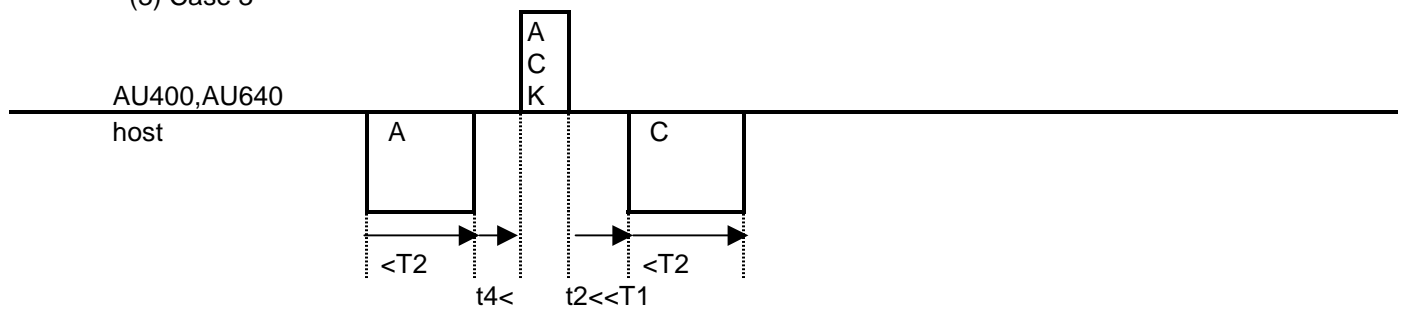
(1) Case 1



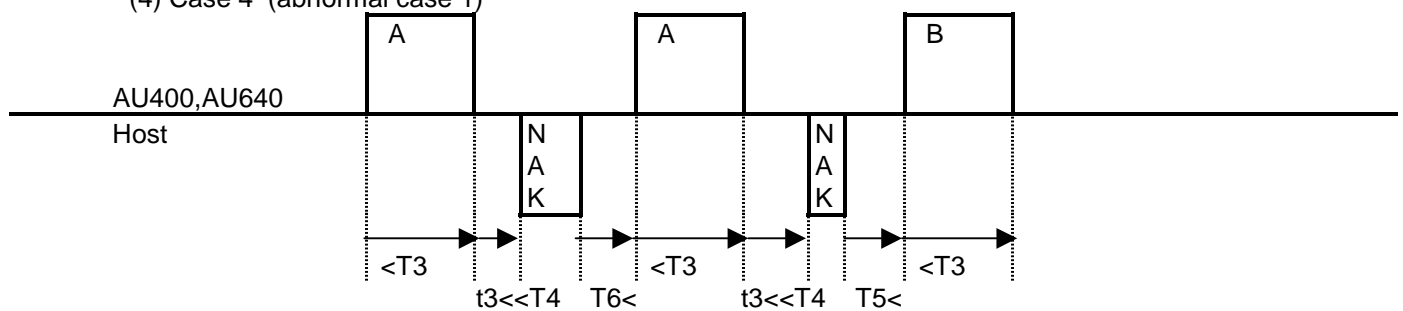
(2) Case 2



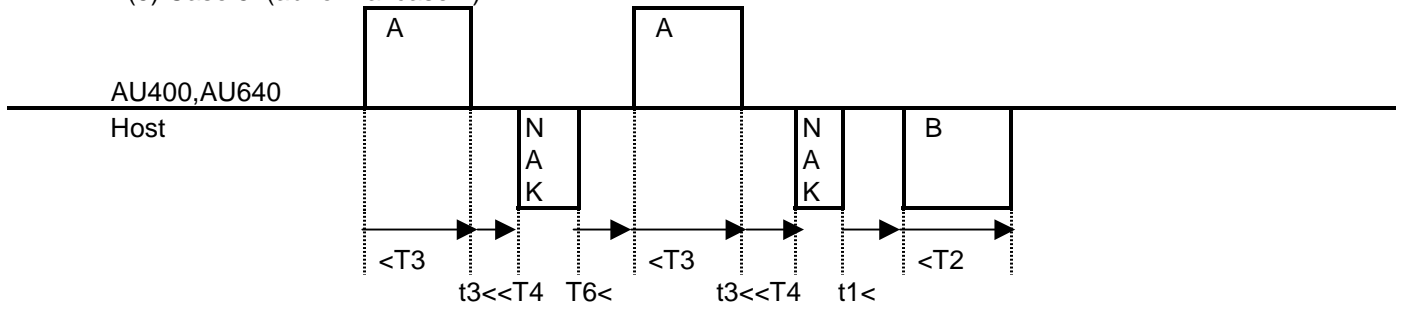
(3) Case 3



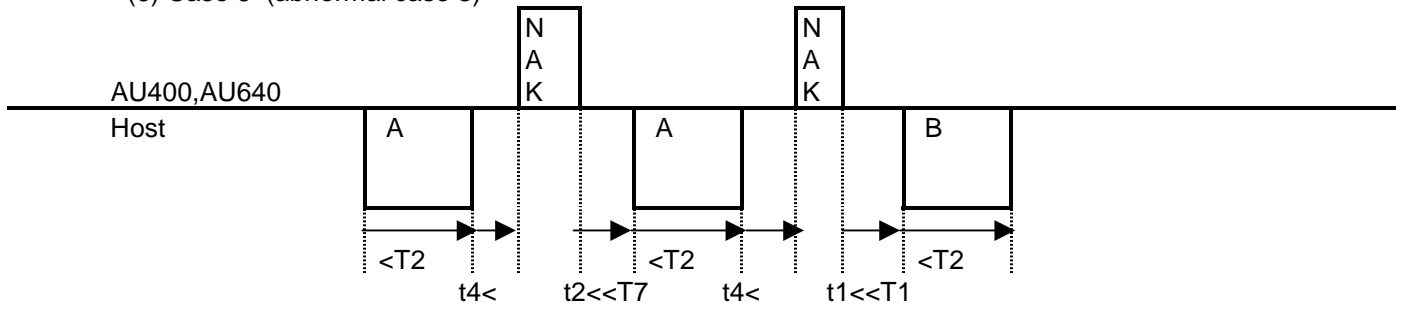
(4) Case 4 (abnormal case 1)



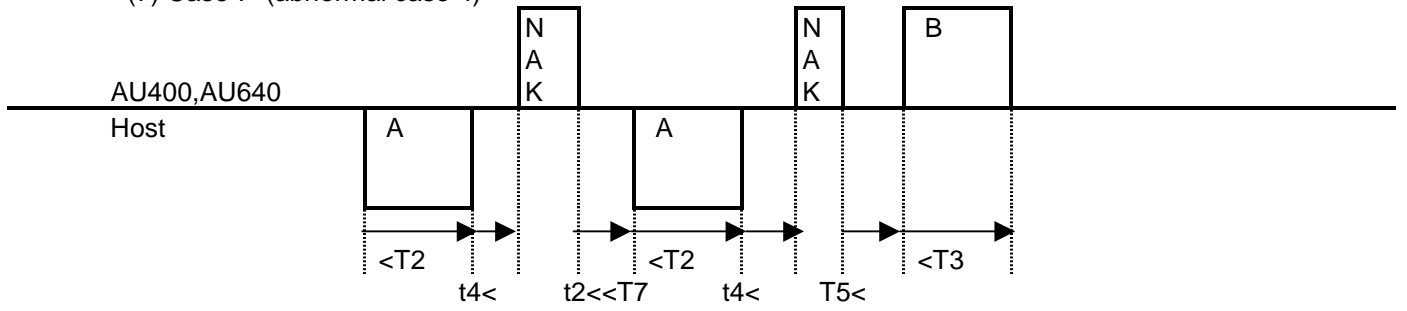
(5) Case 5 (abnormal case 2)



(6) Case 6 (abnormal case 3)



(7) Case 7 (abnormal case 4)



5.Application protocol

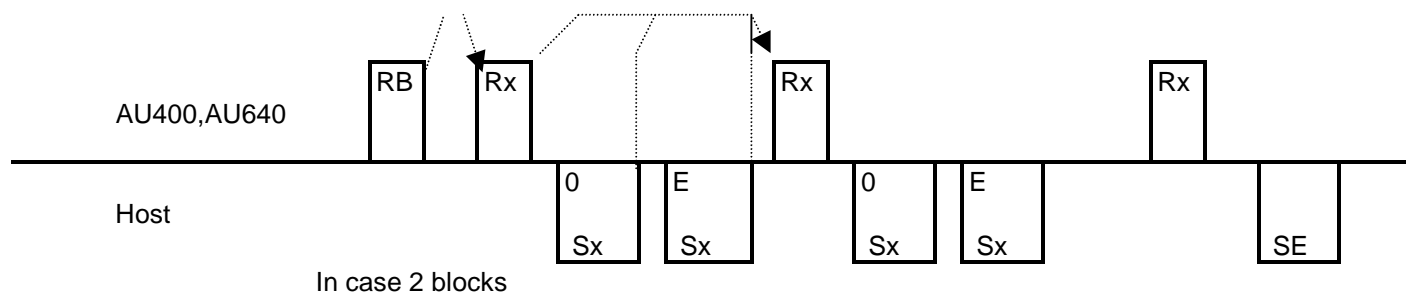
1) Receiving T.R.I.

(1) Trans./receive sequence in one session

General sequence :

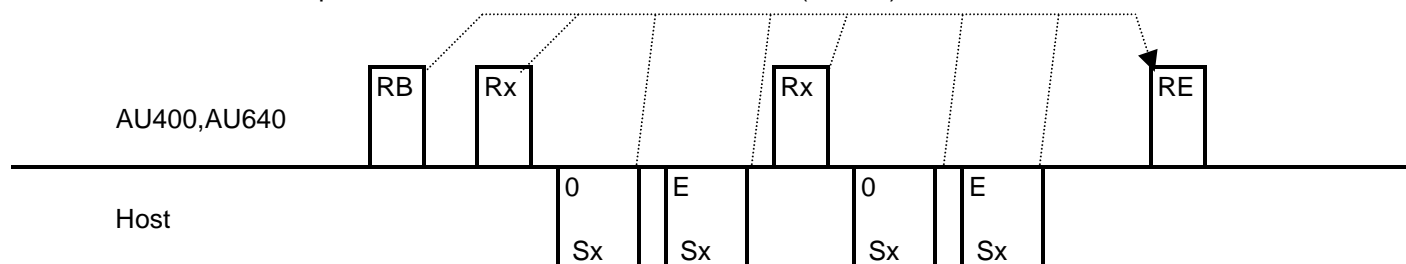
(a) Example 1

Shift next Rx-transfer when Online Error occurs. (note 1)



(b) Example 2

Stop the session when Online Error occurs. (note 1)



(2) Detail

T.R.I. receive	Kind of text	Timing/condition
Real-time	RB(request start)	This text is transferred when it is shifted from stand-by mode to start measure and then the first Rx is transmitted.
	R_ * (request normal)	(note 2)
	request of sample no.	When detecting cup, this sample No. is transferred if this sample has not T.R.I..
	request of sample id	When reading ID is normally, this sample ID is transferred if the sample has no T.R.I..
	RH (request rerun)	(note 2)
	request of sample no.	When detecting cup, this sample No. is always transmitted.
	request of sample ID	When reading ID is normal, the sample ID is always transmitted.

remarks * _ is space.

note 1) The number of times a TRI inquiry can be sent when an online error is generated can be selected in the online parameter menu.

note 2) It is possible that the R_-text and RH-text are mixed in one session.

Receive	Kind of text	Timing/condition
Real-time	Sx	This text can be received after end of Rx-transfer within the designated time.
	SE	
	RE (request end)	This text is transferred when shifting to the modes below. 1) measure mode to standby mode 2) measure mode to stop mode
		This text is transmitted when the communication is Canceled by the online alarm.
batch	RB (request start)	This text is transmitted when receiving T.R.I. is sent in the test Requisition.
	R_ * (request normal)	(note 3)
	request of sample no.	This text is transmitted at the designated time intervals. The texts are the samples that are selected in the test Requisition menu.
	RH (request rerun)	(note 3)
	request of sample no.	This text is transmitted at the designated time intervals. The texts are the samples that are selected in the test Requisition menu.
	Sx	This text can be received after end of Rx-transfer within the designated time.
	SE	
	RE (request end)	This text is transmitted when it was receiving the last sample No. in test requisition menu and SE text isn't received.
		This text is transmitted when the communication is Canceled in the test requisition menu.
		This text is transmitted when the communication is Canceled by the online alarm.

remarks * _ is space.

note 3) R_-text and RH-text are transferred in seperate sessions.

(2) Kind of T.R.I. transfer/receive

a) T.R.I. of normal sample

Setting of parameters		Kind of T.R.I.	Method of T.R.I. inquiry & T.R.I.	
Receive T.R.I.. inquiry	Method of T.R.I. inquiry		T.R.I. inquiry	T.R.I.
Real-time	Sequential Rack no.	Request of sample no	Sample no	Sample no *1
			Sample no (Calculated rack No. and cup pos. No.)	
	Sample ID	Request of sample ID	Sample ID Sample no	Sample ID Sample no *1
Batch	Sequential Rack no.	Request of sample no	Sample no.	Sample no *1
	Sample ID			Sample ID Sample no *1

Selectable setting of receiving T.R.I. in online parameter menu and requisition format menu.

Selectable method of T.R.I. in system menu.

Remark *1: Sample no. of T.R.I. must be the same as the Sample no. of T.R.I inquiry.

b) T.R.I. of Rerun sample

Setting of parameters			Kind of T.R.I.	Method of T.R.I. inquiry & T.R.I.	
Rerun sample Receive of T.R.I.	Rerun rack	Method of T.R.I. inquiry		T.R.I. inquiry	T.R.I.
Real-time	Using	Sequential Rack no.	Request of sample no	Rerun sample no.	Original S.No. Rerun sample no.*1
		Sample ID	Request of sample ID		Original S.No. Sample ID Rerun sample no. *1
Batch	-	Sequential Rack no.	Request of sample no	Rerun sample no.	Original S No. Rerun sample no. *1
		Sample ID			Original S.No Sample ID Rerun sample no.* 1

Remark *1: Rerun sample no. of T.R.I. must be the same as the Rerun sample no. of T.R.I inquiry.

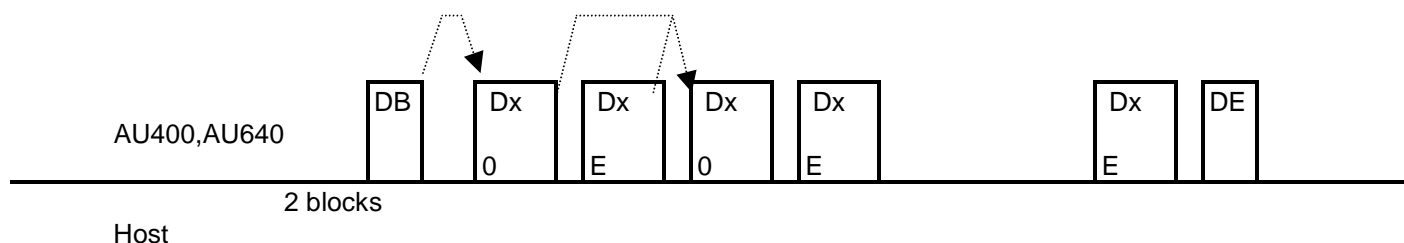
2) Sending test result protocol

(1) Transfer sequence for one session

General sequence :

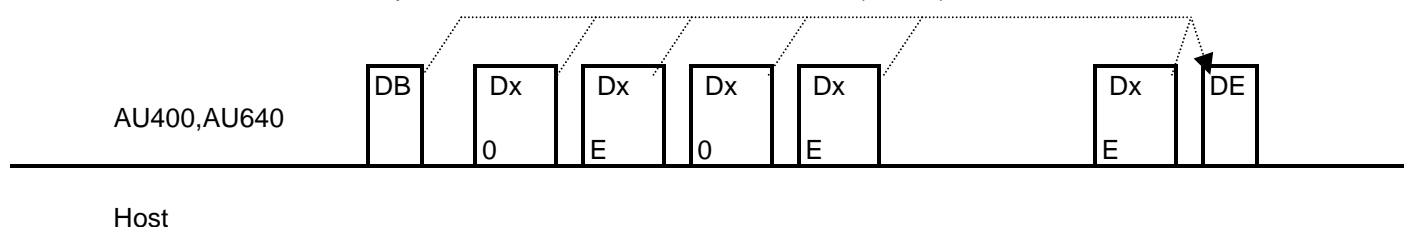
(a) Example 1

Shift next Dx-transfer when Online Error occurred. (note 1)



(b) Example 2

Stop session when Online Error occurred. (note 1)



(2) Detail

Data trans.	Kind of text	Timing/condition	Normal end	Online error
Real-time	DB (START)	This text is transmitted when it is shifted from stand-by Mode to measure mode and just before the first Dx is transmitted.	It is shifting to the Transfer of the test results.	It is output the alarm and it is Executed the below
	Dx (result data)	It is transmitted one by one when the samples are finished measuring.	It is shifting next to the transfer of Dx/DE.	Error protocol is stop. It is canceled the Transfer of Dx/DE Error protocol is Continue It is shifting next the transfer of Dx/DE.
	DE (end)	This text is transmitted after the last transfer of Dx text or when shifting to one of the following modes. 1) measure mode to standby 2) measure mode to stop This text is transmitted when the communication is canceled by the online alarm.	It is ending the Session of Transferring the test results.	The alarm is generated and the transfer of the text of test results ends.

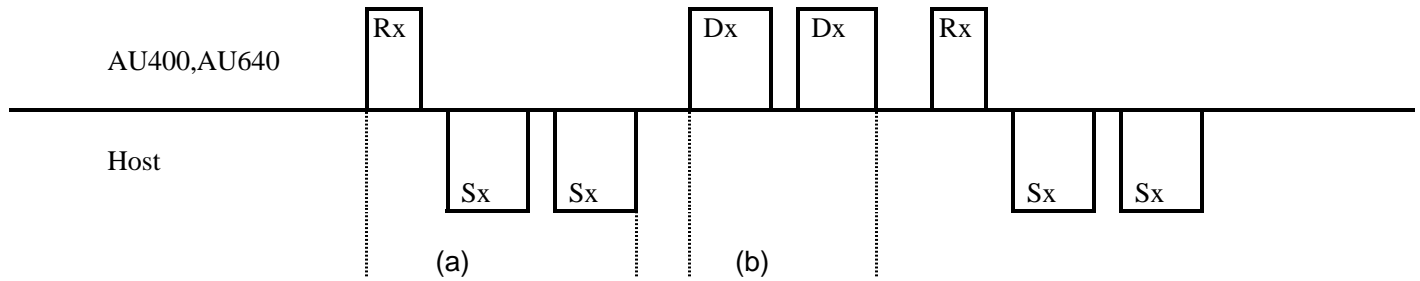
Data trans.	Kind of text	Timing/condition	Normal end	Online error
Batch	DB (start)	This text is transmitted when it selected at the start of transmission in the online menu.	It is shifting to the Transfer of the test Results.	It is output the alarm and it is executed the below
	Dx (result data)	This text is transmitted at the designate time intervals. The text are the samples that is selected in the online menu	It is shifting next to the transfer of Dx/DE.	Error protocol is stop. It is canceled the transfer of Dx/DE Error protocol is continue. It is shifting next the transfer of Dx/DE.
	DE (end)	This text is transmitted when it was transmitting the sample No. that is selected in online menu and it was after the designated time.	It is ending the Session of transferring the test results.	The alarm is generated and the Transfer of the text of test results ends.
		This text is transmitted when the communication is canceled in the online menu.		
		This text is transmitted when the communication is canceled by the online alarm.		

note 1) The number of times a TRI inquiry can be sent when an online error is generated can be selected in the online parameter menu.

3) Others

(1) Mixing the session of the TRI inquiry and the session of the test results.

a) General sequence



(2) Detail

section	Definition of section	Limitation
(a)	The start of the transmission of the text of T.R.I. inquiry -- The end of the receiving of all T.R.I. for one samples	Don't transmit the Test result text.
(b)	The start of the transmission of the text of the test results -- The end of the receiving of all result for one samples	Don't transmit the T.R.I. text.

6. Specification of connection

1) In/Output signals and Terminals

Signal Name	Abbrev.	Terminal at AU400,AU640 for Vectra	Direction	Terminal at host computer
Ground	FG		↔	1
Data sent	TxDATA	3	→	3
Data receive	RxDATA	2	←	2
Signal Ground	SG	5	↔	7
Request to send	RTS	7	↔	
Clear to send	CTS	8		
		Pin configuration of DB9		Pin configuration of DB25.

Caution: RTS and CTS must be shorted.

2) Signal Level

Signal/Signal Format	Signal Level
SPACE (ON)	+3V and higher ("H")
MARK (OFF)	-3V and lower ("L")

Caution: "H" stands for "HIGH LEVEL" and "L" for "LOW LEVEL".

3) Applicable Connector

Style of connector: Conforming to the standard of IBM PC (DB9 Male)
Provide a DB9 female connector.

Style of connector Cover: ditto

4) others

- A. When powering ON or OFF the host computer system, ensure that the AU400, AU640 is in the power on mode (incubator and refrigerator are only running). Powering ON or OFF the host computer system while the AU400,AU640 is being operated, may result in abnormality of the AU400,AU640.
- B. The cable for host communication is not included in the AU400, AU640 standard accessories. A shielded cable must be used for host connection.
- C. Do not use the terminals on the AU400, AU640 other than No. 2,3,5,7, & 8 for any other purpose.

A.1 Appendix Flags list

Flag	Contents
(	Failed to evade the contamination since the detergent for evading the contamination is not enough.
%	The sample probe is clogged with sample.
?	Calculation unable due to abnormal photometric data
#	Sample level detection error
R	Reagent level detection error
!	Calculation unable due to abnormal data
U	Reagent absorbance value at P-END (last photometric point) of Reagent Blank run, is smaller than the lower limit defined in the Specific Test Parameter Menu.
u	Reagent absorbance value at P-START (first photometric point) of Reagent Blank run, is smaller than the lower limit defined in the Specific Test Parameter Menu.
Y	Reagent absorbance value at P-END (last photometric point) of Reagent Blank run, is greater than the upper limit defined in the Specific Test Parameter Menu.
y	Reagent absorbance value at P-START (first photometric point) of Reagent Blank run, is greater than the upper limit defined in the Specific Test Parameter Menu.
@	Abnormally high result; absorbance of every wavelength is more than 2.5.
\$	No linearity validation conducted because less than 3 data obtained in the kinetics.
D	Too quick reaction slope in increasing kinetics, absorbance at P-START is higher than MAX. OD in increasing FIXED assay, or too slow reaction slope in decreasing kinetics (= no reaction observed)
B	Too quick reaction slope in increasing kinetics, or absorbance at P-END is lower than MIN. OD in increasing FIXED assay. Linearity error in kinetics.
*	Linearity error in kinetics.
&	Prozone data error (prozone check point data error)
Z	Prozone error
)	The reagent lot No. used at the time of sample analysis differs from the reagent lot No. used at the time of calibration analysis.
F	Result higher than the dynamic range specified in the Parameters
G	Result lower than the dynamic range specified in the Parameters
x	Other QC data error
1	QC result beyond the QC value range specified in the Parameters
2	multi-rule QC data error
3	multi-rule QC data error
4	multi-rule QC data error
5	multi-rule QC data error
6	multi-rule QC data error
7	multi-rule QC data error
p	Result beyond the panic value specified in the Parameters
T	Abnormality found in the Inter-Item Check
P	Result higher than DECIDE RANGE designated in parameters.
N	Result lower than DECIDE RANGE designated in parameters.
H	higher than the result value range specified in the Parameters
L	lower than the result value range specified in the Parameters
J	Result higher than the repeat run range specified in the Parameters
K	Result lower than the repeat run range specified in the Parameters
S	Result extracted for repeat run
/	Test not performed: test has been requisitioned but not performed due to any reason.
R	transferred data to host
e	edited data
c	correct data by manual correction

d	Data not the object of statistical calculations with [QC monitor]-[Data Edit]
---	---

A.2 Appendix Online parameters list

Transmission information		Contents	Menu
T.R.I. receive			online parameters
	Normal sample	real-time/batch/none	
	Emergency sample	real-time/batch/none	
	Stat sample	real-time/batch/none	
	Rerun sample	real-time/batch/none	
	Emergency repeat	real-time/batch/none	
	Stat rerun sample	real-time/batch/none	
Test result transfer			
	Normal sample	real-time/batch/none	
	Emergency sample	real-time/batch/none	
	Stat sample	real-time/batch/none	
	Stat fast sample	real-time/none	
	Rerun sample	real-time/batch/none	
	Emergency repeat	real-time/batch/none	
	Stat rerun sample	real-time/batch/none	
	QC sample	real-time/batch/none	
Calibration sample		real-time/batch/none	
Reagent blank sample		real-time/batch/none	

Protocol 2		Contents	Menu
Error control			online parameters
	receive	continue/stop	
	transfer	continue/stop	

Protocol -1		Contents	Menu
Data format			
	character length parity bit stop bit	7/8 ODD/EVEN/none 1/2	online parameter
Basic text format			
	start code 1 start code 2 end code 1 end code 2 Max text length unit no. use ETB	00H-FFH 00H-FFH 00H-FFH 00H-FFH 256/512/1024 00-99 space use/none	online parameter
Sequence control			
	bit/sec protocol BCC check retry times time out T1 T2 T3 T4 T5 T6 T7	2400/4800/9600 class A/class B use/none n nn nn nn nn nn nn	online parameter

Text format

Text information	Contents	Menu
rack no. /cup position rack no. digit	use/none 4/5	online parameters
sex age/month	use/none use/none	Requisition format
patient information 1 patient information 2 patient information 3 patient information 4 patient information 5 patient information 6	use/none digits use/none digits use/none digits use/none digits use/none digits use/none digits	Requisition format
sample ID digits	1-20 digits	Requisition format
data format	6 /9 digits	online parameters
data zero suppress	used/none	online parameters

A.3 Appendix character table

HIGH LOW	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0		DE	SP	0	@	P		p								
1	SH	D1	!	1	A	Q	a	q								
2	SX	D2	"	2	B	R	b	r								
3	EX	D3	#	3	C	S	c	s								
4	ET	D4	\$	4	D	T	d	t								
5	EQ	NK	%	5	E	U	e	u								
6	AK	SN	&	6	F	V	f	v								
7	BL	EB	'	7	G	W	g	w								
8	BS	CN	(	8	H	X	h	x								
9	HT	EM	)	9	I	Y	i	y								
A	LF	SB	*	:	J	Z	j	z								
B	HM	EC	+	;	K	[	k	{								
C	CL	FS	,	<	L	\	l	|								
D	CR	GS	-	=	M	]	m	}								
E	SO	RS	.	>	N	^	n	~								
F	SI	US	/	?	O	_	o	DL								

From 20H to 7EH : These characters can be used for Sample ID code.

From 30H to 39H : These characters can be used for Item No.

A1 - DC is Japanese character set.

A.4 AU400,AU640 Online Parameter Sheet

Set up		Setting	
T.R.I. Receive			
	Routine Normal	<input type="checkbox"/> real time	<input type="checkbox"/> batch <input type="checkbox"/> none
	Routine Emergency	<input type="checkbox"/> real time	<input type="checkbox"/> batch <input type="checkbox"/> none
	Routine Rerun	<input type="checkbox"/> real time	<input type="checkbox"/> batch <input type="checkbox"/> none
	Emergency Rerun	<input type="checkbox"/> real time	<input type="checkbox"/> batch <input type="checkbox"/> none
	Stat Normal	<input type="checkbox"/> real time	<input type="checkbox"/> batch <input type="checkbox"/> none
	Stat Rerun	<input type="checkbox"/> real time	<input type="checkbox"/> batch <input type="checkbox"/> none
Results Transfer			
	Routine Normal	<input type="checkbox"/> real time	<input type="checkbox"/> batch <input type="checkbox"/> none
	Routine Emergency	<input type="checkbox"/> real time	<input type="checkbox"/> batch <input type="checkbox"/> none
	Routine Rerun	<input type="checkbox"/> real time	<input type="checkbox"/> batch <input type="checkbox"/> none
	Emergency Rerun	<input type="checkbox"/> real time	<input type="checkbox"/> batch <input type="checkbox"/> none
	Stat Normal	<input type="checkbox"/> real time	<input type="checkbox"/> batch <input type="checkbox"/> none
	Stat rerun	<input type="checkbox"/> real time	<input type="checkbox"/> batch <input type="checkbox"/> none
	Stat quick	<input type="checkbox"/> real time	<input type="checkbox"/> none
	QC	<input type="checkbox"/> real time	<input type="checkbox"/> batch <input type="checkbox"/> none
	Calibration	<input type="checkbox"/> real time	<input type="checkbox"/> batch <input type="checkbox"/> none
	Reagent blank	<input type="checkbox"/> real time	<input type="checkbox"/> batch <input type="checkbox"/> none
Upper protocol		Setting	
Error control			
	T.R.I. Receive	<input type="checkbox"/> continue	<input type="checkbox"/> stop
	Results Transfer	<input type="checkbox"/> continue	<input type="checkbox"/> stop
Lower protocol		Setting	
Character format			
	Character length.	<input type="checkbox"/> 7	<input type="checkbox"/> 8
	Parity bit	<input type="checkbox"/> odd	<input type="checkbox"/> even <input type="checkbox"/> none
	Stop bit	<input type="checkbox"/> 1	<input type="checkbox"/> 2
Data format			
	Start code 1	[]	(01-1F)
	Start code 2	[]	(00-1F)
	End code 1	[]	(01-1F)
	End code 2	[]	(00-1F)
	Text length	256	<input type="checkbox"/> 512 <input type="checkbox"/> 1024
	Unit No.	[]	(00-99 space)
	ETB control	<input type="checkbox"/> yes	<input type="checkbox"/> no
SEQ. control			
	Bit/sec	<input type="checkbox"/> 2400	<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	[]	(0-3)
	Time out T1	[]	(0-99)
	T2	[]	(0-99)
	T3	[]	(0-99)
	T4	[]	(0-99)
	T5	[]	(0-99)
	T6	[]	(0-99)
	T7	[]	(0-99)

Text format	Setting
Rack No.	<input type="checkbox"/> none <input type="checkbox"/> 4 <input type="checkbox"/> 5
Sex	<input type="checkbox"/> yes <input type="checkbox"/> no
AGE/MONTH	<input type="checkbox"/> yes <input type="checkbox"/> no
patient inf. 1	<input type="checkbox"/> yes[]digits <input type="checkbox"/> no
patient inf. 2	<input type="checkbox"/> yes[]digits <input type="checkbox"/> no
patient inf. 3	<input type="checkbox"/> yes[]digits <input type="checkbox"/> no
patient inf. 4	<input type="checkbox"/> yes[]digits <input type="checkbox"/> no
patient inf. 5	<input type="checkbox"/> yes[]digits <input type="checkbox"/> no
patient inf. 6	<input type="checkbox"/> yes[]digits <input type="checkbox"/> no
ID digits	[]digits (0,1-20)
Data format	<input type="checkbox"/> 6 <input type="checkbox"/> 9
ZERO Suppress	<input type="checkbox"/> yes <input type="checkbox"/> no

A-5 ONLINE ALARM LIST

1) ONLINE ERROR [aa] [bbbbbbbb]

<Operation>

- (1). In the Online Parameter menu, submenu Error Control, if the T.R.I. receive has been designated as "STOP", then the following will occur:
 - 1) Text following the alarm will not be received.
 - 2) In a case when the text requisition is received real-time, the "STOP" status is ignored at the start of the next analysis and the text requisition will be received real-time again.
- (2). In the Online Parameter menu, submenu Error Control, if the T.R.I. receive has been designated to "CONTINUE", the test requisition for the next sample will be received real-time.

<Description>

- (1).Communication error occurs when transmitting the text for test requisition or when receiving the test requisition format.
- (2).The display in the [] and its meaning are as follows.

aa : type of the errors

01 : Device name error
02 : Framing error
03 : Over run error
04 : Parity error
05 : Time out error
06 : Receive NAK when transmitting a text
07 : BCC error when receiving a text
08 : Other communication errors
09 : Function error
10 : Unit name error
11 : Parameter error
12 : Request cancel

bbbbbbbb : Text having error

RB : Start text for receiving the test
requisition information.

RE : End text for receiving the test
requisition information.

R_ __ nnnn : normal run, normal sample, sample No.

R_ _E nnnn : normal run, emergency sample, sample No.

R_ _P nnnn : normal run, STAT sample, sample No.

R_ _U nnnn : normal run, urine sample, sample No.

R_ UE nnnn : normal run, urine emergency sample, sample No.

R_ UP nnnn : normal run, urine STAT sample, sample No.
 R_ X_ nnnn : normal run, other sample, sample No.
 R_ XE nnnn : normal run, other emergency sample, sample No.
 R_ XP nnnn : normal run, other STAT sample, sample No.
 RH __ nnnn : repeat run, normal sample, sample No.
 RH _E nnnn : repeat run, emergency sample, sample No.
 RH _P nnnn : repeat run, STAT sample, sample No.
 RH U_ nnnn : repeat run, urine sample, sample No.
 RH UE nnnn : repeat run, urine emergency sample, sample No.
 RH UP nnnn : repeat run, urine STAT sample, sample No.
 R_ __ xxxxxxxxxxx: normal run, normal sample, sample ID
 R_ _E xxxxxxxxxxx: normal run, emergency sample, sample ID
 R_ _P xxxxxxxxxxx: normal run, STAT sample, sample ID
 R_ U_ xxxxxxxxxxx: normal run, urine sample, sample ID
 R_ UE xxxxxxxxxxx: normal run, urine emergency sample, sample ID
 R_ UP xxxxxxxxxxx: normal run, urine STAT sample, sample ID
 R_ X_ xxxxxxxxxxx: normal run, other sample, sample ID
 R_ XE xxxxxxxxxxx: normal run, other emergency sample, sample ID
 R_ XP xxxxxxxxxxx: normal run, other STAT sample, sample ID
 RH __ xxxxxxxxxxx: repeat run, emergency sample, sample ID
 RH _E xxxxxxxxxxx: repeat run, emergency sample, sample ID
 RH _P xxxxxxxxxxx: repeat run, STAT sample, sample ID
 RH U_ xxxxxxxxxxx: repeat run, urine sample, sample ID
 RH UE xxxxxxxxxxx: repeat run, urine emergency sample, sample ID
 RH UP xxxxxxxxxxx: repeat run, urine STAT sample, sample ID
 RH X_ xxxxxxxxxxx: repeat run, other emergency sample, sample ID
 RH XE xxxxxxxxxxx: repeat run, other emergency sample, sample ID
 RH XP xxxxxxxxxxx: repeat run, other STAT sample, sample ID

2) ONLINE FORMAT ERROR [aaaa] [bbbbbbbbbb]

<<Operation>>

- (1).Disregard the test requisition information text for the sample generating the alarm.
- (2).Continue to receive the test requisition information text for samples following the alarm.

<<Description>>

- (1).In the Online Parameter menu, submenu Set Up, the T.R.I. receive is not designated as "YES" for the necessary parameter.
- (2).The display in the [] and its meaning are as follows.

aaaa : Type of error

R_ __ : normal run, a normal sample

R_ _E : normal run, an emergency sample

R_ _P : normal run, a STAT sample

R_ U_ : normal run, a urine normal sample

R_ UE : normal run, a urine emergency sample

R_ UP : normal run, a urine STAT sample

R_ X_ : normal run, a Other normal sample

R_ XE : normal run, an Other emergency sample

R_ XP : normal run, a Other STAT sample

RH __ : repeat run, a normal sample

RH _E : repeat run, an emergency sample

RH _P : repeat run, a STAT sample

RH U_ : repeat run, a urine normal sample

RH UE : repeat run, a urine emergency sample

RH UP : repeat run, a urine STAT sample

RH X_ : repeat run, a Other normal sample

RH XE : repeat run, an Other emergency sample

RH XP : repeat run, a Other STAT sample

bbbbbbbbbb : Information type that is not designated

No sample No.

No ID No.

3) ONLINE ILLEGAL TEXT CODE [aa]

<Operation>

- (1). Disregard the test requisition information text for the sample generating the alarm.
- (2). Continue to receive the test requisition information text for samples following the alarm.

<Description>

- (1). When receiving the test requisition information text using online, the text classification code is out of specification.
- (2). The display of [] and its meaning are as follows.

aa :

R_ : Normal sample

RH : Repeat run sample

4) ONLINE ILLEGAL TEXT BLOCK No. [aa -> bb]

<Operation>

- (1). In the Online Parameter menu, submenu Error Control, if the T.R.I. receive is designated as "STOP", the following events occur:
 - 1). Disregard the test requisition information text for the sample generating the alarm.
 - 2). System will not receive text for samples following the sample generating the alarm.
 - 3). In a case when the text requisition is received in real-time, the "STOP" is ignored and the text requisition text will be received with real-time again during the next analysis.
- (2). In the Online Parameter menu, submenu Error Control, if the T.R.I. receive is designated as "Continue", the following events occur:
 - 1). Disregard the test requisition information text for the sample generating the alarm.
 - 2). The test requisition information text for the next sample will be received.

<Description>

- (1). When receiving the requisition information text using online, the block identification No. is out of specification.
- (2). The display of [] and its meaning are as follows.

aa : Previously received block identification No.

bb : Last received block identification No.

5) ONLINE ILLEGAL SAMPLE No. [aa: bbbbb]

<Operation>

- (1).Disregard the test requisition information text for the sample generating the alarm.
- (2).Continue to receive the test requisition information text for other samples within the run.

<Description>

- (1).When receiving the test requisition information text using online, sample No. of the sample generating the alarm does not meet the specification.
- (2).The display of [] and its meaning are as follows.

aa : Sample type

_ : Normal sample

_E : Emergency sample

_P : Stat sample

U_ : Urine normal sample

UE : Urine emergency sample

UP : Urine stat sample

X_ : Other Normal sample

XE : Other Emergency sample

XP : Other Stat sample

bbbb : Sample No.

0001-9999 : Normal sample

E001-E999 : Emergency

P001-P999 : Stat sample

6) ONLINE ILLEGAL RACK No. [aaaaaa: bbbbbb]

<Operation>

- (1). In the Online Parameter menu, submenu Error Control, if the T.R.I. receive is designated as "STOP", the following events occur:
 - 1).Disregard the test requisition information text for the sample generating the alarm.
 - 2).System will not receive text for samples following the sample generating the alarm.
 - 3).In a case when the text requisition is received in real-time, the "STOP" is ignored and the text requisition text will be received with real-time again during the next analysis.
- (2). In the Online Parameter menu, submenu Error Control, if the T.R.I. receive is designated as "Continue", the following events occur:
 - 1).Disregard the test requisition information text for the sample generating the alarm.
 - 2).The test requisition information text for the next sample will be received.

<Description>

- (1).When receiving the requisition information text using online, the rack No. is out of specification.
- (2).The display of [] and its meaning are as follows.

aaaaaa : Transferred sample type and sample No.

__ nnnn : Normal sample
_E nnnn : Emergency sample
_P nnnn : Stat sample
U_ nnnn : Urine normal sample
UE nnnn : Urine emergency sample
UP nnnn : Urine stat sample
X_ nnnn : Other normal sample
XE nnnn : Other emergency sample
XP nnnn : Other Stat sample

bbbbbb : Received sample type and sample No.

__ nnnn : Normal sample
_E nnnn : Emergency sample
_P nnnn : Stat sample
U_ nnnn : Urine normal sample
UE nnnn : Urine emergency sample
UP nnnn : Urine stat sample
X_ nnnn : Other normal sample
XE nnnn : Other emergency sample
XP nnnn : Other Stat sample

7) ONLINE ILLEGAL SAMPLE KIND No. [aa]

<Operation>

- (1).Disregard the test requisition information text for the sample generating the alarm.
- (2).Continue to receive the test requisition information text for the other samples within the run.

<Operation>

- (1).When receiving the test requisition information text using online, sample kind No. of the sample generating the alarm does not meet the specification.
- (2).The display of [] and its meaning are as follows.

aa : Sample type

_ : Normal sample

_E : Emergency sample

_P : Stat sample

U_ : Urine normal sample

UE : Urine emergency sample

UP : Urine stat sample

X_ : Other normal sample

XE : Other emergency sample

XP : Other stat sample

8) ONLINE ILLEGAL GENDER TEXT [a]

<Operation>

- (1).Disregard the test requisition information text for the sample generating the alarm.
- (2).Continue to receive the test requisition information text for other samples within the run.

<Description>

- (1).When receiving the requisition information text using online, the sex of this text is not within the specification.
- (2).The display of [] and its meaning are as follows.

a : Received sex

9) ONLINE ILLEGAL AGE/MONTH [aaa bb]

<Operation>

- (1).Disregard the test requisition information text for the sample generating the alarm.
- (2).Continue to receive the test requisition information text for other samples within the run.

<Description>

- (1).When receiving the requisition information text using online, age or month age (age for baby before one year old) of this text is out of the specification.
- (2).The display of [] and its meaning are as follows.

aaa : Received age

bb : Received month age

10) ONLINE ANALYSIS METHOD MISMATCH [aa <> bb]

<Operation>

- (1).Disregard the test requisition information text for the sample generating the alarm.
- (2).Continue to receive the test requisition information text for other samples within the run.

<Description>

- (1).When receiving the test requisition information text using online, sample type of this text does not match the required sample type.
- (2).The display of [] and its meaning are as follows.

aa : Sample type

__ : Normal sample

_E : Emergency sample

_P : Stat sample

U_ : Urine normal sample

UE : Urine emergency sample

UP : Urine stat sample

X_ : Other normal sample

XE : Other emergency sample

XP : Other Stat sample

bb : Received sample type

__ : Normal sample

_E : Emergency sample

_P : Stat sample

U_ : Urine normal sample

UE : Urine emergency sample

UP : Urine stat sample

X_ : Other normal sample

XE : Other emergency sample

XP : Other Stat sample

11) ONLINE SAMPLE No. MISMATCH [aaaaaa <> bbbbbb]

<Operation>

- (1).Disregard the test requisition information text for the sample generating the alarm.
- (2).Continue to receive the test requisition information text for the other samples within the run.

<Description>

- (1).When receiving the test requisition information text using online, sample type of this does not match the required sample.
- (2).The display of [] and its meaning are as follows.

aaaaaaa : Transferred sample type and sample No.

__ nnnn : Normal sample
_E nnnn : Emergency sample
_P nnnn : Stat sample
U_ nnnn : Urine normal sample
UE nnnn : Urine emergency sample
UP nnnn : Urine stat sample
X_ nnnn : Other normal sample
XE nnnn : Other emergency sample
XP nnnn : Other Stat sample

bbbbbb : Received sample type and sample No.

__ nnnn : Normal sample
_E nnnn : Emergency sample
_P nnnn : Stat sample
U_ nnnn : Urine normal sample
UE nnnn : Urine emergency sample
UP nnnn : Urine stat sample
X_ nnnn : Other normal sample
XE nnnn : Other emergency sample
XP nnnn : Other Stat sample

12) ONLINE RACK No. MISMATCH [aaaaaaaaa : bbbb <> cccc]

<Operation>

- (1). In the Online Parameter menu, submenu Error Control, if the T.R.I. receive is designated as "STOP", the following events occur:
 - 1).Disregard the test requisition information text for the sample generating the alarm.
 - 2).System will not receive text for samples following the sample generating the alarm.
 - 3).In a case when the text requisition is received in real-time, the "STOP" is ignored and the text requisition text will be received with real-time again during the next analysis.
- (2). In the Online Parameter menu, submenu Error Control, if the T.R.I. receive is designated as "Continue", the following events occur:
 - 1).Disregard the test requisition information text for the sample generating the alarm.
 - 2).The test requisition information text for the next sample will be received.

<Description>

- (1).When receiving the test requisition information text using online, rack No. of this does not match the required sample.
- (2).The display of [] and its meaning are as follows.

aaaaaaaa : Transferred sample type and sample No.

__ nnnn : Normal sample
_E nnnn : Emergency sample
_P nnnn : Stat sample
U_ nnnn : Urine normal sample
UE nnnn : Urine emergency sample
UP nnnn : Urine stat sample
X_ nnnn : Other normal sample
XE nnnn : Other emergency sample
XP nnnn : Other Stat sample

bbbb : Transferred rack No.

cccc : Received rack No.

13) ONLINE MISMATCH [aaaaaaaaa <> bbbbbbbbbb]

<Operation>

- (1).Disregard the test requisition information text for the sample generating the alarm.
- (2).Continue to receive the test requisition information text for the other samples within the run.

<Description>

- (1).When receiving the test requisition information text using online, sample ID of this text does not match the required ones.
- (2).The display of [] and its meaning as follows.

aaaaaaaa : Transferred sample ID

bbbbbbbbb : Received sample ID

14) ONLINE ITEM ERROR [aaaaaa]

<Operation>

- (1).Disregard the test requisition information text for the sample generating the alarm.
- (2).Continue to receive the test requisition information text for the other samples within the run.

<Description>

- (1).When receiving the test requisition information text using online, the test requisition cannot be stored.
- (2).The display of [] and its meaning are as follows.

aaaaaa : Sample type and sample No.

__nnnn : Normal sample

__Ennn : Emergency sample

__Pnnn : Stat sample

_U_nnn : Urine normal sample

_UEnnn : Urine emergency sample

_UPnnn : Urine stat sample

_Xnnnn : Other normal sample

_XEnnn : Other emergency sample

_XPnnn : Other Stat sample

H_nnnn : repeat run normal sample

H_Ennn : repeat run emergency sample

H_Pnnn : repeat run stat sample

HUnnnn : repeat run urine normal sample

HUEnnn : repeat run urine emergency sample

HUPnnn : repeat run urine stat sample

HXnnnn : repeat run other normal sample

HXEnnn : repeat run other emergency sample

HXPnnn : repeat run other stat sample

15) ONLINE RERUN ITEM ERROR [aaaaaa]

<Operation>

- (1).Disregard the repeat run test requisition information for the sample generating the alarm.
- (2).Continue to receive the test requisition information text for the other samples within the run.

<Description>

- (1).When receiving the test requisition information text for repeat run using online, repeat run test requisition cannot be stored with for the following reasons.
 - 1).Original sample that is designated in the repeat run text is not stored in the normal run/sample test requisition information.
 - 2).Sample No. is not set to the original sample that is designated in the repeat run text.
 - 3).Original sample that is designated in the repeat run text has already been stored as a repeat run sample for another sample.
- (2).The display of [] and its meaning are as follows.

aaaaaa	: sample type and original sample No.
__nnnn	: Normal sample
__Ennn	: Emergency sample
__Pnnn	: Stat sample
_Unnnn	: Urine normal sample
_UEnnn	: Urine emergency sample
_UPnnn	: Urine stat sample
_Xnnnn	: Other normal sample
_XEnnn	: Other emergency sample
_XPnnn	: Other Stat sample
