6.5 Communication Interface

6.5.1 Outline of Communication Interface

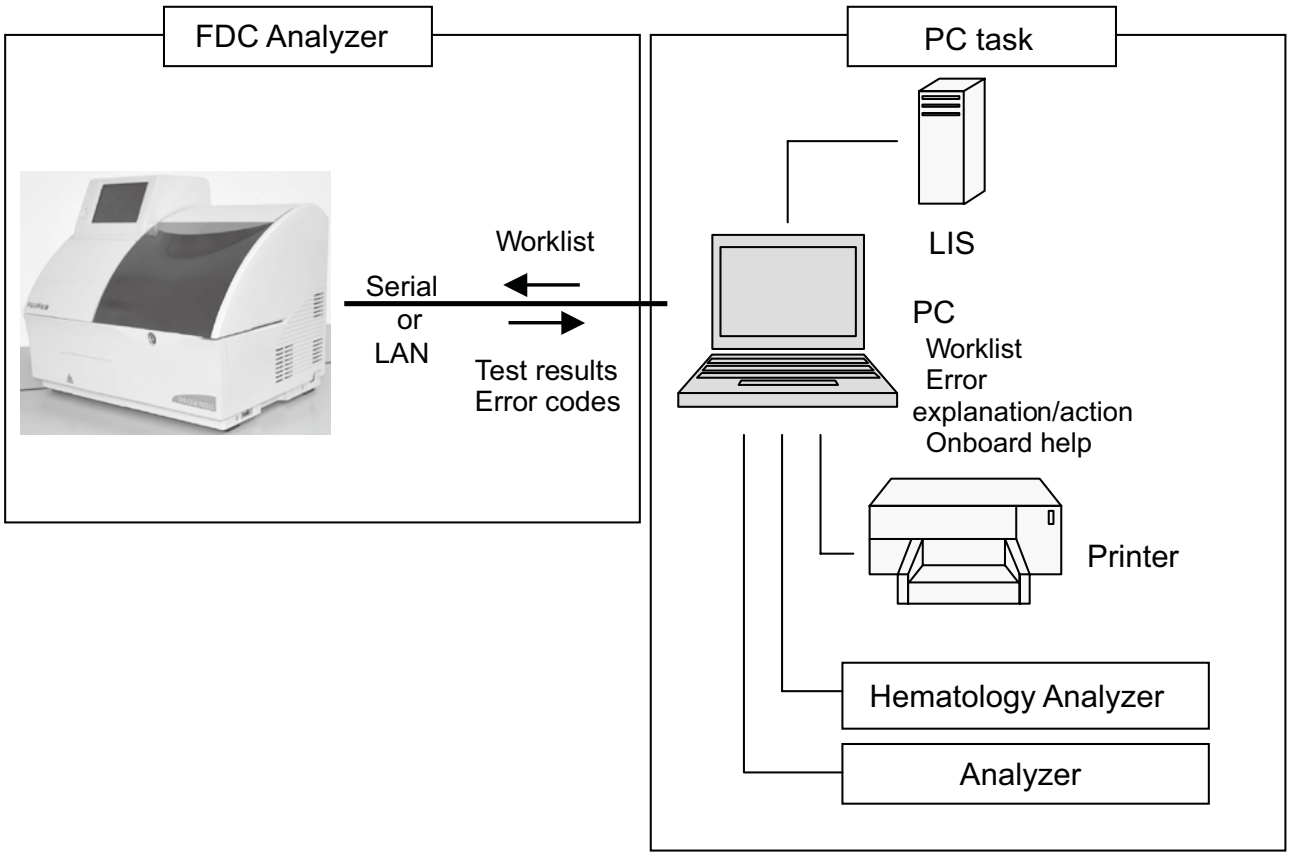
Communication interface has 3 types as the following. The protocols are the same as the FDC4000. All protocols are able to use either a RS-232C connector (9pins) or a LAN connector alternatively.

(1) 2-way communication (requesting test information) [Type 1]
The analyzer requests test information (patient names, test names, etc.) to PC and sends test results after the measurements completed.
When using this protocol, select [Type 1] in the [Host I/F settings].

(2) One-way communication (without requesting test information) [Type 2]
Type 2 is a one-way transmission of test results and its protocol is the same as Type 1.
When using this protocol, select [Type 2] in the [Host I/F settings].

(3) One-way communication (conventional) [Type 3]
Type 3 is one-way transmission as same as the protocol of the FDC4000.
When using this protocol, select [Type 3] in the [Host I/F settings].

6.5.2 System Configuration



6.5.3 Interface Specifications

(1) Communication Specifications

In the [Host I/F settings], select [Serial connection] or [LAN connection

(a) Serial

Host (LIS) connection	Host connection: ON (Yes)		
Com type	Type 1	Type 2	Type 3
Transmission path	RS-232C interface		
Synchronizing method	Asynchronous communication method		
Data transfer rate	19200 bps (fixed)	19200 bps (fixed)	9600 bps (fixed)
Character length	8 bits (fixed)		
Stop bit	1 bit (fixed)		
Parity (VRC)	None (fixed)		
Flow control	Hardware method (CTS/RTS)		
BCC (Parity BCC)	EOR (Exclusive OR except for STX) (fixed)		None (fixed)

(b) LAN

In the LAN connection, the analyzer is a client, and the PC is a server.

The IPv4 is supported, but the IPv6 is not supported.

The analyzer specifies the IP address and the port of the PC and saves the settings in the nonvolatile memory.

When the analyzer initializes the host connection by LAN, it perform the socket connection using the IP address and the port of the PC.

(2) Control Specifications

(a) Time-out monitoring for transmission

Condition: CTS signal remains inactive for five seconds continuously.

Action: The analyzer clears the request and waits the next event (request).

(b) Time-out monitoring for receiving reply

Condition: Five seconds have passed without receiving the reply after sending the request command.

Action: The analyzer clears the request and waits the next event (request).

(c) Re-transmission

No re-transmission supported

6.5.4 Communication Data Format

(1) Communication Data System

(a) Text format

[STX (02H)], Command type, Parameter1, parameter2, … [ETX (03H)] [BCC]

The parameters are added as required.

The " , " (breakpoint) is inserted between a command type and a parameter and between parameters.

To connect some blocks, [ETB (17H)] is added at last.

Within parameter, " , " and " @ " are prohibited. Usable character codes are 20H to 7EH and A1H to DFH.

Ex.)

STX	Command type	,	Parameter 1	,	Parameter 2	ETX	BCC

Ex.)

STX	Command type	,	Parameter 1-1	,	Parameter 1-2	ETB

Parameter 2-1	,	Parameter 2-2	ETX	BCC

(b) BCC

The calculation range for BCC is from the next of STX (command type) to ETX.

The calculation method is exclusive OR.

Ex.)

STX	Command type	,	Parameter 1	,	Parameter 2	ETX	BCC

Calculation range

(2) Communication Data

(a) Command type list

Request / Info (Analyzer=>PC)		Reply (PC=>Analyzer)	
Command type	Description	Command type	Description
W	Request for sample info	W	Reply for sample info
I	Request for Worklist index	I	Reply for Worklist index
S	Test start info		
R	Test results info		
E	Error info		

(b) Definition

Name	Description
Command type	Given by one alphabetical character
Sample No. *1	Assigned sample No. given by PC
Patient ID	Unique ID for a patient (e.g patient's file No.)
Patient name	Patient name
Sample type	W or P or U
Number of test	Number of tests for a sample
Test name	Requested test name
Worklist index	A set of a sample No., a patient ID, a patient name and others
Species	Unique No. assigned for species
Reception No.	No. for a patient (unique No. within a working day)

*1 Sample No.:
When PC assigns a number, the format is "yyyymmdd**" ["Year" + "Month" + "Day"+ "Number (starting 01)"]. (Ex. 2013122001)
In the off-line mode, the format is "**" [Number (starting 01)] without year, month and day.

6.5.5 Communication Data Details

(1) Request for Worklist index

This is used when the analyzer requests index information of the Worklist from PC.

Item	Character	Size	Description
Header	STX	1	STX: 02h
Command type	'I'	1	Request command for Worklist index ('I': 49h)
Breakpoint	';'	1	
Sample No.	Numerical	13	Max. 13 characters
Breakpoint	';'	1	
Number of requests	Numerical	2	Maximum number of indexes to be requested (1 to 99)
Delimiter	ETX	1	ETX: 03h
BCC			

NOTE: Sample No. is the first key to search the Worklist. Blank data is allowable.

NOTE: The search direction is forward direction of the Worklist. But, the Worklist data which has already been informed to start the measurements will be searched last.

NOTE: The search results will be sent with the reply for the request (Worklist index).

<Ex.1> When requesting index information of 3 samples starting from sample ID "061201":

(Transmit data)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	STX	I	,	0	6	1	2	0	1	,	3	ETX			

□ = Space

<Ex.2> When requesting index information of 3 samples without assigning a starting ID for search:

(Transmit data)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	STX	I	,	,	3	ETX									

□ = Space

(2) Reply for request (Worklist index)

This is used when PC sends index information of the Worklist to the analyzer.

Item	Character	Size	Description
Header	STX	1	STX: 02h
Command type	'I'	1	Request command for Worklist index ('X': 49h)
Breakpoint	','	1	
Number of indexes	Numerical	2	Number of following indexes
Breakpoint	','	1	
Sample No. 1	Numerical	13	Max. 13 characters
Breakpoint	','	1	
Patient ID 1	Alphabetical & numerical	13	Max. 13 characters
Breakpoint	','	1	
Patient name 1	Alphabetical & numerical	13	Max. 13 characters
Breakpoint	','	1	
Species 1	Numerical	2	0 to 99 (Max. 2 characters)
Breakpoint	','	1	
Sex 1	Numerical	1	0: Male, 1: Female, 9: Undefined
Breakpoint	','	1	
Age 1	Numerical	3	999: Undefined (Max. 3 characters)
Block breakpoint	ETB	1	
...			
Sample No. n	Numerical	13	Max. 13 characters
Breakpoint	','	1	
Patient ID n	Alphabetical & numerical	13	Max. 13 characters
Breakpoint	','	1	
Patient name n	Alphabetical & numerical	13	Max. 13 characters
Breakpoint	','	1	
Species n	Numerical	2	0 to 99 (Max. 2 characters)
Breakpoint	','	1	
Sex n	Numerical	1	0: Male, 1: Female, 9: Undefined
Breakpoint	','	1	
Age n	Numerical	3	999: Undefined (Max. 3 characters)
Delimiter	ETX	1	ETX: 03h
BCC			

NOTE: Number of indexes is essential.

NOTE: When no data in the Worklist, the "Number of indexes" should be 0 (zero). However, the sample No. send with the "Request for Worklist index" should be copied into the "Sample No. 1" field.

NOTE: When the Worklist has test orders, the sample No. is essential, and either the patient ID or the patient name is essential in the Worklist data.

NOTE: In case that the sample No. is blank, or both the patient ID and the patient name are blank (even if the sample No. has data), the field is invalid.

NOTE: If a number of index fields is larger than the "Number of indexes", overflowed fields (larger than the number of indexes) are ignored.

NOTE: If a number of index fields is smaller than the "Number of indexes", the process will continue without error.

NOTE: A block breakpoint (ETB) must NOT be added at the end of the last index field.

(Ex.) When replying with 2 samples data:

First sample information	Sample No.	2006061201
	Patient ID	ABCDEFGHIJKLM
	Patient name	Taro Fuji
	Species	2: Feline
	Sex	1: Female
	Age	3 years
Second sample information	Sample No.	2006061202
	Patient ID	12345ABCD
	Patient name	Lucy Smith
	Species	1: Canine
	Sex	0: Male
	Age	1 year

(Transmit data)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	STX	I	,	2	,	2	0	0	6	0	6	1	2	0	1
2	,	A	B	C	D	E	F	G	H	I	J	K	L	M	,
3	T	a	r	o	□	F	u	j	i	,	2	,	1	,	3
4	ETB	2	0	0	6	0	6	1	2	0	2	,	1	2	3
5	4	5	A	B	C	D	,	L	u	c	y	□	S	m	i
6	t	h	,	1	,	0	,	1	ETX	BCC					

□ = Space

(3) Request for sample information

This is used when the analyzer requests sample information of the Worklist from PC.

Item	Character	Size	Description
Header	STX	1	STX: 02h
Command type	'W'	1	Request command for sample info ('W': 57h)
Breakpoint	','	1	
Sample No.	Numerical	13	Max. 13 characters
Breakpoint	','	1	
Patient ID	Alphabetical & numerical	13	Max. 13 characters
Breakpoint	','	1	
Patient name	Alphabetical & numerical	13	Max. 13 characters
Delimiter	ETX	1	ETX: 03h
BCC			

NOTE: Sample No., patient ID, and patient name are used for search keys. At least one of those information is required.

NOTE: Priority for the search keys is as follows: sample No. (1st), patient ID (2nd), patient name (last).

NOTE: The character data length for sample No., patient ID, and patient name is max. 13 characters. If the data length is under 13, it is NOT necessary to fill the data area with "space".

(Ex.) When requesting sample information for the 2nd sample:

2nd sample information	Sample No.	2006061202
	Patient ID	12345ABCD
	Patient name	Lucy Smith

(Transmit data)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	STX	W	,	2	0	0	6	0	6	1	2	0	2	,	1
2	2	3	4	5	A	B	C	D	,	L	u	c	y	□	S
3	m	i	t	h	ETX	BCC									

□ = Space

(4) Reply for request (sample info)

This is used when PC sends sample information of the Worklist to the analyzer.

Item	Character	Size	Description
Header	STX	1	STX: 02h
Command type	'W'	1	Request command for sample info ('W': 57h)
Breakpoint	','	1	
Sample No.	Numerical	13	Max. 13 characters
Breakpoint	','	1	
Patient ID	Alphabetical & numerical	13	Max. 13 characters
Breakpoint	','	1	
Patient name	Alphabetical & numerical	13	Max. 13 characters
Breakpoint	','	1	
Number of tests	Numerical	2	0 to 30 slides
Breakpoint 1	','	1	
Test name 1	Alphabetical	8	Max. 8 characters
...			
Breakpoint n	','	1	
Test name n	Alphabetical	8	Max. 8 characters
Delimiter	ETX	1	ETX: 03h
BCC			

NOTE: Sample No. and number of tests are essential.

NOTE: If the "Number of tests" is "0", it means the Worklist does not have test orders.

NOTE: Test name field has maximum of 20 fields.

NOTE: If a number of test name fields is larger than the "Number of tests", overflowed fields (larger than the number of tests) are ignored.

NOTE: If a number of test name fields is smaller than the "Number of tests", the process will continue without error.

NOTE: <Processing of received data>

The received data ("Number of tests" and/or "Test name") is used as printout data for the built-in printer, and then will be deleted after the printout completed.
To re-print out the information, perform from the beginning of the process ("Request for Worklist index").
Also, the received data will not be used other purposes; e.g. for checking test results matching with the received data.

<Ex. 1> When replying for sample information of the 2nd sample:

2nd sample information	Sample No.	2006061202
	Patient ID	12345ABCD
	Patient name	Lucy Smith
	Number of tests	4 tests
	Test names	BUN, CRE, GLU, ALP

(Transmit data)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	STX	W	,	2	0	0	6	0	6	1	2	0	2	,	1
2	2	3	4	5	A	B	C	D	,	L	u	c	y	□	S
3	m	i	t	h	,	4	,	B	U	N	,	C	R	E	,
4	G	L	U	,	A	L	P	ETX	BCC						

□ = Space

<Ex. 2> When replying for sample information of the 1st sample:

1st sample information	Sample No.	2006061201
	Patient ID	ABCDEFGHIJKLM
	Patient name	Taro Fuji
	Number of tests	1 panel
	Test names	Panel A

(Transmit data)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	STX	W	,	2	0	0	6	0	6	1	2	0	1	,	A
2	B	C	D	E	F	G	H	I	J	K	L	M	,	T	a
3	r	o	□	F	u	j	i	,	1	,	P	a	n	e	l
4	□	A	ETX	BCC											

□ = Space

(5) Test start information

This is used when the analyzer sends test start information to PC.

Item	Character	Size	Description
Header	STX	1	STX: 02h
Command type	'S'	1	Test start information command('S': 53h)
Breakpoint	','	1	
Test condition	Alphabetical	7	Selecting control measurements or normal measurements: CONTROL or NORMAL□ <□ : Space (20h)>
Breakpoint	','	1	
Test date	Numerical	10	Year, month, and day when the measurements performed. (Ex. 2006-09-25)
Breakpoint	','	1	
Test time	Numerical	5	Time when the measurements performed. (Ex. 10:50)
Breakpoint	','	1	
Sample No.	Numerical	13	Unique ID for each sample
Breakpoint	','	1	
Patient ID	Alphabetical & numerical	13	Unique ID for each patient
Breakpoint	','	1	
Patient name	Alphabetical & numerical	13	Patient name
Breakpoint	','	1	
Sample position	Numerical	2	Sample position on the sample disk ('01' fixed)
Delimiter	ETX	1	ETX: 03h
BCC			

NOTE: Each data field is a fixed-length field, so that data should be embedded from the left and spaces (20h) should be embedded in the remaining field.

NOTE: The Sample position should be fixed as "01".

<Ex.> When the test for the 1st sample starts on June 12, 2006 at 10:50:

Sample No.	2006061201
Patient ID	ABCDEFGHIJKLM
Patient name	Taro Fuji

(Transmit data)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	STX	S	,	N	O	R	M	A	L	□	,	2	0	0	6
2	-	0	6	-	1	2	,	1	0	:	5	0	,	2	0
3	0	6	0	6	1	2	0	1	□	□	□	,	A	B	C
4	D	E	F	G	H	I	J	K	L	M	,	T	a	r	o
5	□	F	u	j	i	□	□	□	□	,	0	1	ETX	BCC	

□ = Space

(6) Test results information [For 2-way communication (Type 1) and for 1-way (Type 2)]
This is used when the analyzer sends test results to PC.

Item	Character	Size	Description
Header	STX	1	STX: 02h
Command type	'R'	1	Test results inform command ('R': 52h)
Breakpoint	','	1	
Test condition	Alphabetical	7	Selecting control measurements or normal measurements (CONTROL or NORMAL□)
Breakpoint	','	1	
Test date	Numerical	10	Year, month, and day when the measurements performed. (Ex. 2006-09-25)
Breakpoint	','	1	
Test time	Numerical	5	Time when the measurements performed. (Ex. 10:50)
Breakpoint	','	1	
Sample No.	Numerical	13	Unique ID for each sample
Breakpoint	','	1	
Patient ID	Alphabetical & numerical	13	Unique ID for each patient
Breakpoint	','	1	
Patient name	Alphabetical & numerical	13	Patient name
Breakpoint	','	1	
Species	Numerical	2	0 to 99 [2 characters fixed (padding by 0)]
Breakpoint	','	1	
Sex	Numerical	1	0: Male, 1: Female, 9: Stand-alone mode
Breakpoint	','	1	
Age	Numerical	3	999: Stand-alone mode 3 characters fixed (padding by 0)
Breakpoint	','	1	
Sample position	Numerical	2	Sample position on the sample disk ('01' fixed)
Breakpoint	','	1	
Number of tests	Numerical	2	0 to 20 (number of test names) (2 characters fixed (padding by 0)
Breakpoint	','	1	
Test name	Alphabetical & numerical	8	Test name (5 characters) + ' - ' + Sample type (2 characters)
Breakpoint	','	1	
Equal sign		1	Equal sign or unequal signs
Breakpoint	','	1	
Test result	Alphabetical & numerical	9	Test result (9 characters)
Unit	Alphabetical & numerical	6	Unit (6 characters)
Breakpoint	','	1	
Dilution factor	Numerical	2	Used dilution factor (from 01)
Breakpoint	','	1	
Reference interval lower limit	Numerical	5	Setting of reference interval lower limit
Breakpoint	','	1	
Reference interval upper limit	Numerical	5	Setting of reference interval upper limit
Breakpoint	','	1	
Warning	Alphabetical	11	See the following specification.
Test name breakpoint	','	1	Breakpoint
Delimiter	ETX	1	ETX: 03h
BCC			

Test result field

NOTE: The test result field has "Number of tests" of test results.

NOTE: A test name breakpoint must NOT be added at the end of the last test result field.

NOTE: Each data area is a fixed-length field, so that data should be embedded from the left and spaces (20h) should be embedded in the remaining spaces.

NOTE: "Sex" and "Age" fields

In the 2-way communication, the data send with the "Request for Worklist index" should be copied into the "Sex" and "Age" fields.
In the stand-alone mode, the "Sex" field should be embedded with "9", and the "Age" field with "999".

(a) Warning characters

The below table indicates warning character allocation in the warning data field.
When no error has occurred for each, a space (20h) will be embedded.

Position (sending order)	Warning character	Description
1st	H	Testing value exceeds the upper limit of the preset reference interval.
	L	Testing value falls below the lower limit of the preset reference interval.
2nd	@	Testing value is outside of the determination range.
3rd	#	The valid term of the slide has expired.
4th	$	Temperature control error (thermistor disconnection)
	+	Temperature control error (Incubator temperature has exceeded the upper limit of the range.)
	-	Temperature control error (Incubator temperature has fallen below the lower limit of the range.)
5th	*	Photometer malfunction (white plate fluctuation)
	?	Photometer malfunction (out of the white plate range)
6th		Always a space (20h)
7th	&	Abnormally high testing value
8th		Always a space (20h)
9th	E	Calculation error or malfunction of ISE test results
10th	¥	Un-spotted slide
11th		Always a space (20h)

Transmission example

<Test result>

```
2006-06-12 10:50
ID:ABCDEFGHIJKLM
Name: Taro Fuji
GLU-PS     @+*   # E
             =75     mg/dl
(10)     (50.0 - 100.0)
AMYL-PS     H   #
           > 1500     U/l
            (500 - 1500)
```

<Transmit data>

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	STX	R	,	N	O	R	M	A	L	□	,	2	0	0	6
2	-	0	6	-	1	2	,	1	0	:	5	0	,	2	0
3	0	6	0	6	1	2	0	1	□	□	□	,	A	B	C
4	D	E	F	G	H	I	J	K	L	M	,	T	a	r	o
5	□	F	u	j	i	□	□	□	□	,	2	□	,	1	,
6	3	□	□	,	0	1	,	0	2	,	G	L	U	-	P
7	S	□	□	,	=	7	5	□	□	□	□	□	□	□	m
8	g	/	d	l	□	,	1	0	,	5	0	.	0	□	,
9	1	0	0	.	0	,	□	@	#	+	*	□	□	□	E
10	□	□	,	A	M	Y	L	-	P	S	□	,	>	,	1
11	5	0	0	□	□	□	□	u	/	l	□	□	□	,	0
12	1	,	5	0	0	□	□	,	1	5	0	0	□	,	H
13	□	#	□	□	□	□	□	□	□	□	ETX	BCC			

□ = Space

(7) Error information

This is used when the analyzer sends error information to PC.

Item	Character	Size	Description
Header	STX	1	STX: 02h
Command type	'E'	1	Error information command
Breakpoint	','	1	
Error event date	Numerical	10	Year, month, and day when the error occurred. (Ex: 2006-06-12)
Breakpoint	','	1	
Error event time	Numerical	8	Time when the measurements performed. (Ex: 10:30:50)
Breakpoint	','	1	
Error number	Alphabetical & numerical	5	Error number
Breakpoint	','	1	
Number of added info	Numerical	1	Number of added info (0 to 9)
Breakpoint	','	1	
Added info 1	Alphabetical & numerical	6	Added info on the error (voltage, etc.)
Breakpoint	','	1	
...			
Added info n	Alphabetical & numerical	6	Added info on the error (voltage, etc.)
Delimiter	ETX	1	ETX: 03h
BCC			

Added info field

NOTE: The added info field has "Number of added info" of data.

NOTE: A breakpoint must NOT be added at the end of the last added info field.

NOTE: Each data field is a fixed-length field, so that data should be embedded from the left and spaces (20h) should be embedded in the remaining field.

<Ex.> When suction clogging error (E0110) has occurred:

[Printout example by the built-in printer]

```
E0110
 Clogging>sample>suc
 Clogging = 1.000 V
 Check sample
```

(Transmit data)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	STX	E	,	2	0	0	6	-	0	6	-	1	2	,	1
2	0	:	3	0	:	5	0	,	E	0	1	1	0	,	1
3	,	1	.	0	0	0	□	ETX	BCC						

□ = Space

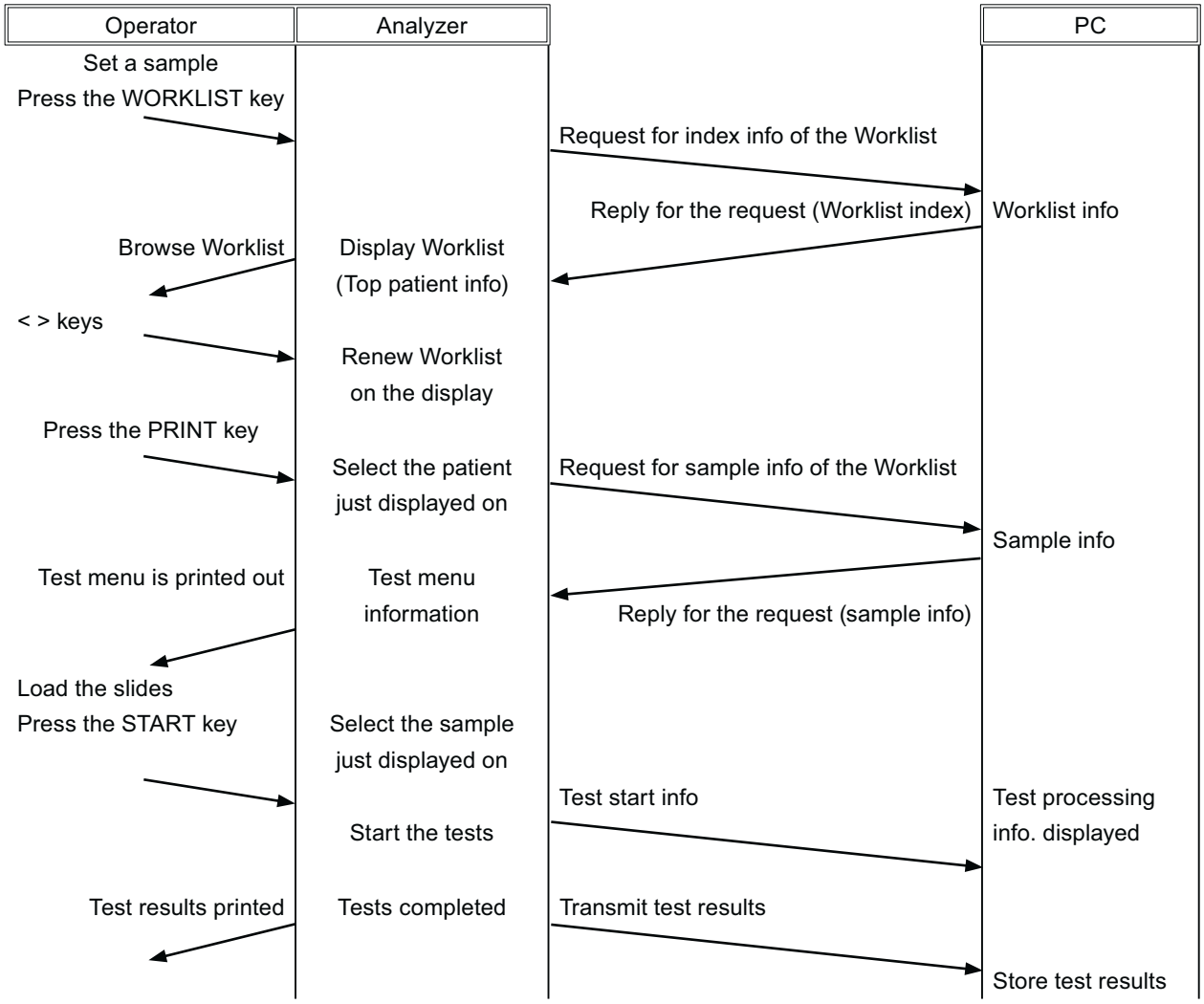
(8) Test results information [For 1-way communication (Type 2)]

In the case of 1-way communication, this function is used to send tests results from the analyzer to PC.

The communication data format for the 1-way communication is the same as “(6) Test results information”.

6.5.6 Data Transmission Flow

(1) Single sample test (Type 1)



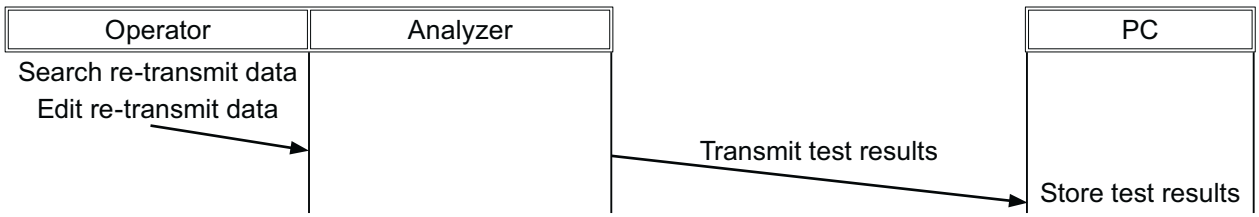
NOTE: Pressing the WORKLIST key requests Worklist index information.

NOTE: Pressing the PRINT key selects the sample just displayed on the display to request sample information of Worklist.

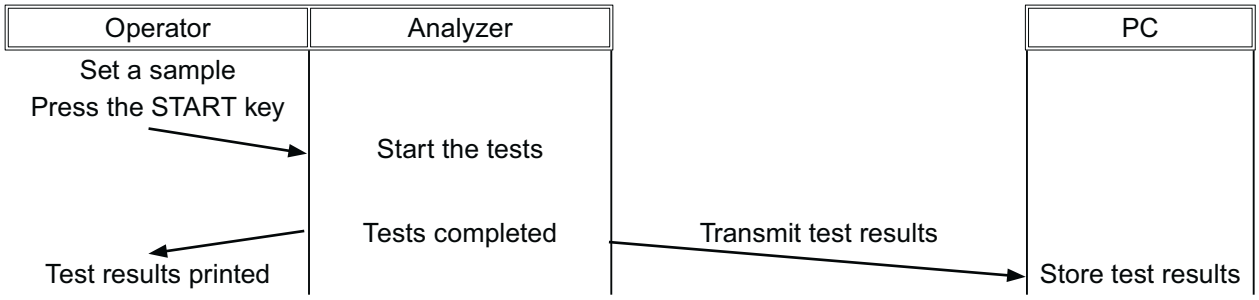
NOTE: When using a sample barcode reader, reading a barcode selects a patient ID to request sample information using the patient ID as a key.

NOTE: Pressing the START key selects the patient's sample which is just displayed on the display to start the testing.

(2) Re-transmitting test results (Type 1, Type 2)
This function is used to re-transmit test results manually. (This is useful when electric power failure or cable disconnection caused the communication interruption.)



(3) Transmitting test results (1-way communication: Type 2, Type 3)
This is 1-way transmission of test results.



6.6 One-way Communication [Type 3]

6.6.1 Communication Specifications

Transmission path	RS-232C interface compatible
Communication method	Asynchronous communication method
Transfer rate	9600 bps
Data bit length	8 bits
Stop bit	1 bit
Parity	None
Flow control	Hardware method (RTS, CTS)
Error detection	No BCC

6.6.2 Transmission Data Format

Transmission data is fixed-length and the unused data area is embedded with a space data (20H).

Item	Charactor	Size	Description
Header	STX	1	STX: 02h
Test condition	Alphabetical	7	Test information whether in the normal or in the control mode CONTROL or NORMAL
Test date	Numerical	10	Test date (Ex.: 2014-06-12)
Test time	Numerical	5	Test time (Ex.: 10:50)
Sequence No.	Numerical	13	Specific No. for each sample
Sample ID	Alphabetical & numerical	13	Specific ID for each sample (ID read by a sample barcode reader)
Sample position	Numerical	2	Sample position on the sample disk Fixed data (01) for the NX500
Test name/ Sample type	Alphabetical & numerical	7	Test name + Sample type = Max. 7 characters Left aligned (Right remainings are embedded with spaces.) Whole blood: -W, Plasma/Serum: -P, Urine: -U, Blank: -E
Equal sign or unequal sign	Alphabetical	1	Either "=" or "< >"
Test results	Numerical	9	Test results Left aligned (Right remainings are embedded with spaces.)
Unit	Alphabetical	6	Unit Left aligned (Right remainings are embedded with spaces.)
Dilution factor	Numerical	2	Dilution factor Left aligned (Right remainings are embedded with spaces.) * CM and ISE are the same.
Warning	Alphabetical	11	Warning during measurement (See warning spec.)
Delimiter	ETX	1	ETX: 03h

6.6.3 Warning Characters

The below table indicates warning character allocation in the warning data field.
When no error has occurred for each, a space (20h) will be embedded.

Position (sending order)	Warning character	Description
1	H	Testing value exceeds the upper limit of the preset reference interval.
	L	Testing value falls below the lower limit of the preset reference interval.
2	@	Testing value is outside of the determination range.
3	#	The valid term of the slide has expired.
4	$	Temperature control error (thermistor disconnection)
	+	Temperature control error (Incubator temperature has exceeded the upper limit of the range.)
	-	Temperature control error (Incubator temperature has fallen below the lower limit of the range.)
5	*	Photometer malfunction (white plate fluctuation)
	?	Photometer malfunction (out of the white plate range)
6		Always a space (20h)
7	&	Abnormally high testing value
8		Always a space (20h)
9	E	Calculation error or malfunction of ISE test results
10	¥	Un-spotted slide
11		Always a space (20h)

6.6.4 Transmission Example

<Test result>

```
2014-06-12    10:50
No.1234567890123
ID=ABCDEFGHIJKLM
GLU-PS   @+*   # E
      = 75     mg/dl
(2)
AMYL-PS  H     #
       > 1500   U/l
(2)
------------------
```

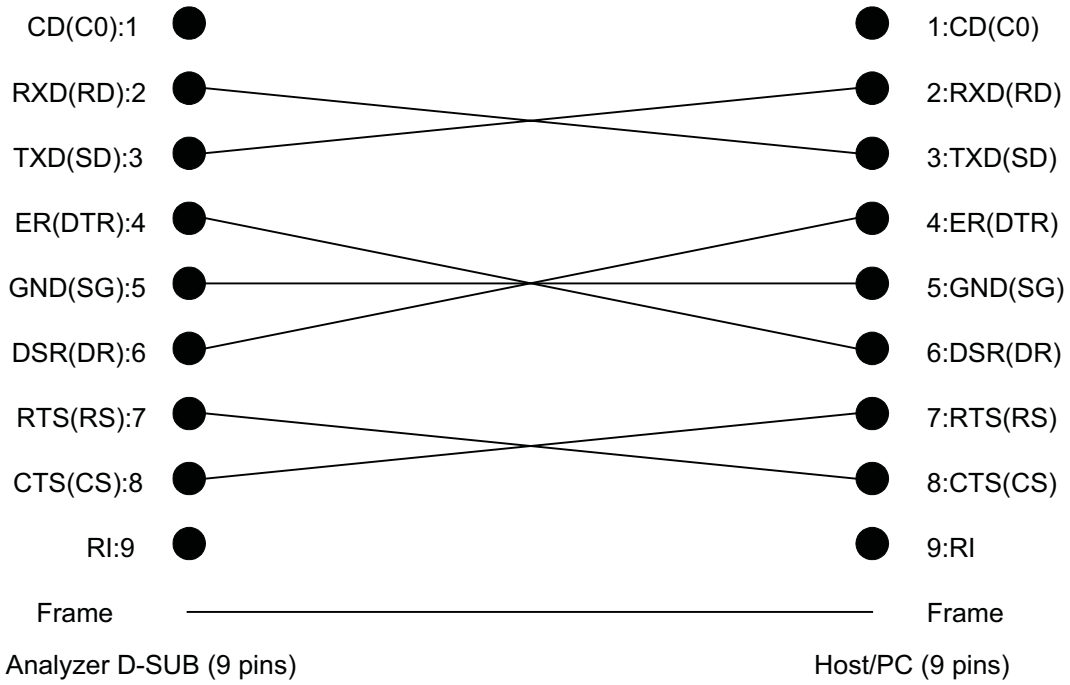
<Transmit data>

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	STX	N	O	R	M	A	L	□	2	0	1	4	-	0	6
2	-	1	2	1	0	:	5	0	1	2	3	4	5	6	7
3	8	9	0	1	2	3	A	B	C	D	E	F	G	H	I
4	J	K	L	M	0	1	G	L	U	-	P	□	□	=	7
5	5	□	□	□	□	□	□	□	m	g	/	d	l	□	2
6	□	□	@	#	+	*	□	□	□	E	□	□	A	M	Y
7	L	-	P	□	>	1	5	0	0	□	□	□	□	□	U
8	/	l	□	□	□	2	□	H	□	#	□	□	□	□	□
9	□	□	□	ETX											

□ = Space

6.6.5 Communication Cable Connection

(1) RS-232C cable
D-SUB 9 pins



(2) LAN cable
Straight

6

6.7 Sample Barcode Reader

6.7.1 Manufacturer, Model number

Manufacturer: Opto Electronics Co., Ltd.
Model number: C-37-USB (HID)

6.7.2 Data Format

Data format: CODE-39, NW-7, ITF 2 of 5, CODE-128, WPC
Data character length: 13