

Automated Hematology Analyzer XN-L series

Standard Host Interface Specifications

Revision 5

Sysmex Corporation

Revision History

Revision	Date	Major Contents of Changes
1	January 30, 2014	Initial version
2	June 24, 2014	<ul style="list-style-type: none"> Added “NEBC#” and “NTBC%” to Analysis Result Format6 (research2). Changed the description ““Spaces” are set to fill the specified number of character” to ““0”s are set to fill the specified number of character” regarding the data which is not output in Analysis Data Format in the destination of North America. Added WBC information to Analysis Data Format.
3	September 4, 2014	<ul style="list-style-type: none"> Revised number of characters of HFLC#, HFLC%, IPF# in Quality Control Data Format 1. Revised the following items to “Reserved” in Analysis Result Data Format 5 (research 1). TNC-N Revised the following items to “Reserved” in Analysis Result Data Format 8 (research 4). BA-N#, BA-N%, BA-D#, BA-D% Revised the following items to “Reserved” in Analysis Result Data Format 10 (service 1). WBC-N2, TNC-N2, WBC-P2, TNC-P2 Added the following items into Analysis Result Data Format 5 (research 1). IPF#, IPF, WBC-C, TNC-C, WBC-D& Added the following items into Analysis Result Data Format 6 (research 2). RDW-SD, RDW-CV Added the following items into Analysis Result Data Format 7 (research 3). MCHC-O Added the following items into Analysis Result Data Format10 (service 2). PRBC-WDF#
4	October 2, 2014	<ul style="list-style-type: none"> Added the description “For the destination of North America, “0”s are set to fill the specified number of characters” of TC-BF.
5	December 1, 2014	<ul style="list-style-type: none"> Deleted the following items in Analysis Data Format 1and Quality Control Data Format 1. HFLC#, HFLC% Added the following items in Analysis Data Format 3 (IP messages and action messages) and Analysis Data Format 4 (Q-Flag). pRBC?(R) Added the description “Without IPF license, values are not set, but “0”s are set to fill the specified number of characters.” of the following items IPF, IPF#, H-IPF Added the description “Without pRBC license, values are not set, but “0”s are set to fill the specified number of characters.” of the following items WBC-D& Revised the description of Flag detail of “2” in Analysis Data Format (Q-Flag) as follow. (Before) 2: Not judged due to low-value sample (After) 2: Not judged due to pre-condition NG or low-value sample

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1. Scope

This document applies to serial or TCP/IP communications between the XN-L series automated hematology analyzer and the host computer.

2. General

The XN-L series automated hematology analyzer has the capabilities to communicate analysis order information and output analysis results and QC data by connecting and communicating with the host computer.

This document intends to provide information required for communications between the XN-L series automated hematology analyzer and the host computer. The provided information includes:

- Specifications concerning software and hardware
- Specifications for outputting analysis results and QC data
- Specifications for communicating analysis order information

3. Terminology

Definitions of the terms used in this document are described below.

Table 3-1: Terminology

Numeric character	Single-byte characters corresponding to ISO/IEC 646 (ASCII) character codes “0” (30h) through “9” (39h).
Alphabetic character	Single-byte characters corresponding to ISO/IEC 646 (ASCII) character codes “A” (41h) through “Z” (5Ah) and “a” (61h) through “z” (7Ah).
Alphanumeric character	Numeric or alphabetical characters.
Single-byte character	ISO/IEC 646 (ASCII) character codes 00h through 7Fh (7-bit codes) except control characters (00h through 1Fh) and DEL (7Fh).
Extended single-byte character	ISO/IEC 8859 character codes 00h through FEh (8-bit codes) except control characters (00h through 1Fh, 80H through 9FH) and DEL (7Fh). For example, single-byte katakana and Latin-1 characters are included.
Any character	An aggregate including extended single-byte characters and double-byte characters.
Repeat analysis	Redoing an analysis due to an analysis error.
Rerun analysis	Running an analysis again with the same parameters, based on results of the initial analysis.
Reflex analysis	Running an analysis again with additional parameters, based on results of the initial analysis.

4. Specifications for Communicating Analysis Order Information

The XN-L series automated hematology analyzer has the capabilities to obtain analysis order information (i.e. analysis parameters and patient information) from the host computer and to automatically perform analysis according to the obtained information.

4.1. Overview of Communicating Analysis Order Information

4.1.1. Types of analysis order inquiries

- Real-time inquiries can be conducted immediately before analysis using the “Sample ID Number” or the “Sampler Adaptor Number/Tube Position” as an inquiry key.

Table 4-1: Specifying Type of Analysis Order Inquiry

Inquiry key	Sample ID Number	
	Sampler Adaptor Number/Tube Position	
Real-time inquiry	Manual analysis	Enables or disables real-time inquiries in manual mode analysis. Sample ID Number is always used as an inquiry key.
	Sampler analysis	Enables or disables real-time inquiries in sampler mode analysis. Either option for “Inquiry key” above is used as an inquiry key.

4.1.2. Timing of analysis order inquiries

- Real-time inquiry (manual analysis)

The XN-L series automated hematology analyzer carries out an inquiry when the [OK] button is clicked to close the manual analysis screen. However, the analyzer does not conduct an inquiry if the Work List already has the analysis order information of the same inquiry key. In this case the analyzer performs the analysis according to the information in the Work List without inquiring into the host computer.

- Real-time inquiry (sampler analysis)

The XN-L series automated hematology analyzer inquiries into the host computer at two events: initial analysis and rerun analysis/reflex analysis. The timing of the inquiry is identified by the value in the Inquiry Timing Distinction Code field in the Analysis Order Inquiry text.

[Inquiry at initial analysis]

The XN-L series automated hematology analyzer carries out the inquiry when the Sample ID Number or Sampler Adaptor Number/Tube Position is read out. However, the analyzer does not conduct an inquiry if the Work List already has the analysis order information of the same inquiry key. In this case the analyzer performs the analysis according to the information in the Work List without inquiring into the host computer.

[Inquiry at rerun analysis/reflex analysis]

After the initial analysis, if the evaluation result is “Query to host” based on the rerun/reflex rule, the IPU carries out the inquiry for rerun analysis/reflex analysis order. The Service settings allow specifying a time interval between the evaluation “Query to host” and the actual transmission of the inquiry text to the host

computer.

4.1.3. Handling communication errors

In case a transmission error occurs or the text data containing analysis order information from the host computer has an error, the transmission is aborted, and then one or more message dialogues are displayed on the IPU. After the displayed messages are confirmed, the analysis module starts an analysis according to the analysis order defined in the IPU. This analysis does not reflect any analysis order or patient information sent from the host computer.

Recovery of transmission is carried out by the operator.

For information about conditions of communication errors, refer to “6. Appendix 1 Actions against Errors in Communications with Host Computer”.

4.2. Serial Communication (RS-232C)

4.2.1. Hardware specifications

(1) Connector

- The output port (to Host) located on the back of the IPU is used for the connection.
- A 9-pin D-SUB, female connector (male on the IPU side) is used for the connection.
- The connector has inch-pitched fixing screws.

(2) Connector signals

Table 4-2: Connector Signals

Pin No.	Signal name	Signal direction
1		
2	Receive Data (RxD)	IN
3	Transmit Data (TxD)	OUT
4	Data/Terminal/Ready (DTR)	OUT
5	Signal Ground (SG)	
6	Data/Set/Ready (DSR)	IN
7	Request to Send (RTS)	OUT
8	Clear to Send (CTS)	IN
9		

(3) Signal levels

The signals levels are compliant with JIS C6361 as follows:

Table 4-3: Signal Levels

Level	Data signal	Control signal
+3V or higher	Logic "0", start bit	ON
-3V or lower	Logic "1", stop bit	OFF

4.2.2. Software specifications

(1) Setting interface parameters

The data is communicated in the asynchronous, half duplex mode. The following parameters can be defined (The values with * are factory defaults.)

Table 4-4: Setting Interface Parameters

Baud rate	600, 1200, 2400, 4800, *9600, 14400, 19200, 38400 (BPS)
Code	7 bits, *8 bits
Stop bit	*1 bit, 2 bits
Parity	*None, Even , Odd
Class	Class A, *Class B
Interval	0, 1, *2, 3, 5, 7, 10, 15 (sec)

(2) Communication format

- Character codes

For information on the character codes that can be used for communications between the host computer and the XN-L series automated hematology analyzer, see “3. Terminology.” Do not use any other character code.

- Structure of text

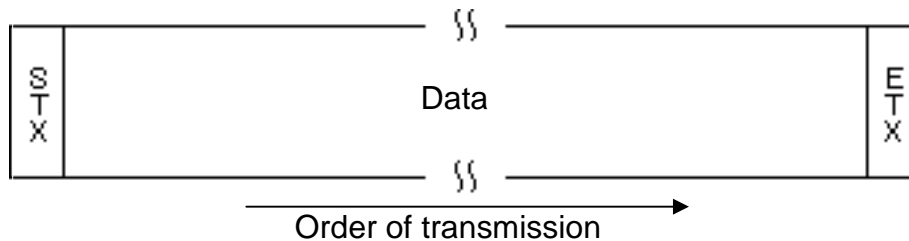


Figure 1: Structure of Text

“STX” (02h) is sent at the beginning of data, and “ETX” (03h) at the end of data.

The maximum length of one text block is 255 bytes.

(3) Communication procedure

To transmit analysis order information to/from the host computer, Class B must be selected. Selecting Class A will prevent desired communications.

Memo:

Class A

One-way transmission without requiring a response from the host computer

Class B

Alternate transmissions requiring a response (ACK, NAK) from the host computer to complete the data transmission. (The factory default is Class B.)

The XN-L series automated hematology analyzer makes analysis order inquiries into the host computer in the following steps:

- The IPU sends the Analysis Order Inquiry Format text.
- The host computer returns NAK in case of an error in receiving the data, or returns ACK upon successful receipt, and then sends the Analysis Order Information Format 1 text in response to the inquiry.
- If NAK is returned in response to the Analysis Order Inquiry Format text, the IPU sends the same text again. When ACK is returned, the XN-L series automated hematology analyzer proceeds to receive the Analysis Order Information Format 1, and then returns ACK if no error occurs.
- When ACK is returned from the IPU, the host computer proceeds to send the next Analysis Order Information Format 2 text in the same way as for the Format 1 text.
- When the Analysis Order Information Format 2 text is successfully sent and received, transmission of the information on one sample is finished.

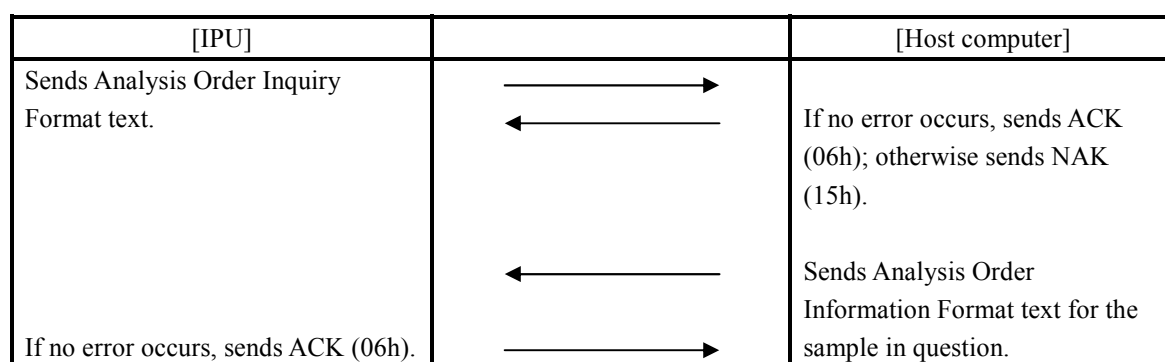


Figure 2: Communication Procedure

Note: If the XN-L series automated hematology analyzer encounters an error in receiving the text sent from the host computer, IPU handles the error as a transmission failure without sending a NAK response.

(4) Intervals of transmission

The Service settings allow specifying time duration between returning ACK upon successful receipt of the Analysis Order Information Format text from the host and sending the next Analysis Order Inquiry Format text.

4.3. TCP/IP Communication

4.3.1. Hardware specifications

- Conforms to IEEE802.3.
- Communications are based on 10/100/1000Base-T.
- The RJ45 socket is used for a hub to connect to the IPU.
- The UTP Category 5 cable is used as a communication cable.

4.3.2. Software specifications

(1) Data link / Network / Transport layer

- Conforms to TCP/IP protocol
- The IP address of the host computer is to be assigned manually. This IP address can be changed via settings on the IPU.
- The TCP port number used for communications with the host computer is to be assigned manually. The factory default is 5000. This value can be changed via settings on the IPU.

(2) Session layer

- To establish TCP/IP connection, the host computer acts as a server and the IPU acts as a client. The IPU checks if connection is established during its startup process. In case of failure to connect to the host computer, the IPU will retry the connection at intervals of 60 seconds. If the server shuts down after the connection, the IPU will retry connection at the same intervals.

(3) Presentation layer

- “STX” (02h) is sent at the beginning of data, and “ETX” (03h) at the end of data.
- The maximum length of one text block is 255 bytes.
- In the presentation layer, explicit responses such as ACK and NAK are not given.

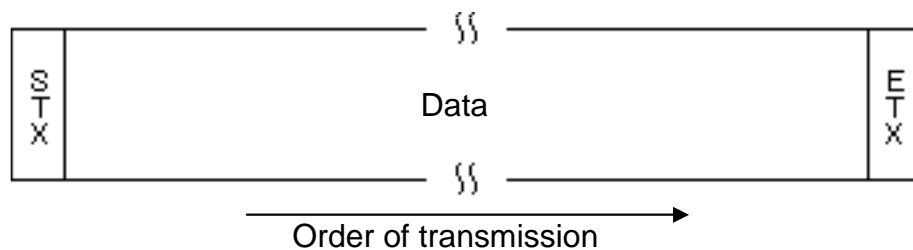


Figure 3: Structure of Text

4.4. Text Format

4.4.1. Types of text format

- Two types of text format are used for communicating analysis order information with the host computer: the Analysis Inquiry Format sent from the IPU and the Analysis Order Information Format sent from the host computer, which are respectively identified by the Text Distinction Code in the text.
 - Analysis Order Inquiry Format
The Text Distinction Code is “R”.
 - Analysis Order Information Format
The Text Distinction Code is “S”.
- The Analysis Order Information Format consists of two text blocks: Analysis Order Information Format 1 and Analysis Order Information Format 2. The order of transmission of these text blocks is identified by the Text Distinction Code 2 (the ETB code is not used).

4.4.2. Analysis Order Inquiry Format

(1) Order of transmission

Parameters in the table are sent from top to bottom; the most significant digit first and the least significant digit last.

(2) Reserved

The “Reserved” parameter is currently not used, but will possibly be used in the future. The “Reserved” parameter is set to 0 as of now; do not check this value.

Table 4-5: Analysis Order Inquiry Format

Parameter	No. of characters	Remarks
STX	1	(02h)
Text Distinction Code	1	“R” (Fixed)
Inquiry Mode Distinction Code	1	Identifies the inquiry mode: “1”: Inquiry with Sample ID Number as inquiry key “2”: Inquiry with Sampler Adaptor Number/Tube Position as inquiry key
Reserved	3	“0”s are set to fill the specified number of characters.
Sample ID Number	22	This parameter is valid for inquiry with Sample ID Number. used as a key. The number consists of extended single-byte characters, right-aligned with space padding (Service settings allow changing to zero padding). Ex.) “△△△△△△△ABCDE1234567890” (The symbol △ represents a space (20h).)
Reserved	2	“0”s are set to fill the specified number of characters.
Sampler Adaptor Number	6	This parameter is valid for real-time (sampler analysis) or batch inquiries. The number consists of extended single-byte characters, right-aligned with zero padding. For real-time inquiries (manual analysis), this parameter is set to “0”s to fill the specified number of characters. Ex.) “000012”
Tube Position Number	2	Indicates the sample position in the sampler adaptor, being valid for real-time (sampler analysis). The number consists of numeric characters between “01” and “10”, right-aligned with zero padding. For real-time inquiries (manual analysis), this parameter is set to “0”s to fill the specified number of characters. Ex.) “05”
Inquiry Timing Distinction Code	1	Indicates the timing of inquiry: “0”: Real-time inquiry (manual analysis) . “1”: Real-time inquiry (sampler analysis) for initial analysis. “2”: Real-time inquiry (sampler analysis) for rerun/reflex analysis.
Reserved	23	“0”s are set to fill the specified number of characters.
ETX	1	(03h)
Total	63	

4.4.3. Analysis Order Information Format

(1) Order of transmission

Please return two blocks of text “Analysis Order Information Format 1” and “Analysis Order Information Format 2” consecutively. Parameters in the table are to be sent from top to bottom; the most significant digit first and the least significant digit last.

(2) Reserved

The “Reserved” parameter is currently not used, but will possibly be used in the future. Return all Reserved parameters set to “0”.

4.4.3.1. Analysis Order Information Format 1

Table 4-6: Analysis Order Information Format 1

Parameter	No. of characters	Remarks
STX	1	(02h)
Text Distinction Code 1	1	“S” (Fixed)
Text Distinction Code 2	1	“1” (Fixed)
Order Distinction Code	1	Indicates whether the order information for the target sample is registered to the host computer. Return one of the following values: “0”: Not registered “1”: Registered * If “0” (Not Registered) is returned, the analyzer will perform an analysis according to a predefined order.
Date Ordered	8	This is the date when the order to analyze the sample was provided. Return the date in the “YYYYMMDD” format. YYYY: year, MM: month, DD: day (month and date to be zero-padded) Ex.) “20060103” (January 3, 2006)
Reserved	3	“0”s are set to fill the specified number of characters.
Sample ID Number	22	For inquiry with Sample ID Number used as inquiry key, return the same number as the one in the Analysis Order Inquiry text. For inquiry with Sampler Adaptor Number/Tube Position used as inquiry key, assign a number for the sample corresponding to the specified Sampler Adaptor Number/Tube Position. If the host computer does not assign a Sample ID Number, return the same sample number as the one in the Analysis Order Inquiry Format. Extended single-byte characters can be used. The returned number has to be right-aligned with space padding. Ex.) “△△△△△△△ABCDE1234567890” (The symbol △ represents a space (20h).) * Sample numbers beginning with “QC” are reserved for QC analysis. Do not assign a sample number beginning with “QC” if QC samples are not going to be analyzed.
Reserved	2	“0”s are set to fill the specified number of characters.
Sampler Adaptor Number	6	Regardless of any inquiry key defined, return the same sampler adaptor number as the one in the Analysis Order Inquiry Format. The returned number has to be right-aligned with zero padding. Ex.) “000012”

Tube Position Number	2	Regardless of any inquiry key defined, return the same tube position number as the one in the Analysis Order Inquiry Format. The returned number has to be right-aligned with zero padding. Ex.) “05”
Inquiry Mode Distinction Code	1	Return the same inquiry mode distinction code as the one in the Analysis Order Inquiry Format.
Patient ID	16	This is an identifier to uniquely identify the patient whose sample is to be analyzed. Extended single-byte characters can be used. The returned value has to be left-aligned with space padding. If no information is available about the patient ID, return spaces (20h) filling the specified number of characters. Ex.) “1234567890A△△△△△” (The symbol △ represents a space (20h).) * If patient information is to be handled, a unique patient ID must be assigned.
Patient Last Name	20	This is the last name of the patient whose sample is to be analyzed. Any character can be used. The returned value has to be left-aligned with space padding. Ex.) “Sysmex△△△△△△△△△△△△△△” (The symbol △ represents a space (20h).) * If no information is available about the patient’s last name, return spaces (20h) filling the specified number of characters.
Patient First Name	20	This is the first name of the patient whose sample is to be analyzed. Any character can be used. The returned value has to be left-aligned with space padding. Ex.) “JIM△△△△△△△△△△△△△△△△△△” (The symbol △ represents a space (20h).) * If no information is available about the patient’s first name, return spaces (20h) filling the specified number of characters.
Patient Sex	1	This is the sex of the patient whose sample is to be analyzed. Return one of the following values: “1”: Male “2”: Female “3”: Unknown * If no information is available about the patient sex, return “3”.
Patient Date of Birth	8	This is the date of birth of the patient whose sample is to be analyzed. Return the date in the “YYYYMMDD” format. YYYY: year, MM: month, DD: day (month and date to be zero-padded) Ex.) “19750123” (January 23, 1975) * If no information is available about the patient’s date of birth, return spaces (20h) filling the specified number of characters.
Doctor Name	20	This is the name of the doctor in charge of the patient whose sample is to be analyzed. Any character can be used. The returned value has to be left-aligned with space padding. Ex.) “Dr.Abcde△△△△△△△△△△△△△△” (The symbol △ represents a space (20h).) * If no information is available about the doctor’s name, return spaces (20h) filling the specified number of characters.
Ward Name	20	This is the name of the ward allocated to the patient whose sample is to be analyzed. Any character can be used. The returned value has to be left-aligned with space padding. Ex.) “Ward.Abc△△△△△△△△△△△△△△” (The symbol △ represents a space (20h).)

		* If no information is available about the ward name, return spaces (20h) filling the specified number of characters.
Comment on Sample	40	<p>This is a comment on the sample to be analyzed. Any character can be used. The returned value has to be left-aligned with space padding.</p> <p>Ex.) “Sample△ABCDE12345△△△△△△△△△△△△△△△△△△△△△△△△△△△△” △”</p> <p>(The symbol △ represents a space (20h).)</p> <p>* If no information is available about the comment, return spaces (20h) filling the specified number of characters.</p>
Inquiry Timing Distinction Code	1	Return the same inquiry timing distinction code as the one in the Analysis Order Inquiry Format.
Reserved	2	“0”s are set to fill the specified number of character.
Low WBC	1	<p>This is a setting related to the Low WBC mode for sampler analysis. Return either “0” (Do not test) or “1” (Do test).</p> <p>* If LYMPH%, MONO%, NEUT%, EO%, BASO%, LYMPH#, MONO#, NEUT#, EO#, and BASO# are all set to “0” (Do not test), this field is regarded as being set to “0” (Do not test). For manual analysis, “0”s are set before they are returned.</p> <p>* Switching to Low WBC mode cannot be ordered from host computer in manual mode analysis. To perform an analysis in Low WBC mode in manual mode analysis, switch the mode to Low WBC mode in the mode switching screen before analysis.</p>
Reserved	7	“0”s are set to fill the specified number of characters.
WBC	1	Return either “0” (Do not test) or “1” (Do test).
RBC	1	Return either “0” (Do not test) or “1” (Do test).
HGB	1	Return either “0” (Do not test) or “1” (Do test).
HCT	1	Return either “0” (Do not test) or “1” (Do test).
MCV	1	Return either “0” (Do not test) or “1” (Do test).
MCH	1	Return either “0” (Do not test) or “1” (Do test).
MCHC	1	Return either “0” (Do not test) or “1” (Do test).
PLT	1	Return either “0” (Do not test) or “1” (Do test).
LYMPH%	1	Return either “0” (Do not test) or “1” (Do test).
MONO%	1	Return either “0” (Do not test) or “1” (Do test).
NEUT%	1	Return either “0” (Do not test) or “1” (Do test).
EO%	1	Return either “0” (Do not test) or “1” (Do test).
BASO%	1	Return either “0” (Do not test) or “1” (Do test).
LYMPH#	1	Return either “0” (Do not test) or “1” (Do test).
MONO#	1	Return either “0” (Do not test) or “1” (Do test).
NEUT#	1	Return either “0” (Do not test) or “1” (Do test).
EO#	1	Return either “0” (Do not test) or “1” (Do test).
BASO#	1	Return either “0” (Do not test) or “1” (Do test).
RDW-CV	1	Return either “0” (Do not test) or “1” (Do test).
RDW-SD	1	Return either “0” (Do not test) or “1” (Do test).
PDW	1	<p>Return either “0” (Do not test) or “1” (Do test).</p> <p>*For the destination of North America, “0”s are set to fill the specified number of characters</p>
MPV	1	Return either “0” (Do not test) or “1” (Do test).
P-LCR	1	<p>Return either “0” (Do not test) or “1” (Do test).</p> <p>*For the destination of North America, “0”s are set to fill the specified number</p>

		of characters
Reserved	2	“0”s are set to fill the specified number of characters.
RET%	1	Return either “0” (Do not test) or “1” (Do test).
RET#	1	Return either “0” (Do not test) or “1” (Do test).
IRF	1	Return either “0” (Do not test) or “1” (Do test).
LFR	1	Return either “0” (Do not test) or “1” (Do test). *For the destination of North America, “0”s are set to fill the specified number of characters
MFR	1	Return either “0” (Do not test) or “1” (Do test). *For the destination of North America, “0”s are set to fill the specified number of characters
HFR	1	Return either “0” (Do not test) or “1” (Do test). *For the destination of North America, “0”s are set to fill the specified number of characters
Reserved	1	“0”s are set to fill the specified number of characters.
PCT	1	Return either “0” (Do not test) or “1” (Do test). *For the destination of North America, “0”s are set to fill the specified number of characters
Reserved	1	“0”s are set to fill the specified number of characters.
Reserved	1	“0”s are set to fill the specified number of characters.
Reserved	15	“0”s are set to fill the specified number of characters.
ETX	1	(03h)
Total	255	

Memo:

Analyzer behavior corresponding to the value predefined in “Order Distinction Code” and “AnalysisParameter” in both initial and rerun analysis inquiries is as shown below:

Order Distinction Code	Analysis Parameter	Analyzer behavior
“0”: Not registered	NA	Performs an analysis according to a predefined order.
“1”: Registered	“0” (Do not test) corresponds for all parameter	Neither performs aspiration on the sample nor saves analysis data in a stored sample list
	If any one of them corresponds “1” (Do test)	Performs aspiration on the sample and saves analysis data in a stored sample list

•

Note:

- If the analyzer receives the Analysis Order Information Format text where a test item requiring a test channel unavailable in the analyzer is set to “1” (Do test), a help message “Invalid analysis item is specified” will be displayed on Help dialogue. After it is confirmed, the analyzer will neither perform aspiration on the sample nor save analysis data in a stored sample list.

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4.4.3.2. Analysis Order Information Format 2

Table 4-7: Analysis Order Information Format 2

Parameter	No. of characters	Remarks
STX	1	(02h)
Text Distinction Code I	1	“S” (Fixed)
Text Distinction Code II	1	“2” (Fixed)
Order Distinction Code	1	Return the same “Order Distinction Code” as the one in the Analysis Order Information Format 1.
Date Ordered	8	Return the same “Date Ordered” as the one in the Analysis Order Information Format 1.
Reserved	3	“0”s are set to fill the specified number of characters.
Sample ID Number	22	Return the same “Sample ID Number” as the one in the Analysis Order Information Format 1.
Reserved	2	“0”s are set to fill the specified number of characters.
Sampler Adaptor Number	6	Return the same “Sampler Adaptor Number” as the one in the Analysis Order Information Format 1.
Tube Position Number	2	Return the same “Tube Position Number” as the one in the Analysis Order Information Format 1.
Inquiry Mode Distinction Code	1	Return the same “Inquiry Mode Distinction Code” as the one in the Analysis Order Information Format 1.
Patient ID	16	Return the same “Patient ID” as the one in the Analysis Order Information Format 1.
Comment on Patient	100	This is a comment on the patient whose sample is to be analyzed. Any character can be used. The returned value has to be left-aligned with space padding. * If no information is available about the comment, return spaces (20h) filling the specified number of characters.
Reserved	90	“0”s are set to fill the specified number of characters.
ETX	1	(03h)
Total	255	

5. Specifications for Analysis Results Output

The XN-L series automated hematology analyzer has the capability to output analysis data to the host computer.

5.1. Overview of Analysis Results Output

5.1.1. Timing of Analysis Results Output

Settings on the IPU allow selecting either automatic output by every test cycle or batch transmission of stored sample data.

5.1.2. Increase in network traffic

If the IPU is configured to output analysis data automatically, the host computer may suffer congestion caused by alternate transmissions of analysis order information and analysis data. To avoid possible delayed responses from the host computer due to excessive burdens, select batch transmission instead of automatic output so that analysis data is collectively transmitted after the analysis.

5.1.3. Handling communication errors

In case a transmission error occurs, the transmission is aborted, and one or more help messages are displayed on the IPU. Recovery of transmission is to be carried out by the operator.

For information about conditions of communication errors, see “6. Appendix 1 Actions against Errors in Communications with Host Computer”.

5.2. Serial Communication (RS-232C)

5.2.1. Hardware specifications

Same as the specifications for communicating analysis order information.

5.2.2. Software specifications

(1) Setting interface parameters

Same as the specifications for communicating analysis order information with the host computer.

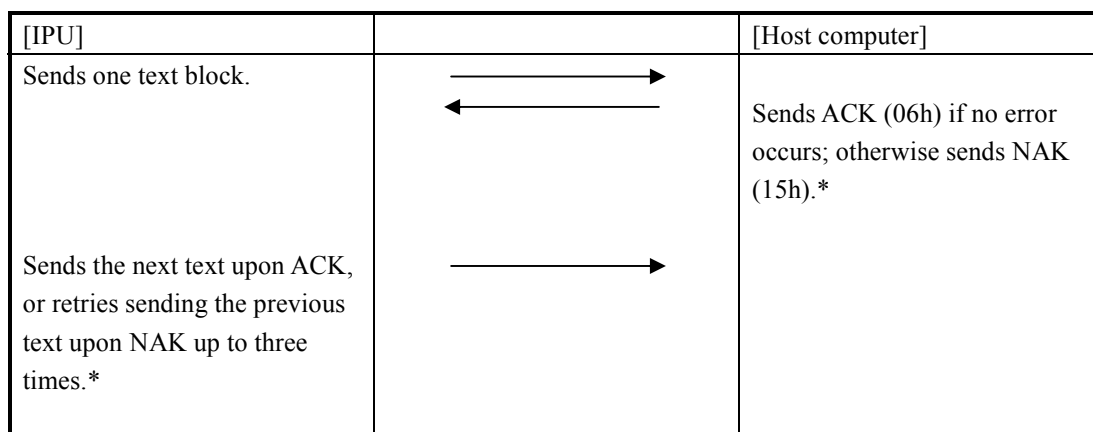
(2) Communication format

Same as the specifications for communicating analysis order information with the host computer.

(3) Communication Procedure

Either Class A or Class B can be selected depending on the system configuration.

The XN-L series automated hematology analyzer outputs analysis results to the host computer in the following steps:



* Applicable to Class B only. Class A involves neither ACK/NAK responses nor transmission retries.

Figure 4: Communication Procedure

(4) Intervals of transmission

The Service settings can be configured to transmit sample analysis data at certain intervals. The interval is a time period between an ACK/NAK response (Class B) and the next text transmission. This interval is common to transmissions of analysis order information.

5.3. TCP/IP Communication

5.3.1. Hardware specifications

Same as the specifications for communicating analysis order information.

5.3.2. Software specifications

(1) Data link / Network / Transport layer

Same as the specifications for communicating analysis order information.

(2) Session layer

Same as the specifications for communicating analysis order information.

(3) Presentation layer

Same as the specifications for communicating analysis order information.

5.4. Text Format

5.4.1. Types of text format

- There are two types of text format used for transmitting analysis data to the host computer: Analysis Data Format and Quality Control Data Format. These are different in text length and content. The types are identified by the Sample Distinction Code indicated in the text.

- Analysis Data Format:

This format is used to output analysis data from an area other than the QC chart. The Sample Distinction Code is “U”.

- Quality Control Data Format:

This format is used to output QC data from the QC chart. The Sample Distinction Code is “C”.

- Regardless of which format type is used, the Text Distinction Code 1 is always set to “D” when analysis data is output.
- Regardless of which format type is used, text data longer than 255 bytes (including STX and ETX) will be divided into two or more blocks before output. The order of transmission of these text blocks is identified by the Text Distinction Code 2 (the ETB code is not used).

5.4.2. Analysis Data Format

(1) Order of transmission

Text blocks “Analysis Data Format 1” and “Analysis Data Format 2” are consecutively transmitted.

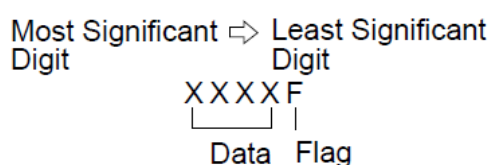
Parameters in the table are sent from top to bottom; the most significant digit first and the least significant digit last.

(2) Decimal point

Numeric values do not include decimal points; instead values displayed on the IPU screen are converted to the units shown in the Remarks column in the format table. If necessary, convert the units on the host computer.

(3) Numeric data format and flags

Numeric data is expressed in the following format. Data is assigned to high-order bytes, and a flag is assigned to the least significant byte. The data is output as a character string, right-aligned with zero padding.



- Flag details

0: Normal

1: “+” abnormal value (exceeding upper limit)

2: “-” abnormal value (exceeding lower limit)

3: Out of assured linearity

4: Low reliability mark set by flagging

5: Out of clinical panic limits, or out of permissible limits for

background check

(4) Abnormal or inapplicable data

A data value displayed as “----” or “++++” is output in the “*0000” format (an asterisk (*) is assigned to the first digit and 0s to the remaining digits; the number of “0”s is the specified number of characters minus 1). For any item given no analysis order, spaces (20h) filling the specified number of characters are output without zero padding.

(5) Invalid data

For any data to which Analysis order cannot be set due to analyzer configuration, spaces(20h) filling the specified number of characters are output without zero padding.

(6) Reserved

The “Reserved” parameter is currently not used, but will possibly be used in the future. Any “Reserved” parameter is set to “0” or “ ” (space) as of now; do not check this value.

Note:

Positive/negative judgments and IP messages are intended for use in a clinical laboratory for inspection only, and not for patient diagnosis. These items notify the operator of the possibility of specific sample abnormality confirmed by checking analysis data.

5.4.2.1. Analysis Data Format 1

Table 5-1: Analysis Data Format 1

Parameter	No. of characters	Remarks
STX	1	(02h)
Text Distinction Code 1	1	“D” (Fixed)
Text Distinction Code 2	1	“1” (Fixed)
Sample Distinction Code	1	“U” (Fixed)
Analyzer Name	10	Indicates the analyzer name for identifying the analyzer. The name consists of alphanumeric characters, right-aligned with space padding. Ex.) “△△△△△XN-550” (The symbol △ represents a space (20h).)
Caret	1	“^” (Fixed)
Analyzer Number	5	Indicates the analyzer number for identifying the analyzer. The number consists of alphanumeric characters. Ex.) “11001”
Sequence No.	10	Indicates the sequence number (serial number) for the sample tested on the same date. This number consists of numeric characters, right-aligned with zero padding. Ex.) “0000000345”
Reserved	3	“0”s are set to fill the specified number of characters.
Sample ID Number	22	The number consists of extended single-byte characters, right-aligned with space padding (Service settings allow changing to zero padding). Ex.) “△△△△△△ABCDE1234567890” (The symbol △ represents a space (20h).) * If a barcode reading error occurs, the ID number for the corresponding sample is expressed as follows: Ex.) “△△△△△△ERR*****” (The symbol △ represents a space (20h), and an asterisk * represents an extended single-byte character.)
Date Tested	8	The format is fixed to “YYYYMMDD”. YYYY: year, MM: month, DD: day (month and date to be zero-padded) Ex.) “20060103” (January 3, 2006)
Test Time	4	The format is fixed to “HHMM”. HH: hour (24-hour basis: “00” – “23”), MM: minute (“00” – “59”) (hour and minute to be zero-padded) Ex.) “0845” (8 o’clock 45 minutes)
Reserved	2	“0”s are set to fill the specified number of characters.
Sampler Adaptor Number	6	Indicates the number for the sampler adaptor where analysis was performed. The number consists of extended single-byte characters, right-aligned with zero padding. For manual analysis, spaces (20h) are set to fill the specified number of characters. Ex.) “000012”
Tube Position Number	2	Indicates the tube position in the sampler adaptor where the sample was analyzed. The number consists of numeric characters between 01 and 10, right-aligned with zero padding. For manual analysis, “0”s are set to fill the specified number of characters. Ex.) “02”

Sample No. Attribute	1	Indicates the attribute of the sample number. “4”: Sample number is read by barcode reader (Sample No. Attribute B). “2”: Sample number cannot be read by barcode reader (Sample No. Attribute A) “0”: Others (Sample No. Attribute M or C)
Analysis Mode	1	Indicates the sample analysis mode. “1”: Manual analysis (WB) “2”: Sampler analysis (WB) “4”: Manual analysis (PD) “6”: Manual analysis (BF) “7”: Sampler analysis (LW) “8”: Manual analysis (LW)
Patient ID	16	Indicates the unique identifier of the patient whose sample was analyzed. The ID consists of extended single-byte characters, left-aligned with space padding. Ex.) “1234567890A△△△△△” (The symbol △ represents a space (20h).) * If no information is available about the patient ID, spaces (20h) are set to fill the specified number of characters.
Analysis Error	1	Indicates whether or not the analysis error other than ID barcode reading error occurred. “0”: No error; Neither Error(Func.) nor Error(Result) occurred “1”: Error; Error(Func.) or Error(Result) occurred
Judgment and Analysis Error	1	Indicates judgment on the sample and whether analysis error occurred. “0”: Negative or Unjudged sample, and No error “1”: Positive and No error “2”: Unjudged sample and Analysis error “3”: Positive and Analysis error “Q”: QC sample
Positive (Diff)	1	Indicates whether the measured value of a blood cell type was normal. “0”: Normal “1”: Abnormal
Positive (Morph)	1	Indicates whether there exists abnormality in blood cell morphology. “0”: Normal “1”: Abnormal
Positive (Count)	1	Indicates whether the blood cell count was normal. “0”: Normal “1”: Abnormal
Error (Func)	1	Indicates whether Error (Func.) occurred. “0”: None of the following errors occurred. “1”: An error occurred except ID barcode reading error and Error (Result).
Error (Result)	1	Indicates whether Error (Result) occurred. “0”: None of the following errors occurred. “1”: One of the following analysis errors occurred: “Sample Not Asp Error”, “Low Blood Volume”, and “Low Count Error”.
With/Without Order	1	Indicates whether the sample was analyzed with order. “0”: Analyzed without order (the cases other than following) “1”: Analyzed with order (Order Distinction Code in Analysis Order Format is registered or Analysis Order in work list is applied to analyze)
Presence of WBC Abnormal IP Message	1	Indicates whether there was any WBC Abnormal IP message. “0”: No IP message “1”: IP message present

Presence of WBC Suspect IP Message	1	Indicates whether there was any WBC Suspect IP message. “0”: No IP message “1”: IP message present
Presence of RBC Abnormal IP Message	1	Indicates whether there was any RBC Abnormal IP message. “0”: No IP message “1”: IP message present
Presence of RBC Suspect IP Message	1	Indicates whether there was any RBC Suspect IP message. “0”: No IP message “1”: IP message present
Presence of PLT Abnormal IP Message	1	Indicates whether there was any PLT Abnormal IP message. “0”: No IP message “1”: IP message present
Presence of PLT Suspect IP Message	1	Indicates whether there was any PLT Suspect IP message. “0”: No IP message “1”: IP message present
Unit Information	1	Indicates whether SI or HGB2 units were used. “0”: Neither SI nor HGB2 units were used “1”: SI units are used but HGB2 units were not used “2” : SI units are not used but HGB2 units were used
WBC Information	1	Indicates whether or not DIFF Analysis and WBC correction were applied. '0' : No Diff Analysis/ No WBC correction '1' : Diff Analysis/No WBC correction '2' : No Diff Analysis/ WBC correction, '3' : DIFF Analysis/WBC correction *Even if the WBC value displayed on the IPU’s Laboratory-Use-Only tab is output (Specifically, Body Fluid mode) , “0” is output.
PLT Information	1	Indicates with which channel the adopted PLT value was analyzed. “0”: RBC/PLT channel “1”: RET channel
Reserved	1	“0”s are set to fill the specified number of characters.
Order Type	1	Indicates the order type. “0”: Initial “1”: Initial/Repeat “2”: Rerun “3”: Rerun/Repeat “4”: Reflex “5”: Reflex/Repeat “6”: Manual “7”: Manual (Open)
Evaluation Based on Repeat/Rerun/Reflex Rule	1	Indicates the evaluation result based on the Repeat/Rerun/Reflex rule (indicates which action to take next for the sample). “0”: None (there is no applicable rule, or evaluation based on the Repeat/Rerun/Reflex rule is not made) “1”: Repeat “2”: Rerun “3”: Reflex “4”: Query to host * Set to “0” for manual analysis.
Reserved	20	“0”s are set to fill the specified number of characters.
WBC-BF	7	(XXXXXXF) [/ μ L]
RBC-BF	6	(XXXXXF) [$\times 10^3$ / μ L]

MN#	7	(XXXXXXF) [/ μ L]
MN%	5	(XXXXF) [$\times 10^{(-1)}$ %]
PMN#	7	(XXXXXXF) [/ μ L]
PMN%	5	(XXXXF) [$\times 10^{(-1)}$ %]
TC-BF#	7	(XXXXXXF) [/ μ L] * If derived software handles the item as a research item, the Service settings (Output_AnalysisInformation) can be configured not to output the item. In this case, "0"s are set to this parameter to fill the specified number of characters.
Reserved	5	"0"s are set to fill the specified number of characters.
Reserved	6	"0"s are set to fill the specified number of characters
Reserved	5	"0"s are set to fill the specified number of characters.
IPF#	5	(XXXXF) [$\times 10^2$ / μ L] * Without IPF license, values are not set, but "0"s are set to fill the specified number of characters.
Reserved	54	"0"s are set to fill the specified number of characters.
ETX	1	(03h)
Total	255	

5.4.2.2. Analysis Data Format 2

Table 5-2: Analysis Data Format 2

Parameter	No. of characters	Remarks
STX	1	(02h)
Text Distinction Code 1	1	"D" (Fixed)
Text Distinction Code 2	1	"2" (Fixed)
Sample Distinction Code	1	"U" (Fixed)
Analyzer Name	10	The same analyzer name is assigned as the one in the Analysis Data Format 1.
Caret	1	The same caret is assigned as the one in the Analysis Data Format 1.
Analyzer Number	5	The same analyzer number is assigned as the one in the Analysis Data Format 1.
Sequence No.	10	The same sequence number is assigned as the one in the Analysis Data Format 1.
Reserved	3	"0"s are set to fill the specified number of characters.
Sample ID Number	22	The same sample number is assigned as the one in the Analysis Data Format 1.
WBC	6	(XXXXXXF) [$\times 10$ / μ L]
RBC	5	(XXXXF) [$\times 10^4$ / μ L]
HGB	5	(XXXXF) [g/L] * [$10^{(-1)}$ mmol/L] in SI units * [$10^{(-1)}$ g/L] in HGB2 units
HCT	5	(XXXXF) [$\times 10^{(-1)}$ %]
MCV	5	(XXXXF) [$\times 10^{(-1)}$ fL]
MCH	5	(XXXXF) [$\times 10^{(-1)}$ pg] *[amol] in SI units
MCHC	5	(XXXXF) [g/L] * [$10^{(-1)}$ mmol/L] in SI units
PLT	5	(XXXXF) [$\times 10^3$ / μ L]
LYMPH%	5	(XXXXF) [$\times 10^{(-1)}$ %]
MONO%	5	(XXXXF) [$\times 10^{(-1)}$ %]
NEUT%	5	(XXXXF) [$\times 10^{(-1)}$ %]
EO%	5	(XXXXF) [$\times 10^{(-1)}$ %]

BASO%	5	(XXXXF) $[\times 10^{(-1)} \text{ \%}]$
LYMPH#	6	(XXXXXXF) $[\times 10 / \mu\text{L}]$
MONO#	6	(XXXXXXF) $[\times 10 / \mu\text{L}]$
NEUT#	6	(XXXXXXF) $[\times 10 / \mu\text{L}]$
EO#	6	(XXXXXXF) $[\times 10 / \mu\text{L}]$
BASO#	6	(XXXXXXF) $[\times 10 / \mu\text{L}]$
RDW-CV	5	(XXXXF) $[\times 10^{(-1)} \text{ \%}]$
RDW-SD	5	(XXXXF) $[\times 10^{(-1)} \text{ fL}]$
PDW	5	(XXXXF) $[\times 10^{(-1)} \text{ fL}]$ * If derived software handles the item as a research (Can be displayed in the main screen) item, the Service settings (Output Analysis Information) can be configured not to output the item. In this case, “0”s are set to this parameter to fill the specified number of characters. *For the destination of North America “0”s are set to fill the specified number of characters.
MPV	5	(XXXXF) $[\times 10^{(-1)} \text{ fL}]$
P-LCR	5	(XXXXF) $[\times 10^{(-1)} \text{ \%}]$ * If derived software handles the item as a research (Can be displayed in the main screen) item, the Service settings (Output Analysis Information) can be configured not to output the item. In this case, “0”s are set to this parameter to fill the specified number of characters. *For the destination of North America, “0”s are set to fill the specified number of characters
RET%	5	(XXXXF) $[\times 10^{(-2)} \text{ \%}]$
RET#	5	(XXXXF) $[\times 10^2 / \mu\text{L}]$
IRF	5	(XXXXF) $[\times 10^{(-1)} \text{ \%}]$
LFR	5	(XXXXF) $[\times 10^{(-1)} \text{ \%}]$ * If derived software handles the item as a research (Can be displayed in the main screen) item, the Service settings (Output Analysis Information) can be configured not to output the item. In this case, “0”s are set to this parameter to fill the specified number of characters. *For the destination of North America, “0”s are set to fill the specified number of characters
MFR	5	(XXXXF) $[\times 10^{(-1)} \text{ \%}]$ * If derived software handles the item as a research (Can be displayed in the main screen) item, the Service settings (Output Analysis Information) can be configured not to output the item. In this case, “0”s are set to this parameter to fill the specified number of characters. *For the destination of North America, “0”s are set to fill the specified number of characters
HFR	5	(XXXXF) $[\times 10^{(-1)} \text{ \%}]$ * If derived software handles the item as a research (Can be displayed in the main screen) item, the Service settings (Output Analysis Information) can be configured not to output the item. In this case, “0”s are set to this parameter to fill the specified number of characters. *For the destination of North America, “0”s are set to fill the specified number of characters

PCT	5	(XXXXF) $[\times 10^{(-2)} \text{ \%}]$ * If derived software handles the item as a research (Can be displayed in the main screen) item, the Service settings (Output Analysis Information) can be configured not to output the item. In this case, “0”s are set to this parameter to fill the specified number of characters. *For the destination of North America, “0”s are set to fill the specified number of characters
Reserved	6	“0”s are set to fill the specified number of characters.
Reserved	6	“0”s are set to fill the specified number of characters.
IG#	6	(XXXXXF) $[\times 10 / \mu\text{L}]$ * If derived software handles the item as a research (Can be displayed in the main screen) item, the Service settings (Output Analysis Information) can be configured not to output the item. In this case, “0”s are set to this parameter to fill the specified number of characters.
IG%	5	(XXXXF) $[\times 10^{(-1)} \text{ \%}]$ * If derived software handles the item as a research (Can be displayed in the main screen) item, the Service settings (Output Analysis Information) can be configured not to output the item. In this case, “0”s are set to this parameter to fill the specified number of characters.
Reserved	6	“0”s are set to fill the specified number of characters.
RET-He	5	(XXXXF) $[\times 10^{(-1)} \text{ pg}]$ *[amol] in SI units
IPF	5	(XXXXF) $[\times 10^{(-1)} \text{ \%}]$ * Without IPF license, values are not set, but “0”s are set to fill the specified number of characters.
Reserved	4	“0”s are set to fill the specified number of characters.
ETX	1	(03h) is transmitted.
Total	255	

5.4.3. Quality Control Data Format

(1) Order of transmission

Text blocks “Quality Control Data Format 1” and “Quality Control Data Format 2” are consecutively transmitted. Parameters in the table are sent from top to bottom; the most significant digit first and the least significant digit last.

(2) Decimal point

Numeric values do not include decimal points; instead values displayed on the screen are converted to the units shown in the Remarks column in the format table, and then output the converted value, right-aligned with zero padding. If necessary, convert the units on the host computer.

(3) Abnormal or inapplicable data

Any data value displayed as “----” is output as “0”s filling the specified number of characters. Any value exceeding the number of digits for display is output as “9”s filling the specified number of characters. For any item given no analysis order, spaces (20h) filling the specified number of characters are output without zero padding.

(4) Invalid data

For any data to which the predefined Analysis order cannot be set due to the analyzer configuration, Spaces(20h) filling the specified number of characters are output without zero padding.

(5) Reserved

The “Reserved” parameter is currently not used, but will possibly be used in the future. Any “Reserved” parameter is set to “0” or “ ” (space) as of now; do not check this value.

5.4.3.1. Quality Control Data Format 1

Table 5-3: Quality Control Data Format 1

Parameter	No. of characters	Remarks
STX	1	(02h)
Text Distinction Code 1	1	“D” (Fixed)
Text Distinction Code 2	1	“I” (Fixed)
Sample Distinction Code	1	“C” (Fixed)
QC File Number	2	The QC file number is assigned. This number consists of single-byte characters, right-aligned with zero padding. For XbarM QC files, one of “X1” – “X5” is assigned.
Date of QC Analysis	8	The format is fixed to “YYYYMMDD”. YYYY: year, MM: month, DD: day (month and date to be zero-padded) Ex.) “20060103” (January 3, 2006)
QC Analysis Time	4	The format is fixed to “HHMM”. HH: hour (24-hour basis: “00” – “23”), MM: minute (“00” – “59”) (hour and minute to be zero-padded) Ex.) “0845” (8 o’clock 45 minutes)
Analyzer Name	10	Indicates the analyzer name for identifying the analyzer. The name consists of alphanumeric characters, right-aligned with space padding. Ex.) “△△△△△XN-550” (The symbol △ represents a space (20h).)
Caret	1	“^” (Fixed)
Analyzer Number	5	Indicates the analyzer number for identifying the analyzer. The number consists of alphanumeric characters. Ex.) “11001”
RBC	4	(XXXX) $[\times 10^4 / \mu\text{L}]$
HGB	4	(XXXX) $[\text{g/L}]$ $*[10^{-1} \text{ mmol/L}]$ in SI units $*[10^{(-1)} \text{ g/L}]$ in HGB2 units
HCT	4	(XXXX) $[\times 10^{(-1)} \%]$
MCV	4	(XXXX) $[\times 10^{(-1)} \text{ fL}]$
MCH	4	(XXXX) $[\times 10^{(-1)} \text{ pg}]$ $*[\text{amol}]$ in SI units
MCHC	4	(XXXX) $[\text{g/L}]$ $*[10^{-1} \text{ mmol/L}]$ in SI units
RDW-CV	4	(XXXX) $[\times 10^{(-1)} \%]$
RDW-SD	4	(XXXX) $[\times 10^{(-1)} \text{ fL}]$

PLT-I	4	(XXXX) [$\times 10^3$ / μ L]
PDW	4	(XXXX) [$\times 10^{(-1)}$ fL] *For the destination of North America, Spaces are set to fill the specified number of characters
MPV	4	(XXXX) [$\times 10^{(-1)}$ fL]
P-LCR	4	(XXXX) [$\times 10^{(-1)}$ %] *For the destination of North America, Spaces are set to fill the specified number of characters
PCT	4	(XXXX) [$\times 10^{(-2)}$ %] *For the destination of North America, Spaces are set to fill the specified number of characters
WBC-C	5	(XXXXX) [$\times 10$ / μ L]
NEUT%	4	(XXXX) [$\times 10^{(-1)}$ %]
LYMPH%	4	(XXXX) [$\times 10^{(-1)}$ %]
MONO%	4	(XXXX) [$\times 10^{(-1)}$ %]
EO%	4	(XXXX) [$\times 10^{(-1)}$ %]
BASO%	4	(XXXX) [$\times 10^{(-1)}$ %]
NEUT#	5	(XXXXX) [$\times 10$ / μ L]
LYMPH#	5	(XXXXX) [$\times 10$ / μ L]
MONO#	5	(XXXXX) [$\times 10$ / μ L]
EO#	5	(XXXXX) [$\times 10$ / μ L]
BASO#	5	(XXXXX) [$\times 10$ / μ L]
Reserved	5	“0”s are set to fill the specified number of characters.
RET#	4	(XXXX) [$\times 10^2$ / μ L]
RET%	4	(XXXX) [$\times 10^{(-2)}$ %]
HFR	4	(XXXX) [$\times 10^{(-1)}$ %] *For the destination of North America, Spaces are set to fill the specified number of characters
MFR	4	(XXXX) [$\times 10^{(-1)}$ %] *For the destination of North America, Spaces are set to fill the specified number of characters
LFR	4	(XXXX) [$\times 10^{(-1)}$ %] *For the destination of North America, Spaces are set to fill the specified number of characters
IRF	4	(XXXX) [$\times 10^{(-1)}$ %]
Reserved	5	“0”s are set to fill the specified number of characters.
IG#	5	(XXXXX) [$\times 10$ / μ L]
IG%	4	(XXXX) [$\times 10^{(-1)}$ %]
Reserved	5	“0”s are set to fill the specified number of characters.
RET-He	4	(XXXX) [$\times 10^{(-1)}$ pg] *[amol] in SI units
IPF	4	(XXXX) [$\times 10^{(-1)}$ %] *Without IPF license, values are not set, but “0”s are set to fill the specified number of characters.
Reserved	5	“0”s are set to fill the specified number of characters.
Reserved	5	“0”s are set to fill the specified number of characters.
WBC-D	5	(XXXXX) [$\times 10$ / μ L]
Reserved	4	“0”s are set to fill the specified number of characters.
Reserved	5	“0”s are set to fill the specified number of characters.
Reserved	4	“0”s are set to fill the specified number of characters.
IPF#	4	(XXXXF) [$\times 10^2$ / μ L]

		*Without IPF license, values are not set, but “0”s are set to fill the specified number of characters.
Reserved	28	“0”s are set to fill the specified number of characters.
Number of XbarM Batches	2	Indicates the number of samples (batches) per plot in XbarM QC. This number consists of numeric characters, right-aligned with zero padding. If non-XbarM QC data is output, this parameter is set to “0”.
ETX	1	(03h)
Total	255	

5.4.3.2. Quality Control Data Format 2

Table 5-4: Quality Control Data Format 2

Parameter	No. of characters	Remarks
STX	1	(02h)
Text Distinction Code 1	1	“D” (Fixed)
Text Distinction Code 2	1	“2” (Fixed)
Sample Distinction Code	1	“C” (Fixed)
QC File Number	2	The same QC file number is assigned as the one in the Quality Control Data Format 1.
Date of QC Analysis	8	The same date of QC analysis is assigned as the one in the Quality Control Data Format 1.
QC Analysis Time	4	The same QC analysis time is assigned as the one in the Quality Control Data Format 1.
Analyzer Name	10	The same analyzer name is assigned as the one in the Quality Control Data Format 1.
Caret	1	The same caret is assigned as the one in the Quality Control Data Format 1.
Analyzer Number	5	The same analyzer number is assigned as the one in the Quality Control Data Format 1.
Reserved	4	“0”s are set to fill the specified number of characters.
Reserved	4	“0”s are set to fill the specified number of characters.
WDF-X	4	(XXXX) $[\times 10^{(-1)} \text{ ch}]$
WDF-Y	4	(XXXX) $[\times 10^{(-1)} \text{ ch}]$
Reserved	5	“0”s are set to fill the specified number of characters.
Reserved	4	“0”s are set to fill the specified number of characters.
Reserved	4	“0”s are set to fill the specified number of characters.
Reserved	5	“0”s are set to fill the specified number of characters.
Reserved	4	“0”s are set to fill the specified number of characters.
Reserved	4	“0”s are set to fill the specified number of characters.
RBC-O	4	(XXXX) $[\times 10^4 / \mu\text{L}]$
PLT-O	4	(XXXX) $[\times 10^3 / \mu\text{L}]$
RET-RBC-X	4	(XXXX) $[\times 10^{(-1)} \text{ ch}]$
RET-RBC-Y	4	(XXXX) $[\times 10^{(-1)} \text{ ch}]$

DLT-RBC	4	(XXXX) $[\times 10^{(-2)}]$
DLT-PLTO	4	(XXXX) $[\times 10^{(-2)}]$
Reserved	4	“0”s are set to fill the specified number of characters.
Reserved	4	“0”s are set to fill the specified number of characters.
RET-RBC-WX	4	(XXXX) No unit
RET-RBC-WY	4	(XXXX) No unit
Reserved	5	“0”s are set to fill the specified number of characters.
Reserved	4	“0”s are set to fill the specified number of characters.
Reserved	4	“0”s are set to fill the specified number of characters.
Reserved	4	“0”s are set to fill the specified number of characters.
Reserved	4	“0”s are set to fill the specified number of characters.
Reserved	4	“0”s are set to fill the specified number of characters.
WBC-BF	6	(XXXXXX) $[\mu\text{L}]$
RBC-BF	5	(XXXXXX) $[\times 10^3 / \mu\text{L}]$
MN#	6	(XXXXXX) $[\mu\text{L}]$
MN%	4	(XXXX) $[\times 10^{(-1)} \text{ \%}]$
PMN#	6	(XXXXXX) $[\mu\text{L}]$
PMN%	4	(XXXX) $[\times 10^{(-1)} \text{ \%}]$
TC-BF#	6	(XXXXXX) $[\mu\text{L}]$
Reserved	4	“0”s are set to fill the specified number of characters.
WDF-Z	4	(XXXX) $[\times 10^{(-1)} \text{ ch}]$
Reserved	4	“0”s are set to fill the specified number of characters.
RET-RBC-Z	4	(XXXX) $[\times 10^{(-1)} \text{ ch}]$
Reserved	4	“0”s are set to fill the specified number of characters.
Reserved	4	“0”s are set to fill the specified number of characters.
Reserved	4	“0”s are set to fill the specified number of characters.
Reserved	48	“0”s are set to fill the specified number of characters.
ETX	1	(03h)
Total	255	

6. Appendix 1 Actions against Errors in Communications with Host Computer

6.1. DSR is off

Error message:	DSR is off.
Condition:	In serial connection, the control signal (DSR) for the serial port is not active.
Action:	Abort transmission of data related to the sample.

6.2. Communication time-out with host computer has occurred

Error message:	Communication time-out with host computer has occurred.
Condition 1:	In serial connection, the analyzer cannot receive text data from the host computer after waiting for 30 seconds.
Condition 2:	In serial connection Class B, the analyzer receives no ACK/NAK response within 15 seconds after sending text data to the host computer.
Condition 3:	In serial connection, the size of the text data sent/received does not conform to the specifications.
Condition 4:	The size of the text received from the host computer in response to an order inquiry does not conform to the specifications.
Action:	- Abort transmission of data related to the sample. - For Conditions 1, 3, or 4, stop inquiring for analysis order for the sample.

6.3. Send data to host computer has failed (Serial port)

Error message:	Send data to host computer has failed (serial port).
Condition:	In serial connection, the analyzer detected a frame error, parity error, or overrun error while transmitting text data to the host computer.
Action:	Abort transmission of data related to the sample.

6.4. Retry error has occurred

Error message:	Retry error has occurred.
Condition:	In serial connection Class B, the analyzer received an NAK response 4 times from the host computer after sending text data to the host.
Action:	Abort transmission of data related to the sample.

6.5. ACK/NAK receive has failed

Error message:	ACK/NAK receive has failed.
Condition:	In serial connection Class B, the analyzer received a response other than ACK/NAK from the host computer after sending text data to the host.
Action:	Abort transmission of data related to the sample.

6.6. STX receive has failed

Error message:	STX receive has failed.
----------------	-------------------------

Condition:	The text data received from the host computer does not start with “STX (0x02)”.
Action:	Stop inquiring for analysis order for the sample.

6.7. ETX receive has failed

Error message:	ETX receive has failed.
Condition:	The text data received from the host computer does not end with “ETX (0x03)”.
Action:	Stop inquiring for analysis order for the sample.

6.8. TCP/IP connection with host computer has failed

Error message:	TCP/IP connection with host computer has failed.
Condition:	In TCP/IP connection, the analyzer failed to establish TCP/IP connection before transmitting text data.
Action:	Abort transmission of data related to the sample.

6.9. Receive data from host computer has failed (TCP/IP)

Error message:	Receive data from host computer has failed (TCP/IP).
Condition:	In TCP/IP connection, the analyzer failed to receive text data of the specified size from the host computer due to a TCP/IP communication error.
Action:	Stop inquiring for analysis order for the sample.

6.10. Send data to host computer has failed (TCP/IP)

Error message:	Send data to host computer has failed (TCP/IP).
Condition:	In TCP/IP connection, the analyzer failed to send text data of the specified size to the host computer due to a TCP/IP communication error.
Action:	Abort transmission of data related to the sample.

6.11. Sample No. from host computer is invalid

Error message:	Sample No. from host computer is invalid. Sample No. of Analyzer is used.
Condition:	After inquiry into the host computer for analysis order with the sample ID number as an inquiry key in manual or sampler mode, the host returned a different sample ID number. Does not occur if the value of “Check order key matching” in the service settings is 0.
Action:	Discard the order information concerning that sample.

6.12. Sampler Adaptor Number/Tube position from host computer is invalid (Real-time query)

Error message:	Sampler Adaptor Number/Tube position from host computer is invalid. Sampler Adaptor Number/Tube position of Analyzer is used.
Condition:	After inquiry into the host computer for analysis order with the sampler adaptor number/tube position as an inquiry key in sampler mode, the host returned a

	different rack number/tube position. Does not occur if the value of “Check order key matching” in the service settings is 0.
Action:	Discard the order information concerning that sample.

6.13. Receive data from host computer is invalid

Error message:	Receive data from host computer is invalid.
Condition:	In an order query, data was received from the host that included invalid characters (characters other than extended single-byte characters) in the sample number, sampler adaptor number, or patient ID, and an attempt was made to use this as the order.
Action:	Discard the order information concerning that sample.

6.14. Text receive has failed

Error message:	Text receive has failed.
Condition:	Text data received from host was control character.
Action:	Discard the order information concerning that sample.

7. Appendix 2 Output of Option Items

7.1. Output of IP messages, action messages, Q-Flags, research parameters, and service parameters

- If IP messages, action messages, Q-Flags, research parameters, and service parameters are set for host output in the service settings, the format text blocks below are output in addition to “Analysis Data Format 1” and “Analysis Data Format 2” when analysis results are output.

“Analysis Data Format 3 (IP messages and action messages)”

“Analysis Data Format 4 (Q-Flag)”

“Analysis Data Format 5 (research 1)”

“Analysis Data Format 6 (research 2)”

“Analysis Data Format 7 (research 3)”

“Analysis Data Format 8 (research 4)”

“Analysis Data Format 9 (service 1)”

“Analysis Data Format 10 (service 2)”

“Analysis Data Format 11 (only Host)”

- In the host computer analysis result output specifications, the format text blocks are successively sent after “Analysis Data Format 2” in the order of the analysis data format numbers (in the case of a serial connection and Class B, ACK/NAK response processing and reprocessing for NAKs are also performed).
- In the factory default settings, only “Analysis Data Format 1” and “Analysis Data Format 2” are sent. Transmission of other analysis data formats can be set during IPU installation. (The settings cannot be changed by the customer. To have the settings changed, contact your local Sysmex representative.)
- Format text blocks that are output depend on the values set in the service settings. Service settings and analysis data formats that are output are shown in the table below.

Table 7-1: Service settings and output formats

Service setting	Formats that are output
Output research/service parameters = 0	1, 2
Output research/service parameters = 1	1, 2, 3, 4, 5
Output research/service parameters = 2	1, 2, 3, 4, 5, 6, 7, 8, 9, 10
Output research/service parameters = 3	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11

7.2. Data formats

7.2.1. Analysis Data Format (IP messages and action messages)

(1) Order of transmission

Parameters in the table are sent from top to bottom; the most significant digit first and the least significant digit last

(2) Reserved

The “Reserved” parameter is currently not used, but may be used in the future. All “Reserved” parameters are currently set to “0”. Do not check this value.

Table 7-2: Analysis Data Format 3 (IP messages and action messages)

Parameter		No. of characters	Remarks
STX		1	(02h)
Text Distinction Code 1		1	“D” (fixed)
Text Distinction Code 2		1	“3” (fixed)
Sample Distinction Code		1	“U” (fixed)
Analyzer Name		10	The same analyzer name is assigned as in Analysis Data Format 1.
Caret		1	The same caret is assigned as in Analysis Data Format 1.
Analyzer Number		5	The same analyzer number is assigned as in Analysis Data Format 1.
Sequence No.		10	The same sequence number is assigned as in Analysis Data Format 1.
Reserved		3	“0”s are set to fill the specified number of characters.
Sample ID Number		22	The same sample number is assigned as in Analysis Data Format 1.
Reserved		50	“0”s are set to fill the specified number of characters.
WBC ABNORMAL 16 byte	WBC Abn Scattergram	1	“0”: Does not apply to flag, “1”: Applies to flag
	Neutropenia	1	“0”: Does not apply to flag, “1”: Applies to flag
	Neutrophilia	1	“0”: Does not apply to flag, “1”: Applies to flag
	Lymphopenia	1	“0”: Does not apply to flag, “1”: Applies to flag
	Lymphocytosis	1	“0”: Does not apply to flag, “1”: Applies to flag
	Leukocytosis	1	“0”: Does not apply to flag, “1”: Applies to flag
	Monocytosis	1	“0”: Does not apply to flag, “1”: Applies to flag
	Eosinophilia	1	“0”: Does not apply to flag, “1”: Applies to flag
	Basophilia	1	“0”: Does not apply to flag, “1”: Applies to flag
	Leukocytopenia	1	“0”: Does not apply to flag, “1”: Applies to flag
	Reserved	1	“0”s are set to fill the specified number of characters.
	Reserved	1	“0”s are set to fill the specified number of characters.
	Reserved	1	“0”s are set to fill the specified number of characters.
	Reserved	1	“0”s are set to fill the specified number of characters.
	IG present	1	“0”: Does not apply to flag, “1”: Applies to flag
	Reserved	1	“0”s are set to fill the specified number of characters.
SUSPEC	Reserved	1	“0”s are set to fill the specified number of characters.
	Reserved	1	“0”s are set to fill the specified number of characters.
	Left Shift?	1	“0”: Does not apply to flag, “1”: Applies to flag

16 byte	RBC ABNORMAL	Reserved	1	“0”s are set to fill the specified number of characters.
		NRBC?	1	“0”s are set to fill the specified number of characters.
		Reserved	1	“0”s are set to fill the specified number of characters.
		Reserved	1	“0”s are set to fill the specified number of characters.
		Atypical Lymph?	1	“0”: Does not apply to flag, “1”: Applies to flag
		Reserved	1	“0”s are set to fill the specified number of characters.
		Blasts/Abn Lympho?	1	“0”: Does not apply to flag, “1”: Applies to flag
		Reserved	1	“0”s are set to fill the specified number of characters.
		Reserved	1	“0”s are set to fill the specified number of characters.
		Reserved	1	“0”s are set to fill the specified number of characters.
		Reserved	1	“0”s are set to fill the specified number of characters.
		Reserved	1	“0”s are set to fill the specified number of characters.
		Reserved	1	“0”s are set to fill the specified number of characters.
		RBC Abn Distribute.	1	“0”: Does not apply to flag, “1”: Applies to flag
		Dimorphic Population	1	“0”: Does not apply to flag, “1”: Applies to flag
		Anisocytosis	1	“0”: Does not apply to flag, “1”: Applies to flag
		Microcytosis	1	“0”: Does not apply to flag, “1”: Applies to flag
		Macrocytosis	1	“0”: Does not apply to flag, “1”: Applies to flag
		Hypochromia	1	“0”: Does not apply to flag, “1”: Applies to flag
		Anemia	1	“0”: Does not apply to flag, “1”: Applies to flag
		Erythrocytosis	1	“0”: Does not apply to flag, “1”: Applies to flag
		RET Abn Scattergram	1	“0”: Does not apply to flag, “1”: Applies to flag
		Reticulocytosis	1	“0”: Does not apply to flag, “1”: Applies to flag
		Reserved	1	“0”s are set to fill the specified number of characters.
		Reserved	1	“0”s are set to fill the specified number of characters.
		Reserved	1	“0”s are set to fill the specified number of characters.
		Reserved	1	“0”s are set to fill the specified number of characters.
		Reserved	1	“0”s are set to fill the specified number of characters.
		Reserved	1	“0”s are set to fill the specified number of characters.
	RBC SUSPECT 16 byte	RBC Agglutination?	1	“0”: Does not apply to flag, “1”: Applies to flag
		Turbidity/HGB Interf?	1	“0”: Does not apply to flag, “1”: Applies to flag
		Iron Deficiency?	1	“0”: Does not apply to flag, “1”: Applies to flag
		HGB Defect?	1	“0”: Does not apply to flag, “1”: Applies to flag
		Reserved	1	“0”s are set to fill the specified number of characters.
		Fragments?	1	“0”: Does not apply to flag, “1”: Applies to flag
		pRBC?	1	“0”: Does not apply to flag, “1”: Applies to flag
		pRBC?(R)	1	“0”: Does not apply to flag, “1”: Applies to flag
		Reserved	1	“0”s are set to fill the specified number of characters.
		Reserved	1	“0”s are set to fill the specified number of characters.
		Reserved	1	“0”s are set to fill the specified number of characters.
		Reserved	1	“0”s are set to fill the specified number of characters.
		Reserved	1	“0”s are set to fill the specified number of characters.
		Reserved	1	“0”s are set to fill the specified number of characters.
	ABNORMA	PLT Abn Distrib.	1	“0”: Does not apply to flag, “1”: Applies to flag
		Thrombocytopenia	1	“0”: Does not apply to flag, “1”: Applies to flag
		Thrombocytosis	1	“0”: Does not apply to flag, “1”: Applies to flag
		PLT Abn Scattergram	1	“0”: Does not apply to flag, “1”: Applies to flag

PLT SUSPECT 16 byte	Reserved	1	“0”s are set to fill the specified number of characters.
	Reserved	1	“0”s are set to fill the specified number of characters.
	Reserved	1	“0”s are set to fill the specified number of characters.
	Reserved	1	“0”s are set to fill the specified number of characters.
	Reserved	1	“0”s are set to fill the specified number of characters.
	Reserved	1	“0”s are set to fill the specified number of characters.
	Reserved	1	“0”s are set to fill the specified number of characters.
	Reserved	1	“0”s are set to fill the specified number of characters.
	Reserved	1	“0”s are set to fill the specified number of characters.
	Reserved	1	“0”s are set to fill the specified number of characters.
	Reserved	1	“0”s are set to fill the specified number of characters.
	Reserved	1	“0”s are set to fill the specified number of characters.
	Reserved	1	“0”s are set to fill the specified number of characters.
	Reserved	1	“0”s are set to fill the specified number of characters.
	Reserved	1	“0”s are set to fill the specified number of characters.
	Reserved	1	“0”s are set to fill the specified number of characters.
	Reserved	1	“0”s are set to fill the specified number of characters.
	Reserved	1	“0”s are set to fill the specified number of characters.
	Reserved	1	“0”s are set to fill the specified number of characters.
	Reserved	1	“0”s are set to fill the specified number of characters.
	Reserved	1	“0”s are set to fill the specified number of characters.
	Reserved	1	“0”s are set to fill the specified number of characters.
	Reserved	1	“0”s are set to fill the specified number of characters.
	Reserved	1	“0”s are set to fill the specified number of characters.
	Reserved	1	“0”s are set to fill the specified number of characters.
	Reserved	1	“0”s are set to fill the specified number of characters.
Reserved		22	“0”s are set to fill the specified number of characters.
Action Message: The sample might be wrong.		1	Indicates whether the Action Message “The sample might be wrong. Check the sample.” is present. “0”: The Action Message is not present, “1”: The Action Message present
Action Message: Significant change in WBC.		1	Indicates whether the Action Message “Significant change in WBC. Check the sample.” is present. “0”: The Action Message is not present, “1”: The Action Message present
Action Message: Significant change in HGB.		1	Indicates whether the Action Message “Significant change in HGB. Check the sample.” is present. “0”: The Action Message is not present, “1”: The Action Message present
Action Message: Significant change in MCV.		1	Indicates whether the Action Message “Significant change in MCV. Check the sample.” is present. “0”: The Action Message is not present, “1”: The Action Message present
Action Message: Significant change in PLT.		1	Indicates whether the Action Message “Significant change in PLT. Check the sample.” is present. “0”: The Action Message is not present, “1”: The Action Message present
Reserved		1	“0”s are set to fill the specified number of characters.
Action Message: Difference between RBC and RET.		1	Indicates whether the Action Message “Difference between RBC and RET. Check the results.” is present. “0”: The Action Message is not present, “1”: The Action Message present
Action Message: The PLT test result may		1	Indicates whether the Action Message “The PLT test result may have low reliability.” is present.

have low reliability.		“0”: The Action Message is not present, “1”: The Action Message present
Reserved	1	“0”s are set to fill the specified number of characters.
Reserved	1	“0”s are set to fill the specified number of characters.
Reserved	1	“0”s are set to fill the specified number of characters.
Reserved	20	“0”s are set to fill the specified number of characters.
ETX	1	(03h)
Total	255	

7.2.2. Analysis Data Format (Q-Flag)

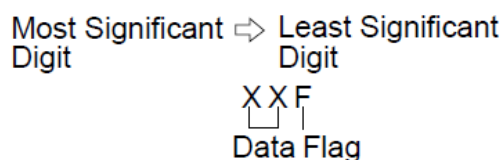
(1) Order of transmission

Parameters in the table are sent from top to bottom; the most significant digit first and the least significant digit last.

(2) Structure of Q-Flag data

The Q-Flag data is structured as follows: A grade value is assigned to high-order bytes, and additional information is assigned to the least significant byte. The grade value is converted to one tenth the value displayed on the screen and output as a right-aligned character string with zero padding. If necessary, convert the units on the host computer.

If a Q-Flag judgment is not made due to QC samples or a flag status other than those below, spaces (20h) are set to fill the specified number of characters (no zero padding).



- Flag details

- 0: Negative
- 1: Not judged due to Discrete setting
- 2: Not judged due to pre-condition NG or low-value sample
- 3: Not judged due to analysis error
- 4: Positive

(3) Reserved

The “Reserved” parameter is currently not used, but may be used in the future. All “Reserved” parameters are currently set to “0”. Do not perform a data check or other operation on this value.

Table 7-3: Analysis Data Format 4 (Q-Flag)

Parameter	No. of characters	Remarks
STX	1	(02h)
Text Distinction Code 1	1	“D” (fixed)
Text Distinction Code 2	1	“4” (fixed)
Sample Distinction Code	1	“U” (fixed)
Analyzer Name	10	The same analyzer name is assigned as in Analysis Data Format 1.
Caret	1	The same caret is assigned as in Analysis Data Format 1.
Analyzer Number	5	The same analyzer number is assigned as in Analysis Data Format 1.
Sequence No.	10	The same sequence number is assigned as in Analysis Data Format 1.
Reserved	3	“0”s are set to fill the specified number of characters.
Sample ID Number	22	The same sample number is assigned as in Analysis Data Format 1.
Reserved	3	“0”s are set to fill the specified number of characters.
Reserved	3	“0”s are set to fill the specified number of characters.

QFLAG (Left Shift?)	3	(XXF) Indicates the grade value of Q-Flag (Left Shift?) and additional information.
Reserved	3	“0”s are set to fill the specified number of characters.
QFLAG (Atypical Lympho?)	3	(XXF) Indicates the grade value of Q-Flag (Atypical Lympho?) and additional information.
Reserved	3	“0”s are set to fill the specified number of characters.
QFLAG (Blasts/Abn Lympho?)	3	(XXF) Indicates the grade value of Q-Flag (Blasts/Abn Lympho?) and additional information.
QFLAG (RBC Agglutination?)	3	(XXF) Indicates the grade value of Q-Flag (RBC Agglutination?) and additional information.
QFLAG (Turb/HGB Interference?)	3	(XXF) Indicates the grade value of Q-Flag (Turb/HGB Interference?) and additional information.
QFLAG (Iron Deficiency?)	3	(XXF) Indicates the grade value of Q-Flag (Iron Deficiency?) and additional information.
QFLAG (HGB Defect?)	3	(XXF) Indicates the grade value of Q-Flag (HGB Defect?) and additional information.
QFLAG (Fragments?)	3	(XXF) Indicates the grade value of Q-Flag (Fragments?) and additional information.
QFLAG (PLT Clumps?)	3	(XXF) Indicates the grade value of Q-Flag (PLT Clumps?) and additional information.
Reserved	3	“0”s are set to fill the specified number of characters.
QFLAG (Abn Lympho?)	3	(XXF) Indicates the grade value of Q-Flag (Abn Lympho?) and additional information.
QFLAG (PRBC?)	3	(XXF) Indicates the grade value of Q-Flag (PRBC?) and additional information.
QFLAG (NRBC?)	3	(XXF) Indicates the grade value of Q-Flag (NRBC?) and additional information.
QFLAG (PRBC?(R))	3	(XXF) Indicates the grade value of Q-Flag (PRBC?(R)) and additional information.
Reserved	145	“0”s are set to fill the specified number of characters.
ETX	1	(03h)
Total	255	

7.2.3. Analysis Data Format (Research)

(1) Order of transmission

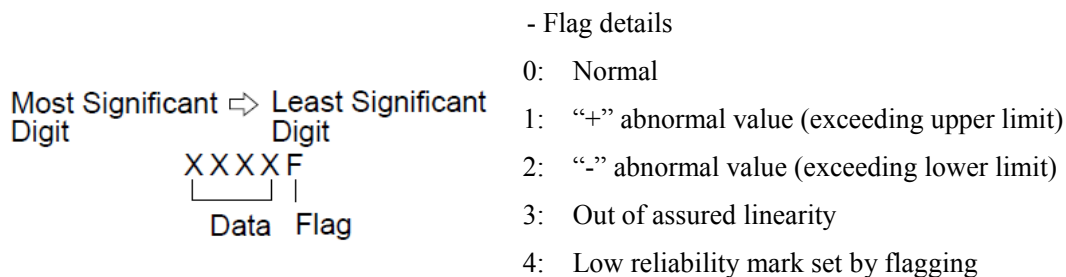
Parameters in the table are sent from top to bottom; the most significant digit first and the least significant digit last.

(2) Decimal Point

Numeric values do not include decimal points; instead values displayed on the IPU screen are converted to the units shown in the Remarks column in the format table. If necessary, convert the units on the host computer.

(3) Numeric data format and flags

Numeric data is expressed in the following format: Data is assigned to high-order bytes, and a flag is assigned to the least significant byte. The data is output as a character string, right-aligned with zero padding.



For Delta-He numerical data, a sign is assigned to the most significant byte and a flag is assigned to the least significant byte. The data is output as a character string, right-aligned with zero padding. Flag details are the same as above.

(MSD) \triangle XXXXF (LSD)

\triangle : Indicates a sign. “-” (2Dh) is output for a negative value, and “0” (30h) is output for a positive value.

XXXX : Indicates the absolute value of the data, output as a character string right-aligned with zero padding.

F : Indicates a flag. Flag details are the same as above.

Example) If the Delta-He value is “-23” and normal, “-00230” is output. If the value is 23 and normal, “000230” is output.

(4) Abnormal data or non-analyzed items

A data value displayed as “----” or “++++” is output in the “*0000” format (an asterisk (*) is assigned to the first digit and 0s to the remaining digits; the number of “0”s is the specified number of characters minus 1). For any item which is not analyzed, spaces (20h) filling the specified number of characters are output without zero padding.

Similarly, a non-analyzed Delta-He parameter is output as “*00000”, where the most significant digit indicates a sign.

(5) Reserved

The “Reserved” parameter is currently not used, but will possibly be used in the future. Any “Reserved” parameter is set to “0” or “ ” (space) as of now; do not check this value.

Table 7-4: Analysis Result Data Format 5 (research 1)

Parameter	No. of characters	Remarks
STX	1	(02h)
Text Distinction Code 1	1	“D” (fixed)
Text Distinction Code 2	1	“5” (fixed)
Sample Distinction Code	1	“U” (fixed)
Analyzer Name	10	The same analyzer name is assigned as in Analysis Data Format 1.
Caret	1	The same caret is assigned as in Analysis Data Format 1.
Analyzer Number	5	The same analyzer number is assigned as in Analysis Data Format 1.
Sequence No.	10	The same sequence number is assigned as in Analysis Data Format 1.
Reserved	3	“0”s are set to fill the specified number of characters.
Sample ID Number	22	The same sample number is assigned as in Analysis Data Format 1.
WBC-C	6	(XXXXXF) $[\times 10 / \mu\text{L}]$
WBC-D	6	(XXXXXF) $[\times 10 / \mu\text{L}]$
NEUT#&	6	(XXXXXF) $[\times 10 / \mu\text{L}]$
NEUT%&	5	(XXXXF) $[\times 10^{(-1)} \text{ \%}]$
LYMP#&	6	(XXXXXF) $[\times 10 / \mu\text{L}]$
LYMP%&	5	(XXXXF) $[\times 10^{(-1)} \text{ \%}]$
HFLC#	6	(XXXXXF) $[\times 10 / \mu\text{L}]$
HFLC%	5	(XXXXF) $[\times 10^{(-1)} \text{ \%}]$
Reserved	6	“0”s are set to fill the specified number of characters.
Delta-HGB	5	(XXXXF) $[\text{g/L}] * [10^{(-1)} \text{ mmol/L}]$ in SI units * $10^{(-1)} \text{ g/L}]$ in HGB2 units
WBC-D&	6	(XXXXXF) $[\times 10 / \mu\text{L}]$ * Without pRBC license, values are not set, but “0”s are set to fill the specified number of characters.
HGB-O	5	(XXXXF) $[\text{g/L}] * [10^{(-1)} \text{ mmol/L}]$ in SI units * $10^{(-1)} \text{ g/L}]$ in HGB2 units
RBC-O	5	(XXXXF) $[\times 10^4 / \mu\text{L}]$
PLT-O	5	(XXXXF) $[\times 10^3 / \mu\text{L}]$
PLT-I	5	(XXXXF) $[\times 10^3 / \mu\text{L}]$
IPF	5	(XXXXF) $[\times 10^{(-1)} \text{ \%}]$ * Without IPF license, values are not set, but “0”s are set to fill the specified number of characters. The “IPF” value displayed on the IPU’s Laboratory Use Only tab, is output. *For the destination of North America, “0”s are set to fill the specified number of characters.
TNC-C	6	(XXXXXF) $[\times 10 / \mu\text{L}]$
TNC-D	6	(XXXXXF) $[\times 10 / \mu\text{L}]$
Reserved	6	“0”s are set to fill the specified number of characters.
Reserved	5	“0”s are set to fill the specified number of characters.
Reserved	2	“0”s are set to fill the specified number of characters.
FRC#	5	(XXXXF) $[\times 10^2 / \mu\text{L}]$
FRC%	5	(XXXXF) $[\times 10^{(-2)} \text{ \%}]$

RBC-He	5	(XXXXF) $[\times 10^{(-1)} \text{ pg}]$ *[amol] in SI units
Delta-He	6	(Δ XXXXF) $[\times 10^{(-1)} \text{ pg}]$ *[amol] in SI units Δ represents a sign. “-” (2Dh) is output for a negative value, and “0” (30h) for a positive value. XXXX represent the absolute value of the data, right-aligned with zero padding. F represents a flag.
RET-Y	5	(XXXXF) $[\times 10^{(-1)} \text{ ch}]$
RET-RBC-Y	5	(XXXXF) $[\times 10^{(-1)} \text{ ch}]$
IRF-Y	5	(XXXXF) $[\times 10^{(-1)} \text{ ch}]$
RPI	5	(XXXXF) No unit
HYPO-He	5	(XXXXF) $[\times 10^{(-1)} \text{ \%}]$
HYPER-He	5	(XXXXF) $[\times 10^{(-1)} \text{ \%}]$
MicroR	5	(XXXXF) $[\times 10^{(-1)} \text{ \%}]$
MacroR	5	(XXXXF) $[\times 10^{(-1)} \text{ \%}]$
H-IPF	5	(XXXXF) $[\times 10^{(-1)} \text{ \%}]$ * Without IPF license, values are not set, but “0”s are set to fill the specified number of characters.
IPF#	5	(XXXXF) $[\times 10^2 / \mu\text{L}]$ * Without IPF license, values are not set, but “0”s are set to fill the specified number of characters. The “IPF#” value displayed on the IPU’s Laboratory Use Only tab, is output. *For the destination of North America, “0”s are set to fill the specified number of characters.
TNC	6	(XXXXXF) $[\times 10 / \mu\text{L}]$
RET-UPP	5	(XXXXF) No unit
RET-TNC	5	(XXXXF) No unit
ETX	1	(03h)
Total	255	

Table 7-5: Analysis Result Data Format 6 (research 2)

Parameter	No. of characters	Remarks
STX	1	(02h)
Text Distinction Code 1	1	“D” (fixed)
Text Distinction Code 2	1	“6” (fixed)
Sample Distinction Code	1	“U” (fixed)
Analyzer Name	10	The same analyzer name is assigned as in Analysis Data Format 1.
Caret	1	The same caret is assigned as in Analysis Data Format 1.
Analyzer Number	5	The same analyzer number is assigned as in Analysis Data Format 1.
Sequence No.	10	The same sequence number is assigned as in Analysis Data Format 1.
Reserved	3	“0”s are set to fill the specified number of characters.
Sample ID Number	22	The same sample number is assigned as in Analysis Data Format 1.
Reserved	6	“0”s are set to fill the specified number of characters.
Reserved	5	“0”s are set to fill the specified number of characters.
Reserved	5	“0”s are set to fill the specified number of characters.
Reserved	5	“0”s are set to fill the specified number of characters.
Reserved	5	“0”s are set to fill the specified number of characters.
Reserved	5	“0”s are set to fill the specified number of characters.

Reserved	5	“0”s are set to fill the specified number of characters.
Reserved	5	“0”s are set to fill the specified number of characters.
LYMPH%	5	(XXXXF) $[\times 10^{(-1)} \text{ \%}]$ *The “LYMPH%” value displayed on the IPU’s Laboratory-Use-Only tab is output. *For the destination of North America, “0”s are set to fill the specified number of characters
MONO%	5	(XXXXF) $[\times 10^{(-1)} \text{ \%}]$ * The “MONO%” value displayed on the IPU’s Laboratory-Use-Only tab is output. *For the destination of North America, “0”s are set to fill the specified number of characters
NEUT%	5	(XXXXF) $[\times 10^{(-1)} \text{ \%}]$ *The “NEUT%” value displayed on the IPU’s Laboratory-Use-Only tab is output. *For the destination of North America, “0”s are set to fill the specified number of characters
EO%	5	(XXXXF) $[\times 10^{(-1)} \text{ \%}]$ *The “EO%” value displayed on the IPU’s Laboratory-Use-Only tab is output. *For the destination of North America, “0”s are set to fill the specified number of characters
BASO%	5	(XXXXF) $[\times 10^{(-1)} \text{ \%}]$ *The “BASO%” value displayed on the IPU’s Laboratory-Use-Only tab is output. *For the destination of North America, “0”s are set to fill the specified number of characters
LYMPH#	6	(XXXXXF) $[\times 10 \text{ /}\mu\text{L}]$ * The “LYMPH#” value displayed on the IPU’s Laboratory-Use-Only tab is output. *For the destination of North America, “0”s are set to fill the specified number of characters
MONO#	6	(XXXXXF) $[\times 10 \text{ /}\mu\text{L}]$ *The “MONO#” value displayed on the IPU’s Laboratory-Use-Only tab is output. *For the destination of North America, “0”s are set to fill the specified number of characters
NEUT#	6	(XXXXXF) $[\times 10 \text{ /}\mu\text{L}]$ *The “NEUT#” value displayed on the IPU’s Laboratory-Use-Only tab is output. *For the destination of North America, “0”s are set to fill the specified number of characters
EO#	6	(XXXXXF) $[\times 10 \text{ /}\mu\text{L}]$ *The “EO#” value displayed on the IPU’s Laboratory-Use-Only tab is output. *For the destination of North America, “0”s are set to fill the specified number of characters
BASO#	6	(XXXXXF) $[\times 10 \text{ /}\mu\text{L}]$ *The “BASO#” value displayed on the IPU’s Laboratory-Use-Only tab is output. *For the destination of North America, “0”s are set to fill the specified number of characters

Reserved	5	“0”s are set to fill the specified number of characters.
Reserved	5	“0”s are set to fill the specified number of characters.
PDW	5	(XXXXF) $[\times 10^{(-1)} \text{ fL}]$ *The “PDW” value displayed on the IPU’s Laboratory-Use-Only tab is output. *For the destination of North America, “0”s are set to fill the specified number of characters
Reserved	5	“0”s are set to fill the specified number of characters.
P-LCR	5	(XXXXF) $[\times 10^{(-1)} \text{ \%}]$ *The “P-LCR” value displayed on the IPU’s Laboratory-Use-Only tab is output. *For the destination of North America, the “P-LCR” value displayed on the RUO tab is output.
RDW-CV	5	(XXXXF) $[\times 10^{(-1)} \text{ \%}]$ *The “RDW-CV” value displayed on the IPU’s Laboratory-Use-Only tab is output. *For the destination of North America, “0”s are set to fill the specified number of characters.
RDW-SD	5	(XXXXF) $[\times 10^{(-1)} \text{ fL}]$ *The “RDW-SD” value displayed on the IPU’s Laboratory-Use-Only tab is output. *For the destination of North America, “0”s are set to fill the specified number of characters.
Reserved	5	“0”s are set to fill the specified number of characters.
LFR	5	(XXXXF) $[\times 10^{(-1)} \text{ \%}]$ *The “LFR” value displayed on the IPU’s Laboratory-Use-Only tab is output. *For the destination of North America, “0”s are set to fill the specified number of characters
MFR	5	(XXXXF) $[\times 10^{(-1)} \text{ \%}]$ * The “MFR” value displayed on the IPU’s Laboratory-Use-Only tab is output. *For the destination of North America, “0”s are set to fill the specified number of characters
HFR	5	(XXXXF) $[\times 10^{(-1)} \text{ \%}]$ * The “HFR” value displayed on the IPU’s Laboratory-Use-Only tab is output. *For the destination of North America, “0”s are set to fill the specified number of characters
PCT	5	(XXXXF) $[\times 10^{(-2)} \text{ \%}]$ * The “PCT” value displayed on the IPU’s Laboratory-Use-Only tab is output.
NRBC#	6	(XXXXXF) $[\times 10 / \mu\text{L}]$
NRBC%	6	(XXXXXF) $[\times 10^{(-1)} / 100\text{WBC}]$
IG#	6	(XXXXXF) $[\times 10 / \mu\text{L}]$ * The “IG#” value displayed on the IPU’s Laboratory-Use-Only tab is output. *For the destination of North America, “0”s are set to fill the specified number of characters
IG%	5	(XXXXF) $[\times 10^{(-1)} \text{ \%}]$ * The “IG%” value displayed on the IPU’s Laboratory-Use-Only tab is

		output.
Reserved	6	“0”s are set to fill the specified number of characters.
Reserved	5	“0”s are set to fill the specified number of characters.
Reserved	5	“0”s are set to fill the specified number of characters.
Reserved	4	“0”s are set to fill the specified number of characters.
ETX	1	(03h) is transmitted.
Total	255	

Table 7-6: Analysis Result Data Format 7 (research 3)

Parameter	No. of characters	Remarks
STX	1	(02h)
Text Distinction Code 1	1	“D” (fixed)
Text Distinction Code 2	1	“7” (fixed)
Sample Distinction Code	1	“U” (fixed)
Analyzer Name	10	The same analyzer name is assigned as in Analysis Data Format 1.
Caret	1	The same caret is assigned as in Analysis Data Format 1.
Analyzer Number	5	The same analyzer number is assigned as in Analysis Data Format 1.
Sequence No.	10	The same sequence number is assigned as in Analysis Data Format 1.
Reserved	3	“0”s are set to fill the specified number of characters.
Sample ID Number	22	The same sample number is assigned as in Analysis Data Format 1.
HF-BF#	7	(XXXXXXF) [μL]
HF-BF%	5	(XXXXF) [$\times 10^{(-1)}$ /100WBC]
NE-BF#	7	(XXXXXXF) [μL]
NE-BF%	5	(XXXXF) [$\times 10^{(-1)}$ %]
LY-BF#	7	(XXXXXXF) [μL]
LY-BF%	5	(XXXXF) [$\times 10^{(-1)}$ %]
MO-BF#	7	(XXXXXXF) [μL]
MO-BF%	5	(XXXXF) [$\times 10^{(-1)}$ %]
EO-BF#	7	(XXXXXXF) [μL]
EO-BF%	5	(XXXXF) [$\times 10^{(-1)}$ %]
RBC-BF2	7	(XXXXXXF) [$\times 10^2$ /μL]
Reserved	7	“0”s are set to fill the specified number of characters.
Reserved	6	“0”s are set to fill the specified number of characters.
Reserved	7	“0”s are set to fill the specified number of characters.
Reserved	5	“0”s are set to fill the specified number of characters.
Reserved	7	“0”s are set to fill the specified number of characters.
Reserved	5	“0”s are set to fill the specified number of characters.
TC-BF#	7	(XXXXXXF) [μL] *For the destination of North America, “0”s are set to fill the specified number of characters.
Reserved	8	“0”s are set to fill the specified number of characters.
Reserved	9	“0”s are set to fill the specified number of characters.
Reserved	7	“0”s are set to fill the specified number of characters.
Reserved	7	“0”s are set to fill the specified number of characters.
Reserved	8	“0”s are set to fill the specified number of characters.
Reserved	8	“0”s are set to fill the specified number of characters.

Reserved	8	“0”s are set to fill the specified number of characters.
Reserved	5	“0”s are set to fill the specified number of characters.
Reserved	5	“0”s are set to fill the specified number of characters.
Reserved	5	“0”s are set to fill the specified number of characters.
Reserved	8	“0”s are set to fill the specified number of characters.
MCHC-O	5	(XXXXF) [g/L] * 10^{-1} mmol/L in SI units
Reserved	5	“0”s are set to fill the specified number of characters.
ETX	1	(03h)
Total	255	

Table 7-7: Analysis Result Data Format (research 4)

Parameter	No. of characters	Remarks
STX	1	(02h)
Text Distinction Code 1	1	“D” (fixed)
Text Distinction Code 2	1	“8” (fixed)
Sample Distinction Code	1	“U” (fixed)
Analyzer Name	10	The same analyzer name is assigned as in Analysis Data Format 1.
Caret	1	The same caret is assigned as in Analysis Data Format 1.
Analyzer Number	5	The same analyzer number is assigned as in Analysis Data Format 1.
Sequence No.	10	The same sequence number is assigned as in Analysis Data Format 1.
Reserved	3	“0”s are set to fill the specified number of characters.
Sample ID Number	22	The same sample number is assigned as in Analysis Data Format 1.
NE-SSC	5	(XXXXF) [$\times 10^{-1}$ ch]
NE-SFL	5	(XXXXF) [$\times 10^{-1}$ ch]
NE-FSC	5	(XXXXF) [$\times 10^{-1}$ ch]
Reserved	6	“0”s are set to fill the specified number of characters.
Reserved	5	“0”s are set to fill the specified number of characters.
Reserved	6	“0”s are set to fill the specified number of characters.
Reserved	5	“0”s are set to fill the specified number of characters.
LY-X	5	(XXXXF) [$\times 10^{-1}$ ch]
LY-Y	5	(XXXXF) [$\times 10^{-1}$ ch]
LY-Z	5	(XXXXF) [$\times 10^{-1}$ ch]
MO-X	5	(XXXXF) [$\times 10^{-1}$ ch]
MO-Y	5	(XXXXF) [$\times 10^{-1}$ ch]
MO-Z	5	(XXXXF) [$\times 10^{-1}$ ch]
NE-WX	5	(XXXXF) No unit
NE-WY	5	(XXXXF) No unit
NE-WZ	5	(XXXXF) No unit
LY-WX	5	(XXXXF) No unit
LY-WY	5	(XXXXF) No unit
LY-WZ	5	(XXXXF) No unit
MO-WX	5	(XXXXF) No unit
MO-WY	5	(XXXXF) No unit
MO-WZ	5	(XXXXF) No unit
Reserved	8	“0”s are set to fill the specified number of characters.
Reserved	8	“0”s are set to fill the specified number of characters.

Reserved	8	“0”s are set to fill the specified number of characters.
Reserved	8	“0”s are set to fill the specified number of characters.
Reserved	5	“0”s are set to fill the specified number of characters.
Reserved	5	“0”s are set to fill the specified number of characters.
Reserved	5	“0”s are set to fill the specified number of characters.
Reserved	5	“0”s are set to fill the specified number of characters.
Reserved	35	“0”s are set to fill the specified number of characters.
ETX	1	(03h)
Total	255	

7.2.4. Analysis Data Format (Service)

(1) Order of transmission

Parameters in the table are sent from top to bottom; the most significant digit first and the least significant digit last.

(2) Decimal Point

Numeric values do not include decimal points; instead values displayed on the IPU screen are converted to the units shown in the Remarks column in the format table. If necessary, convert the units on the host computer.

(3) Abnormal data or non-analyzed items

A data value displayed as “----” or “++++” is output in the “*0000” format (an asterisk (*) is assigned to the first digit and 0s to the remaining digits; the number of “0”s is the specified number of characters minus 1). For any item which is not analyzed, spaces (20h) filling the specified number of characters are output without zero padding.

(4) Reserved

The “Reserved” parameter is currently not used, but will possibly be used in the future. Any “Reserved” parameter is set to “0” or “ ” (space) as of now; do not check this value.

Table 7-8: Analysis Result Data Format 9 (service 1)

Parameter	No. of characters	Remarks
STX	1	(02h)
Text Distinction Code 1	1	“D” (fixed)
Text Distinction Code 2	1	“9” (fixed)
Sample Distinction Code	1	“U” (fixed)
Analyzer Name	10	The same analyzer name is assigned as in Analysis Data Format 1.
Caret	1	The same caret is assigned as in Analysis Data Format 1.
Analyzer Number	5	The same analyzer number is assigned as in Analysis Data Format 1.
Sequence No.	10	The same sequence number is assigned as in Analysis Data Format 1.
Reserved	3	“0”s are set to fill the specified number of characters.
Sample ID Number	22	The same sample number is assigned as in Analysis Data Format 1.
HGB-BLANK	5	(XXXXX) No unit
HGB-SAMPLE	5	(XXXXX) No unit
R-MFV	4	(XXXX) [$\times 10^{(-1)}$ fL]
S-RBC	4	(XXXX) [$\times 10^4$ / μ L]
S-MCV	4	(XXXX) [$\times 10^{(-1)}$ fL]
L-RBC	4	(XXXX) [$\times 10^4$ / μ L]
L-MCV	4	(XXXX) [$\times 10^{(-1)}$ fL]
P-MFV	4	(XXXX) [$\times 10^{(-1)}$ fL]
Reserved	4	“0”s are set to fill the specified number of characters.
Reserved	4	“0”s are set to fill the specified number of characters.

Reserved	4	“0”s are set to fill the specified number of characters.
Reserved	4	“0”s are set to fill the specified number of characters.
Reserved	4	“0”s are set to fill the specified number of characters.
WDF-X	4	(XXXX) $[\times 10^{(-1)} \text{ ch}]$
WDF-Y	4	(XXXX) $[\times 10^{(-1)} \text{ ch}]$
WDF-Z	4	(XXXX) $[\times 10^{(-1)} \text{ ch}]$
WDF-WX	4	(XXXX) No unit
WDF-WY	4	(XXXX) No unit
Reserved	4	“0”s are set to fill the specified number of characters.
DLT-WBCD	4	(XXXX) $[\times 10^{(-2)}]$
Reserved	4	“0”s are set to fill the specified number of characters.
Reserved	4	“0”s are set to fill the specified number of characters.
Reserved	4	“0”s are set to fill the specified number of characters.
Reserved	4	“0”s are set to fill the specified number of characters.
Reserved	5	“0”s are set to fill the specified number of characters.
Reserved	5	“0”s are set to fill the specified number of characters.
Reserved	5	“0”s are set to fill the specified number of characters.
RET-RBC-X	4	(XXXX) $[\times 10^{(-1)} \text{ ch}]$
RET-X	4	(XXXX) $[\times 10^{(-1)} \text{ ch}]$
RET-RBC-Z	4	(XXXX) $[\times 10^{(-1)} \text{ ch}]$
RET-RBC-WX	4	(XXXX) No unit
RET-RBC-WY	4	(XXXX) No unit
DLT-RBC	4	(XXXX) $[\times 10^{(-2)}]$
DLT-PLTO	4	(XXXX) $[\times 10^{(-2)}]$
Unclassified	4	(XXXX) No unit
Reserved	5	“0”s are set to fill the specified number of characters.
Reserved	4	“0”s are set to fill the specified number of characters.
Reserved	4	“0”s are set to fill the specified number of characters.
Reserved	4	“0”s are set to fill the specified number of characters.
Reserved	4	“0”s are set to fill the specified number of characters.
Reserved	4	“0”s are set to fill the specified number of characters.
Reserved	4	“0”s are set to fill the specified number of characters.
Reserved	4	“0”s are set to fill the specified number of characters.
Reserved	4	“0”s are set to fill the specified number of characters.
Reserved	5	“0”s are set to fill the specified number of characters.
Reserved	5	“0”s are set to fill the specified number of characters.
Reserved	3	“0”s are set to fill the specified number of characters.
ETX	1	(03h)
Total	255	

Table 7-9: Analysis Result Data Format 10 (service 2)

Parameter	No. of characters	Remarks
STX	1	(02h)
Text Distinction Code 1	1	“D” (fixed)
Text Distinction Code 2	1	“A” (fixed)
Sample Distinction	1	“U” (fixed)

Code		
Analyzer Name	10	The same analyzer name is assigned as in Analysis Data Format 1.
Caret	1	The same caret is assigned as in Analysis Data Format 1.
Analyzer Number	5	The same analyzer number is assigned as in Analysis Data Format 1.
Sequence No.	10	The same sequence number is assigned as in Analysis Data Format 1.
Reserved	3	“0”s are set to fill the specified number of characters.
Sample ID Number	22	The same sample number is assigned as in Analysis Data Format 1.
Reserved	6	“0”s are set to fill the specified number of characters.
Reserved	6	“0”s are set to fill the specified number of characters.
WBC-D2	6	(XXXXXX) [μL]
TNC-D2	6	(XXXXXX) [μL]
Reserved	6	“0”s are set to fill the specified number of characters.
Reserved	6	“0”s are set to fill the specified number of characters.
HGB_NONSI	4	(XXXX) [g/L]
HGB_SI	4	(XXXX) [10 ⁽⁻¹⁾ mmol/L]
HGB_SI2	4	(XXXX) [10 ⁽⁻²⁾ mmol/L]
Reserved	8	“0”s are set to fill the specified number of characters.
WDF_TOTAL_COUNT	6	(XXXXXX) No unit
WDF_PLOT_COUNT	6	(XXXXXX) No unit
Reserved	8	“0”s are set to fill the specified number of characters.
PRBC-WDF#	6	(XXXXXX) No unit
RET_TOTAL_COUNT	8	(XXXXXXXX) No unit
Reserved	8	“0”s are set to fill the specified number of characters.
Reserved	6	“0”s are set to fill the specified number of characters.
Reserved	6	“0”s are set to fill the specified number of characters.
Reserved	6	“0”s are set to fill the specified number of characters.
Reserved	6	“0”s are set to fill the specified number of characters.
HGB_NONSI2	4	(XXXX) [10 ⁽⁻¹⁾ g/L]
Reserved	73	“0”s are set to fill the specified number of characters.
ETX	1	(03h)
Total	255	

7.2.5. Analysis Data Format (only Host)

(1) Order of transmission

Parameters in the table are sent from top to bottom; the most significant digit first and the least significant digit last.

(2) Decimal Point

Numeric values do not include decimal points; instead values displayed on the IPU screen are converted to the units shown in the Remarks column in the format table. If necessary, convert the units on the host computer.

(3) Abnormal data or non-analyzed items

A data value displayed as “----” or “++++” is output in the “*0000” format (an asterisk (*) is assigned to the first digit and 0s to the remaining digits; the number of “0”s is the specified number of characters minus 1). For any item which is not analyzed, spaces (20h) filling the specified number of characters are output without zero padding.

(4) Reserved

The “Reserved” parameter is currently not used, but will possibly be used in the future. Any “Reserved” parameter is set to “0” or “ ” (space) as of now; do not check or otherwise operate this value.

Table 7-10: Analysis Result Data Format 11 (only Host)

Parameter	No. of characters	Remarks
STX	1	(02h)
Text Distinction Code 1	1	“D” (fixed)
Text Distinction Code 2	1	“B” (fixed)
Sample Distinction Code	1	“U” (fixed)
Analyzer Name	10	The same analyzer name is assigned as in Analysis Data Format 1.
Caret	1	The same caret is assigned as in Analysis Data Format 1.
Analyzer Number	5	The same analyzer number is assigned as in Analysis Data Format 1.
Sequence No.	10	The same sequence number is assigned as in Analysis Data Format 1.
Reserved	3	“0”s are set to fill the specified number of characters.
Sample ID Number	22	The same sample number is assigned as in Analysis Data Format 1.
Reserved	5	“0”s are set to fill the specified number of characters.
Reserved	5	“0”s are set to fill the specified number of characters.
Reserved	5	“0”s are set to fill the specified number of characters.
Reserved	5	“0”s are set to fill the specified number of characters.
LY-BF1#	6	(XXXXXX) [μL]
LY-BF2#	6	(XXXXXX) [μL]
MO-BF1#	6	(XXXXXX) [μL]
MO-BF2#	6	(XXXXXX) [μL]
MO-BF3#	6	(XXXXXX) [μL]
HF-BF1#	6	(XXXXXX) [μL]
HF-BF2#	6	(XXXXXX) [μL]
LY-BF1%	4	(XXXX) [×10 [^] (-1) %]

LY-BF2%	4	(XXXX) $[\times 10^{(-1)} \text{ \%}]$
MO-BF1%	4	(XXXX) $[\times 10^{(-1)} \text{ \%}]$
MO-BF2%	4	(XXXX) $[\times 10^{(-1)} \text{ \%}]$
MO-BF3%	4	(XXXX) $[\times 10^{(-1)} \text{ \%}]$
HF-BF1%	4	(XXXX) $[\times 10^{(-1)} / 100\text{WBC}]$
HF-BF2%	4	(XXXX) $[\times 10^{(-1)} / 100\text{WBC}]$
Reserved	4	“0”s are set to fill the specified number of characters.
Reserved	4	“0”s are set to fill the specified number of characters.
Reserved	4	“0”s are set to fill the specified number of characters.
Reserved	4	“0”s are set to fill the specified number of characters.
Reserved	4	“0”s are set to fill the specified number of characters.
Reserved	4	“0”s are set to fill the specified number of characters.
Reserved	4	“0”s are set to fill the specified number of characters.
Reserved	4	“0”s are set to fill the specified number of characters.
Reserved	4	“0”s are set to fill the specified number of characters.
Reserved	4	“0”s are set to fill the specified number of characters.
Reserved	4	“0”s are set to fill the specified number of characters.
Reserved	4	“0”s are set to fill the specified number of characters.
Reserved	4	“0”s are set to fill the specified number of characters.
Reserved	5	“0”s are set to fill the specified number of characters.
Reserved	5	“0”s are set to fill the specified number of characters.
Reserved	5	“0”s are set to fill the specified number of characters.
Reserved	5	“0”s are set to fill the specified number of characters.
Reserved	5	“0”s are set to fill the specified number of characters.
Reserved	5	“0”s are set to fill the specified number of characters.
Reserved	5	“0”s are set to fill the specified number of characters.
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Reserved	5	“0”s are set to fill the specified number of characters.
Reserved	2	“0”s are set to fill the specified number of characters.
ETX	1	(03h)
Total	255	

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