Automated Hematology Analyzer XN series
ASTM Host Interface Specifications

Revision 10.0

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Sysmex Corporation

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1. Scope

This document applies to communication between the XN series automated hematology analyzer and the host computer using the ASTM protocol.

2. General

ASTM (the American Society for Testing and Materials)
ASTM is one of the world's largest volunteer non-profit organizations, founded in 1898 to create standard regulations for materials, products and system services.

This specification conforms to the following two standards:

- ASTM E1381-02
  Specifications for low-level protocols to transfer data between clinical laboratory instruments and computer systems.

- ASTM E1394-97
  Standard specifications for transferring data between clinical instruments and computer systems.

3. Terminology

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

Table 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).
Alpha-numeric 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.

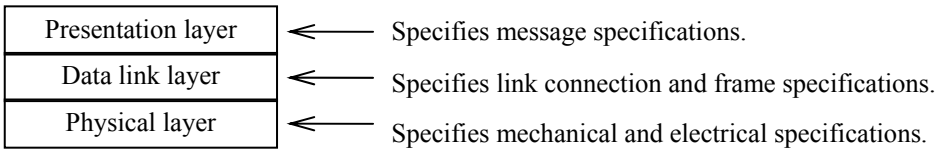
4. Communication Specifications

Communication specifications are based on a layer protocol.

(1) Physical layer
Specifies the sending and receiving of signals between the IPU and the host computer through mechanical and electrical connections.
See “4.1 Physical Layer (Hardware).”

(2) Data link layer
Specifies the sending and receiving of data by link connections and for each frame between the IPU and the host computer.
See “4.2 Data Link Layer (Transmission Protocol)”.

(3) Presentation layer
Specifies the messages that are sent and received by the IPU and the host computer.
See “4.3 Presentation Layer”.



Note:
The IPU of the XN series automated hematology analyzer supports serial and TCP/IP connections.
For serial connections, the IPU conforms to ASTM E1381-02/ASTM E1394-97.
For TCP/IP connections, the IPU supports the following two modes for data output conforming to the ASTM 1394-97 format:

1. ASTM E1381-02 mode
The presentation layer conforms to ASTM E1394-97.
The data link layer conforms to ASTM E1381-02.
The physical layer conforms to IEEE802.3.

2. ASTM E1381-95 mode
The presentation layer conforms to ASTM E1394-97.
The data link layer and the physical layer conform to IEEE802.3.

	Serial connection *3	TCP/IP connection	
		ASTM E1381-95 mode *1	ASTM E1381-02 mode *1
Presentation layer	ASTM E1394-97	ASTM E1394-97	ASTM E1394-97
Data link layer *2	ASTM E1381-02	IEEE802.3	ASTM E1381-02
Physical layer *2	ASTM E1381-02	IEEE802.3	IEEE802.3

*1: In TCP/IP connections, the IPU runs in the ASTM E1381-02 mode if “ASTM 1381-02/1394-97” is selected for the Host Setting on the IPU. The IPU runs in the ASTM E1381-95 mode if “ASTM 1381-95/1394-97” is selected.
*2: The IEEE802.3 specifications for the data link and physical layers are not described in this document.
*3: In serial connections, if the Service settings are configured to output research and service items, the IPU may take a long time to output analysis results due to a larger number of records transmitted. To avoid causing the total communication sequence to be slowed, make settings not to output research or service items.
*4: If the host connection setting or unit setting is changed in the IPU settings, the connection with the host computer is broken and reconnection with the new settings is attempted. For this reason, these settings must not be changed during transmission/reception of data to/from the host computer.

4.1. Physical Layer (Hardware)

4.1.1. Connector

Although the ASTM standard specifies a D-SUB 25-pin male connector as standard, a D-SUB 9-pin-male I/O connector located on the back of the IPU is used for communications.

Table 2: Connector pin assignment

Pin No.	Signal name		Signal direction
1		NC	
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		NC	

* The control signals are not used with ASTM specifications. For this reason, do not make connections to pins not in use.

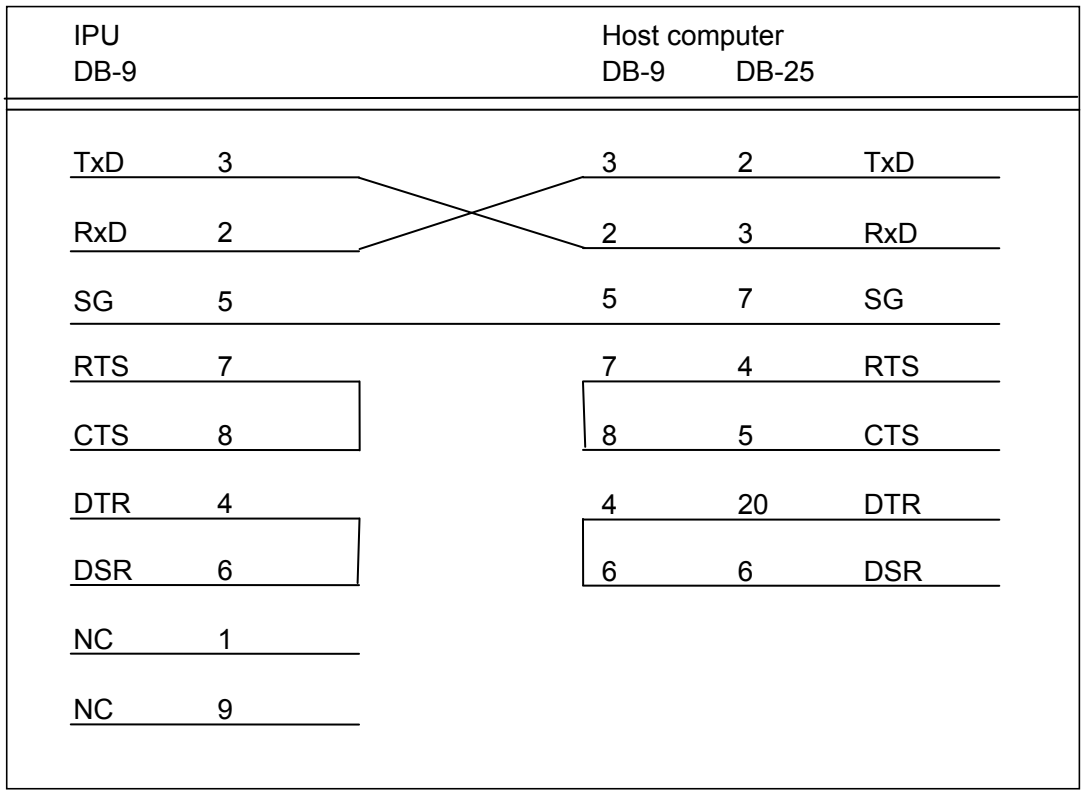
4.1.2. Signal identification level

Table 3: Signal identification level

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

4.1.3. Connection cable

Configure a cable with a D-SUB 9 pin female adaptor for connecting to the IPU's D-SUB 9 male connector in accordance with the following connection chart.



4.1.4. Interface parameters

Table 4: Interface parameters

Parameter	Selection of settings
Baud rate	600, 1200, 2400, 4800, 9600, 14400, 19200, 38400 bps
Data length	7 bits, 8 bits
Stop bit	1 bit, 2 bits
Parity	None, Even, Odd

The underlined values conform to the ASTM standard.

Note: However, 7-bit data lengths, Even/Odd parity and two stop bits are allowed by the ASTM standard for use with special applications.

4.1.5. Standard specifications (ASTM E1381-02)

The physical layer of the IPU conforms to ASTM E1381-02 “5. Physical Layer”, except for the connector type. The IPU uses a D-SUB 9-pin male connector (the ASTM standard specifies a 25-pin male connector).

4.2. Data Link Layer (Transmission Protocol)

The data link layer transfers data between systems using a character-based protocol in accordance with ASTM E1381-02 “6. Data Link layer”.
This section briefly describes communication control procedures. For details, refer to ASTM E1381-02.
When ASTM E1381-02 mode is intended to be used, the TCP connection is established prior to the communication. To establish the TCP connection, the host computer acts as a server and the IPU acts as a client. The IPU establishes a connection by requesting a connection to the IP address and the port number that are provided by the host computer.

4.2.1. Communication status

The data link layer has the following two communication states:

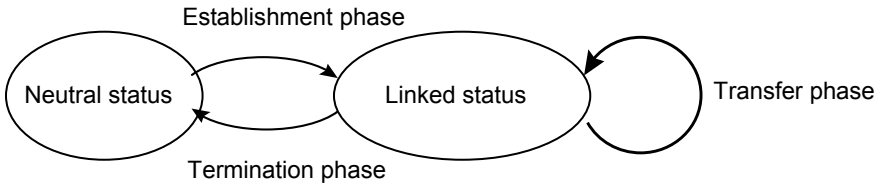
- Neutral status
- Linked status

Transition to each status is accomplished through the following three phases.

(1) Establishment phase
Establishes a communication line, and determines the direction of data transfer. In this way, the sender and the receiver are identified, and the change is made from neutral status to linked status.

(2) Transfer phase
The sender transmits messages to the receiver until all messages are transferred.

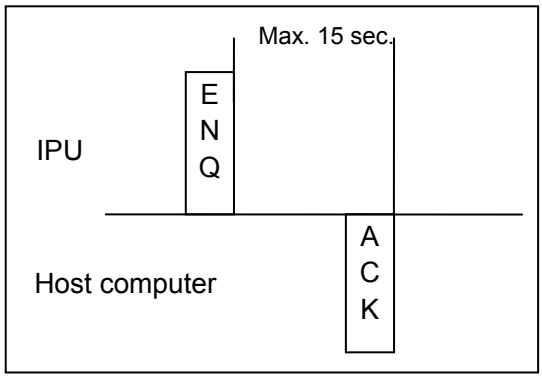
(3) Termination phase
Releases the communication line. Changes both the sender and the receiver from linked status to neutral status.

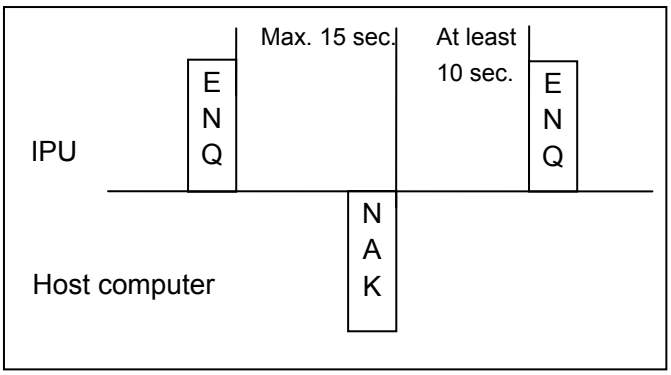


4.2.2. Establishment phase

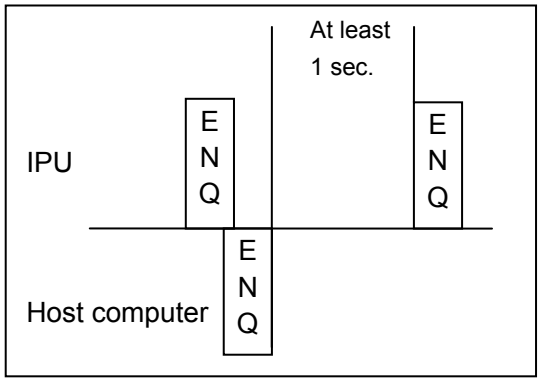
(1) The sender (IPU) sends an [ENQ] signal to the receiver (host computer). To respond to the sender, the receiver performs the following action:
- Returns an [ACK] signal when the communication is enabled.
- Returns a [NAK] signal when the communication is disabled.

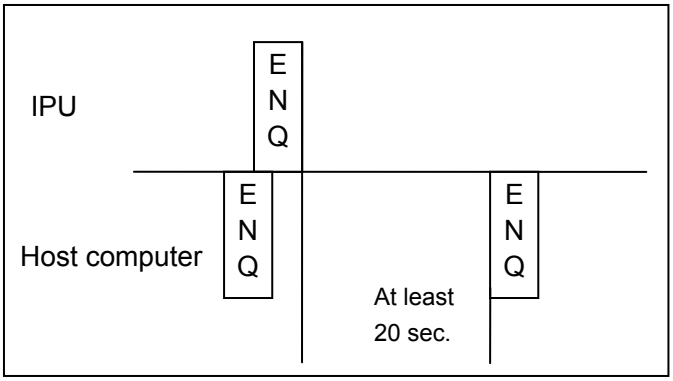
If the receiver responds with [NAK] signal, the sender waits for at least 10 seconds before attempting to send another [ENQ] signal.





(2) When both the sender and receiver send [ENQ] signals, the host computer must yield control authority to the IPU.
- The IPU sends [ENQ] signal again after 1 second.
- The host computer must wait for 20 seconds before sending [ENQ] signal again.





4.2.3. Transfer phase

During the transfer phase, the sender sends messages to the receiver. The transfer phase continues until all messages have been sent.

(1) Messages are sent in each record with multiple frames. Each frame contains a maximum of 64,000 characters (including frame overhead). If the record is longer than 63,993 characters*, it is divided into two or more frames.

*: For serial connections, the maximum number of characters in each record is set to 240 to ensure compatibility with ASTM E1381-95. To ensure full compatibility with ASTM E1381-02, the maximum number of characters in each record must be set to 63,993. For detailed instructions to make this setting, please contact your local sale branch or sales representative. For TCP/IP connections, the maximum number of characters is set to 63,993.

(2) Multiple records cannot be included in a single frame.

(3) If the record contains the maximum number of characters or less, a frame with the following structure will be transferred.

[STX] [F#] [Text] [ETX] [CHK1] [CHK2] [CR] [LF]

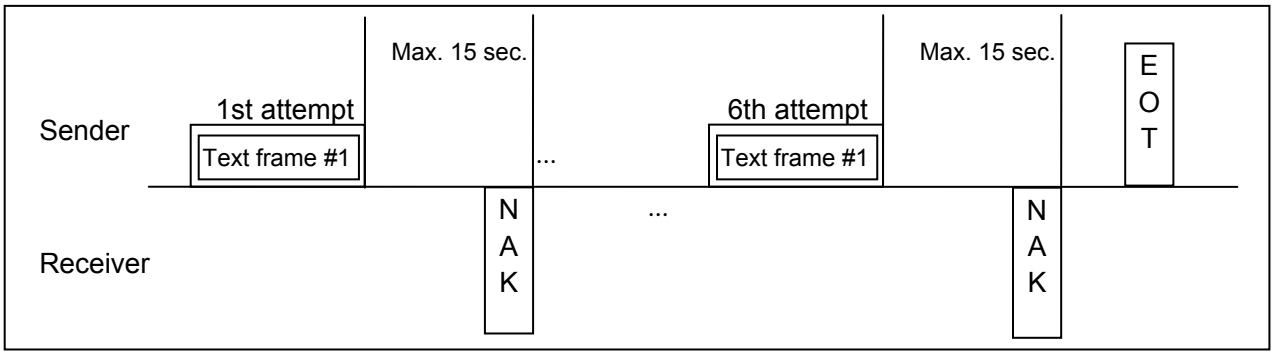
If the record is longer than the maximum number of characters, it is divided into two or more frames. The intermediate frame text termination code is [ETB], and the final frame text termination code is [ETX], as shown below.

[STX] [F#] [Text] [ETB] [CHK1] [CHK2] [CR] [LF]
[STX] [F#] [Text] [ETB] [CHK1] [CHK2] [CR] [LF]
.....
[STX] [F#] [Text] [ETX] [CHK1] [CHK2] [CR] [LF]

Symbol	Description
[STX]	Start of a frame
[F#]	Frame number One of the numbers 0 to 7 is used, beginning with 1 and repeating 2, 3, 4, 5, 6, 7, 0. In case of retransmission, the same frame number is sent.
[Text]	ASTM E1394-97 records are used. For this reason, the codes below will not be used. 0x00-0x06, 0x08, 0x0A, 0x0E-0x1F, 0x7F, 0xFF
[ETB]	Control code indicating end of text (for intermediate frame)
[ETX]	Control code indicating end of text (for the final frame)
[CHK1] [CHK2]	Expressed by characters “0” – “9” and “A” – “F”. Characters starting from the character following [STX] up to [ETB] or up to [ETX] (including [ETB] or [ETX]) are added in binary. The 2-digit numbers, which represent the least significant 8 bits in hexadecimal code, are converted to ASCII characters “0” – “9” and “A” – “F”. The most significant digit is stored in CHK1 and the least significant digit in CHK2.
[CR] [LF]	Control code indicating end of frame

(4) If the receiver has successfully received the frame and is prepared to receive the next frame, the receiver responds with [ACK] signal. After the sender receives [ACK] signal, the sender advances the frame number and either sends a new frame or transitions to the termination phase.

(5) If the receiver fails to receive the frame and is prepared to receive the same frame again, the receiver responds with [NAK] signal. After receiving [NAK] signal, the sender sends the most recent frame again, using the same frame number. If the sender fails to send the same frame 6 times consecutively, the sender has to transition to the termination phase to stop sending the message.



(6) The IPU processes the response of [EOT] signal from the host computer as [ACK] signal. (Response of [EOT] signal from the receiver is usually a request to suspend a transmission to the sender. However, the IPU does not support this function.)

4.2.4. Termination phase

During the termination phase, the status returns to neutral.
The sender sends [EOT] signal to inform the receiver that the message transmission has been completed.
The sender transitions to neutral status by sending [EOT] signal, and the receiver transitions to neutral status by receiving [EOT] signal.

4.2.5. Timeout

The timer is used to detect a failure to coordinate between the sender and the receiver. The timer is used as a mean of recovery from failure in a communication line or communication destination device.

(1) During the establishment phase, the timer is set when the sender sends [ENQ] signal. A timeout occurs if an [ACK], [NAK] or [ENQ] signal response is not received within 15 seconds. After the timeout, the sender transitions to the termination phase.

(2) During the transfer phase, the 15-second timer is set when the sender sends the final character of a frame. A timeout occurs if no response is received within 15 seconds. After the timeout, the sender transitions to the termination phase. The receiver sets a 30-second timer when first entering the transfer phase or when responding (either with [ACK] signal or [NAK] signal) to a frame. A timeout occurs if the receiver receives no frame or [EOT] signal from the sender within 30 seconds. After the timeout, the receiver discards the current incomplete message and transitions to the termination phase.

4.3. Presentation Layer

4.3.1. Messages, Records, and Fields

4.3.1.1.Messages

In the presentation layer, all data is transmitted using messages. A message is composed of record arrays that start with a message header record (H) and end with a message termination record (L).

4.3.1.2.Records

A record is a series of text, beginning with an ASCII alphabetic character called the identifier and ending with [CR].

Table 5: Records

Record type	Record identifier	Level	Description
Header Record	H	0	Contains the sender and the receiver information
Patient Information Record	P	1	Contains the patient information
Inquiry Record	Q	1	Contains inquiry into the host computer for analysis order information
Analysis Order Record	O	2	Contains analysis order information
Analysis Result Record	R	3	Contains analysis results
Comment Record	C	1-4	Contains comments about the sample or patient
Manufacturer Information Record	M	1-4	Not used
Scientific Information Record	S	N/A	Not used
Message Terminator Record	L	0	Indicates the end of the message

- A smaller level number indicates a higher level.
- A higher-level record has information that is commonly contained in all lower-level records.
- Any level other than 0 must be located after higher levels. However, the comment record can be inserted at any level. They are considered to be one lower level than the preceding record. However, consecutive comment records are not allowed.

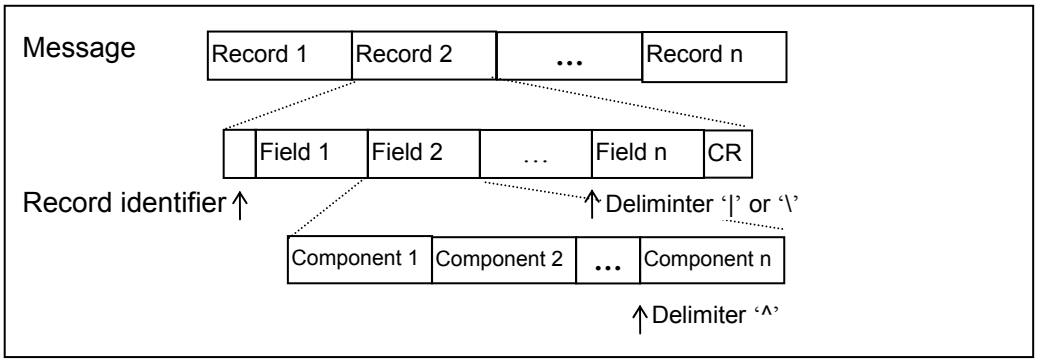
[Example of transmission]
H -> P -> O -> R -> L : Correct
H -> R -> L : Incorrect because P and O must be transmitted prior to R.

4.3.1.3.Fields

A record is further divided into multiple fields by field delimiters. A field is identified by its position within a record and has a variable length. The following are used as delimiters.

Table 6: Fields

Delimiter type	Code	Description
Field delimiter	Vertical bar (|) [7Ch]	Separates adjacent fields within a record.
Repeat delimiter	Back slash (\) [5Ch]	Used when there are plural components of the same type in one field, to repeat the same field.
Component delimiter	Caret (^) [5Eh]	Separates data elements within a field that has a hierarchical or qualifier nature.
Escape delimiter	Ampersand (&) [26H]	Used within a text field to identify special case operations.



4.3.2. Communication Protocol

4.3.2.1.Analysis Order inquiry (IPU-> Host computer)

This protocol is used for the analysis module to inquire about analysis orders to obtain information about the sample to be tested by the analyzer.
Inquiries can be made using the Sample ID Number or Rack Number/Tube Position as an inquiry keyword.
When XN-3000 Standalone mode is used, a query for SP-10 slide preparation information is made at the same time. In this case, only a query using the sample number as keyword can be made.

Table 7: Analysis Order Inquiry

IPU	Direction	Host computer
ENQ	→	
	←	ACK
H : Header Record	→	
	←	ACK
Q : Inquiry Record	→	
	←	ACK
L : Message Terminator Record	→	
	←	ACK
EOT	→	

Note: This table is created assuming that the data link layer conforms to E1381. If the IPU is in TCP/IP connection in the ASTM E1381-95 mode, ENQ, ACK, and EOT are not handled. For more information, see Appendix A.

4.3.2.2.Information about Analysis Order (Host computer -> IPU)

This protocol is used for the host computer to respond to an inquiry about analysis information. A comment record can be omitted.
When using XN-3000 Standalone mode, return SP-10 slide preparation information at the same time.

Table 8: Analysis Information

IPU	Direction	Host computer
	←	ENQ
ACK	→	
	←	H : Header Record
ACK	→	
	←	P : Patient Information Record
ACK	→	
	←	C : Patient Comment Record
ACK	→	
	←	O : Analysis Order Record
ACK	→	
	←	C : Sample Comment Record
ACK	→	
	←	L : Message Terminator Record
ACK	→	
	←	EOT

Note: This table is created assuming that the data link layer conforms to E1381. If the IPU is in TCP/IP connection in the ASTM E1381-95 mode, ENQ, ACK, and EOT are not handled. For more information, see Appendix A.

4.3.2.3.Analysis Results or QC Data (IPU -> Host computer)

This protocol is used for the IPU to perform output of analysis results, real-time output of QC data (control blood sample number is “QC-XXXXXX” and transmitted in a similar manner to regular samples), and manual output of QC data (data selected in the QC chart screen is output). If QC data is output when patient information is not registered, the patient information record is sent blank. A comment record can be omitted.

Table 9: Analysis results/QC data

	IPU	Direction	Host computer
	ENQ	→	
		←	ACK
	H: Header Record	→	
		←	ACK
	P: Patient Information Record	→	
		←	ACK
	C: Patient Comment Record	→	
		←	ACK
	O: Analysis Order Record	→	
		←	ACK
	C: Sample Comment Record	→	
Repeat n times (n = the number of items)		←	ACK
	R: Result Record	→	
		←	ACK
	C: Re-Analysis/Reflex Comment Record	→	
		←	ACK
	L: Message Terminator Record	→	
		←	ACK
	EOT	→	

Note: This table is created assuming that the data link layer conforms to E1381. If the IPU is in TCP/IP connection in the ASTM E1381-95 mode, ENQ, ACK, and EOT are not handled. For more information, see Appendix A.

4.3.2.4.Slide preparation result data (IPU→Host computer)

When XN-3000 Standalone mode is used, this is sent when the SP-10 slide preparation result is output. If patient information is not registered, the patient information record is sent blank.

Table 10: Slide preparation result data

IPU	Direction	Host computer
ENQ	→	
	←	ACK
H: Header Record	→	
	←	ACK
P: Patient Information Record	→	
	←	ACK
O: Analysis Order Record	→	
	←	ACK
R: Result Record (Slide preparation result data)	→	
	←	ACK
L: Message Terminator Record	→	
	←	ACK
EOT	→	

Note: This table is created based on the assumption that the data link layer conforms to E1381.
In ASTM E1381-95 mode of TCP/IP, ENQ, ACK and EOT are not handled.
Refer to Appendix A.

4.3.2.5.Reagent replacement information (IPU→Host computer)

When XN-3000 Standalone mode is used, this is sent when SP-10 consumable replacement is reported. The comment record cannot be omitted.

Table 11: Reagent replacement information

IPU	Direction	Host computer
ENQ	→	
	←	ACK
H: Header Record	→	
	←	ACK
R: Replacement information Comment Record	→	
	←	ACK
L:Message Terminator Record	→	
	←	ACK
EOT	→	

Note: This table is created based on the assumption that the data link layer conforms to E1381.
In ASTM E1381-95 mode of TCP/IP, ENQ, ACK, and EOT are not handled.
Refer to Appendix A.

4.3.3. Details of Records

4.3.3.1.Header Record

[Example of transmission]

- IPU -> Host computer
  `H|\^&|||XN-10^00-00^11001^^^^12345678|||||||E1394-97<CR>`
- Host computer -> IPU
  `H|\^&||||||||||E1394-97<CR>`

Table 12: Details of Header Record

ASTM field	Field name	IPU ↓ Host computer	Host computer ↓ IPU	Max. size (byte)	Remarks
7.1.1	Record Type	H	H	1	Fixed
7.1.2	Delimiter Definition	|\^&	|\^&	4	Fixed
7.1.3	Message Control ID	Not used	Not used	-	
7.1.4	Access Password	Not used	Not used	-	
7.1.5	Sender Name or ID	Analyzer name^ Software version^ Analyzer serial No.^^^^ PS code	Not used	10^ 13^ 5^^^^ 8	
7.1.6	Sender Address	Not used	Not used	-	
7.1.7	Reserved	Not used	Not used	-	
7.1.8	Sender Phone Number	Not used	Not used	-	
7.1.9	Sender Characteristics	Not used	Not used	-	
7.1.10	Receiver ID	Not used	Not used	-	
7.1.11	Comment	Not used	Not used	-	
7.1.12	Processing ID	Not used	Not used	-	
7.1.13	ASTM Version Number	E1394-97	E1394-97	8	Fixed
7.1.14	Date and Time of Message	Not used	Not used	-	

[Detailed explanation of the fields]

1) 7.1.2 Delimiter Definition

The characters "|\^&" are used as a fixed character string. No field delimiter is required between 7.1.1 and 7.1.2

2) 7.1.5 Sender Name or ID

Set one of the text strings in the table below for the product name. For the software version, set the software version of the IPU.

Table 13: Product names

Product name	Product name
XN-20	SA-10
XN-10	SA-20
XN-21	SA-30
XN-11	CV-50
SP-10	

4.3.3.2.Patient Information Record

[Example of transmission]

- IPU -> Host computer
  `P|1|||123456|^Jim^Brown||20010820|M|||||^Dr.1|||||||||||^^^WEST<CR>`
- Host computer -> IPU
  `P|1|||100|^ Jim^Brown||20010820|M|||||^Dr.2|||||||||||^^^EAST<CR>`

Table 14: Details of Patient Information Record

ASTM field	Field name	IPU ↓ Host computer*1	Host computer ↓ IPU	Max. size (byte)	Remarks
8.1.1	Record Type	P	P	1	Fixed
8.1.2	Sequence Number	Sequence No.	Sequence No.	4	Sequence Number of records
8.1.3	Practice-Assigned Patient ID	Not used	Not used	-	
8.1.4	Laboratory-Assigned Patient ID	Not used	Not used	-	
8.1.5	Patient ID Number	Patient ID	Patient ID	16	
8.1.6	Patient Name	^First name^Last name	^First name^Last name	^20^20	^First name^Last name for non-Japanese version
8.1.7	Mother's Maiden Name	Not used	Not used	-	
8.1.8	Birth Date	YYYYMMDD	YYYYMMDD	8	Ex.:20010802 (August 2, 2001)
8.1.9	Patient Sex	M, F or U	M, F or U	1	M: male, F: female, U: unknown
8.1.10	Patient Race	Not used	Not used	-	
8.1.11	Patient Address	Not used	Not used	-	
8.1.12	Reserved Field	Not used	Not used	-	
8.1.13	Patient Telephone Number	Not used	Not used	-	
8.1.14	Attending Physician ID	^Physician name	^Physician name	^20	
8.1.15	Special Field 1	Not used	Not used	-	
8.1.16	Special Field 2	Not used	Not used	-	
8.1.17	Patient Height	Not used	Not used	-	
8.1.18	Patient Weight	Not used	Not used	-	
8.1.19	Patient's Known or Suspected Diagnosis	Not used	Not used	-	
8.1.20	Patient Active Medications	Not used	Not used	-	
8.1.21	Patient's Diet	Not used	Not used	-	
8.1.22	Practice Field 1	Not used	Not used	-	
8.1.23	Practice Field 2	Not used	Not used	-	
8.1.24	Admission and Discharge Dates	Not used	Not used	-	
8.1.25	Admission Status	Not used	Not used	-	
8.1.26	Location	^^^Ward	^^^Ward	^^^20	
8.1.27	DRG or AVG	Not used	Not used	-	
8.1.28	DRG or AVG2	Not used	Not used	-	
8.1.29	Patient Religion	Not used	Not used	-	
8.1.30	Marital Status	Not used	Not used	-	
8.1.31	Isolation Status	Not used	Not used	-	
8.1.32	Language	Not used	Not used	-	
8.1.33	Hospital Service	Not used	Not used	-	
8.1.34	Hospital Institution	Not used	Not used	-	
8.1.35	Dosage Category	Not used	Not used	-	

*1 When transmitting QC data, only 8.1.1 "Record Type" and 8.1.2 "Sequence Number" are used (any other field is not used).

[Detailed explanation of the fields]

1) 8.1.2 Sequence Number

The sequence number starts with 1 and indicates the sequence position in which the record appears in the message. This number is reset to 1 when a higher-level record appears in the message.

2) 8.1.5 Patient ID Number

The patient ID Number is a unique patient identifier. Up to 16-digit extended single-byte characters can be used.

3) 8.1.6 Patient Name

Up to 20 any characters can be used for the first name and the last name, respectively.

4) 8.1.8 Birth Date

This is the date of birth of the patient. The format is fixed to “YYYYMMDD”.

YYYY indicates the year, MM the month, and DD the day.

5) 8.1.9 Patient Sex

The patient sex is indicated by M, F or U.

M: Male, F: Female, U: Unknown

6) 8.1.14 Attending Physician ID

Up to 20 any characters can be used for the name of the attending physician.

7) 8.1.26 Location

Up to 20 any characters can be used for the name of the patient ward.

4.3.3.3.Inquiry Record

[Example of transmission]

- IPU -> Host computer
  `Q|1|1^1^ ABCDE1234567890^B||||20010905150000||||||F<CR>`
- Host computer -> IPU
  Not used

Table 15: Details of Inquiry Record

ASTM field	Field name	IPU ↓ Host computer	Host computer ↓ IPU	Max. size (byte)	Remarks
12.1.1	Record Type	Q	Not used	1	Fixed
12.1.2	Sequence Number	Sequence No.	Not used	4	Sequence Number of records
12.1.3	Starting Range ID Number	Rack No.^ Rack Position^ Sample ID No.^ Sample No. Attribute	Not used	6^ 2^ 22^ 1	Sample Number attribute is one of the following: M: Manual input A: Automatic assignment by analyzer. B: Barcode reader C: Assignment by host computer
12.1.4	Ending Range ID Number	Not used	Not used	-	
12.1.5	Universal Test ID	Not used	Not used	-	
12.1.6	Nature of Request Time Limits	Not used	Not used	-	
12.1.7	Beginning Request Results Date & Time	YYYYMMDDHHMMSS	Not used	14	
12.1.8	Ending Request Results Date & Time	Not used	Not used	-	
12.1.9	Requesting Physician Name	Not used	Not used	-	
12.1.10	Requesting Physician Telephone Number	Not used	Not used	-	
12.1.11	User Field No. 1	Not used	Not used	-	
12.1.12	User Field No. 2	Not used	Not used	-	
12.1.13	Requested Information Status Codes	F, N, C	Not used	1	F: Real-time inquiry (manual analysis) or batch inquiry N: Real-time inquiry (sampler analysis) for initial analysis. C: Real-time inquiry (sampler analysis) for re-analysis

[Detailed explanation of the fields]

1) 12.1.2 Sequence Number

The sequence number starts with 1 and indicates the sequence position in which the record appears in the message. This number is reset to 1 when a higher-level record appears in the message.

2) 12.1.3 Starting Range ID Number

Rack Number:

This is a number assigned to the sample rack, represented by up to 6-digit extended single-byte characters.

Rack Position:

This is a number between 1 and 10, indicating the sample position in a rack.

Sample ID Number:

The sample ID number is expressed with 22-digit extended single-byte characters. A number less than 22 digits is right-aligned with space padding.

Sample Number Attribute:

M: Manual input

The Sample ID Number is manually entered through the touch panel or the IPU keyboard.

A: Automatic assignment by analyzer

The number is assigned by the automatic-increment function of the analyzer. This number is used when a barcode reading error occurs and a sample number starting with "ERR" is given to the sample.

B: Barcode reader

This is used when the sample ID number is read by the barcode reader.

C: Assignment by host computer

This is used when the host computer assigns a sample number in response to the inquiry with Rack Number/Rack Position used as a key.

Note 1: A real-time inquiry (manual analysis) uses Sample ID as a key, without specifying Rack Number/Rack Position.

Note 2: A batch inquiry from the Work List uses Rack Number/Rack Position as a key, without specifying Sample ID.

3) 12.1.7 Beginning Request Results Date & Time

The format is fixed to "YYYYMMDDHHMMSS".

YYYY indicates the year, MM the month, DD the day, HH the hour in 24-hour system (00-23), MM the minute (00-59), and SS the second (00-59).

4) 12.1.13 Requested Information Status Codes

Indicates the timing of inquiry:

F: Real-time inquiry (manual analysis) or batch inquiry

N: Real-time inquiry (sampler analysis) for initial analysis.

C: Real-time inquiry (sampler analysis) for re-analysis

4.3.3.4.Analysis Order Record

[Example of transmission]

- IPU -> Host computer

```
O|1||^^       ABCDE1234567890^B|^^^^WBC\^^^^RBC\···
\^^^^BASO#|||||||N|||||||||||||F<CR>
```

- Host computer -> IPU

```
O|1|^^       ABCDE1234567890^B||^^^^WBC\^^^^RBC\···
\^^^^BASO#||20010807101000|||||N|||||||||||||Q<CR>
```

Table 16: Details of Test Order Record

ASTM field	Field name	IPU ↓ Host computer	Host computer ↓ IPU	Max. size (byte)	Remarks
9.4.1	Record Type	O	O	1	Fixed
9.4.2	Sequence Number	Sequence No.	Sequence No.	4	Sequence Number of records
9.4.3	Specimen ID	Not used	Rack No.^ Rack Position^ Sample ID No.^ Sample No. Attribute	6^ 2^ 22^ 1	Sample Number attribute is one of the following: M: Manual input A: Automatic assignment by analyzer B: Barcode reader C: Assignment by host computer
9.4.4	Instrument Specimen ID	Rack No.^ Rack Position^ Sample ID No.^ Sample No. Attribute	Not used	6^ 2^ 22^ 1^	
9.4.5	Universal Test ID	^^^^Parameter	^^^^Parameter	^^^^6	Any order for a specific analysis parameter
9.4.6	Priority	Not used	Not used	-	
9.4.7	Requested/Ordered Date and Time	Not used	YYYYMMDDHHMMSS	14	
9.4.8	Specimen Collection Date and Time	Not used	Not used	-	
9.4.9	Collection End Time	Not used	Not used	-	
9.4.10	Collection Volume	Not used	Not used	-	
9.4.11	Collector ID	Not used	Not used	-	
9.4.12	Action Code	N, A, Q	N, Q	1	N: Manual analysis Initial analysis Slide preparation A: Rerun analysis Reflex analysis Q: QC analysis
9.4.13	Danger Code	Not used	Not used	-	
9.4.14	Relevant Clinical Information	Not used	Not used	-	
9.4.15	Date/Time Specimen Received	Not used	Not used	-	
9.4.16	Specimen Descriptor	Not used	Not used	-	
9.4.17	Ordering Physician	Not used	Not used	-	
9.4.18	Physician Telephone Number	Not used	Not used	-	
9.4.19	User Field No. 1	Not used	Not used	-	
9.4.20	User Field No. 2	Not used	Not used	-	
9.4.21	Laboratory Field No. 1	Not used	Not used	-	
9.4.22	Laboratory Field No. 2	Not used	Not used	-	
9.4.23	Date/time Results Reported or Last Modified	Not used	Not used	-	
9.4.24	Instrument Charge to Computer System	Not used	Not used	-	

ASTM field	Field name	IPU ↓ Host computer	Host computer ↓ IPU	Max. size (byte)	Remarks
9.4.25	Instrument Section ID	Not used	Not used	-	
9.4.26	Report Type	F, I	X, Y, Q	1	[IPU -> Host] F: Manual analysis Analysis other than Repeat Slide preparation I: Repeat analysis [Host -> IPU] X: Analysis not performed Y: No order Q: Response to inquiry
9.4.27	Reserved	Not used	Not used	-	
9.4.28	Location or Ward of Specimen Collected	Not used	Not used	-	
9.4.29	Nosocomial Infection Flag	Not used	Not used	-	
9.4.30	Specimen Service	Not used	Not used	-	
9.4.31	Specimen Institution	Not used	Not used	-	

[Detailed explanation of the fields]

1) 9.4.2 Sequence Number

The sequence number starts with 1 and indicates the sequence position in which the record appears in the message. This number is reset to 1 when a higher-level record appears in the message.

2) 9.4.3 Specimen ID

Rack Number:

This is a number assigned to the sample rack, represented by up to 6-digit extended single-byte characters. Return the same number as was used for the inquiry.

Rack Position:

This is a number between 1 and 10, indicating the sample position in a rack. Return the same number as was used for the inquiry.

Sample ID Number:

The sample ID number is expressed with 22-digit extended single-byte characters. A number less than 22 digits should be right-aligned with space padding.

Any sample number beginning with “QC” is reserved for QC analysis.

For a real-time inquiry with Sample ID Number being used as a keyword, return the same number as was used for the inquiry.

For a real-time inquiry with Rack Number/Rack Position being used as a keyword, or for a batch inquiry from the Work List, assign a sample ID number for the sample corresponding to the specified rack number/rack position.

Sample Number Attribute:

M: Manual input

The Sample ID Number is manually entered through the touch panel or the IPU keyboard.

A: Automatic assignment by analyzer

The number is assigned by the automatic-increment function of the analyzer. This number is used when a barcode reading error occurs and a sample number starting with “ERR” is given to the sample.

B: Barcode reader

This is used when the sample ID number is read by the barcode reader.

C: Assignment by host computer

This is used when the host computer assigns a sample number in response to the inquiry with Rack Number/Rack Position used as a key.

3) 9.4.4 Instrument Specimen ID

Rack Number:

This is a rack number for the analyzed sample, expressed with up to 6-digit alphanumeric characters.

Rack Position:

This is a number between 1 and 10, indicating the tube position of the analyzed sample in a rack.

Sample ID Number:

In addition to a standard Sample ID Number, Barcode Reading Error Number, QC Sample Number, and QC File Number may be specified.

Standard Sample ID Number	: 22-digit extended single-byte characters are used. A number less than 22 digits is right-aligned with space padding.
Reading Error Number	: The first three digits are “ERR”, followed by a 12-digit number. A number less than 22 digits is right-aligned with space padding.
QC Sample Number	: The first three digits are “QC-”, followed by a 12-digit number. This number is used for real-time output of QC data. A QC number less than 22 digits is right-aligned with space padding.
QC File Number:	: One of “1” through “94” or “XbarM1” through “XbarM5” is assigned. This number is used for manual output of QC data.

Sample Number Attribute:

M: Manual input

The Sample ID Number is manually entered through the touch panel or the IPU keyboard.

A: Automatic assignment by analyzer

The number is assigned by the automatic-increment function of the analyzer. This number is used when a barcode reading error occurs and a sample number starting with “ERR” is given to the sample.

B: Barcode reader

This is used when the sample ID number is read by the barcode reader.

C: Assignment by host computer

This is used when the host computer assigns a sample number in response to the inquiry with Rack Number/Rack Position used as a key.

Note1: Rack Number, Rack Position, and Sample Number Attribute are excluded for manual output of QC data (output from QC charts).

4) 9.4.5 Universal Test ID

When returning order information, the host computer is to indicate the analysis parameter(s) ordered. Use delimiters to indicate two or more parameters.

Example: "^^^^Parameter1\^^^^Parameter2\^^^^Parameter3"

Table 17: List of Analysis Parameters Ordered

List of parameters			
Parameter	Full name	Parameter	Full name
WBC	White blood cell count	NRBC%	Nucleated red blood cell percent
RBC	Red blood cell count	NRBC#	Nucleated red blood cell count
HGB	Hemoglobin content	RDW-SD	Red blood cell distribution width
HCT	Hematocrit	RDW-CV	Red blood cell distribution width
MCV	Mean red blood cell volume	PDW	Platelet distribution width
MCH	Mean corpuscular hemoglobin	MPV	Mean platelet volume
MCHC	Mean corpuscular hemoglobin concentration	P-LCR	Platelet large cell ratio
PLT	Platelet count	PCT	Plateletcrit
NEUT%	Neutrophil ratio	RET%	Reticulocyte ratio
LYMPH%	Lymphocyte ratio	RET#	Reticulocyte count
MONO%	Monocyte ratio	IRF	Immature reticulocyte fraction
EO%	Eosinophil ratio	LFR	Low fluorescence ratio
BASO%	Basophil ratio	MFR	Middle fluorescence ratio
NEUT#	Neutrophil count	HFR[*1]	High fluorescence ratio
LYMPH#	Lymphocyte count	PLT-F[*1]	With/without PLT-F channel
MONO#	Monocyte count	WPC[*2]	With/without WPC channel
EO#	Eosinophil count	LWBC[*3]	With/without low WBC mode
BASO#	Basophil count	SMEAR[*4]	With/without slide preparation

*1: If PLT analysis is not ordered, PLT-F is regarded as having no analysis order.

*2: If analysis of NEUT%, LYMPH%, MONO%, EO%, BASO%, NEUT#, LYMPH#, MONO#, EO#, and BASO# is not ordered, WPC is regarded as having no analysis order.

*3: If analysis of NEUT%, LYMPH%, MONO%, EO%, BASO%, NEUT#, LYMPH#, MONO#, EO#, and BASO# is not ordered, LWBC is regarded as having no analysis order.

*4: Only set when XN-3000 Standalone mode is used. For differences in slide preparation processing that depend on whether or not there is a SMEAR order, refer to the table below.

SEMAR order exists	Slide is prepared according to the default SP order of the IPU.
No SEMAR order	Slide is prepared according to the SP rule of the IPU.

The IPU arranges the analyzed parameters when transmitting analysis results to the host computer.

[Transmitting analyzed parameters (output of analysis results or real-time output of QC data)]

WBC, RBC, HGB, HCT, MCV, MCH, MCHC, PLT, RDW-SD, RDW-CV, PDW[*1], MPV, P-LCR[*1], PCT[*1], NEUT#, LYMPH#, MONO#, EO#, BASO#, NEUT%,LYMPH%, MONO%, EO%, BASO%, IG#[*1*3], IG%[*1*3], NRBC#, NRBC%, RET#, RET%, IRF, LFR[*1], MFR[*1], HFR[*1], HPC#[*1*8], RET-HE[*4], IPF[*7], WBC-BF[*2], RBC-BF[*2], MN#[*2], MN%[*2], PMN#[*2], PMN%[*2], TC-BF#[*1*2], PLT-F, WPC, LWBC[*5], OPEN[*6]

*1: If derived software handles the parameters as research items, only the items defined in the Service settings to be output (Output_Analysis Information) are transmitted.

*2: The analysis results are output if the analysis is performed in the body fluid mode (other parameters are not output).

*3: The analysis results are output if analysis of NEUT# or NEUT% is ordered.

*4: The analysis results are output if analysis of RET#, RET%, LFR, MFR, HFR, or IRF is ordered.

*5: This parameter is output if the analysis is performed in the low WBC mode.

*6: This parameter is output if an open, manual analysis is performed.

*7: The analysis results are output if there is an analysis order for the PLT-F channel.

*8: The analysis results are output if the analysis is performed in HPC mode, or if real-time output of quality control data is performed.

[Transmitting QC chart items (manual output of QC data)]

WBC, RBC, HGB, HCT, MCV, MCH, MCHC, PLT, RDW-SD, RDW-CV, PDW, MPV, P-LCR, PCT, NEUT#, LYMPH#, MONO#, EO#, BASO#, NEUT%, LYMPH%, MONO%, EO%, BASO%, IG#, IG%, NRBC#, NRBC%, RET#, RET%, IRF, LFR, MFR, HFR, HPC#, RET-HE, IPF, WBC-D, WNR-X, WNR-Y, WNR-Z, WDF-X, WDF-Y, WDF-Z, RBC-O, PLT-O, RET-RBC-X, RET-RBC-Y, RET-RBC-Z, DLT-RBC, DLT-PLTO, RET-RBC-WX, RET-RBC-WY, WBC-P, WPC-X, WPC-Y, WPC-Z, PLT-F, PLT-F-X, PLT-F-Y, PLT-F-Z, PLT-F-RBC-X, PLT-F-RBC-Y, WBC-BF, RBC-BF, MN#, MN%, PMN#, PMN%, TC-BF#

5) 9.4.7 Requested/Ordered Date and Time

Indicates the date and time when the analysis was ordered for the sample. The format is fixed to "YYYYMMDDHHMMSS".

YYYY indicates the year, MM the month, DD the day, HH the hour in 24-hour system (00-23), MM the minute (00-59), and SS the second (00-59).

6) 9.4.12 Action Code

[IPU -> HOST]

Indicates the order type for the results record to be sent.

N: Manual, Manual (Open), Initial, Initial/Repeat, Slide preparation
A: Rerun, Rerun/Repeat, Reflex, Reflex/Repeat
Q: QC

Note 1: For QC data analysis, the action code is set to "Q" irrespective of the order type.

[HOST -> IPU]

Indicates the content of the results record to be sent.

N: Normal sample analysis
Q: QC sample analysis

7) 9.4.26 Report Type

[IPU -> HOST]

Indicates the order type for the results record to be sent.

F: Manual, Manual (Open), Initial, Rerun, Reflex, Slide preparation
I: Initial/Repeat, Rerun/Repeat, Reflex/Repeat

[HOST -> IPU]

Indicates whether there is an order corresponding to the inquiry from the IPU.

Q: Response to inquiry (use this if there is an order corresponding to the inquiry)
Y: No order (use this if there is no order corresponding to the inquiry)
X: No aspiration (use this to indicate that no aspiration should be performed on the sample)

Note 2: Any value other than above is regarded as having no order.
Note 3: If the Report Type is set to "Y" or any value indicating no order, the sample will be analyzed with the analyzer's default order.
Whether or not there is slide preparation processing depends on the result of SP rule judgment on the IPU.
Note 4: When "X" is set, the target analysis and slide preparation are not performed.

4.3.3.5.Result Record (Analysis result data, QC data)

[Example of transmission]

- IPU -> Host computer

```
R|1|^^^^WBC^1|7.80|10*3/uL||N||||||20011116101000<CR>
R|2|^^^^RBC^1|10.00|10*6/uL||A||||||20011116101000<CR>
.....
R|18|^^^^PLT_C(S)?|200|||A||||||20011116101000<CR>
```

- Host computer -> IPU

  Not used.

Table 18: Details of the Result record

ASTM field	Field name	IPU ↓ Host computer	Host computer ↓ IPU	Max. size (byte)	Remarks
10.1.1	Record Type	R	Not used	1	
10.1.2	Sequence Number	Sequence No.	Not used	4	Sequence Number of records
10.1.3	Universal Test ID	^^^^Parameter^ Dilution ratio^ Analysis result type^^ Extended order result	Not used	^^^^27 ^ 1^2^^ 1	[Dilution ratio] 1: Non-capillary 5: Capillary
10.1.4	Data Value	Data value	Not used	-	
10.1.5	Unit	Unit	Not used	7	
10.1.6	Reference Range	Not used	Not used	-	
10.1.7	Result Abnormal Fags	L, H, >, N, A, W	Not used	2	L: Lower than patient limit H: Higher than patient limit >: Out of assured linearity N: Normal A: Analysis/hardware error W: Low reliability LL: Lower than panic value HH: Higher than panic value
10.1.8	Nature of Abnormality Testing	Not used	Not used	-	
10.1.9	Result Status	F, I, P, N	Not used	1	Indicates judgment based on Repeat/Rerun/Reflex rule: F: None I: Repeat P: Rerun or Reflex N: Query to host
10.1.10	Date of Change in Instrument Normative Values or Units	Not used	Not used	-	
10.1.11	Operator Identification	Not used	Not used	-	
10.1.12	Date/Time Test Started	Not used	Not used	-	
10.1.13	Date/Time Test Completed	YYYYMMDDHHMMSS	Not used	14	
10.1.14	Instrument Identification	Not used	Not used	-	

[Detailed explanation of the fields]

1) 10.1.2 Sequence Number

The sequence number starts with 1 and indicates the sequence position in which the record appears in the message. This number is reset to 1 when a higher-level record appears in the message.

2) 10.1.9 Result Status

Indicates judgment based on the Repeat/Rerun/Reflex rule:

F: None (there is no applicable rule, or evaluation based on the Repeat/Rerun/Reflex rule is not made)
I: Repeat
P: Rerun or Reflex
N: Query to host

3) 10.1.3 Universal Test ID / 10.1.4 Data Value / 10.1.5 Unit / 10.1.7 Result Abnormal flags / 10.1.13 Date/Time Test Completed

Values assigned to the individual fields will vary depending on the content to be transmitted.

3.1) Outputting analysis parameters: the parameters having analysis orders are output.

Table 19: List of Parameters

10.1.3 Universal Test ID			10.1.4 Data Value *1	10.1.5 Unit	10.1.7 Result Abnormal Flag	10.1.13 Date/Time Test Completed
Parameter	Dilution ratio	Extended order result				
WBC	1,5	W, (None)	○○○.○○	10*3/uL	L,H,>,N,A,W,LL,HH	YYYYMMDDHHMMSS
RBC	1,5	Not used	○○.○○	10*6/uL	L,H,>,N,A,W,LL,HH	YYYYMMDDHHMMSS
HGB[*2]	1,5	Not used	○○○.○	g/dL	L,H,>,N,A,W,LL,HH	YYYYMMDDHHMMSS
HCT	1,5	Not used	○○○.○	%	L,H,>,N,A,W,LL,HH	YYYYMMDDHHMMSS
MCV	1,5	Not used	○○○.○	fL	L,H,>,N,A,W,LL,HH	YYYYMMDDHHMMSS
MCH[*2]	1,5	Not used	○○○.○	pg	L,H,>,N,A,W,LL,HH	YYYYMMDDHHMMSS
MCHC[*2]	1,5	Not used	○○○.○	g/dL	L,H,>,N,A,W,LL,HH	YYYYMMDDHHMMSS
PLT	1,5	W, (None)	○○○○	10*3/uL	L,H,>,N,A,W,LL,HH	YYYYMMDDHHMMSS
NEUT%	1,5	W, (None)	○○○.○	%	L,H,>,N,A,W,LL,HH	YYYYMMDDHHMMSS
LYMPH%	1,5	Not used	○○○.○	%	L,H,>,N,A,W,LL,HH	YYYYMMDDHHMMSS
MONO%	1,5	Not used	○○○.○	%	L,H,>,N,A,W,LL,HH	YYYYMMDDHHMMSS
EO%	1,5	Not used	○○○.○	%	L,H,>,N,A,W,LL,HH	YYYYMMDDHHMMSS
BASO%	1,5	Not used	○○○.○	%	L,H,>,N,A,W,LL,HH	YYYYMMDDHHMMSS
NEUT#	1,5	W, (None)	○○○.○○	10*3/uL	L,H,>,N,A,W,LL,HH	YYYYMMDDHHMMSS
LYMPH#	1,5	Not used	○○○.○○	10*3/uL	L,H,>,N,A,W,LL,HH	YYYYMMDDHHMMSS
MONO#	1,5	Not used	○○○.○○	10*3/uL	L,H,>,N,A,W,LL,HH	YYYYMMDDHHMMSS
EO#	1,5	Not used	○○○.○○	10*3/uL	L,H,>,N,A,W,LL,HH	YYYYMMDDHHMMSS
BASO#	1,5	Not used	○○○.○○	10*3/uL	L,H,>,N,A,W,LL,HH	YYYYMMDDHHMMSS
IG%[*3*5]	1,5	Not used	○○○.○	%	L,H,>,N,A,W,LL,HH	YYYYMMDDHHMMSS
IG#[*3*5]	1,5	Not used	○○○.○○	10*3/uL	L,H,>,N,A,W,LL,HH	YYYYMMDDHHMMSS
NRBC%	1,5	Not used	○○○○.○	/100WBC	L,H,>,N,A,W,LL,HH	YYYYMMDDHHMMSS
NRBC#	1,5	Not used	○○○.○○	10*3/uL	L,H,>,N,A,W,LL,HH	YYYYMMDDHHMMSS
RDW-SD	1,5	Not used	○○○.○	fL	L,H,>,N,A,W,LL,HH	YYYYMMDDHHMMSS
RDW-CV	1,5	Not used	○○○.○	%	L,H,>,N,A,W,LL,HH	YYYYMMDDHHMMSS
PDW[*3]	1,5	Not used	○○○.○	fL	L,H,>,N,A,W,LL,HH	YYYYMMDDHHMMSS
MPV	1,5	Not used	○○○.○	fL	L,H,>,N,A,W,LL,HH	YYYYMMDDHHMMSS
P-LCR[*3]	1,5	Not used	○○○.○	%	L,H,>,N,A,W,LL,HH	YYYYMMDDHHMMSS
PCT[*3]	1,5	Not used	○○.○○	%	L,H,>,N,A,W,LL,HH	YYYYMMDDHHMMSS
RET%	1,5	Not used	○○.○○	%	L,H,>,N,A,W,LL,HH	YYYYMMDDHHMMSS
RET#	1,5	Not used	○.○○○○	10*6/uL	L,H,>,N,A,W,LL,HH	YYYYMMDDHHMMSS

10.1.3 Universal Test ID			10.1.4 Data Value *1	10.1.5 Unit	10.1.7 Result Abnormal Flag	10.1.13 Date/Time Test Completed
Parameter	Dilution ratio	Extended order result				
IRF	1,5	Not used	○○○.○	%	L,H,>,N,A,W,LL,HH	YYYYMMDDHHMMSS
LFR[*3]	1,5	Not used	○○○.○	%	L,H,>,N,A,W,LL,HH	YYYYMMDDHHMMSS
MFR[*3]	1,5	Not used	○○○.○	%	L,H,>,N,A,W,LL,HH	YYYYMMDDHHMMSS
HFR[*3]	1,5	Not used	○○○.○	%	L,H,>,N,A,W,LL,HH	YYYYMMDDHHMMSS
HPC#[*8]	1	Not used	○○.○○○	10*3/uL	L,H,>,N,A,W,LL,HH	YYYYMMDDHHMMSS
RET-HE[*2,*6]	1,5	Not used	○○○.○	pg	L,H,>,N,A,W,LL,HH	YYYYMMDDHHMMSS
IPF[*7]	1,5	Not used	○○○.○	%	L,H,>,N,A,W,LL,HH	YYYYMMDDHHMMSS
WBC-BF[*4]	1	Not used	○○○.○○○	10*3/uL	L,H,>,N,A,W,LL,HH	YYYYMMDDHHMMSS
RBC-BF[*4]	1	Not used	○○.○○○	10*6/uL	L,H,>,N,A,W,LL,HH	YYYYMMDDHHMMSS
MN#[*4]	1	Not used	○○○.○○○	10*3/uL	L,H,>,N,A,W,LL,HH	YYYYMMDDHHMMSS
MN%[*4]	1	Not used	○○○.○	%	L,H,>,N,A,W,LL,HH	YYYYMMDDHHMMSS
PMN#[*4]	1	Not used	○○○.○○○	10*3/uL	L,H,>,N,A,W,LL,HH	YYYYMMDDHHMMSS
PMN%[*4]	1	Not used	○○○.○	%	L,H,>,N,A,W,LL,HH	YYYYMMDDHHMMSS
TC-BF#[*3*4]	1	Not used	○○○.○○○	10*3/uL	L,H,>,N,A,W,LL,HH	YYYYMMDDHHMMSS

*1: The Data Value field indicates the maximum number of digits and the decimal positions.

*2: The data values and units expressed in SI units and HGB2 units (only when the XN-21/XN-11 is connected) are as follows:

Units	Parameter	Data Value	Unit
SI Units	HGB	○○○.○	mmol/L
	MCH	○○○○	amol
	MCHC	○○○.○	mmol/L
	RET-HE	○○○○	amol
HGB2 Units (Only when the XN-21/XN-11 is connected)	HGB	○○○.○○	g/dL
	MCH	○○○.○	pg
	MCHC	○○○.○	g/dL
	RET-HE	○○○.○	pg

*3: If derived software handles the parameters as research (Can be displayed in the main screen) items, only the items defined in the Service settings to be output (Output Analysis Information) are transmitted.

*4: Analysis results are output if the analysis is performed in the body fluid mode (other items are not output).

*5: Analysis results are output if analysis of NEUT# or NEUT% is ordered.

*6: Analysis results are output if analysis of RET#, RET%, LFR, MFR, HFR, or IRF is ordered.

*7: Analysis results are output when there is an analysis order for the PLT-F channel.

*8: Analysis results are output when analysis is performed in HPC mode, or when real-time output of quality control data is performed.

a) 10.1.3 Universal Test ID

Parameter:

Analysis parameter names are output.

Dilution ratio:

1: Manual mode, Sampler mode

5: Capillary mode

Analysis result type:

Not used

Extended order result:

This parameter is set to “W” in the cases WDF channel is used for WBC, IG is corrected for NEUT# or NEUT%, or PLT-F or PLT-O is selected for PLT.

b) 10.1.4 Data Value

Data values for individual parameters are output.

When “Link to IPU unit setting” is disabled (default setting) in the service settings, analysis data is output using the decimal point position indicated in “Table 19: List of Parameters”.

When “Link to IPU unit setting” is enabled in the service settings, analysis data is output using the linked decimal point position in the IPU unit settings.

If any data value is to be masked due to failure such as an analyzer error, the output data value is also masked as on the IPU display.

---- : Analysis or hardware error

++++ : Out of range

c) 10.1.5 Unit

Units for individual parameters are output.

When “Link to IPU unit setting” is disabled (default setting) in the service settings, the units indicated in “Table 19: List of Parameters” are output.

When “Link to IPU unit setting” is enabled in the service settings, the linked units in the IPU unit settings are output.

d) 10.1.7 Result Abnormal Flag

L: Lower than limit

H: Higher than limit

>: Out of assured linearity

N: Normal result

A: Abnormal result due to analysis or hardware error

W: Low reliability mark is attached to the result by flagging

LL: Lower than clinical panic limit

HH: Higher than clinical panic limit or out of permissible limits for background check

e) 10.1.13 Date/Time Test Completed

Indicates the date and time the analysis was completed. The format is fixed to “YYYYMMDDHHMMSS”.

YYYY indicates the year, MM the month, DD the day, HH the hour in 24-hour system (00-23), MM the minute (00-59), and SS the second (00-59).

3.2) Outputting QC parameters: the QC chart parameters having analysis orders are output.

Table 20: List of QC Analysis Parameters

10.1.3 Universal Test ID			10.1.4 Data Value *1	10.1.5 Unit	10.1.7 Result Abnormal Flag	10.1.13 Date/Time Test Completed
Parameter	Dilution ratio	Extended order result				
WBC	1	Not used	○○○.○○	10*3/uL	N,A	YYYYMMDDHHMMSS
RBC	1	Not used	○○.○○	10*6/uL	N,A	YYYYMMDDHHMMSS
HGB*2	1	Not used	○○○.○	g/dL	N,A	YYYYMMDDHHMMSS
HCT	1	Not used	○○○.○	%	N,A	YYYYMMDDHHMMSS
MCV	1	Not used	○○○.○	fL	N,A	YYYYMMDDHHMMSS
MCH*2	1	Not used	○○○.○	pg	N,A	YYYYMMDDHHMMSS
MCHC*2	1	Not used	○○○.○	g/dL	N,A	YYYYMMDDHHMMSS
PLT	1	Not used	○○○○	10*3/uL	N,A	YYYYMMDDHHMMSS
NEUT%	1	Not used	○○○.○	%	N,A	YYYYMMDDHHMMSS
LYMPH%	1	Not used	○○○.○	%	N,A	YYYYMMDDHHMMSS
MONO%	1	Not used	○○○.○	%	N,A	YYYYMMDDHHMMSS
EO%	1	Not used	○○○.○	%	N,A	YYYYMMDDHHMMSS
BASO%	1	Not used	○○○.○	%	N,A	YYYYMMDDHHMMSS
NEUT#	1	Not used	○○○.○○	10*3/uL	N,A	YYYYMMDDHHMMSS
LYMPH#	1	Not used	○○○.○○	10*3/uL	N,A	YYYYMMDDHHMMSS
MONO#	1	Not used	○○○.○○	10*3/uL	N,A	YYYYMMDDHHMMSS
EO#	1	Not used	○○○.○○	10*3/uL	N,A	YYYYMMDDHHMMSS
BASO#	1	Not used	○○○.○○	10*3/uL	N,A	YYYYMMDDHHMMSS
IG%	1	Not used	○○○.○	%	N,A	YYYYMMDDHHMMSS
IG#	1	Not used	○○○.○○	10*3/uL	N,A	YYYYMMDDHHMMSS
NRBC%	1	Not used	○○○○.○	/100WBC	N,A	YYYYMMDDHHMMSS
NRBC#	1	Not used	○○○.○○	10*3/uL	N,A	YYYYMMDDHHMMSS
RDW-SD	1	Not used	○○○.○	fL	N,A	YYYYMMDDHHMMSS
RDW-CV	1	Not used	○○○.○	%	N,A	YYYYMMDDHHMMSS
PDW	1	Not used	○○○.○	fL	N,A	YYYYMMDDHHMMSS
MPV	1	Not used	○○○.○	fL	N,A	YYYYMMDDHHMMSS
P-LCR	1	Not used	○○○.○	%	N,A	YYYYMMDDHHMMSS
PCT	1	Not used	○○.○○	%	N,A	YYYYMMDDHHMMSS
RET%	1	Not used	○○.○○	%	N,A	YYYYMMDDHHMMSS
RET#	1	Not used	○.○○○○	10*6/uL	N,A	YYYYMMDDHHMMSS
IRF	1	Not used	○○○.○	%	N,A	YYYYMMDDHHMMSS
LFR	1	Not used	○○○.○	%	N,A	YYYYMMDDHHMMSS
MFR	1	Not used	○○○.○	%	N,A	YYYYMMDDHHMMSS
HFR	1	Not used	○○○.○	%	N,A	YYYYMMDDHHMMSS
HPC#	1	Not used	○○.○○○	10*3/uL	N,A	YYYYMMDDHHMMSS
RET-HE*2	1	Not used	○○○.○	pg	N,A	YYYYMMDDHHMMSS
IPF	1	Not used	○○○.○	%	N,A	YYYYMMDDHHMMSS
WBC-D	1	Not used	○○○.○○	10*3/uL	N,A	YYYYMMDDHHMMSS
WNR-X	1	Not used	○○○.○	ch	N,A	YYYYMMDDHHMMSS
WNR-Y	1	Not used	○○○.○	ch	N,A	YYYYMMDDHHMMSS
WNR-Z	1	Not used	○○○.○	ch	N,A	YYYYMMDDHHMMSS
WDF-X	1	Not used	○○○.○	ch	N,A	YYYYMMDDHHMMSS
WDF-Y	1	Not used	○○○.○	ch	N,A	YYYYMMDDHHMMSS
WDF-Z	1	Not used	○○○.○	ch	N,A	YYYYMMDDHHMMSS
RBC-O	1	Not used	○○.○○	10*6/uL	N,A	YYYYMMDDHHMMSS
PLT-O	1	Not used	○○○○	10*3/uL	N,A	YYYYMMDDHHMMSS

10.1.3 Universal Test ID			10.1.4 Data Value *1	10.1.5 Unit	10.1.7 Result Abnormal Flag	10.1.13 Date/Time Test Completed
Parameter	Dilution ratio	Extended order result				
RET-RBC-X	1	Not used	○○○.○	ch	N,A	YYYYMMDDHHMMSS
RET-RBC-Y	1	Not used	○○○.○	ch	N,A	YYYYMMDDHHMMSS
RET-RBC-Z	1	Not used	○○○.○	ch	N,A	YYYYMMDDHHMMSS
DLT-RBC	1	Not used	○○.○○	None	N,A	YYYYMMDDHHMMSS
DLT-PLTO	1	Not used	○○.○○	None	N,A	YYYYMMDDHHMMSS
RET-RBC-WX	1	Not used	○○○○	None	N,A	YYYYMMDDHHMMSS
RET-RBC-WY	1	Not used	○○○○	None	N,A	YYYYMMDDHHMMSS
WBC-P	1	Not used	○○○.○○	10*3/uL	N,A	YYYYMMDDHHMMSS
WPC-X	1	Not used	○○○.○	ch	N,A	YYYYMMDDHHMMSS
WPC-Y	1	Not used	○○○.○	ch	N,A	YYYYMMDDHHMMSS
WPC-Z	1	Not used	○○○.○	ch	N,A	YYYYMMDDHHMMSS
PLT-F	1	Not used	○○○○	10*3/uL	N,A	YYYYMMDDHHMMSS
PLT-F-X	1	Not used	○○○.○	ch	N,A	YYYYMMDDHHMMSS
PLT-F-Y	1	Not used	○○○.○	ch	N,A	YYYYMMDDHHMMSS
PLT-F-Z	1	Not used	○○○.○	ch	N,A	YYYYMMDDHHMMSS
PLT-F-RBC-X	1	Not used	○○○.○	ch	N,A	YYYYMMDDHHMMSS
PLT-F-RBC-Y	1	Not used	○○○.○	ch	N,A	YYYYMMDDHHMMSS
WBC-BF	1	Not used	○○○.○○○	10*3/uL	N,A	YYYYMMDDHHMMSS
RBC-BF	1	Not used	○○.○○○	10*6/uL	N,A	YYYYMMDDHHMMSS
MN#	1	Not used	○○○.○○○	10*3/uL	N,A	YYYYMMDDHHMMSS
MN%	1	Not used	○○○.○	%	N,A	YYYYMMDDHHMMSS
PMN#	1	Not used	○○○.○○○	10*3/uL	N,A	YYYYMMDDHHMMSS
PMN%	1	Not used	○○○.○	%	N,A	YYYYMMDDHHMMSS
TC-BF#	1	Not used	○○○.○○○	10*3/uL	N,A	YYYYMMDDHHMMSS

*1: The Data Value field indicates the maximum number of digits and the decimal position.

*2: The data values and units expressed in SI units and HGB2 units (only when the XN-21/XN-11 is connected) are as follows:

Units	Parameter	Data Value	Unit
SI Units	HGB	○○○.○	mmol/L
	MCH	○○○○	amol
	MCHC	○○○.○	mmol/L
	RET-HE	○○○○	amol
HGB2 Units (Only when the XN-21/XN-11 is connected)	HGB	○○○.○○	g/dL
	MCH	○○○.○	pg
	MCHC	○○○.○	g/dL
	RET-HE	○○○.○	pg

a) 10.1.3 Universal Test ID

Parameter : QC parameter names are output.

Dilution ratio : Fixed to “1”.

Analysis result type : If output from the XbarM chart, the number of batches currently specified in XBarM is output. This parameter is not used if data is output from a screen other than the XbarM chart.

Extended order result : Not used.

b) 10.1.4 Data Value

QC data values for individual QC analysis parameters are output.

When “Link to IPU unit setting” is disabled (default setting) in the service settings, analysis data is output using the decimal point position indicated in “Table 20: List of QC Analysis Parameters”.

When “Link to IPU unit setting” is enabled in the service settings, analysis data is output using the linked decimal point position in the IPU unit settings.

If any data value is to be masked due to failure such as an analyzer error, the output data value is also masked as on the IPU display.

---- : Analysis or hardware error

++++ : Out of range

c) 10.1.5 Unit

Units for individual QC parameters are output.

When “Link to IPU unit setting” is disabled (default setting) in the service settings, the units indicated in “Table 20: List of QC Analysis Parameters” are output.

When “Link to IPU unit setting” is enabled in the service settings, the linked units in the IPU unit settings are output.

d) 10.1.7 Result Abnormal Flag

N: Normal result

A: Abnormal result due to analysis or hardware error

e) 10.1.13 Date/Time Test Completed

Indicates the date and time the QC analysis was completed. The format is fixed to “YYYYMMDDHHMMSS”.

YYYY indicates the year, MM the month, DD the day, HH the hour in 24-hour system (00-23), MM the minute (00-59), and SS the second (00-59).

3.3) Outputting IP messages (ABNORMAL): The parameters having IP message flags are output.

(Note)
The IP messages (ABNORMAL) are intended for use in a clinical laboratory for inspection only, and not for patient diagnosis. The IP messages (ABNORMAL) notify the operator of the possibility of specific sample abnormality confirmed by checking analysis data.

Table 21: List of IP Massages (ABNORMAL)

10.1.3 Universal Test ID			10.1.4 Data Value	10.1.5 Unit	10.1.7 Result Abnormal Flag	10.1.13 Date/Time Test Completed
Parameter	Dilution ratio	Extended order result				
WBC_Abn_Scattergram	Not used	Not used	Not used	Not used	A	YYYYMMDDHHMMSS
Neutropenia	Not used	Not used	Not used	Not used	A	YYYYMMDDHHMMSS
Neutrophilia	Not used	Not used	Not used	Not used	A	YYYYMMDDHHMMSS
Lymphopenia	Not used	Not used	Not used	Not used	A	YYYYMMDDHHMMSS
Lymphocytosis	Not used	Not used	Not used	Not used	A	YYYYMMDDHHMMSS
Leukocytopenia	Not used	Not used	Not used	Not used	A	YYYYMMDDHHMMSS
Leukocytosis	Not used	Not used	Not used	Not used	A	YYYYMMDDHHMMSS
Monocytosis	Not used	Not used	Not used	Not used	A	YYYYMMDDHHMMSS
Eosinophilia	Not used	Not used	Not used	Not used	A	YYYYMMDDHHMMSS
Basophilia	Not used	Not used	Not used	Not used	A	YYYYMMDDHHMMSS
NRBC_Present	Not used	Not used	Not used	Not used	A	YYYYMMDDHHMMSS
IG_Present	Not used	Not used	Not used	Not used	A	YYYYMMDDHHMMSS
RBC_Abn_Distribution	Not used	Not used	Not used	Not used	A	YYYYMMDDHHMMSS
Dimorphic_Population	Not used	Not used	Not used	Not used	A	YYYYMMDDHHMMSS
Anisocytosis	Not used	Not used	Not used	Not used	A	YYYYMMDDHHMMSS
Microcytosis	Not used	Not used	Not used	Not used	A	YYYYMMDDHHMMSS
Macrocytosis	Not used	Not used	Not used	Not used	A	YYYYMMDDHHMMSS
Hypochromia	Not used	Not used	Not used	Not used	A	YYYYMMDDHHMMSS
Anemia	Not used	Not used	Not used	Not used	A	YYYYMMDDHHMMSS
Erythrocytosis	Not used	Not used	Not used	Not used	A	YYYYMMDDHHMMSS
RET_Abn_Scattergram	Not used	Not used	Not used	Not used	A	YYYYMMDDHHMMSS
Reticulocytosis	Not used	Not used	Not used	Not used	A	YYYYMMDDHHMMSS
PLT_Abn_Scattergram	Not used	Not used	Not used	Not used	A	YYYYMMDDHHMMSS
PLT_Abn_Distribution	Not used	Not used	Not used	Not used	A	YYYYMMDDHHMMSS
Thrombocytopenia	Not used	Not used	Not used	Not used	A	YYYYMMDDHHMMSS
Thrombocytosis	Not used	Not used	Not used	Not used	A	YYYYMMDDHHMMSS

a) 10.1.3 Universal Test ID

Parameter : The IP messages are output.
Dilution ratio : Not used
Analysis result type : Not used
Extended order result : Not used

b) 10.1.4 Data Value

Not used

c) 10.1.5 Unit

Not used

d) 10.1.7 Result Abnormal Flag

A: Indicates the IP message flag is on.

e) 10.1.13 Date/Time Test Completed

Indicates the date and time the QC analysis was completed. The format is fixed to "YYYYMMDDHHMMSS".
YYYY indicates the year, MM the month, DD the day, HH the hour in 24-hour system (00-23), MM the minute (00-59), and SS the second (00-59).

3.4) Outputting IP messages (SUSPECT): The parameters with Q-FLAG data are output.

(Note)
The IP messages (SUSPECT) and Q-Flag data are intended for use in a clinical laboratory for inspection only, and not for patient diagnosis. The IP messages (SUSPECT) and Q-Flag notify the operator of the possibility of specific sample abnormality confirmed by checking analysis data.

Table 22: List of IP Massages (SUSPECT)

10.1.3 Universal Test ID			10.1.4 Data Value *1	10.1.5 Unit	10.1.7 Result Abnormal Flag	10.1.13 Date/Time Test Completed
Parameter	Dilution ratio	Extended order result				
Blasts?	Not used	Not used	○○○	Not used	A, (None)	YYYYMMDDHHMMSS
Left_Shift?	Not used	Not used	○○○	Not used	A, (None)	YYYYMMDDHHMMSS
Atypical_Lympho?	Not used	Not used	○○○	Not used	A, (None)	YYYYMMDDHHMMSS
Blasts/Abn_Lympho?	Not used	Not used	○○○	Not used	A, (None)	YYYYMMDDHHMMSS
Abn_Lympho?	Not used	Not used	○○○	Not used	A, (None)	YYYYMMDDHHMMSS
RBC_Agglutination?	Not used	Not used	○○○	Not used	A, (None)	YYYYMMDDHHMMSS
Turbidity/HGB_Interfe-rence?	Not used	Not used	○○○	Not used	A, (None)	YYYYMMDDHHMMSS
Iron_Deficiency?	Not used	Not used	○○○	Not used	A, (None)	YYYYMMDDHHMMSS
HGB_Defect?	Not used	Not used	○○○	Not used	A, (None)	YYYYMMDDHHMMSS
Fragments?	Not used	Not used	○○○	Not used	A, (None)	YYYYMMDDHHMMSS
PLT_Clumps?	Not used	Not used	○○○	Not used	A, (None)	YYYYMMDDHHMMSS

*1: The Data Value fields indicate the maximum number of digits.

a) 10.1.3 Universal Test ID

Parameter : The IP messages are output.
Dilution ratio : Not used
Analysis result type : Not used
Extended order result : Not used

b) 10.1.4 Data Value

Q-FLAG grade values ranging from 0 to 300 are output.

c) 10.1.5 Unit

Not used

d) 10.1.7 Result Abnormal Flag

A: Indicates the IP message flag is on.
(If no IP message flag is on, result abnormal flags are not output.)

e) 10.1.13 Date/Time Test Completed

Indicates the date and time the QC analysis was completed. The format is fixed to "YYYYMMDDHHMMSS".
YYYY indicates the year, MM the month, DD the day, HH the hour in 24-hour system (00-23), MM the minute (00-59), and SS the second (00-59).

3.5) Outputting Action Messages: The parameters having Action Message flags are output.

(Note)
The Action Messages are intended for use in a clinical laboratory for inspection only, and not for patient diagnosis. The Action Messages notify the operator of the possibility of specific sample abnormality confirmed by checking analysis data.

Table 23: List of Action Messages

10.1.3 Universal Test ID			10.1.4 Data Value	10.1.5 Unit	10.1.7 Result Abnormal Flag	10.1.13 Date/Time Test Completed
Parameter	Dilution ratio	Extended order result				
ACTION_MESSAGE_Delta	Not used	Not used	Not used	Not used	A	YYYYMMDDHHMMSS
ACTION_MESSAGE_Delta_WBC	Not used	Not used	Not used	Not used	A	YYYYMMDDHHMMSS
ACTION_MESSAGE_Delta_HGB	Not used	Not used	Not used	Not used	A	YYYYMMDDHHMMSS
ACTION_MESSAGE_Delta_MCV	Not used	Not used	Not used	Not used	A	YYYYMMDDHHMMSS
ACTION_MESSAGE_Delta_PLT	Not used	Not used	Not used	Not used	A	YYYYMMDDHHMMSS
ACTION_MESSAGE_WBC	Not used	Not used	Not used	Not used	A	YYYYMMDDHHMMSS
ACTION_MESSAGE_RBC	Not used	Not used	Not used	Not used	A	YYYYMMDDHHMMSS
ACTION_MESSAGE_Review_PLT	Not used	Not used	Not used	Not used	A	YYYYMMDDHHMMSS
ACTION_MESSAGE_PLT	Not used	Not used	Not used	Not used	A	YYYYMMDDHHMMSS

a) 10.1.3 Universal Test ID

Parameter : Action Messages are output.

- ACTION_MESSAGE_Delta : A wrong sample may have been tested.
- ACTION_MESSAGE_Delta_WBC : A significant difference is observed in WBC.
- ACTION_MESSAGE_Delta_HGB : A significant difference is observed in HGB.
- ACTION_MESSAGE_Delta_MCV : A significant difference is observed in MCV.
- ACTION_MESSAGE_Delta_PLT : A significant difference is observed in PLT.
- ACTION_MESSAGE_WBC : There is a difference between WNR and WDF channels.
- ACTION_MESSAGE_RBC : There is a difference between RBC and RET channels.
- ACTION_MESSAGE_Review_PLT : There is a difference between PLT and PLT-F channels.
- ACTION_MESSAGE_PLT : PLT test result may be less reliable.

Dilution ratio : Not used
Analysis result type : Not used
Extended order result : Not used

b) 10.1.4 Data Value

Not used

c) 10.1.5 Unit

Not used

d) 10.1.7 Result Abnormal Flag

A: Indicates the Action Massage flag is on.

e) 10.1.13 Date/Time Test Completed

Indicates the date and time the QC analysis was completed. The format is fixed to “YYYYMMDDHHMMSS”.
YYYY indicates the year, MM the month, DD the day, HH the hour in 24-hour system (00-23), MM the minute (00-59), and SS the second (00-59).

3.6) Outputting Positive/Error judgments: The parameters having Positive/Error judgment are output.

(Note)
The Positive/Negative and Error judgments are intended for use in a clinical laboratory for inspection only, and not for patient diagnosis. The Positive/Negative and Error judgments notify the operator of the possibility of specific sample abnormality confirmed by checking analysis data.

Table 24: List of Positive/Error Judgments

10.1.3 Universal Test ID			10.1.4 Data Value	10.1.5 Unit	10.1.7 Result Abnormal Flag	10.1.13 Date/Time Test Completed
Parameter	Dilution ratio	Extended order result				
Positive_Diff	Not used	Not used	Not used	Not used	A	YYYYMMDDHHMMSS
Positive_Morph	Not used	Not used	Not used	Not used	A	YYYYMMDDHHMMSS
Positive_Count	Not used	Not used	Not used	Not used	A	YYYYMMDDHHMMSS
Error_Func	Not used	Not used	Not used	Not used	A	YYYYMMDDHHMMSS
Error_Result	Not used	Not used	Not used	Not used	A	YYYYMMDDHHMMSS

a) 10.1.3 Universal Test ID

Parameter : Positive/Error judgments are output.

Positive_Diff, Positive_Morph, Positive_Count:

Indicates a data value of a blood cell type has some error.

Error_Func :

Indicates an analysis error other than barcode reading errors has occurred.

Error_Result :

Indicates one of the following analysis errors has occurred: “Sample Not Asp Error”, “Low Blood Volume”, and “Low Count Error”.

Dilution ratio : Not used

Analysis result type : Not used

Extended order result : Not used

b) 10.1.4 Data Value

Not used

c) 10.1.5 Unit

Not used

d) 10.1.7 Result Abnormal Flag

A: Indicates the Positive or Error flag is on.

e) 10.1.13 Date/Time Test Completed

Indicates the date and time the QC analysis was completed. The format is fixed to “YYYYMMDDHHMMSS”.

YYYY indicates the year, MM the month, DD the day, HH the hour in 24-hour system (00-23), MM the minute (00-59), and SS the second (00-59).

3.7) Outputting file paths to image data are output: the parameters having image data are output.

(Note)
Scattergrams and distributions indicated as being for research should only be used for research purposes.

(Note)
When image data is acquired using the Windows folder sharing function, a lag in synchronization between the terminals may prevent the host from immediately accessing the image data in the IPU. To ensure certain acquisition of the image data, add processing such as a delay time between reception of the message and execution of image acquisition, or a retry when the image data cannot be acquired.

Table 25: List of Scattergrams Data

10.1.3 Universal Test ID			10.1.4 Data Value	10.1.5 Unit	10.1.7 Result Abnormal Flag	10.1.13 Date/Time Test Completed
Parameter	Dilution ratio	Extended order result				
SCAT_WDF	Not used	Not used	File path	Not used	N	YYYYMMDDHHMMSS
SCAT_WNR	Not used	Not used	File path	Not used	N	YYYYMMDDHHMMSS
SCAT_WPC	Not used	Not used	File path	Not used	N	YYYYMMDDHHMMSS
SCAT_RET	Not used	Not used	File path	Not used	N	YYYYMMDDHHMMSS
SCAT_PLT-F	Not used	Not used	File path	Not used	N	YYYYMMDDHHMMSS
SCAT_PLT-O	Not used	Not used	File path	Not used	N	YYYYMMDDHHMMSS
SCAT_RET-E	Not used	Not used	File path	Not used	N	YYYYMMDDHHMMSS
SCAT_WDF-E	Not used	Not used	File path	Not used	N	YYYYMMDDHHMMSS
SCAT_WNR(SFL-SSC)*1	Not used	Not used	File path	Not used	N	YYYYMMDDHHMMSS
SCAT_WNR(SSC-FSC)*1	Not used	Not used	File path	Not used	N	YYYYMMDDHHMMSS
SCAT_WNR(FSCW-FSC)*1	Not used	Not used	File path	Not used	N	YYYYMMDDHHMMSS
SCAT_WDF(SSC-FSC)*1	Not used	Not used	File path	Not used	N	YYYYMMDDHHMMSS
SCAT_WDF(FSC-SFL)*1	Not used	Not used	File path	Not used	N	YYYYMMDDHHMMSS
SCAT_WDF(FSCW-FSC)*1	Not used	Not used	File path	Not used	N	YYYYMMDDHHMMSS
SCAT_RET(SFL-SSC)*1	Not used	Not used	File path	Not used	N	YYYYMMDDHHMMSS
SCAT_RET(SSC-FSC)*1	Not used	Not used	File path	Not used	N	YYYYMMDDHHMMSS
SCAT_RET(FSCW-FSC)*1	Not used	Not used	File path	Not used	N	YYYYMMDDHHMMSS
SCAT_PLT-F(SFL-SSC)*1	Not used	Not used	File path	Not used	N	YYYYMMDDHHMMSS
SCAT_PLT-F(SSC-FSC)*1	Not used	Not used	File path	Not used	N	YYYYMMDDHHMMSS
SCAT_PLT-F(FSCW-FSC)*1	Not used	Not used	File path	Not used	N	YYYYMMDDHHMMSS
SCAT_WPC(SSC-FSC)*1	Not used	Not used	File path	Not used	N	YYYYMMDDHHMMSS
SCAT_WPC(FSC-SFL)*1	Not used	Not used	File path	Not used	N	YYYYMMDDHHMMSS
SCAT_WPC(FSCW-FSC)*1	Not used	Not used	File path	Not used	N	YYYYMMDDHHMMSS
DIST_RBC	Not used	Not used	File path	Not used	N	YYYYMMDDHHMMSS
DIST_PLT	Not used	Not used	File path	Not used	N	YYYYMMDDHHMMSS
DIST_WDF(FSC)	Not used	Not used	File path	Not used	N	YYYYMMDDHHMMSS
DIST_RBC(FSC)	Not used	Not used	File path	Not used	N	YYYYMMDDHHMMSS
DIST_RBC(NORMAL)*1	Not used	Not used	File path	Not used	N	YYYYMMDDHHMMSS
DIST_PLT(NORMAL)*1	Not used	Not used	File path	Not used	N	YYYYMMDDHHMMSS

*1: Only output when output of research scattergrams and histograms is set in the service settings.

a) 10.1.3 Universal Test ID

Parameter : Types of image data having data values are output.
- SCAT_WDF : WDF scattergram image data
- SCAT_WNR : WNR scattergram image data
- SCAT_WPC : WPC scattergram image data
- SCAT_RET : RET scattergram image data
- SCAT_PLT-F : PLT-F scattergram image data
- SCAT_PLT-O : PLT-O scattergram image data (research)
- SCAT_RET-E : RET (ext) scattergram image data (research)
- SCAT_WDF-E : WDF (ext) scattergram image data
- SCAT_WNR(SFL-SSC) : WNR (SFL-SSC) scattergram image data (research)

SCAT_WNR(SSC-FSC)	: WNR (SSC-FSC) scattergram image data (research)
SCAT_WNR(FSCW-FSC)	: WNR (FSCW-FSC) scattergram image data (research)
SCAT_WDF(SSC-FSC)	: WDF (SSC-FSC) scattergram image data (research)
SCAT_WDF(FSC-SFL)	: WDF (FSC-SFL) scattergram image data (research)
SCAT_WDF(FSCW-FSC)	: WDF (FSCW-FSC) scattergram image data (research)
SCAT_RET(SFL-SSC)	: RET (SFL-SSC) scattergram image data (research)
SCAT_RET(SSC-FSC)	: RET (SSC-FSC) scattergram image data (research)
SCAT_RET(FSCW-FSC)	: RET (FSCW-FSC) scattergram image data (research)
SCAT_PLT-F(SFL-SSC)	: PLT-F (SFL-SSC) scattergram image data (research)
SCAT_PLT-F(SSC-FSC)	: PLT-F (SSC-FSC) scattergram image data (research)
SCAT_PLT-F(FSCW-FSC)	: PLT-F (FSCW-FSC) scattergram image data (research)
SCAT_WPC(SSC-FSC)	: WPC (SSC-FSC) scattergram image data (research)
SCAT_WPC(FSC-SFL)	: WPC (FSC-SFL) scattergram image data (research)
SCAT_WPC(FSCW-FSC)	: WPC (FSCW-FSC) scattergram image data (research)
DIST_RBC	: RBC size distribution image data
DIST_PLT	: PLT size distribution image data
DIST_WDF(FSC)	: WDF (FSC) particle size distribution image data (research)
DIST_RBC(FSC)	: RBC (FSC) particle size distribution image data (research)
DIST_RBC(NORMAL)	: RBC particle size distribution image data with normal range (research)
DIST_PLT(NORMAL)	: PLT particle size distribution image data with normal range (research)

Dilution ratio	: Not used
Analysis result type	: Not used
Extended order result	: Not used

b) 10.1.4 Data Value

Paths to the image data files are output. The character "\" appearing in the path is converted to the escape sequence "&R&". Image data files are exported to the "C:\shared\ PNG\<date>" folder. A character string representing the file path staring with "PNG" is output. The format for the <date> folder is fixed to "YYYYMMDD". A file name is composed of the date (format is fixed to "YYYYMMDDHHMM"), sample number, and image data type.

Example: "PNG&R&20030930&R&2003_09_30_12_00_1234567890_WDF.PNG"
In this example, the image data file named "2003_09_30_12_00_1234567890_DIFF.PNG" is stored in the "C:\shared\PNG\20030930" folder.

When the IPU is started, image data files that have been stored for 3 days or more in the folder are deleted.

c) 10.1.5 Unit

Not used

d) 10.1.7 Result Abnormal Flag

The value "N" is always output.

e) 10.1.13 Date/Time Test Completed

Indicates the date and time the QC analysis was completed. The format is fixed to "YYYYMMDDHHMMSS". YYYY indicates the year, MM the month, DD the day, HH the hour in 24-hour system (00-23), MM the minute (00-59), and SS the second (00-59).

3.8) Research items related to analysis orders are output.

(Note)
No research item is output if the Service settings are configured not to output research items.

(Note)
Analysis results for research items should be used for research purposes only. Do not use these analysis results for patient diagnosis.

Table 26: List of Research Items

10.1.3 Universal Test ID			10.1.4 Data Value [*1]	10.1.5 Unit	10.1.7 Result Abnormal Flag	10.1.13 Date/Time Test Completed
Parameter	Dilution ratio	Extended order result				
WBC-N	1,5	Not used	○○○.○○	10*3/uL	L,H,>,N,A,W	YYYYMMDDHHMMSS
WBC-D	1,5	Not used	○○○.○○	10*3/uL	L,H,>,N,A,W	YYYYMMDDHHMMSS
NEUT#& [*2]	1,5	Not used	○○○.○○	10*3/uL	L,H,>,N,A,W	YYYYMMDDHHMMSS
NEUT%& [*2]	1,5	Not used	○○○.○	%	L,H,>,N,A,W	YYYYMMDDHHMMSS
LYMP#& [*2]	1,5	Not used	○○○.○○	10*3/uL	L,H,>,N,A,W	YYYYMMDDHHMMSS
LYMP%& [*2]	1,5	Not used	○○○.○	%	L,H,>,N,A,W	YYYYMMDDHHMMSS
HFLC#	1,5	Not used	○○○.○○	10*3/uL	L,H,>,N,A,W	YYYYMMDDHHMMSS
HFLC%	1,5	Not used	○○○.○	%	L,H,>,N,A,W	YYYYMMDDHHMMSS
WBC-P	1,5	Not used	○○○.○○	10*3/uL	L,H,>,N,A,W	YYYYMMDDHHMMSS
RBC-O	1,5	Not used	○○.○○	10*6/uL	L,H,>,N,A,W	YYYYMMDDHHMMSS
HGB-O [*3]	1,5	Not used	○○○.○	g/dL	L,H,>,N,A,W	YYYYMMDDHHMMSS
PLT-O	1,5	Not used	○○○○	10*3/uL	L,H,>,N,A,W	YYYYMMDDHHMMSS
PLT-I	1,5	Not used	○○○○	10*3/uL	L,H,>,N,A,W	YYYYMMDDHHMMSS
PLT-F	1,5	Not used	○○○○	10*3/uL	L,H,>,N,A,W	YYYYMMDDHHMMSS
PLT-F2	1,5	Not used	○○○○.○	10*3/uL	L,H,>,N,A,W	YYYYMMDDHHMMSS
TNC-N	1,5	Not used	○○○.○○	10*3/uL	L,H,>,N,A,W	YYYYMMDDHHMMSS
TNC-D	1,5	Not used	○○○.○○	10*3/uL	L,H,>,N,A,W	YYYYMMDDHHMMSS
TNC-P	1,5	Not used	○○○.○○	10*3/uL	L,H,>,N,A,W	YYYYMMDDHHMMSS
HPC% [*6]	1	Not used	○○.○○	%	L,H,>,N,A,W	YYYYMMDDHHMMSS
FRC#	1,5	Not used	○.○○○○	10*6/uL	L,H,>,N,A,W	YYYYMMDDHHMMSS
FRC%	1,5	Not used	○○.○○	%	L,H,>,N,A,W	YYYYMMDDHHMMSS
RBC-HE [*3]	1,5	Not used	○○○.○	pg	L,H,>,N,A,W	YYYYMMDDHHMMSS
DELTA-HE [*3]	1,5	Not used	○○○○.○	pg	L,H,>,N,A,W	YYYYMMDDHHMMSS
RET-Y	1,5	Not used	○○○.○	ch	L,H,>,N,A,W	YYYYMMDDHHMMSS
RET-RBC-Y	1,5	Not used	○○○.○	ch	L,H,>,N,A,W	YYYYMMDDHHMMSS
IRF-Y	1,5	Not used	○○○.○	ch	L,H,>,N,A,W	YYYYMMDDHHMMSS
RPI	1,5	Not used	○○○.○	(None)	L,H,>,N,A,W	YYYYMMDDHHMMSS
HYPO-HE	1,5	Not used	○○○.○	%	L,H,>,N,A,W	YYYYMMDDHHMMSS
HYPER-HE	1,5	Not used	○○○.○	%	L,H,>,N,A,W	YYYYMMDDHHMMSS
MICROR	1,5	Not used	○○○.○	%	L,H,>,N,A,W	YYYYMMDDHHMMSS
MACROR	1,5	Not used	○○○.○	%	L,H,>,N,A,W	YYYYMMDDHHMMSS
H-IPF	1,5	Not used	○○○.○	%	L,H,>,N,A,W	YYYYMMDDHHMMSS
IPF#	1,5	Not used	○○○.○	10*3/uL	L,H,>,N,A,W	YYYYMMDDHHMMSS
TNC	1,5	Not used	○○○.○○	10*3/uL	L,H,>,N,A,W	YYYYMMDDHHMMSS
RET-UPP	1,5	Not used	○○○○	(None)	L,H,>,N,A,W	YYYYMMDDHHMMSS
RET-TNC	1,5	Not used	○○○○	(None)	L,H,>,N,A,W	YYYYMMDDHHMMSS
LYMPH%_RESEARCH [*5]	1,5	Not used	○○○.○	%	L,H,>,N,A,W,LL,HH	YYYYMMDDHHMMSS
MONO%_RESEARCH [*5]	1,5	Not used	○○○.○	%	L,H,>,N,A,W,LL,HH	YYYYMMDDHHMMSS
NEUT%_RESEARCH [*5]	1,5	W, (None)	○○○.○	%	L,H,>,N,A,W,LL,HH	YYYYMMDDHHMMSS

10.1.3 Universal Test ID			10.1.4 Data Value [*1]	10.1.5 Unit	10.1.7 Result Abnormal Flag	10.1.13 Date/Time Test Completed
Parameter	Dilution ratio	Extended order result				
EO%_RESEARCH[*5]	1,5	Not used	○○○.○	%	L,H,>,N,A,W,LL,HH	YYYYMMDDHHMMSS
BASO%_RESEARCH[*5]	1,5	Not used	○○○.○	%	L,H,>,N,A,W,LL,HH	YYYYMMDDHHMMSS
LYMPH#_RESEARCH[*5]	1,5	Not used	○○○.○○	10*3/uL	L,H,>,N,A,W,LL,HH	YYYYMMDDHHMMSS
MONO#_RESEARCH[*5]	1,5	Not used	○○○.○○	10*3/uL	L,H,>,N,A,W,LL,HH	YYYYMMDDHHMMSS
NEUT#_RESEARCH[*5]	1,5	W, (None)	○○○.○○	10*3/uL	L,H,>,N,A,W,LL,HH	YYYYMMDDHHMMSS
EO#_RESEARCH[*5]	1,5	Not used	○○○.○○	10*3/uL	L,H,>,N,A,W,LL,HH	YYYYMMDDHHMMSS
BASO#_RESEARCH[*5]	1,5	Not used	○○○.○○	10*3/uL	L,H,>,N,A,W,LL,HH	YYYYMMDDHHMMSS
PDW_RESEARCH[*5]	1,5	Not used	○○○.○	fL	L,H,>,N,A,W,LL,HH	YYYYMMDDHHMMSS
P-LCR_RESEARCH[*5]	1,5	Not used	○○○.○	%	L,H,>,N,A,W,LL,HH	YYYYMMDDHHMMSS
LFR_RESEARCH[*5]	1,5	Not used	○○○.○	%	L,H,>,N,A,W,LL,HH	YYYYMMDDHHMMSS
MFR_RESEARCH[*5]	1,5	Not used	○○○.○	%	L,H,>,N,A,W,LL,HH	YYYYMMDDHHMMSS
HFR_RESEARCH[*5]	1,5	Not used	○○○.○	%	L,H,>,N,A,W,LL,HH	YYYYMMDDHHMMSS
PCT_RESEARCH[*5]	1,5	Not used	○○.○○	%	L,H,>,N,A,W,LL,HH	YYYYMMDDHHMMSS
IG%_RESEARCH[*5]	1,5	Not used	○○○.○	%	L,H,>,N,A,W,LL,HH	YYYYMMDDHHMMSS
IG#_RESEARCH[*5]	1,5	Not used	○○○.○○	10*3/uL	L,H,>,N,A,W,LL,HH	YYYYMMDDHHMMSS
HF-BF#[*4]	1	Not used	○○○.○○○	10*3/uL	L,H,>,N,A,W	YYYYMMDDHHMMSS
HF-BF%[*4]	1	Not used	○○○.○	/100WBC	L,H,>,N,A,W	YYYYMMDDHHMMSS
NE-BF#[*4]	1	Not used	○○○.○○○	10*3/uL	L,H,>,N,A,W	YYYYMMDDHHMMSS
NE-BF%[*4]	1	Not used	○○○.○	%	L,H,>,N,A,W	YYYYMMDDHHMMSS
LY-BF#[*4]	1	Not used	○○○.○○○	10*3/uL	L,H,>,N,A,W	YYYYMMDDHHMMSS
LY-BF%[*4]	1	Not used	○○○.○	%	L,H,>,N,A,W	YYYYMMDDHHMMSS
MO-BF#[*4]	1	Not used	○○○.○○○	10*3/uL	L,H,>,N,A,W	YYYYMMDDHHMMSS
MO-BF%[*4]	1	Not used	○○○.○	%	L,H,>,N,A,W	YYYYMMDDHHMMSS
EO-BF#[*4]	1	Not used	○○○.○○○	10*3/uL	L,H,>,N,A,W	YYYYMMDDHHMMSS
EO-BF%[*4]	1	Not used	○○○.○	%	L,H,>,N,A,W	YYYYMMDDHHMMSS
RBC-BF2[*4]	1	Not used	○○.○○○○	10*6/uL	L,H,>,N,A,W	YYYYMMDDHHMMSS
TC-BF#_RESEARCH[*4*5]	1	Not used	○○○.○○○	10*3/uL	L,H,>,N,A,W,LL,HH	YYYYMMDDHHMMSS
NE-SSC	1,5	Not used	○○○.○	ch	L,H,>,N,A,W	YYYYMMDDHHMMSS
NE-SFL	1,5	Not used	○○○.○	ch	L,H,>,N,A,W	YYYYMMDDHHMMSS
NE-FSC	1,5	Not used	○○○.○	ch	L,H,>,N,A,W	YYYYMMDDHHMMSS
BA-N#	1,5	Not used	○○○.○○	10*3/uL	L,H,>,N,A,W	YYYYMMDDHHMMSS
BA-N%	1,5	Not used	○○○.○	%	L,H,>,N,A,W	YYYYMMDDHHMMSS
BA-D#	1,5	Not used	○○○.○○	10*3/uL	L,H,>,N,A,W	YYYYMMDDHHMMSS
BA-D%	1,5	Not used	○○○.○	%	L,H,>,N,A,W	YYYYMMDDHHMMSS
LY-X	1,5	Not used	○○○.○	ch	L,H,>,N,A,W	YYYYMMDDHHMMSS
LY-Y	1,5	Not used	○○○.○	ch	L,H,>,N,A,W	YYYYMMDDHHMMSS
LY-Z	1,5	Not used	○○○.○	ch	L,H,>,N,A,W	YYYYMMDDHHMMSS
MO-X	1,5	Not used	○○○.○	ch	L,H,>,N,A,W	YYYYMMDDHHMMSS
MO-Y	1,5	Not used	○○○.○	ch	L,H,>,N,A,W	YYYYMMDDHHMMSS
MO-Z	1,5	Not used	○○○.○	ch	L,H,>,N,A,W	YYYYMMDDHHMMSS
NE-WX	1,5	Not used	○○○○	(None)	L,H,>,N,A,W	YYYYMMDDHHMMSS
NE-WY	1,5	Not used	○○○○	(None)	L,H,>,N,A,W	YYYYMMDDHHMMSS
NE-WZ	1,5	Not used	○○○○	(None)	L,H,>,N,A,W	YYYYMMDDHHMMSS
LY-WX	1,5	Not used	○○○○	(None)	L,H,>,N,A,W	YYYYMMDDHHMMSS
LY-WY	1,5	Not used	○○○○	(None)	L,H,>,N,A,W	YYYYMMDDHHMMSS
LY-WZ	1,5	Not used	○○○○	(None)	L,H,>,N,A,W	YYYYMMDDHHMMSS
MO-WX	1,5	Not used	○○○○	(None)	L,H,>,N,A,W	YYYYMMDDHHMMSS
MO-WY	1,5	Not used	○○○○	(None)	L,H,>,N,A,W	YYYYMMDDHHMMSS
MO-WZ	1,5	Not used	○○○○	(None)	L,H,>,N,A,W	YYYYMMDDHHMMSS

*1: The Data Value field indicates the maximum number of digits and the decimal position.
*2: The character "&" appearing in item names is converted to "&E&" using escape delimiters.
*3: The data values and units expressed in SI units and HGB2 units (only when the XN-21/XN-11 is connected) are as follows:

Units	Parameter	Data Value	Unit
SI Units	HGB-O	○○○.○	mmol/L
	RBC-HE	○○○○	amol
	DELTA-HE	○○○○○	amol
HGB2 Units (Only when the XN-21/XN-11 is connected)	HGB-O	○○○.○○	g/dL
	RBC-HE	○○○.○	pg
	DELTA-HE	○○○○.○	pg

*4: Analysis results are output if the analysis is performed in the body fluid mode (other items are not output).
*5: Output values for these items are the ones displayed in the IPU's Laboratory-Use-Only tab.
*6: Analysis results are output when analysis is performed in HPC mode, or when real-time output of quality control data is performed.

a) 10.1.3 Universal Test ID

Parameter:

Research item names are output.

Dilution ratio:

1: Manual mode, Sampler mode

5: Capillary mode

Analysis result type:

Not used

Extended order result:

This parameter is set to "W" when IG is corrected for NEUT#_Reseaech or NEUT%_Research.

b) 10.1.4 Data Value

Data values for individual research items are output.

When "Link to IPU unit setting" is disabled (default setting) in the service settings, analysis data is output using the decimal point position indicated in "Table 26: List of Research Items".

When "Link to IPU unit setting" is enabled in the service settings, analysis data is output using the linked decimal point position in the IPU unit settings.

If any data value is to be masked due to failure such as an analyzer error, the output data value is also masked as on the IPU display.

---- : Analysis or hardware error

++++ : Out of range

c) 10.1.5 Unit

Units for individual research items are output.

When "Link to IPU unit setting" is disabled (default setting) in the service settings, the units indicated in "Table 26: List of Research Items" are output.

When "Link to IPU unit setting" is enabled in the service settings, the linked units in the IPU unit settings are output.

d) 10.1.7 Result Abnormal Flag

L: Lower than limit
H: Higher than limit
>: Out of assured linearity
N: Normal result
A: Abnormal result due to analysis or hardware error
W: Low reliability mark is attached to the result by flagging
LL: Lower than clinical panic limit
HH: Higher than clinical panic limit or out of permissible limits for background check

e) 10.1.13 Date/Time Test Completed

Indicates the date and time the analysis was completed. The format is fixed to “YYYYMMDDHHMMSS”. YYYY indicates the year, MM the month, DD the day, HH the hour in 24-hour system (00-23), MM the minute (00-59), and SS the second (00-59).

3.9) Service items related to analysis orders are output.

(Note)
No service item is output if the Service settings are configured not to output service items.

(Note)
Analysis results for service items should be used for research purposes only. Do not use these analysis results for patient diagnosis.

Table 27: List of Service Items

10.1.3 Universal Test ID			10.1.4 Data Value *1	10.1.5 Unit	10.1.7 Result Abnormal Flag	10.1.13 Date/Time Test Completed
Parameter	Dilution ratio	Extended order result				
HGB-BLANK	1,5	Not used	OOOOO	(None)	N	YYYYMMDDHHMMSS
HGB-SAMPLE	1,5	Not used	OOOOO	(None)	N	YYYYMMDDHHMMSS
R-MFV	1,5	Not used	OOO.O	fL	N	YYYYMMDDHHMMSS
S-RBC	1,5	Not used	OO.OO	10*6/uL	N	YYYYMMDDHHMMSS
S-MCV	1,5	Not used	OOO.O	fL	N	YYYYMMDDHHMMSS
L-RBC	1,5	Not used	OO.OO	10*6/uL	N	YYYYMMDDHHMMSS
L-MCV	1,5	Not used	OOO.O	fL	N	YYYYMMDDHHMMSS
P-MFV	1,5	Not used	OOO.O	fL	N	YYYYMMDDHHMMSS
WNR-X	1,5	Not used	OOO.O	ch	N	YYYYMMDDHHMMSS
WNR-Y	1,5	Not used	OOO.O	ch	N	YYYYMMDDHHMMSS
WNR-Z	1,5	Not used	OOO.O	ch	N	YYYYMMDDHHMMSS
WNR-WX	1,5	Not used	OOOO	(None)	N	YYYYMMDDHHMMSS
WNR-WY	1,5	Not used	OOOO	(None)	N	YYYYMMDDHHMMSS
WDF-X	1,5	Not used	OOO.O	ch	N	YYYYMMDDHHMMSS
WDF-Y	1,5	Not used	OOO.O	ch	N	YYYYMMDDHHMMSS
WDF-Z	1,5	Not used	OOO.O	ch	N	YYYYMMDDHHMMSS
WDF-WX	1,5	Not used	OOOO	(None)	N	YYYYMMDDHHMMSS
WDF-WY	1,5	Not used	OOOO	(None)	N	YYYYMMDDHHMMSS
WBC-FX	1,5	Not used	OOO.O	ch	N	YYYYMMDDHHMMSS
DLT-WBCD	1,5	Not used	OO.OO	(None)	N	YYYYMMDDHHMMSS
WPC-X	1,5	Not used	OOO.O	ch	N	YYYYMMDDHHMMSS
WPC-Y	1,5	Not used	OOO.O	ch	N	YYYYMMDDHHMMSS
WPC-Z	1,5	Not used	OOO.O	ch	N	YYYYMMDDHHMMSS
DLT-WBCP	1,5	Not used	OO.OO	(None)	N	YYYYMMDDHHMMSS
WPC-AREA1#	1,5	Not used	OOOOO	(None)	N	YYYYMMDDHHMMSS
WPC-AREA2#	1,5	Not used	OOOOO	(None)	N	YYYYMMDDHHMMSS
WPC-AREA3#	1,5	Not used	OOOOO	(None)	N	YYYYMMDDHHMMSS
RET-RBC-X	1,5	Not used	OOO.O	ch	N	YYYYMMDDHHMMSS
RET-X	1,5	Not used	OOO.O	ch	N	YYYYMMDDHHMMSS
RET-RBC-Z	1,5	Not used	OOO.O	ch	N	YYYYMMDDHHMMSS
RET-RBC-WX	1,5	Not used	OOOO	(None)	N	YYYYMMDDHHMMSS
RET-RBC-WY	1,5	Not used	OOOO	(None)	N	YYYYMMDDHHMMSS
DLT-RBC	1,5	Not used	OO.OO	(None)	N	YYYYMMDDHHMMSS
DLT-PLTO	1,5	Not used	OO.OO	(None)	N	YYYYMMDDHHMMSS
Unclassified	1,5	Not used	OOOO	(None)	N	YYYYMMDDHHMMSS
PLT-F-AREA1#	1,5	Not used	OOOOO	(None)	N	YYYYMMDDHHMMSS
PLT-F-X	1,5	Not used	OOO.O	ch	N	YYYYMMDDHHMMSS
PLT-F-Y	1,5	Not used	OOO.O	ch	N	YYYYMMDDHHMMSS
PLT-F-Z	1,5	Not used	OOO.O	ch	N	YYYYMMDDHHMMSS

10.1.3 Universal Test ID			10.1.4 Data Value *1	10.1.5 Unit	10.1.7 Result Abnormal Flag	10.1.13 Date/Time Test Completed
Parameter	Dilution ratio	Extended order result				
PLT-F-RBC-X	1,5	Not used	○○○.○	ch	N	YYYYMMDDHHMMSS
PLT-F-RBC-Y	1,5	Not used	○○○.○	ch	N	YYYYMMDDHHMMSS
PLT-F-RBC-Z	1,5	Not used	○○○.○	ch	N	YYYYMMDDHHMMSS
PLT-F-RBC-WX	1,5	Not used	○○○○	(None)	N	YYYYMMDDHHMMSS
PLT-F-RBC-WY	1,5	Not used	○○○○	(None)	N	YYYYMMDDHHMMSS
DLT-PLT-F	1,5	Not used	○○.○○	(None)	N	YYYYMMDDHHMMSS
NRBC-1%	1,5	Not used	○○○○.○	/100WBC	N	YYYYMMDDHHMMSS
NRBC-2%	1,5	Not used	○○○○.○	/100WBC	N	YYYYMMDDHHMMSS
WBC-N2	1,5	Not used	○○○.○○○	10*3/uL	N	YYYYMMDDHHMMSS
TNC-N2	1,5	Not used	○○○.○○○	10*3/uL	N	YYYYMMDDHHMMSS
WBC-D2	1,5	Not used	○○○.○○○	10*3/uL	N	YYYYMMDDHHMMSS
TNC-D2	1,5	Not used	○○○.○○○	10*3/uL	N	YYYYMMDDHHMMSS
WBC-P2	1,5	Not used	○○○.○○○	10*3/uL	N	YYYYMMDDHHMMSS
TNC-P2	1,5	Not used	○○○.○○○	10*3/uL	N	YYYYMMDDHHMMSS
HGB_NONSI	1,5	Not used	○○○.○	g/dL	N	YYYYMMDDHHMMSS
HGB_SI	1,5	Not used	○○○.○	mmol/L	N	YYYYMMDDHHMMSS
HGB_SI2	1,5	Not used	○○.○○	mmol/L	N	YYYYMMDDHHMMSS
WNR_TOTAL_COUNT	1,5	Not used	○○○○○○○○	(None)	N	YYYYMMDDHHMMSS
WDF_TOTAL_COUNT	1,5	Not used	○○○○○○	(None)	N	YYYYMMDDHHMMSS
WDF_PLOT_COUNT	1,5	Not used	○○○○○○	(None)	N	YYYYMMDDHHMMSS
WPC_TOTAL_COUNT	1,5	Not used	○○○○○○○○	(None)	N	YYYYMMDDHHMMSS
WPC_PLT_COUNT	1,5	Not used	○○○○○○	(None)	N	YYYYMMDDHHMMSS
RET_TOTAL_COUNT	1,5	Not used	○○○○○○○○	(None)	N	YYYYMMDDHHMMSS
PLT-F_SIGNAL_COUNT_A	1,5	Not used	○○○○○○○○	(None)	N	YYYYMMDDHHMMSS
PLT-F_DATA_COUNT_A	1,5	Not used	○○○○○○	(None)	N	YYYYMMDDHHMMSS
PLT-F_PLOT_COUNT_A	1,5	Not used	○○○○○○	(None)	N	YYYYMMDDHHMMSS
PLT-F_PLOT_COUNT_B	1,5	Not used	○○○○○○	(None)	N	YYYYMMDDHHMMSS
AREA-F#	1,5	Not used	○○○○○○	(None)	N	YYYYMMDDHHMMSS
HGB_NONSI2	1,5	Not used	○○○.○○	g/dL	N	YYYYMMDDHHMMSS

*1: The Data Value field indicates the maximum number of digits and the decimal position.

a) 10.1.3 Universal Test ID

Parameter:

Service item names are output.

Dilution ratio:

1: Manual mode, Sampler mode

5: Capillary mode

Analysis result type:

Not used

Extended order result:

Not used

b) 10.1.4 Data Value

Data values for individual service items are output.

When “Link to IPU unit setting” is disabled (default setting) in the service settings, analysis data is output using the decimal point position indicated in “Table 27: List of Service Items”.

When “Link to IPU unit setting” is enabled in the service settings, analysis data is output using the linked decimal point position in the IPU unit settings.

If any data value is to be masked due to failure such as an analyzer error, the output data value is also masked as on the IPU display.

---- : Analysis or hardware error

++++ : Out of range

c) 10.1.5 Unit

Units for individual service items are output.

When “Link to IPU unit setting” is disabled (default setting) in the service settings, the units indicated in “Table 27: List of Service Items” are output.

When “Link to IPU unit setting” is enabled in the service settings, the linked units in the IPU unit settings are output.

d) 10.1.7 Result Abnormal Flag

N: Normal result

e) 10.1.13 Date/Time Test Completed

Indicates the date and time the analysis was completed. The format is fixed to “YYYYMMDDHHMMSS”.

YYYY indicates the year, MM the month, DD the day, HH the hour in 24-hour system (00-23), MM the minute (00-59), and SS the second (00-59).

3.10) Only Host items related to analysis orders are output.

(Note)
Only Host items are not output if the Service settings are configured not to output Only Host items.

(Note)
Analysis results for Only Host items should be used for research purposes only. Do not use these analysis results for patient diagnosis.

Table 28: List of Service Items

10.1.3 Universal Test ID			10.1.4 Data Value *1	10.1.5 Unit	10.1.7 Result Abnormal Flag	10.1.13 Date/Time Test Completed
Parameter	Dilution ratio	Extended order result				
LY-BF1#	1,5	Not used	○○○.○○○	10*3/uL	N	YYYYMMDDHHMMSS
LY-BF2#	1,5	Not used	○○○.○○○	10*3/uL	N	YYYYMMDDHHMMSS
MO-BF1#	1,5	Not used	○○○.○○○	10*3/uL	N	YYYYMMDDHHMMSS
MO-BF2#	1,5	Not used	○○○.○○○	10*3/uL	N	YYYYMMDDHHMMSS
MO-BF3#	1,5	Not used	○○○.○○○	10*3/uL	N	YYYYMMDDHHMMSS
HF-BF1#	1,5	Not used	○○○.○○○	10*3/uL	N	YYYYMMDDHHMMSS
HF-BF2#	1,5	Not used	○○○.○○○	10*3/uL	N	YYYYMMDDHHMMSS
LY-BF1%	1,5	Not used	○○○.○	%	N	YYYYMMDDHHMMSS
LY-BF2%	1,5	Not used	○○○.○	%	N	YYYYMMDDHHMMSS
MO-BF1%	1,5	Not used	○○○.○	%	N	YYYYMMDDHHMMSS
MO-BF2%	1,5	Not used	○○○.○	%	N	YYYYMMDDHHMMSS
MO-BF3%	1,5	Not used	○○○.○	%	N	YYYYMMDDHHMMSS
HF-BF1%	1,5	Not used	○○○.○	/100WBC	N	YYYYMMDDHHMMSS
HF-BF2%	1,5	Not used	○○○.○	/100WBC	N	YYYYMMDDHHMMSS
WPC-GR-X	1,5	Not used	○○○.○	ch	N	YYYYMMDDHHMMSS
WPC-GR-Y	1,5	Not used	○○○.○	ch	N	YYYYMMDDHHMMSS
WPC-GR-Z	1,5	Not used	○○○.○	ch	N	YYYYMMDDHHMMSS
WPC-LY-X	1,5	Not used	○○○.○	ch	N	YYYYMMDDHHMMSS
WPC-LY-Y	1,5	Not used	○○○.○	ch	N	YYYYMMDDHHMMSS
WPC-LY-Z	1,5	Not used	○○○.○	ch	N	YYYYMMDDHHMMSS
WPC-MO-X	1,5	Not used	○○○.○	ch	N	YYYYMMDDHHMMSS
WPC-MO-Y	1,5	Not used	○○○.○	ch	N	YYYYMMDDHHMMSS
WPC-MO-Z	1,5	Not used	○○○.○	ch	N	YYYYMMDDHHMMSS
WPC-LY2-X	1,5	Not used	○○○.○	ch	N	YYYYMMDDHHMMSS
WPC-LY2-Z	1,5	Not used	○○○.○	ch	N	YYYYMMDDHHMMSS
WPC-SC-X	1,5	Not used	○○○.○	ch	N	YYYYMMDDHHMMSS
WPC-SC-Z	1,5	Not used	○○○.○	ch	N	YYYYMMDDHHMMSS
WPC-GR#	1,5	Not used	○○○.○○	10*3/uL	N	YYYYMMDDHHMMSS
WPC-LY#	1,5	Not used	○○○.○○	10*3/uL	N	YYYYMMDDHHMMSS
WPC-MO#	1,5	Not used	○○○.○○	10*3/uL	N	YYYYMMDDHHMMSS
WPC-LY2#	1,5	Not used	○○○.○○	10*3/uL	N	YYYYMMDDHHMMSS
WPC-SC#	1,5	Not used	○○○.○○	10*3/uL	N	YYYYMMDDHHMMSS
WPC-FL-H1#	1,5	Not used	○○○.○○	10*3/uL	N	YYYYMMDDHHMMSS
WPC-FL-H2#	1,5	Not used	○○○.○○	10*3/uL	N	YYYYMMDDHHMMSS
WPC-FL-H3#	1,5	Not used	○○○.○○	10*3/uL	N	YYYYMMDDHHMMSS
WPC-FL-L1#	1,5	Not used	○○○.○○	10*3/uL	N	YYYYMMDDHHMMSS
WPC-LC1#	1,5	Not used	○○○.○○	10*3/uL	N	YYYYMMDDHHMMSS
WPC-LC2#	1,5	Not used	○○○.○○	10*3/uL	N	YYYYMMDDHHMMSS

*1: The Data Value field indicates the maximum number of digits and the decimal position.

a) 10.1.3 Universal Test ID

Parameter:

Only Host item names are output.

Dilution ratio:

1: Manual mode, Sampler mode

5: Capillary mode

Analysis result type:

Not used

Extended order result:

Not used

b) 10.1.4 Data Value

Data values for individual Only Host item are output.

Analysis data is output using the decimal point position indicated in “Table 28: List of Service Items”, regardless of “Link to IPU unit setting” in the service settings.

If any data value is to be masked due to failure such as an analyzer error, the output data value is also masked as on the IPU display.

---- : Analysis or hardware error

++++ : Out of range

c) 10.1.5 Unit

Units for individual Only Host items are output.

The units indicated in “Table 28: List of Service Items” are output, regardless of “Link to IPU unit setting” in the service settings.

d) 10.1.7 Result Abnormal Flag

N: Normal result

e) 10.1.13 Date/Time Test Completed

Indicates the date and time the analysis was completed. The format is fixed to “YYYYMMDDHHMMSS”.

YYYY indicates the year, MM the month, DD the day, HH the hour in 24-hour system (00-23), MM the minute (00-59), and SS the second (00-59).

4.3.3.6.Result Record (Slide preparation result data)

(Note)
Only output when XN-3000 Standalone mode is used.

[Example of transmission]

- IPU -> Host computer
  R|1|^^^^SMEAR^^^^|OK|10*3/uL||||||||20011116101000<CR>
- Host computer -> IPU
  Not used

Table 29: Details of Result Record (Slide Preparation Result Data)

ASTM field	Field name	IPU ↓ Host computer	Host computer ↓ IPU	Max. size (byte)	Remarks
10.1.1	Record Type	R	Not used	1	
10.1.2	Sequence Number	Sequence No.	Not used	4	Sequence Number of records
10.1.3	Universal Test ID	^^^^Item Name^^^^	Not used	^^^^5^^^^	ASP: Aspiration result SMEAR: Smearing result STAIN: Staining result
10.1.4	Data Value	Result	Not used	2	OK: Success NG: Failure NB: No blood CN: Cancelled RC: Recovery slide
10.1.5	Unit	Not used	Not used	-	
10.1.6	Reference Range	Not used	Not used	-	
10.1.7	Result Abnormal Flags	Not used	Not used	-	
10.1.8	Nature of Abnormality Testing	Not used	Not used	-	
10.1.9	Result Status	Not used	Not used	-	
10.1.10	Date of Change in Instrument Normative Values or Units	Not used	Not used	-	
10.1.11	Operator Identification	Not used	Not used	-	
10.1.12	Date/Time Test Started	Not used	Not used	-	
10.1.13	Date/Time Test Completed	YYYYMMDDHHMMSS	Not used	14	
10.1.14	Instrument Identification	Not used	Not used	-	

[Detailed explanation of the fields]

1) 10.1.2 Sequence Number

The sequence number starts with 1 and indicates the sequence position in which the record appeared in the message. This number is reset to 1 when a higher-level record appeared in the message.

2) 10.1.3 Universal Test ID

This parameter is set to one of the slide preparation result types:

ASP : Aspiration result is output.
SMEAR : Smearing result is output.
STAIN : Staining result is output.

If an error occurs during the SP-10 smearing process, the staining result is not output.
However, when the sample list stored in the SP-10 is manually output, the staining result is output even if an error occurs during the smear process.

The manually output data includes the following as updated as of the time when the smearing process was completed:

- Date
- Time
- Status

3) 10.1.4 Data Value

This parameter is set to one of the slide preparation results:

OK : Success (the slide was successfully prepared)
NG : Failure (the SP-10 failed in preparing the slide)
NB : No blood (the sample was found having no blood)
CN : Cancelled (the SP-10 was ordered to cancel)
RC : Recovery (the SP-10 finished preparing the slide as Recovery slide.

Assigned values differ depending on the Universal Test ID.

Data value / Universal Test ID	Success "OK"	Failure "NG"	No blood "NB"	Cancelled "CN"	Recovery "RC"
Aspiration result	○	○	○	○	-
Smearing result	○	○	○	○	- *
Staining result	○	○	-	-	○

Data values marked with ○ can be assigned.

* Because the smearing result "Recovery" is not managed as of now, there is no possibility that the value "RC" is assigned; this is a reserved word for future extension.

Depending on the instrument settings, either "OK" or "NG" can be set and output for the sample whose slide preparation result is "Recovery".
In this case, the word "Recovery" is displayed in the sample list screen, but either "OK" or "NG" is assigned to the output result.

4) 10.1.13 Date/Time Test Completed

Indicates the date and time the analysis was completed. The format is fixed to "YYYYMMDDHHMMSS".
YYYY indicates the year, MM the month, DD the day, HH the hour in 24-hour system (00-23), MM the minute (00-59), and SS the second (00-59).

4.3.3.7.Comment Record (patient/sample comment)

[Example of transmission]

- IPU -> Host computer
  `C|1||Patient comments<CR>`
- Host computer -> IPU
  `C|1||Patient comments<CR>`

Table 30: Details of Comment Record (Patient/Sample Comment)

ASTM field	Field name	IPU ↓ Host computer	Host computer ↓ IPU	Max. size (byte)	Remarks
11.1.1	Record Type	C	C	1	
11.1.2	Sequence Number	Sequence No.	Sequence No.	4	Sequence Number of records
11.1.3	Comment Source	Not used	Not used	-	
11.1.4	Comment Text	Comments	Comments	100: Patient comments 40: Sample comments	Patient comments Comment on Sample
11.1.5	Comment Type	Not used	Not used	-	

[Detailed explanation of the fields]

1) 11.1.2 Sequence Number

The sequence number starts with 1 and indicates the sequence position in which the record appeared in the message. This number is reset to 1 when a higher-level record appeared in the message.

2) 11.1.4 Comment Text

Comment Record subsequent to Patient Information Record:

This is a comment on the patient. Up to 100 any characters can be used.

Comment Record subsequent to Analysis Order Record:

This is a comment on the sample to be analyzed. Up to 40 any characters can be used.

4.3.3.8.Comment Record (Rerun/Reflex comment)

[Example of transmission]

- IPU -> Host computer
  `C|1||1^Rule Name1\2^Rule Name2<CR>`
- Host computer -> IPU
  Not used

Table 31: Details of Comment Record (Rerun/Reflex Comment)

ASTM field	Field name	IPU ↓ Host computer	Host computer ↓ IPU	Max. size (byte)	Remarks
11.1.1	Record Type	C	Not used	1	
11.1.2	Sequence Number	Sequence No.	Not used	4	Sequence Number of records
11.1.3	Comment Source	Not used	Not used	-	
11.1.4	Comment Text	Rule No.^Rule Name	Not used	3^20	
11.1.5	Comment Type	Not used	Not used	-	

[Detailed explanation of the fields]

1) 11.1.2 Sequence Number

The sequence number starts with 1 and indicates the sequence position in which the record appeared in the message. This number is reset to 1 when a higher-level record appeared in the message.

2) 11.1.4 Comment Text

Any rule number and rule name in the IPU Rerun/Reflex rules found applicable are output. Any characters can be used. If two or more rules are applicable, the output rule numbers and rule names are separated by delimiters.

Example: If Rule No. 1: Rule Name “WBC High”, Rule No. 2: Rule Name “RBC Low”, Rule No. 23: Rule Name “NEED PLT-F” are applicable, the Comment Record (Rerun/Reflex comment) will be output as follows:

`C|1||1^WBC HIGH\2^RBC LOW\23^Need to PLT-F analysis<CR>`

4.3.3.9.Comment Record (replacement information comments)

(Note)
Only output when XN-3000 Standalone mode is used.

[Example of transmission]

- IPU -> Host computer
  C|1||1<CR>
- Host computer -> IPU
  C|1||ABCDEFG^123456789012345^20121023^^HIJKLMN^123456789012345^20121023<CR>

Table 32: Comment Record (replacement information comments) details

ASTM field	Field name	IPU ↓ Host computer	Host computer ↓ IPU	Max. size (byte)	Remarks
11.1.1	Record Type	C	Not used	1	
11.1.2	Sequence Number	Sequence No.	Not used	4	Sequence Number of Record
11.1.3	Comment Source	Not used	Not used	-	
11.1.4	Comment Text	Replacement Information	Not used	1	
11.1.5	Comment Type	Not used	Not used	-	

[Detailed explanation of the fields]

1) 11.1.2 Sequence Number
The sequence number starts with 1 and indicates the sequence position in which the record appeared in the message. This number is reset to 1 when a higher-level record appeared in the message.

2) 11.1.4 Comment Text
Replacement Information:
If a consumable has been replaced on the SP-10, one of the following consumable codes is set in the 1st record and sent to the host computer.
"1": Staining solution 1
"2": Staining solution 2
"3": Buffer
"4": Rinse water
"5": DiluCell CL
"6": Methanol

4.3.3.10.Message termination record

[Example of transmission]

- IPU -> Host computer
  L|1|N<CR>
- Host computer -> IPU
  L|1|N<CR>

Table 33: Message Terminator Record

ASTM field	Field name	IPU ↓ Host computer	Host computer ↓ IPU	Max. size (byte)	Remarks
13.1.1	Record Type	L	L	1	Fixed
13.1.2	Sequence Number	1	1	4	Always “1”
13.1.3	Termination Cord	N	N	1	N: Normal termination

5. Examples of Communication

It is assumed that the following communications are made in serial connection.

5.1. Analysis Order Inquiry (IPU -> Host computer)

5.1.1. Batch Inquiry from Work List

IPU	<ENQ>
Host	<ACK>
IPU	<STX>1**H|\^&|||XN-20^00-01^11001^^^^12345678||||||||** **E1394-97<CR>**<ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
IPU	<STX>2**Q|1|2^1||||20011001153000** **<CR>**<ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
IPU	<STX>3**L|1|N<CR>**<ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
IPU	<EOT>

5.1.2. Real-Time Inquiry in Manual Mode

IPU	<ENQ>
Host	<ACK>
IPU	<STX>1**H|\^&|||XN-20^00-01^11001^^^^12345678||||||||** **E1394-97<CR>**<ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
IPU	<STX>2**Q|1|^^ 1234567890^B||||20011001153000** **<CR>**<ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
IPU	<STX>3**L|1|N<CR>**<ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
IPU	<EOT>

5.1.3. Real-Time Inquiry in Sampler Mode

IPU	<ENQ>
Host	<ACK>
IPU	<STX>1**H|\^&|||XN-20^00-01^11001^^^^12345678||||||||** **E1394-97<CR>**<ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
IPU	<STX>2**Q|1|2^1^ 1234567890^B||||20011001153000** **<CR>**<ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
IPU	<STX>3**L|1|N<CR>**<ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
IPU	<EOT>

5.2. Analysis Order Information (Host computer -> IPU)

5.2.1. Order exists

Host	<ENQ>
IPU	<ACK>
Host	<STX>1**H|\^&||||||||||E1394-97<CR>**<ETX><CHK1><CHK2><CR><LF>
IPU	<ACK>
Host	<STX>2**P|1|||100|^Jim^Brown||20010820|M|||||^Dr.1||||||||||||^ ^^WEST <CR>**<ETX><CHK1><CHK2><CR><LF>
IPU	<ACK>
Host	<STX>3**C|1||Patient Comments<CR>**<ETX><CHK1><CHK2><CR><LF>
IPU	<ACK>
Host	<STX>4 **O|1|2^1^ 1234567890^B||^^^^WBC\^^^^RBC\^^^^HGB \^^^^HCT\^^^^MCV\^^^^MCH\^^^^MCHC\^^^^PLT\^^^^NEUT %\^^^^LYMPH%\^^^^MONO%\^^^^EO%\^^^^BASO%\^^^^NEUT# \^^^^LYMPH#\^^^^MONO#\^^^^EO#\^^^^BASO#\^^^^RDW-SD \^^^^RDW-CV\^^^^PDW\^^^^MPV\^^^^P-LCR\^^** <ETB><CHK1><CHK2><CR><LF>
IPU	<ACK>
Host	<STX>5 **^^PCT||20010807101000|||||N||||||||||||Q<CR>** <ETX><CHK1><CHK2><CR><LF>
IPU	<ACK>
Host	<STX>6**C|1||Sample Comments<CR>**<ETX><CHK1><CHK2><CR><LF>
IPU	<ACK>
Host	<STX>7**L|1|N<CR>**<ETX><CHK1><CHK2><CR><LF>
IPU	<ACK>
Host	<EOT>

5.2.2. No order exists

Host	<ENQ>
IPU	<ACK>
Host	<STX>1**H|\^&||||||||||E1394-97<CR>**<ETX><CHK1><CHK2><CR><LF>
IPU	<ACK>
Host	<STX>2**P|1<CR>**<ETX><CHK1><CHK2><CR><LF>
IPU	<ACK>
Host	<STX>3**O|1|2^1^ 1234567890^B ||||20010910101000||||||||||||||||Y<CR>** <ETX><CHK1><CHK2><CR><LF>
IPU	<ACK>
Host	<STX>4**L|1|N<CR>**<ETX><CHK1><CHK2><CR><LF>
IPU	<ACK>
Host	<EOT>

5.3. Analysis Results & QC Data (IPU -> Host computer)

5.3.1. Output of analysis results

IPU	<ENQ>
Host	<ACK>
IPU	<STX>1**H|\^&|||XN-20^00-01^11001^^^^12345678|||||||| E1394-97<CR>**<ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
IPU	<STX>2**P|1|||100|^Jim^Brown||20010820|M|||||^Dr.1||||||||||||^ ^^WEST <CR>**<ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
IPU	<STX>3**C|1||Patient Comments<CR>**<ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
IPU	<STX>4 **O|1|2^1^ 1234567890^B||^^^^WBC\^^^^RBC\^^^^HGB \^^^^HCT\^^^^MCV\^^^^MCH\^^^^MCHC\^^^^PLT\^^^^NEUT %\^^^^LYMPH%\^^^^MONO%\^^^^EO%\^^^^BASO%\^^^^NEUT# \^^^^LYMPH#\^^^^MONO#\^^^^EO#\^^^^BASO#\^^^^RDW-SD \^^^^RDW-CV\^^^^PDW\^^^^MPV\^^^^P-LCR\^^** <ETB><CHK1><CHK2><CR><LF>
Host	<ACK>
IPU	<STX>5 **^^PCT||20010807101000|||||N||||||||||||Q<CR>** <ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
IPU	<STX>6**C|1||Sample Comments<CR>**<ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
IPU	<STX>7**R|1|^^^^WBC^1^^^W|7.81|10*3/uL||N|||||20010806120000<C R>** <ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
IPU	<STX>0**R|2|^^^^RBC^1|----|10*6/uL||A||||||20010806120000<CR>** <ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
IPU	<STX>1**R|3|^^^^HGB^1|20.5|g/dL||W||||||20010806120000<CR>** <ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
IPU	<STX>2**R|4|^^^^HCT^1|40.3|%||W||||||20010806120000<CR>** <ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
	(...omitted...)
IPU	<STX>7**R|33|^^^^PLT_Abn_Distribution|||A||||||20010806120000 <CR>**<ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
IPU	<STX>0**R|34|^^^^Blasts?|0|||||||||20010806120000<CR>** <ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
IPU	<STX>1**R|35|^^^^Immature_Gran?|40|||||||||20010806120000 <CR>**<ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
IPU	<STX>2**R|36|^^^^Left_Shift?|0|||||||||20010806120000 <CR>**<ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
IPU	<STX>3**R|37|^^^^Atypical_Lympho?|0|||||||||20010806120000 <CR>**<ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
IPU	<STX>4**R|38|^^^^RBC_Lyse_Resistance?|10|||||||||2001080612000 0 <CR>**<ETX><CHK1><CHK2><CR><LF>

Host	<ACK>
IPU	<STX>5**R|39|^^^^Abn_Lympho/Blasts?|100|||A||||||20010806120000 <CR>**<ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
	(...omitted...)
IPU	<STX>4**R|46|^^^^ACTION_MESSAGE_Delta||||A<CR>**<ETX><CHK1><CHK2> <CR><LF>
Host	<ACK>
IPU	<STX>5**R|47|^^^^SCAT_DIFF|PNG&R&20010806&R&2001_08_06_12_00_12 34567890_ DIFF.PNG|||N|||||20010806120000<CR>**<ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
	(omitted)
IPU	<STX>5**L|1|N<CR>**<ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
IPU	<EOT>

5.3.2. Output of analysis results in body fluid mode

IPU	<ENQ>
Host	<ACK>
IPU	<STX>1**H|\^&|||XN-20^00-00^11001^^^^12345678|||||||| E1394-97<CR>**<ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
IPU	<STX>2**P|1|||100|^Jim^Brown||20010820|M|||||^Dr.1||||||||||||^ ^^WEST <CR>**<ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
IPU	<STX>3**C|1||Patient Comments<CR>**<ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
IPU	<STX>4 **O|1||^^ 1234567890^B|^^^^WBC-BF\^^^^RBC-BF\^ ^^^MN#\^^^^MN%\^^^^PMN#\^^^^PMN%||||||N||||||||| ||||F<CR>** <ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
IPU	<STX>5**C|1||Sample Comments<CR>**<ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
IPU	<STX>6**R|1|^^^^WBC-BF^1|5.359|10*3/uL||N|||||20010806120000<C R>** <ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
IPU	<STX>7**R|2|^^^^RBC-BF^1|4.4|10*6/uL||A|||||20010806120000<CR>** <ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
IPU	<STX>0**R|3|^^^^MN#^1|4.041|10*3/uL||W|||||20010806120000<CR>** <ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
IPU	<STX>1**R|4|^^^^MN%^1|75.4|%||N|||||20010806120000<CR>** <ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
IPU	<STX>2**R|5|^^^^PMN#^1|1.318|10*3/uL||N|||||20010806120000<CR>** <ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
IPU	<STX>3**R|6|^^^^PMN%^1|24.6|%||N||||||20010806120000<CR>** <ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
IPU	<STX>4**L|1|N<CR>**<ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
IPU	<EOT>

5.3.3. Real-time output of QC data

IPU	<ENQ>
Host	<ACK>
IPU	<STX>1**H|\^&|||XN-20^00-01^11001^^^^12345678||||||||** **E1394-97<CR>**<ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
IPU	<STX>2**P|1<CR>**<ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
IPU	<STX>3 **O|1||^^ QC-12345678^B|^^^^WBC\^^^^RBC\^^^^HGB** **\^^^^HCT\^^^^MCV\^^^^MCH\^^^^MCHC\^^^^PLT\^^^^NEUT** **%\^^^^LYMPH%\^^^^MONO%\^^^^EO%\^^^^BASO%\^^^^NEUT#** **\^^^^LYMPH#\^^^^MONO#\^^^^EO#\^^^^BASO#\^^^^RDW-SD** **\^^^^RDW-CV\^^^^PDW\^^^^MPV\^^^^P-LCR\^^^^** <ETB><CHK1><CHK2><CR><LF>
Host	<ACK>
IPU	<STX>4 **PCT|||||||Q|||||||||||||F<CR>** <ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
IPU	<STX>5**R|1|^^^^WBC^1|7.58|10*3/uL||N||||||20010806120000<CR>** <ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
IPU	<STX>6**R|2|^^^^RBC^1|4.49|10*6/uL||N||||||20010806120000<CR>** <ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
IPU	<STX>7**R|3|^^^^HGB^1|13.3|g/dL||N||||||20010806120000<CR>** <ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
IPU	<STX>0**R|4|^^^^HCT^1|37.3|%||N||||||20010806120000<CR>**
	<ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
	(omitted)
IPU	<STX>5**R|33|^^^^SCAT_DIFF|PNG&R&20010806&R&2001_08_06_12_00_12** **34567890_** **DIFF.PNG|||N||||||20010806120000<CR>**<ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
	(...omitted...)
IPU	<STX>1**L|1|N<CR>**<ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
IPU	<EOT>

5.3.4. Manual output of QC data

IPU	<ENQ>
Host	<ACK>
IPU	<STX>1**H|\^&|||XN-20^00-01^11001^^^^12345678||||||||** **E1394-97<CR>**<ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
IPU	<STX>2**P|1<CR>**<ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
IPU	<STX>3 **O|1||^^1|^^^^WBC\^^^^RBC\^^^^HGB\^^^^HCT\^^^^MCV\^** **^^^MCH\^^^^MCHC\^^^^PLT\^^^^NEUT%\^^^^LYMPH%\^^^^M** **ONO%\^^^^EO%\^^^^BASO%\^^^^NEUT#\^^^^LYMPH#\^^^^MO** **NO#\^^^^EO#\^^^^BASO#\^^^^RDW-SD\^^^^RDW-CV\^^^^PD** **W\^^^^MPV\^^^^P-LCR\^^^^PCT\DIFF-X\DIFF-** <ETB><CHK1><CHK2><CR><LF>
Host	<ACK>
IPU	<STX>4 **Y\DIFF-WBC|||||||Q|||||||||||||F<CR>** <ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
IPU	<STX>5**R|1|^^^^WBC^1|7.58|10*3/uL||N||||||20010806120000<CR>** <ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
IPU	<STX>6**R|2|^^^^RBC^1|4.49|10*6/uL||N||||||20010806120000<CR>** <ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
IPU	<STX>7**R|3|^^^^HGB^1|13.3|g/dL||N||||||20010806120000<CR>** <ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
IPU	<STX>0**R|4|^^^^HCT^1|37.3|%||N||||||20010806120000<CR>** <ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
	(...omitted...)
IPU	<STX>0**L|1|N<CR>**<ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
IPU	<EOT>

Appendix.A TCP/IP Communication

A.1. Network Interface Layer

Conforms to IEEE802.3.
Communications are based on 10Base-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.

A.2. TCP/IP

The IP address of the host computer is to be specified on the IPU screen. The address should be a value other than 192.168.28.*, which is reserved in the IPU.
The TCP port number used for communications with the host is a fixed value (the default is 5000). This port number can be changed on the IPU screen.

A.3. Timing of Transmission

Either transmission by every test cycle or batch transmission of stored samples data can be selected via settings on the data processing unit.

A.4. Transmitted Messages

- ASTM E1381-95 mode

According to the TCP/IP protocol, records defined in the presentation layer are transmitted. While the records are sent/received, a TCP connection must be established. If the TCP connection is not established, the IPU automatically starts a session before sending the records. Only records defined in the presentation layer are transmitted as shown below.

Example: Real-time inquiry

IPU→Host	**H|\^&|||XN-20^00-01^11001^^^^12345678|||||||E1394-97<CR> Q|1|2^1^ 1234567890^B||||20011001153000<CR>L|1|N<CR>**
Host→IPU	**H|\^&|||||||||||E1394-97<CR> P|1|||100|^Jim^Brown||20010820| M|||||^Dr.1|||||||||||^^^WEST<CR> C|1||Patient Comments<CR> O|1|2^1^ 1234567890^B||^^^^WBC\^^^^RBC\^^^^HGB \^^^^HCT\^^^^MCV\^^^^MCH\^^^^MCHC\^^^^PLT\^^^^NEUT %\^^^^LYMPH%\^^^^MONO%\^^^^EO%\^^^^BASO%\^^^^NEUT# \^^^^LYMPH#\^^^^MONO#\^^^^EO#\^^^^BASO#\^^^^RDW-SD \^^^^RDW-CV\^^^^PDW\^^^^MPV\^^^^P-LCR\^^^^PCT||200 10807101000||||N||||||||||||Q<CR> C|1||Sample Comments<CR>L|1|N<CR>**

Note: <CR> stands for the carriage return code “0D”. There is no carriage return at word-wrap sections in the messages above.

- In case of ASTM E1381-02 mode

  According to “4.2 Data Link Layer (Transmission Protocol)”, records defined in the presentation layer are transmitted. While the records are sent/received, a TCP connection must be established. If the TCP connection is not established, the IPU automatically starts a session before sending the records. For examples of transmitted messages, refer to “5. Examples of Communication”. (Note that in TCP/IP communication a record will not be divided because the maximum number of characters in a record is set to 63,993.)

[end of document]