



**SP-10**  
**ASTM Host Interface Specifications**

Revision 1.04

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**Sysmex Corporation**

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## 1 Scope

This document applies to host communications based on the ASTM format between the SP-10 and the host computer.

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 document conforms to the following two standards:

ASTM E1381-95/02    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.

## 2 General

The SP-10 provides the following functions by communicating with the host computer:

- (1)    Receives smear and staining orders from the host computer.
- (2)    Informs the host computer of the progress of smear and staining.
- (3)    Prints certain information on the frosted area of a slide (accepts print only orders).
- (4)    Informs the host computer of the status of consumables replacement (staining solution 1, staining solution 2, buffer, rinse water, DiluCell CL, and methanol).

## 3 Terminology

For definitions of the terms used in this document, refer to the SP-10 Host Interface Specifications [R310012].

## 4 Communication Specifications

Communication specifications are based on a layer protocol.

- (1)    Physical layer

Specifies the sending and receiving of signals between the SP-10 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 SP-10 and the host computer.

See “4.2 Data Link Layer (Transmission Protocol)”.

(3) Presentation layer

Specifies the messages that are sent and received between the SP-10 and the host computer.

See “4.3 Presentation Layer”.

Presentation layer	←	Specifies message specifications.
Data link layer	←	Specifies link connection and frame specifications.
Physical layer	←	Specifies mechanical and electrical specifications.

Note:

The SP-10 supports serial and TCP/IP connections.

For serial connections, the SP-10 conforms to ASTM E1381-02/ASTM E1394-97.

For TCP/IP connections, the SP-10 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	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 SP-10 runs in the ASTM E1381-02 mode if “1381-02” is selected for [ASTM Rev.] in the settings screen. The SP-10 runs in the ASTM E1381-95 mode if “1381-95” is selected.

\*2: The IEEE802.3 specifications for the data link and physical layers are not described in this document.

## 4.1 Physical Layer (Hardware)

### 4.1.1 Connector and cable

Although the ASTM standard specifies a D-SUB 25-pin connector as standard, the SP-10 uses a D-SUB 9-pin male I/O connector. A 9-pin D-SUB female connector should be used as the connector on the cable side. The connector has inch-pitched fixing screws. Use a 9-pin D-SUB RS-232C crossover cable to connect to the SP-10.

**Table 1: SP-10 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 2: 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 SP-10's D-SUB 9 male connector in accordance with the following connection chart:

SP-10 DB-9		Host computer		
		DB-9	DB-25	
TxD	3	3	2	TxD
RxD	2	2	3	RxD
SG	5	5	7	SG
RTS	7	7	4	RTS
CTS	8	8	5	CTS
DTR	4	4	20	DTR
DSR	6	6	6	DSR
NC	1			
NC	9			

#### 4.1.4 Interface parameters

**Table 3: Interface Parameters**

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

The underlined values conform to the ASTM standard.

Note: However, 7-bit data lengths, even or 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 SP-10 conforms to ASTM E1381-02 “5. Physical Layer”, except for the connector type. The SP-10 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 E 1381-02 “6. Data Link layer”.

This section briefly describes communication control procedures. For details, refer to ASTM E1381-02.

#### 4.2.1 Communication status

The data link layer has the following two communication states:

- (1) Neutral status
- (2) Linked status

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

- (1) Establishment phase

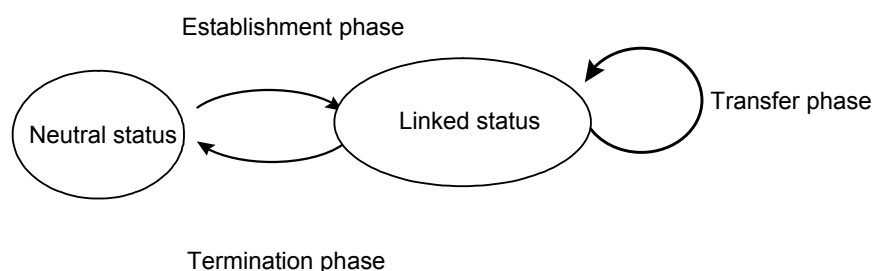
Establishes a communication line, and determines the direction of data transfer. In this way, the sender and the receiver are identified, and the change is made from neutral status to linked status.

- (2) Transfer phase

The sender transmits messages to the receiver until all messages are transferred.

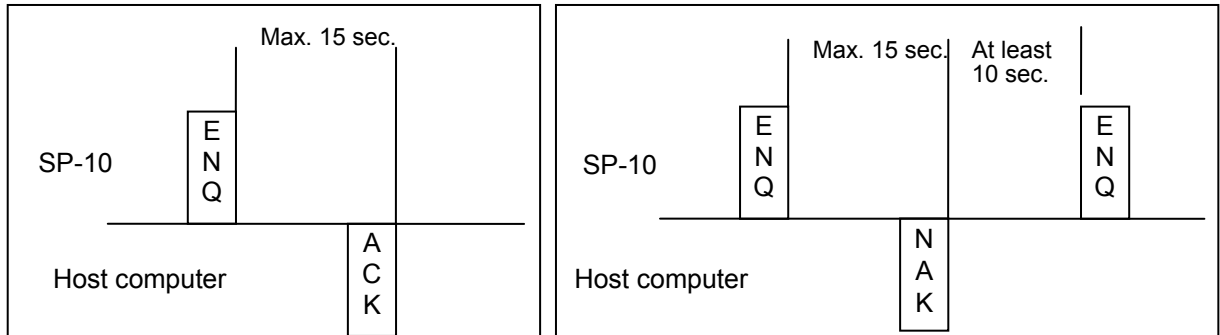
- (3) Termination phase

Releases the communication line. Changes both the sender and the receiver from linked status to neutral status.

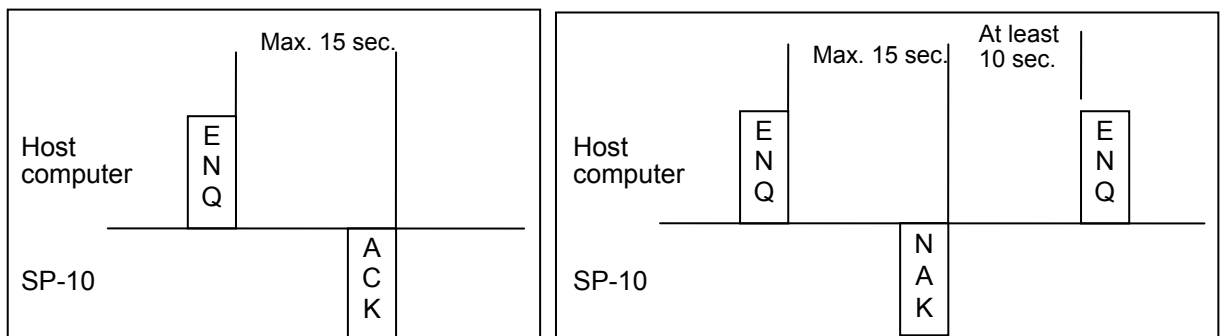


#### 4.2.2 Establishment phase

- (1) To transmit data to the host computer, the SP-10 sends an [ENQ] signal to the host computer first. To respond to the SP-10, the host computer should perform the following action:
- When the communication is enabled, return an [ACK] signal.
  - When the communication is disabled, return a [NAK] signal.
  - Failure to receive [ACK] or [NAK] for 15 seconds or more results in “Host Communication Error”.
- If the host computer responds with a [NAK] signal, the SP-10 waits for at least 10 seconds before attempting to send another [ENQ] signal.

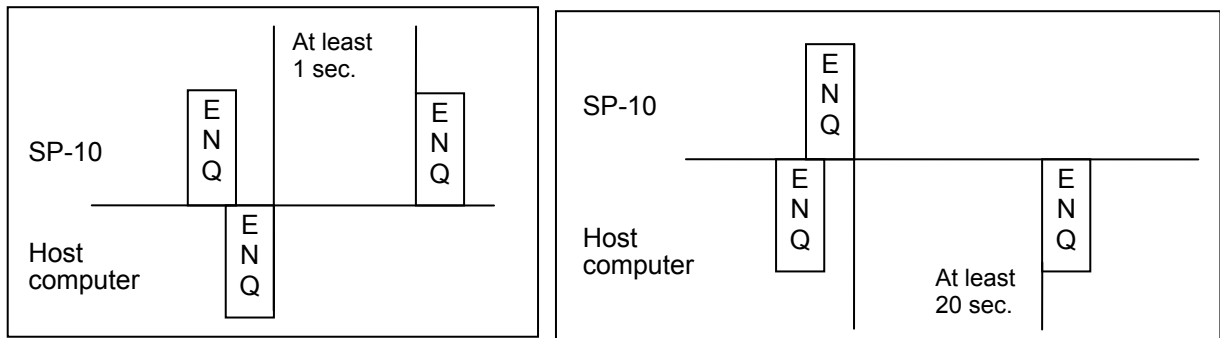


- (2) To transmit data to the SP-10, the host computer sends an [ENQ] signal to the SP-10 first. To respond to the host computer, the SP-10 performs the following action:
- When the communication is enabled, returns an [ACK] signal.
  - When the communication is disabled, returns a [NAK] signal.
  - Failure to receive [ACK] or [NAK] for 15 seconds or more results in “Host Communication Error”.
- If the SP-10 responds with a [NAK] signal, the host computer should wait for at least 10 seconds before attempting to send another [ENQ] signal.





- (3) When both send [ENQ] signals, the host computer must yield control authority to the SP-10.
- The SP-10 sends an [ENQ] signal again after one second.
  - The host computer must wait for 20 seconds before sending an [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 247 characters\* (including frame overhead). If the record is longer than 240 characters\*, it is divided into two or more frames. (For information about messages, refer to “4.3.1.3”.)

\* Although ASTM E1381-02 specifies a maximum of 63,993 characters per record, the maximum number of characters is set to 240 to ensure compatibility with ASTM E1381-95.

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

- (3) If the record contains 240 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 240 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]

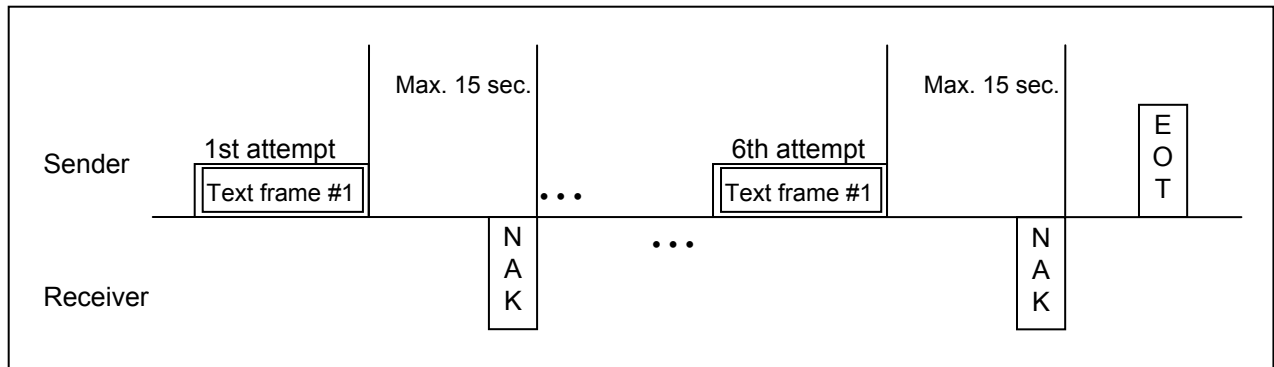
[STX] [F#] [Text] [ETB] [CHK1] [CHK2] [CR] [LF]

.....

[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 frames)
[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 an [ACK] signal. After the sender receives the [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 a [NAK] signal. After receiving the [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 transitions to the termination phase by sending [EOT] to stop sending the message.  
If the SP-10 fails to send the same frame 6 times consecutively, it generates “Host Communication Error”.



- (6) If the SP-10 receives [EOT] from the host computer after sending [NAK] 6 times, it displays “Host Communication Error” and transitions to the termination phase.
- (7) The SP-10 will send all the messages even if it receives [EOT] (request to suspend transmission) from the host computer.

#### 4.2.4 Termination phase

During the termination phase, the status returns to neutral.

The sender sends an [EOT] signal to inform the receiver that the message transmission has been completed. The sender transitions to neutral status by sending an [EOT] signal, and the receiver transitions to neutral status by receiving the [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 means of recovery from failure in a communication line or in a communication destination device.

- (1) During the establishment phase, the timer is set when the sender sends an [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, a 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] or [NAK]) to a frame. A timeout occurs if the receiver receives no frame or no [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].

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. The comment record is 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.

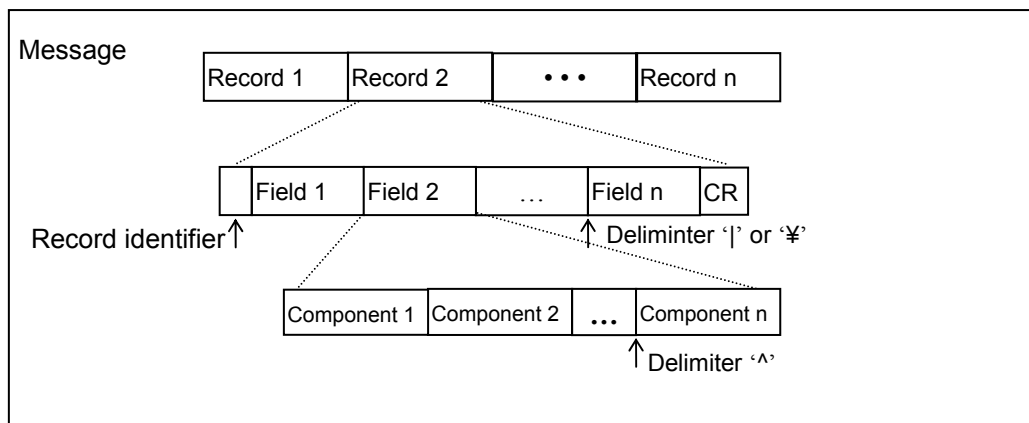
#### 4.3.1.3 Fields

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.

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 in data to insert special characters. Names and comments in Japanese, Chinese, or Korean are expressed using double-byte codes without escape delimiters. On the SP-10, the codes below are used for 2-byte character code sets. Japanese S-JIS Chinese (simplified) GB2312 Chinese (traditional) Big5 Korean KS C 5601 (for other than Chinese character codes)



### 4.3.2 Communication protocol

#### 4.3.2.1 Analysis Order Inquiry (SP-10 -> Host computer)

This protocol is used for the SP-10 to inquire about analysis orders to obtain information about the sample to be tested by the instrument. Inquiries can be made using the Sample ID Number as an inquiry key.

**Table 4: Analysis Order Inquiry**

SP-10	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 SP-10 is in TCP/IP connection in the ASTM E1381-95 mode, ENQ, ACK, and EOT are not handled. For more information, refer to Appendix A.

#### 4.3.2.2 Analysis Order Information (Host computer -> SP-10)

This protocol is used for the host computer to respond to an inquiry about analysis order. No record can be omitted.

**Table 5: Analysis Order Information**

SP-10	Direction	Host computer
	←	ENQ
ACK	→	
	←	H: Header Record
ACK	→	
	←	P: Patient Information 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 SP-10 is in TCP/IP connection in the ASTM E1381-95 mode, ENQ, ACK, and EOT are not handled. For more information, refer to Appendix A.

#### 4.3.2.3 Analysis Results Data (SP-10 -> Host computer)

This protocol is used for the SP-10 to output analysis results. No record can be omitted.

**Table 6: Analysis Results Data**

SP-10	Direction	Host computer
ENQ	→	
	←	ACK
H: Header Record	→	
	←	ACK
P: Patient Information Record	→	
	←	ACK
O: Analysis Order Record	→	
	←	ACK
R: Analysis Result Record	→	
	←	ACK
L: Message Terminator Record	→	
	←	ACK
EOT	→	

Note: This table is created assuming that the data link layer conforms to E1381. If the SP-10 is in TCP/IP connection in the ASTM E1381-95 mode, ENQ, ACK, and EOT are not handled. For more information, refer to Appendix A.

#### 4.3.2.4 Print Data Inquiry (SP-10 -> Host computer)

The following communication sequence is used for the SP-10 to inquire into the host computer about content to be manually printed:

SP-10	Direction	Host computer
ENQ	→	
	←	ACK
H: Header Record	→	
	←	ACK
Q: Inquiry Record	→	
	←	ACK
L: Message Terminator Record	→	
	←	ACK
EOT	→	

Note: No record can be omitted.

#### 4.3.2.5 Print Data (Host computer -> SP-10)

The following communication sequence is used for the host computer to send the SP-10 the content to be manually printed:

SP-10	Direction	Host computer
	←	ENQ
ACK	→	
	←	H: Header Record
ACK	→	
	←	P: Patient Information Record
ACK	→	
	←	O: Analysis Order Record
ACK	→	
	←	C: Sample Comment Record
ACK	→	
	←	L: Message Terminator Record
ACK	→	
	←	EOT

Note: No record can be omitted.

#### 4.3.2.6 Reagent Replacement Information (SP-10 -> Host computer)

The following communication sequence is used for the SP-10 to inform the host computer of consumables replacement:

SP-10	Direction	Host computer
ENQ	→	
	←	ACK
H: Header Record	→	
	←	ACK
C: Sample Comment Record	→	
	←	ACK
L: Message Terminator Record	→	
	←	ACK
EOT	→	

Note: The output report is not in the SP-100 compatible format.

Note: No record can be omitted.

### 4.3.3 Details of Records

#### 4.3.3.1 Header Record

[Example of transmission]

■ SP-10 -> Host computer

H|¥^&|||SP-10^00-04^11001^^^12345678|||||||E1394-97|20040822100525<C  
R>

■ Host computer -> SP-10

H|¥^&|||||||E1394-97|20040822100525<CR>

Field No.	Field name	SP-10 ↓ Host computer	Host computer ↓ SP-10	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	Instrument Name^ Software Version^ Instrument Serial Number^^^^ PS Code	Not used	5^ 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	YYYYMMDDHH MMSS	YYYYMMDDH HMMSS	14	

1) 7.1.1 Record Type

This parameter is set to “H”.

2) 7.1.2 Delimiter Definition

Set this parameter to ‘¥^&’. No field delimiter is required between the Record Type and the Delimiter Definition.



3) 7.1.5 Sender Name or ID

This field consists of components: Instrument Name, Software Version, Instrument Serial Number, and PS Code, separated by “^”.

3-1) Instrument Name

This parameter is set to “SP-10” (fixed).

3-2) Software Version

This parameter is set to the version number for the SP-10 application program.

3-3) Instrument Serial Number

This parameter is set to the serial number for the SP-10 consisting of up to 5 alphanumeric characters.

3-4) PS Code

This parameter is set to an 8-digit PS code representing the destination of the SP-10.

4) 7.1.13 ASTM Version Number

This parameter is set to “E1394-97” (fixed).

5) 7.1.14 Date and Time of Message

The format is fixed to “YYYYMMDDHHMMSS”, which cannot be changed.

YYYY: Year (4 digits)

MM: Month (2 digits, right-aligned with zero padding)

DD: Day (2 digits, right-aligned with zero padding)

HH: hour (24-hour basis: “00” - “23”) (2 digits, right-aligned with zero padding)

MM: minute (“00” - “59”) (2 digits, right-aligned with zero padding)

SS: second (“00” - “59”) (2 digits, right-aligned with zero padding)

Ex.) “20050101090530” for 9 o’clock 5 minutes 30 seconds, January 1st, 2005

#### 4.3.3.2 Patient Information Record

[Example of transmission]

- SP-10 -> Host computer

P | 1 <CR>

- Host computer -> SP-10

P | 1 <CR>

Field No.	Field name	SP-10 ↓ Host computer	Host computer ↓ SP-10	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	Not used	Not used	-	
8.1.6	Patient Name	Not used	Not used	-	
8.1.7	Mother's Maiden Name	Not used	Not used	-	
8.1.8	Birth Date	Not used	Not used	-	
8.1.9	Patient Sex	Not used	Not used	-	
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	Not used	Not used	-	
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	Not used	Not used	-	
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) 8.1.1 Record Type

This parameter is set to “P”.

2) 8.1.2 Sequence Number

The Sequence Number is a 4 or less digit number starting 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.

#### 4.3.3.3 Inquiry Record

[Example of transmission]

■ SP-10 -> Host computer

Q|1| 1^01^ 123456789012345^M|||20010905150000|||0|

<CR>

■ Host computer -> SP-10

Not used

Field No.	Field name	SP-10 ↓ Host computer	Host computer ↓ SP-10	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.^ Tube 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 instrument B: Barcode reader
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	YYYYMMDDHH MMSS	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	Type of Inquiry	Not used	1	O: Order inquiry P: Print content inquiry
12.1.12	User Field No. 2	Not used	Not used	-	
12.1.13	Requested Information Status Codes	(Spaces)	(Spaces)	8	Fixed to spaces

1) 12.1.1 Record Type

This parameter is set to “Q”.

2) 12.1.2 Sequence Number

The Sequence Number is a 4 or less digit number starting 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.

3) 12.1.3 Starting Range ID Number

This field consists of components: Rack Number, Tube Position, Sample ID Number, and Sample Number Attribute, separated by “^”.

### 3-1) Rack Number

Indicates the rack number corresponding to the analyzed sample.

The Rack Number consists of 6 or less digit alphanumeric characters. A hyphen “-” (2DH) can be inserted between characters.

Any hyphen is counted as part of 6 digits. A 5 or less digit number is right-aligned with space padding to fill 6 digits.

This parameter is set to “000000” for manual mode where slides are prepared without racks.

### 3-2) Tube Position

Indicates the tube position corresponding to the analyzed sample.

The Tube Position is a 2 or less digit number. A single-digit number is right-aligned with zero padding to fill 2 digits.

This parameter is set to “00” for manual mode where slides are prepared without racks.

### 3-3) Sample ID Number

Identifies the sample where smearing is completed.

The Sample ID Number consists of 22 or less digit characters. A hyphen “-” (2DH) can be inserted between characters.

Any hyphen is counted as part of 22 digits. Character codes 20H to FEH (except control codes 00H to 1FH, and FFH) can be used.

A 21 or less digit number is right-aligned with space padding to fill 22 digits.

\* Note:

If 16 or more digit sample ID numbers are going to be used, set the SP-10 maximum number of digits displayed for sample IDs to “Max. 22”.

\* Note:

If your SP-10 is Ver. 00-04 or lower, use sample IDs of up to 15 digits.

In this case, align the number to the right with space padding to fill 15 digits.

Ex.) “△△△△△△△△△△△△△△1234567890” (The symbol △ represents a space (20h).)

### 3-4) Sample Number Attribute

Indicates how the sample number was determined.

“M”: The sample number was manually input.

“A”: The sample number was automatically assigned.

“B”: The sample number was input by means of a barcode label.

## 4) 12.1.7 Beginning Request Results Date & Time

The format is fixed to “YYYYMMDDHHMMSS”, which cannot be changed.

YYYY: Year (4 digits)

MM: Month (2 digits, right-aligned with zero padding)

DD: Day (2 digits, right-aligned with zero padding)

HH: hour (24-hour basis: “00” - “23”) (2 digits, right-aligned with zero padding)

MM: minute (“00” - “59”) (2 digits, right-aligned with zero padding)

SS: second (“00” - “59”) (2 digits, right-aligned with zero padding)

Ex.) “20050101090530” for 9 o'clock 5 minutes 30 seconds, January 1st, 2005

5) 12.1.11 User Field No. 1

This parameter is set to either “O” (inquiry about smear or smear + stain order) or “P” (inquiry about print order only).

6) 12.1.13 Requested Information Status Codes

This parameter is fixed to eight spaces.

#### 4.3.3.4 Analysis Order Record

[Example of transmission]

- SP-10 -> Host computer

O|1|| 1^05^ 123456789012345^B||20040807101000||||N|||||  
|||||F<CR>

- Host computer -> SP-10

O|1|| 1^05^ 123456789012345^C||SMEAR^0500^123456^12345^2^1^2  
||20040807101000||||N|||||||||Q<CR>

Field No.	Field name	SP-10 ↓ Host computer	Host computer ↓ SP-10	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.^ Tube Position^ Sample ID No.^ Sample No. Attribute	6^ 2^ 22^ 1	C: Assignment by host computer
9.4.4	Instrument Specimen ID	Rack No.^ Tube 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 instrument B: Barcode reader C: Assignment by host computer
9.4.5	Universal Test ID	Not used	SMEAR^ HCT Value^ WBC Value^ RBC Value^ Number of Prepared Slides^ Designated Slide Glass (1st)^ Designated Slide Glass (2nd)^	5^ 4^ 6^ 5^ 1^ 1^ 1	
9.4.6	Priority	Not used	Not used	-	
9.4.7	Requested/Ordered Date and Time	YYYYMMDDH HMMSS	YYYYMMDDH HMMSS	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	N	1	N: Normal slide preparation
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	-	

Field No.	Field name	SP-10 ↓ Host computer	Host computer ↓ SP-10	Max. size (byte)	Remarks
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	-	
9.4.25	Instrument Section ID	Not used	Not used	-	
9.4.26	Report Type	F	Y, Q	1	F: Final result 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	-	

1) 9.4.1 Record Type

This parameter is set to “O”.

2) 9.4.2 Sequence Number

The Sequence Number is a four or less digit number starting 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.

3) 9.4.3 Specimen ID

This field consists of components: Rack Number, Tube Position, Sample ID Number, and Sample Number Attribute, separated by “^”.

3-1) Rack Number

Indicates the rack number corresponding to the analyzed sample.

The Rack Number consists of 6 or less digit alphanumeric characters. A hyphen “-” (2DH) can be inserted between characters.

Any hyphen is counted as part of 6 digits. A 5 or less digit number is right-aligned with space padding to fill 6 digits.

This parameter is set to “000000” for manual mode where slides are prepared without racks.

3-2) Tube Position

Indicates the tube position corresponding to the analyzed sample.

The Tube Position is a 2 or less digit number. A single-digit number is right-aligned with zero padding to fill 2 digits.

This parameter is set to “00” for manual mode where slides are prepared without racks.



### 3-3) Sample ID Number

Identifies the sample where smearing is completed.

The Sample ID Number consists of 22 or less digit characters. A hyphen “-” (2DH) can be inserted between characters.

Any hyphen is counted as part of 22 digits. Character codes 20H to FEH (except control codes 00H to 1FH, and FFH) can be used.

A 21 or less digit number is right-aligned with space padding to fill 22 digits.

\* Note:

If 16 or more digit sample ID numbers are going to be used, set the SP-10 maximum number of digits displayed for sample IDs to “Max. 22”.

\* Note:

If your SP-10 is Ver. 00-04 or lower, use sample IDs of up to 15 digits.

In this case, align the number to the right with space padding to fill 22 digits.

Ex.) “△△△△△△△△△△△△△△1234567890” (The symbol △ represents a space (20h).)

### 3-4) Sample Number Attribute

Indicates how the sample number was determined.

“C”: The sample number was assigned by the host computer.

## 4) 9.4.4 Instrument Specimen ID

### 4-1) Rack Number

Refer to “9.4.3 Specimen ID”.

### 4-2) Tube Position

Refer to “9.4.3 Specimen ID”.

### 4-3) Sample ID Number

Refer to “9.4.3 Specimen ID”.

### 4-4) Sample Number Attribute

Indicates how the sample number was determined.

“M”: The sample number was manually input.

“A”: The sample number was automatically assigned.

“B”: The sample number was input by means of a barcode label.

“C”: The sample number was assigned by the host computer.

5) 9.4.5 Universal Test ID

5-1) SMEAR

Set this parameter to "SMEAR" (fixed).

5-2) HCT Value

Indicates the HCT test result for the inquired sample.

Set this parameter to an integer of 4 or less digits (unit: 0.1%).

If the data is masked due to an unperformed test or analysis error, set this parameter to "\*\*\*\*\*".

Ex.) "402" (40.2%)

"\*\*\*\*\*" (test is not performed or data is masked)

5-3) WBC Value

Indicates the WBC test result for the inquired sample.

Set this parameter to an integer of 6 or less digits (unit: 10/ $\mu$ L).

If the data is masked due to an unperformed test or analysis error, set this parameter to

"\*\*\*\*\*".

Ex.) "600" (600 x 10/ $\mu$ L)

"\*\*\*\*\*" (test is not performed or data is masked)

5-4) RBC Value

Indicates the RBC test result for the inquired sample.

Set this parameter to an integer of 5 or less digits (unit: 10<sup>4</sup>/ $\mu$ L).

If the data is masked because due to an unperformed test or analysis error, set this parameter to

"\*\*\*\*\*".

Ex.) "500" (500 x 10<sup>4</sup>/ $\mu$ L)

"\*\*\*\*\*" (test is not performed or data is masked)

5-5) Number of Prepared Slides

Indicates the number of slides to be prepared. Set this parameter to one of the following:

"0": Do not prepare slides.

"1": Prepare 1 slide.

"2": Prepare 2 slides.

"3": Prepare 1 slide with default settings.

Note: If this Analysis Order Record is used as the analysis order information and the value "3" (default) is assigned, slides will be prepared according to the settings preset in the SP-10 without reference to any values, except the number of prepared slides, specified for the Universal Test ID, or any values specified for the Comment Text in the Comment Record.

In this case, the word "Host" is displayed in the Order field of the sample list screen.

#### 5-6) Designated Slide Glass (1st)

Transmit one of the following as the slide glass to be used for the 1st slide specified in the analysis order information:

- “0”: Do not specify any slide glass.
- “1”: Use a slide glass in the Slide Cassette 1.
- “2”: Use a slide glass in the Slide Cassette 2.

<With DIA connected> (Domestic Version only)

If the SP-10 is connected to DIA, assign one of the following to send the Analysis Order Record as the analysis order information:

To send the Analysis Order Record as the print information, specify “0”, “1”, or “2” even if the SP-10 is connected to DIA; specifying “A”, “B”, or “C” will result in “HC communication error”.

- “0”: Do not specify any slide cassette. Place the cassette into SP.
- “1”: Use a slide glass in the Slide Cassette 1. Place the cassette into SP.
- “2”: Use a slide glass in the Slide Cassette 2. Place the cassette into SP.
- “A”: Do not specify any slide cassette. Feed out the cassette to DIA.
- “B”: Use a slide glass in the Slide Cassette 1. Feed out the cassette to DIA.
- “C”: Use a slide glass in the Slide Cassette 2. Feed out the cassette to DIA.
- \* When the SP-10, which is not connected to DIA, receives “A”, “B”, or “C”, an HC communication error occurs.

#### 5-7) Designated Slide Glass (2nd)

Transmit one of the following as the slide glass to be used for the 2nd slide for the analysis order information: If the Number of Prepared Slides is set to “1” (1 slide) or “3” (1 slide with the default smear settings), this 2nd slide setting is ignored.

- “0”: Do not specify any slide glass.
- “1”: Use a slide glass in the Slide Cassette 1.
- “2”: Use a slide glass in the Slide Cassette 2.

<With DIA connected> (Domestic Version only)

To send the Analysis Order Record as the analysis order information, assign one of the following if the SP-10 is connected to DIA.

To send the Analysis Order Record as the print information, assign “0”, “1”, or “2” even if the SP-10 is connected to DIA; specifying “A”, “B”, or “C” will result in “HC communication error”.

- “0”: Do not specify any slide cassette. Place the cassette into SP.
- “1”: Use a slide glass in the Slide Cassette 1. Place the cassette into SP.
- “2”: Use a slide glass in the Slide Cassette 2. Place the cassette into SP.
- “A”: Do not specify any slide cassette. Feed out the cassette to DIA.
- “B”: Use a slide glass in the Slide Cassette 1. Feed out the cassette to DIA.
- “C”: Use a slide glass in the Slide Cassette 2. Feed out the cassette to DIA.
- \* If the SP-10 is not connected to DIA, it will generate “HC Communication Error” upon receipt of “A”, “B”, or “C”.

6) 9.4.7 Date and Time

The format is fixed to “YYYYMMDDHHMMSS”, which cannot be changed.

YYYY: Year (4 digits)

MM: Month (2 digits, right-aligned with zero padding)

DD: Day (2 digits, right-aligned with zero padding)

HH: hour (24-hour basis: “00” - “23”) (2 digits, right-aligned with zero padding)

MM: minute (“00” - “59”) (2 digits, right-aligned with zero padding)

SS: second (“00” - “59”) (2 digits, right-aligned with zero padding)

Ex.) “20050101090530” for 9 o’clock 5 minutes 30 seconds, January 1st, 2005

7) 9.4.12 Action Code

Set this parameter to “N”.

8) 9.4.26 Report Type

F: Final result (fixed: the SP-10 always assigns “F”)

Y: No order (use this if there is no order corresponding to the inquiry)

Q: Response to inquiry (use this if there is an order corresponding to the inquiry)

#### 4.3.3.5 Analysis Result Record

[Example of transmission]

- SP-10 -> Host computer

R|1|^^^SMEAR^^^|OK|||||||20041116101000<CR>

- Host computer -> SP-10

Not used

Field No.	Field name	SP-10 ↓ Host computer	Host computer ↓ SP-10	Max. size (byte)	Remarks
10.1.1	Record Type	R	Not used	1	Fixed
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	YYYYMMDDHH MMSS	Not used	14	
10.1.14	Instrument Identification	Not used	Not used	-	

##### 1) 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

## 2) 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.

## 3) 10.1.13 Date/Time Test Completed

The format is fixed to “YYYYMMDDHHMMSS”, which cannot be changed.

YYYY: Year (4 digits)

MM: Month (2 digits, right-aligned with zero padding)

DD: Day (2 digits, right-aligned with zero padding)

HH: hour (24-hour basis: “00” - “23”) (2 digits, right-aligned with zero padding)

MM: minute (“00” - “59”) (2 digits, right-aligned with zero padding)

SS: second (“00” - “59”) (2 digits, right-aligned with zero padding)

Ex.) “20050101090530” for 9 o’clock 5 minutes 30 seconds, January 1st, 2005

#### 4.3.3.6 Comment Record

[Example of transmission]

- SP-10 -> Host computer

C | 1 | | 1 <CR>

- Host computer -> SP-10

C | 1 | | ABCDEFG^123456789012345^20040822^^HIJKLMN^123456789012345^20040822^<CR>

Field No.	Field name	SP-10 ↓ Host computer	Host computer ↓ SP-10	Max. size (byte)	Remarks
11.1.1	Record Type	C	C	1	Fixed
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	Replacement Information	Print Info 1^ Print Info 2^ Print Info 3^ Print Info 4^ Print Info 5^ Print Info 6^ Print Info 7^ Print Info 8	15^ 15^ 15^ 50^ 15^ 15^ 15^ 50	Indicate contents to be printed on slides. Print Info 1 - 4: Applied to 1st slide Print Info 5 - 8: Applied to 2nd slide Note that Print Info 4 and 8 are for 2-dimensional barcode.
11.1.5	Comment Type	Not used	Not used	-	

##### 1) 11.1.1 Record Type

This parameter is set to “C”.

##### 2) 11.1.2 Sequence Number

The Sequence Number is a 4 or less digit number starting 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.

##### 3) 11.1.4 Comment Text

If the Number of Prepared Slides is set to “3” (default) for the Universal Test ID in the Analysis Order Record, a slide will be prepared according to the settings preset in the SP-10 without reference to any values specified for the Universal Test ID except the Number of Prepared Slides.

In this case, the word “Host” is displayed in the Order field of the sample list screen.

##### 3-1) Print Info 1 - 3 and Print Info 5 - 7

If Host order 1, 2, or 3 is selected in the SP-10 print setting screen, the Print Info 1, 2, and 3 are used for printing on the frosted area of the 1st slide.

If two slides are to be prepared, the Print Info 5, 6, and 7 are used for printing on the frosted area of the 2nd slide. Any content less than 15 digits should be left aligned, with extra spaces omitted.

If any item other than Host order 1, 2, or 3 is selected in the SP-10 print setting screen, the values in these fields are ignored and the contents specified in the SP-10 screen will be printed on a slide.

Character codes that can be used are as follows:

Chinese (simplified)	ASCII codes, GB2312
Chinese (traditional)	ASCII codes, Big5
Korean	ASCII codes, KS C 5601 (excluding Chinese character codes 0xCA to 0xFD)
Other	20h to 7Eh of Codepage1252

Print Info 1: Content to be printed in the 1st line on the 1st slide

Print Info 2: Content to be printed in the 2nd line on the 1st slide

Print Info 3: Content to be printed in the 3rd line on the 1st slide

Print Info 5: Content to be printed in the 1st line on the 2nd slide

Print Info 6: Content to be printed in the 2nd line on the 2nd slide

Print Info 7: Content to be printed in the 3rd line on the 2nd slide

The maximum printable length on a slide may be less than 15 digits depending on the print format. For more information, refer to the instruction manual.

### 3-2) Print Info 4 and 8

If the SP-10 is connected to the thermal printer and Type 3 is selected as the print type in the Printer setting screen, values in these fields are effective, enabling a 2-dimensional barcode symbol to be printed on the frosted area of a slide glass.

Any content less than 50 digits should be left aligned, with extra spaces omitted.

If the selected SP-10 print type is other than Type 3, values in these fields are ignored.

If the Number of Prepared Slides is set to "1" (1 slide) or "3" (1 slide with default smear settings), the Print Info 8 is ignored.

Character codes that can be used are as follows:

Chinese (simplified)	ASCII codes, GB2312
Chinese (traditional)	ASCII codes, Big5
Korean	ASCII codes, KS C 5601 (excluding Chinese character codes 0xCA to 0xFD)
Other	20h to 7Eh of Codepage1252

Print Info 4: Content of 2-dimensional barcode to be printed on the 1st slide glass

Print Info 8: Content of 2-dimensional barcode to be printed on the 2nd slide glass

The maximum printable length in the 2-dimensional barcode may be less than 50 digits depending on the print format. For more information, refer to the instruction manual.

### 3-3) Replacement Information

If any consumable has been replaced on the SP-10, one of the following consumable codes is assigned to the 1st record and transmitted to the host computer.

"1": Staining solution 1

"2": Staining solution 2

"3": Buffer

"4": Rinse water

"5": DiluCell CL

"6": Methanol



#### 4.3.3.7 Message Termination Record

[Example of transmission]

- SP-10 -> Host computer

L|1|N<CR>

- Host computer -> SP-10

L|1|N<CR>

Field No.	Field name	SP-10 ↓ Host computer	Host computer ↓ SP-10	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

1) 13.1.1 Record Type

This parameter is set to "L".

2) 13.1.2 Sequence Number

The Sequence Number is a 4 or less digit number starting 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.

3) 13.1.3 Terminator Code

This parameter is set to "N".

## 5 Examples of Communication

### 5.1 Analysis Order Inquiry (SP-10 -> Host computer)

#### 5.1.1 Inquiry about order

SP-10	<ENQ>
Host	<ACK>
SP-10	<STX>1H ¥^&   SP-10^00-12001^SP-1^^^^04303413     E1394-97 200503241 00447<CR> <ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
SP-10	<STX>2Q 1 1^01^1234^B    20050324214154   O  <CR> <ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
SP-10	<STX>3L 1 N<CR><ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
SP-10	<EOT>

#### 5.1.2 Inquiry about print content

SP-10	<ENQ>
Host	<ACK>
SP-10	<STX>1H ¥^&   SP-10^00-12001^SP-1^^^^04303413     E1394-97 200503242 10447<CR> <ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
SP-10	<STX>2Q 1 000000^00^1234^M    20050324214154   P  <CR> <ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
SP-10	<STX>3L 1 N<CR><ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
SP-10	<EOT>

## 5.2 Analysis Order Information (Host computer -> SP-10)

### 5.2.1 Order exists

Host	<ENQ>
SP-10	<ACK>
Host	<STX>1H ¥^&   SP-10^00-12001^SP-1^^^^04303413   E1394-97  20050324210847<CR><ETX><CHK1><CHK2><CR><LF>
SP-10	<ACK>
Host	<STX>2P 1<CR><ETX><CHK1><CHK2><CR><LF>
SP-10	<ACK>
Host	<STX>3O 1 1^01^1234^C  SMEAR^0500^^^2^1^2   20050324210847    N     Q<CR><ETX><CHK1><CHK2><CR><LF>
SP-10	<ACK>
Host	<STX>4C 1  1234^Jim^Brown^1^1234^Jim^Brown^2^^<CR> <ETX><CHK1><CHK2><CR><LF>
SP-10	<ACK>
Host	<STX>5L 1 N<CR><ETX><CHK1><CHK2><CR><LF>
SP-10	<ACK>
Host	<EOT>

### 5.2.2 No order exists

Host	<ENQ>
SP-10	<ACK>
Host	<STX>1H ¥^&   SP-10^00-12001^SP-1^^^^04303413   E1394-97 200503242 10847<CR><ETX><CHK1><CHK2><CR><LF>
SP-10	<ACK>
Host	<STX>2P 1<CR><ETX><CHK1><CHK2><CR><LF>
SP-10	<ACK>
Host	<STX>3O 1 1^01^1234^C  SMEAR^0500^^^2^1^2   20050324210847    N     Y<CR><ETX><CHK1><CHK2><CR><LF>
SP-10	<ACK>
Host	<STX>4C 1<CR><ETX><CHK1><CHK2><CR><LF>
SP-10	<ACK>
Host	<STX>5L 1 N<CR><ETX><CHK1><CHK2><CR><LF>
SP-10	<ACK>
Host	<EOT>

### 5.2.3 Print info

Host	<ENQ>
SP-10	<ACK>
Host	<STX>1H ¥^&   SP-10^00-12001^SP-1^^^^04303413   E1394-97 20050324210847<CR><ETX><CHK1><CHK2><CR><LF>
SP-10	<ACK>
Host	<STX>2P 1<CR><ETX><CHK1><CHK2><CR><LF>
SP-10	<ACK>
Host	<STX>3O 1 000000^00^1234^M  SMEAR^^^^2^1^2  20040617201900    N     Q<CR><ETX><CHK1><CHK2><CR><LF>
SP-10	<ACK>
Host	<STX>4C 1 A234567890^^^^^^<CR><ETX><CHK1><CHK2><CR><LF>
SP-10	<ACK>
Host	<STX>5L 1 N<CR><ETX><CHK1><CHK2><CR><LF>
SP-10	<ACK>
Host	<EOT>

## 5.3 Analysis Results Data (SP-10 -> Host computer)

### 5.3.1 Aspiration result

SP-10	<ENQ>
Host	<ACK>
SP-10	<STX>1H ¥^&   SP-10^00-12001^SP-1^^^^04303413   E1394-97 20050324210747<CR><ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
SP-10	<STX>2P 1<CR><ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
SP-10	<STX>3O 1  1^01^1234^C   20100527191900    N F<CR><ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
SP-10	<STX>4R 1 ^^^^ASP^^^^ OK     20050324210747<CR><ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
SP-10	<STX>5L 1 N<CR><ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
SP-10	<EOT>

### 5.3.2 Smearing result

SP-10	<ENQ>
Host	<ACK>
SP-10	<STX>1H ¥^&   SP-10^00-12001^SP-1^^^^04303413     E1394-97 20050324210747<CR><ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
SP-10	<STX>2P 1<CR><ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
SP-10	<STX>3O 1  1^01^1234^C   20100527191900    N         F<CR><ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
SP-10	<STX>4R 1 ^^^^SMEAR^^^^ OK       20050324210747<CR><ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
SP-10	<STX>5L 1 N<CR><ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
SP-10	<EOT>

### 5.3.3 Staining result

SP-10	<ENQ>
Host	<ACK>
SP-10	<STX>1H ¥^&   SP-10^00-12001^SP-1^^^^04303413     E1394-97 20050324213047<CR><ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
SP-10	<STX>2P 1<CR><ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
SP-10	<STX>3O 1  1^01^1234^C   20100527191900    N         F<CR><ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
SP-10	<STX>4R 1 ^^^^STAIN^^^^ OK       20050324213047<CR><ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
SP-10	<STX>5L 1 N<CR><ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
SP-10	<EOT>

### 5.3.4 Reagent replacement information

SP-10	<ENQ>
Host	<ACK>
SP-10	<STX>1H ¥^&   SP-10^00-12001^SP-1^^^^04303413   E1394-97 20050324210447<CR><ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
SP-10	<STX>2C 1  1<CR><ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
SP-10	<STX>3L 1 N<CR><ETX><CHK1><CHK2><CR><LF>
Host	<ACK>
SP-10	<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 SP-10.

The UTP Category 5 cable is used as a communication cable.

### A.2 Timing of Transmission

Either transmission by every test cycle or batch transmission of stored samples data can be selected via settings on the SP-10.

### A.3 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 SP-10 automatically starts a session before sending the records. Records defined in the presentation layer are only transmitted as shown below.

Example: Inquiry about order

SP-10 -> Host	H ¥^&  SP-10^00-12001^SP-1^^^04303413     E1394-97 20050324100447<CR> Q 1 1^01^1234^B    20050324214154   O  <CR> L 1 N<CR>
Host -> SP-10	H ¥^&  SP-10^00-12001^SP-1^^^04303413     E1394-97 20050324210847<CR> P 1<CR> O 1 1^01^1234^C  SMEAR^0500^^^2^1^2  20050324210847     N       Y<CR> C 1  12345^Jim^Brown^1^12345^Jim^Brown^2^^<CR> L 1 N<CR>

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

- 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 SP-10 automatically starts a session before sending the records. For examples of transmitted messages, refer to “5 Examples of Communication”.

[End of document]