



XT-2000*i*/XT-1800*i*
DPS Format
Data Communication Specifications

Revision 4.0

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SYSMEX CORPORATION

1. Scope

This host interface specification is applied to the TCP/IP communication between DPS or SIS (hereinafter, described as the host computer) and XT-2000*i* or XT-1800*i*.

However, in case of XT-1800*i*, the word XT-2000*i* in the text, tables and figures should be recognized as XT-1800*i*.

2. Revision History

The revision history is listed as from the development of the software.

Revision	Date	Major Contents of Changes
1.0	April 19, 2002	Ver.1.0 • Initial Version
2.0	May 10, 2002	Added the description of XT-1800 <i>i</i>
3.0	June 04, 2004	Corrected errors and added shortage in description. No Specification change. • Added the description of Holland SI Units. • Added the description about the parameters that is not output in North American Specifications. • Added the IP message to the explanation of parameters not be output in case of XT-1800 <i>i</i> . • Deleted the description in the case of the conveyance connection from explanation of Sample ID Number in the Analysis Data Format. • Added the caution in handling patient information for the Patient ID Number in the Analysis Information Format. • Changed the description of Positive (Diff), Positive (Morph) and Positive (Count) in the Analysis Data Format 1. Before the change, the Positive information that the blood cell differential data is abnormal was commonly used for the three cases. After the change, three terms of the blood cell differential data, the blood cell morphology data and the blood cell count data are discriminated, and used for Positive (Diff), Positive (Morph) and Positive (Count), respectively.
4.0	September 05, 2006	Supported XT IG master and XT RET master and added shortage in description. • Added descriptions about the following: (a) XT-2000 <i>i</i> and XT-1800 <i>i</i> (b) XT IG master, XT RET master (c) Digit number of year, North American specifications and Holland SI Units • Added the IG#, IG% and RET-H _e in "Analysis Data Format 2" and "QC Data Format 1". • Added the IG Present in the Flag Data Format.

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1 Terminology

The definition of the terminology used in this document is described in the following:

- 1) Numeric
Indicates ASCII codes '0' (30h) through '9' (39h).
- 2) Alphabet
Indicates ASCII codes 'A' (41h) through 'Z' (5Ah) and 'a' (61h) through 'z' (7Ah).
- 3) Alpha-numeric
Indicates numerical or alphabetical character.

2 Order of Transmission and Reserved Area

The order of transmission is from the top parameter to the bottom in each format table; the most significant digit first and the least significant digit last. Zero suppression is not performed.

The reserved area is not used now and contains all zeros '0'. Please do not check the values in this area because the reserved area may be defined and used in the future.

3 Product and Additional Software

3.1 XT-2000i and XT-1800i

The following parameters will not be output by XT-1800i because RET channel is not installed. Please refer to the operation manual for details of each parameter.

- RET#
- RET%
- HFR
- MFR
- LFR
- IRF
- RBC-O (QC only)
- PLT-O (QC only)
- RBC-X (QC only)
- RBC-Y (QC only)
- d-RBC (QC only)
- d-PLT (QC only)
- Dw/X(QC only)
- Dw/Y(QC only)
- RET Scattergram
- RET-EXT Scattergram
- PLT-O Scattergram
- RET Abnormal Scattergram
- Reticulocytosis
- PLT Abnormal Scattergram

3.2 Additional Software

3.2.1 Upgraded software for hematology analyzer, XT IG master

Installing XT IG master, upgraded software for hematology analyzer, enables to output the following parameters. Please contact your local Sysmex service representative about XT IG master.

- IG#
- IG%
- IG Present

Caution:

- In case of IG# and IG% have enough reliability (without "*"), IG Present will be judged. As a result of this judgement, IG Present will be output when it meets requirements. (In this case, Immature Gran? will not be output.)
- In case of IG# and IG% have not enough reliability (with "*"), Immature Gran? will be judged, because IG Present can not be judged. As a result of this judgment, Immature Gran? will be output when it meets requirements. (In this case, IG Present will not be output.)

3.2.2 Upgraded software for hematology analyzer, XT RET master

Installing XT RET master, upgraded software for hematology analyzer, enables to output the following parameters though it is not applicable to XT-1800i. Please contact your local Sysmex service representative about XT RET master.

- RET-H_e

3.3 XT for North America (NA)

In the North American Specifications, the following parameters in “Analysis Data Format 2” will not be output.

- PDW
- P-LCR
- PCT
- HFR
- MFR
- LFR

3.4 Holland SI Units

In case of the Holland SI Units system is used in XT, the data of HGB, MCH, MCHC and RET-H_e will be sent in following unit system.

Parameter	Holland SI Units
HGB	10 ⁻¹ mmol/L
MCH	amol
MCHC	10 ⁻¹ mmol/L
RET-H _e	amol

4 Analysis Information Inquiry Format

Analysis Information Inquiry Format is sent from XT-2000i to the host computer in the format shown in “Table 1: Analysis Information Inquiry Format” to obtain the analysis sample information.

Terms used in Table 1 are explained in the following:

1) Inquiry Mode

This shows Inquiry Mode.

'1' (Other than '2'): Real-time inquiry with sample ID number as the key word.

'2': Batch inquiry with Rack Number and Tube Position Number as the key words.

2) Inquiry Sample ID No.

This parameter becomes effective in the real-time inquiry with a sample ID number as the key word.

It consists of 15-digit alphanumerical characters, and may include hyphen “-” (2Dh) between characters.

The “-” (2Dh) is counted in the 15-digit characters.

3) Rack No.

This parameter becomes effective in the batch inquiry with a Rack Number and a Tube Position Number as the key words. This is the number for the sample rack and consists of 6 digits.

4) Tube Position Number

This parameter becomes effective in the batch inquiry with a Rack Number and a Tube Position Number as the key words. This indicates an analysis position in a sample rack and is the number between 01 and 10.

Table 1: Analysis Information Inquiry Format

[Inquiry (XT-2000i to HOST), 63 bytes fixed (Including STX and ETX)]

Parameter	Size (byte)	Right-/Left-Aligned	Space-/Zero-Padding	Remarks
STX	1	-	-	(02H)
Text Distinction Code	1	-	-	'R'
Inquiry Mode	1	-	-	'1': Real-time inquiry '2': Batch inquiry
Reserved	3	-	-	"000"
Inquiry Sample ID No.	15	Right-Aligned	Space-Padding	Ex) " A1234567890"
Reserved	2	-	-	"00"
Rack No.	6	Right-Aligned	Zero-Padding	Ex) "000012"
Tube Position Number	2	Right-Aligned	Zero-Padding	Ex) "02"
Reserved	31	-	-	"00...00"
ETX	1	-	-	(03H)
Total	63			

5 Analysis Information Format

Analysis Information Format is sent from the host computer to XT-2000i as a response for the Analysis Information Inquiry. The host computer fills in an appropriate value to the respective position shown in “Table 2: Analysis Information Format 1” and “Table 3: Analysis Information Format 2”, and sends to XT-2000i in the order of Table 2 and then Table 3 in two blocks.

Terms used in Table 2 and Table 3 are explained in the following:

1) Information Status

This parameter indicates if the inquired analysis information is registered. If the required sample is not registered, make sure to return “0” (Not registered) in the analysis information text.

'0': Not registered

'1': Registered

'2': Quality control

2) Date Ordered

This parameter indicates the requested date of analysis of the inquired sample. Return in the “YYYYMMDD” format. (YYYY: Year, MM: Month, DD: Day)

3) Sample ID Number

In the case of real-time inquiry with a sample ID number as the key word, this number should be the same as that in the inquiry text. In the case of batch inquiry with a Rack Number and a Tube Position Number as the key words, the sample ID number corresponding to the specified Rack Number and Tube Position Number should be assigned.

It consists of 15-digit alphanumerical characters, and may include hyphen “-” (2Dh) between characters.

The “-” (2Dh) is counted in the 15-digit characters.

The sample ID number starting with “QC” is reserved for the Quality Control samples. If no quality control sample is to be analyzed, do not assign any number starting with “QC”. For details, refer to the Instructions for Use.

4) Rack Number

In the case of batch inquiry with a Rack Number and a Tube Position Number as the key words, return the same Rack Number that was sent in the Analysis Information Inquiry Format from the XT-2000i.

Also in the case of real-time inquiry with a sample ID number as the key word, return the same Rack Number as in the Analysis Information Inquiry Format.

5) Tube Position Number

In the case of batch inquiry with a Rack Number and a Tube Position Number as the key words, return the same Tube Position Number that was sent in the Analysis Information Inquiry Format from the XT-2000i.

Also in the case of real-time inquiry with a sample ID number as the key word, return the same Tube Position Number as in the Analysis Information Inquiry Format.

6) Inquiry Mode

This shows Inquiry Mode.

'1' (Other than '2'): Real-time inquiry with sample ID number as the key word.

'2': Batch inquiry with Rack Number and Tube Position Number as the key words.

7) Patient ID Number

This parameter is the patient ID for the inquired sample, and is unique to a patient. It consists of 16-digit characters from alphanumerical characters and hyphen "-" (2Dh).

When no patient ID Number is available, enter all spaces (20h).

Note:

When handling the patient information, it is required to assign a unique Patient ID Number for each patient.

8) Patient Name

This is the patient name for sample inquired. For last name (within 20 characters) and first name (within 20 characters), alphanumerical characters can be used.

A space ' ' (20h) is needed between First and Last name as a separator.

When no patient name information is available or PIM (Patient Information Manager) software is not installed, enter all spaces (20h).

Note:

The space between the Family and Given names is included in 40 characters.

For example, when the Family name needs 20 characters, the number of characters used for the Given name is 19 characters or less.

9) Sex

This is the sex of the inquired patient.

When no sex information is available, return "3".

'1': Male

'2': Female

'3': Unknown

10) Date of Birth

This is the date of birth of the inquired patient. Return in "YYYYMMDD" format.

When no date-of-birth information is available, enter all spaces (20h).

YYYY: Year, MM: Month, DD: Day

11) Doctor

This is the name of the doctor in charge, and consists of up to 20 alphanumeric characters.

When no doctor information is available, enter all spaces (20h).

12) Ward (Medical section)

This is the ward (medical section) in which the patient is staying, and consists of up to 20 alphanumeric characters.

When no ward information is available, enter all spaces (20h).

13) Sample Comments

This is the comments for the inquired sample, and consists of up to 40 alphanumeric characters.

When no sample comment is available, enter all spaces (20h).

14) Order Information

This shows the analysis order for each analysis parameter.

'0': Not analyze

'1': Analyze

15) Patient Comments

This is the comments of the patient for the inquired sample, and consists of up to 100 alphanumeric characters.

When no patient comment is available, enter all spaces (20h).

Table 2: Analysis Information Format 1

[Analysis Information Format 1 (HOST to XT-2000i), 255 bytes fixed (Including STX and ETX)]

Parameter	Size (byte)	Right-/Left-Aligned	Space-/Zero-Padding	Remarks
STX	1	-	-	(02H)
Text Distinction Code 1	1	-	-	'S'
Text Distinction Code 2	1	-	-	'1'
Information Status	1	-	-	'0': Not registered '1': Registered '2': Quality control
Date Ordered	8	-	Zero-Padding	YYYYMMDD Format Ex: "20000103" (Jan. 3, 2000)
Reserved	3	-	-	"000"
Sample ID Number	15	Right-Aligned	Space-Padding	Ex: " 1234567890"
Reserved	2	-	-	"00"
Rack Number	6	Right-Aligned	Zero-Padding	Ex: "000012"
Tube Position Number	2	Right-Aligned	Zero-Padding	Ex: "02"
Inquiry Mode	1	-	-	'1': Real-time inquiry '2': Batch inquiry
Patient ID Number	16	Left-Aligned	Space-Padding	Ex: "1234567890A "
Patient Name	40	Left-Aligned	Space-Padding	
Sex	1	-	-	'1': Male '2': Female '3': Unknown
Date of Birth	8	-	Zero-Padding	YYYYMMDD Format Ex: "19800205" (Feb. 5, 1980)
Doctor	20	Left-Aligned	Space-Padding	
Ward (Medical section)	20	Left-Aligned	Space-Padding	
Sample Comments	40	Left-Aligned	Space-Padding	
Reserved	18	-	-	"00...00"
WBC	1	-	-	'1': Analyze, '0': Not Analyze
RBC	1	-	-	'1': Analyze, '0': Not Analyze
HGB	1	-	-	'1': Analyze, '0': Not Analyze
HCT	1	-	-	'1': Analyze, '0': Not Analyze
MCV	1	-	-	'1': Analyze, '0': Not Analyze
MCH	1	-	-	'1': Analyze, '0': Not Analyze
MCHC	1	-	-	'1': Analyze, '0': Not Analyze
PLT	1	-	-	'1': Analyze, '0': Not Analyze
LYMPH%	1	-	-	'1': Analyze, '0': Not Analyze
MONO%	1	-	-	'1': Analyze, '0': Not Analyze
NEUT%	1	-	-	'1': Analyze, '0': Not Analyze
EO%	1	-	-	'1': Analyze, '0': Not Analyze
BASO%	1	-	-	'1': Analyze, '0': Not Analyze
LYMPH#	1	-	-	'1': Analyze, '0': Not Analyze
MONO#	1	-	-	'1': Analyze, '0': Not Analyze
NEUT#	1	-	-	'1': Analyze, '0': Not Analyze
EO#	1	-	-	'1': Analyze, '0': Not Analyze
BASO#	1	-	-	'1': Analyze, '0': Not Analyze
RDW-CV	1	-	-	'1': Analyze, '0': Not Analyze
RDW-SD	1	-	-	'1': Analyze, '0': Not Analyze
PDW	1	-	-	'1': Analyze, '0': Not Analyze
MPV	1	-	-	'1': Analyze, '0': Not Analyze
P-LCR	1	-	-	'1': Analyze, '0': Not Analyze
Reserved	2	-	-	"00"

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RET%	1	-	-	'1': Analyze, '0': Not Analyze *For XT-1800i, '0' shall be set.
RET#	1	-	-	'1': Analyze, '0': Not Analyze *For XT-1800i, '0' shall be set.
IRF	1	-	-	'1': Analyze, '0': Not Analyze *For XT-1800i, '0' shall be set.
LFR	1	-	-	'1': Analyze, '0': Not Analyze *For XT-1800i, '0' shall be set.
MFR	1	-	-	'1': Analyze, '0': Not Analyze *For XT-1800i, '0' shall be set.
HFR	1	-	-	'1': Analyze, '0': Not Analyze *For XT-1800i, '0' shall be set.
Reserved	1	-	-	'0'
PCT	1	-	-	'1': Analyze, '0': Not Analyze
Reserved	1	-	-	'0'
Reserved	1	-	-	'0'
Reserved	15	-	-	"00...00"
ETX	1	-	-	(03H)
Total	255			

Table 3: Analysis Information Format 2

[Analysis Information Format 2 (HOST to XT-2000i), 255 bytes fixed (Including STX and ETX)]

Parameter	Size (byte)	Right-/Left-Aligned	Space-/Zero-Padding	Remarks
STX	1	-	-	(02H)
Text Distinction Code 1	1	-	-	'S'
Text Distinction Code 2	1	-	-	'2'
Information Status	1	-	-	'0': Not registered '1': Registered '2': Quality control
Date Ordered	8	-	Zero-Padding	YYYYMMDD Format Ex: "20010204" (Feb. 4, 2001)
Reserved	3	-	-	"000"
Sample ID Number	15	Right-Aligned	Space-Padding	Ex: "1234567890"
Reserved	2	-	-	"00"
Rack Number	6	Right-Aligned	Zero-Padding	Ex: "000012"
Tube Position Number	2	Right-Aligned	Zero-Padding	Ex: "02"
Inquiry Mode	1	-	-	'1': Real-time inquiry '2': Batch inquiry
Patient ID Number	16	Left-Aligned	Space-Padding	Ex: "1234567890A "
Patient Comments	100	Left-Aligned	Space-Padding	
Reserved	97	-	-	"00...00"
ETX	1	-	-	(03H)
Total	255			

6 Analysis Data Format

The Analysis Data Format is a format to output the analysis results from the XT-2000i to the host computer. The XT-2000i will set an appropriate value to the prescribed position in “Table 4: Analysis Data Format” and output to the host computer.

Terms used in Table 4 are explained in the following:

- 1) Block Number
"01": Fixed. This indicates the block number.
- 2) Total Number of Blocks
"01": Fixed. This indicates the total number of blocks.
- 3) Communication Protocol Version
"0.00": Fixed. This is the communication protocol version number.
- 4) PS Code
"01325318": Fixed for XT-2000i.
"02305316": Fixed for XT-1800i.
- 5) Analyzer Serial Number
This indicates the serial number of the analyzer by which the analysis was run.
- 6) Sequence Number
This indicates the sequence number of the sample analyzed on the same day.
- 7) Analysis Date
This indicates the date of analysis, and is fixed in the format of "YYYYMMDD".
YYYY: Year, MM: Month, DD: Day
- 8) Analysis Time
This indicates the time of analysis, and is fixed in the format of "HHMMSS".
HH: hour (24-hour system: "00" through "23")
MM: minute ("00" through "59")
SS: second ("00" through "59")
- 9) Rack Number
This indicates the rack number used for the analysis.
- 10) Tube Position Number
This indicates the tube position number within the rack.
- 11) Sample ID Number
This sample ID number is right aligned and zero padded.

Table 4: Analysis Data Format

[Analysis Data Format (XT-2000i to HOST), Data size: Variable length of 1,206 to 230,582 bytes, including STX and ETX]

Parameter	Size (byte)	Right-/Left-Aligned	Space-/Zero-Padding	Remarks
STX	1	-	-	(02H)
Text Distinction Code I	1	-	-	'D': Analysis Data
Text Distinction Code II	1	-	-	'I': Image Data
Block Number	2	Right-Aligned	Zero-Padding	"01": Fixed.
Total Number of Blocks	2	Right-Aligned	Zero-Padding	"01": Fixed.
Communication Protocol Version	4	-	-	"0.00": Fixed.
Analyzer Model	7	-	-	"XT-2000i": Fixed. "XT-1800i": Fixed for XT-1800i.
Caret	1	-	-	'^'
PS Code	8	-	-	"01325318" (XT-2000i) "02305316" (XT-1800i)
Caret	1	-	-	'^'
Analyzer Serial Number	5	-	-	"XXXXX": Unique serial number of the analyzer.
Sequence Number	10	Right-Aligned	Zero-Padding	Right aligned and zero padded. "0000000001" to "9999999999"
Analysis Date	8	-	Zero-Padding	YYYYMMDD: Date of analysis Ex: "20000101" (Jan. 1, 2000)
Analysis Time	6	-	Zero-Padding	HHMMSS: Time of analysis Ex: "230503" (23:05:03)
Rack Number	6	Right-Aligned	Zero-Padding	Ex: "000012"
Tube Position Number	2	Right-Aligned	Zero-Padding	Ex: "02"
Sample ID Number	15	Right-Aligned	Zero-Padding	This consists of alphanumeric characters and hyphen ("-") 2Dh)
Separator	2	-	-	"[CR][LF]" (0DH, 0AH)
Analysis Data D1U	132	-	-	See "6.1: Analysis Data Format 1".
Separator	2	-	-	"[CR][LF]" (0DH, 0AH)
Analysis Data D2U	216	-	-	See "6.2: Analysis Data Format 2".
Separator	2	-	-	"[CR][LF]" (0DH, 0AH)
Flag Data DBU	106	-	-	See "6.3: Flag Data Format".
Separator	2	-	-	"[CR][LF]" (0DH, 0AH)
Histogram Data D3U (RBC)	241	-	-	See "6.4: Distribution Data Format".
Separator	2	-	-	"[CR][LF]" (0DH, 0AH)
Histogram Data D4U (PLT)	201	-	-	See "6.4: Distribution Data Format".
Separator	2	-	-	"[CR][LF]" (0DH, 0AH)
Scattergram Data D1G (DIFF)	29 to 32,797	-	-	See "6.5: Scattergram Text Data Format".
Separator	2	-	-	"[CR][LF]" (0DH, 0AH)
Scattergram Data D2G (BASO)	29 to 32,797	-	-	See "6.5: Scattergram Text Data Format".
Separator	2	-	-	"[CR][LF]" (0DH, 0AH)
Scattergram Data D3G (IMI)	29 to 32,797	-	-	This is output to keep compatibility with XE-2100 though XT-2000i/XT-1800i has no IMI channel. See "6.5: Scattergram Text Data Format".

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Separator	2	-	-	"[CR][LF]" (0DH, 0AH)
Scattergram Data D4G (RET)	29 to 32,797	-	-	This is output to keep compatibility with XE-2100 though XT-1800i have no RET channel. See "6.5: Scattergram Text Data Format".
Separator	2	-	-	"[CR][LF]" (0DH, 0AH)
Scattergram Data D5G (PLT-O)	29 to 32,797	-	-	This is output to keep compatibility with XE-2100 though XT-1800i have no RET channel. See "6.5: Scattergram Text Data Format".
Separator	2	-	-	"[CR][LF]" (0DH, 0AH)
Scattergram Data D6G (RET-EXT)	29 to 32,797	-	-	This is output to keep compatibility with XE-2100 though XT-1800i have no RET channel. See "6.5: Scattergram Text Data Format".
Separator	2	-	-	"[CR][LF]" (0DH, 0AH)
Scattergram Data D7G (NRBC)	29 to 32,797	-	-	This is output to keep compatibility with XE-2100 though XT-2000i/XT-1800i has no NRBC channel. See "6.5: Scattergram Text Data Format".
Separator	2	-	-	"[CR][LF]" (0DH, 0AH)
ETX	1	-	-	(03H)
Total	1,206 to 230,582			

6.1 Analysis Data Format 1

Analysis Data Format 1 is described in "Table 5: Analysis Data Format 1".
Terms used in Table 5 are explained in the following:

- 1) Data Length
This is the data size on and after the Sample Number Attribute.
"000122": Fixed.
- 2) Sample No. Attribute
This indicates where and how the sample number was obtained.
'2': Sample number was automatically assigned due to the ID Bar Code Read Error.
'4': Sample number was read by the ID Bar Code Reader.
'0': Other than those above
- 3) Analysis Mode
This indicates the analysis mode.
'1': Manual mode
'2': Sampler mode
'3': Closed mode
'4': Capillary mode
- 4) Patient ID
This indicates the patient ID that is unique to the patient and is consisted of 16 alphanumeric characters including a hyphen "-" (2Dh).
When there is no patient ID available, all spaces (" " 20h) are output.
- 5) Analysis Information
This indicates the analysis status of the sample.
'0': Analyzed without any error
'1': Analyzed with an error
- 6) Sample Judgment Information
This indicates the sample judgment information whether re-analysis of the sample is required.
'0': Negative
'1': Positive
'2': Error
'3': Positive+Error
'Q': QC sample
- 7) Positive (Diff), Positive (Morph), Positive (Count)
Each term indicates whether the blood cell differential data, the blood cell morphology data or the blood cell count data is abnormal or not, respectively.
'0': Normal,
'1': Abnormal

- 8) Error (Func)
 '1': Analysis error other than the ID bar code read error occurred.
 '0': No analysis error occurred.
- 9) Error (Result)
 '1': When one of analysis errors of "Sample Aspiration Error", "Short Sample Error" and "Sample Value Low" occurred.
 '0': No analysis error occurred.
- 10) Order Information
 This indicates whether an analysis order was placed when analyzing the sample.
 '0': Analyzed without an order
 '1': Analyzed by an order
- 11) IP Message (WBC Abnormal), (WBC Suspect), (RBC Abnormal), (RBC Suspect), (PLT Abnormal), (PLT Suspect)
 This indicates whether the sample is flagged with some IP messages.
 '0': No IP message
 '1': With some IP messages
- 12) Units Information
 This indicates whether the Holland SI Units system is used.
 '1': Holland SI units is used
 '0': Other units than Holland SI is used
- 13) PLT Information
 '1': When the PLT value is analyzed in the optical system
 '0': When the PLT value is analyzed in the electric resistance method.
 * When the PLT value is not analyzed in the optical system, it is analyzed in the electric resistance method.
 However, output is always '0' in the case of XT-1800i.

Table 5: Analysis Data Format 1

[Analysis Data Format 1 (XT-2000i to HOST), 132 bytes fixed]

Parameter	Size (byte)	Right-/Left-Aligned	Space-/Zero-Padding	Remarks
Text Distinction Code 1	1	-	-	'D'
Text Distinction Code 2	1	-	-	'1'
Sample Distinction Code	1	-	-	'U'
Data Length	6	Right-Aligned	Zero-Padding	This is the data size on and after the Sample Number Attribute. (= "000122": Fixed)
Reserved	1	-	-	'0'
Sample No. Attribute	1	-	-	'2': Sample number was automatically assigned due to the ID Bar Code Read Error. '4': Sample number was read by the ID Bar Code Reader. '0': Other than those above
Analysis Mode	1	-	-	'1': Manual mode '2': Sampler mode '3': Closed mode '4': Capillary mode
Patient ID	16	Left- Aligned	Space-Padding	Ex: "1234567890A "
Analysis Information	1	-	-	The analysis status of the sample '0': Analyzed without any error '1': Analyzed with an error
Sample Judgment Information	1	-	-	'0': Negative '1': Positive '2': Error '3': Positive+Error 'Q': QC sample
Positive (Diff)	1	-	-	'0': Normal, '1': Abnormal
Positive (Morph)	1	-	-	'0': Normal, '1': Abnormal
Positive (Count)	1	-	-	'0': Normal, '1': Abnormal
Error (Func)	1	-	-	'1': Analysis error other than the ID bar code read error occurred. '0': No analysis error occurred.
Error (Result)	1	-	-	'1': When one of analysis errors of "Sample Aspiration Error", "Short Sample Error" and "Sample Value Low" occurred. '0': No analysis error occurred.
Order Information	1	-	-	'0': Analyzed without an order '1': Analyzed by an order
IP Message (WBC Abnormal)	1	-	-	'0': No IP message '1': Some IP messages
IP Message (WBC Suspect)	1	-	-	'0': No IP message '1': Some IP messages
IP Message (RBC Abnormal)	1	-	-	'0': No IP message '1': Some IP messages
IP Message (RBC Suspect)	1	-	-	'0': No IP message '1': Some IP messages
IP Message (PLT Abnormal)	1	-	-	'0': No IP message '1': Some IP messages
IP Message (PLT Suspect)	1	-	-	'0': No IP message '1': Some IP messages
Units Information	1	-	-	'0': Other units than Holland SI is used '1': Holland SI units is used
Reserved	1	-	-	'0'
PLT Information	1	-	-	'1': Analyzed in the optical system '0': Analyzed in the electric resistance method * Fixed to '0' for XT-1800i
Reserved	87	-	-	"00...00"
Total	132			

6.2 Analysis Data Format 2

Analysis Data Format 2 is described in “Table 6: Analysis Data Format 2”.

Terms used in Table 6 are explained in the following:

1) Data Length

This is the data size on and after the WBC.

"000206": Fixed

2) Construction of Numerical Value and Flag

The numerical value is constructed as follows.

Most significant digit → Least significant digit

XXXXF

X: Data value

F: Flag

The data value is assigned in the most significant 4 digits (or the most significant 5 digits, when the total data size is 6 digits). And the Flag is assigned in the least significant 1 digit.

The numerical value displayed on the screen is converted to the units shown in the remarks column in “Table 6: Analysis Data Format 2” to eliminate decimal point, and is output as a character string with right-aligned and zero-padding. Therefore, it is necessary to convert and add the decimal point specified for each parameter at the host computer.

The flag indicates the additional information to the numerical value, as shown below.

'0': Normal

'1': Data is greater than the Upper Patient Mark Limit.

'2': Data is less than the Lower Patient Mark Limit.

'3': Data is out of linearity limit.

'4': Data is less reliable according to the flagging.

When the numerical value is displayed with "----", the data is output in the form of "*0000" or "*00000". If the parameter is not ordered, such a parameter data is output with " " (all spaces). In this case, zero padding will not be performed.

Table 6: Analysis Data Format 2

[Analysis Data Format 2 (XT-2000i to HOST), 216 bytes fixed]

Parameter	Size (byte)	Right-/Left-Aligned	Space-/Zero-Padding	Remarks
Text Distinction Code 1	1	-	-	'D'
Text Distinction Code 2	1	-	-	'2'
Sample Distinction Code	1	-	-	'U'
Data Length	6	Right- Aligned	Zero-Padding	This is the data size on and after the WBC. ("000206": Fixed)
Reserved	1	-	-	'0'
WBC	6	Right- Aligned (*1)	Zero-Padding	Output data: 10/ μ L
RBC	5	Right- Aligned (*1)	Zero-Padding	Output data: 10 ⁴ / μ L
HGB	5	Right- Aligned (*1)	Zero-Padding	Output data: g/L, or in case of Holland SI [10 ⁻¹ mmol/L]
HCT	5	Right- Aligned (*1)	Zero-Padding	Output data: 10 ⁻¹ %
MCV	5	Right- Aligned (*1)	Zero-Padding	Output data: 10 ⁻¹ fL
MCH	5	Right- Aligned (*1)	Zero-Padding	Output data: 10 ⁻¹ pg, or in case of Holland SI [amol]
MCHC	5	Right- Aligned (*1)	Zero-Padding	Output data: g/L, or in case of Holland SI [10 ⁻¹ mmol/L]
PLT	5	Right- Aligned (*1)	Zero-Padding	Output data: 10 ³ / μ L
LYMPH%	5	Right- Aligned (*1)	Zero-Padding	Output data: 10 ⁻¹ %
MONO%	5	Right- Aligned (*1)	Zero-Padding	Output data: 10 ⁻¹ %
NEUT%	5	Right- Aligned (*1)	Zero-Padding	Output data: 10 ⁻¹ %
EO%	5	Right- Aligned (*1)	Zero-Padding	Output data: 10 ⁻¹ %
BASO%	5	Right- Aligned (*1)	Zero-Padding	Output data: 10 ⁻¹ %
LYMPH#	6	Right- Aligned (*1)	Zero-Padding	Output data: 10/ μ L
MONO#	6	Right- Aligned (*1)	Zero-Padding	Output data: 10/ μ L
NEUT#	6	Right- Aligned (*1)	Zero-Padding	Output data: 10/ μ L
EO#	6	Right- Aligned (*1)	Zero-Padding	Output data: 10/ μ L
BASO#	6	Right- Aligned (*1)	Zero-Padding	Output data: 10/ μ L
RDW-CV	5	Right- Aligned (*1)	Zero-Padding	Output data: 10 ⁻¹ %
RDW-SD	5	Right- Aligned (*1)	Zero-Padding	Output data: 10 ⁻¹ fL
PDW	5	Right- Aligned (*1)	Zero-Padding	Output data: 10 ⁻¹ fL In the North American specifications, this parameter is not output. (Fixed to "00000" or " " depending on the setting.)
MPV	5	Right- Aligned (*1)	Zero-Padding	Output data: 10 ⁻¹ fL
P-LCR	5	Right- Aligned (*1)	Zero-Padding	Output data: 10 ⁻¹ % In the North American specifications, this parameter is not output. (Fixed to "00000" or " " depending on the setting.)
RET%	5	Right- Aligned (*1)	Zero-Padding	Output data: 10 ⁻² % For XT-1800i, output as Reserved. (Fixed to "00000" or " " depending on the setting.)
RET#	5	Right- Aligned (*1)	Zero-Padding	Output data: 10 ² / μ L For XT-1800i, output as Reserved. (Fixed to "00000" or " " depending on the setting.)
IRF	5	Right- Aligned (*1)	Zero-Padding	Output data: 10 ⁻¹ % For XT-1800i, output as Reserved. (Fixed to "00000" or " " depending on the setting.)

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LFR	5	Right- Aligned (*1)	Zero-Padding	Output data: 10 ⁻¹ % In the North American specifications, this parameter is not output. (Fixed to "00000" or " " depending on the setting.) For XT-1800i, output as Reserved. (Fixed to "00000" or " " depending on the setting.)
MFR	5	Right- Aligned (*1)	Zero-Padding	Output data: 10 ⁻¹ % In the North American specifications, this parameter is not output. (Fixed to "00000" or " " depending on the setting.) For XT-1800i, output as Reserved. (Fixed to "00000" or " " depending on the setting.)
HFR	5	Right- Aligned (*1)	Zero-Padding	Output data: 10 ⁻¹ % In the North American specifications, this parameter is not output. (Fixed to "00000" or " " depending on the setting.) For XT-1800i, output as Reserved. (Fixed to "00000" or " " depending on the setting.)
PCT	5	Right- Aligned (*1)	Zero-Padding	Output data: 10 ⁻² % In the North American specifications, this parameter is not output. (Fixed to "00000" or " " depending on the setting.)
Reserved	6	-	-	Fixed to "000000" or " " depending on the setting.
Reserved	6	-	-	Fixed to "000000" or " " depending on the setting.
IG#	6	Right- Aligned (*1)	Zero-Padding	Output data: 10/ μ L, or " " (all spaces) when XT IG master is not installed, or is not ordered in NEUT# or NEUT%.
IG%	5	Right- Aligned (*1)	Zero-Padding	Output data: 10 ⁻¹ %, or " " (all spaces) when XT IG master is not installed, or is not ordered in NEUT# or NEUT%.
Reserved	6	-	-	Fixed to "000000" or " " depending on the setting.
RET-H _e	5	Right- Aligned (*1)	Zero-Padding	Output data: 10 ⁻¹ pg, or in case of Holland SI [amol] For XT-1800i, output as Reserved. (Fixed to "00000" or " " depending on the setting.), or " " (all spaces) when XT RET master is not installed in XT-2000i, or is not ordered in RET#, RET%, LFR, MFR, HFR or IRF.
Reserved	5	-	-	Fixed to "00000" or " " depending on the setting.
Reserved	11	-	-	"00...00"
Total	216			

(*1): See "6.2, 2) Construction of Numerical Value and Flag".

6.3 Flag Data Format

Flag Data Format is described in “Table 7: Flag Data Format”.

Terms used in Table 7 are explained in the following:

1) Data Length

This is the data size on and after the WBC Abn Scattergram.

"000096": Fixed.

2) Abnormal and Suspect Flag

This indicates whether each Abnormal and Suspect is flagged or not.

'0': Not flagged.

'1': Flagged.

Table 7: Flag Data Format

[Flag Data Format (XT-2000i to HOST), 106 bytes fixed]

Parameter		Size (byte)	Remarks
Text Distinction Code 1		1	'D'
Text Distinction Code 2		1	'B'
Sample Distinction Code		1	'U'
Data Length		6	This is the data size on and after the WBC Abn Scattergram. ("000096": Fixed)
Reserved		1	'0'
WBC Abnormal (16 bytes)	WBC Abn Scattergram	1	'0': Not flagged, '1': Flagged
	Neutropenia	1	'0': Not flagged, '1': Flagged
	Neutrophilia	1	'0': Not flagged, '1': Flagged
	Lymphopenia	1	'0': Not flagged, '1': Flagged
	Lymphcytosis	1	'0': Not flagged, '1': Flagged
	Leukocytosis	1	'0': Not flagged, '1': Flagged
	Monocytosis	1	'0': Not flagged, '1': Flagged
	Eosinophilia	1	'0': Not flagged, '1': Flagged
	Basophilia	1	'0': Not flagged, '1': Flagged
	Leukocytopenia	1	'0': Not flagged, '1': Flagged
	Reserved	1	'0'
	Reserved	1	'0'
	Reserved	1	'0'
	Reserved	1	'0'
	IG Present	1	'0': Not flagged, '1': Flagged *Fixed to '0', if XT IG master is not installed.
	Reserved	1	'0'
WBC Suspect (16 bytes)	Blasts ?	1	'0': Not flagged, '1': Flagged
	Immature Gran ?	1	'0': Not flagged, '1': Flagged
	Left Shift ?	1	'0': Not flagged, '1': Flagged
	Reserved	1	'0'
	NRBC ?	1	'0': Not flagged, '1': Flagged
	Reserved	1	'0'
	Reserved	1	'0'
	Atypical Lympho ?	1	'0': Not flagged, '1': Flagged
	RBC Lyse Resistance ?	1	'0': Not flagged, '1': Flagged
	Abn Lympho/Blasts ?	1	'0': Not flagged, '1': Flagged
	Reserved	1	'0'
	Reserved	1	'0'
	Reserved	1	'0'
	Reserved	1	'0'
	Reserved	1	'0'
	Reserved	1	'0'
RBC Abnormal (16 bytes)	RBC Abn Distribution	1	'0': Not flagged, '1': Flagged
	Dimorphic Population	1	'0': Not flagged, '1': Flagged
	Anisocytosis	1	'0': Not flagged, '1': Flagged
	Microcytosis	1	'0': Not flagged, '1': Flagged
	Macrocytosis	1	'0': Not flagged, '1': Flagged
	Hypochromia	1	'0': Not flagged, '1': Flagged
	Anemia	1	'0': Not flagged, '1': Flagged
	Erythrocytosis	1	'0': Not flagged, '1': Flagged
	RET Abn Scattergram	1	'0': Not flagged, '1': Flagged *Fixed to '0' for XT-1800i
	Reticulocytosis	1	'0': Not flagged, '1': Flagged *Fixed to '0' for XT-1800i
	Reserved	1	'0'
	Reserved	1	'0'

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	Reserved	1	'0'
	Reserved	1	'0'
	Reserved	1	'0'
	Reserved	1	'0'
	Reserved	1	'0'
RBC Suspect (16 bytes)	RBC Agglutination ?	1	'0': Not flagged, '1': Flagged
	Turbidity/HGB Interf ?	1	'0': Not flagged, '1': Flagged
	Iron Deficiency ?	1	'0': Not flagged, '1': Flagged
	HGB Defect ?	1	'0': Not flagged, '1': Flagged
	Reserved	1	'0'
	Fragments ?	1	'0': Not flagged, '1': Flagged
	Reserved	1	'0'
	Reserved	1	'0'
	Reserved	1	'0'
	Reserved	1	'0'
	Reserved	1	'0'
	Reserved	1	'0'
	Reserved	1	'0'
	Reserved	1	'0'
	Reserved	1	'0'
	Reserved	1	'0'
	Reserved	1	'0'
PLT Abnormal (16 bytes)	PLT Abn Distribution	1	'0': Not flagged, '1': Flagged
	Thrombocytopenia	1	'0': Not flagged, '1': Flagged
	Thrombocytosis	1	'0': Not flagged, '1': Flagged
	PLT Abn Scattergram	1	'0': Not flagged, '1': Flagged *Fixed to '0' for XT-1800i
	Reserved	1	'0'
	Reserved	1	'0'
	Reserved	1	'0'
	Reserved	1	'0'
	Reserved	1	'0'
	Reserved	1	'0'
	Reserved	1	'0'
	Reserved	1	'0'
	Reserved	1	'0'
	Reserved	1	'0'
	Reserved	1	'0'
	Reserved	1	'0'
	Reserved	1	'0'
PLT Suspect (16 bytes)	Reserved	1	'0'
	Reserved	1	'0'
	PLT Clumps ?	1	'0': Not flagged, '1': Flagged
	Reserved	1	'0'
	PLT Clumps(S)?	1	'0': Not flagged, '1': Flagged
	Reserved	1	'0'
	Reserved	1	'0'
	Reserved	1	'0'
	Reserved	1	'0'
	Reserved	1	'0'
	Reserved	1	'0'
	Reserved	1	'0'
	Reserved	1	'0'
	Reserved	1	'0'
	Reserved	1	'0'
	Reserved	1	'0'
	Reserved	1	'0'
Total		106	

6.4 Distribution Data Format

Distribution Data Format is described in “Table 8: RBC Distribution Data Format” and “Table 9: PLT Distribution Data Format”.

Terms used in Table 8 and Table 9 are explained in the following:

- 1) **Parameter Name**
This indicates the parameter name for the distribution curve data.
- 2) **X-axis Data Size**
This indicates the number of data in the x-axis (horizontal).
For example, “050” indicates there are 50 bins and data is set in each of “DISCRI 1” through “DISCRI 50”. In the same way, “040” indicates there are 40 bins and data is set in each of “DISCRI 1” through “DISCRI 40”.
- 3) **Y-axis Data Size**
This indicates the maximum value that is set for the Y-axis (vertical).
In other words, this indicates the maximum data set for each of “DISCRI 1” through “DISCRI 50”, or “DISCRI 1” through “DISCRI 40”.
- 4) **Data Length**
This is the data size on and after “LOWER DISCRI”.
- 5) **LOWER DISCRI, UPPER DISCRI**
This indicates the lower/upper discriminator position. For example, when the value for “LOWER DISCRI” is 5, the lower discrete position is the position of “DISCRI 5”.
- 6) **Ratio**
This indicates the ratio to normalize. The distribution curve data is obtained by multiplying the ratio by each data in “DISCRI 1” through “DISCRI 50”, or “DISCRI 1” through “DISCRI 40”.
- 7) **“DISCRI 1” through “DISCRI 50”, and “DISCRI 1” through “DISCRI 40”**
This indicates the bin value to be plotted to obtain the distribution curve from the left side in serial.

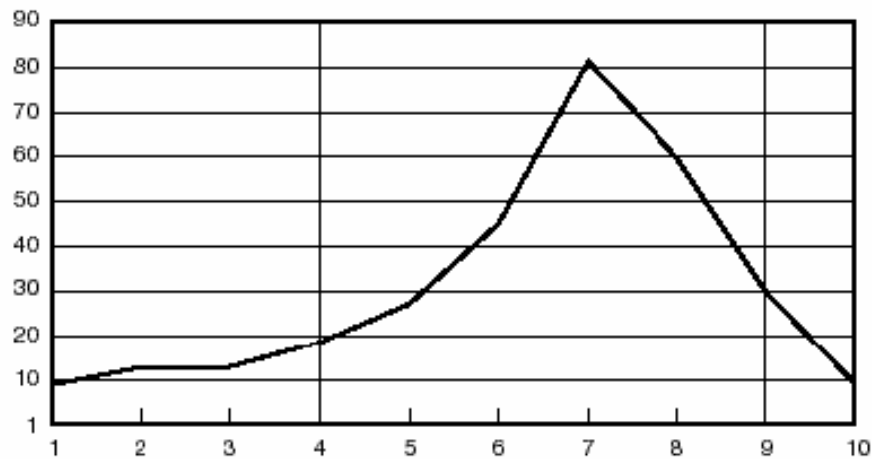
Example:

X-axis Data Size = 10
Y-axis Data Size = 255
LOWER DISCRI = 4
UPPER DISCRI = 9
Ratio = 3
DISCRI 1 = 3
DISCRI 2 = 4
DISCRI 3 = 4
DISCRI 4 = 6
DISCRI 5 = 9
DISCRI 6 = 15
DISCRI 7 = 27
DISCRI 8 = 20
DISCRI 9 = 10
DISCRI 10 = 3

Since the Ratio is 3, the distribution curve data at each Discri position will become as follows.

Curve data: 9, 12, 12, 18, 27, 45, 81, 60, 30, 9

Therefore, the line graph created will be shown below:



Note that this graph is a conceptual and explanatory drawing to show how the distribution curve will be generated.

XT-2000i will not display the scales and graduations in X- and Y-axes.

Figure 1: Distribution Curve

Table 8: RBC Distribution Data Format

[RBC Distribution Data Format (XT-2000i to HOST), 241 bytes fixed]

Parameter	Size (byte)	Right-/Left-Aligned	Space-/Zero-Padding	Remarks
Text Distinction Code 1	1	-	-	'D'
Text Distinction Code 2	1	-	-	'3'
Sample Distinction Code	1	-	-	'U'
Data Format	3	Right-Aligned	Space-Padding	" SE"
Parameter Name	10	-	-	"RBC DISCRI"
X-axis Data Size	3	Right-Aligned	Zero-Padding	"050"
Y-axis Data Size	3	Right-Aligned	Zero-Padding	"255"
Data Length	6	Right-Aligned	Zero-Padding	This is the data size on and after "LOWER DISCRI". ("000212": Fixed)
Reserved	1	-	-	'0'
LOWER DISCRI	4	Right-Aligned	Zero-Padding	
UPPER DISCRI	4	Right-Aligned	Zero-Padding	
Ratio	4	Right-Aligned	Zero-Padding	
DISCRI 1	4	Right-Aligned	Zero-Padding	
DISCRI 2	4	Right-Aligned	Zero-Padding	
:	184	Right-Aligned	Zero-Padding	4×46
DISCRI 49	4	Right-Aligned	Zero-Padding	
DISCRI 50	4	Right-Aligned	Zero-Padding	
Total	241			

Table 9: PLT Distribution Data Format

[PLT Distribution Data Format (XT-2000i to HOST), 201 bytes fixed]

Parameter	Size (byte)	Right-/Left-Aligned	Space-/Zero-Padding	Remarks
Text Distinction Code 1	1	-	-	'D'
Text Distinction Code 2	1	-	-	'4'
Sample Distinction Code	1	-	-	'U'
Data Format	3	Right-Aligned	Space-Padding	" SE"
Parameter Name	10	-	-	"PLT DISCRI"
X-axis Data Size	3	Right-Aligned	Zero-Padding	"040"
Y-axis Data Size	3	Right-Aligned	Zero-Padding	"255"
Data Length	6	Right-Aligned	Zero-Padding	This is the data size on and after "LOWER DISCRI". ("000172": Fixed)
Reserved	1	-	-	'0'
LOWER DISCRI	4	Right-Aligned	Zero-Padding	
UPPER DISCRI	4	Right-Aligned	Zero-Padding	
Ratio	4	Right-Aligned	Zero-Padding	
DISCRI 1	4	Right-Aligned	Zero-Padding	
DISCRI 2	4	Right-Aligned	Zero-Padding	
:	144	Right-Aligned	Zero-Padding	4×36
DISCRI 39	4	Right-Aligned	Zero-Padding	
DISCRI 40	4	Right-Aligned	Zero-Padding	
Total	201			

6.5 Scattergram Text Data Format

Scattergram Text Data Format is described in “Table 10: Scattergram Text Data Format”.

Ordinarily the Scattergram Data is compressed. (Regarding the de-compression procedures and the details of the Scattergram Data, refer to “Appendix A: De-compression Procedures of the Scattergram Data”.)

Terms used in Table 10 are explained in the following:

1) Text Distinction Code

This indicates the parameter for the scattergram.

"D1G": DIFF

"D2G": BASO

"D3G": IMI (is output to keep compatibility with XE-2100)

"D4G": RET

"D5G": PLT-O

"D6G": RET-EXT

"D7G": NRBC (is output to keep compatibility with XE-2100)

2) Parameter Name

This indicates the name for the scattergram.

"DIFF SCAT ": DIFF

"BASO SCAT ": BASO

"IMI SCAT ": IMI (is output to keep compatibility with XE-2100)

"RET SCAT ": RET

"PLT-O SCAT": PLT-O

"RET-E SCAT": RET-EXT

"NRBC SCAT ": NRBC (is output to keep compatibility with XE-2100)

3) X-axis/ Y-axis Data Size

This indicates the number of bins in X-axis (horizontal)/ Y-axis (vertical).

4) Data Length

This is the data size of the scattergram data, is filled in the right-aligned and zero-padding.

If there is no scattergram data, this data length will be “000000”.

This value is variable length as “000000” to “032768”.

5) Scattergram Compression Information

This indicates whether compression (Run-Length compression or Huffman coding) of the scattergram is used. Regarding the de-compression procedures, refer to “Appendix A: De-compression Procedures of the Scattergram Data”

"0": Not compressed

"1": Compressed

6) Scattergram Data

This is the ASCII data to which the original scattergram data is compressed and converted. Regarding the conversion procedures, refer to “Appendix A: De-compression Procedures of the Scattergram Data”. If there is no scattergram data, this data length will be “0”.

Table 10: Scattergram Text Data Format

[Scattergram Text Data Format (XT-2000i to HOST), Data size: Variable length of 29 to 32,797 bytes]

Parameter	Size (byte)	Right-/Left-Aligned	Space-/Zero-Padding	Remarks
Text Distinction Code	3	-	-	"D1G": DIFF "D2G": BASO "D3G": IMI "D4G": RET "D5G": PLT-O "D6G": RET-EXT "D7G": NRBC
Data Format	3	Right-Aligned	Space-Padding	"SE"
Parameter Name	10	Left-Aligned	Space-Padding	"DIFF SCAT " "BASO SCAT " "IMI SCAT " "RET SCAT " "PLT-O SCAT" "RET-E SCAT" "NRBC SCAT "
X-axis Data Size	3	-	-	"128"
Y-axis Data Size	3	-	-	"128"
Data Length	6	Right-Aligned	Zero-Padding	This is the data size of the scattergram data. ("000000" to "032768") If there is no scattergram data, or Text Distinction Code is set "D3G" or "D7G", this data length will be also "000000". *For XT-1800i, this data length will be also "000000" if Text Distinction Code is set "D4G", "D5G" or "D6G".
Scattergram Compression Information	1	-	-	'0': Not compressed '1': Compressed If Text Distinction Code is set "D3G" or "D7G", this will be '0'. *For XT-1800i, this will be also '0' if Text Distinction Code is set "D4G", "D5G" or "D6G".
Scattergram Data	0 to 32,768	-	-	If there is no scattergram data, or Text Distinction Code is set "D3G" or "D7G", this data length will be 0 byte (no output). *For XT-1800i, this data length will be also 0 byte (no output) if Text Distinction Code is set "D4G", "D5G" or "D6G". *32,768 (=2×16,384)
Total	29 to 32,797			

7 QC Data Format

QC Data Format is to send the QC data from XT-2000i to the host computer. XT-2000i fills in an appropriate value to the respective position shown in “Table 11: QC Data Format 1” and “Table 12: QC Data Format 2”, and sends these to the host computer in the order of Table 11 and then Table 12 in two blocks.

Terms used in Table 11 and Table 12 are explained in the following:

- 1) QC Number
This indicates the corresponding to the QC file number, as shown in “Table 13: QC Number Corresponding to QC file number”.
- 2) Analysis Date
This indicates the date of analysis, and is fixed in the format of “YYYYMMDD”.
YYYY: Year, MM: Month, DD: Day
- 3) Analysis Time
This indicates the time of analysis, and is fixed in the format of “HHMM”.
HH: hour (24-hour system: “00” through “23”), MM: minute (“00” through “59”)
- 4) Instrument Serial No.
This is the unique serial number of the analyzer main unit.
- 5) Numerical Data Value
The numerical value displayed on the screen is converted to the units shown in the remarks column in the Table 11 and Table 12 to eliminate decimal point, and is output as a character string with right-aligned and zero-padding. Therefore, it is necessary to convert and add the decimal point specified for each parameter at the host computer.
When the numerical value is displayed with “----”, the data is output in the form of “0000” or “00000”. If the parameter is not ordered, such a parameter data is output with “ ” (all spaces). In this case, zero padding will not be performed.

Table 11: QC Data Format 1

[QC Data Format 1 (XT-2000i to HOST), 255 bytes fixed, including STX and ETX]

Parameter	Size (byte)	Right-/Left-Aligned	Space-/Zero-Padding	Remarks
STX	1	-	-	(02H)
Text Distinction Code 1	1	-	-	'D'
Text Distinction Code 2	1	-	-	'1'
Sample Distinction Code	1	-	-	'C'
QC Number	1	-	-	'1'~'9', 'A'~'F', 'a'~'e', 'M' This indicates the correspondence to the QC file number, as shown in "Table 13: QC Number Corresponding to QC file number".
Analysis Date	8	-	Zero-Padding	"YYYYMMDD" fixed format. Ex: "20060103" means 3 rd of January, 2006.
Analysis Time	4	-	Zero-Padding	"HHMM" fixed format. Ex: "2305" means 23:05
Instrument Model	10	Right-Aligned	Space-Padding	" XT-2000" For XT-1800i, this Instrument Model will be " XT-1800".
Caret	1	-	-	'^'
Instrument Serial No.	5	-	-	XXXXX: This is the unique serial number of the analyzer main unit.
RBC	4	Right-Aligned (*2)	Zero-Padding	Output data: 10 ⁴ /μL
HGB	4	Right-Aligned (*2)	Zero-Padding	Output data: g/L, or in case of Holland SI [10 ⁻¹ mmol/L]
HCT	4	Right-Aligned (*2)	Zero-Padding	Output data: 10 ⁻¹ %
MCV	4	Right-Aligned (*2)	Zero-Padding	Output data: 10 ⁻¹ fL
MCH	4	Right-Aligned (*2)	Zero-Padding	Output data: 10 ⁻¹ pg, or in case of Holland SI [amol]
MCHC	4	Right-Aligned (*2)	Zero-Padding	Output data: g/L, or in case of Holland SI [10 ⁻¹ mmol/L]
RDW-CV	4	Right-Aligned (*2)	Zero-Padding	Output data: 10 ⁻¹ %
RDW-SD	4	Right-Aligned (*2)	Zero-Padding	Output data: 10 ⁻¹ fL
PLT	4	Right-Aligned (*2)	Zero-Padding	Output data: 10 ³ /μL
PDW	4	Right-Aligned (*2)	Zero-Padding	Output data: 10 ⁻¹ fL
MPV	4	Right-Aligned (*2)	Zero-Padding	Output data: 10 ⁻¹ fL
P-LCR	4	Right-Aligned (*2)	Zero-Padding	Output data: 10 ⁻¹ %
PCT	4	Right-Aligned (*2)	Zero-Padding	Output data: 10 ⁻² %
WBC	5	Right-Aligned (*2)	Zero-Padding	Output data: 10/μL
NEUT%	4	Right-Aligned (*2)	Zero-Padding	Output data: 10 ⁻¹ %
LYMPH%	4	Right-Aligned (*2)	Zero-Padding	Output data: 10 ⁻¹ %
MONO%	4	Right-Aligned (*2)	Zero-Padding	Output data: 10 ⁻¹ %
EO%	4	Right-Aligned (*2)	Zero-Padding	Output data: 10 ⁻¹ %
BASO%	4	Right-Aligned (*2)	Zero-Padding	Output data: 10 ⁻¹ %
NEUT#	5	Right-Aligned (*2)	Zero-Padding	Output data: 10/μL
LYMPH#	5	Right-Aligned (*2)	Zero-Padding	Output data: 10/μL
MONO#	5	Right-Aligned (*2)	Zero-Padding	Output data: 10/μL
EO#	5	Right-Aligned (*2)	Zero-Padding	Output data: 10/μL
BASO#	5	Right-Aligned (*2)	Zero-Padding	Output data: 10/μL
Reserved	5	-	-	Fixed to "00000" or " " depending on the setting.
RET#	4	Right-Aligned (*2)	Zero-Padding	Output data: 10 ² /μL For XT-1800i, output as Reserved, and fixed to "0000" or " " depending on the setting.

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RET%	4	Right-Aligned (*2)	Zero-Padding	Output data: 10 ⁻² % For XT-1800 <i>i</i> , output as Reserved, and fixed to "0000" or " " depending on the setting.
HFR	4	Right-Aligned (*2)	Zero-Padding	Output data: 10 ⁻¹ % For XT-1800 <i>i</i> , output as Reserved, and fixed to "0000" or " " depending on the setting.
MRF	4	Right-Aligned (*2)	Zero-Padding	Output data: 10 ⁻¹ % For XT-1800 <i>i</i> , output as Reserved, and fixed to "0000" or " " depending on the setting.
LFR	4	Right-Aligned (*2)	Zero-Padding	Output data: 10 ⁻¹ % For XT-1800 <i>i</i> , output as Reserved, and fixed to "0000" or " " depending on the setting.
IRF	4	Right-Aligned (*2)	Zero-Padding	Output data: 10 ⁻¹ % For XT-1800 <i>i</i> , output as Reserved, and fixed to "0000" or " " depending on the setting.
Reserved	5	-	-	Fixed to "00000" or " " depending on the setting.
IG#	5	Right-Aligned (*2)	Zero-Padding	Output data: 10/μL, or " " (all spaces) when XT IG master is not installed.
IG%	4	Right-Aligned (*2)	Zero-Padding	Output data: 10 ⁻¹ %, or " " (all spaces) when XT IG master is not installed.
Reserved	5	-	-	Fixed to "00000" or " " depending on the setting.
RET-H _e	4	Right-Aligned (*2)	Zero-Padding	Output data: 10 ⁻¹ pg, or in case of Holland SI [amol]. For XT-1800 <i>i</i> , output as Reserved, and fixed to "0000" or " " depending on the setting. For XT-2000 <i>i</i> , fixed to " " (all spaces) when XT RET master is not installed.
Reserved	4	-	-	Fixed to "0000" or " " depending on the setting.
Reserved	40	-	-	"00...00"
Analysis Mode	1	-	-	'0': Manual mode '1': Closed mode See "Table 13: QC Number Corresponding to QC file number" for details.
Instrument Model	7	-	-	"XT-2000 <i>i</i> " For XT-1800 <i>i</i> , this Instrument Model will be "XT-1800 <i>i</i> ".
Caret	1	-	-	"^"
PS code	8	-	-	"01325318"(XT-2000 <i>i</i>) "02305316"(XT-1800 <i>i</i>)
Caret	1	-	-	"^"
Instrument Serial No.	5	-	-	XXXXX
ETX	1	-	-	(03H)
Total	255			

(*2): See “7, 5) Numerical Data Value”.

Table 12: QC Data Format 2

[QC Data Format 2 (XT-2000*i* to HOST), 255 bytes (Fixed), including STX and ETX]

Parameter	Size (byte)	Right-/Left-Aligned	Space-/Zero-Padding	Remarks
STX	1	-	-	(02H)
Text Distinction Code 1	1	-	-	'D'
Text Distinction Code 2	1	-	-	'2'
Sample Distinction Code	1	-	-	'C'
QC Number	1	-	-	'1'~'9', 'A'~'F', 'a'~'e', 'M' This indicates the correspondence to the QC file number, as shown in "Table 13: QC Number Corresponding to QC file number".
Analysis Date	8	-	Zero-Padding	"YYYYMMDD" fixed format. Ex: "20060103" means 3 rd of January, 2006.
Analysis Time	4	-	Zero-Padding	"HHMM" fixed format. Ex: "2305" means 23:05
Instrument Model	10	Right-Aligned	Space-Padding	" XT-2000" For XT-1800 <i>i</i> , this Instrument Model will be " XT-1800".
Caret	1	-	-	'^'
Instrument Serial No.	5	-	-	XXXXX: This is the unique serial number of the analyzer main unit
WBC/BASO-X	4	Right-Aligned (*2)	Zero-Padding	Output data: 10 ⁻¹ ch
WBC/BASO-Y	4	Right-Aligned (*2)	Zero-Padding	Output data: 10 ⁻¹ ch
DIFF-X	4	Right-Aligned (*2)	Zero-Padding	Output data: 10 ⁻¹ ch
DIFF-Y	4	Right-Aligned (*2)	Zero-Padding	Output data: 10 ⁻¹ ch
Reserved	5	-	-	"00000"
Reserved	4	-	-	Fixed to "0000" or " " depending on the setting.
Reserved	4	-	-	Fixed to "0000" or " " depending on the setting.
Reserved	5	-	-	Fixed to "00000" or " " depending on the setting.
Reserved	4	-	-	Fixed to "0000" or " " depending on the setting.
Reserved	4	-	-	Fixed to "0000" or " " depending on the setting.
RBC-O	4	Right-Aligned (*2)	Zero-Padding	Output data: 10 ⁴ /μL For XT-1800 <i>i</i> , output as Reserved, and fixed to "0000" or " " depending on the setting.
PLT-O	4	Right-Aligned (*2)	Zero-Padding	Output data: 10 ³ /μL For XT-1800 <i>i</i> , output as Reserved, and fixed to "0000" or " " depending on the setting.
RBC-X	4	Right-Aligned (*2)	Zero-Padding	Output data: 10 ⁻¹ ch For XT-1800 <i>i</i> , output as Reserved, and fixed to "0000" or " " depending on the setting.
RBC-Y	4	Right-Aligned (*2)	Zero-Padding	Output data: 10 ⁻¹ ch For XT-1800 <i>i</i> , output as Reserved, and fixed to "0000" or " " depending on the setting.

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d-RBC	4	Right-Aligned (*2)	Zero-Padding	Output data: 10 ⁻¹ % For XT-1800 <i>i</i> , output as Reserved, and fixed to "0000" or " " depending on the setting.
d-PLT	4	Right-Aligned (*2)	Zero-Padding	Output data: 10 ⁻¹ % For XT-1800 <i>i</i> , output as Reserved, and fixed to "0000" or " " depending on the setting.
Dw/X	4	Right-Aligned (*2)	Zero-Padding	Output data: 10 ⁻¹ % For XT-1800 <i>i</i> , output as Reserved, and fixed to "0000" or " " depending on the setting.
Dw/Y	4	Right-Aligned (*2)	Zero-Padding	Output data: 10 ⁻¹ % For XT-1800 <i>i</i> , output as Reserved, and fixed to "0000" or " " depending on the setting.
Reserved	125	-	-	"00...00"
Instrument Model	7	-	-	"XT-2000 <i>i</i> " For XT-1800 <i>i</i> , this Instrument Model will be "XT-1800 <i>i</i> ".
Caret	1	-	-	"^"
PS code	8	-	-	"01325318"(XT-2000 <i>i</i>) "02305316"(XT-1800 <i>i</i>)
Caret	1	-	-	"^"
Instrument Serial No.	5	-	-	XXXXX
ETX	1	-	-	(03H)
Total	255			

(*2): See "7, 5) Numerical Data Value".

Table 13: QC Number Corresponding to QC file number

QC Number	Analysis Mode	QC File Number	QC Number	Analysis Mode	QC File Number
1	0	1	1	1	21
2	0	2	2	1	22
3	0	3	3	1	23
4	0	4	4	1	24
5	0	5	5	1	25
6	0	6	6	1	26
7	0	7	7	1	27
8	0	8	8	1	28
9	0	9	9	1	29
A	0	10	A	1	30
B	0	11	B	1	31
C	0	12	C	1	32
D	0	13	D	1	33
E	0	14	E	1	34
F	0	15	F	1	35
a	0	16	a	1	36
b	0	17	b	1	37
c	0	18	c	1	38
d	0	19	d	1	39
e	0	20	e	1	40
M	0	XbarM			

Appendix A De-compression Procedures of the Scattergram Data

A.1 Overview

A.1.1 Purpose

When XT-2000*i* transmits the scattergram image data to the host computer such as SIS, the scattergram image data is compressed and transmitted. It is requested for the host computer to de-compress the data and re-structure the image data. This document describes the procedures to de-compress the compressed data sent from the XT-2000*i*.

A.1.2 Process Flow

Figure A-1 shows the data flow when the XT-2000*i* transmits the scattergram image data to the host computer. It is expected that the host computer processes the image data according to the SE image format, as described in the Section A.1.3, the image data is converted from the XT image format to the SE image format. The data is then processed by the Run-Length Encoding (RLE) and the Huffman coding. The compressed and coded binary data is then converted into the ASCII codes. The necessary header information is added and transmitted to the host computer.

The host computer is requested to convert the received data to the binary data, de-code, de-compress and generate the image data in the SE image format.

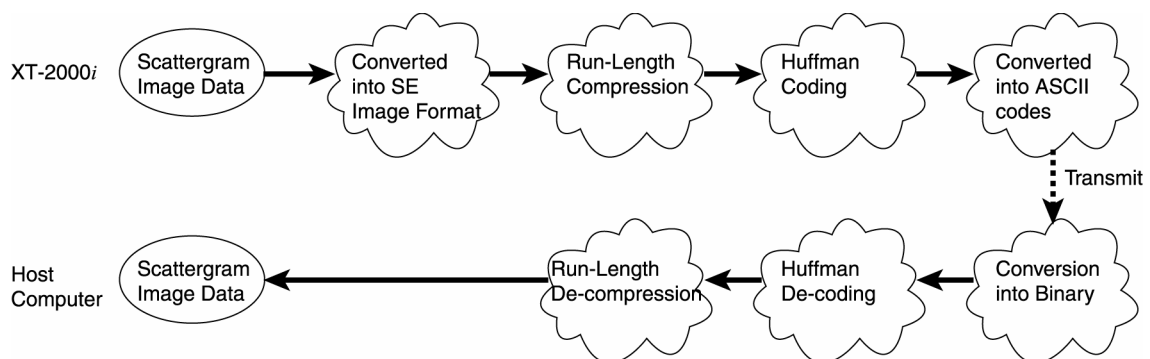


Figure A-1

A.1.3 SE Image Format

One scattergram has 128 dots by 128 dots, which make 16384 dots in total. Each dot has 4 bits in depth to express the color information (see Figure A-2). An array of unsigned char type with the number of elements of 8192 is prepared. Two dots of the de-compressed image data are stored in 1 byte each of the memory, as shown in Table A-1, to have the same data structure with the sender side. Figure A-3 shows the Dot Number Address, shown in Table A-1, on the screen.

It is also suggested to use the color palette shown in Table A-2 to obtain the same coloration as displayed on the IPU of the XT-2000i.

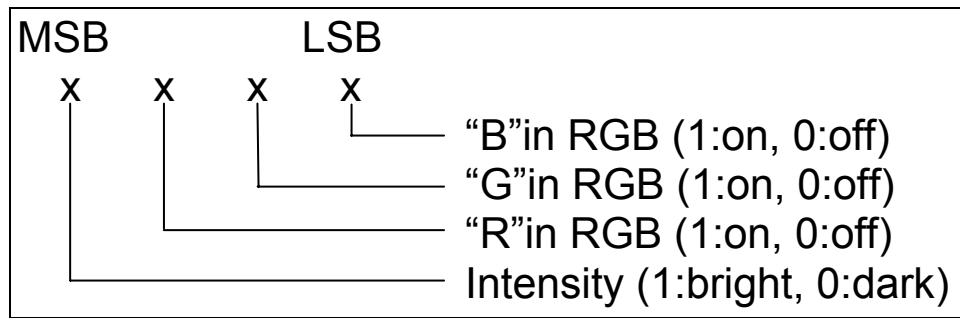


Figure A-2

Table A-1

Address +0000h	Dot No. 1 Color Information	Dot No. 0 Color Information
Address +0001h	Dot No. 3 Color Information	Dot No. 2 Color Information
Address +0002h	Dot No. 5 Color Information	Dot No. 4 Color Information
	:	:
	:	:
	:	:
Address +1FFFh	Dot No. 16383 Color Information	Dot No. 16382 Color Information

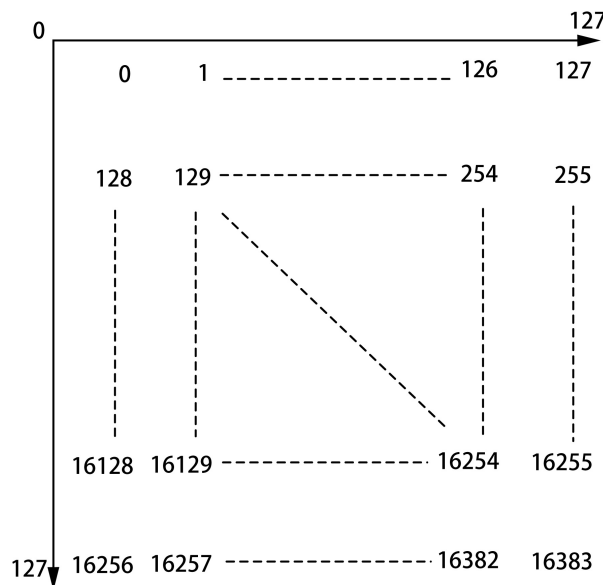


Figure A-3

Table A-2

Color Info.		Color	RGB Value		
bin	hex		R	G	B
0000	0	BLACK	0	0	0
0001	1	BLUE	0	0	128
0010	2	GREEN	0	128	0
0011	3	CYAN	0	128	128
0100	4	RED	128	0	0
0101	5	MAGENTA	128	0	128
0110	6	YELLOW	128	128	0
0111	7	WHITE	192	192	192
1000	8	GRAY	128	128	128
1001	9	LIGHT BLUE	0	0	255
1010	A	LIGHT GREEN	0	255	0
1011	B	LIGHT CYAN	0	255	255
1100	C	LIGHT RED	255	0	0
1101	D	LIGHT MAGENTA	255	0	255
1110	E	LIGHT YELLOW	255	255	0
1111	F	LIGHT WHITE	255	255	255

A.2 De-compression Procedures

The host computer receives the analysis data according to the analysis data format specified in this specification sheet. The scattergram data is received according to the scattergram text data format. If the “Scattergram Compression Information” in the scattergram text data format is “1”, the scattergram data is compressed. If the “Scattergram Compression Information” is “0”, the scattergram data is not compressed, but the conversion into binary, as described in A.2.1, is still needed.

A.2.1 Conversion into Binary Codes

The scattergram image data sent from XT-2000i is converted into ASCII codes. The binary data is split up by every 4 bits and added “3” to the most significant 4 bits. Therefore, it is necessary to take out the least significant 4 bits from the received data, and to convert it into binary data.

[Procedures to convert into binary data]

Step 1: Take out the least significant 4 bits from the received data

Step 2: Make the 1 byte of the binary data by arranging the odd-numbered data to the most significant 4 bits and the even-numbered data to the least significant 4 bits, and write this byte data into the buffer.

The relation between ASCII characters and binary data is shown in Table A-3.

Table A-3

ASCII	Text	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
	Code	30h	31h	32h	33h	34h	35h	36h	37h	38h	39h	3Ah	3Bh	3Ch	3Dh	3Eh	3Fh
Binary		0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F

Example: 1? (31h 3Fh) → 1Fh

A.2.2 De-compression Process

Compression process uses the Huffman coding and the Run-Length compression. Therefore, it is necessary to perform the following procedures to de-compress.

Compressed data

↓ < Huffman de-coding >

Intermediate data

↓ < Run-Length de-compression >

Scattergram Image data

Received compressed data has the data structure, shown in the following.

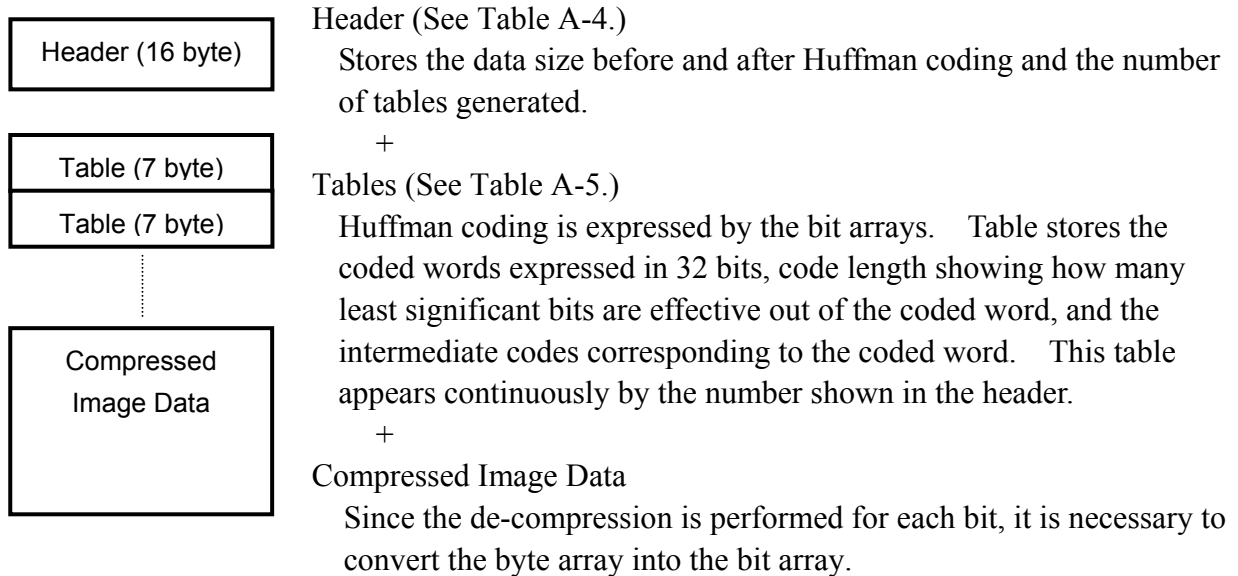


Table A-4

Name	Data Type	Size(byte)	Contents
type	unsigned short	2	Not used (* Note 1)
dsiz	unsigned short	2	Image data size after de-compression
tsiz	unsigned short	2	Number of tables
comprssiz	unsigned short	2	Image data size after compression
dm[4]	unsigned short	2×4	Not used (* Note 1)

* Note 1: This area is not currently used, and “00h” will be stored.

Table A-5

Name	Data Type	Size(byte)	Contents
ptn	unsigned long	4	Coded word
ptnq	unsigned char	1	Code length (bit)
no	unsigned short	2	Intermediate code(* Note 2)

* Note 2: The lower byte of the intermediate code stores the binary data (00h to FFh) of the two dots corresponding to the coded word, and the higher byte stored the value whether the data is compressed by the Run-Length compression (01h: compressed, 00h: not compressed).

[Procedures for de-compression]

Step 1: Read the header

The header is the first 16 bytes out of the read data. Read type, dsiz, comprsiz, and dm[4] shown in the Table A-4, by using care with swapped byte order. For example, although dsiz comes up with the third and the fourth bytes of the binary converted data, the third byte data is the lower byte and the fourth data is the higher byte. When the third and the fourth data are 00h and 20h, dsiz will be 2000h.

Step 2: Read the table

The table is the 7*tsiz (the number of tables) of the binary data following the header. Read ptn, ptnq, no shown in Table A-5, by using care with swapped byte order. Repeat this tsiz times, to generate the table.

Step 3: De-compress

1. Expand the binary data following the table into the bit-array. The read data is arranged from the right side to the left side in serial, and proceeded from the right side. See Figure A-4.

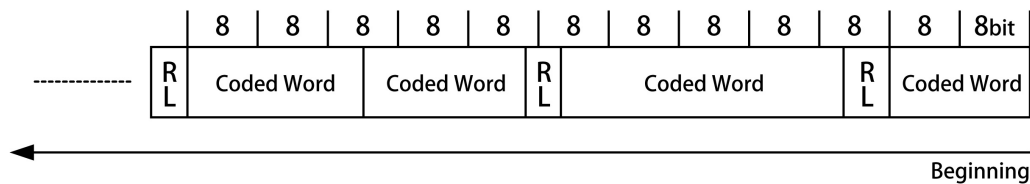


Figure A-4

The coded word is distinguished by the array of 0 and 1 in 1 through 32 bits long, obtains the intermediate code by referring to the table, and determines whether the data is compressed by the Run-Length compression. If the higher byte of the intermediate code is 0 (not compressed), RL is 0 bit and de-compression by the Run-Length compression will not be performed. If the higher byte of the intermediate code is 1 (compressed), RL is either 3 bits or 6 bits by the lower byte (image 2 dots), and shows the Run-Length (consecutive number). When the lower byte is "00h", RL is 6 bits and shows consecutive number. In other cases, RL is 3 bits and shows a consecutive number. See Figure A-5.

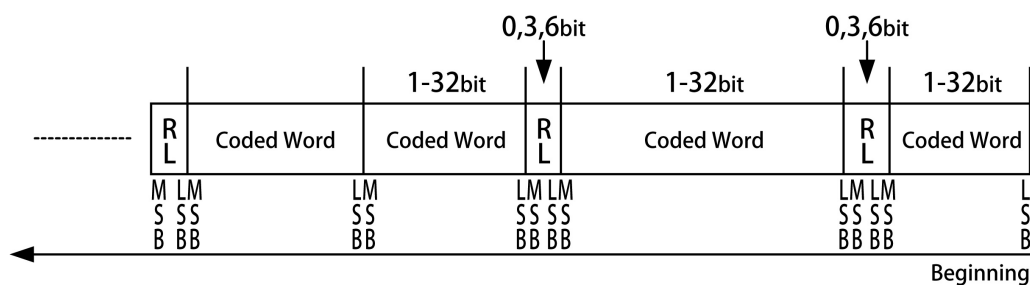


Figure A-5

2. When the coded word and bit pattern are compared starting from the beginning of the bit array and agree, actual image is obtained from the intermediate code. If the intermediate code shows “compressed by Run-Length”, get a consecutive number by the 3 bits or 6 bits following to the coded word. The actual consecutive number will be obtained by adding 1 to the gotten value. The actual 2 dots of the image data is obtained from the intermediate code, and output the data by the obtained number. If the intermediate code shows the data is not compressed, the actual code is obtained from the intermediate code, and output the data of 2 dots. It is suggested to store the obtained image data in the array shown in Table A-1.
3. For the following bit array, data is compared with the coded word in the table, get the intermediate code, and de-compress by the Run-Length. Repeat this to obtain the scattergram image data from the compressed data.

A.2.3 Example of de-compression

A communication log when the XT-2000i DIFF channel scattergram is sent to the host computer is shown below as an example, and the de-compression is explained using this example.

1. Contents of the communication log (Actual log will not contain <CR><LF>.)

```
D1G SEDIFF SCAT 12812800049410000000200800?700000000
00000000000010000000010001040000000039900020000000031
0000600000000401000>000000004110000000000004910018000
0000519000800000000500007=?=????????????????????
????????????????????????????????????????????????
????????????????????????????????????????????????3?=
2?????:?>;????07;4;77=?<??77?59597:4;=?2;2;=3<6?;
>9790=?==7597;;>24248>>790753==1==;1=>809;5817>17;
1=705<45617>97720<=>622;1=745>23;90760762:;8;<4772
0>=0>:4==497<17697720>?02>2;;48;;8;=8>>:223=5853=>
?;>97=?=????????????????>;
```

Twenty nine bytes from the beginning including the spaces “D1G SEDIFF SCAT 1281280004941” are consisting of the header, and indicates SE format DIFF scattergram image data, X-axis data size, Y-axis data size, and data length. See “6.5: Scattergram Text Data Format” for more information.

2. Converting compressed data to the binary data

Example: ASCII character “1?” (31h, 3Fh) → Binary data 1Fh

```
000000200800F7000000000000000000010000000100010400
00000399000200000000310000600000000401000E0000000411
000000000004910018000000051900080000000500007DFDFF
FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF
FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF
FFFFFFFFFFFFFFFFFFFFFFFF3FD2FFFFFAFEBFFFFF07B4B77FDFCCFF77
F59597A4BDF2B2BD3C6FBE9790DFDD7597BBE24248EE790753
DD1DDB1DE809B5817E17B1D705C45617E97720CDE622B1D745
E23B90760762AB8BC47720ED0EA4DD497C17697720EF02E2BB
48BB8BD8EEA223D5853DEFBE97FDFFFFFFFFFFFFFFFFFFFFEB
```

3. Read the header

From the beginning, 16 bytes of data “000000200800F7000000000000000000” shows the header, as shown in Table A-6.

Table A-6

Size(byte)	Contents	Value
2	(Not used)	0
2	Image data size after de-compression	2000h (8192) bytes
2	Number of tables	0008h (8)
2	Image data size after compressed	F700h (247) bytes
2×4	(Not used)	0

4. Read the table

Since the number of tables is 8, and one table is consisted of 7 bytes, the data following the header are the tables, such as “01000000010001”, “04000000039900”, “02000000031000”, “06000000040100”, “0E000000041100”, “00000000049100”, “18000000051900”, “08000000050000”. This is expressed in Table A-7.

Table A-7

Coded word (binary)	Code Length	Intermediate code (Hexadecimal)
0000000 <u>1</u>	1	0100
000001 <u>00</u>	3	0099
00000 <u>010</u>	3	0010
00000 <u>110</u>	4	0001
0000 <u>1110</u>	4	0011
0000 <u>0000</u>	4	0091
000 <u>11000</u>	5	0019
000 <u>01000</u>	5	0000

Note that the underlined portion of the coded word indicates the effective bits shown by the code length.

5. De-compressing

The data following the table “7DFDFFFF---” is aligned in binary expression by 1 byte from the right to the left, and the following is obtained.

“---11111111 11111111 11111111 11111111 11111101 01111101”

This bit array is processed starting from the right.

The first bit matches with the first coded word in the table. Since the intermediate code is “0100”, this data is compressed “Black-Black” dot pattern. In case of “00”, 6-bit of the continuous number is used, and “111110” from the second bit shows the continuous number. “111110” is 62, and the continuous number is 63 times by adding 1.

When the data starting from the 8th bit is then compared with the coded word, the third coded word matches.

The intermediate code “0010” shows the data is “Blue-Black” dot pattern which is not compressed.

Following this, starting from the 11th bit “1” appears continuously for a while. This indicates “Black-Black” (1) dot pattern repeats for 64 (111111) times, and this appears repeatedly.

The de-compression of the above is brought together, “Black-Black” appears 63 times, and “Blue-Black” then appears, and “Black-Black” appears for a while.

In the SE Format, since the appearance order of the dot pattern and the actual display order is swapped, “Blue-Black” is displayed in the order of Black and Blue.

Since the X- and Y-axis data size is 128 dots by 128 dots, the upper part of the image data is almost black, and one blue dot appears in the upper right.

By repeating this process through to the last data, a scattergram data will be obtained.

Appendix B. TCP/IP Communication Specifications

B.1 Network interface layer

- The network interface conforms to IEEE 802.3.
- Communication is performed by the 10Base-T.
- RJ45 socket is used in a hub to connect with the IPU of XT-2000i.
- The cable of UTP category 5 should be used for communication.

B.2 TCP/IP

Text Format including STX and ETX is set in TCP data part and communications are carried out.

The IP address that is used to communicate between the IPU and XT-2000i analyzer is fixed. The default value is “192.168.28.150”. When this value is to be changed, please contact your Sysmex service representative.

The IP address for the host computer can be set using the setting screen in the IPU. This IP address is fixed. The IP address may be selected other than “192.168.28.*” that is used to communicate between the IPU and XT-2000i analyzer.

The TCP port number of the IPU for the host communication is fixed. The default value is “5000”. This value may be changed in the IPU setting screen.

B.3 TCP connection

Connection is established with the host computer as a server and the IPU of XT-2000i as a client. The XT-2000i checks the connection when the system starts. If connection is failed, the IPU retries to establish connection in a certain interval. When the server becomes down after the connection was established once, the IPU will not retry to establish connection again. When re-connection is intended from XT-2000i side, connect to the host computer using the setting screen in the IPU after disconnecting with the screen. Or re-transmit the data from XT-2000i, the IPU will try to re-connect to the host computer.

B.4 Application layer

Communication is performed according to the Bit Serial Interface, Class A.

B.5 Text and Communication Protocol

- 1) Control Characters
ASCII codes are used for all the output to the host computer.
- 2) Text Format
[STX] is sent at the beginning of data, and [ETX] is sent at the end of data.

B.6 Treatment of the Transmission Error

When transmission error occurred, transmission is stopped and an error message is displayed in the IPU. Recovery of the transmission is made by the operator. Transmission Error will occur in the following case:

- XT-2000i does not receive any response from the host computer within 30 seconds after completing to send out the data.

B.7 Transmission Timing

By setting in the IPU, it is possible to select either the real-time transmission upon completion of each analysis, or the batch transmission from the stored data.

[end of document]