SUIT

Sysmex Universal Interface

sysmex

Document Information

Status	Release version
Version	7.0
Last edited date	27-06-2011
Validator	Olivier Kaulmann

Version History

Version	Date	Author	Comment
1.0	10.05.2005	Thomas Ettrich	Initial Version of the SUIT-Description based on the SIS 2.0-Description by Mieko Asada
2.0	05.01.2007	Susanne Jäkel	Test-Codes and Flags are added for the support of the UF-1000i
3.0	05.03.2007	Thomas Ettrich	– The font “Times New Roman” was exchanged with the font “Arial” – Some text-passages are point out – Added a more precisely description how to handle an OBR-5 which is exceeding 200 Bytes. – Added a note for the ordering in a multi-discipline environment at chapter 3.3.1 – Replaced the “Yen”-Character by “\” – Added the test-codes for the XE-5000 and CA-Series
4.0	21.05.2007	Thomas Ettrich	Corrected the host-codes for COND-Info, RBC-Info and UTI-Info Added parameters for the UF-1000 like Flag Path CAST, Flag SRC, Flag SPERM, Flag XTAL, Flag YLC, Flag MUCUS, Flag Conduc
5.0	08.08.2008 09.09.2008	Kaulmann Olivier	– Re-structure the document – Added use case for better understanding – OBX-6 field length extended from 14 to 106 – OBX-4 field lenght extended from 15 to 60 – Added new parameters at the haematology section (5.3.1)
6.0	13.11.2009	Kaulmann Olivier	– Add new analyzer XT4000i and AX4030, refer page 2 – Rename IP flag Leucocytosis into Leukocytosis, refer chapter 5.4 – Add new Scatergram RET-E and Histogram RBC-Y, refer chapter 5.1.1, 5.1.2 – Update Appendix D: Interpretation-flags – Add following new parameters at chapter 5.3.1: TC-PMN%, TC-MN%, TC-EO%,TC-HF%

7.0	27.06.2011	Kaulmann Olivier	– Add new chapter: 5.4.1 Action & error messages and positive flagging information – Add 5.6 Appendix F: Case Manager – Update chapter 5.4 Appendix D: Interpretation-Flags (IP Flags) – Update chapter 5.3 with the test code available with XN analyzer – Update chapter 5.3.2 with the urinalysis parameter name – Update chapter 5.4 with the Interpretation-Flags available with XN analyzer

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1 Introduction

This document describes the Communication Specifications of the Sysmex Universal Interface (SUIT). This protocol is based on the ASTM standards E1238-94 and E1381-91

(1) Presentation Level

ASTM E1238-94 Standard Specification for Transferring Clinical Observations Between Independent Computer Systems

(2) Physical Level and Data Link Level

ASTM E1381-91 Specification for Low-level Protocol to Transfer Message Between Clinical Laboratory Instruments and Computer Systems

Please refer the original ASTM documents for the details

Note:

SUIT supports the order query mode as well as the order (batch) download mode. Which specific communication mode is used depends on the device type (analyzer) or solution type (WAM) which is connected to the host.

Be prepared for both modes and wait for our confirmation which communication mode has to be used.

This document consists of 2 main chapters:

– The ***SUIT interface*** and ***Message format*** chapters:

Theses chapters describe the communication protocol itself which is mainly the same for all device types or WAM solution connected to the hosts and

– The ***Appendix*** chapters:

These chapters describe the differences between the different analyzer types and solution types (WAM) connected to the host. The differences consist of the:

- graphic file management
- analyzer specific test names and flags names

Some Log files are detailed in Appendix B meant to provide additional information for better understanding.

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Different analyzer types and WAM solution types

As mentioned different analyzer types and WAM solution types exists which all communicate to the LIS in the SUIT format. These different types can be summarized into 4 categories. Please refer to the table1 below which lists the different *Analyzer types* and *WAM solution* types

Haematology Devices	Urinalysis Devices	Coagulation Device	WAM solution
XN series: – XN-1000 – XN-2000 – XN-9000	*UF1000i* *UF500i*	*CS-2000i*	**SIS / TWIST /ELC:** – XE series – XS series – XT series – K-4500 – K-X21
XE series: – XE5000 – XE2100 – XE2100D			– DM8 & DM96 – Manual differentiation WP
XS series: – XS1000i – XS800i			– UF50 – UF100 – UF100i – UF500i – UF1000i – *Dispstik reader*: • Cobas U411 • Urisys 1800 • Urisys 2400 • Miditron M • Clinitek Atlas • Clinitek 200+ • AX-4280 • AX-4030
XT series: – XT2000i – XT1800i – XT4000i			– CA series: • CA-500 • CA-6000 • CA-7000 – CS-2000i
			– VesCube – STARSED
			– Tube Sorter: • TS-500 • TS-1000

Table 1: Different analyzer types and WAM solution types

2 Communication Specifications

The communication specifications are based on different levels

(1) Physical Connection Method:

RS-232C or Ethernet connection per HOST connection.

(2) No. of HOST connection lines:

SUIT supports up to 2 line connection to the LIS:

- case of 1 line configuration: Test Orders & Test Results on same line
- case of 2 lines configuration[1]: Test Orders / Test Results on separate lines

(3) Communication Mode[2]:

Query mode or Batch download mode

(4) Communication Description:

Test Order	HOST → SUIT
Order Inquiry	HOST ← SUIT
Test Result	HOST ← SUIT:

(5) Test Order: 300 items / sample

(6) Test Result: 300 items / sample

*1. Some configurations are not able to work with a 2 line connection configuration. In case you require a 2 line connection, please ask for confirmation.

*2. SUIT supports the order query mode as well as the order (batch) download mode. Which specific communication mode is used depends on the device type (analyzer) or solution type (WAM) which is connected to the host.
Be prepared for both modes and wait for our confirmation which communication mode has to be used.

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3 SUIT Interface

3.1 Physical Level

With the exception of the following, this specification conforms to ASTM E1381-91 standard:

- RS-232C or Ethernet (RS-232D for ASTM)
- RS-232C Connector: D-SUB 25pin Male or D-SUB 9pin Male

D-SUB 25pin Male:

Pin Code	Name	Signal Direction
1	Shield	
2	Send Data	Output
3	Receive Data	Input
4	Request To Send	Output
5	Clear To Send	Input
6	Data Set Ready	Input
7	Ground	
20	Data Terminal Ready	Output

D-SUB 9pin Male:

Pin Code	Name	Signal Direction
1	Shield	
2	Receive Data	Input
3	Send Data	Output
4	Data Terminal Ready	Output
5	Ground	
6	Data Set Ready	Input
7	Request To Send	Output
8	Clear To Send	Input

(3) RS-232C Settings Parameters (Default Underlined)

- Start bit : 1 (“0” in Binary expression)
- Stop bit : 1 , 2 (“1” in Binary expression)
- Data Byte : 7 , 8
- Parity : N/A, Even Numbers, Odd Numbers
- Transmission Speed (bps) :1200, 2400, 4800, 9600, 19200

3.2 Data Link Level

Data Link Level consists of the following 3 types of communication status:

- Setting Status:

  Establish a logical communication and determine the sending direction of information. This defines the Sending and Receiving sides.

- Forwarding Status:

  The Sending side transmits messages to the Receiving side.

- End Status:

  Open the communication line(s) and change to idle status for both the Sending and Receiving side.

3.2.1 Setting Status

Establish a logical communication line to determine the sending direction of information.

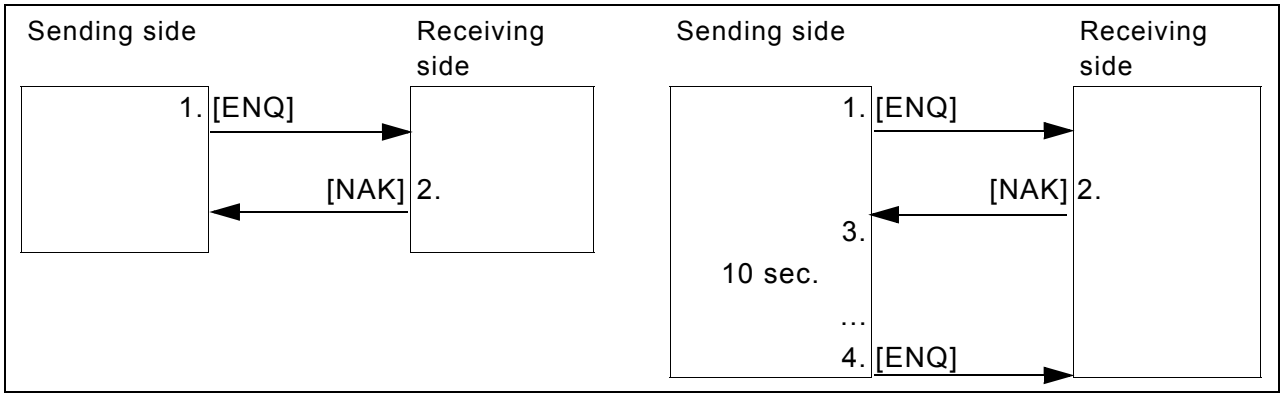
1. The Sending side transmits [ENQ] to the Receiving side.

   In its response, the Receiving side:

   – Returns [ACK] if the transmission is available.

   – Returns [NAK] if the transmission is unavailable.

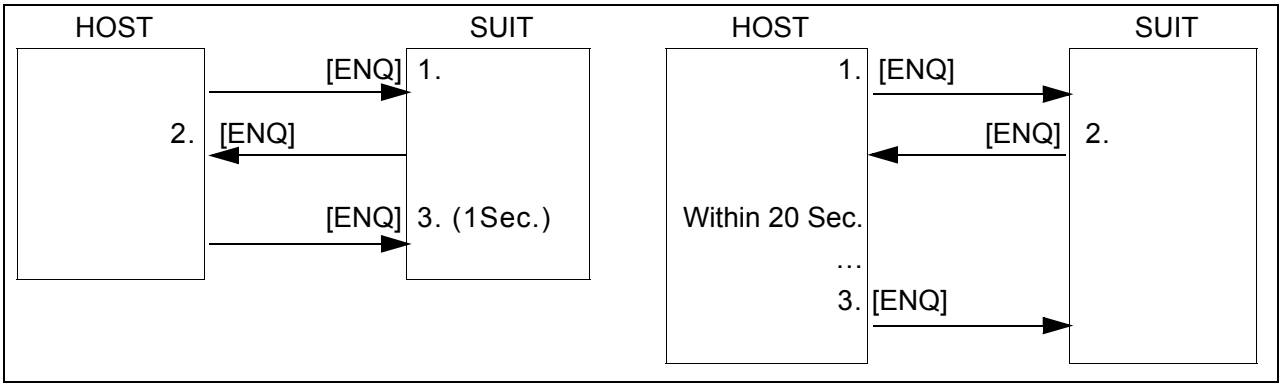
   The Sending side must wait 10 seconds before re-sending [ENQ].



2. When both sides send [ENQ] ([ENQ] clash), the Slave Computer side has priority over the Host Computer.

   – The Slave Computer re-sends [ENQ] 1 second later.

   – The Host Computer must wait 20 seconds before ' re-sending.



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3.2.2 Forwarding Status

The Sending side transmits a message to the Receiving side.

The following is an example of the text frame structure:

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

Note:

When the text exceeds 240 characters, use a [ETB] to divide and create 2 or more frames

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

Symbol	Code	Description
[STX]	Indicates the beginning of the text Send.	Code to be sent at the beginning of a frame.
[F#]	Frame Number	Frame Number is “0” to “7” of ASCII numbers. Its purpose is to distinguish between sent frame and re-send frames. This 1-digit number is sent immediately after STX characters. The Frame Number begins with “1” when the Forwarding Status starts, and increases sequentially, every time a new frame is sent and a positive reply is received. The Frame Number returns to “0” after “7”, and the above steps are repeated.
[TEXT]	Message Text (Refer to explanation of ASTM E1238-94)	Employ ASTM E1394-91 Record. Refer to the Message Format in the later section for details.
[EXT]	Indicates the end of the text Send.	The code to indicate the end of the final frame.
[CHK1] [CHK2]	Express with “0” to “F” characters.	Add text between [STX] and [ETX] in Binary. Then take the last 8 bits and express it in Hexadecimal (2 digits). Then, change the 2-digit number into “0” to “F” ASCII character format, and save each digit as CHK1 and CHK2.
[CR]	The ASCII Code for Recovery.	Code required before completing an E1394-91 Record (E1381-91 Message) or code that is sent between the 2nd and last within a frame.
[LF]	ASCII Code for line changes.	LF Code is used for the last character of a frame. LF cannot be used for Text messages.

Note:

- **Timeout:**

1. In Setting Status, the Sending side sets a 15-second timer when sending [ENQ]. If there is no response within the 15 seconds, Timeout is applied. The Sending side turns to an End Status when Timeout occurs.

2. In Forwarding Status, the Sending side sets a 15 seconds timer after sending the last character of a frame.

   If there is no response within the 15 seconds, Timeout is applied. The Sending side turns to End Status once the Timeout occurs.

   The Receiving side sets the timer for 30 seconds when it first turns to the Receiving Status or responding to a frame.

   If there is no response within 30 seconds, Timeout is applied. The Receiving side turns to the End Status when the Timeout occurs.

- **Restricted message codes:**

  Please find below 10 Transmission Restricted Message Codes. These (1 type of Format Restriction Code & 4 types of Instrument Restricted Codes) cannot be used for message Text**:**

Restricted Message Codes

Code Symbol	Meaning
SOH (01)	Beginning of Header
STX (02)	Beginning of Text Sending
ETX (03)	End of Text Sending
EOT (04)	End of Sending
ENQ (05)	Inquiry
ACK (06)	Positive Response
DLE (10)	Lost Data Link
NAK (15)	Negative Response
SYN (16)	Simultaneous Signal characters
ETB (17)	End of Sending Block
LF (0A)	Change lines
DC1 (11)	Instrument Restricted Character 1
DC2 (12)	Instrument Restricted Character 2
DC3 (13)	Instrument Restricted Character 3
DC4 (14)	Instrument Restricted Character 4

3.2.3 End Status

The Sending side sends [EOT] to indicate that all information has been transmitted to the Receiving side, and turns to the Idling Status.

Or the Receiving side sends [EOT] when the time out occurs, and turns to the Idling status. In order for the Sending Side to start transfer again, turns to the Setting Status.

3.3 Protocol

3.3.1 SUIT ← HOST (Test Order)

SUIT	Com. Direction	HOST
	←	ENQ
ACK	→	
	←	H: Header Record
ACK	→	
	←	P: Patient Record
ACK	→	
	←	C: Patient Comment Record
ACK	→	
	←	OBR: Order Record
ACK	→	
	←	C: Order Comment Record
ACK	→	
	←	L: End Mark Record
ACK	→	
	←	EOT

Repeat as many times as the No. of patients

Note:

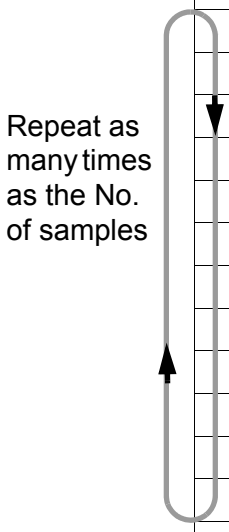
- SUIT saves the Patient Comment Record in Patient Free Comment and Order Comment Record in Order Free Comment
- Discipline Separation:

  In the event of a laboratory receiving two specimens (e.g. 1x EDTA for Haematology and 1x Sodium Citrate for Coagulation) on a single patient, requiring tests for both haematology and coagulation on a single sample number, the downloaded order information from LIS, must be separated into the various disciplines.

  It is possible for the orders to be sent in the same data string, but the different discipline tests need to have separate patient and order records.

  Refer a log file example at chapter 5.2.3 Order for multiple discipline.

3.3.2 SUIT → HOST (Test Results)



SUIT	Com. Direction	HOST
ENQ	→	
	←	ACK
H: Header Record	→	
	←	ACK
P: Patient Record	→	
	←	ACK
C: Patient Comment Record	→	
	←	ACK
OBR: Order Record	→	
	←	ACK
C: Order Comment Record	→	
	←	ACK
OBX: Test Result Record	→	
	←	ACK
C: Result Comment Record	→	
	←	ACK
L: End Mark Record	→	
	←	ACK
EOT	→	

Note:

SUIT sets:

- the Patient Comment Record in the Patient Free Comment
- Order Comment Record in the Order Free Comment
- Sample Free Comment, IP Message (incl. Rule Message) and Graphic Data information (File Name) in the Result Comment Record

3.3.3 SUIT → HOST (Order Inquiry)

SUIT	Com. Direction	HOST
ENQ	→	
	←	ACK
H: Header Record	→	
	←	ACK
Q: Inquiry Record	→	
	←	ACK
L: End Mark Record	→	
	←	ACK
EOT	→	

3.3.4 SUIT ← HOST (Order Command)

Same as 3.3.1

3.3.5 SUIT → HOST (QC Data)

SUIT	Com. Direction	HOST
ENQ	→	
	←	ACK
H: Header Record	→	
	←	ACK
S: QC Record	→	
	←	ACK
L: End Mark Record	→	
	←	ACK
EOT	→	

Note:

No output available for IP Messages, Graphic Data or for QC Data.

4 Message Format

4.1 Message and Record

SUIT employs ASTM E1238-94 Record for Text (messages) to be forwarded with an ASTM E1381-91 frame.

4.1.1 Record

The Record is a type of Text beginning with ASCII (alphabet code) called Record Descriptor, and ending with [CR]

Segment	Record Descriptor	Original Reference Location	Description
Message Header	H	Section 7	Information Exchange Management Information
Patient Segment	P	Section 8	Patient Information
Observation Order Segment	OBR	Section 9	Test Order Information
Result Observation Segment	OBX	Section 10	Test Result Information
Error Checking Segment	E	Section 11	Do not use
Comment Segment	C	Section 12	Comment Information
Request Results Segment	Q	Section 13	Order Inquiry
Message Terminator	L	Section 14	Message End
Scientific Segment	S	Section 15	Scientific Information (Used for QC Data Output)

4.1.2 Fields

The Record can be separated into several fields by separators. The fields are distinguished by their position in the record. Field lengths are not fixed. The following are types of separators:

Separator Type	Symbol	Description
Field	|	Distinguish between fields within records. - When there is no contents in a field, send the separator only.
Repeat	~	Use to distinguish a repeated/multiple same type of information within a field.
Component	^	Divide a field into several sub-fields.
Sub-component	&	Defined only in Header. Not used as separator.
Escape	\	Defined only in Header. Not used as separator.

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4.2 Header Record

Header Records include definitions of separators, Version Information, and the Message Created Date etc.

(Record Format)

H | ^ ~ \ & | | | | | | | | | | VER | DT<CR>

(1) (2) (3) (4) (5)

Note:

Mandatory Fields described in Bold Text

	Field	Field Code	Field Name	Description	Field Length (bytes)	HOST to SUIT	HOST from SUIT
(1)	**H**	**H-1**	Segment type ID	"H" fixed	1	Y	Y
(2)	**^ ~ \ &**	**H-2**	Delimiter definition	Definition of Separators | : Field Separator (7Ch) ^ : Component Separator (5Eh) ~: Repeat Symbol (7Eh) \: Escape Symbol (5Ch) &:Sub-component Separator (26h) - "\" and "&" Not used.	5	Y	Y
(3)		H-3 - H-12		Not in use		-	-
(4)	**VER**	**H-13**	Version	Regulated Version Number "A.2" Fixed (ASTM E1238-94)	3	Y	Y
(5)	**DT**	**H-14**	Date and time of message	Message Created Date/Time Format:YYYYMMDDHHMM	12	Y	Y

Mandatory Fields: H-1, H-2, H-13, H-14

4.3 Patient Record

Patient Record includes Patient Attribute Information.

(Record Format)

```
P | SEQ | PID |  | APID | NAME | MN | B/D | SEX |  |  |  | DCODE |  |  | HT | WT
(1)  (2)  (3)  (4)  (5)   (6)    (7)  (8)   (9)     (10)      (11)   (12)  (13) (14)
| |  |  |  |  |  | ADMS | LC |  |  |  |  |  | DTR <CR>
      (15)      (16)   (17)      (18)       (19)
```

Note:

Mandatory Fields described in Bold Text

	Field	Field Code	Field Name	Description	Field Length (bytes)	HOST to SUIT	HOST from SUIT
(1)	**P**	**P-1**	Segment type ID	"P" Fixed.	1	Y	Y
(2)	**SEQ**	**P-2**	Trans-mission sequence number	Sequence Number. Sequential from "1" and increase by one per patient.	4	Y	Y
(3)	PID	P-3	Practice assigned patient ID	Patient ID.	16	Y	Y
(4)		P-4		Not in use		-	-
(5)	APID	P-5	Alter-native patient ID	Alternative ID. Use as Public Insurance ID.	16	Y	Y
(6)	NAME	P-6	Patient name	Patient Name FN^LN FN : First Name LN : Last Name	41 (20^20)	Y	Y
(7)	MN	P-7	Mother's Maiden name	Mother's Maiden Name	20	Y	Y
(8)	B/D	P-8	Birth Date	Date of Birth Format: YYYYMMDD	8	Y	Y
(9)	SEX	P-9	Patient sex	Gender M: Male, F: Female, U: Unknown	1	Y	Y
(10)		P-10 - P-13		Not in use		-	-
(11)	DCODE	P-14	Attending physician ID	Primary Doctor Code/Doctor Name	27 (6^20)	Y	Y
(12)		P-15 - P16		Not in use		-	-

(13)	HT	P-17	Patient height	Height: cm (w/ decimals) or feet^inch	6	Y	Y
(14)	WT	P-18	Patient weight	Weight: kg (w/ decimals) or pound^ounce	6	Y	Y
(15)		P-19 - P-24		Not in use		-	-
(16)	ADMS	P-25	Admission status	In/Out Patient Differentiation OP:Out Patient, IP:In Patient	2	Y	Y
(17)	LC	P-26	Location	Location: Clinic Code^Ward Code	13 (6^6)	Y	Y
(18)		P-27 - P-32		Not in use		-	-
(19)	DTR	P-33	Date/time registered	Data Registration Date (Patient Data/Latest Update Date) Format:YYYYMMDD	8	Y	Y

Mandatory Fields: P-1, P-2

4.4 Order Record

Order Record includes Test Order Information. Multiple order items are included in a record by using component Separators. Pay attention to 3.3.1, “Discipline Separation”.

(Record Format)

OBR | SEQ | ONO | SNO | TESTID | PRI | RQDT | CLDT | | CVLM | | ACCD | DGCD
(1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13)

RCINF | RCDT | SRC | | | | | | DTR | | PSID| | S<CR>
(14) (15) (16) (17) (18) (19) (20) (21)(22)

Note:

Mandatory Fields described in Bold Text

	Field	Field Code	Field Name	Description	Field Length (bytes)	HOST to SUIT	HOST from SUIT
(1)	**OBR**	**OBR-1**	Segment type ID	“OBR” Fixed.	3	Y	Y
(2)	**SEQ**	**OBR-2**	Sequence number	Sequence Number Sequential per OBR record in the Patient segment	4	Y	Y
(3)	**ONO**	**OBR-3**[1]	Requester specimen ID or accession number	Sample No. (Barcode No.)* (HOST side)	29	Y	N
(4)	SNO	OBR-4	Producer specimen ID or accession number	Sample No. (Barcode No.)* (SUIT side)	29	N	Y
(5)	**TESTID**	**OBR-5**	Observation battery ID	Test Item Code^Name When ordering multiple orders, use the Repeat character, “~”, to proceed as below: Code1^Name1~Code2^Name2 ~Code3^Name3 ~ … If OBR-5 is too long, the part that exceeded 200 characters cannot be registered. When it is over 200, it has to send the order twice for one sample. E.g. if the length becomes 300 bytes, separate it ex. 200+100 or 150+150 and so on. E.g. H, P, OBR, P, OBR, L E.g. H, P, OBR(ETB), OBR(ETX), L	200	Y	Y

(6)	PRI	OBR-6	Priority	Processing Priority Level: S: STAT / Urgent	1	Y	Y
(7)		OBR-7	Requested date-time	Not in use		-	-
(8)	CLDT	OBR-8	Specimen collection or observation date-time	Sample Collection Date/Time Format:YYYYMMDDHHMM	12	Y	Y
(9)		OBR-9	observation end-time	Not in use		-	-
(10)	CVLM	OBR-10	Collection volume	Collection Volume (Urine etc.): Unit ml	5	Y	Y
(11)		OBR-11	CollectorID	Not in use		-	-
(12)	**ACCD**	**OBR-12**	Action code	Order Process Code <For New Samples> Register with the following: “A”: Add the ordered “L”: Lab. To obtain a sample <For Registered Samples> “A”: Clear registered order(s), register the order as new. “L”: Add orders	1	Y	N
(13)		OBR-13	Danger code	Not in use.			
(14)	RCINF	OBR-14	Relevant clinical information	Patient Comment, Sample Comment The code for Patient Comment 1~2~3~4~5^the code for Sample Comment1~2	48	Y	Y
(15)	**RCDT**	**OBR-15**	Date and time of specimen receipt	Registration Date/Time Format: YYYYMMDDHHMM	12	Y	Y
(16)	SRC	OBR-16	Source of specimen	Tube Type Code, Collection Source Code Tube Type 1^Collection Source~ Tube Type 2^Collection Source~ …. Tube Type 9^Collection Source (Note) SUIT saves the Collection source of Tube Type 1 only.	98	Y	Y
(17)		OBR-17 - OBR-22		Not in use		-	-

(18)	DTR	OBR-23	Date and time observation reported or status changed	Report (Update) Date/Time Format:YYYYMMDDHHMM	12	N	Y
(19)		OBR-24	Producer's Change	Not in use		-	-
(20)	PSID	OBR-25	Producer's section ID	Testing Section ID	3	N	Y
(21)		OBR-26 - OBR-27		Not in use		-	-
(22)	QT	OBR-28	Quantity-Timing	Order Comment Code	6	Y	Y

[1.] **Refer chapter 5.5 Appendix E: Optional specification of OBR-3 management**

Note:

Mandatory Fields: OBR-1, OBR-2, OBR-3, OBR-5, OBR-12, OBR-15.

4.5 Test Result Record

Test Result Record includes information on the received results.

(Record Format)

OBX | SEQ | VTYPE | OBID | | OBVAL | UNT | | AFLG | | | | ORST | DT | | | | RSPS<C
(1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13) (14)

	Field	Field Code	Field Name	Description	Field Length (bytes)	HOST to SUIT	HOST from SUIT
(1)	OBX	OBX-1	Segment type ID	"OBX" Fixed	3	N	Y
(2)	SEQ	OBX-2	Sequence number	Sequence Number. Sequential per OBX Record in the Order Segment.	4	N	Y
(3)	VTYPE	OBX-3	Value type	Test Result Data format ST:Characters NM:Numeric Value CE:Code	2	N	Y
(4)	OBID	OBX-4	Observation identifier	Test Item Code^Name	61 (30^30)	N	Y
(5)		OBX-5		Not in use		-	-
(6)	OBVAL	OBX-6	Observation value	Test Result^Result Comment Code[1]^Dilution ratio The Dilution ratio is optional and not supported by any configuration E.g these examples are equivalent: 10 10^tel 10^tel^ 10^tel^1 10^^1 Be prepared for all varieties (When the test results are Test Comment, set the Test Comment Code)	106 (100^3^1)	N	Y
(7)	UNT	OBX-7	Units	Unit (optional)	10	N	Y
(8)		OBX-8		Not in use		-	-

1. "W" is set:
- when WBC, LYMPH# and LYMPH% are compensated by NRBC,
- NEUT# and NEUT% are compensated by IG or NRBC or
- WBC is reported by using WBC-D and PLT is reported by using PLT-O.

(9)	AFLG	OBX-9	Abnormal flags	Abnormal Value Flag: Upper/Lower Flag ~ Delta Check Flag L : Low H : High LL : Panic low HH : Panic high > : out if linearity W : low reliability A : Abnormal (Except numeric value data)	5 (2~2)	N	Y
(10)		OBX-10 - OBX-11		Not in use		-	-
(11)	ORST	OBX-12	Observation result status	Test Result Status ^ Latest Operation Test Result Status: P: Preliminary Report F: Final Result I: Pending C: Revision Report Latest Operation: Edit : input or edit Validate : manual validate Count : count at pad menu Manual Send : send manually (N/A) : others	22 (1^20)	N	Y
(12)	DT	OBX-13	Date/Time of last change in normal value or units	Sending Date/Time Format:YYYYMMDDHHMM	12	N	Y
(13)		OBX-14 - OBX-16		Not in use		-	-
(14)	RSPS	OBX-17	Responsible Observer	Latest Operator ID	6	N	Y

4.6 Comment Record

Comment Record includes the comments for the previous P, OBR, or OBX Record.

In case of following a P-Record, valid for SUIT Patient Free Comments.

In case of following an OBR-Record, valid for SUIT Order Free Comments.

In the case of following an OBX Record, valid for Sample Free Comments, IP Message, Graphic Data Information (File Name).

(Record Format)

```
C | SEQ |  | CMT <CR>
(1)  (2)  (3)  (4)
```

	Field	Field Code	Field Name	Description	Field Length (bytes)	HOST to SUIT	HOST from SUIT
(1)	C	C-1	Segment type ID	“C” Fixed	1	Y	Y
(2)	SEQ	C-2	Sequence number	Sequence Number. Sequential per C Record.	2	Y	Y
(3)		C-3		Not in use		-	-
(4)	CMT	C-4	Comment text	Comment Contents	100	Y	Y

To supply the LIMS with the graphical data of the analyzers, SUIT is transmitting the filename to host by using a C-Record.

For more details refer to chapter 5.1 Appendix A

4.7 Order Inquiry Record

In ASTM1238-94, this is used for Previous Order Information and Result Information Inquiry; however for SUIT this is used for the Query (Order Inquiry)

(Record Format)

```
 Q | SEQ |  | PROPID |  |  | DT <CR>
(1)  (2)  (3)   (4)     (5)  (6)
```

	Field	Field Code	Field Name	Description	Field Length (bytes)	HOST to SUIT	HOST from SUIT
(1)	Q	Q-1	Segment type ID	“Q” Fixed	1	N	Y
(2)	SEQ	Q-2	Sequence number	Sequence Number: 1 - 9999	4	N	Y
(3)		Q-3	Requestor Assigned patient ID	Not in use		-	-
(4)	PROPID	Q-4	Producer assigned patient ID	Sample No.~ Sample No.~…..	200	N	Y
(5)		Q-5 - Q-6		Not in use		-	-
(6)	DT	Q-7	Nature of request time limits	Registration Date/Time Format:YYYYMMDDHHMM (SUIT sets the Registration Date)	12	N	Y

4.8 Scientific Information Record

(Record Format)

S | SEQ | METH | INST | | | QC | | | | SID | ANA | RESULT | | | DT<CR>
(1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12)

	Field	Field Code	Field Name	Description	Field Length (bytes)	HOST to SUIT	HOST from SUIT
(1)	S	S-1	Segment type ID	“S” Fixed	1	N	Y
(2)	SEQ	S-2	Sequence number	Sequence Number: 1 – 9999	4	N	Y
(3)	METH	S-3	Analytical Method	Mode: “Manual” or “Closed”	10	N	Y
(4)	INST	S-4	Instrumentation	Analyzer Name or Instrument ID	10	N	Y
(5)		S-5 - S-6		Not in use		-	-
(6)	QC	S-7	Quality Control	“QC” Fixed	2	N	Y
(7)		S-8 - S-10		Not in use		-	-
(8)	SID	S-11	Specimen ID	Lot Number of Control Reagent	10	N	Y
(9)	ANA	S-12	Analytic	Analysis Item Name	8	N	Y
(10)	RESULT	S-13	Result	QC Data	8	N	Y
(11)		S-14 - S-15		Not in use		-	-
(12)	DT	S-16	Analysis Date and time	Measurement Date/Time YYYYMMDDHHMM	12	N	Y

4.9 End Mark Record

(Record Format)

```
L | SEQ |  | PCNT | LCNT <CR>
(1)  (2)  (3)  (4)    (5)
```

Note:

Mandatory Fields described in Bold Text

	Field	Field Code	Field Name	Description	Field Length (bytes)	HOST to SUIT	HOST from SUIT
(1)	**L**	**L-1**	Segment type ID	"L" Fixed	1	Y	Y
(2)	**SEQ**	**L-2**	Sequence number	Sequence Number: 1	1	Y	Y
(3)		L-3		Not in use		-	-
(4)	**PCNT**	**L-4**	Patient count	Total number of P Records in message.	4	Y	Y
(5)	**LCNT**	**L-5**	Line count	Total number of records, (end with <CR>), in message.	10	Y	Y

Mandatory Fields: L-1, L-2, L-4, L-5.

5 Appendixes

5.1 Appendix A: Information concerning the graphic-files management

Depending on the analyzer or solution type, SUIT is using two kinds of filenames for the graphic-files: BMP-Files or PNG-Files. Be prepared for both types and wait for our confirmation which file type has to be implemented at the respective installation site.

5.1.1 Case that SUIT supplies bmp-files

In this case the protocol will transmit only the filename. The host has to cut the files out of a specified shared folder. To distinguish between other C-Records the host can use the leading "@" as a trigger.

Example of file name:

4C|9||@DPL-52000000002.BMP[0DH][ETX]70[0DH][0AH]

Refer more log file examples at chapter 5.3.5.

The graphics listed below are possible:

Scatter Type		Scatter Data Type		Basic size	Section	Prefix	256 Color File size (byte)	24bit Color File size (byte)
1	Scatter	01	3Diff	128*128	Hematology	@3DI	17,462	49,206
		02	IMI	128*128	Hematology	@IMI	17,462	49,206
		03	Ret	128*128	Hematology	@RET	17,462	49,206
		04	Diff	128*128	Hematology	@DIF	17,462	49,206
		05	WBC/BASO	128*128	Hematology	@WBC	17,462	49,206
		06	Ret-Ext	128*128	Hematology	@REX	17,462	49,206
		07	PLT-O	128*128	Hematology	@PLT	17,462	49,206
		08	NRBC	128*128	Hematology	@NRB	17,462	49,206
		09	CD4	128*128	Hematology	@CD4	17,462	49,206
		10	RET-E	128*128	Hematology	@REX	17,462	49,206
		20	Fl2-Fsc	256*128	Urinalysis	@FL2	33,846	98,358
		21	Fscw-Flw	256*128	Urinalysis	@FSC	33,846	98,358
		22	Fl-Fsc	128*128	Urinalysis	@FSF	17,462	49,206
		23	Fscw-Fl	128*128	Urinalysis	@FLF	17,462	49,206
2	Histogram	01	WBC	128*64	Hematology	@DWB	9,270	24,630
		02	RBC	128*64	Hematology	@DRB	9.270	24.630
		03	PLT	128*64	Hematology	@DPL	9,270	24,630
		04	EO	128*64	Hematology	@EO_	9,270	24,630
		05	BASO	128*64	Hematology	@BAS	9,270	24,630
		06	RetX	128*64	Hematology	@REX	9,270	24,630
		07	RetY	128*64	Hematology	@REY	9,270	24,630
		08	CD4X	128*64	Hematology	@C4X	9,270	24,630
		09	CD4Y	128*64	Hematology	@C4Y	9,270	24,630
		10	RBC-Y	128*64	Hematology	@RBCY	9,270	24,630
		20	RBC-FSC	150*75	Urinalysis	@RGF	12,478	33,954
		21	WBC-FSC	150*75	Urinalysis	@WBF	12,478	33,954

5.1.2 Case that SUIT supplies “png” files

In this case SUIT is sending the graphics including the subfolders as png. The character string “**&r&**” in the name is representing a “\”.

To distinguish between other C-Records you have to use the leading “png” as a trigger.

Cut out these files from the specified location.

Example:
1C|3||PNG&R&20050627&R&2005_06_27_14_54_8205026_WBC_BASO.PNG[#13][#3]5A[#13][#10]

Refer log file example at chapter 5.3.4.

The following graphics are available:

Scatter Type		Scatter Data Type		Basic size	Section	Prefix	256 Color File size (byte)	24bit Color File size (byte)
1	Histogram	01	RBC-Y		Hematology	PNG		
	Histogram	02	RBC		Hematology	PNG		
	Histogram	03	PLT		Hematology	PNG		
	Scatter	04	WBC_BASO		Hematology	PNG		
	Scatter	05	PLT_O		Hematology	PNG		
	Scatter	06	DIFF		Hematology	PNG		
	Scatter	07	IMI		Hematology	PNG		
	Scatter	08	NRBC		Hematology	PNG		
	Scatter	09	RET		Hematology	PNG		
	Scatter	10	RET_EXT		Hematology	PNG		

5.1.3 Summary of which image file type is generated depending on analyzer or solution type

	Haematology devices stand alone	Urinanalysis devices stand alone	Coagulation devices stand alone	WAM solution SIS [TWIST/ELC]
Analyzer types / Solution type	*XN series:* - XN-1000 - XN-2000 - XN-9000 ---------- *XE series:* - XE5000i - XE2100 - XE2100D ---------- *XS series*: - XS1000i - XS800i ---------- *XT series:* - XT2000i - XT1800i - XT4000i	UF1000i UF500i	CS-2000i	**SIS / TWIST /ELC:** - XE series - XS series - XT series - K-4500 - K-X21 ---------- - DM8 & DM96 - *Manual differentiation WP* ---------- - UF50 - UF100 - UF100i - UF500i - UF1000i - *Dispstik reader*: o Cobas U411 o Urisys 1800 o Urisys 2400 o Miditron M o Clinitek Atlas o Clinitek 200+ o AX-4280 o AX-4030 ---------- - *CA series:* o CA-500 o CA-6000 o CA-7000 - *CS-2000i* ---------- - *VesCube* - *STARSED* ---------- - *Tube Sorter:* o TS-500 o TS-1000
Graphic file type	**PNG files**	**No image to host**	**No image to host**	**PNG or BMP.** Please wait of our confirmation

5.2 Appendix B: Examples of Logfiles

5.2.1 Query for an order with an answer of LIS for a registered sample

S: [ENQ]
R: [ACK]
S: [STX]1H|^~\&| | | | | | | | | | A.2|200508041245[CR][ETX]33[CR][LF]
R: [ACK]
S: [STX]2Q|1| | 995316031064| | | 200508041245[CR][ETX]7A[CR][LF]
R: [ACK]
S: [STX]3L|1| | 0|2[CR][ETX]12[CR][LF]
R: [ACK]
S: [EOT]

R: [ENQ]
S: [ACK]
R: [STX]1H|^~\&| | | | | | | | | | A.2|200508041240[CR][ETX]2E[CR][LF]
S: [ACK]
R: [STX]2P|1|516| | | ^9953160310| | 19401028|F| | | | | | | | | | | | | | | | | | | | | | | | | | | | 20050804[CR]
[ETX]B4[CR][LF]
S: [ACK]
R: [STX]3OBR|1|995316031064| | WBC~RBC~HGB~HCT~MCV~MCH~PLT| | | 200508041240| | | | A|
| | 200508041240| | | | 2001| | | | | | | | | R|[CR][ETX]65[CR][LF]
S: [ACK]
R: [STX]4L|1| | 1|4[CR][ETX]16[CR][LF]
S: [ACK]
R: [EOT]

5.2.2 Query for an order with an answer of LIS for an unknown sample

S: [ENQ]
R: [ACK]
S: [STX]1H|^~\&| | | | | | | | | | A.2|200508041211[CR][ETX]2C[CR][LF]
R: [ACK]
S: [STX]2Q|1| |1| | 200508041211[CR][ETX]35[CR][LF]
R: [ACK]
S: [STX]3L|1| | 0| 2[CR][ETX]12[CR][LF]
R: [ACK]
S: [EOT]

R: [ENQ]
S: [AC]
R: [STX]1H|^~\&| | | | | | | | | | A.2|200508041206[CR][STX]30[CR][LF]
S: [ACK]
R: [STX]2P|1| | | | ^| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 20050804[CR][STX]34[CR][LF]
S: [ACK]
R: [STX]3OBR|1|1| | | | | 200508041206| | | | A| | | 200508041206| | | | | | | | | | | | R|[CR][ETX]63[CR][LF]
S: [ACK]
R: [STX]4L|1| | 1|4[CR][ETX]16[CR][LF]
S: [ACK]
R: [EOT]

5.2.3 Order for multiple disciplines

R: [ENQ]
S: [ACK]
R: [STX]1H|^~\\| | | | | | | | | | | 200702161054[0Dh][ETX]8F[CR][LF]
S: [ACK]
R: [STX]2P|1|LSW-124579| | |AJNOS^ADDOORW| | 19740508|M| | | | | .| | | | | | | | | | | | |.[0Dh][ETX]72[CR][LF]
S: [ACK]
R: [STX]3C|1| | [0Dh][ETX]2B[CR][LF]
S: [ACK]
R: [STX]4OBR|1|07B00001| | RBC^~MCH^~MCHC^~PLT^~WBC^~| | |200702011003| | | | G| | |200702011428| | | | | | | | | | | | | R[0Dh][ETX]2C[CR][LF]
S: [ACK]
R: [STX]5P|2|LSW-124579| | |AJNOS^ADDOORW| | 19740508|M| | | | | .| | | | | | | | | | | | |.[0Dh][ETX]76[CR][LF]
S: [ACK]
R: [STX]6C|1| | [0Dh][ETX]2E[CR][LF]
S: [ACK]
R: [STX]7OBR|1|07B00001| | INR^~APTT^~DD^| | |200702011003| | | | G| | |200702011428| | | | | | | | | | | | |R[0Dh][ETX]23[CR][LF]
S: [ACK]
R: [STX]0L|1| | 1|8[0Dh][ETX]16[CR][LF]
S: [ACK]
R: [EOT]

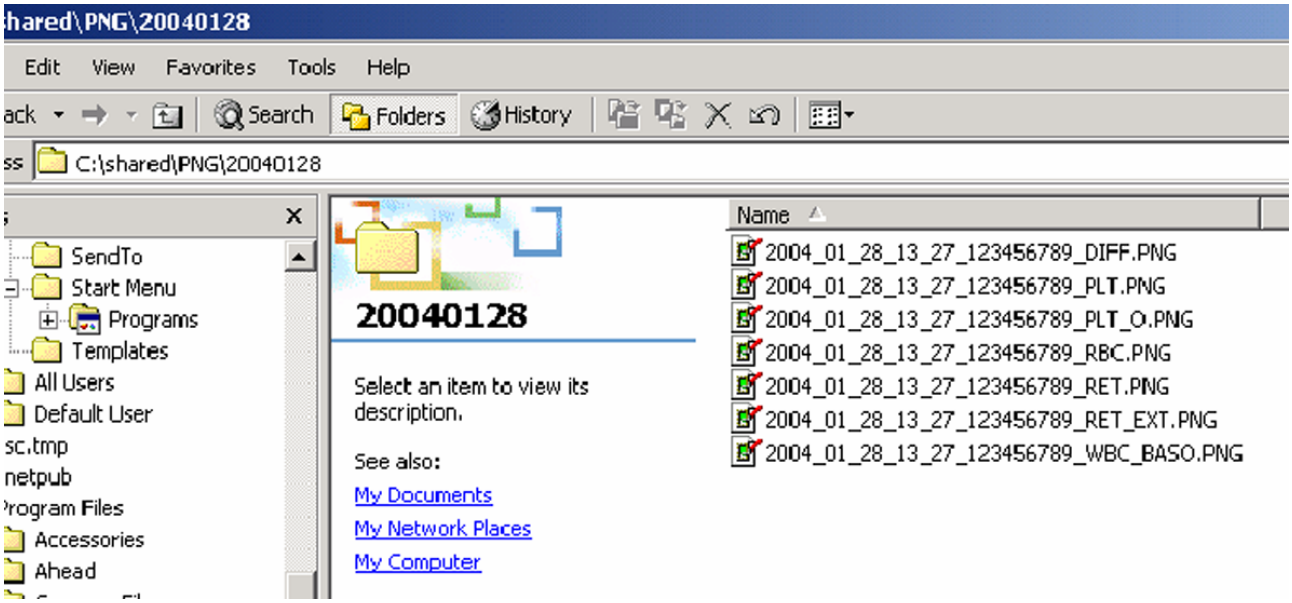
5.2.4 Result with graphical information in PNG-format

S: [ENQ]
R: [ACK]
S: S:[STX]1H|^~\&| | | | | | | | | |A.2|200508041154[CR][ETX]32[CR][LF]
R: [ACK]
S: [STX]2P|1| | | |^| | |U| | | | | | | | | | | | | | |^ | | | | | |[CR][ETX]54[CR][LF]
R: [ACK]
S: [STX]3C|1[CR][ETX]33[CR][LF]
R: [ACK]
S: [STX]4OBR|1| |840004804064| wbc~rbc~hgb~hct~mcv~mch~mchc~plt~neut%~lymph%~mono%~eo%
~baso%~ neut#~lymph#~mono#~eo#~baso#~rdw-sd~rdw-cv~pdw~mpv~p-lcr~pct~h_rack~h_tube~h_inid
~h_inst | | |200508041154| | | | | |200508041154| | | | | | |200508041154| |001| | | [CR][ETX]E1[CR][LF]
R: [ACK]
S: [STX]5C|1[CR][ETX]35[CR][LF]
R: [ACK]
S: [STX]6OBX|1|NM|WBC | |5.16^^1|10*3/uL | | | | |F^|200508041154 | | | |[CR][ETX]FE[CR][LF]
R: [ACK]
S: [STX]7OBX|2|NM|RBC | |5.23^^1|10*6/uL | |H | | |F^|200508041154 | | | |[CR][ETX]44[CR][LF]
R: [ACK]
S: [STX]0OBX|3|NM|HGB | |15.8^^1|g/dL | | | | |F^|200508041154 | | | |[CR][ETX]89[CR][LF]
R: [ACK]
S: [STX]1OBX|4|NM|HCT | |47.7^^1|% | | | | |F^|200508041154 | | | |[CR][ETX]7C[CR][LF]
R: [ACK]
S: [STX]2OBX|5|NM|MCV | |91.2^^1|fL | | | | |F^|200508041154 | | | |[CR][ETX]0C[CR][LF]
R: [ACK]
S: [STX]3OBX|6|NM|MCH | |30.2^^1|pg | | | | |F^|200508041154 | | | |[CR][ETX]1E[CR][LF]
R: [ACK]
S: [STX]4OBX|7|NM|MCHC | |33.1^^1|g/dL | | | | | | | |F^|200508041154 | | | |[CR][ETX]D4[CR][LF]
R: [ACK]
S: [STX]5OBX|8|NM|PLT | |274^^1|10*3/uL | | | | |F^|200508041154 | | | |[CR][ETX]EB[CR][LF]
R: [ACK]
S: [STX]6OBX|9|NM|NEUT% | |53.3^^1|% | | | | |F^|200508041154 | | | |[CR][ETX]01[CR][LF]
R: [ACK]
S: [STX]7OBX|10|NM|LYMPH% | |33.1^^1|% | | | | |F^|200508041154 | | | |[CR][ETX]74[CR][LF]
R: [ACK]

S: [STX]0OBX|11|NM|MONO% | |9.1^^1|% | | | | |F^|200508041154 | | | |[CR][ETX]F0[CR][LF]
R: [ACK]
S: [STX]1OBX|12|NM|EO% | |3.7^^1|% | | | | |F^|200508041154 | | | |[CR][ETX]4D[CR][LF]
R: [ACK]
S: [STX]2OBX|13|NM|BASO% | |0.8^^1|% | | | | |F^|200508041154 | | | |[CR][ETX]DE[CR][LF]
R: [ACK]
S: [STX]3OBX|14|NM|NEUT# | |2.75^^1|10*3/uL | | | | |F^|200508041154 | | | |[CR][ETX]B4[CR][LF]
R: [ACK]
S: [STX]4OBX|15|NM|LYMPH# | |1.71^^1|10*3/uL | | | | |F^|200508041154 | | | |[CR][ETX]FF[CR][LF]
R: [ACK]
S: [STX]5OBX|16|NM|MONO# | |0.47^^1|10*3/uL | | | | |F^|200508041154 | | | |[CR][ETX]B2[CR][LF]
R: [ACK]
S: [STX]6OBX|17|NM|EO# | |0.19^^1|10*3/uL | | | | |F^|200508041154 | | | |[CR][ETX]0E[CR][LF]
R: [ACK]
S: [STX]7OBX|18|NM|BASO# | |0.04^^1|10*3/uL | | | | |F^|200508041154 | | | |[CR][ETX]9B[CR][LF]
R: [ACK]

S: [STX]0OBX|19|NM|RDW-SD | |42.9^^1|fL | | | | |F^|200508041154 | | | |[CR][ETX]0D[CR][LF]
R: [ACK]
S: [STX]1OBX|20|NM|RDW-CV | |12.9^^1|% | | | | |F^|200508041154 | | | |[CR][ETX]78[CR][LF]
R: [ACK]
S: [STX]2OBX|21|NM|PDW | |13.2^^1|fL | | | | |F^|200508041154 | | | |[CR][ETX]39[CR][LF]
R: [ACK]
S: [STX]3OBX|22|NM|MPV | |10.7^^1|fL | | | | |F^|200508041154 | | | |[CR][ETX]45[CR][LF]
R: [ACK]
S: [STX]4OBX|23|NM|P-LCR | |29.5^^1|% | | | | |F^|200508041154 | | | |[CR][ETX]2D[CR][LF]
R: [ACK]
S: [STX]5OBX|24|NM|PCT | |0.29^^1|% | | | | |F^|200508041154 | | | |[CR][ETX]B3[CR][LF]
R: [ACK]
S: [STX]6OBX|25|NM|H_RACK | |1 | | | | | |F^ | | | | |[CR][ETX]8E[CR][LF]
R: [ACK]
S: [STX]7OBX|26|NM|H_TUBE | |1 | | | | | |F^ | | | | |[CR][ETX]9F[CR][LF]
R: [ACK]
S: [STX]0OBX|27|NM|H_INID | |11035 | | | | | |F^ | | | | |[CR][ETX]56[CR][LF]
R: [ACK]
S: [STX]1OBX|28|NM|H_INST | |XT-1800i | | | | | |F^ | | | | |[CR][ETX]83[CR][LF]
R: [ACK]
S: [STX]2C|1 | |PNG&R&20050804&R&2005_08_04_11_54_840004804064_PLT.PNG[CR][ETX]DF[CR][LF]
R: [ACK]
S: [STX]3C|2 | |PNG&R&20050804&R&2005_08_04_11_54_840004804064_RBC.PNG[CR][ETX]C8[CR][LF]
R: [ACK]
S: [STX]4C|3| |PNG&R&20050804&R&2005_08_04_11_54_840004804064_WBC_BASO.PNG[CR]
[ETX]53[CR][LF]
R: [ACK]
S: [STX]5C|4 | |PNG&R&20050804&R&2005_08_04_11_54_840004804064_DIFF.PNG[CR][ETX]0E[CR][LF]
R: [ACK]
S: [STX]6L|1 | |1|38[CR][ETX]4F[CR][LF]
R: [ACK]
S: [EOT]

Example of graphic-files in the explorer:



5.2.5 Result with graphical information in BMP-Format

S: [ENQ]
R: [ACK]
S: [STX]1H|^~\&| | | | | | | | | |A.2|200510281531[CR][ETX]30[CR][LF]
R: [ACK]
S: [STX]2P|1|123456578| | |Lucky^Luke| | 19471212|M| | | | D0003^Prof. James| | |0.0|0.0| | | | | | | C0001^399| | | | | | 20051028[CR][ETX]EA[CR][LF]
R: [ACK]
S: [STX]3OBR|1| | 1^1|c^CBC~cd^CBC+DIFF|S| | 200510281503| | | | | ~~~~^001~|200510281507|^29| | | | | | 200510281531| | 001| | |1[CR][ETX]BC[CR][LF]
R: [ACK]
S: [STX]4OBX|1|NM|H_RACK^RACK| | 1^| | | | | F^Manual Send|200510281531| | | | SIS [CR][ETX]E6[CR][LF]
R: [ACK]
S: [STX]5OBX|2|NM|H_TUBE^TUBE| | 1^| | | | | F^Manual Send|200510281531| | | | SIS [CR][ETX]06[CR][LF]
R: [ACK]
S: [STX]6OBX|3|ST|H_INST^Inst.| | XE-2100^| | | | | F^Manual Send|200510281531| | | | SIS [CR][ETX]1A[CR][LF]
R: [ACK]
S: [STX]7OBX|4|ST|H_INID^Analyzer| | A3627^| | | | | F^Manual Send|200510281531| | | | SIS [CR][ETX]02[CR][LF]
R: [ACK]
S: [STX]0OBX|5|NM|WBC^WBC| | 5.88^|10^3/uL| | | | | F^Manual Send|200510281531| | | | SIS [CR][ETX]39[CR][LF]
R: [ACK]
S: [STX]1OBX|6|NM|RBC^RBC| | 4.82^|10^6/uL| | | | | F^Manual Send|200510281531| | | | SIS [CR][ETX]2D[CR][LF]
R: [ACK]
S: [STX]2OBX|7|NM|HGB^HGB| | 15.1^|g/dl| | | | | F^Manual Send|200510281531| | | | SIS [CR][ETX]9D[CR][LF]
R: [ACK]

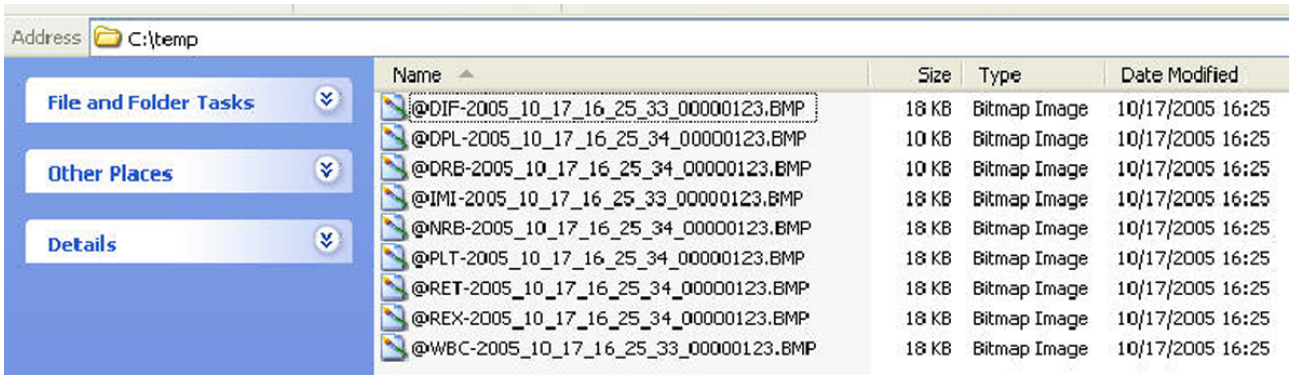
S: [STX]3OBX|8|NM|HCT^HCT| | 45.4^|%| | | | | F^Manual Send|200510281531| | | | SIS [CR][ETX]80[CR][LF]
R: [ACK]
S: [STX]4OBX|9|NM|MCV^MCV| | 94.0^|fL| | | | | F^Manual Send|200510281531| | | | SIS [CR][ETX]1D[CR][LF]
R: [ACK]
S: [STX]5OBX|10|NM|MCH^MCH| | 30.0^|pg| | | | | F^Manual Send|200510281531| | | | SIS [CR][ETX]45[CR][LF]
R: [ACK]
S: [STX]6OBX|11|NM|MCHC^MCHC| | 33.2^|g/dl| | | | | F^Manual Send|200510281531| | | | SIS [CR][ETX]61[CR][LF]
R: [ACK]
S: [STX]7OBX|12|NM|PLT^PLT| | 224^|10^3/uL| | | | | F^Manual Send|200510281531| | | | SIS [CR][ETX]5B[CR][LF]
R: [ACK]
S: [STX]0OBX|13|NM|RDW-SD^RDW-SD| | 44.7^|fL| | | | | F^Manual Send|200510281531| | | | SIS [CR][ETX]DC[CR][LF]
R: [ACK]
S: [STX]1OBX|14|NM|RDW-CV^RDW-CV| | 13.0^|%| | | | | F^Manual Send|200510281531| | | | SIS [CR][ETX]4A[CR][LF]
R: [ACK]

S: [STX]2OBX|15|NM|PDW^PDW| | 12.4^|fL| | | | | F^Manual Send|200510281531| | | | SIS [CR][ETX]4C[CR][LF]
R: [ACK]
S: [STX]3OBX|16|NM|MPV^MPV| | 10.8^|fL| | | | | F^Manual Send|200510281531| | | | SIS [CR][ETX]60[CR][LF]
R: [ACK]
S: [STX]4OBX|17|NM|P-LCR^P-LCR| | 31.5^|%| | | | | F^Manual Send|200510281531| | | | SIS [CR][ETX]AB[CR][LF]
R: [ACK]
S: [STX]5OBX|18|NM|PCT^PCT| | 0.24^|%| | | | | F^Manual Send|200510281531| | | | SIS [CR][ETX]BC[CR][LF]
R: [ACK]
S: [STX]6OBX|19|NM|NEUT#^NEUT#| | 3.33^|10^3/[B5h]l| | | | | F^Manual Send|200510281531| | | | SIS [CR][ETX]CE[CR][LF]
R: [ACK]
S: [STX]7OBX|20|NM|NEUT%^NEUT%| | 56.7^|%| | | | | F^Manual Send|200510281531| | | | SIS [CR][ETX]B7[CR][LF]
R: [ACK]
S: [STX]0OBX|21|NM|IG%^IG%| | 0.0^| | | | | | F^Manual Send|200510281531| | | | SIS [CR][ETX]F2[CR][LF]
R: [ACK]
S: [STX]1OBX|22|NM|IG#^IG#| | 0.00^| | | | | | F^Manual Send|200510281531| | | | SIS [CR][ETX]20[CR][LF]
R: [ACK]
S: [STX]2OBX|23|NM|LYMPH#^LYMPH#| | 2.03^|10^3/[B5h]l| | | | | F^Manual Send|200510281531| | | | SIS [CR][ETX]5D[CR][LF]
R: [ACK]
S: [STX]3OBX|24|NM|LYMPH%^LYMPH%| | 34.5^|%| | | | | F^Manual Send|200510281531| | | | SIS [CR][ETX]4D[CR][LF]
R: [ACK]
S: [STX]4OBX|25|NM|MONO#^MONO#| | 0.32^|10^3/[B5h]l| | | | | F^Manual Send|200510281531| | | | SIS [CR][ETX]BF[CR][LF]
R: [ACK]
S: [STX]5OBX|26|NM|MONO%^MONO%| | 5.4^|%| | | | | F^Manual Send|200510281531| | | | SIS [CR][ETX]7C[CR][LF]
R: [ACK]
S: [STX]6OBX|27|NM|EO#^EO#| | 0.16^|10^3/[B5h]l| | | | | F^Manual Send|200510281531| | | | SIS [CR][ETX]7B[CR][LF]
R: [ACK]

S: [STX]7OBX|28|NM|EO%^EO%| | 2.8^|%| | | | | F^Manual Send|200510281531| | | | SIS [CR][ETX]37[CR][LF]
R: [ACK]
S: [STX]0OBX|29|NM|BASO#^BASO#| | 0.04^|10^3/[B5h]l| | | | | F^Manual Send|200510281531| | | | SIS [CR][ETX]96[CR][LF]
R: [ACK]
S: [STX]1OBX|30|NM|BASO%^BASO%| | 0.6^|%| | | | | F^Manual Send|200510281531| | | | SIS [CR][ETX]48[CR][LF]
R: [ACK]
S: [STX]2C|1| | @DIF-2005_10_28_15_31_44_00000001.BMP[CR][ETX]F6[CR][LF]
R: [ACK]
S: [STX]3C|2| | @WBC-2005_10_28_15_31_44_00000001.BMP[CR][ETX]01[CR][LF]
R: [ACK]
S: [STX]4C|3| | @IMI-2005_10_28_15_31_44_00000001.BMP[CR][ETX]06[CR][LF]
R: [ACK]
S: [STX]5C|4| | @RET-2005_10_28_15_31_44_00000001.BMP[CR][ETX]14[CR][LF]
R: [ACK]

S: [STX]6C|5| | @PLT-2005_10_28_15_31_44_00000001.BMP[CR][ETX]1B[CR][LF]
R: [ACK]
S: [STX]7C|6| | @REX-2005_10_28_15_31_44_00000001.BMP[CR][ETX]1C[CR][LF]
R: [ACK]
S: [STX]0C|7| | @NRB-2005_10_28_15_31_44_00000001.BMP[CR][ETX]09[CR][LF]
R: [ACK]
S: [STX]1C|8| | @DRB-2005_10_28_15_31_44_00000001.BMP[CR][ETX]01[CR][LF]
R: [ACK]
S: [STX]2C|9| | @DPL-2005_10_28_15_31_44_00000001.BMP[CR][ETX]0B[CR][LF]
R: [ACK]
S: [STX]3L|1| | 1|43[CR][ETX]48[CR][LF]
R: [ACK]
S: [EOT]

Example of graphic-files in the explorer.



5.2.6 Quality Control log files

There are two methods to send a quality control results from the analyzer to the host.

Method 1:

One method is that the user is sending the quality control out of the IPU's sample explorer. In this case the sample will get the lot number of the actual QC as sample number.

E.g.: QC-51470801

For each parameter the analyzer-id and the measurement-mode is transmitted, too.

S: [ENQ]
R: [ACK]
S: [STX]1H|^~\&| | | | | | | | | |A.2|200506271532[CR][ETX]35[CR][LF]
R: [ACK]
S: [STX]2S|1|Manual|A2424| | | QC| | | | QC-51470801|WBC|2.27| | | 20050627153202|[CR][ETX]C8[CR][LF]
R: [ACK]
S: [STX]3S|2|Manual|A2424| | | QC| | | | QC-51470801|RBC|2.30| | | 20050627153202|[CR][ETX]BF[CR][LF]
R: [ACK]
S: [STX]4S|3|Manual|A2424| | | QC| | | | QC-51470801|HGB|6.0| | | 20050627153202|[CR][ETX]8C[CR][LF]
R: [ACK]
S: [STX]5S|4|Manual|A2424| | | QC| | | | QC-51470801|HCT|17.6| | | 20050627153202|[CR][ETX]D4[CR][LF]
R: [ACK]
S: [STX]6S|5|Manual|A2424| | | QC| | | | QC-51470801|MCV|76.5| | | 20050627153202|[CR][ETX]E1[CR][LF] | | | | R: [ACK]
S: [STX]1S|16|Manual|A2424| | | QC| | | | QC-51470801|MONO#|0.24| | | 20050627153202|[CR][ETX]78[CR][LF]
R: [ACK]
S: [STX]2S|17|Manual|A2424| | | QC| | | | QC-51470801|EO#|0.17| | | 20050627153202|[CR][ETX]D7[CR][LF]
R: [ACK]
S: [STX]3S|18|Manual|A2424| | | QC| | | | QC-51470801|BASO#|1.38| | | 20050627153202|[CR][ETX]6E[CR][LF]
R: [ACK]
S: [STX]4S|19|Manual|A2424| | | QC| | | | QC-51470801|IG%|10.1| | | 20050627153202|[CR][ETX]D3[CR][LF]
R: [ACK]
S: [STX]5S|20|Manual|A2424| | | QC| | | | QC-51470801|IG#|0.23| | | 20050627153202|[CR][ETX]CD[CR][LF]
R: [ACK]
S: [STX]6S|21|Manual|A2424| | | QC| | | | QC-51470801|NRBC%|100.0| | | 20050627153202 |[CR][ETX]92 [CR][LF]
R: [ACK]
S: [STX]7S|22|Manual|A2424| | | QC| | | | QC-51470801|NRBC#|2.38| | | 20050627153202 |[CR][ETX]6E [CR][LF]
R: [ACK]
S: [STX]0S|23|Manual|A2424| | | QC| | | | QC-51470801|RDW-SD|42.7| | | 20050627153202 |[CR][ETX]D1[CR] [LF]
R: [ACK]
S: [STX]1S|24|Manual|A2424| | | QC| | | | QC-51470801|RDW-CV|15.3| | | 20050627153202 |[CR][ETX]D1 [CR][LF]
R: [ACK]
S: [STX]2S|25|Manual|A2424| | | QC| | | | QC-51470801|PDW|9.1| | | 20050627153202|[CR][ETX]DC[CR][LF]
R: [ACK]
S: [STX]3S|26|Manual|A2424| | | QC| | | | QC-51470801|MPV|9.8| | | 20050627153202|[CR][ETX]ED[CR][LF]
S: [STX]4S|27|Manual|A2424| | | QC| | | | QC-51470801|P-LCR|19.6| | | 20050627153202|[CR][ETX]89[CR][LF]
R: [ACK]
R: [ACK]

S: [STX]5S|28|Manual|A2424| | | QC| | | | QC-51470801|PCT|0.05| | | 20050627153202|[CR][ETX]09[CR][LF]
R: [ACK]
S: [STX]6S|29|Manual|A2424| | | QC| | | | QC-51470801|RET%|6.92| | | 20050627153202|[CR][ETX]40[CR][LF]
R: [ACK]
S: [STX]7S|30|Manual|A2424| | | QC| | | | QC-51470801|RET#|0.1592| | | 20050627153202|[CR][ETX]97[CR][LF]
R: [ACK]
S: [STX]0S|31|Manual|A2424| | | QC| | | | QC-51470801|IRF|36.6| | | 20050627153202|[CR][ETX]02[CR][LF]
R: [ACK]
S: [STX]1S|32|Manual|A2424| | | QC| | | | QC-51470801|LFR|63.4| | | 20050627153202|[CR][ETX]05[CR][LF]
R: [ACK]
S: [STX]2S|33|Manual|A2424| | | QC| | | | QC-51470801|MFR|29.7| | | 20050627153202|[CR][ETX]0D[CR][LF]
R: [ACK]
S: [STX]3S|34|Manual|A2424| | | QC| | | | QC-51470801|HFR|6.9| | | 20050627153202|[CR][ETX]D7[CR][LF]
R: [ACK]
S: [STX]4S|35|Manual|A2424| | | QC| | | | QC-51470801|RET-HE|20.7| | |
20050627153202|[CR][ETX]C8[CR][LF]
R: [ACK]
S: [STX]5S|36|Manual|A2424| | | QC| | | | QC-51470801|IPF|22.2| | | 20050627153202|[CR][ETX]01[CR][LF]
R: [ACK]
S: [STX]6S|37|Manual|A2424| | | QC| | | | QC-51470801|H_R[ACK]| | | | 20050627153202|[CR][ETX]28[CR][LF]
R: [ACK]
S: [STX]7S|38|Manual|A2424| | | QC| | | | QC-51470801|H_TUBE| | | | 20050627153202|[CR][ETX]39[CR][LF]
R: [ACK]
S: [STX]0S|39|Manual|A2424| | | QC| | | | QC-51470801|H_INID|A2424| | |
20050627153202|[CR][ETX]34[CR][LF]
R: [ACK]
S: [STX]1S|40|Manual|A2424| | | QC| | | | QC-51470801|H_INST|XE-2100| | |
20050627153202|[CR][ETX]C7[CR][LF]
R: [ACK]
S: [STX]2L|1| | 0|42[CR][ETX]45[CR][LF]
R: [ACK]
S: [EOT]

Method 2:

Another method consists that the user will send the quality by using the QC-Charts of the analyzer. In this case the file number of the charts will be used as sample number.

E.g.: 11 for the file no. 11

S: [ENQ]
R: [ACK]
S: [STX]1H|^~\&| | | | | | | | | |A.2|200506271532[CR][ETX]35[CR][LF]
R: [ACK]
S: [STX]2S|1|Manual|A2424| | | QC| | | | 11|WBC|2.27| | | 20050627153207|[CR][ETX]54[CR][LF]
R: [ACK]
S: [STX]3S|2|Manual|A2424| | | QC| | | | 11|RBC|2.30| | | 20050627153207|[CR][ETX]4B[CR][LF]
R: [ACK]
S: [STX]4S|3|Manual|A2424| | | QC| | | | 11|HGB|6.0| | | 20050627153207|[CR][ETX]18[CR][LF]
R: [ACK]
S: [STX]5S|4|Manual|A2424| | | QC| | | | 11|HCT|17.6| | | 20050627153207|[CR][ETX]60[CR][LF]
R: [ACK]
S: [STX]6S|5|Manual|A2424| | | QC| | | | 11|MCV|76.5| | | 20050627153207|[CR][ETX]6D[CR][LF]
R: [ACK]
S: [STX]7S|6|Manual|A2424| | | QC| | | | 11|MCH|26.1| | | 20050627153207|[CR][ETX]58[CR][LF]
R: [ACK]
S: [STX]0S|7|Manual|A2424| | | QC| | | | 11|MCHC|34.1| | | 20050627153207|[CR][ETX]94[CR][LF]
R: [ACK]
S: [STX]1S|8|Manual|A2424| | | QC| | | | 11|PLT|54| | | 20050627153207|[CR][ETX]0E[CR][LF]
R: [ACK]
S: [STX]2S|9|Manual|A2424| | | QC| | | | 11|NEUT%|44.9| | | 20050627153207|[CR][ETX]E7[CR][LF]
R: [ACK]
S: [STX]3S|10|Manual|A2424| | | QC| | | | 11|LYMPH%|37.0| | | 20050627153207|[CR][ETX]57[CR][LF]
R: [ACK]
S: [STX]4S|11|Manual|A2424| | | QC| | | | 11|MONO%|10.6| | | 20050627153207|[CR][ETX]05[CR][LF]
R: [ACK]
S: [STX]5S|12|Manual|A2424| | | QC| | | | 11|EO%|7.5| | | 20050627153207|[CR][ETX]37[CR][LF]
R: [ACK]
S: [STX]6S|13|Manual|A2424| | | QC| | | | 11|BASO%|60.8| | | 20050627153207|[CR][ETX]FC[CR][LF]
R: [ACK]
S: [STX]7S|14|Manual|A2424| | | QC| | | | 11|NEUT#|1.02| | | 20050627153207|[CR][ETX]08[CR][LF]
R: [ACK]
S: [STX]0S|15|Manual|A2424| | | QC| | | | 11|LYMPH#|0.84| | | 20050627153207|[CR][ETX]59[CR][LF]
R: [ACK]
S: [STX]1S|16|Manual|A2424| | | QC| | | | 11|MONO#|0.24| | | 20050627153207|[CR][ETX]04[CR][LF]
R: [ACK]
S: [STX]2S|17|Manual|A2424| | | QC| | | | 11|EO#|0.17| | | 20050627153207|[CR][ETX]63[CR][LF]
R: [ACK]
S: [STX]3S|18|Manual|A2424| | | QC| | | | 11|BASO#|1.38| | | 20050627153207|[CR][ETX]FA[CR][LF]
R: [ACK]
S: [STX]4S|19|Manual|A2424| | | QC| | | | 11|IG%|10.1| | | 20050627153207|[CR][ETX]5F[CR][LF]
R: [ACK]
S: [STX]5S|20|Manual|A2424| | | QC| | | | 11|IG#|0.23| | | 20050627153207|[CR][ETX]59[CR][LF]
R: [ACK]
S: [STX]6S|21|Manual|A2424| | | QC| | | | 11|NRBC%|100.0| | | 20050627153207|[CR][ETX]1E[CR][LF]
R: [ACK]
S: [STX]7S|22|Manual|A2424| | | QC| | | | 11|NRBC#|2.38| | | 20050627153207|[CR][ETX]FA[CR][LF]
R: [ACK]
S: [STX]0S|23|Manual|A2424| | | QC| | | | 11|RDW-SD|42.7| | | 20050627153207|[CR][ETX]5D[CR][LF]
R: [ACK]
S: [STX]1S|24|Manual|A2424| | | QC| | | | 11|RDW-CV|15.3| | | 20050627153207|[CR][ETX]5D[CR][LF]

R: [ACK]
S: [STX]2S|25|Manual|A2424| | | QC| | | | 11|PDW|9.1| | | 20050627153207|[CR][ETX]68[CR][LF]
R: [ACK]
S: [STX]3S|26|Manual|A2424| | | QC| | | | 11|MPV|9.8| | | 20050627153207|[CR][ETX]79[CR][LF]
R: [ACK]
S: [STX]4S|27|Manual|A2424| | | QC| | | | 11|P-LCR|19.6| | | 20050627153207|[CR][ETX]15[CR][LF]
R: [ACK]
S: [STX]5S|28|Manual|A2424| | | QC| | | | 11|PCT|0.05| | | 20050627153207|[CR][ETX]95[CR][LF]
R: [ACK]
S: [STX]6S|29|Manual|A2424| | | QC| | | | 11|RET%|6.92| | | 20050627153207|[CR][ETX]CC[CR][LF]
R: [ACK]
RS: [STX]7S|30|Manual|A2424| | | QC| | | | 11|RET#|0.1592| | | 20050627153207|[CR][ETX]23[CR][LF]
R: [ACK]
S: [STX]0S|31|Manual|A2424| | | QC| | | | 11|IRF|36.6| | | 20050627153207|[CR][ETX]8E[CR][LF]
R: [ACK]
S: [STX]1S|32|Manual|A2424| | | QC| | | | 11|LFR|63.4| | | 20050627153207|[CR][ETX]91[CR][LF]
R: [ACK]
S: [STX]2S|33|Manual|A2424| | | QC| | | | 11|MFR|29.7| | | 20050627153207|[CR][ETX]99[CR][LF]
R: [ACK]
S: [STX]3S|34|Manual|A2424| | | QC| | | | 11|HFR|6.9| | | 20050627153207|[CR][ETX]63[CR][LF]
R: [ACK]
S: [STX]4S|35|Manual|A2424| | | QC| | | | 11|RET-HE|20.7| | | 20050627153207|[CR][ETX]54[CR][LF]
R: [ACK]
S: [STX]5S|36|Manual|A2424| | | QC| | | | 11|IPF|22.2| | | 20050627153207|[CR][ETX]8D[CR][LF]
R: [ACK]
S: [STX]6S|37|Manual|A2424| | | QC| | | | 11|BASO-X|112.4| | | 20050627153207|[CR][ETX]8C[CR][LF]
R: [ACK]
S: [STX]7S|38|Manual|A2424| | | QC| | | | 11|BASO-Y|123.6| | | 20050627153207|[CR][ETX]93[CR][LF]
R: [ACK]
S: [STX]0S|39|Manual|A2424| | | QC| | | | 11|DIFF-X|152.8| | | 20050627153207|[CR][ETX]84[CR][LF]
R: [ACK]
S: [STX]1S|40|Manual|A2424| | | QC| | | | 11|DIFF-Y|62.5| | | 20050627153207|[CR][ETX]4B[CR][LF]
R: [ACK]
S: [STX]2S|41|Manual|A2424| | | QC| | | | 11|NRBC-X|197.5| | | 20050627153207|[CR][ETX]91[CR][LF]
R: [ACK]
S: [STX]3S|42|Manual|A2424| | | QC| | | | 11|NRBC-Y|131.7| | | 20050627153207|[CR][ETX]8A[CR][LF]
R: [ACK]
S: [STX]4S|43|Manual|A2424| | | QC| | | | 11|IMI#|1182| | | 20050627153207|[CR][ETX]B5[CR][LF]
R: [ACK]
S: [STX]5S|44|Manual|A2424| | | QC| | | | 11|IMI-DC|503.9| | | 20050627153207|[CR][ETX]7B[CR][LF]
R: [ACK]
S: [STX]6S|45|Manual|A2424| | | QC| | | | 11|IMI-RF|164.1| | | 20050627153207|[CR][ETX]89[CR][LF]
R: [ACK]
S: [STX]7S|46|Manual|A2424| | | QC| | | | 11|RBC-O|2.21| | | 20050627153207|[CR][ETX]03[CR][LF]
R: [ACK]
S: [STX]0S|47|Manual|A2424| | | QC| | | | 11|PLT-O|66| | | 20050627153207|[CR][ETX]BF[CR][LF]
R: [ACK]
S: [STX]1S|48|Manual|A2424| | | QC| | | | 11|RBC-Y|152.5| | | 20050627153207|[CR][ETX]41[CR][LF]
R: [ACK]
S: [STX]2S|49|Manual|A2424| | | QC| | | | 11|H_R[ACK]| | | | 20050627153207|[CR][ETX]B3[CR][LF]
R: [ACK]
S: [STX]3S|50|Manual|A2424| | | QC| | | | 11|H_TUBE| | | | 20050627153207|[CR][ETX]BB[CR][LF]
R: [ACK]
S: [STX]4S|51|Manual|A2424| | | QC| | | | 11|H_INID|A2424| | | 20050627153207|[CR][ETX]BE[CR][LF]
R: [ACK]
S: [STX]5S|52|Manual|A2424| | | QC| | | | 11|H_INST|XE-2100| | | 20050627153207|[CR][ETX]5A[CR][LF]
R: [ACK]
S: [STX]6L|1| | 0|54[CR][ETX]4C[CR][LF]
R: [ACK]
S: [EOT]

5.3 Appendix C: host codes

5.3.1 Haematology section

Haematology	Code	Parameter name
CBC	WBC	Number of all leukocytes
	RBC	Number of all erythrocytes
	HGB	Hemoglobin concentration
	HCT	Hematocrit value: Erythrocytes ratio of total blood volume
	MCH	Mean erythrocyte volume in total sample
	MCHC	Mean hemoglobin volume per RBC
	MCV	Mean hemoglobin concentration of erythrocytes
	PLT	Number of all platelets
	RDW-CV	Calculated distribution width of erythrocytes, coefficient of variation
	RDW-SD	Calculated distribution width of erythrocytes, standard deviation
	P-LCR	Platelet- Large Cell Ratio
	PCT	Plateletcrit
	PDW	Calculated distribution width of platelets
	MPV	Mean platelet volume
	PLT-INFO[1]	Info which indicated if the PLT value was corrected by RET channel
	WBC-INFO[2]	Info which indicated if WBC value was corrected by NRBC count
DIFF	NEUT#	Neutrophil Count
	NEUT%	Neutrophil Percent
	LYMPH#	Lymphocyte Count
	LYMPH%	Lymphocyte Percent
	MONO#	Monocyte Count
	MONO%	Monocyte Percent
	EO#	Eosinophil Count
	EO%	Eosinophil Percent
	BASO#	Basophil Count
	BASO%	Basophil Percent
	IG# [3]	Immature granulocytes in #
	IG% [3]	Immature granulocytes in %
	HPC#[4]	Hematopoietic Progenitor Cell Count
RET	RET#	Reticulocyte Count
	RET%	Reticulocyte Percent
	RET-HE [5]	Reticulocyte Hemoglobin Equivalent
	LFR	Low Fluorescence Ratio
	MFR	Middle Fluorescence Ratio
	HFR	High Fluorescence Ratio
	IRF	Immature Reticulocyte Fraction
	IPF [5]	Reticulocyte Hemoglobin Equivalent
NRBC	NRBC#	Nucleated RBC Count
	NRBC%	Nucleated RBC Percent
BF (Bodyfluid)	MN# [6]	Mononuclear Cell Count
	MN%[6]	Mononuclear Cell Percent
	PMN# [6]	Polymorphonuclear Cell Count
	PMN% [6]	Polymorphonuclear Cell Count
	WBC-BF[6]	WBC Body Fluid
	RBC-BF[6]	RBC Body Fluid
	TC-BF[6]	Total cell count body fluid

[1] If result “0” means not corrected, if result “1” = corrected
[2] If result “0” means not corrected, if result “1” = corrected
[3] Output analysis results when either NEUT# or NEUT% is ordered
[4] Output analysis results when analyzed in the HPC mode
[5] Output analysis results when one of RET#, RET%, LFR, MFR, HFR and IRF is ordered

[6] Output analysis results when analyzed in the Body Fluid mode"

Haematology	Code	Parameter name
Research parameter	WBC-B	
	WBC-D	
	NEUT%_RESEARCH	
	LYMPH%_RESEARC	
	MONO%_RESEARCH	
	EO%_RESEARCH	
	BASO%_RESEARCH	
	NEUT#_RESEARCH	
	LYMPH#_RESEARCH	
	MONO#_RESEARCH	
	EO#_RESEARCH	
	BASO#_RESEARCH	
	IG%_RESEARCH	
	IG#_RESEARCH	
	RBC-BF_RESEARCH	
	BASO-X	
	BASO-Y	
	DIFF-X	
	DIFF-Y	
	NRBC-X	
	NRBC-Y	
	IMI#	
	IMI-DC	
	IMI-RF	
	RBC-O	
	PLT-O	
	RBC-X	
	RBC-Y	
	d-RBC	
	d-PLT	
	Dw/X	
	Dw/Y	
	NEUT#&	
	NEUT%&	
	LYMPH#&	
	LYMPH%&	
	HFLC#	
	HFLC%	
	AREA#	
	AREA%	
	NRBC+W	
	NEUT-X	
	NEUT-Y	
	PLT-I	
	HF-BF#	
	HF-BF%	
	TC-BF#[1]	
	FRC#	

Haematology	Code	Parameter name
Research parameter	FRC%	
	IRF-Y	
	LSCRBC	
	HSCRBC	
	HYPOHE	
	HYPRHE	
	MICROR	
	MACROR	
	H-IPF	
	IPF#	
	PLT-X	
	RBC-HE	
	D-HE	
	RET-Y	
	RPI	
	EO-BF#	
	EO-BF%	
	TC-PMN%*	
	TC-MN%*	
	TC-EO%*	
	TC-HF%*	
	TNC-D	
	BA-D#	
	BA-D%	
	NE-SSC	
	NE-SFL	
	NE-FSC	
	LY-X	
	LY-Y	
	LY-Z	
	MO-X	
	MO-Y	
	MO-Z	
	NE-WX	
	NE-WY	
	NE-WZ	
	LY-WX	
	LY-WY	
	LY-WZ	
	MO-WX	
	MO-WY	
	MO-WZ	
	WBC-D	
	RBC-He	
	D-He (Delta-He)	
	UPP(RET)	
	TNC(RET)	
	WBC-P	
	TNC-P	
	AREA1#(PLTF)	
	NE-BF#	
	NE-BF%	

Haematology	Code	Parameter name
	LY-BF#	
	LY-BF%	
	MO-BF#	
	MO-BF%	
	RBC-BF(Research)	
Service parameter	WNR-X	
	WNR-Y	
	WNR-Z	
	WNR-WX	
	WNR-WY	
	NRBC-1#	
	NRBC-2#	
	NRBC-1%	
	NRBC-2%	
	HGB-BLANK	
	HGB-SAMPLE	
	R-MFV	
	S-RBC	
	S-MCV	
	L-RBC	
	L-MCV	
	P-MFV	
	WDF-X	
	WDF-Y	
	WDF-Z	
	WDF-WX	
	WDF-WY	
	WBC-FX(WDF)	
	DLT-WBCD	
	RBC-X	
	RET-X	
	RBC-Z	
	RBC-WX	
	RBC-WY	
	DLT-RBC	
	DLT-PLTO	
	Unclassified(RET)	
	WPC-X	
	WPC-Y	
	WPC-Z	
	DLT-WBCP	
	AREA1#(WPC)	
	AREA2#(WPC)	
	AREA3#(WPC)	
	WPC-GR#	
	WPC-LY#	
	WPC-MO#	
	WPC-LY2#	
	WPC-SC#	
	WPC-FL-H1#	
	WPC-FL-H2#	
	WPC-FL-H3#	
	WPC-FL-L1#	

Haematology	Code	Parameter name
Service parameter	WPC-LC1#	
	WPC-LC2#	
	WPC-GR-X	
	WPC-GR-Y	
	WPC-GR-Z	
	WPC-LY-X	
	WPC-LY-Y	
	WPC-LY-Z	
	WPC-MO-X	
	WPC-MO-Y	
	WPC-MO-Z	
	WPC-LY2-X	
	WPC-LY2-Z	
	WPC-SC-X	
	WPC-SC-Z	
	PLTF-X	
	PLTF-Y	
	PLTF-Z	
	RBC-X(PLTF)	
	RBC-Y(PLTF)	
	RBC-Z(PLTF)	
	RBC-WX(PLTF)	
	RBC-WY(PLTF)	
	DLT-PLTF	
	RBC-BF-I	
	RBC-BF-O	
	LY-BF1#	
	LY-BF2#	
	MO-BF1#	
	MO-BF2#	
	MO-BF3#	
	HF-BF1#	
	HF-BF2#	
	LY-BF1%	
	LY-BF2%	
	MO-BF1%	
	MO-BF2%	
	MO-BF3%	
	HF-BF1%	
	HF-BF2%	

[1]Output analysis results when analyzed in the Body Fluid mode

* Theses research parameters are only available with the WAM solution SIS

Disclaimer

Research Parameter + Service Parameter

Parameter defined as “research parameters” (listed at table above) and “service parameters” and which are obtained from in vitro examination of specimens derived from the human body used for the purpose of providing information:

- concerning a physiological or pathological state, or
- concerning a congenital abnormality, or
- to determine the safety and compatibility with potential recipients, or
- to monitor therapeutic measures

are not officially intended by SYSMEX to be included in patient’s reports as “reportable (diagnostic) parameters”.

If the user/licencee of the Sysmex instruments wants to use these Research Parameter + Service Parameter in official diagnosis for patients or in patient reports, he may do so, but before he can use them for this purpose, it is under his own responsibility to make a full evaluation of data, limitations, interferences and complete risk management (ISO 14971) after In-vitro Diagnostic Directive. (IVDD 98/79/EC, Annex VIII) and its national transpositions in EU member states law.

5.3.2 Urinalysis section

Urinanalysis	Code	Parameter name
Urinanalysis	RBC	Red blood cell
	WBC	White blood cell
	EC	Epithelial cell
	BACT	Bacteria
	Path.Cast **(*)**	Pathological Cast
	SRC **(*)**	Small round cell
	SPERM **(*)**	Spermatozoa
	X'TAL **(*)**	Crystal
	MUCUS **(*)**	Mucus
	COND. **(*)**	Conductivity (urine conductivity)
	COND-Info[1]	Urinary concentration (urine concentration Information)
	RBC-Info [2]	RBC-Information (RBC forms Information)
	UTI-Info [3]	UTI-Information
	CAST	Cast
	YLC **(*)**	Yeast like cell
	FLAG_REVIEW [4]	
	FLAG_ERROR [5]	
	FLAG_IDERROR [6]	
	SAMPLE_SOURCE[7]	
	SAMPLE_COLOR [8]	
	SAMPLE_CLARITY[9]	
	TOTAL_SEDch	
	TOTAL_BACch	

1 COND_Info: The result "0" means "not flagged, "1" means "Rank 1", "2" means "Rank 2", "3" means "Rank 3", "4" means "Rank 4", "5" means "Rank 5"

2 RBC_Info: The result "0" means "RBC negative", "1" means "Isomorphic?", "2" means "Dismorphic?", "3" means "Mixed?"

3 UTI_Info: The result of "0" means "not flagged", "1" means "UTI?"

4 FLAG_REVIEW: The result of "0" means "not flagged", "1" means "REVIEW"

5 FLAG_ERROR: The result of "0" means "not flagged", "1" means "Analysis error"

6 FLAG_IDERROR: The result of "0" means "not flagged", "1" means "ID read error occurred"

7 SAMPLE_SOURCE: The result "0" means "Sample collected optionally, "1" means "Sample collected in the morning", "2" means "Sample accumulated during a period of time", "3" means "Sample collected after meal", "4" means "Sample collected through Catheter", "*" means "Uncertain sample"

8 SAMPLE_COLOR: The result "0" means "water-white", "1" means "light yellow brown", "2" means "brown", "3" means "yellow brown", "4" means "orange", "5" means "red", "6" means "dark brown", "7" means "green" , "8" means "blue", "9" means "milky white", "*" means "Uncertain"

9 SAMPLE_CLARITY: The result "0" means "clear", "1" means "slight hazy", "2" means "hazy", "3" means "slightly cloudy", "4" means "cloudy", "*" means "Uncertain"

(*) Research Parameter Disclaimer

Parameter marked as **(*)** (research parameters) and which are obtained from in vitro examination of specimens derived from the human body used for the purpose of providing information:

concerning a physiological or pathological state, or

concerning a congenital abnormality, or

to determine the safety and compatibility with potential recipients, or

to monitor therapeutic measures

are not officially intended by SYSMEX to be included in patient's reports as "reportable (diagnostic) parameters".

If the user/licencee of the Sysmex instruments wants to use these Research Parameter + Service Parameter in official diagnosis for patients or in patient reports, he may do so, but before he can use them for this purpose, it is under his own responsibility to make a full evaluation of data, limitations, interferences and complete risk management (ISO 14971) after In-vitro Diagnostic Directive (IVDD 98/79/EC, Annex VIII) and its national transpositions in EU member states law

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Urinanalysis	Code	Parameter name
	FLAG_RBC [10] FLAG_WBC [10] FLAG_EC [10] FLAG_CAST [10] FLAG_BACT [10] FLAG_PATCAST[10] FLAG_SRC[10] FLAG_SPERM[10] FLAG_YLC[10] FLAG_MUCUS[10] FLAG_XTAL[10] FLAG_COND [10]	

Urinanalysis	Code	Parameter name
Extra QC-Data	S_FSC S_FSCW S_FLH S_FLL S_FLLW S_SSC B_FSC B_FSCW B_FLH	

[10] FLAG_RBC, FLAG_WBC, FLAG_EC, FLAG_CAST, FLAG_BACT, FLAG_PATCAST, FLAG_SRC, FLAG_SPERM, FLAG_YLC, FLAG_MUCUS, FLAG_XTAL, FLAG_COND: The result of " " means "not flagged", "+" means "REVIEW", "*" means "Low Reliability"

5.3.3 Coagulation section

Due to the fact that that the profile codes as well as the related test names from the coagulation analyzers are customizable we recommend you to contact the site where the analyzer will be installed for the exact test codes and test names.

However please find below a table with the different test code and test name which are the default manufacturer settings.

As mention these codes can be customized

Test code	Test name	Test code	Test name	Test code	Test name
040	PT	190	IX	510	TT
050	APTT	200	X	600	FDP
060	Fbg	210	XI	610	DD
080	TTO	220	XII	620	P-FDP
090	NT	260	BXT	800	vWF-Rco
120	II	300	AT3		
150	V	310	APL		
170	VII	320	Plg		
180	VIII	330	PC		

5.3.4 Sample tracking information

General	Code	Parameter name
Sampletracking	H_TUBE	Haematology Tube position in the rack
	H_RACK	Haematology Rack identification
	H_INST	Haematology Instrument name
	H_INID	Haematology Instrument ID
	C_TUBE	Coagulation Tube position in the rack
	C_RACK	Coagulation Rack identification
	C_INST	Coagulation Instrument name
	C_INID	Coagulation Instrument ID
	U_TUBE	Urinalysis Tube position in the rack
	U_RACK	Urinalysis Rack identification
	U_INST	Urinalysis Instrument name
	U_INID	Urinalysis Instrument ID

5.4 Appendix D: Interpretation-Flags (IP Flags)

If there is a work area-manager connected to LIS all flags can be customized and will not follow this table!

If a single analyzer is directly connected to LIS, these flags will be in use. The UF-1000i is also able to transmit up to 8 customizable additional flags.

Flagname (IP messages)	XE-2100	XE-2100D	XE-2100L	XT-2000i	XT1800i	XS-1000i/ XS-800i	XT-4000i	XE-5000	XN series	UF-1000i
WBC_Abn_Scattergram	•		•	•	•	•	•	•	•	
NRBC_Abn_Scattergram	•		•					•		
Neutropenia	•	•	•	•	•	•	•	•	•	
Neutrophilia	•	•	•	•	•	•	•	•	•	
Lymphopenia	•	•	•	•	•	•	•	•	•	
Lymphocytosis	•	•	•	•	•	•	•	•	•	
Leukocytopenia	•	•	•	•	•	•	•	•	•	
Leukocytosis	•	•	•	•	•	•	•	•	•	
Monocytosis	•	•	•	•	•	•	•	•	•	
Eosinophilia	•	•	•	•	•	•	•	•	•	
Basophilia	•	•	•	•	•	•	•	•	•	
NRBC_Present	•		•					•	•	
IG_Present	•	•	•	•[1]			•	•	•	
RBC_Abn_Distribution	•	•	•	•	•	•	•	•	•	
Dimorphic_Population	•	•	•	•	•	•	•	•	•	
Anisocytosis	•	•	•	•	•	•	•	•	•	
Microcytosis	•	•	•	•	•	•	•	•	•	
Macrocytosis	•	•	•	•	•	•	•	•	•	
Hypochromia	•	•	•	•	•	•	•	•	•	
Anemia	•	•	•	•	•	•	•	•	•	
Erythrocytosis	•	•	•	•	•	•	•	•	•	
RET_Abn_Scattergram	•			•			•	•	•	
Reticulocytosis	•			•			•	•	•	
PLT_Abn_Scattergram	•			•			•	•	•	
PLT_Abn_Distribution	•	•	•	•	•	•	•	•	•	
Thrombocytopenia	•	•	•	•	•	•	•	•	•	
Thrombocytosis	•	•	•	•	•	•	•	•	•	
Blasts?	•	•	•	•	•	•	•	•	•	
Immature_Gran?	•	•	•	•	•	•	•	•		
NRBC?	•	•	•	•	•	•	•	•		
Left_Shift?	•	•	•	•	•	•	•	•	•	
Atypical_Lympho?	•	•	•	•	•	•	•	•	•	
RBC_Lyse_Resistance?	•	•	•	•	•		•	•		
Abn_Lympho/L-Blasts?	•		•					•		
Abn_Lympho/Blasts?		•		•	•	•	•			
Blast/Abn Lympho?									•	
Abn_Lympho?						•			•	
RBC_Agglutination?	•	•	•	•	•	•	•	•	•	
Turbidity/HGB_Interference?	•	•	•	•	•	•	•	•	•	
Iron_Deficiency?	•	•	•	•	•	•	•	•	•	
HGB_Defect?	•	•	•	•	•	•	•	•	•	

Flagname (IP messages)	XE-2100	XE-2100D	XE-2100L	XT-2000i	XT1800i	XS-1000i/ XS-800i	XT-4000i	XE-5000	XN series	UF-1000i
Fragments?	•	•	•	•	•	•	•	•	•	
PLT_Clumps?	•	•	•	•	•	•	•	•	•	
PLT_Clumps(S)?	•	•	•	•	•	•	•	•		
Debris high										•
Discriminator error RBC/XTAL										•
Discriminator error RBC/BACT										•
Discriminator error RBC/YLC										•
Urine conductivity abnormal										•
Carry-over?										•

[1]Only available with the IG Master software

5.4.1 Action & Error Messages and positive flagging information

Flagname	XE-2100	XE-2100D	XE-2100L	XT-2000i	XT1800i	XS-1000i/ XS-800i	XT-4000i	XE-5000	UF-1000i
Action_Message_RET	•			•			•	•	
Action_Message_NRBC	•		•					•	
Action_Message_Delta	•	•	•	•	•	•	•	•	
Action_Message_DIFF	•	•	•	•	•	•	•	•	
Positive_Diff	•	•	•	•	•	•	•	•	
Positive_Morph	•	•	•	•	•	•	•	•	
Positive_Count	•	•	•	•	•	•	•	•	
Error_Func	•	•	•	•	•	•	•	•	
Error_Result	•	•	•	•	•	•	•	•	

5.5 Appendix E: Optional specification of OBR-3 management

To be compatible to some installations of SIS/PC-DPS it's possible to use this specification for the OBR-3 / OBR-4, too.

(3)	**ONO**	**OBR-3**	Requester specimen ID or accession number	Sample No. or Accession No. [OR] Accession No. and Sample No. (Format: Accession No.^Sample No.) (HOST side)	29	Y	N
(4)	SNO	OBR-4	Producer specimen ID or accession number	Sample No. or Accession No. [OR] Accession No. and Sample No. (Format: Accession No.^Sample No.) (SIS side)	29	N	Y

5.6 Appendix F: Case Manager

Please contact your local Sysmex representative if the Case Manager (CM) is used or not.

5.6.1 Case Manager specific test codes & test names

Please find below the details of the test codes with its test names that the Case Manger could send in the OBX-4 segment.

Test code	Test name
Case_Manager_A	Case_Manager_A
Case_Manager_B	Case_Manager_B
Case_Manager_C	Case_Manager_C
Case_Manager_D	Case_Manager_D
Case_Manager_E	Case_Manager_E
Case_Manager_F	Case_Manager_F
Case_Manager_G	Case_Manager_G
Case_Manager_H	Case_Manager_H
Case_Manager_I	Case_Manager_I
Case_Manager_J	Case_Manager_J
Case_Manager_K	Case_Manager_K
Case_Manager_L	Case_Manager_L
Case_Manager_M	Case_Manager_M
Case_Manager_N	Case_Manager_N
Case_Manager_O	Case_Manager_O
Case_Manager_P	Case_Manager_P
Case_Manager_Q	Case_Manager_Q
Case_Manager_R	Case_Manager_R
Case_Manager_S	Case_Manager_S
Case_Manager_T	Case_Manager_T

5.6.2 Case Manager Results

Please find below the details (refer “Description” column) of the test result that the Case Manger could send in the OBX-6 segment.

Each description is identified by a code for internal management i.e. this code is not sent to the host

Case No.	Description
1	1: Suspicion of Microangiopathic Haemolytic Disease as cause of thrombocytopenia?
2	2: Suspicion of HELLP syndrome?
3	3: Suspicion of Autoimmune Thrombocytopenia?
4	4: Suspicion of platelet transfusion requirement due to suppressed thrombopoiesis?
5	5: Suspicion of Malaria associated Disseminated Intravascular Coagulation?

Case No.	Description
6	6: Suspicion of Essential Thrombocythaemia?
7	7: Suspicion of Thalassaemia Minor as cause of microcytic hypochromic anaemia?
8	8: Suspicion of Megaloblastic Anaemia?
9	9: Suspicion of imminent platelet count recovery post bone marrow suppression?
10	10: Suspicion of Polycythaemia vera as cause of extreme thrombocytosis?
11	11: Suspicion of iron deficient Polycythaemia vera as cause of thrombocytosis?
12	12: Suspicion of Iron deficiency as the cause of microcytic hypochromic anaemia?
13	13: Suspicion of Polycythaemia vera as the cause of erythrocytosis?
14	14: Suspicion of reactive erythrocytosis?
15	15: Suspicion of Thalassaemia Intermedia?
16	16: Suspicion of immune mediated intravascular haemolysis as cause of anaemia?
17	17: Suspicion of immune mediated extravascular haemolysis as cause of anaemia?
18	18: Suspicion of intravascular haemolytic anaemia due to microangiopathy (MAHA)
19	19: Suspicion of Thalassaemia Intermedia with marked haemolysis?
20	20: Suspicion for extravascular haemolysis due to hereditary spherocytosis?
21	21: Suspicion of Myelodysplastic Syndrome - Refractory Anaemia with Excess Blasts?
22	22: Suspicion of Myelodysplastic Syndrome as cause of anaemia ?
23	23: Suspicion of Acute Erythroleukaemia?
24	24: Suspicion of Myelodysplastic Syndrome as cause of pancytopenia?
25	25: Suspicion of Chronic Myelomonocytic Leukaemia despite absence of dysplasia?
26	26: Suspicion of Chronic Myelomonocytic Leukaemia ?
27	27: Suspicion of Atypical Chronic Myeloid Leukaemia (with dysplasia)?

5.6.3 Log file example

Please find below some log file examples of Case Manger transaction:

H|^~\&||||||||||A.2|201002181450
P|1|001|||FirstName^LastName||19200808|M|||||||0.0|0.0|||||||^Internal|||||||20100218
OBR|1||12345| CASE_MANAGER_A^CASE_MANAGER_A|||||||||201002181450||||||||||||
OBX|1|NM|h_rack^RACK|||||||F|201002181450||||
OBX|2|NM|h_tube^TUBE|||||||F|201002181450||||
OBX|3|ST|h_inst^Inst.||11001||||||F|201002181450||||
OBX|4|ST|h_inID^Analyzer||XE-5000||||||F|201002181450||||
OBX|5|ST|CASE_MANAGER_A^CASE_MANAGER_A||1: Suspicion of Microangiopathic Haemolytic Disease as cause of thrombocytopenia?||||||F|201002181450||||
L|1||1|9

H|^~\&||||||||||A.2|201002181450
P|1|002|||FirstName^LastName||19200808|M|||||||0.0|0.0|||||||^Internal|||||||20100218
OBR|1||23456|CASE_MANAGER_A^CASE_MANAGER_A~
CASE_MANAGER_B^CASE_MANAGER_B~CASE_MANAGER_C^CASE_MANAGER_C|||||||||20100218145
0|||||||||||||
OBX|1|NM|h_rack^RACK|||||||F|201002181450||||
OBX|2|NM|h_tube^TUBE|||||||F|201002181450||||
OBX|3|ST|h_inst^Inst.||11001||||||F|201002181450||||
OBX|4|ST|h_inID^Analyzer||XE-5000||||||F|201002181450||||
OBX|5|ST|CASE_MANAGER_A^CASE_MANAGER_A||1: Suspicion of Microangiopathic Haemolytic Disease as cause of thrombocytopenia?||||||F|201002181450||||
OBX|6|ST|CASE_MANAGER_B^CASE_MANAGER_B||2: Suspicion of HELLP syndrome?||||||F|201002181450||||
OBX|0|ST|CASE_MANAGER_C^CASE_MANAGER_C||27: Suspicion of Atypical Chronic Myeloid Leukaemia (with dysplasia)?||||||F|201002181450||||
L|1||1|11