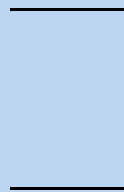


 **HORIBA**ABX Montpellier

# Micros CRP 200 Output format

RAA031AEN



## Introduction

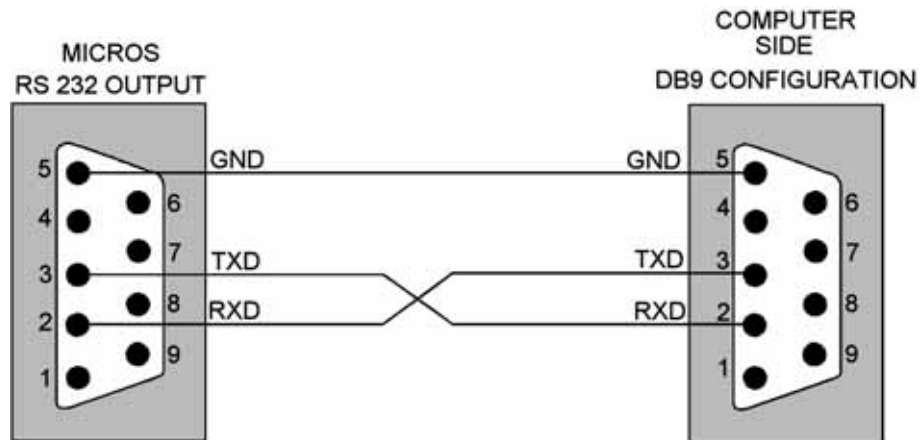
ABX Format, is currently supported to be compliant with earlier instruments or existing connections.

Table 1: Definitions

Term	Definition
<STX>	Start of Frame (ASCII decimal 2).
<ETX>	End of Text (ASCII decimal 3). Required at the end of each record.
<CR>	Carriage Return (ASCII decimal 13).

## Physical connection (RS232)

### Instrument RS DB9





## ABX Format

### 1. Overview

- ABX format supports unidirectional connections.
- ABX format can have a different numbers of fields according to the transmitted items setup by the user (results, curves, flags, etc...) or to the type of cycle.
- Fields sequence is not fixed.
- The result identifier is different according to the type of result: patient result («RESULT»), QC result (QC-RES) etc....

### 2. Protocol description

#### Unidirectional mode

Table 2: Typical unidirectional transmission from Instrument to Host

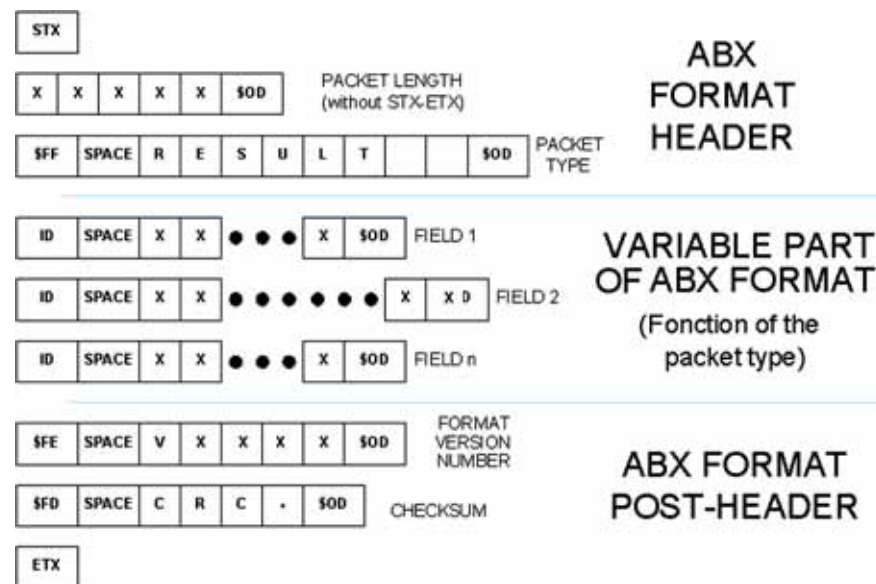
Instrument	< >	Host	Comment
<STX> + RESULT + <ETX>	>		

### 3. Message structure

#### 3.1. Lines structure

- STX
- Size + carriage return (Size: 5 bytes representing the total amount of the data except STX and ETX).
- Identifier followed by a Load Type + carriage return (Load: An 8 character chain preceded by a space indicating the type of datas.).

- Identifier followed by the Information associated to the Load Type + carriage return (Identifier: 1 byte moving about \$21 to \$FF, it describes the information type which follows this indicator, always followed by a space character \$20).
  - Remainder of the other Identifiers and Informations associated to the Load Type + carriage returns.
  - Other Load Type blocs + Associated Informations.
- .....
- Identifier followed by the CheckSum + carriage return (CheckSum: Sum modulo 65536 of all the characters except ETX, STX and all informations about checksum (identifier - space - checksum - carriage return) in the hexadecimal format on 4 bytes, preceded by a space character \$20).
  - ETX



Diag. 1: ABX format line structure



### 3.2. Control characters

Table 3: Standard control characters

Control String	Hexadecimal value
<STX>	\$02
<ETX>	\$03
<CR>	\$0D

## 4. Data transmitted by the analyzer to the host

### 4.1. Packet type

The information described in the packet type allows the specification of the global message content: hematological routine results or statistic results.

Table 4: Packet type list

Data packet string (8 char.)	Use
RESULT	Hematological result transmission on a routine mode
QC-RES	Result transmission of a control blood

### 4.2. Identifier list (Instrument to Host)

Table 5: Identifier list (Instrument to Host)

Identifier	Correspondance	Exemple	Length	Format
\$70 p	Analyzer number	73	2+2+1	Integers
\$71 q	Analysis date and time	07/06/06 17h37mn09s	2+19+1	String(19)
\$73 s	Analyzer sequence number	0001	2+4+1	String(4)
\$74 t	Sampling mode	R: rack	2+1+1	String(1)

Table 5: Identifier list (Instrument to Host)

Identifier	Correspondance	Exemple	Length	Format
\$75 u	Id # or sample id.	0000000000000001	2+16+1	String(16)
\$80 ç	Analysis type	Defined on 1 character 'D': LMG (CBC+LMG)	2+1+1	String(1)

### 4.2.1. Numerical result fields

The numerical result filed format is 5 digits completed with zeros on the left.

The unit is the one chosen by the operator.

If one parameter cannot be calculated by the analyzer, the field is replaced with ---.

Parameter status:

Following the numerical field, a first digit gives the counting rejection status or the suspicion, a second one gives the parameter value status according to high and low normalities, to high and low extreme values and to the overloading capacities.

Table 6: Identifier First digit

First digit (letter)	Correspondance
R	Parameter rejected for a counting default
S	Suspicious parameter value
'space'	No anomaly observed

Table 7: Identifier Second digit

Second digit (letter)	Correspondance
l	Parameter < to the low normal value
'space'	Parameter normal value
h	Parameter > to the high normal value
O	Parameter exceeding the capacity



Table 7: Identifier Second digit

Second digit (letter)	Correspondance
U	Parameter not reaching the linear limit of the instrument
e	Reagent run-out on CRP
p	Prozone flag on CRP

Example:

5.5 millions RBC with a counting error in the standard units:

\$32 \$20 \$30 \$35 \$2E \$35 \$30 \$52 \$68 \$0D or «2 05.50Rh» + carriage return.

Table 8: LMG numerical result fields list

Identifier	Correspondance	Example	Format (Length)
\$21 !	WBC	005.1	2+String(7)+1
\$22 "	Lymphocytes (#)	002.6	2+String(7)+1
\$23 #	Lymphocytes (%)	051.9	2+String(7)+1
\$24 \$	Monocytes (#)	000.7	2+String(7)+1
\$25 %	Monocytes (%)	014.9	2+String(7)+1
\$26 &	Granulocytes (#)	001.8	2+String(7)+1
\$27 '	Granulocytes (%)	033.2	2+String(7)+1
\$32 2	RBC	05.01	2+String(7)+1
\$33 3	HGB	014.5	2+String(7)+1
\$34 4	HCT	044.7	2+String(7)+1
\$35 5	MCV	089.3	2+String(7)+1
\$36 6	MCH	029.1	2+String(7)+1
\$37 7	MCHC	032.6	2+String(7)+1
\$38 8	RDW	016.1	2+String(7)+1
\$40 @	PLT	00174	2+String(7)+1

Table 8: LMG numerical result fields list

Identifier	Correspondance	Example	Format (Length)
\$41 A	MPV	008.7	2+String(7)+1
\$42 B	PCT	0.151	2+String(7)+1
\$43 C	PDW	013.3	2+String(7)+1

Table 9: CRP numerical result field list

Identifier	Correspondance	Example	Format (Length)
\$4B K	C-Reactive protein	04.90	2+String(7)+1

#### 4.2.2. Flag fields

Flags are transmitted. They are replaced with 'spaces' when the flag has not been detected. See 5.1. "Example of result sent by instrument", page 7.



In the following tables identifier's formats are separated by a space only for a better comprehension.

Table 10: Identifier list

Identifier	Parameter	Format	Length
\$50 P	WBC or LMG	L1 M1 M2 G1 G2 G3	2+12+1
\$53 S	PLT	Pc Sc Mc	2+6+1

#### 4.2.3. Histograms

##### 4.2.3.1. Histograms

Histograms are transmitted on 128 channels, preceded by a space. They are automatically rescaled to a 223 maximum amplitude value. The zero amplitude value is \$20, the maximum amplitude value is \$FF.



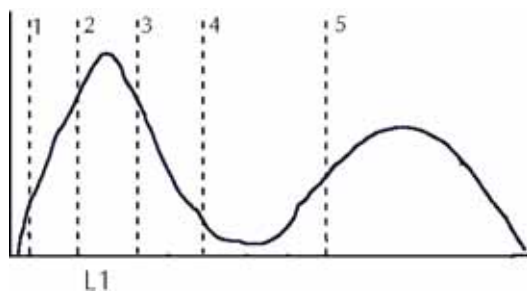
### 4.2.3.2. Separation thresholds

It is the channel number (decimal value) enclosing areas on the histograms or on the matrix. Each threshold is transmitted on 3 bytes preceded by a space. Format description of the threshold transmission

#### A. WBC identifier

Separation thresholds 1-2-3 allow the L1 flag determination. For the analyzers in LMG mode, the 4-5 thresholds allow the separation of the 3 populations Lymphocytes, Monocytes, Granulocytes.

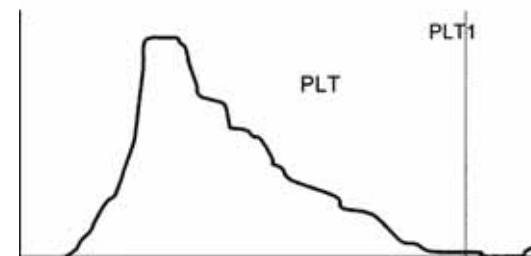
Example : output format of the WBC curve thresholds for an LMG sampling. In this example, the analyzer does not send the calculation thresholds of the L1 flag.  
 «] 000 000 000 040 060» + carriage return.



Diag.2: WBC thresholds

#### B. PLT identifier

The threshold 1 is the number of the last channel used to calculate the PLT number.



Diag.3: PLT histogram

Table 11: Histogram & Matrix format description

Identifier	Parameter	Format	Length
\$57 W	WBC	Amplitude of each channel	2+128+1
\$58 X	RBC	Amplitude of each channel	2+128+1
\$59 Y	PLT	Amplitude of each channel	2+128+1
\$5D ]	WBC thresholds	5 thresholds	1+20+1
\$5F _	PLT thresholds	1 threshold	1+4+1

### 4.2.4. Other identifiers

Identifier \$FB: Identifies the analyzer type when communicating.

Identifier \$FC: This identifier allows the transmission of a number which can be an error number, a position number, a burn-in sequence number or a status in hexadecimal mode (Not available yet).

Identifier \$FD: Checksum value (see section on the message structure).



Identifier \$FC: The error list is dedicated to the "remote" mode, however the MICROS instrument is able to transmit the error #0001 (Operating temperature out of limits). For \$FB and \$FF, the strings having less than 8 characters are completed on the right handside by "spaces".





5.2. Example of QC result sent by instrument

```

FF      RESULT
70      73
71      07/06/06 18h01mn26s
75      0000000000000002
73      0004
76
74      R
80      D
21      005.4
32      05.01
33      014.3
34      044.6
35      089.0
36      028.6
37      032.1
38      016.4 h
40      00184
41      008.6
42      .157
43      014.4
23      052.5 h
25      013.0 h
27      034.5 l
22      002.8
24      000.7
26      001.9
48      "" e
57      I+7Ys|Cee0y60|g||XUTQMKKKLMPPSSQQPPMLI...
58      "$"##"1""##&+5=QY||AÜe0cy8YÜÖNµEc%||...
59      "[4BHJGGST[w]ZUQTUUWQPEAEGKGEEDHG...
53
5F      105
50      M2G1G2
5D      000 000 000 025 035
FB      CRP
FE      V2.8
FD      9E94
  
```

Diag.5: Example of result sent by instrument (LMG+CRP test)

```

FF      QC-RES
70      73
71      07/06/06 17h45mn40s
75      00000000000000--
73      0002
76
74      R
80      D
21      004.8
32      04.95
33      014.4
34      044.0
35      089.1
36      029.2
37      032.8
38      016.2
40      00170
41      008.8
42      .150
43      015.0
23      064.9
25      021.3
27      013.8
22      003.1
24      001.0
26      000.7
57      <UhlEej+eR||b|v|w|w|w|T|Q|L|J|J|L|N|P|M|N|...
58      ##"1""##"##)+6?QY|e|A|b|Ü|e|j|Ü|Ü|D|,|µ| |L|...
59      !$+47:<EELLQNRUQNILXc|N|H|I|F|H|B|B|<97:@@?|...
53
5F      105
50      000 000 000 035 053
FB      CRP
FE      V2.8
FD      9A0A
  
```

Diag.6: Example of QC result sent by instrument (LMG)

