

Dokumentnummer/Document Number 13241-2	Titel/Title Manual - BM800 Data Interface	Sida/Page 1/16
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## 1. Introduction

BM800 Data Interface (BDI) is intended for transferring data from BM800 instrument to PC or as a sample data interface between BM800 and LIS systems.

### Features

- Transfer data from BM800 to PC via local COM port (RS232, USB) or Network (TCP Client, Server)
- Parse sample data from files
- Supports multiple channels / instruments (hardware dependent)
- Supports multiple connection types (RS232, USB, TCP/IP)
- Selectable parameter collections (Reduced, Standard, Extended)
- Multiple output formats (LIS, Text, Excel)
- Validation of transferred data

## 2. Minimum Requirements

<b>Hardware</b>
Pentium 4, 512 MB RAM

Operating System	LIS	Text	Excel
Windows 2000 .Net 2.0*	x	x	-
Windows XP SP3 .Net 2.0*	x	x	-
Windows XP SP3 + .Net 2.0* + Microsoft Office XP	x	x	x

\*.NET is automatically installed by the BDI installer

## 3. Installation

See Installation Instructions (included in the zip-file)

**NOTE 1** This manual refers to version 1.01 of BDI software. Future revision changes could make this information obsolete. Only use the manual that was included in the installed software package.

**NOTE 2** Always set Serial Output Setup - *Send with Ack* to enabled according to section 5 in order to ensure safe data transfer between BM800 and PC (See section 4).

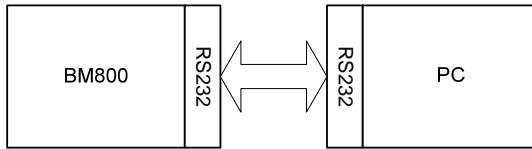
## 4. Windows Environment

**Program Location:** Setup will create a shortcut to the program in the start menu.

**Default output Folder:** Default folder for sample output is Program Files/Boule Medical/BM800\_Data. Setup will also create a shortcut to the output folder on the desktop.

## 5. Typical Configurations

### RS232 Configuration – One channel



A single BM800 is connected to PC via COM port (RS232)

1. Connect BM800 to an available COM port on PC
2. Configure BM800 communications settings as follows

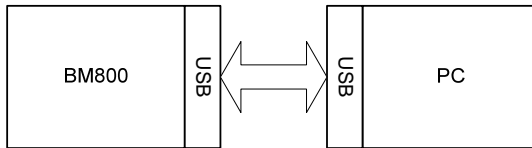
The image shows two side-by-side screenshots of the BM800's Serial Output Setup interface. The left screen is titled 'Serial Output Setup A' and contains the following settings: Manual Send Mode (1), Auto Send Mode (1), HW Handshake ([ ]), Send with Ack. ([X]), and Baud Rate (1). The right screen is titled 'Serial Output Setup B' and contains the setting: Select Send Port (1). Both screens have 'More' and 'Exit' buttons at the bottom.

3. Configure BDI channel settings, where “Available Port(s)” is the connected COM port.

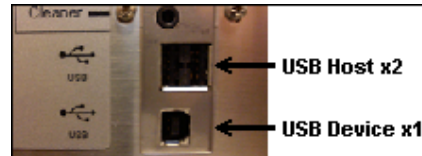
The screenshot shows the 'Settings' dialog box with the following configuration:

- Instrument Connection:** Channel 1, Connection: COM Port (RS232/USB), COM Port: Available Port(s): COM1, Selected Port: COM1 RS232, Baudrate: 19200.
- Server Mode:** Local IP Address: 193.100.100.202, Port: N/A, Server Name: N/A.
- Client Mode:** Server IP Address: N/A, Port: N/A, Server Name: N/A.
- Output Dir:** C:\Program Files (x86)\Boule Med
- File Format:** LIS, Text, Excel (selected).
- Sample Data:** Standard collection, Reduced collection (selected), Extended collection. Transfer all instrument data (unchecked), Transfer all sample information data (unchecked).
- Transferred Data:** SNO, IID, ID, SEQ, DATE, SORC, ASPM, ASPS, BLMD, BLNK, ASWP, WDMA, APNA, RBC, MCV, HCT, MCH, MCHC, RDWR, RDWA, PLT, MPV, PCT, PDW, LPCR, HGB, WBC, LA, MA, GA, LR, MR, GR, EA, ER, +Higher revision parameters.
- Channels:** Add, Remove, Default buttons.
- Buttons:** Save, Cancel.

## USB Configuration – One Channel



A single BM800 is connected to PC via USB port



1. Connect BM800 to USB device port on PC (see image above for position)
2. Install USB drivers (see Installation documentation, included in the zip file)
3. Configure both BM800 communications settings as follows (if changing USB VID&PID the instrument needs to be restarted for the changes to take effect).

**Note:** If using firmware below 2.7.1 VID & PID selection will not be available and defaults to “1”

### Serial Output Setup A

Manual Send Mode

Auto Send Mode

HW Handshake

Send with Ack.

Baud Rate

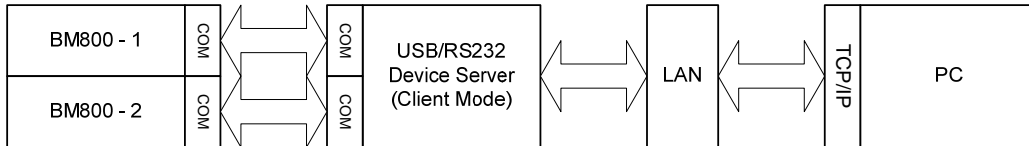
### Serial Output Setup B

Select Send Port

Select USB VID&PID

4. Configure BDI channel settings, where “Available Port(s)” is the virtual USB port

## TCP Server Configuration



Typical setup (connecting multiple BM800 to single device server e.g. Moxa Nport 5610)

1. Connect BM800 to available port on device server (see your device server manual)
2. Configure your device server to act as client and setup IP address (the server IP address) and port number
3. Configure both BM800 communications settings as follows

### Serial Output Setup A

Manual Send Mode

Auto Send Mode

HW Handshake

Send with Ack.  [X]

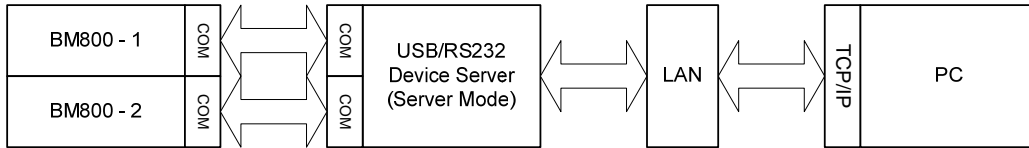
Baud Rate

### Serial Output Setup B

Select Send Port

4. Configure BDI connection as Server and configure IP address and Port to match the the device server (Use the “Channels – Add” button to add a channel for next BM800)

## TCP Client Configuration



Typical setup (connecting multiple BM800 to single device server)

1. Connect BM800 to available port on device server (see your device server manual)
2. Configure your device server to act as server and setup IP address (the server IP address) and port number
3. Configure both BM800 communications settings as following

### Serial Output Setup A

Manual Send Mode:

Auto Send Mode:

HW Handshake:

Send with Ack.:

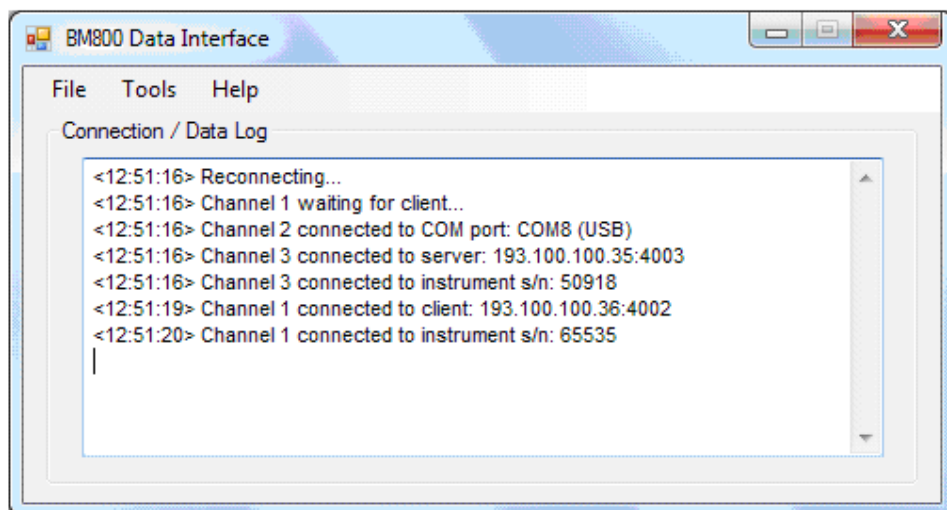
Baud Rate:

### Serial Output Setup B

Select Send Port:

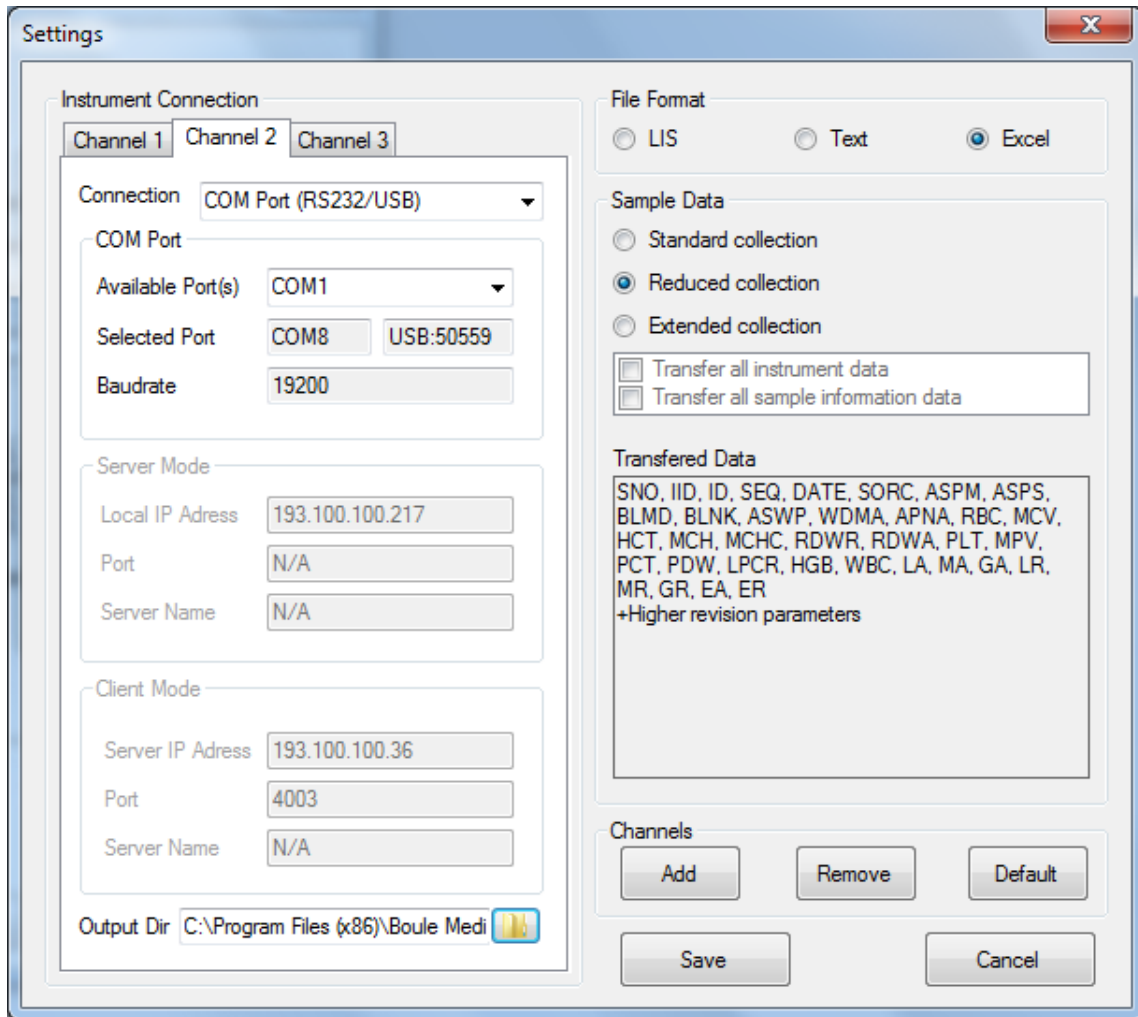
4. Configure BDI connection as Client and configure IP address and Port to match the device server (Use the "Channels – Add" button to add a channel for next BM800)

## 6. Main Program Window



Connection / Data Log	Displays configured connections and status. This text box can also be configured to display real-time status of parsed sample data.
File - Open File	Opens a file (raw BM800 data captured via e.g. Hyper Terminal) to parse data.
File - Exit	Close BDI
Tools - Settings	Open settings window
Tools - Restart Channel	Restarts a single channel (only communication is restarted, not BM800).
Tools - Restart All Channels	Restarts all channels (only communication is restarted, not BM800).
Tools - Datalog / No Datalog	Select if parse information for current sample shall be displayed in the Connection / Data Log window.
Tools - Clear Screen	Clears the Connection / Data Log screen.
Help Manual	Opens this manual
Help About	BDI version information

## 7. Settings Window



### 7.1. Instrument Connection

The instrument connection panel displays all current active channels and settings.

Connection	Select type of connection to be used for this channel (RS232/USB, TCP Server, and TCP Client). Depending on selected type, COM Port, Server Mode or Client Mode will be highlighted.
COM Port - Available Port(s)	Display a list of available COM ports.
COM Port - Selected Port	Displays current selected port (if selected port is a virtual USB port, BM800 S/N will also be displayed).
COM Port - Baud Rate	Selected baud rate (not changeable).
Server Mode - Local IP Address	Device server IP Address.
Server Mode - Port	Port number to be used.
Server Mode - Server Name	Used only for reference if more than one device server is used.

Client Mode - Server IP Address	Display PC local IP address (if more than one network adapter is present on the PC, only the first will be shown. To change to second adapter manually enter IP Address)
Client Mode - Port	Port number to be used.
Client Mode - Server Name	Used only for reference if more than one device server is used.
Output Directory	Path to this channels selected output folder.

## 7.2. File Format

Select which output format to be used. See section 7 *File Format* for detailed information. This is a global option affecting all channels.

LIS	Output is LIS format.
Text	Output is Text format.
Excel	Output is Excel format.

## 7.3. Sample Data

Select data to be parsed and stored on file. See section 8 *Transferred Data* for detailed information on which parameters that are transferred. This is a global option affecting all channels.

Standard Collection	Standard set of Instrument information, sample information and parameters.
Reduced Collection	Instrument information and sample information are reduced.
Extended Collection	If check-boxes “Transfer all instrument data” and “Transfer all sample information data” are checked, all BM800 parameter data is transferred.

## 7.4. Channels

Add	Add a channel to connect additional BM800 (default is one channel).
Remove	Remove selected channel.
Default	Set settings to default factory mode.

## 8. File Format

LIS - Format Description	LIS files are intended to be used as interface between BM800 and installed LIS system. All samples are stored in separate .txt files. Parameters are stored as TAB separated ASCII values. LIS files are in a fixed collection format i.e. it is not possible to change which parameters are transferred.
LIS - File name	Sample ID_Date_Sequence.txt Example: AUTOBACKGROUND_2010-03-23_s7979.txt
Text - Format Description	Similar format as LIS but with the option to change collection size.
Text - File name	Sample ID_Date_Sequence.txt Example: AUTOBACKGROUND_2010-03-23_s7979.txt
Excel - Format Description	All samples are stored in a single Excel file. A new file is created each day.
Excel - File name	BM800_Instrument ID_Date.xls Example: BM800_50559_2010-03-25.xls



**N.B** Excel Important Information      If you change sample collection size, you need to archive the old file and delete the original (a new will be created automatically when first sample is stored). This is to ensure sure that Excel column information corresponds to current collection.

## 9. Transferred Data

For all collection types (standard, reduced and extended) possible future parameter data will be included automatically.

Standard Collection	SNO, IID, ID, SEQ, DATE, SORC, ASPM, ASPS, BLMD, BLNK, ASWP, WDMA, CLVL, CEXP, APNA, RDPN, RDED, RLLI, RLPN, RLED, RCLI, RCPN, RCED, RBC, MCV, HCT, MCH, MCHC, RDWR, RDWA, PLT, MPV, PCT, PDW, LPCR, HGB, WBC, LA, MA, GA, LR, MR, GR, EA, ER
Reduced Collection	SNO, IID, ID, SEQ, DATE, SORC, ASPM, ASPS, BLMD, BLNK, ASWP, WDMA, APNA, RBC, MCV, HCT, MCH, MCHC, RDWR, RDWA, PLT, MPV PCT, PDW, LPCR, HGB, WBC, LA, MA, GA, LR, MR, GR, EA, ER
Extended Instrument	PRDI, SNO, BRND FIWV, IAPL, IID, ID, SEQ, DATE, SORC, ASPM, ASPS, BLMD, BLNK, ASWP, WDMA, CLVL, CEXP, APNA, RDPN, RDED, RLLI, RLPN, RLED, RCLI, RCPN, RCED, RBC, MCV, HCT, MCH, MCHC, RDWR, RDWA, PLT, MPV, PCT, PDW, LPCR, HGB, WBC, LA, MA, GA, LR, MR, GR, EA, ER
Extended Sample	SNO, IID, ID, SEQ, DATE, SORC, STYP, ASPM, ASPS, BLMD, BLNK, ASWP, RPD, RPDS, RPD, RPDH, RPDF, WDMS, WDMA, WDFB, WDLL, WDLH, WDCL, WDCH, LGL, WDIL, WDIH, WDDM, WDDP, CAPL, CLVL, CEXP, CEXT, RGED, RGEL, RGEC, APNU, APNA, XLT, RDLI, RDPN, RDED, RLLI, RLPN, RLED, RCLI, RCPN, RCED, RBC, MCV, HCT, MCH, MCHC, RDWR, RDWA, PLT, MPV, PCT, PDW, LPCR, HGB, WBC, LA, MA, GA, LR, MR, GR, EA, ER

## 10. Parameters

### 10.1. Static Instrument Parameters

The static instrument parameters are parameters that are always the same during the instrument life cycle.

#### 9.1.1 SNO - Serial Number

SNO is a 5-digit serial number. This number is unique for each instrument.

Value range: 00001 – 65534.

### 10.2. Instrument Configuration Parameters

The instrument configuration parameters are "semi-static" instrument parameters. The parameters are probably the same during the instrument life cycle, but may change, for example after a software upgrade.

#### 9.2.1 FIWV - Firmware Version

FIWV identifies the software used in the instrument. This parameter is always present with a value.

#### 9.2.2 IID - User-Settable Instrument ID

IID identifies an individual BM800 instrument. It is a user settable string of 1-15 characters. This parameter is always present, but the value is only present if the instrument ID is set.

### 10.3. Sample Identification Parameter Values

Sample identification parameter values identify the sample run.

#### 9.3.1 ID - Blood Sample ID

ID is the identification of the blood sample. This parameter is always present, but the value is absent for "blank" ID:s.

Value range: 1 - 15 characters

**Note 1:** Non-numeric characters are allowed. Leading or trailing white space will be filtered away.

**Note 2:** Non-ASCII characters may be used.

**Note 3:** All control blood sample ID:s are a number followed by a trailing "+". (The number is normally the digits of the lot number of the control blood.)

**Note 4:** Leading zero digits in ID numbers are significant.

**Note 5:** The maximum number of characters in ID numbers may change.

#### 9.3.2 SEQ - Sample Sequence Number

SEQ is the sequence number of the sample run. This parameter is always present with a value.

Value range: 1 - 9999

**Note 1:** SEQ numbers are not unique in samples from one instrument. The operator can set the sequence number of the next sample, and sequence numbers wraps around.

**Note 2:** The upper limit of sequence numbers may change.

#### 9.3.3 DATE - Sample Date and Time

DATE is the date and time of the sample run. This parameter is always present with a value except when the date and time is not set in the instrument. The value is always formatted according to ISO 8601. See example below. The date and time is always in the local time zone. No time zone info is provided.

Example: 2004-05-06T07:08:09

#### 9.3.4 SORC – Sample or Control

SORC indicates if it is a normal sample run or a control sample run. This parameter is always present with a value.

Value range: 0: normal sample  
2: control sample with reference ranges

**Note 1:** More sample or control types may be added. They will all be small positive numbers.

## 10.4. Aspiration Parameters

### 9.4.1 ASPM - Aspiration Mode

ASPM indicates the aspiration mode for the sample. This parameter is always present with a value.

Value Description: "OT" Open Tube  
"PD" Pre-diluted sample  
"CT" Closed Tube = Cap piercer  
"MC" Micro capillary = MPA / MCI  
"AS" Auto sampler

### 9.4.2 ASPS – Aspiration Status

ASPS indicates the aspiration status for the run. This parameter is always present with a value.

The value is a status flag indicating if blood (or some other sample type) was detected during aspiration.

Value range: 0: no blood (or other) detected  
1: blood (or other) detected  
2: indeterminate due to e.g. timeout during aspiration

### 9.4.3 BLMD - Background Mode Sample Run

BLMD indicates if the sample was run in background mode. Background mode is used for blank test runs.

This parameter is always present with a value.

Value range: 0: not background mode  
1: background mode

**Note:** the parameter BLNK indicates if the sample actually was a blank sample.

### 9.4.4 BLNK - Blank Sample

BLNK indicates if the sample was a blank sample run or not, determined by the instrument. This parameter is always present with a value.

Value range: 0: not a blank sample  
1: a blank sample

**Note:** The definition of a blank is RBC < 0,50 and HGB < 2,0 (below approx 15% of a normal human blood sample).

### 9.4.5 ASWP - Auto-sampler Wheel Position

ASWP indicates the wheel position for an auto-sampler run. This parameter is always present. The value is only present for auto-sampler samples.

Value range: 1 - 20.

## 10.5. Differentiation – White Cells

The BM800 instrument has several different methods to separate the complete WBC population into three subpopulations: LYM, MID , GRAN (in increasing size order). The instrument configuration allows or disallows selection of the different WBC diff methods.

### 9.5.1 WDMA - WBC Diff Method Actually Used

WDMA indicates the floating WBC diff method actually used during the calculations. This parameter is always present. The value is only present if the instrument actually tried a WBC diff.

Value range: 1: DM1 human floating  
2: DM2 fixed  
4: DM4 vet floating

**Note 1:** more diff methods may be added. They will all be small positive numbers.

## 10.6. Control Blood with Reference Ranges

The operator inputs control blood assay information to specify reference ranges and other information about a control blood. All control blood lots have a unique ID number that is used to separate different control blood lots.

**Note 1:** The unique ID number is normally the digits from the control blood lot number followed by a plus (+) sign. Example: lot number "0606-123" gets the ID number "0606123+".

**Note 2:** Leading zero digits in control blood ID numbers are significant.

### 9.6.1 CLVL – Control Blood Level

CLVL identifies the level (normal/low/high/calibrator) of a control blood with reference ranges. This parameter is always present. The value is only present if the blood was a control blood with reference ranges. The value is a one-character string: "N" for normal level, "L" for low level, "H" for high level, and "C" for calibrator. Other control blood levels may be added. All control blood level codes will be one uppercase letter.

**Note 1:** This information comes from the control blood reference range assay information.

**Note 2:** The control blood level is also present as a name in the parameter APNA (see 9.9.2)

### 9.6.2 CEXP - Expiry Date of a Control Blood with Reference Ranges

CEXP is the expiry date of a control blood with reference ranges. This parameter is always present. The value is only present if the blood was a control blood with reference ranges.

The value is a date, always formatted according to ISO 8601. See example below.

**Note:** This information comes from the control blood reference range assay information.

Example: 2005-03-09

## 10.7. Settings

### 9.7.1 APNA – Analysis Profile Name / control blood level name

APNA is the name (if defined) of the Analysis Profile (species in vet instruments) selected for the sample. This parameter is always present. The value is present if a name is defined for the selected Analysis Profile (species). A qualified operator can set the value of this parameter.

The value is a string of 1 to 15 characters.

**Note 1:** Non-ASCII characters may be used.

**Note 2:** The initial instrument setup uses "BLOOD" for the "blood" analysis profile, and "BACKGROUND" for "background". The control bloods with reference ranges have "LOW", "NORMAL", "HIGH", and "CALIBRATOR".

**Note 3:** The predefined names in the previous note may be translated to other languages.

**Note 4:** A qualified operator can set the names of analysis profiles.

## 10.8. Reagent statistics

The BM800 instrument has an optional reagent statistics system that keeps track of the reagents used in the instrument.

**Note:** The diluent and hemolyzing reagent information is exactly the same if a reagent "combo" pack is used.

### 9.8.1 RDLI Reagent Statistics Diluent Lot identifier

RDLI is the lot identifier of the diluent reagent. This parameter is always present. The value is only present if the reagent statistics system is enabled.

The value is always formatted as "YYMM-NNN", where YY, MM and NNN are digits. (Normally YY = production year, MM = production month and NNN = lot sequence number.) See example below.

**Note 1:** This information comes from the reagent package information.

**Note 2:** leading zero digits in reagent lot identifiers are significant.

Example: 0606-123

### 9.8.2 RDED Reagent Statistics Diluent Expiry date

RDED is the expiry date of the diluent reagent. This parameter is always present. The value is only present if the reagent statistics system is enabled.

The value is a date, always formatted according to ISO 8601. See example below.

**Note:** This information comes from the reagent package information.

Example: 2006-06-29

### 9.8.3 RLLI Reagent Statistics Hemolyzer Lot identifier

RLLI is the lot identifier of the hemolyzing reagent. This parameter is always present. The value is only present if the reagent statistics system is enabled.

The value is always formatted as “YYMM-NNN”, where YY, MM and NNN are digits. (Normally YY = production year, MM = production month and NNN = lot sequence number.) See example below.

**Note 1:** This information comes from the reagent package information.

**Note 2:** leading zero digits in reagent lot identifiers are significant.

Example: 0606-124

### 9.8.4 RLED Reagent Statistics Hemolyzer Expiry date

RLED is the expiry date of the hemolyzing reagent. This parameter is always present. The value is only present if the reagent statistics system is enabled.

The value is a date, always formatted according to ISO 8601. See example below.

**Note:** This information comes from the reagent package information.

Example: 2006-06-29

### 9.8.5 RCLI Reagent Statistics Cleaner Lot identifier

RCLI is the lot identifier of the cleaning reagent. This parameter is optional, and may be present in vet instruments. The value is only present if the reagent statistics system is enabled.

The value is always formatted as “YYMM-NNN”, where YY, MM and NNN are digits. (Normally YY = production year, MM = production month and NNN = lot sequence number.) See example below.

**Note 1:** This information comes from the reagent package information.

**Note 2:** leading zero digits in reagent lot identifiers are significant.

Example: 0606-125

### 9.8.6 RCED Reagent Statistics Cleaner Expiry date

RCED is the expiry date of the cleaning reagent. This parameter is optional, and may be present in vet instruments. The value is only present if the reagent statistics system is enabled.

The value is a date, always formatted according to ISO 8601. See example below.

**Note:** This information comes from the reagent package information.

Example: 2006-06-29

## 10.9. Sample Result Parameter Values

Sample result parameter values are the measured and calculated hematology parameters from a sample run. The parameter order below is not fixed. The parameters might be in another order. Parameter definitions may be added or removed with new software releases.

### 9.9.1 Result Parameter Values

Result Parameter	Description	Unit	Existence Condition
RBC	Red blood cell concentration	$10^{12}/l$	Red side counting succeeded.
MCV	Mean Cell Volume	fl	Red side counting succeeded, and enough cells counted.
HCT	Hematocrit value	%	RBC and MCV values present.
MCH	Mean Cell Haemoglobin	pg	RBC and HGB values present.
MCHC	Mean Cell Haemoglobin Concentration	g/dl	RBC, HGB and MCV values present.
RDWR	Red blood cell distribution width, relative. Note: RDW relative is the commonly accepted RDW value.	%	Red side counting succeeded, and enough cells counted.
RDWA	Red blood cell distribution width, absolute.	fl	Red side counting succeeded, and enough cells counted.
PLT	Platelet concentration (trombocytes).	$10^9/l$	Red side counting succeeded.
MPV	Mean Platelet Volume.	fl	Red side counting succeeded, and enough cells counted.
PCT	Platelet Crit. As HCT but for platelets (PLT).	%	PLT and MPV values present.
PDW	Platelet distribution width.	fl	Red side counting succeeded, and enough cells counted.
LPCR	Large Platelet Concentration Ratio. ("PLT cells > 12 fl" / PLT)	%	Red side counting succeeded, and enough cells counted.
HGB	Haemoglobin concentration.	g/dl	HGB measuring succeeded.
WBC	White blood cell concentration	$10^9/l$	White side counting succeeded.
LA	Lymphocyte concentration	$10^9/l$	White side counting succeeded, enough cells counted, and WBC diff calculation succeeded.
MA	Mid concentration	$10^9/l$	White side counting succeeded, enough cells counted, and WBC diff calculation succeeded.
GA	Granulocyte concentration.	$10^9/l$	White side counting succeeded, enough cells counted, and WBC diff calculation succeeded.
LR	Lymphocyte concentration, relative total WBC. Given in percent (%).	%	White side counting succeeded, enough cells counted, and WBC diff calculation succeeded.
MR	Mid concentration, relative total WBC. Given in percent (%).	%	White side counting succeeded, enough cells counted, and WBC diff calculation succeeded.
GR	Granulocyte concentration, relative total WBC. Given in percent (%).	%	White side counting succeeded, enough cells counted, and WBC diff calculation succeeded.

Figure 3: Parameter values

### 9.9.2 Result Parameter Format

For each parameter a set of 5 values are present

Parameter Name	Value
ParameterName	Actual parameter value
ParameterName_L	Low range value
ParameterName_H	High range value
ParameterName_F	Flag value
ParameterName_O	Out of range flag

A result parameter always has a Parameter name and a normal / reference range (ParameterName\_L, ParameterName\_H) . It could also have a value (ParameterName) or an out-of range (ParameterName\_O)

flag, and an error flag (ParameterName\_F).

Example (PLT, Background within range, no error flag present)

PLT	3
PLT_L	0
PLT_H	10
PLT_F	
PLT_O	

### 9.9.3 Parameter Value

The data type of the result parameters is either floating point or scaled integer.

For example, if the instrument counts RBC as 0.00, then there are no cells to calculate an MCV value from. The instrument reports the RBC value as 0.00, since it did actually not count any cells, but the MCV value is absent.

The value range and the number of decimals depend of the parameter.

The parameter value and out of range value are mutually exclusive. A value is either not calculated (neither "value" nor "out of range value", calculated ("value" only), or "out-of-range" only).

### 9.9.4 Parameter Out-of-Range

The "ParameterName\_O" tag is only present if the parameter value is either completely out-of-range, or could not be determined for some unusual reason. For example, if the MCV value is absent due to a blank run, then there is no "ParameterName\_O" tag. But if the RBC value is absent due to a ridiculously high count (above 14 in human models), then BM800 outputs a "ParameterName\_O: H".

The "ParameterName\_O" flag can take the values "H" (value too high) or "L" (value too low).

The "ParameterName\_O" and "ParameterName" values are mutually exclusive. A value is either not calculated (neither "ParameterName" nor "ParameterName\_O"), calculated ("ParameterName" only), or out-of-range ("ParameterName\_O" only).

### 9.9.5 Parameter Error Flag

The "ParameterName\_F" value is an optional parameter error flag. Some errors block the calculation of the corresponding parameter value, while others provide additional information.

The error flag is always two upper-case letters, or one upper-case letter followed by a digit. The list of possible flags are not included here.

**Note:** Only these parameters can have an error flag: RBC, MCV, PLT, HGB, WBC, LYM, MID, GRAN.

### 9.9.6 Parameter Normal/Reference Range Low

The "ParameterName\_L" value is always present. Its value is the low end of the normal / reference(\*) range. If the parameter value is exactly equal to "ParameterName\_L", then it is within the normal / reference range. (\* It is called the normal range for normal blood, and reference range for control blood with reference ranges.)

### 9.9.7 Parameter Normal/Reference Range High

The "ParameterName\_H" tag is always present. Its value is the high end of the normal / reference range. If the parameter value is exactly equal to "ParameterName\_H", then it is within the normal / reference range.

## 11. Limitations and Requirements

BDI only supports Excel output for PC with Microsoft Office XP and above installed.

BM800 'Send with Ack' must be set to active for proper data transfer (NOTE! If "Send with Ack" is not set sample data could be lost without any warnings).

If a sample have been lost and "Send with Ack" is activated, the error will be indicated by BM800 (A beep and a Serial Output Alarm, no further samples will be sent until the issue is acknowledged manually).

All BM800 sample data must be deleted manually by user input on the instrument. BDI does not change any data or settings on the instrument.

## 12. FAQ

### **Samples are lost when transferred from BM800 to computer**

1. Make sure that BM800 is set to *Send with Ack* under Advanced -> Setup -> Serial.

BDI validates received data. All data that fails validation will be discarded. BDI signals BM800 if a sample has been transferred successfully by transmitting an acknowledge message. If *Send with Ack* is not set on BM800 there is no possibility for BM800 to acknowledge that a sample needs to be re-transmitted.

2. Ensure that the computer meets stated HW requirements / Ensure that no unnecessary programs/services are running on the computer.

BM800 will timeout within 5 seconds after a sample is sent. If the computer is too slow, it may not allow for validation and parsing within this time frame.

### **How do I know which COM port to use?**

Connected via USB: Instrument serial number will be shown in *Settings -> Selected Port*.

Connected via RS232: You need to know which COM port connects to a physical port. One way to resolve this is to:

1. Use *Settings -> Selected Port* to select a COM port and click Save.
2. If the program successfully connects to an instrument the serial number will be shown in the connection log. If the connection fails serial number will be shown as *N/A* in the connection log. Retry with another COM port.

### **I disconnected the USB cable and now the program does not work**

1. Click Tools -> Restart All Channels.
2. Remove and re insert USB cable at PC end.
3. Click Tools -> Restart All Channels.
4. Check the "Connection / Data Log" text box in main window to see if connection is on-line

If above 4 steps does not work close the application and restart.

### **Local IP Address is wrong when I setup the program in Server Mode**

This is set automatically to the address of the first detected network adapter in your PC. If you have two or more network adapters you need to change the address manually to the one you want. To find the address of available network adapters: start Command Prompt (Start -> Programs -> Accessories -> Command Prompt) and type *ipconfig.exe*, then hit Enter key. A list of available adapters with corresponding IP Addresses will be shown.

### **I changed the Sample Data collection size and now Excel tables are not matching with previous data?**

When changing collection size it is recommended to archive current excel file and then delete it (a new will be created automatically as the first sample is parsed). BDI creates a new excel file each day. Within that day the collection size must be fixed.

### **Where is the sample data?**

Default location can be found by opening the shortcut *BM800 Sample Data* on your desktop

### **I sent the same sample twice but only one was transferred?**

BDI will ignore the second sample if two consecutive samples have the same sequence number and Sample ID.

### **Why can I not change sample collection size when saving as LIS?**

LIS output is the same as Text but with fixed collection size (Extended)

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