Operator's Guide





PN 4237519CB (March 2011)





WARNINGS AND PRECAUTIONS

READ ALL PRODUCT MANUALS AND CONSULT WITH BECKMAN COULTER-TRAINED PERSONNEL BEFORE ATTEMPTING TO OPERATE INSTRUMENT. DO NOT ATTEMPT TO PERFORM ANY PROCEDURE BEFORE CAREFULLY READING ALL INSTRUCTIONS. ALWAYS FOLLOW PRODUCT LABELING AND MANUFACTURER'S RECOMMENDATIONS. IF IN DOUBT AS TO HOW TO PROCEED IN ANY SITUATION, CONTACT YOUR BECKMAN COULTER REPRESENTATIVE.

HAZARDS AND OPERATIONAL PRECAUTIONS AND LIMITATIONS

WARNINGS, CAUTIONS, and IMPORTANTS alert you as follows:

- **WARNING** Can cause injury.
- **CAUTION** Can cause damage to the instrument.
- **IMPORTANT** Can cause misleading results.

BECKMAN COULTER, INC. URGES ITS CUSTOMERS TO COMPLY WITH ALL NATIONAL HEALTH AND SAFETY STANDARDS SUCH AS THE USE OF BARRIER PROTECTION. THIS MAY INCLUDE, BUT IT IS NOT LIMITED TO, PROTECTIVE EYEWEAR, GLOVES, AND SUITABLE LABORATORY ATTIRE WHEN OPERATING OR MAINTAINING THIS OR ANY OTHER AUTOMATED LABORATORY ANALYZER.

WARNING Risk of operator injury if:

- All doors, covers and panels are not closed and secured in place prior to and during instrument operation.
- The integrity of safety interlocks and sensors is compromised.
- Instrument alarms and error messages are not acknowledged and acted upon.
- You contact moving parts.
- You mishandle broken parts.
- Doors, covers and panels are not opened, closed, removed and/or replaced with care.
- Improper tools are used for troubleshooting.

To avoid injury:

- Keep doors, covers and panels closed and secured in place while the instrument is in use.
- Take full advantage of the safety features of the instrument. Do not defeat safety interlocks and sensors.
- Acknowledge and act upon instrument alarms and error messages.
- Keep away from moving parts.
- Report any broken parts to your Beckman Coulter Representative.
- Open/remove and close/replace doors, covers and panels with care.
- Use the proper tools when troubleshooting.

CAUTION System integrity might be compromised and operational failures might occur if:

- This equipment is used in a manner other than specified. Operate the instrument as instructed in the Product Manuals.
- You introduce software that is not authorized by Beckman Coulter into your computer. Only operate your system's computer with software authorized by Beckman Coulter.
- You install software that is not an original copyrighted version. Only use software that is an original copyrighted version to prevent virus contamination.

IMPORTANT If you purchased this product from anyone other than Beckman Coulter or an authorized Beckman Coulter distributor, and, if it is not presently under a Beckman Coulter service maintenance agreement, Beckman Coulter cannot guarantee that the product is fitted with the most current mandatory engineering revisions or that you will receive the most current information bulletins concerning the product. If you purchased this product from a third party and would like further information concerning this topic, call your Beckman Coulter Representative.

Initial Issue, A 6/99 Software version 1.0.

Revision B, 3/01

Software version 1.3.

Changes were made to add the IVD parameters, MRV and IRF.

Changed pages: Cover, iii, vi, vii, 2-17, 2-21, 2-23, 2-27, 3-4, 3-9, 3-18 to 3-21, 4-9, 4-21 to 4-23, 6-4, 6-7, 6-10, 6-15, 6-18, the Index, and back cover.

Some repagination was done at the end of Chapters 3 and 4 due to new information added to earlier pages.

Revision C, 6/03

Changes were made to,

- comply with the EU IVD Directive (98/79/EC).
- change the company name from Coulter Corporation to Beckman Coulter Inc.

Note: Changes that are part of the most recent revision are indicated in text by a bar in the margin of the amended page.

Revision CA, **5/10** Software Version 1.3.

Updates were made to the company corporate address.

Note: Changes that are part of the most recent revision are indicated in text by a bar in the margin of the amended page.

Revision CB, 03/11 Software Version 1.3.

Changes were made to page 2-27, 3-2.

Note: Changes that are part of the most recent revision are indicated in text by a bar in the margin of the amended page.

This document applies to the latest software listed and higher versions. When a subsequent software version changes the information in this document, a new issue will be released to the Beckman Coulter website. For labeling updates, go to www.beckmancoulter.com and download the most recent manual or system help for your instrument.

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CONTENTS

This introductory section contains the following topics:

- How to use your COULTER HmX Hematology Analyzer Documentation set
- About this Manual
- Conventions
- Hot Keys

HOW TO USE YOUR COULTER HmX HEMATOLOGY ANALYZER DOCUMENTATION SET

Use the **Reference** manual for in-depth information about what the instrument does, the methods it uses, its specifications, and information on installation, safety and software options.

Use the **Special Procedures and Troubleshooting** Manual to run a calibration, perform reproducibility and carryover checks, and to clean, replace or adjust a component of the instrument. The troubleshooting tables appear at the back of the manual.

Use the **Operator's Guide** for the day-to-day running of your instrument. Read the System Overview chapter to become familiar with the different parts of your system. Then go through the detailed step-by-step procedures of start up, running controls and samples, reviewing data and shutdown.

Use the **Host Specifications** Manual to locate information about transmission to a host computer.

See the Documentation page on the back cover of this manual for the contents of each manual. It can help you to determine quickly which manual contains the information you need.

ABOUT THIS MANUAL

Your HmX Hematology Analyzer Operator's Guide provides step-by-step instructions for the day-to-day running of your instrument.

This information is organized as follows:

- Chapter 1, System Overview
 Identifies and defines the function of the system components of the HmX Hematology
 Analyzer. Gives an overview of the software menu structure and the DMS status line.
- Chapter 2, Startup and Controls
 Contains step-by step instructions for performing daily start up and quality control procedures. Includes information on control run, review or report, graphs, X
 <u>B</u> analysis, differential comparison, and mode to mode.
- Chapter 3, Sample Analysis
 Contains step-by-step instructions for performing sample analysis in the Primary,
 Secondary, Predilute, and Retic modes. Information about using the Worklist and Host
 Worklist is also included.

- Chapter 4, Data Review
 Contains information about reviewing the data on the Run Samples screen such as
 histograms, scatterplots, parameter codes, flags, and messages. Also presents information
 on Data Base Query and Workload Recording.
- Chapter 5, Shut Down Contains step-by-step instructions for shutting down your system for short or prolonged periods.
- Chapter 6, Set Up Contains information on how to set up control files, sample analysis options, and system options.

CONVENTIONS

This manual uses the following conventions:

- ITALICS indicate screen messages such as RESET THE SYSTEM or Press any key.
- **Bold** indicates
 - a menu item such as **Run Samples**
 - a function such as **F3 Run**.
- The software path to access the needed function or screen appears in a series separated by double arrow heads. For example, the path to the Reagents set up screen is:

```
Special Functions → Set Up → System Set Up → Reagents.
```

To select a menu item, highlight it then press *Enter* or press the alphabetic key on the keyboard that corresponds to the letter displayed in black within the name of the menu item.

- indicates a key (such as Enter).
- 🗋 🗋 indicates to press and release the first key listed, then press and release the next key listed.
- _____+ indicates to press and hold the first key listed, then press the next key.

HOT KEYS (SHORTCUTS)

F1 Go to the Access screen. This Alt + End Stops instrument beeping and removes the error message at the is only available when the Main Menu is displayed. bottom of the screen. Move from the current screen to **F4** Print. (Ctrl]+(F2) the Error file and back to the original screen. (F9) Exit (unless the F3 Run Ctrl +W Move from the Sample Analysis window is displayed, then the screen to the Worklist and back function of F9 is Stop.) when a sub-menu or window is not displayed. (F10) Save and/or return to the previous screen.

1.1 HmX MAIN UNIT COMPONENTS



- Aspirator probe. Use this to aspirate from open vials, predilute specimens, and retic preparations.
- 2 Sample bar. Press this to start aspiration from an open vial, predilute specimen, or retic preparation.
- Bar-code reader.
- 4 Entry port for closed vials.
- Exit tray for closed vials.
- 6 Standby/Reset rocker switch. Use this switch to put the instrument in the standby state or to reset the system (refer to Special Procedures and Troubleshooting manual for reset procedure). The I symbol indicates the ready position and the O symbol indicates the standby position.
- Green glow means bar-code read is successful, cycle the sample.
- 8 Red glow means wait. It also indicates when a bar-code read is unsuccessful.
- Ready indicator light. Main power is on and the Standby/Reset rocker switch is in the ready position. Instrument is ready to operate.
- Standby indicator light. Main power is on and the Standby/Reset rocker switch is in the standby position. Voltages are applied to a memory location in the analyzer but everything else is powered down. To return to the ready state, put the Standby/Reset rocker switch in the ready position, I.
- Main power On/Off rocker switch. This is located on the back of the instrument.

1.2 COMPUTER, MONITOR AND KEYBOARD



Note: The design of your computer and monitor may differ from this illustration. If so, refer to the manufacturer's documentation for information on controls and indicators.

- Monitor power indicator light. Glows when power is on.
- 2 Monitor power On/Off switch.
- 3 Monitor menu controls. Not used routinely.
- Monitor audio controls. Not used with the HmX Hematology Analyzer.
- **3** Computer power On/Off switch.
- 6 Hard disk indicator light. Glows when the computer is saving or retrieving data
- Computer reset button. Used only in special circumstances. If you reset the computer, you must also reset the system using the Standby/Reset switch on the main unit before you return to normal operation.
- **8** Computer power indicator light. Glows when power is on.
- Diskette drive. Used to upload COULTER 5C cell control file data and archive patient sample results. Indicator light glows when saving or retrieving data.



Spacebar. Toggles options. Press the spacebar to continue when the monitor screen is blank.

Cursor keys move the cursor to highlight menu items, scroll up and down screens, or move to a field on a screen to enter or edit data.

All other keys. Function is defined on each screen and in individual procedures.

1.3 ACCESS SCREEN

The Access screen provides you with quick access to the most commonly used areas of the software. It is the first screen to appear after a system reset or power up. If you go to any of these areas using the Access screen, you will automatically return to the Access screen upon exit. The Access screen is also available from the Main Menu by using the F1 key.



1.4 SOFTWARE MENU TREE

The Main Menu consists of the four items listed across the top of the menu tree: **Sample Analysis**, **Controls**, **Diluter Functions**, and **Special Functions**.



1.5 RUN SAMPLES SCREEN OPTIONS

F5 Optns:

F2	XB: ON N=2 IN
F3	CAP PIERCER 10mm-13mm
F4	DB: ON
F5	Print: NONE
F6	Host: OFF
F7	Display only: OFF
F8	Operator: OPR
F11	B&W screen print
F12	Color screen print

Table 1.1 F5 from Run Samples Screen

F2 XB: ON N=2 IN	Turns XB ON and OFF. N is the number of samples stored in the current batch. Also displays the status of the last completed batch (IN or OUT).
F3 CAP PIERCER 10mm-13mm	Alternate between this and 16mm. Select the correct carousel slot based on the size of the tube you run.
F4 DB: ON	Turns the data base ON and OFF. Default setting is ON.
F5 Print: NONE	Sets the automatic printing of samples to the graphic printer. Choose between NONE, NORMALS, ABNORMALS or ALL. Default setting is NONE.
F6 Host: OFF	Turns the automatic host transmission ON and OFF. Default setting is OFF.
F7 Display only: OFF	If ON, then XB, DB and HOST turn OFF. Default setting is OFF.
F8 Operator: OPR	Enter up to three alphanumeric characters for an Operator ID. Default setting is OPR.
F11 B&W screen print	Initiates a large black and white screen print of the current sample.
F12 Color screen print	Initiates a large color screen print of the current sample if your printer can print in color.

Note: After a system reset, these options return to their default settings. Be sure to set them up again according to your laboratory's protocol before running patient samples.

Note: Print, Host and Operator can also be set up from the Main Menu using F5-Options.

1.6 STATUS LINE

The status line at the bottom of your screen indicates the current operating status of the HmX Hematology Analyzer.

07/13/99 19:34 OPR DMST PRT P2T HCT DBT XBT WLT HWLT QCT

Table 1.2 Status Line Definition

Symbol	Refers to	\uparrow	\downarrow	Red	Yellow	White
DMS	Data Management System	Connected to Analyzer.	Not connected to Analyzer.	Not communicating with Analyzer.	DMS busy or receiving data.	DMS is OK.
PR*	Graphics Printer	Autoprint is set to ALL, ABNORMALS, or NORMALS.	Autoprint is set to NONE.	Printer is off-line, or printer is out of paper.	Printer is printing.	Printer and DMS are connected.
HC	Host Computer	Auto transmission ON.	Auto transmission OFF.	Not connected to host.	Sending data to host computer.	Host and DMS are connected.
DB	Data Base	Store is ON.	Store is OFF.	Data Base is not functional. System stops. Reset the system and rerun last 2 samples.	Data Base is storing data.	Data Base is OK.
XB	\overline{X}_{B} Analysis	XB is ON.	XB is OFF.	Last completed batch was OUT.	N/A	Last completed batch was IN.
WL	Worklist	Preassigned entries pending on Worklist.	No preassigned entries on Worklist.	3 consecutive or 10 total error messages are in the status field.	The Worklist is full. (300 preassigned samples)	Worklist is OK.
HWL	Host Worklist	Preassigned entries pending on the Host Worklist.	No preassigned entries on Host Worklist.	Host Worklist is full.	DMS is receiving preassigned samples from the host computer.	Host Worklist is OK.
QC	Quality Control	Auto-Stop is ON.	Auto-Stop is OFF.	Last control run had an error message.	Receiving a control run.	Results of last control run are OK.
P2	Additional Graphics Printer.	Autoprint is ON.	Autoprint is OFF.	Printer is off-line OR printer is out of paper.	Printer is printing.	Printer and DMS are connected.

*Changes to MA for manual printing, BA for batch printing and AU for auto-printing.

IMPORTANT Operating the HmX Hematology Analyzer with open doors or panels introduces electrical interference which can cause misleading results. Operate the HmX Hematology Analyzer with all doors and panels closed.

2.1 STARTUP

- 1. Are Start Up results already displayed as the result of a Clean cycle?
 - If no, go to step 2.
 - If yes, go to step 3.

Note: The Clean cycle consists of 30 minutes in Shut Down followed by an automatic Start Up. See Chapter 5, Shut Down for more information.

- 2. To begin Start Up
 - a. Select **Diluter Functions → Start Up**.
 - b. Press Enter.
- 3. Once Start Up is complete, evaluate the display. Expired reagents and failed checks appear in red.

Note: Results print automatically. For additional printouts, press **F4**.

		-	TART UP	
			Press <enter> to continue system status values.</enter>	2
			Electronics Checks	: Pass
	Lot #	EXP DATE	Pressure/Vacuum Check	s : Pass
		09/15/99 03/31/99	Temperature Checks	: Pass
		04/30/99 03/31/99	Background Checks	: Pass
			HGB Lamp Checks	: Pass

 Press F2 to view detailed results. Make sure the Background and other Start Up results are within limits. Results outside limits turn red.

• If a background count is red, press

- F3 Repeat Background.
- See the Special Procedures and Troubleshooting Manual for additional troubleshooting.

TEST	RESULT	LIMITS	TEST	RESULT	LIMIT
+5 VDC		4.75 - 5.25	60 PSI	60.5	
+5.6 VDC			30 PSI	32.2	
+6.3 VDC		5.98 - 6.62	Sheath/Lo PSI		
+12 VDC		11.40 - 12.60	Diff PSI	0.643	0.100 - 1.0
+15 VDC	15.20	14.25 - 15.75	Low Vac	5.993	5.940 - 6.0
-15 VDC	-15.21	(-)15.75 - (-)14.25	High Vac	22.63	17.00 - 28.
+24 VDC	24.27	22.80 - 25.20	Lyse Temp °C	23.7	
+240 VDC	244.4	228.0 - 265.0	Amb Temp °C	24.2	
+300 VDC	300	285 - 315			
+1350 VDC	1287	1186 - 1523			
WIa V	116.5	100.6 - 129.6	В	ACKGROUN	ID LIMIT
RIa V	156.8	141.5 - 169.1			
Hgb V	6.89	6.65 - 7.35	WBC	.00	0.40
Fr Bl Dtr	4.2	3.50 - 5.12	RBC	.001	0.040
Rr Bl Dtr	4.89	4.50 - 5.12	HGB	0.00	0.10
Retic VDC	0.72	0.20 - 1.20	PLT	0.0	3.0
			Diff	0.0	100
			Date: 01/31/	99 T	ime: 05:37:3

2.2 CONTROL RUN

Preparation

Ensure that a control file is set up for each control you intend to run. If you need to set up a control file, refer to Heading 6.2, Control Set Up.

LATEX

Analyze COULTER LATRON primer and control once each day.

1. Make sure the LATRON primer and control are within the correct temperature range. See the package insert.



- 2. Access the Latex Control Run screen:
 - at the Access screen, press F2 RUN CONTROLS OR
 - at the Main Menu, select **Controls** → **Control Run**.
- 3. If the LATRON file does not appear
 - a. Press F2 File.
 - b. Move the cursor to highlight the LATRON file.
 - c. Press Enter.

FIL	E :	4			LOT: 8	60600	OPR: N	ICJ	SHIFT	: 0
LEVE	L: .	Abnorm	al II	EXP	DATE: O	3/16/99	RUN:	2	01/30/	99 07:0
						ct File:			7	
	RES	Level		Lot#	Shift	Level	Lot#	Shift	DIFF	LIMIT
WBC	2	LATRO	N	107332		NCT SETUP			-0.11	0.14
		Norma	1	882300	0	NOT SETUP			-0.0	0.4
NE®	6	Abnor	mal I	871100	0	NOT SETUP			-0.8	1.7
NE#	1	Abnor	mal II	860600	0	NOT SETUP				
		Level	I	313400	0	NOT SETUP			0.4	3.0
LY&	1	Level	II	423400	0	NOT SETUP			0.9	1.2
LY#		Level	III	533400	0	NOT SETUP			0.9	1.7
		NOT 3	ETUP			NOT SETUP			-0.1	1.5
NO#	1	NOT 3	ETUP			NOT SETUP				
NO#		NOT 2				NOT SETUP			-10	25
						1			-0.2	2.0
EO%	8	.7	7.5	1.2	2.0					
EO#	0	.8	0.6	0.2	0.7					
BA≒	0	. 3	0.1	0.2	0.5					
B.&#</td><td>0</td><td>.0</td><td>0.0</td><td>0.0</td><td>0.1</td><td></td><td></td><td></td><td></td><td></td></tr></tbody></table>										

4. Press F3 Run F4 PRIMER.

SAMPLE	MODE?
F3 F4 F7 F8 F9	CONTROL (SECONDARY) PRIMER PURGE RINSE STOP
Select	to change/ESC to continue

5. Cycle the primer (bottle 1):

IMPORTANT Removing the primer bottle before you hear the beep can cause falsely increased primer results. Do not remove the primer bottle until you hear the beep.

- a. Immerse the aspirator tip completely in the primer.
- b. Press and release the sample bar.
- c. Remove the primer bottle when you hear the beep.



- 6. Evaluate primer results:
 - a. Are both counts \leq 500?
 - If yes, go to step 7.
 - If no, go to step 6b.
 - b. Cycle a new vial. Make sure it is free of bubbles. Are both counts ≤ 500 ?
 - If yes, go to step 7.
 - If no, press **F4** to print the screen then call your Beckman Coulter representative.
- 7. Press Esc to remove the Primer Run window.
- 8. When SELECT FUNCTION appears on the status line, press F3 Run
 F3 CONTROL (SECONDARY).

	FILE: 1 L			4		(PRIM	ER RUN	
	LOT: 107332	01/30/99	11:	53:36					
							01/31/99		
		DIFF MOD	E			RET			ount
							DIFF:		
	Mean Channel	RESULTS	ASSAY	DIFF	RANGE +/-	RESUL	RETIC:	3	
	Volume (V)	27.4	27.7	0.4	2.0	26.1			
	Conduct.(C)	27.3	27.7	0.3	2.0	26.9	27.7	-0.8	2.0
	Scatter (S)	91.7	90.0	1.7	5.0	186.8	192.0 -	- 5.2	10.0
		DIFF MOD	E			RETIC	MODE		
÷	cv	RESULTS	EXPI	ECTED C	v	RESULTS	EXPEC	TED CV	
				<			<		
	Volume (V)					4.5	7.		
	Conduct.(C)	8.2	10	0.0		4.6	10.	0	
	Scatter (S)	3.5	\$	9.0		6.8	9.	0	

SAMPLE	MODE?
F4 F7 F8	CONTROL (SECONDARY) PRIMER PURGE RINSE STOP
Select	to change/ESC to continue

9. Gently mix the control. Invert the bottle 5 to 8 times.



10. Cycle the control (bottle 2):

IMPORTANT Removing the control bottle before you hear the beep can cause misleading control results. Do not remove the control bottle until you hear the beep.

- a. Immerse the aspirator tip completely in the control.
- b. Press and release the sample bar.
- c. Remove the control bottle when you hear the beep.



- 11. Check for H (High) or L (Low) beside the results for both modes.
 - If there are no H's or L's, results are within range.
 - If you see an H or L, go to Table 2.1. Follow the troubleshooting steps until you solve the problem.
- 12. Optional: Press **F4** to print the results for your logbook.

	FILE 1 L LOT: 107332		RUN	: 4	CONTROL I	NUN			
		DIFF MOD	E			RETIC	MODE		
	Mean Channel	RESULTS	ASSAY	DIFF	RANGE	RESULTS	ASSAY	DIFF	RANGE
	Volume (V)	27.4	27.7	0.4		26.1	27.7	- 1.6	
	Conduct.(C)	27.3	27.7	0.3	2.0	26.9	27.7	- 0.8	2.0
	Scatter (S)	91.7	90.0	1.7	5.0	186.8	192.0	- 5.2	10.0
_		DIFF MOD	E			RETIC	MODE		
ş	CV	RESULTS	EXPI	ECTED C	v	RESULTS	EXP		,
	Volume (V)			<				<	
	Conduct.(C)	0.0					1		
	Scatter (S)		10			4.6		9.0	
	Scatter (S)	3.5	2	.0		0.8		9.0	
F2	2-File F3-Ru	n F4-Pri	nt F5-	Histo	F6-Grap	n F8-Delet	e F9-E	lait	

Table 2.1 When LATRON Control is Out of Limits

Possibility	Action
Assigned value or range is incorrect.	Be sure the assigned values and ranges match the ones on the LATRON control package insert. If in error, correct them by selecting Special Functions → Set Up → Control Set Up .
Bubbles in the flow cell or improper vial handling	Rerun the primer and then the control.
Control is: • contaminated • improperly mixed • past open-vial expiration date	Ensure that the aspirator tip is clean and dry. Try a new vial of LATRON control. Mix gently according to directions on the package insert. Do not use expired control.
Plugged flow cell.	 Press F3 Run. Press F7 PURGE to purge the flow cell. Press F4 PRIMER. Cycle the LATRON primer again. Press Esc. Press F3 Run F3 CONTROL (SECONDARY). Cycle the LATRON control again. If the control is still "out," repeat steps 1 through 5. If the problem remains, either: Perform Shutdown or Turn the DIFF OFF and run CBCs only then call your Beckman Coulter representative for help.
There is an instrument change.	Call your Beckman Coulter Representative for help.

Cycling COULTER 5C Cell Controls in Primary Mode with Bar-Code Labels

COULTER 5C cell control, with bar-code labels, is the recommended method of QC. Your HmX Hematology Analyzer automatically recognizes bar code-labeled 5C cell controls and assigns results to the correct file. If the bar-code label cannot be read, follow the procedure Cycling Commercial Cell Controls without Bar-Code Labels.

IMPORTANT

- 1. If you cycle 5C cell control with the DIFF OFF, differential results do not post to the control file and therefore are not evaluated for being IN or OUT of control. Cycle 5C cell control with the DIFF ON.
- 2. Misleading results can occur if 5C cell control is not prepared properly. Follow the procedure on the package insert to properly warm and mix 5C cell control.
- 1. Follow the directions on the cell control package insert for storage, preparation and mixing.
- 2. Does *SELECT FUNCTION* appear at the lower right corner of the DMS screen?
 - If no, go to step 3.
 - If yes, continue with this step.
 - a. Access the Run Samples screen:
 - at the Access screen, press **F1 RUN SAMPLES** OR
 - at the Main Menu, select Sample Analysis → Run Samples.
 - b. The instrument automatically prepares itself for Primary mode, DIFF ON. Go to step 7.
- 3. Access the Run Samples screen:
 - at the Access screen, press F1 RUN SAMPLES OR
 - at the Main Menu, select Sample Analysis → Run Samples
- 4. Press F3 Run.

5. Make sure the DIFF is ON. If it is OFF, press **F6 DIFF ON/OFF**.

Note: If **SAMPLE MODE?** is not displayed, press F9 **STOP** first.

SAMPLE MODE? F2 START PRIMARY F3 SECONDARY F4 PREDILUTE CBC F5 RETIC F6 DIFF ON/OFF F7 PURGE F8 RINSE F9 STOP DIFF: ON BLOOD DET: ON Select to change/ESC to continue

- 6. Does the top of the **F3-Run** window display **PRIMARY: SAMPLE ANALYSIS**?
 - If yes, press Esc.
 - If no, press F2 START PRIMARY.

PRIMARY: SAMPLE ANALYSIS F2 START PRIMARY F3 SECONDARY F4 PREDILUTE CBC F5 RETIC F6 DIFF ON/OFF F7 PURGE F8 RINSE F9 STOP DIFF: ON BLOOD DET: ON Select to change/ESC to continue

- 7. Mix the control tube according to package insert directions.
- 8. Identify the sample:
 - Hold the 5C cell control bar-code label in front of the reader.
 - Green light and beep: Bar code read. Go to step 9.
 - Red light: Wait. Try again.

If the bar-code label is unreadable, follow the procedure Cycling Commercial Cell Controls without Bar-Code Labels.



- 9. Place the control in the carousel.
 - Results are placed automatically in the correct file.
 - Results do not appear on the Run Samples screen.
 - If any result is out of control, an error message displays.
- 10. Repeat steps 7 through 9 for other levels of control.
- 11. Check the results of the controls.
 - a. Select **Controls •• Review or Report.**
 - b. Check for H (High) or L (Low) beside the results.
 - If there are no H's or L's, results are within range.
 - If you see an H or L, go to Table 2.2. Follow the troubleshooting steps until you solve the problem.

Note: For more information about **Review or Report**, see Heading 2.3

- c. Use F2 File to select other files to review.
- 12. Optional: To print your last control run, select Controls → Control Run. Press F4
 Print. Use F2 File to select other files to print.

Table 2.2 When CBC/DIFF Control is Out of Limits

Possibility	Action
Improper mixing	Follow the instructions on the package insert. Rerun control.
Control file set up incorrectly	Make sure the assigned values and ranges match those on the control package insert. If in error, correct them by selecting Special Functions → Set Up → Control Set Up .
Chance (statistical outlier)	Rerun the control. If it is still "out," try the next possibility.
Change in the control	Try another vial or level of control. Follow directions on the package insert for proper handling.
Instrument change	Watch for normal sample flow. Call your Beckman Coulter Representative to help you troubleshoot abnormal operation.

FII	Ε:	2	LO	T: 88230	0 3	HIFT :	0	IQAP ID	# 75012-	1-T6-1
LEV	EL:	Norm	al		EXP	DATE:	3/15/99			
RUN	DA	TE	TIME	OPR	WBC	RBC	HGB	HCT	MCV	MCH
1	01/2	8/99	06:24	OPR	7.4	4.24	13.4	37.2	87.8	31.5
2	01/2	3/99	14:07	OPR	7.4	4.34	13.4	37.7	87.0	30.9
3	01/2	9/99	06:02	OPR	7.5	4.28	13.5	37.2	86.9	31.4
4	01/2	9/99	14:26	OPR	7.3	4.33	13.4	37.3	86.0	31.0
5	01/3	D/99	06:45	OPR	7.4	4.25	13.3	37.1	87.4	31.4
6	01/3	3/99	14:13	OPR	7.3	4.25	13.4	37.2	87.5	31.5
7	1	1	:							
з	1	1								
9	1	1								
10	/	/	:							
			ME AN		7.4	4.28	13.4	37.3	87.1	31.3
			2SD		0.2	0.09	0.1	0.4	1.3	0.5
			CV		1.0	1.0	0.5	0.6	0.7	0.8
			N		6	6	6	6	6	6
			ASSAY		7.4	4.33	13.4	38.1	88.0	30.9
			LIMITS		0.5	0.12	0.4	1.7	3.0	1.2

Cycling Commercial Cell Controls without Bar-Code Labels

- 1. Follow the directions on the cell control package insert for storage, preparation and mixing.
- 2. Access the appropriate Control Run screen:
 - at the Access screen, press F2 RUN CONTROLS

OR

- at the Main Menu, select **Controls** ► **Control Run**.
- 3. If the correct file does not appear
 - a. Press F2 File.
 - b. Move the cursor to highlight the correct file.
 - c. Press Enter.

FILE:		4			LOT: 8	60600		OPR: N	CJ	SHIFT	: 0
LEVEL:		Abnorms	81 II	EXP				RUN:	2	01/30/	99 07:03
					-Sele					1	
		Level			Shift			Lot#	Shift	DIFF	
WBC	2	LATRON		107332		NCT S	SETUP			-0.11	0.14
		Norma.	1	882300	0	NOT S	SETUP			-0.0	0.4
NE*	6	Abnors	nal I	871100	0	NOT S	SETUP			-0.8	1.7
NE#	1	Abnors	oal II	860600	0	NOT S	SETUP				
		Level	I	313400	0	NOT S	SETUP			0.4	3.0
LYN	1	Level	II	423400	0	NOT :	SETUP			0.9	1.2
LY#		Level	III	533400	0	NOT :	SETUP			0.9	1.7
		NOT S	ETHP			NOT :	SETUP			-0.1	1.5
NOR	1	NOT 3	ETHE			NOT :	SETUP				
NO#		NOT S				NOT :	SETUP			-10	25
										-0.2	2.0
EO%	8	.7	7.5	1.2	2.0						
E0#	0	.8	0.6	0.2	0.7						
Bå%	0	. 3	0.1	0.2	0.5						
BA#					0.5						
日本井	0	.0	0.0	0.0	0.1						

- 4. Press F3 Run F2 START PRIMARY.
- 5. Mix the control tube according to package insert directions.
- 6. Place the control tube in the carousel.



- 7. Check for H (High) or L (Low) beside the results on the screen.
 - If there are no H's or L's, results are within range.
 - If you see an H or L, go to Table 2.2. Follow the troubleshooting steps until you solve the problem.
- 8. Optional: press **F4** to print the control results.
- 9. Use F2 File to select other files and run additional levels of control as required.

FILI		mal II	EXP		860600 03/16/99	OPR: RUN:		SHIFT 30/99	
	RESILTS	ASSAV	DIFF	LINIT		RESULTS	ASSAY	DIFF	LINT
MBC	20.4	20.3	0.1	0.5	RBC	4.02	4.13		0.1
WDC	20.4	20.5	0.1	0.5	HGB	13.8	13.8		
NEN	61.7	62.4	0.7	5.0		37.7			
NE#	12.6	12.7	-0.1	0.8	nci	31.1	30.5	-0.0	1.
NE#	12.0	16.7	-0.1	0.0	NCV	93.6	93.2	0.4	3.
LYS	16.0	16.5	0.5	5.0		34.3	33.4		
	3.3	3.4	-0.3	0.6	MCHC		35.8		
LY#	3.3	3.4	-0.1	0.6	RDW	14.2	14.3		1.
					RDU	14.2	14.3	-0.1	1.
MOS	16.3	15.3		3.0					
MO#	3.3	3.1	0.2	0.3	PLT	437	447		
					MPV	10.0	10.2	-0.2	2.
EO∜	5.8	5.6		2.0					
EO#	1.2	1.1	0.1	0.2					
BA≒	0.2	0.1	0.1	0.5					
BA#	0.0	0.0	0.0	0.1					

Cycling 5C Cell Control in the Secondary Mode

5C cell control is assayed only for Primary mode. If you use Secondary mode, your laboratory must determine its own means and expected ranges for each parameter.

IMPORTANT Blood detectors are inactive in Secondary mode. Sample and aspiration integrity are not checked. To avoid misleading results, ensure complete immersion of the aspirator tip in the sample. Do not remove the sample until you hear the beep.

- 1. Follow the directions on the cell control package insert for storage, preparation and mixing.
- 2. Access the appropriate Control Run screen:
 - at the Access screen, press F2 RUN CONTROLS

OR

- at the Main Menu, select **Controls** ► **Control Run**.
- 3. If the correct file does not appear
 - a. Press F2 File.
 - b. Move the cursor to highlight the correct file.
 - c. Press Enter.

FIL	E: '	4			LOT: 8	60600		OPR: N	CJ	SHIFT	: 0
LEVE	L: J	Abnorm	al II	EXP	DATE: O	3/16/	99	RUN:	2	01/30/	99 07:03
					-Sele					1	
	RES	Leve1		Lot#	Shift	Leve	1	Lot#	Shift	DIFF	LINIT
WBC	2	LATRO	N	107332		NCT	SETUP			-0.11	0.14
		Norma	1	882300	0	NOT	SETUP			-0.0	0.4
NE*	6	Abnor	mal I	871100	0	NOT	SETUP			-0.8	1.7
NE#	1	Abnor	mal II	860600	0	NOT	SETUP				
		Level	I	313400	0	NOT	SETUP			0.4	3.0
LYà	1	Level	II	423400	0	NOT	SETUP			0.9	1.2
LY#		Level	III	533400	0 0	NOT	SETUP			0.9	1.7
		NOT 3	ETHP			NOT	SETUP			-0.1	1.5
NON	1	NOT 3	ETHP			NOT	SETUP				
NO#		NOT 9				NOT	SETUP			-10	25
										J _0.2	2.0
EO%	8	.7	7.5	1.2	2.0						
EO#	0.	.8	0.6	0.2	0.7						
BÅ∜	0.	. 3	0.1	0.2	0.5						
B À#	0.	.0	0.0	0.0	0.1						

- 4. Press F3 Run F3 SECONDARY.
- 5. Mix the control tube according to package insert directions.
- 6. Cycle the control:
 - a. Open the tube and immerse the aspirator tip **1** into the sample.
 - b. Press and release the sample bar.
 - c. Remove the tube when you hear the beep.



- 7. Check for H (High) or L (Low) beside the results on the screen.
 - If there are no H's or L's, results are within range.
 - If you see an H or L, go to Table 2.2. Follow the troubleshooting steps until you solve the problem.
- 8. Optional: press **F4** to print the control results.
- 9. Use F2 File to select other files and run additional levels of control as required.

FIL	E: 4			LOT:	860600	OPR:	MCJ	SHIFT	: 0
LEVE	L: Abnor	mal II	EXP	DATE:	03/16/99	RUN:	3 01/	30/99	10:30
	RESULTS	ASSAY	DIFF	LIMIT		RESULTS	ASSAY	DIFF	LINI
WBC	20.4	20.3	0.1	0.5	RBC	4.02	4.13	-0.11	0.1
					HGB	13.8	13.8	-0.0	0.4
NE%	61.7	62.4	-0.7	5.0	HCT	37.7	38.5	-0.8	1.1
NE#	12.6	12.7	-0.1	0.8					
					MCV	93.6	93.2	0.4	3.0
LYs	16.0	16.5	-0.5	5.0	MCH	34.3	33.4	0.9	1.3
LY#	3.3	3.4	-0.1	0.6	MCHC	36.7	35.8	0.9	1.1
					RDW	14.2	14.3	-0.1	1.
MO∜	16.3	15.3	1.0	3.0					
MO#	3.3	3.1	0.2	0.3	PLT	437	447	-10	23
					MPV	10.0	10.2	-0.2	2.
EO≷	5.8	5.6	0.2	2.0					
E0#	1.2	1.1	0.1	0.2					
BA≒	0.2	0.1	0.1	0.5					
BA#	0.0	0.0	0.0	0.1					

COULTER Retic-C Cell Control

Retic-C cell control is a hematology reference control that monitors Beckman Coulter systems with reticulocyte technology using VCS (volume, conductivity, and light scatter). Use Retic-C cell controls, Levels I, II and III, with the COULTER ReticPrep Reagent kit.

IMPORTANT

- 1. Modifications to the pre-prep procedures or failure to follow these instructions may lead to misleading or erroneous results. Perform the pre-prep procedures according to the instructions below.
- 2. Misleading results can occur if Retic-C cell control is not prepared properly. Follow the procedure on the package insert to properly warm, mix and prepare Retic-C cell control for analysis.

CAUTION Running whole blood or control through the aspirator probe while in the Retic mode can damage the system. Perform the pre-prep procedures according to the instructions below.

- 1. Make sure:
 - a. Dispenser is fitted securely to the Reagent B bottle.
 - b. Reagent fills the clear tubing without any bubbles.

2. For each control tested, label two test tubes: "A" and "B."



IMPORTANT Dispensing Reagent A at an angle changes the dilution of the preparation. Dispense the drops of Reagent A vertically.

3. Place four drops of Reagent A into the test tube labeled "A."



4. Dispense 50 μL of well-mixed control into the tube labeled "A." Do not let the control run down the sides of the tube.



 Gently mix tube "A."
 Prepare other levels of control using steps 1 through 5.



- 6. Let stand for at least 5 minutes at room temperature. Up to 60 minutes is allowable.
- 7. Access the appropriate Control Run screen:
 - at the Access screen, press F2 RUN CONTROLS OR
 - at the Main Menu, select **Controls** → **Control Run**.
- 8. If the correct file does not appear
 - a. Press F2 File.
 - b. Move the cursor to highlight the correct file.
 - c. Press Enter.

9.	Press F3 Run
	F3 CONTROL (SECONDARY)

FILI		4						OPR: N		SHIFT	
LEVEI		Abnorm	al II	EXP				RUN:	2	01/30/	99 07:0
					-Sele					1	
	RES	Level		Lot#	Shift	Level		Lot#	Shift	DIFF	LIMIT
WBC	2	LATRO	N	107332		NCT S	ETUP			-0.11	0.14
		Norms	1	882300	0	NOT S	ETUP			-0.0	0.4
NE*	6	Abnor	mal I	871100	0	NOT 2	ETUP			-0.8	1.7
NE#	1	Abnor	mal II	860600	0	NOT 2	ETUP				
		Level	I	313400	0	NOT S	ETUP			0.4	3.0
LYS	1	Level	II	423400	0	NOT S	ETHP			0.9	1.2
LY#		Level	TTT	533400	1 0	NOT S				0.9	1.7
		NOT 3				NOT 3	ETHP			-0.1	1.5
NOS	1	NOT S				NOT 3					
NO#		NOT 3				NOT 3				-10	25
		NOT 2	SETUP			mor .				-0.2	2.0
EO%	8	.7	7.5	1.2	2.0						
EO#		.8	0.6	0.2	0.7						
201		.0	0.0	0.5	0.7						
BÅ∜	0	. 3	0.1	0.2	0.5						
BA#	0	.0	0.0	0.0	0.1						

SAMPLE MODE ?

F3 CONTROL (SECONDARY)

- F7 PURGE
- F8 RINSE F9 STOP

Select to change/ESC to continue

IMPORTANT To ensure accurate results, add the control-stain mixture directly to the bottom of the tube; do not allow control-stain mixture to run down the sides of the tube. To prevent drying of this small amount, proceed immediately to the next step.

 Gently mix tube "A" again then transfer
 2 μL of the control/stain mixture from tube "A" into the bottom of tube "B."



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- 11. Dispense Reagent B.
 - a. Place tube "B" with the control-stain aliquot at a 30° angle under the tip of the Reagent B dispenser.
 - b. Dispense 2 mL of Reagent B into the test tube "B." DO NOT MIX.



2 µL

≞

12. Wait 30 seconds.

- 13. After 30 seconds, analyze the control.
 - a. Immerse the aspirator tip **1** into the retic preparation.
 - b. Press and release the sample bar.
 - c. Remove the tube when you hear the beep.



- 14. Check for H (High) or L (Low) beside the results on the screen.
 - If there are no H's or L's, results are within expected range.
 - If you see an H or L, go to Table 2.3. Follow the troubleshooting steps until you solve the problem.

Note: MRV and IRF results only appear on the screen if you enabled these parameters.

F2-File F3-Run F4-Print F6-Graph F8-Delete F9-Exit F12-Graphics

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Table 2.3	When Retic	Control is	Out of Limits
-----------	------------	------------	---------------

Possibility	Action
Improper mixing or preparation of control	Follow the mixing instructions on the package insert and the preparation instructions in the manual. Make another preparation and rerun control.
Control file set up incorrectly	Make sure the assigned values and ranges match those on the control package insert. For MRV and IRF, make sure the assigned values and expected ranges are set to 99.9 or to the values established by your laboratory. If in error, correct them by selecting Special Functions → Set Up → Control Set Up .
Chance (statistical outlier)	Rerun the control. If it is still "out", try the next possibility.
Change in the control or pre-prep reagents	Try another vial or level of control. Try new reagents A and B.
Instrument change	Call your Coulter Representative to help you troubleshoot abnormal operation.

2.3 CONTROL REVIEW OR REPORT

Select Controls >> Review or Report

- Use to review and print:
 - Control results, cumulative statistics and histograms for LATEX files.
 - Control results, cumulative statistics and graphics for CBC/DIFF and RETIC files.
 - Control results and cumulative statistics for CBC files.
- Use to transmit control results and cumulative statistics for any control file to a host.
- Use to periodically check cumulative results for trends or shifts.

LATEX Control Review or Report

Use to review and print control results, cumulative statistics and histograms for LATEX files. Can also be used to transmit the data of the entire control file to a host computer.

Check cumulative results to look for trends, shifts, or, if necessary, troubleshooting.

Screen-Specific Function Keys:

Diff Latex Control Review screen

FILE	: 1 LATRO	N		FF LATEX			ID # 75	5012-1-T6	-1
LOT:	107332			Hea	an Channe	-1		- * CV	
RUN	DATE	TIME	P	v	С	s	v	С	s
1	02/01/99	06:32	24						
2	02/01/99	06:36		27.2	26.8	86.2	2.9	4.0	3.2
3	02/02/99	06:46	12						
4	02/02/99	06:48		27.2	26.7	88.7	3.0	4.2	3.1
5	02/03/99	06:27	18						
6	02/03/99	06:30		27.2	26.7	86.9	3.2	4.3	3.0
7	02/04/99	06:36	2						
8	02/04/99	06:38		27.1	26.8	87.6	2.9	4.2	3.2
9	02/05/99	06:31	11						
10	02/05/99	06:34		27.2	27.0	86.3	3.1	4.3	3.1
			HE AN	27.2	26.8	87.1	3.0	4.2	3.1
			N	5	5	5	5	5	5
		MI	NIMUM	27.1	26.7	86.2	2.9	4.0	3.0
		MA	XIMUM	27.2	27.0	88.7	3.2	4.3	3.2
			ASSAY	27.7	27.7	90.0	7.0	10.0	9.0
			RANGE	2.0	2.0	5.0			
	ile F3-Tra								

2-File F3-Transmit F4-Print F5-Histo F6-Rem/Res F8-Delete File F9-Exit \leftrightarrow More

F2 File

Displays all available files. Use \uparrow and \downarrow to select the file you need. Press Enter.

F3 Transmit

Transmits the data of the entire control file to a host computer.

F4 Print

Prints entire file in a line list format.

F5 Histo

Displays the volume, conductivity, and scatter (VCS) histograms screen.

F4 Print

Prints the screen.

F6 Additional Histo

Switches between DIFF and RETIC histograms.

Retic Latex Control Review screen

ILE:	1 LATRO	N	EX	P DATE: 0	02/20/99	IQAI	PID # 79	5012-1-T6	-1
OT:	107332			— Нес	an Chann	el —		- * CV	
RUN	DATE	TIME	P	v	С	s	v	с	s
1 0	02/01/99	06:32	24						
2 0	02/01/99	06:36		27.2	26.8	186.2	2.9	4.0	3.2
3 0	2/02/99	06:46	12						
4 0	2/02/99	06:48		27.2	26.7	188.7	3.0	4.2	3.1
5 0	02/03/99	06:27	18						
6 0	02/03/99	06:30		27.2	26.7	186.9	3.2	4.3	3.0
7 0	02/04/99	06:36	2						
8 0	02/04/99	06:38		27.1	26.8	187.6	2.9	4.2	3.2
9 0	02/05/99	06:31	11						
10 0	02/05/99	06:34		27.2	27.0	186.3	3.1	4.3	3.1
			HE AN	27.2	26.8	187.1	3.0	4.2	3.1
			N	5	5	5	5	5	5
		MI	NIMUM	27.1	26.7	186.2	2.9	4.0	3.0
		MA	XIMUM	27.2	27.0	188.7	3.2	4.3	3.2
			ASSAY	27.7	27.7	192.0	7.0	10.0	9.0
			RANGE	2.0	2.0	5.0			

F2-File F3-Transmit F4-Print F5-Histo F6-Rem/Res F8-Delete File F9-Exit $\leftrightarrow More$
F6 Rem/Res

Removes a highlighted run from the calculations. DEL appears in place of the run number. The statistics recalculate. Pressing F6 again restores the run and original statistics.

Note: This does not apply to Primer runs.

F8 Delete File

Deletes the current control file. Displays a message You have asked to delete ENTIRE control file. Are you sure you want to delete?: No. Press the Spacebar to select Yes or No then press Enter to confirm your choice.

F9 Exit

Exits to the Main Menu.

$\leftrightarrow \text{More}$

Use \rightarrow and \leftarrow to go back and forth between the Diff Latex Control Review screen and the Retic Latex Control Review screen.

Diff Latex Control Review screen

	: 1 LATRO	N	EX				ID # 79	5012-1-T6	-1
OT:	107332				an Channe			- * CV —	
RUN		TIME	P	v	С	S	v	с	S
	02/01/99	06:32	24						
	02/01/99	06:36		27.2	26.8	86.2	2.9	4.0	3.2
3	02/02/99	06:46	12						
4	02/02/99	06:48		27.2	26.7	88.7	3.0	4.2	3.1
5	02/03/99	06:27	18						
6	02/03/99	06:30		27.2	26.7	86.9	3.2	4.3	3.0
7	02/04/99	06:36	2						
8	02/04/99	06:38		27.1	26.8	87.6	2.9	4.2	3.2
9	02/05/99	06:31	11						
10	02/05/99	06:34		27.2	27.0	86.3	3.1	4.3	3.1
			HE AN	27.2	26.8	87.1	3.0	4.2	3.1
			N	5	5	5	5	5	5
		MI	NIMUM	27.1	26.7	86.2	2.9	4.0	3.0
		MA	XIMUM	27.2	27.0	88.7	3.2	4.3	3.2
			ASSAY	27.7	27.7	90.0	7.0	10.0	9.0
			RANGE	2.0	2.0	5.0			

Retic Latex Control Review screen

	: 1 LATRO	N		P DATE: C	2/20/99	L REVIEW IQAF	ID # 7		-1
JOT:						e1 —		- * CV —	
RUN	DATE	TIME	P	v	с	S	v	с	s
1	02/01/99	06:32	24						
2	02/01/99	06:36		27.2	26.8	186.2	2.9	4.0	3.2
3	02/02/99	06:46	12						
4	02/02/99	06:48		27.2	26.7	188.7	3.0	4.2	3.1
5	02/03/99	06:27	18						
6	02/03/99	06:30		27.2	26.7	186.9	3.2	4.3	3.0
7	02/04/99	06:36	2						
8	02/04/99	06:38		27.1	26.8	187.6	2.9	4.2	3.2
9	02/05/99	06:31	11						
10	02/05/99	06:34		27.2	27.0	186.3	3.1	4.3	3.1
			HEAN	27.2	26.8	187.1	3.0	4.2	3.1
			N	5	5	5	5	5	5
		MI	NIMUM	27.1	26.7	186.2	2.9	4.0	3.0
		MA	XIMUN	27.2	27.0	188.7	3.2	4.3	3.2
			ASSAY	27.7	27.7	192.0	7.0	10.0	9.0
			RANGE	2.0	2.0	5.0			

F2-File F3-Transmit F4-Print F5-Histo F6-Rem/Res F8-Delete File F9-Exit \leftrightarrow More

CBC/DIFF Control Review or Report

Use to review and print control results, cumulative statistics, and graphics for CBC/DIFF files. Can also be used to transmit the data of the entire control file to a host computer.

Check cumulative results to look for trends, shifts, or, if necessary, troubleshooting.

Screen-Specific Function Keys:

F2 File

Displays all available files. Use ↑ and ↓ to select the file you need. Press Enter.

F3 Transmit

Transmits the data of the entire control file to a host computer.

F4 Print

Prints the entire control file in a line list format.

F6 Rem/Res

Removes a highlighted run from the calculations. DEL appears in place of the run number. The statistics recalculate. Pressing F6 again restores the run and original statistics.

F8 Del File

Deletes the current control file. Displays a message You have asked to delete ENTIRE control file. Are you sure you want to delete?: No. Press the Spacebar to select Yes or No then press Enter to confirm your choice.

F9 Exit

Exits to the Main Menu.

F12 Graphics

Displays scatterplot, histograms, and numeric results.

\leftrightarrow More

Press \leftarrow or \rightarrow to see additional parameters not currently displayed on the screen.

FII			T: 8823			0	IQAP ID	# 75012-	1-T6-1
LEV		rmal			DATE:	3/15/99			
RUN	DATE	TIME	OPR	WBC	RBC	HGB	HCT	MCV	MCH
1	01/28/9	9 06:24	OPR	7.4	4.24	13.4	37.2	87.8	31.5
2	01/28/9	9 14:07	OPR	7.4	4.34	13.4	37.7	87.0	30.9
3	01/29/9	9 06:02	OPR	7.5	4.28	13.5	37.2	86.9	31.4
4	01/29/9	9 14:26	OPR	7.3	4.33	13.4	37.3	86.0	31.0
5	01/30/9	9 06:45	OPR	7.4	4.25	13.3	37.1	87.4	31.4
6	01/30/9	9 14:13	OPR	7.3	4.25	13.4	37.2	87.5	31.5
7	11	:							
8	11	:							
9	11	:							
10	11	:							
		ME AN		7.4	4.28	13.4	37.3	87.1	31.3
		2 S D		0.2	0.09	0.1	0.4	1.3	0.5
		CV		1.0	1.0	0.5	0.6	0.7	0.8
		N		6	6	6	6	6	6
		ASSAY		7.4	4.33	13.4	38.1	88.0	30.9
		LINITS		0.5	0.12	0.4	1.7	3.0	1.2

Retic Control Review or Report

Use to review and print control results, cumulative statistics, and graphics for Retic files. Can also be used to transmit the data of the entire control file to a host computer.

Check cumulative results to look for trends, shifts, or, if necessary, troubleshooting.

Note: MRV and IRF results only appear on the screen if you enabled these parameters.

Screen-Specific Function Keys:

F2 File

Displays all available files. Use ↑ and ↓ to select the file you need. Press Enter.

F3 Transmit

Transmits the data of the entire control file to a host computer.

F4 Print

Prints the entire control file in a line list format.

F6] Remove/Res

Removes a highlighted run from the calculations. DEL appears in place of the run number. The statistics recalculate. Pressing F6 again restores the run and original statistics.

F8 Delete File

Deletes the current control file. Displays a message You have asked to delete ENTIRE control file. Are you sure you want to delete?: No. Press the Spacebar to select Yes or No then press Enter to confirm your choice.

F9 Exit

Exits to the Main Menu.

F12 Graphics

Displays results in the Retic Control Analysis screen format.

FII	.Е:	5	LO	T: 31340	DO SHIFT :	0	IQAP ID # 7501	2-1-T6-1
LE\	/EL:	Leve.	1 I		EXP DATE:	02/14/99		
RUN	DAT	E	TIME	OPR	RET [®]	RET#	MRV	IR
1	01/0	1/99	09:42	OPR	0.87	.0421	100.4	50.
2	01/0	2/99	09:08	OPR	0.79	.0381	104.8	62.
3	01/0	3/99	09:46	OPR	0.84	.0407	101.6	55.
4	01/0	4/99	09:01	OPR	0.75	.0364	104.0	54.3
5	01/0	5/99	09:59	OPR	0.73	.0352	101.9	58.
6	01/0	6/99	09:10	OPR	0.87	.0422	109.0	60.
7	01/0	7/99	09:08	OPR	1.00	.0482	105.0	52.
8	01/0	8/99	09:44	OPR	0.82	.0395	102.6	58.
9	01/0	9/99	09:13	OPR	0.88	.0425	101.5	56.
10	01/1	0/99	09:23	OPR	0.82	.0395	104.7	66.
Ref	RBC	4	.84	MEAN	0.82	0.040	103.6	57.
				2SD	0.2	0.009	8.9	8.
				CV	11.9	11.9	4.3	7.
				N	43	43	43	4
			ASSA	Y/COMP	1.200	0.06	99.9	99.
				LIMITS	0.60	0.029	99.9	99.

F2-File F3-Transmit F4-Print F6-Remove/Res F8-Delete File F9-Exit F12-Graphics

CBC Control Review or Report

Use to review and print control results and cumulative statistics for CBC files. Can also be used to transmit the data of the entire control file to a host computer.

Check cumulative results to look for trends, shifts, or, if necessary, troubleshooting.

Screen-Specific Function Keys:

F2 File

Displays all available files. Use ↑ and ↓ to select the file you need. Press Enter.

F3 Transmit

Transmits the data of the entire control file to a host computer.

F4 Print

Prints the entire control file in a line list format.

F6 **Remove/Restore**

Removes a highlighted run from the calculations. DEL appears in place of the run number. The statistics recalculate. Pressing F6 again restores the run and original statistics.

F8 Delete File

Deletes the current control file. Displays a message You have asked to delete ENTIRE control file. Are you sure you want to delete?: No. Press the Spacebar to select Yes or No then press Enter to confirm your choice.

F9 Exit Exits to the Main Menu.

FIL		CBC		EXP	DATE:	03/08,	/99				
LOT					P ID #		-1-T6-				
RUN	DATE	WBC	RBC	HGB	HCT	MCV	NCH	MCHC	RDW	PLT	MPV
1	02/24/99	8.8	4.15	12.6	4.6	83.4	30.3	36.3	13.7	212	10.7
2	02/24/99	8.9	4.14	12.6	34.5	83.5	30.4	36.4	14.1	217	10.9
3	02/24/99	8.9	4.11	12.6	34.3	83.4	30.6	36.7	14.2	213	10.7
4	02/24/99	8.8	4.16	12.5	35.0	84.1	30.1	35.8	13.7	217	10.8
5	02/25/99	9.0	4.28	12.6	35.7	83.4	29.5	35.4	14.0	223	10.7
6	02/25/99	9.0	4.21	12.7	35.3	83.8	30.0	35.8	14.2	222	10.8
7	02/28/99	9.1	4.22	12.7	35.1	83.3	30.1	36.1	14.1	221	10.7
8	02/28/99	9.0	4.20	12.7	34.8	83.0	30.3	36.5	14.2	221	10.7
9	02/28/99	8.6	4.17	12.6	34.9	83.8	30.3	36.2	14.1	219	10.8
10	02/28/99	9.0	4.20	12.6	35.0	83.4	30.1	36.1	14.0	218	10.8
	ME AN	8.9	4.18	12.6	34.9	83.7	30.2	36.1	14.0	218	10.8
	2 S D	0.3	0.10	0.1	0.7	1.0	0.6	0.7	0.3	7	0.2
	CV	1.5	1.2	0.5	1.1	0.6	1.0	1.0	1.2	1.7	0.7
	N	12	12	12	12	12	12	12	12	12	12
	ASSAY	8.9	4.20	12.6	35.3	84.0	30.0	35.7	14.5	219	10.6
	LIMITS	0.4	0.11	0.3	1.7	3.0	1.2	1.7	1.5	25	2.0

2.4 CONTROL GRAPHS

Select Controls >> Graphs

Control results are plotted on Levey-Jennings graphs.

Review as necessary to check for shifts and trends.

Note: MRV and IRF graphs only appear on the Retic Control graph screen if you enabled these parameters.

Screen-Specific Function Keys:

F2 File

Displays all available files. Use \uparrow and \downarrow to select the file you need. Press Enter.

F4 Print Prints all graphs for the file.

F6 Additional Graphs

See graphs of the other parameters. Retic has only one graph.

F9 Exit

Exits to the Main Menu.







Note: Each **Control Run** screen has the function **F6 Graph** which displays semi-quantitative graphs of the last 10 control samples for a quick quality control check. Press **F6** several times until you have scrolled through the graphs of all of the parameters.

2.5 MODE TO MODE

Beckman Coulter recommends that you perform a mode to mode quality-control check at intervals established by your laboratory. Run a normal whole blood sample multiple times in both the Primary and Secondary modes and compare the mean results. For an N of 10, the mean results should compare within the limits listed below. If you use an N of less than 10, you will need to establish your own limits.

Secondary mode-to-Primary mode comparison limits for an N of 10 are:

WBC	\pm 0.4 X 10 ³ cells/µL or <5%, whichever is greater
RBC	\pm 0.20 X 10 ⁶ cells/µL or <2%, whichever is greater
Hgb	\pm 0.3 g/dL or <2%, whichever is greater
Plt	\pm 20 X 10 ³ cells/µL or <7%, whichever is greater

Investigate any failure to recover values within expected limits. If you cannot resolve the problem, contact your Beckman Coulter Representative.

2.6 \overline{X}_{B} ANALYSIS

$\overline{\mathbf{X}}_{\mathbf{B}}$ Theory

 \overline{X}_B analysis is a quality control method that monitors instrument performance by tracking the MCV, MCH and MCHC parameters of patient samples. The method uses the red blood cell indices because they tend to remain fairly stable and show little variance between patient samples.

Target Values

Dr. Brian Bull (the creator of \overline{X}_B analysis) has determined the following target values for each index:

MCV - 89.5 MCH - 30.5 MCHC - 34.0

These constants were established using a general hospital population. Each laboratory should begin with these target values and then adjust them for their own patient population. \overline{X}_B target values are set up in the DMS. See Chapter 6, Set Up, XB LIMITS.

Current XB Batch

Select Sample Analysis → XB → Current XB Batch

When XB is ON, the DMS stores the RBC parameter results of all patient samples as they are cycled. These results display on the Current XB Batch screen. When a batch of 20 samples is collected, the DMS performs XB analysis and calculates the batch mean for MCV, MCH and MCHC. Partial aspirations are not included.

Screen-Specific Function Keys:

F4 Print

Prints the table.

F6 Delete Sample

Deletes a single sample from the current batch. A maximum of 5 samples may be deleted.

F8 Delete Table Deletes the entire table.

F9 Exit Exits to the Main Menu.

XB Batch Means

Select Sample Analysis -> XB -> XB Batch Means

Use to view the calculated means for each batch of 20 samples collected. MCV, MCH and MCHC means are calculated.

Date	Time	OPR	RBC	HGB	HCT	MCV	MCH	MCH
06/24/99	14:50:06	OPR	4.86	12.5	41.2	84.7	25.6	30.
06/24/99	14:55:51	OPR	4.87	12.5	41.3	84.8	25.6	30.
06/24/99	15:08:29	OPR	4.73	12.5	39.9	84.3	26.4	31.
06/24/99	15:14:54	OPR	5.63	16.2	51.5	91.5	28.8	31.
06/24/99	15:16:08	OPR	5.11	13.9	43.4	84.9	27.1	31.
06/24/99	15:17:21	OPR	5.01	14.4	45.4	90.5	28.8	31.
06/24/99	15:18:24	OPR	6.31	16.5	53.1	84.1	26.2	31.
06/24/99	15:19:26	OPR	5.67	16.2	52.2	92.0	28.5	31.
06/24/99	15:20:48	OPR	5.07	13.9	44.6	88.0	27.3	31.
06/24/99	15:22:13	OPR	5.34	14.1	46.8	87.7	26.5	30.
06/24/99	15:26:48	OPR						
06/24/99	15:28:38	OPR	5.15	14.1	44.5	86.3	27.4	31.
06/24/99	15:34:01	OPR	4.97	14.5	45.9	92.5	29.2	31.
06/24/99	15:35:05	OPR	5.63	16.1	51.0	90.6	28.5	31.
06/24/99	15:36:09	OPR	6.31	16.5	53.5	84.8	26.1	30.
06/24/99	15:37:29	OPR	4.87	14.4	45.0	92.4	29.5	31.

= CURRENT XB BATCH =

		XB BATCH MEANS		
	Target Limits	MCV 89.5+/- 3.0%	MCH 30.5 +/- 3.0%	MCHC 34.0 +/- 3.0%
2 06/23/99 3 06/23/99 4 06/23/99 5 06/23/99 6 06/24/99 7 06/24/99 8 06/24/99 9 06/24/99	Time OFR 14:12:08 OFR 14:49:47 OFR 15:24:29 OFR 15:57:57 OFR 16:33:53 OFR 10:25:11 OFR 11:10:16 OFR 13:28:25 OFR 14:32:55 OFR 14:32:55 OFR 14:35:56 OFR 14:25 OFR 14:25 OFR	90.1 / +0.7 89.6 / +0.1 89.6 / +0.1 89.4 / -0.1 89.1 / -0.4 89.3 / -0.2 89.3 / -0.2	30.0 / -1.6 30.0 / -1.6 29.9 / -2.0 29.5 / -3.3L 29.5 / -3.3L 29.5 / -3.3L 29.5 / -3.3L 29.3 / -3.9L	33.4 / -1.8 33.4 / -1.8 33.0 / -2.9 33.0 / -2.9 33.0 / -2.9
F4-Print F6-Del	ete Last Batch	F8-Delete Table	F9-Exit	

Screen-Specific Function Keys:

F4 Print Prints the table.

F6 Delete Last Batch

Deletes the last batch. Delete only if the batch is so badly skewed because of non-random sampling or an instrument problem that it will adversely affect many later batches.

F8 Delete Table Deletes the entire table.

F9 Exit Exits to the Main Menu.

XB Graphs

Select Sample Analysis >> XB >> XB Graphs

Use to view the graphs of the last 20 MCV, MCH, and MCHC XB batch means.

Screen-Specific Function Keys:

F4 Print Prints the graphs.

F9 Exit Exits to the Main Menu.

Note: For more information about XB, including results interpretation and troubleshooting, refer to the Operator's Training Guide.





2.7 IQAP

The Interlaboratory Quality Assurance Program (IQAP) both complements and enhances your laboratory's in-house quality control. It is a service offered to users of Beckman Coulter Hematology cell controls and calibrators worldwide. The IQAP manual (PN 4206266 for 4C Plus, 5C and Retic-C cell controls) presents information on program enrollment, data entry, the IQAP report, quality control concepts, and answers to the most commonly asked questions about the program.

The IQAP program is comprehensive and easy to use. For each set of data you submit, you will receive a personalized report. It presents summaries of your results and compares them to those of the peer group (pool).

You should submit your control data to IQAP as soon as you finish the control lots. Only submit data from control files you have not previously submitted.

The IQAP Data Download Instructions document (PN 4237600) provides detailed instructions how to download your control files to a diskette.

2.8 DIFFERENTIAL COMPARISON PROCEDURE

You can perform manual differentials as a measure of QC practice or as recommended by your laboratory, state and federal protocol. See the Diff Comparison procedure in the Reference manual.

SAMPLE ANALYSIS

3.1 CBC/DIFF SPECIMEN COLLECTION

Collect whole blood in a salt of EDTA according to procedures in:1,2,3

- NCCLS publication H4-A3,⁴
- NCCLS publication H3-A3.⁵

IMPORTANT If you do whole-blood calibration, you must use the same salt of EDTA for patient samples that you use for calibration. If you use a different salt of EDTA, sample results may be misleading.

All performance claims and validation studies have been based on the use of K₃EDTA. K₂EDTA shows no significant differences for CBC and differential results generated by instruments using VCS technology. If you use another anticoagulant, verify accuracy and precision data on your sample base.

Sample tubes cycled in the Primary mode must contain a minimum of 1.0 mL sample with the proper proportion of blood to anticoagulant. Sample tubes must contain enough air space for the sample to mix properly.

3.2 CBC/DIFF SPECIMEN STORAGE

- Refer to NCCLS publication H18-A for sample handling and storage.⁶
- Run within 24 hours of drawing.
- Store capped at room temperature.



3.3 BAR-CODE LABELING

IMPORTANT

- 1. Blood, scratches and powder from gloves reduces bar-code read rate. Keep the bar-code label free of blood, scratches and powder from gloves to maintain a high-read rate.
- 2. Risk of misidentification. Do not use the tilde (~) character in demographics, including Specimen or Patient ID.

Place the bar-code label on the sample tube.

- Place the end of the label flush with the stopper.
- The bars on the label must be parallel to the stopper. If the label is skewed more than 5°, the scanner may not read it.
- Do not cover the bottom of the tube with the bar-code label. The tube may jam in the carousel.



3.4 TUBE ADAPTERS

Round-bottom tube adapters can be used for:

2mL (10.25mm X 47 mm) or

3mL (10.25 mm X 64 mm) sample tubes.

- You can use a maximum of two labels in addition to the sample tube manufacturer's label.
- Place each label so that it does not cover the bottom of the tube and is flat and smooth against the tube. This prevents the adapter from being broken or jammed.
- Ensure that the bar-code symbol and a 1/4-inch blank space "quiet zone" on either side of the bar-code symbol are visible through the read slit ① when you insert the tube into the adapter.
- If the entire bar-code and "quiet zones" do not fit within the read slit, the number of data digits that can be read from your bar-code label may be reduced. In this case, read the bar-code label before you put the tube in the adapter then cycle immediately.

3.5 PREASSIGNING THE WORKLIST

If using this option, assign samples to the Worklist now.

See Heading 3.11, Worklist at the end of this chapter for more information and procedures.



3.6 SAMPLE INTEGRITY CHECKS

In Primary mode, the system checks each sample aspiration using dual sensors, called blood detectors, which monitor the blood before and after it passes through the Blood Sampling



Valve (BSV). These blood detectors optically sense air bubbles, diluent, and blood. As an indication of a good aspiration, the system looks for blood in both detectors. If the detectors optically identify bubbles in the sample, the instrument pierces the tube a second time. If the second aspiration contains bubbles, the instrument reports a partial aspiration. Bubbles or air may be present for various reasons, such as short sample aspirations or blockages in the aspiration pathway. Single dots (•••••) and *PART. ASP* are reported instead of numeric results when a partial aspiration occurs. Samples that generate multiple partial aspiration messages should be evaluated for specimen quality according to laboratory's protocol.

Samples with very low hemoglobin results may give partial aspirations when run in the Primary mode because the blood detectors do not recognize the sample as being blood. To obtain results, cycle the sample in the Secondary mode.

3.7 CYCLING SAMPLES IN THE PRIMARY MODE

IMPORTANT

- 1. Poor quality specimens may require inspection and special attention. Specimens that may contain fibrin, cell fragments or other debris, or have been difficult to collect, such as, pediatric or oncology specimens may require special handling.
- 2. The HmX Hematology Analyzer is an automated cell counter that uses triplicate counting with strict voting criteria, and has proprietary flagging algorithms to confirm parameter results prior to reporting. Rarely, a transient or partial aperture blockage may not be detected by any of these processes. A partial aperture blockage may cause erroneous results, such as, WBC count lower than what is actually present.
- 3. As with any analysis method in which a specimen of suspect quality is used, particular attention should be given to the results. Verify the accuracy of results that are flagged and review all results that exceed your laboratory's action limits.
- 4. Changing the reporting units after initial setup may cause misleading results. Make sure the reporting units currently selected for patient results are correct by checking any result in the database.
- 5. A printer malfunction could cause you to report erroneous results. Check all printers attached to your HmX Hematology Analyzer. Make sure they are working properly and all numbers are printing correctly.
- 6. Operating the HmX Hematology Analyzer with open doors or panels introduces electrical interference which can cause misleading results. Operate the HmX Hematology Analyzer with all doors and panels closed.
- 7. Running out of reagent will cause erroneous results. The reagent sensors are designed to alert you before you run out. If you disable reagent sensors, the message *Reagent Sensors Off* appears on the screen and on graphic printouts. Carefully monitor the reagent's level if you ever disable its sensor.

IMPORTANT Running out of reagent will cause erroneous results. The reagent sensors are designed to alert you before you run out. If you disable reagent sensors, the message *Reagent Sensors Off* appears on the screen and on graphic printouts. Carefully monitor the reagent's level if you ever disable its sensor.

- 1. Does *SELECT FUNCTION* appear at the lower right corner of the DMS screen?
 - If no, go to step 2.
 - If yes, continue with this step.
 - a. Access the Run Samples screen:
 - at the Access screen, press F1 RUN SAMPLES OR
 - at the Main Menu, select Sample Analysis → Run Samples
 - b. The instrument automatically prepares itself to run in the Primary mode, DIFF ON. Do you want DIFF ON?
 - If yes, go to step 6.
 - If no, press F3 Run, F9 STOP, F6 DIFF ON/OFF, F2 START PRIMARY. Go to step 6.
- 2. Access the Run Samples screen:
 - at the Access screen, press F1 RUN SAMPLES OR
 - at the Main Menu, select Sample Analysis → Run Samples.
- 3. Press F3 Run.
- 4. If necessary, press **F6 DIFF ON/OFF** to change the DIFF setting.

Note: If **SAMPLE MODE?** is not displayed, press F9 **STOP** first.

SAMPLE MODE?
F2 START PRIMARY
F3 SECONDARY
F4 PREDILUTE CBC
F5 RETIC
F6 DIFF ON/OFF
F7 PURGE
F8 RINSE
F9 STOP
DIFF: ON
BLOOD DET: ON
Select to change/ESC to continue

- 5. Does the top of the **F3-Run** window display **PRIMARY: SAMPLE ANALYSIS**?
 - If yes, press Esc
 - If no, press F2 START PRIMARY

PRIMARY: SAMPLE ANALYSIS
F2 START PRIMARY
F3 SECONDARY
F4 PREDILUTE CBC
F5 RETIC
F6 DIFF ON/OFF
F7 PURGE
F8 RINSE
F9 STOP
DIFF: ON
BLOOD DET: ON
Select to change/ESC to continue

- 6. If necessary, set up your run samples options:
 - a. Press F5 Optns.
 - b. Press the corresponding function keys to set up your options.
 - c. Press Esc to exit.

Note: For detailed information about these options, refer to Chapter 1, Heading 1.5, RUN SAMPLES SCREEN OPTIONS.

F2	XB: ON N=2 IN
F3	CAP PIERCER 10mm-13mm
F4	DB: ON
F5	Print: NONE
F6	Host: OFF
F7	Display only: OFF
F8	Operator: OPR
F11	B&W screen print
F12	Color screen print

- 7. Identify the sample:
 - Hold the tube's bar-code label in front of the reader.

Green light and beep: Bar code read. Go to step 8. Red light:

Wait. Try again.

Note: Cycle the sample within 10 seconds of reading the bar code. After 10 seconds, the system deletes the identification.

OR



• Enter 1 to 16 alphanumeric characters then press Enter.



- 8. Place the well-mixed blood sample in the carousel.
- 9. Review the results. Refer to Chapter 4, Data Review, for information on the Run Samples screen, scatterplots, histograms, parameter codes and flags and messages.

3.8 CYCLING SAMPLES IN THE SECONDARY MODE

IMPORTANT

- 1. Poor quality specimens may require inspection and special attention. Specimens that may contain fibrin, cell fragments or other debris, or have been difficult to collect, such as, pediatric or oncology specimens may require special handling.
- 2. The HmX Hematology Analyzer is an automated cell counter that uses triplicate counting with strict voting criteria, and has proprietary flagging algorithms to confirm parameter results prior to reporting. Rarely, a transient or partial aperture blockage may not be detected by any of these processes. A partial aperture blockage may cause erroneous results, such as, WBC count lower than what is actually present.
- 3. As with any analysis method in which a specimen of suspect quality is used, particular attention should be given to the results. Verify the accuracy of results that are flagged and review all results that exceed your laboratory's action limits.
- 4. Blood detectors are inactive in Secondary mode. Sample and aspiration integrity are not checked. To avoid misleading results, ensure complete immersion of the aspirator tip in the sample. Do not remove the sample until you hear the beep.
- 1. Access the Run Samples screen:
 - at the Access screen, press **F1 RUN SAMPLES** OR
 - at the Main Menu, select Sample Analysis → Run Samples.

- 2. Press F3 Run.
- 3. If necessary, press **F6 DIFF ON/OFF** to change the DIFF setting.

Note: If **SAMPLE MODE?** is not displayed, press **F9 STOP** first.

4. Press F3 SECONDARY.

SAMPLE MODE? F2 START PRIMARY F3 SECONDARY F4 PREDILUTE CBC F5 RETIC F6 DIFF ON/OFF F7 PURGE F8 RINSE F9 STOP DIFF: ON BLOOD DET: ON Select to change/ESC to continue

- 5. Mix according to the tube manufacturer's instructions.
- 6. Identify the sample:
 - Hold the tube's bar-code label in front of the reader.

Green light and beep: Bar code read. Go to step 7.

Red light: Wait. Try again.

Note: Cycle the sample within 10 seconds of reading the bar code. After 10 seconds, the system deletes the identification.

OR

- Enter 1 to 16 alphanumeric characters then press Enter.
- 7. Cycle the sample:
 - a. Open the tube and immerse the aspirator tip \bullet into the sample.
 - b. Press and release the sample bar.
 - c. Remove the tube when you hear the beep.





3.9 CYCLING SAMPLES IN THE PREDILUTE MODE

Use the Predilute mode to do a repeat analysis of microcollection samples when less than 125 μ L of sample remains. Only CBC results are reported on a Predilute mode sample.

The Predilute mode requires a 1:3 (X3) dilution. The HmX Hematology Analyzer automatically calculates the correct results based on a times three dilution.

You cannot use the Predilute mode to determine overrange counts that were reported ++++. To determine overrange counts, make the appropriate dilution, cycle in the Secondary mode, then multiply the results by the dilution factor.

IMPORTANT

- 1. Poor quality specimens may require inspection and special attention. Specimens that may contain fibrin, cell fragments or other debris, or have been difficult to collect, such as, pediatric or oncology specimens may require special handling.
- 2. The HmX Hematology Analyzer is an automated cell counter that uses triplicate counting with strict voting criteria, and has proprietary flagging algorithms to confirm parameter results prior to reporting. Rarely, a transient or partial aperture blockage may not be detected by any of these processes. A partial aperture blockage may cause erroneous results, such as, WBC count lower than what is actually present.
- 3. As with any analysis method in which a specimen of suspect quality is used, particular attention should be given to the results. Verify the accuracy of results that are flagged and review all results that exceed your laboratory's action limits.
- 1. Access the Run Samples screen:
 - at the Access screen, press F1 RUN SAMPLES OR
 - at the Main Menu, select Sample Analysis → Run Samples.
- 2. Press F3 Run.
- 3. Press **F4 PREDILUTE CBC**.

SAMPLE MODE? F2 START PRIMARY F3 SECONDARY F4 PREDILUTE CBC F5 RETIC F6 DIFF ON/OFF F7 PURGE F8 RINSE F9 STOP DIFF: ON BLOOD DET: ON Select to change/ESC to continue **IMPORTANT** Blood detectors are inactive in Predilute mode. Sample and aspiration integrity are not checked. To avoid misleading results, ensure complete immersion of the aspirator tip in the dilution. Do not remove the tube until you hear the beep.

- 4. Label a clean empty tube with an ID number.
- 5. Make an accurate 1:3 (X3) dilution of the sample. Pipet a minimum of:
 - 50 μL of well-mixed, fresh whole blood **1**
 - 100 μL of diluent **2**

into a tube.

Note: Use larger volumes of diluent and blood, if available, to minimize the possibility of short sampling the dilution. Be sure to maintain the proper proportions for a times three dilution (one part blood, two parts diluent).

6. Mix the sample gently but thoroughly.

7. Enter 1 to 16 alphanumeric characters to identify the sample then press Enter.



IMPORTANT Incomplete aspiration will cause erroneous results. Tilt the tube as shown to ensure full aspiration.

- 8. Cycle the dilution:
 - a. Immerse the aspirator tip **1** into the dilution.
 - b. Press and release the sample bar.
 - c. Remove the tube when you hear the beep.



9. Use these results to compare to and confirm the original results of the microsample.

3.10 CYCLING SAMPLES IN THE RETIC MODE

Retic Specimen Collection

Collect whole blood in a salt of EDTA according to procedures in:

- NCCLS publication H4-A3, or
- NCCLS publication H3-A3.

Use of other anticoagulants can give misleading results.

Retic Specimen Storage

Store specimens capped and:

- If stored at room temperature, run within 8 hours.
- If stored refrigerated (2-8°C; 36-46°F), run within 24 hours.

Retic Sample Preparation

CAUTION Running whole blood or control through the aspirate probe while in the Retic mode can damage the system. Perform the pre-prep procedures according to the instructions below.

IMPORTANT Modifications to the pre-prep procedures or failure to follow these instructions may lead to misleading or erroneous results. Perform the pre-prep procedures according to the instructions below.

- 1. Make sure:
 - a. Dispenser is fitted securely to the Reagent B bottle.
 - b. Reagent fills the clear tubing without any bubbles.



2. For each patient sample tested, label two test tubes: "A" and "B."



IMPORTANT Dispensing Reagent A at an angle changes the dilution of the preparation. Dispense the drops of Reagent A vertically.

3. Place four drops of Reagent A into the test tube labeled "A."



4. Dispense 50 μL of well-mixed sample into the tube labeled "A." Do not let the blood run down the sides of the tube.



 Gently mix tube "A."
 Prepare other patient samples using steps 1 through 5.



6. Let stand for at least 5 minutes at room temperature. Up to 60 minutes is allowable.

Retic Sample Analysis

- 1. Access the Run Samples screen:
 - at the Access screen, press **F1 RUN SAMPLES** OR
 - at the Main Menu, select Sample Analysis → Run Samples.
- 2. Press F3 Run.
- 3. Press F5 RETIC.

SAMPLE MODE? F2 START PRIMARY F3 SECONDARY F4 PREDILUTE CBC F5 RETIC F6 DIFF ON/OFF F7 PURGE F8 RINSE F9 STOP DIFF: ON BLOOD DET: ON Select to change/ESC to continue

IMPORTANT To ensure accurate results, add the blood-stain mixture directly to the bottom of the tube; do not allow the blood-stain mixture to run down the sides of the tube. To prevent drying of this small amount, proceed immediately to the next step.

 Gently mix tube "A" again then transfer
 2 μL of the blood/stain mixture from tube "A" into the bottom of tube "B."



IMPORTANT To ensure accurate results, allow Reagent B to run down the side of the tube so that no foaming or bubbles occur, but rapidly enough to mix the blood-stain mixture and Reagent B. Do not do any additional mixing.

- 5. Dispense Reagent B.
 - a. Place tube "B" with the blood-stain aliquot at a 30° angle under the tip of the Reagent B dispenser.
 - b. Dispense 2 mL of Reagent B into the test tube "B." DO NOT MIX.

- 6. Wait 30 seconds.
 While you wait, enter the sample's identification. Type 1-16 alphanumeric characters then press [Enter].
- 7. After 30 seconds, analyze the sample.
 - a. Immerse the aspirator tip **1** into the retic preparation.
 - b. Press and release the sample bar.
 - c. Remove the tube when you hear the beep.



8. Review the results. Refer to Chapter 4, Data Review, for information on the retic scatterplot and parameter codes and flags.

> Note: MRV and IRF results only appear on the screen if you enabled these parameters. See the Reference manual for more information on MRV and IRF.



- 9. If you report RET#:
 - a. Look up your retic result in Database Query.
 - b. Press F3 Edit.
 - c. Move your cursor to the RBC field and enter the patient's RBC result from that same sample.

The system automatically calculates the RET#. An E appears next to the RBC and an e next to the RET#.

- 10. To print a graphic report including the RET#:
 - a. Press Esc.
 - b. Press F12 to display the graphic report.
 - c. Press F4 to print.

3.11 WORKLIST

The purpose of the Worklist is to assign additional sample identifiers such as patient name and demographics, or additional information such as comments, **before** you cycle the sample. This additional information prints on the report and is stored in the database with the results. Worklist entries such as demographic data are best entered in batches.

Note: If you enter information to the Worklist during sample analysis or any time the instrument is transmitting to the DMS, you need to verify that the entries were accepted. Any demographic data entered during instrument transmission to the DMS is not entered into the DMS and does not appear on the sample printout.

The DMS matches sample results with additional information based on ID#1.

The Worklist is a list of work to be done. Once the DMS matches the results to preassigned data, the entry disappears from the Worklist.

You can preassign the Worklist manually or automatically. The procedure for manual entry is presented in this section. See Heading 3.12, Host Worklist for information about automatic preassignment.

Automatic Sequencing Set Up

To minimize typing, you can set up the Worklist to automatically sequence ID#1, Sequence #, and Secondary mode sample reference number. You set up which ones you want to automatically sequence and the starting number for each. When you preassign the Worklist, pressing Enter automatically enters the next number in the sequence.

- 1. Access the Worklist screen:
 - at the Run Samples screen, press [Ctrl] + [W]

OR

• at the Access screen, press F5 WORKLIST

OR

- at the Main Menu, select Sample Analysis → Worklist.
- 2. Press F12 Seq to move the cursor to the automatic sequencing area at the top of the screen.

	ID# 1 On	Sequence # On	Current line 7	Entries
	1240		Sec. Sample 000002	Tagged
Node	ID# 1	ID# 2	Sequence #	Status
	1234	SMITH, MARY	000001	
	1235	DOE, JOHN	000002	
	1236	WHITE, BENJAMI	N 000003	
	1237	CARPENTER, JEA	N 000004	
	1238	BROWN, NANCY	000005	
S000001	1239	JONES, B.G.	000006	

- 3. Use the Enter key to move from field to field and set up the items you want to automatically sequence.
 - Spacebar toggles between ON and OFF.
 - Type in the starting number for each item you choose to autosequence.
- 4. Press F12 again to move the cursor back down to the preassigning area.

Preassigning the Worklist

- 1. If not already on the Worklist screen, access it:
 - at the Run Samples screen, press Ctrl + W OR
 - at the Access screen, press F5 WORKLIST OR
 - at the Main Menu, select Sample Analysis → Worklist.
- 2. Will this sample be run in the Primary mode?
 - If yes, go to step 3.
 - If no, press F2 Sec. A Secondary mode sample reference number appears in the Mode column.
- 3. Enter ID#1.
 - If automatically sequencing, press Enter.
 - If not, type the ID#1 and press Enter.
- 4. Type in the sample's ID#2 and press Enter.

	ID# 1 On 1240	Sequence # On C 000007 S	Current line 7 Sec. Sample 000002	Entries Tagged
Node	ID# 1	ID# 2	Sequence #	Status
	1234	SMITH, MARY	000001	
	1235	DOE, JOHN	000002	
	1236	WHITE, BENJAMIN	000003	
	1237	CARPENTER, JEAN	000004	
	1238	BROWN, NANCY	000005	
S000001	1239	JONES, B.G.	000006	

- 5. Do you want to add demographics and/or comments?
 - If no, go to step 6.
 - If yes, continue with this step.
 - a) Press **F3** Comments.
 - b) Type in demographic data and comments. Verify that the entries are correct. Entries made during sample processing or while the instrument is transmitting data might not be accepted. Then press F10 Save/Esc.

Note: Use F2 Choice list to choose from previously set up Location and Physician lists. To set up these lists, refer to Chapter 6, Set Up.

Note: If the Date of Birth is prior to 1990, enter all four digits of the year.

- 6. Enter Sequence # (optional).
 - If automatically sequencing, press Enter.
 - If not, type the sequence # or leave blank and press Enter.
- 7. Repeat steps 2 through 6 for each sample.
- 8. If you want to print the Worklist:
 - a. Press F8 Tag All.
 - b. Press F4 Print.
- Press Cm+W to go to the Run Samples screen and cycle the specimens. They can be cycled in any order. The DMS matches results to items on the Worklist based on ID#1.

Status Messages

The Status column on the Worklist corresponds to the Status field on the Run Samples screen. There are two conditions that cause a sample to remain on the Worklist after it has been run. The two status messages associated with these conditions are explained below.

	ID# 1 0	off Sequence # Off Current line 2 Entries 000001 Sec. Sample 000001 Tagged	
Mode	ID# 1	ID# 2 Sequence # Statu	3
	892359739	COMMENTS	SP
		Node ID# 1 123456789 ID# 2 Sequence # Status Date of Birth / / Sex Location Physician Date 4 Time 04/20/99 08:14 User field 1 User field 2 User field 3 Comments	

	ID# 1 On 1240		Current line 7 Sec. Sample 000002	
Node	ID# 1	ID# 2	Sequence #	Status
	1234	SMITH, MARY	000001	
	1235	DOE, JOHN	000002	
	1236	WHITE, BENJAMIN	000003	
	1237	CARPENTER, JEAN		
	1238	BROWN, NANCY	000005	
S000001	1239	JONES, B.G.	000006	

NO MATCH

This message means that the ID#1 of the cycled sample did not match any of the ID#1 entries on the Worklist. The most common cause is a typing error when entering the ID#1 either on the Worklist or just prior to cycling. Cycling a sample that has not been preassigned on the Worklist will also cause a *NO MATCH* unless the Worklist is completely empty.

If there are three consecutive NO MATCH errors:

- The system stops.
- A beeping alarm sounds.
- The error message 3 CONSECUTIVE NO MATCHES appears at the bottom of the screen.
- The background of the WL indicator on the status line turns red.

Operator response:

- 1. Press Att + End to stop the alarm.
- 2. Press Ctrl + W to go to the Worklist.
- 3. Determine the cause of the *NO MATCH* errors and take appropriate action.
- 4. Tag and delete some or all of the samples with *NO MATCH* errors.
 - a. Use F7 to tag individual samples or F8 to tag all.
 - b. Use F6 to delete them.
- 5. Rerun samples as necessary.

PART. ASP

The Worklist posts samples with aspiration errors. *PART. ASP* appears in the Status column. This happens whether or not you routinely use the Worklist.

If any combination of 10 NO MATCH and/or PART. ASP errors accumulate on the Worklist:

- The system stops.
- A beeping alarm sounds.
- The error message 10 NO READ, NO MATCH, PART. ASP appears at the bottom of the screen.

Note: The *NO READ* error message applies only to the HmX Hematology Analyzer with Autoloader.

• The background of the WL indicator on the status line turns red.

Operator response:

- 1. Press Alt + End to stop the alarm.
- 2. Press Ctrl + W to go to the Worklist.
- 3. Determine the cause of the errors and take appropriate action.
- 4. Tag and delete some or all of the samples with errors.
 - a. Use F7 to tag individual samples or F8 to tag all.
 - b. Use **F6** to delete them.
- 5. Reassign and rerun samples as necessary.

3.12 HOST WORKLIST

The Host Worklist receives sample identifiers and demographics from your host computer. The Host Worklist can hold up to 5,000 samples. Tag and transfer samples to the Worklist when you are ready to cycle them. The Worklist can accept up to 300 samples from the Host Worklist.

- 1. Access the Host Worklist screen:
 - at the Access screen, press F6 HOST WORKLIST OR
 - at the Main Menu, select Sample Analysis → Host Worklist.
- 2. Use F7 to tag individual samples or F8 to tag all.
- 3. Press F3 to transfer tagged samples from the Host Worklist to the Worklist.

SAMPLE ANALYSIS HOST WORKLIST

4.1 RUN SAMPLES DISPLAY



4.2 CBC HISTOGRAMS

RBC Distribution Curve





PIt Distribution Curve

The normal Plt distribution yields two curves, both using averaged data.

- The smooth curve derives from raw data and displays between 2 fL and 20 fL.
- The fitted curve ranges from 0 to 70 fL and is used to derive the Plt count. Only the area between 0 fL and 36 fL displays.


4.3 DIFF SCATTERPLOTS AND HISTOGRAMS

HmX PAK reagents maintain white cells in their near-native state.

The instrument looks at cells in all three dimensions.

You see results on your screen

- two dimensions at a time
- in three different views.



Density

- In black and white highest density = blackest areas
- In color highest density = yellow

DF1

DF1 is always the initial display.

The horizontal spread derives primarily from light scatter.

You cannot see the basophils as a separate population in this view. They are behind the upper right quadrant of the lymphocytes.

- 1 Monocyte Population
- 2 Neutrophil Population
- **3** Eosinophil Population
- Lymphocyte and Basophil Populations



white

DF2

Press **F6 DF** then **At**+**F2** to rotate the cube to the DF2 display. Here the horizontal spread derives primarily from conductivity.

- Lymphocyte Population
- Monocyte Population
- Neutrophil, Basophil, and Eosinophil Populations



DF3

Now press At +F3 to display the DF3 view which shows the Neutrophils and Eosinophils gated out to reveal the Basophils.

- 1 Lymphocyte Population
- **2** Monocyte Population
- **3** Basophil Population



4

VCS Histograms

Att+F4 displays histograms that show the distribution of

- volume
- conductivity
- scatter

across the horizontal axis.



RETICULOCYTE SCATTERPLOTS 4.4

DF5

DF5 is always the initial display.

The horizontal spread displays the amount of light scatter, which is the primary counting/separating device.



Mature Red Blood Cell Population





DF6

Press F6 **DF** then At + F2 to view DF6. The horizontal spread displays the amount of opacity, which is primarily used as a gating device to screen out all non-reticulocyte/red cell particles.



Mature Red Blood Cell Population

0 **Reticulocyte Population**



4.5 PARAMETER CODES

Table 4.1 lists the parameters and their codes. If any of the following flags occur, review the results for the affected parameter.

Table 4.1 P	arameter	Codes
-------------	----------	-------

On DMS Display	Cause
All Par	ameters
••••• for a parameter result	Incomplete or abnormal computation.
••••• for all parameter results and <i>PART. ASP</i> message displayed	Sample integrity check failed.
 for CBC parameter results, and no average histogram for the affected parameter If WBC is, then LY#, MO#, NE#, EO#, and BA# are •••• If RBC is, then MCH, MCHC, and Hct are also 	Total voteout (none of the three counts agreed). Note: Diff parameters do not vote out.
*V	Single-count period voteout. May indicate an erroneous result due to aperture blockage.
V	Appears next to parameters derived from the parameter with the single count period voteout.
+++++ for parameter results	Result exceeds: WBC 99.9 x 10 ³ cells/µL
IMPORTANT If the WBC, RBC, Hgb, or Plt result is +++++, the results of the next sample could be falsely increased due to carryover. Repeat any sample that follows a sample with +++++ results.	 RBC 9.99 x 10⁶ cells/µL Plt 999. x 10³ cells/µL If WBC is overrange an R appears next to the RBC, Hgb, Hct, MCV, MCH,
IMPORTANT Sample dilutions may result in erroneous differential results. Do not report the differential results from a diluted sample.	 MCHC, RDW, MPV, Plt and Diff% results. Results for Diff # are dots (•••••). If RBC is overrange an R appears next to Hct, MCH and MCHC results. If Plt is overrange an R appears next to WBC, Hgb, MCH, MCHC, diff #
IMPORTANT The overrange value displayed in Data Base Query F3 Edit is not accurate enough for reporting purposes. It is only for review to help decide how much of a dilution to make. Do not report the overrange values displayed in Data Base Query F3 Edit .	and Pct results. Average "ballpark" values for overrange WBC, RBC or Plt are displayed in Data Base Query, F3 Edit , beneath the Definitive flag section. Press End to view this display. These values do not print. Use this information only as a guide to make the appropriate dilution.
?????	DMS has received questionable data.

On DMS Display	Cause					
All Pa	arameters					
L next to parameter result	Result is lower than the laboratory-set patient low action limit or below the assay control lower limit.					
H next to parameter result	Result is higher than the laboratory-set patient high action limit or above the assay control upper limit.					
Pit Pa	arameters					
R next to Plt and MPV results	PDW > 20, mode not between 3 and 15, or non-positive curve detected,					
	OR					
	Plt < 20,000					
	OR					
	Total voteout of fitted curve					
	OR					
	WBC is overrange.					
RBC P	arameters					
R next to RDW result	Excessive asymmetry in RBC histogram					
	OR					
	WBC or MCV overrange.					
*R next to MCV; also R next to RBC, Hct, MCH, MCHC, RDW, Plt, and MPV	MCV < 50 fL					
WBC P	arameters					
*R next to WBC; also R next to Diff numbers	Check of WBC lower threshold failed.					
R next to Diff percentages and numbers	Low differential count statistics.					
	These messages occur also:					
	Population message: ABNORMAL WBC POP					
	Suspect message: REVIEW SLIDE					
::::: for Diff results	System detected a clog in the flow cell. There are three types of clogs:					
	FC - Full Clog					
	PC1 - Partial Clog 1					
	PC2 - Partial Clog 2					
	Refer to the Special Procedures and Troubleshooting manual for more information.					

Table 4.1 Parameter Codes (Continued)

Retic Parameter Codes

Table 4.2 lists the parameters and their codes. If any of the following flags occur, review the results for the affected parameter.

Results	Message in Message Box	Code Under Scatterplot	Situation
	VERIFY RETIC	FC	Full Clog. Instrument performs an Autopurge.
	VERIFY RETIC		Count time failure or initial count failure.
••••	VERIFY RETIC		Incomplete data.
RBC xx.xx E	EDITED DATA		Results entered by the operator.
RET# .xxxx e or			Calculated result.
RET# .xxxxeH or			Calculated result exceeds limit of display.
RET# .xxxxeL			
RET% xx.xx +	VERIFY RETIC		RET% > 30.0%
			Overrange.
RET% xx.xx R	VERIFY RETIC		RET% < 0.5%. MRV and IRF also flag R.
RET% xx.xx		FD	Flow deviation (underrange). Instrument performs an Auto purge. It may occur with another condition.
L or H	VERIFY RETIC		Results < or > Action Limits.
RET% ?????	VERIFY RETIC		Invalid data:
			RET% < 0.00 or > 100.00.
RET# +++++	EDITED DATA		Exceeds limit of display for parameter RET# > 9.999.

Table 4.2 Retic Parameter Codes

4.6 MESSAGES

IMPORTANT

- Your HmX Hematology Analyzer provides you with various data, flags and graphical representations that are designed for use as an integrated report. To assure that your system provides you with the most meaningful and accurate results, set up all definitive limits according to your laboratory's established reference ranges and use all report outputs for decision-making purposes. Setting definitive limits is essential if you use Condition messages in decision making.
- 2. Use all the flagging options (suspect, definitive, high/low, parameter codes and your laboratory's flagging criteria) to optimize the sensitivity of the instrument results. Do not single out one system message or output, such as a histogram or scatterplot, to summarize the specimen or patient's condition.

Your HmX Hematology Analyzer provides three types of messages:

- Condition messages describe the sample's condition (normal or abnormal population).
- Definitive messages indicate that the result exceeds user-defined limits.
- Suspect messages indicate some abnormalities that exhibit the specified characteristic cluster patterns. The system generates these messages with an internal algorithm; they do not require limits.

Note the following circumstances:

- 1. An overrange (+++++) parameter result does not generate a definitive message but does generate an abnormal population condition message.
- 2. With a colon (:::::) code for the differential results, if the WBC count exceeds the limits for Leukopenia or Leukocytosis, then these definitive messages appear and an abnormal population condition message occurs.
- 3. If a Pancytopenia message appears, it replaces Anemia, Leukopenia and Thrombocytopenia definitive messages.

Table 4.3 summarizes the condition, definitive and suspect flagging messages.

Parameter	Condition	Suspect	Definitive
WBC	Normal WBC Pop	Blasts	Leukopenia
	Abnormal WBC Pop	Imm Grans/Bands 1	Leukocytosis
	No message	Imm Grans/Bands 2	Neutropenia
	Note: If you run with the	Variant Lymphs	Neutrophilia
	Diff OFF, Leukopenia and Leukocytosis definitive	Review Slide	Lymphopenia
	messages will still		Lymphocytosis
	generate Abnormal WBC		Monocytosis
	Pop messages.		Eosinophilia
			Basophilia
RBC	Normal RBC Pop	NRBCs	Anemia
	Abnormal RBC Pop	Dimorphic RBC Pop	Anisocytosis
	No message	Micro RBCs/RBC	Microcytosis
		Fragments	Macrocytosis
		RBC Agglutination	Hypochromia
			Poikilocytosis
			Erythrocytosis
			Pancytopenia
Plt	Normal Plt Pop	Platelet Clumps	Thrombocytopenia
	Abnormal Plt Pop	Giant Platelets	Thrombocytosis
	No message		Small Platelets
			Large Platelets

Table 4.3 Summary of Flagging Messages

Condition Messages

Population condition messages appear in the lower left corner of the Run Samples screen. They are:

Normal WBC Pop	Abnormal WBC Pop
Normal RBC Pop	Abnormal RBC Pop
Normal Plt Pop	Abnormal Plt Pop

If there is a voteout for WBC, RBC or Plt, no message appears for the respective parameter.

The system generates these population messages from one or a combination of the following: suspect messages, definitive messages or meeting the criteria of an internal algorithm that does not report a separate flag. High (H) and Low (L) flags do not cause Abnormal Pop condition messages.

When there is an abnormal population message, you can use F11 **Cell Classification** to display a window that lists the suspect and definitive messages associated with that sample. If the window does not display and the DMS instructs you to print the results to see the messages, press F4 **Print**.

Table 4.4 summarizes the origin of abnormal population messages.

Message Type	Source	Characteristic				
Suspect	Instrument Internal Algorithm	Some abnormalities exhibit characteristic cluster patterns that are indicated by specific suspect messages. Suspect messages alert you to the possibility of a particular abnormality. Not every atypical scatterplot has a corresponding suspect message.				
Definitive	User-Defined	Messages appear at your laboratory's defined limits. If you use definitive flags or condition messages for decision-making purposes or action limits, these flags must identify the limits for review/no review, action/no action, and so on, according to your laboratory's criteria.				
No Message	Instrument Internal Algorithm	Certain conditions trigger an Abnormal WBC Pop message in the absence of suspect or definitive flags.				

Table 4.4 Origin of Abnormal Pop Messages

Suspect Messages

Suspect messages flag an abnormal cell distribution or population. The system generates these messages according to an internal algorithm. These messages appear on the sample report printout. Confirm any abnormality by microscopic review. See Table 4.3.

Definitive Messages

Set definitive flags at "decision limits" to trigger Abnormal Pop condition messages to appear when results exceed your laboratory's defined limits (low and high). Use definitive flags to denote moderate to seriously abnormal distributions. See Chapter 6, Set Up for instructions on setting limits. It is essential to set these limits if you use condition messages (Abnormal Pop) in decision making. The values you select affect when your condition messages appear.

Table 4.5 lists the limits which, if exceeded, generate the definitive flags. Results that generate these messages may require review according to your laboratory's reference range for that particular condition. See also Table 4.3.

For this Parameter	This Message	Indicates the Result Exceeds this Limit
WBC	Leukopenia	Low limit for WBC
	Leukocytosis	High limit for WBC
	Neutropenia%	Low limit for NE%
	Neutrophilia%	High limit for NE%
	Lymphopenia%	Low limit for LY%
	Lymphocytosis%	High limit for LY%
	Monocytosis%	High limit for MO%
	Eosinophilia%	High limit for E0%
	Basophilia%	High limit for BA%
	Neutropenia#	Low limit for NE#
	Neutrophilia#	High limit for NE#
	Lymphopenia#	Low limit for LY#
	Lymphocytosis#	High limit for LY#
	Monocytosis#	High limit for MO#
	Eosinophilia#	High limit for EO#
	Basophilia#	High limit for BA#
RBC	Anemia	Low limit for RBC or for Hgb
	1+ Anisocytosis	High limit for RDW
	2+ Anisocytosis	A gradient range from 1+ Anisocytosis
	3+ Anisocytosis	A gradient range from 2+ Anisocytosis
	1+ Microcytosis	Low limit for MCV
	2+ Microcytosis	A gradient range from 1+ Microcytosis
	3+ Microcytosis	A gradient range from 2+ Microcytosis
	1+ Macrocytosis	High limit for MCV
	2+ Macrocytosis	A gradient range from 1+ Macrocytosis
	3+ Macrocytosis	A gradient range from 2+ Macrocytosis

Table 4.5 Definitive Flagging Limits

For this Parameter	This Message	Indicates the Result Exceeds this Limit
RBC	1+ Hypochromia	Low limit for MCH
	2+ Hypochromia	A gradient range from 1+ Hypochromia
	3+ Hypochromia	A gradient range from 2+ Hypochromia
	1+ Poikilocytosis	High limit for RDW and Low limit for MCH
	2+ Poikilocytosis	A gradient range from 1+ Poikilocytosis
	3+ Poikilocytosis	A gradient range from 2+ Poikilocytosis
	Erythrocytosis	High limit for RBC
	Pancytopenia	Low limit for WBC and RBC and Plt
Plt	Thrombocytopenia	Low limit for Plt
	Thrombocytosis	High limit for Plt
	Small Platelets	Low limit for MPV
	Large Platelets	High limit for MPV

 Table 4.5 Definitive Flagging Limits (Continued)

4.7 MICROSCOPIC REVIEW

If a possible abnormality appears on the report, check the blood film.

If the blood film does not appear consistent with the printed results, check for:

- Possible printer or instrument problem.
- Sample, film or report misidentification.
- Sample conditions (age, storage, anticoagulant, chemical composition, abnormally small WBCs, clumped platelets).
- Limitations of slide preparation, staining and microscopic review.
- Interfering substances (medications, cryoglobulins or cryofibrinogen crystals).
- Patient conditions (fragmented WBCs, giant platelets, platelet satellites, lyse resistant RBCs, nucleated RBCs).

4.8 DATA BASE QUERY

To access the Data Base Query screen:

- at the Access screen, press **F4 DATA BASE QUERY** OR
- at the Main Menu, select Sample Analysis ->>> Data Base Query.

Overview

You can sort, retrieve, review, print, transmit, archive to diskette and mark for saving sample results you previously stored.

The data base stores results of up to 5,000 samples. Sample 5,001 overwrites the oldest sample not marked for saving.

Data Base Function

When you access this option, you see what was selected by the last Sort criteria. To review other samples, change the Sort criteria. If the last sorting process resulted in no entries displayed here, then when you access this option, the sort window appears.

The top of the screen shows you, from left to right:

- How many entries there are in the data base
- How many entries have been selected for sorting
- How many entries are tagged for batch processing
- How many entries are marked to save at wraparound

Entries:	5	Selected:	5	Tagged:	0	Saved:	0
ID# 1	ID#	2	Date	Time	Mode	Opr Fl	g Out
▶89278381402			03/30/99	09:36:09	s	OPR F	
▶89278382486			03/30/99	09:36:55		OPR F	
89278381486			03/30/99	09:37:40		OPR F	
89278382487			03/30/99	09:38:26		OPR F	
89278381406			03/30/99	09:42:13	S	OPR F	

Each data line has fields for the following information about a sample:

- A pointer character if the sample is tagged
- ID #1
- The secondary identifier (ID #2), if one has been entered, for example, a name.
- Date and time of cycle
- Sample mode
 - P = Primary
 - S = Secondary
 - PrD = Predilute CBC
 - RET = Retic
- The operator identification (Opr) at time of cycle
- Flags field (Flg):
 - Blank means not flagged
 - F means flagged
 - PA means Partial Aspiration
- Output field:
 - ► P = Batch Print
 - ► H = Host
 - S = Save
 - A = Archive

Screen-Specific Function Keys

F2 Save

Marks a sample to save it from overwriting. Place the cursor on the sample to be saved and press this key. You can save 150 samples.

F3 Edit

Displays the highlighted sample data. Press End to display the average values for overrange results. These values appear as +++++ for parameter results on the Run Samples screen.

Note: The overrange values are provided for review only; do not report them. For more information refer to table 4.1, Parameter Codes.

Entries	5		Selected:	5	Tagged:	0	Save	1:	0
ID# 1		ID#	2	Date	Time	Mode	Opr	Flg	Out
▶89278381402	2			03/30/99	09:36:09	s	OPR	F	
▶8927838248	5			03/30/99	09:36:55		OPR	F	
8927838148	5			03/30/99	09:37:40		OPR	F	
8927838248	7			03/30/99	09:38:26		OPR	F	
8927838140	5			03/30/99	09:42:13	S	OPR	F	

After you press **F3 Edit**, the Sample Results screen appears. The function key options on this screen are:

F2 Choice Lists

When you move the cursor to the field, displays location or physician's choice list.

F4 Print

Prints the screen.

F10 Save/Esc

Saves and escapes to the previous screen

End

Shows Suspect and Definitive Flags screen and overrange results if any.

Node				ID# 1			DATE :		TIME:	Status
Р	(CBC		89278379	000		01/27	7/99	13:56:45	
ID#	2						Seque	ence #		
loca	tion						Date	& Time	e /	/ :
	ician							Field		
Date	of Birt	:h /	/	Sex				Field		
comm	ents						User	Field	3	
	Normal 1	JBC Pop			Abnormal	RB	C Pop		Abnormal	PLT Pop
/BC	3.7	10^	3/uL	RBC	1.95	L	10^6/uL	PLT	56	L 10^3/uL
	4		#	HGB	5.6	L	g/dL	MPV	9.8	fL
٩E					17.6					
LΥ					90.3		fL			
90 P					28.5		pg			
20				MCHC						
BA					14.4	н	*	Pr	ess <f1></f1>	for valid
				RET*			4		paramete	r ranges.
				RET#			10^6/uL			

ſ	SAMPLE RESULTS	
	SUSPECT FLAGS	
WBC	RBC	PLT
Blasts		
Imm Grans/Bands1		
Variant Lymphs		
	DEFINITIVE FLAGS	
WBC	RBC	PLT
Leukocytosis	Anemia	
Neutrophilia #		
Lymphopenia %		
Monocytosis %		
Monocytosis #		
Eosinophilia #		
240.0	0.00	0
F2-Choice Lists F4-Print	F10-Save/Esc	

F4 Print

Generates the line list printout of all the sorted samples. Underlining of parameter data indicates that it was flagged.

01/28/ SNU131 01 02	99 · 21 (530	15:25:1 IPR	1	Co	ulter C (305) 3	orpor 80-38	ation 00		- 11	800 SM	(05) 147th : . 33196				
										Cata	dase Qu	ery			
)age 3	of	8		Ent	ries:	158	Se	lected	: 15	6	Tagged	: 0	S	aved :	0
10# 1 RBC	HGB	HCT	ID# HCV	2 H CH	MCHC	Dat RDW	te PLT	Time MPV	PCT	Cass/p PDN	xs Opr WBC	flg NE%	Cute LYX	ut Cy MOX	∶le Ty EOX
B01 6.65	19.5	59.0	88.7	29.4	33.1	09/2 12.4	27/94 155	13:35: 8.2	38 0.127	006901 15.5	0PR 4.5	F 60.1	32.9	СВ 5.1	C+Diff 1.5
B02 6.51	19.5	58.0	89.1	29.9	33.6	09/1 12.5	27/94 150	13:36: 8.4	38 0.126	006902 15.7	0PR 4.7	F 60.4	32.0	CB 5.9	C+Diff 1.4
B03 6.50	19.6	58.1	89.3	30.1	33.7	09/3 12.7	27/94 143	13:37: 8.3	38 0.119	006903 15.5	0PR 4.6	F 60,7	32.2	СВ 5.2	C+D1ff 1.5
B01 6.62	19.6	58.6	68.5	29.7	33.5	09/ 12.0	27/94 150	14:04: 8.5	25 0.127	006901	0PR 4.7	F 60.3	32.4	68 5.3	C+Diff 1.7
B02 6.54	19.5	58.6	89.7	29.8	33.3	09/ 12.6	27/94 144	14:05: 8.6	25 0.123	006902	0PR 4.7	F 60.5	32.4		C+D1ff 1,5
6.66	19.4	60.5	90.8	29.2	32.1	09/ 12.5	27/94 154	14:17: 8.4	33 0.129	006901 15.4	OPR 4.7	F 60.6	32.1	СВ 5.3	C+D1ff 1.8
B02 6.61	19.5	59.9	90.7	29.5	32.5	09/ 12.6	27/94 156	14:18: 8,2	33 0.127	006902 16.0	OPR 4.8	F 60.1	32.7	CB 5.5	C+D1ff 1.5
803 6.58	19.3	58.8	89.4	29.3	32.8	09/ 12.7	27/94 151	14:19:	33 0.126	006903	OPR 4.7	F 60.3	32.6	CB	C+D1ff 1.4

F5 Batch

- Print tagged results in graphic format
- Transmit tagged results to the host computer or
- Archive tagged results to diskette.

More information on each of these features is presented later in this section.

Entries:	1000	Selected:	6	Tagge	d: 3	Sav	red:	0
ID# 1	ID# 2		Date	Time	Node	Opr	Flg	Outpu
128765		02	/23/99	14:23:49	s	OPR	F	
124567		02	/23/99	14:42:39	RET	OPR	F	
▶892837345		02	/21/99	16:04:13	RET	OPR	F	
▶892837347		02	/21/99	16:05:01	s	OPR	F	
892837352		02	/21/99	16:08:58	s	OPR	F	
▶892837355		02	/21/99	16:11:22	RET	OPR	F	
					Bat	atch Pro ch is In les left Print: Host: Archiv Format Filena	No No No No No	ive 0 ew KS

When the **F5 Batch** window is displayed, you have these function keys:

F2 Choice List

Available only when the Archive field is highlighted. Choose between No, New, and All.

F6 Resume Resumes batch processing.

F7 Abort Ends batch processing.



Starts the batch processing. *SELECT FUNCTION* must be displayed on the status line.

Sorting



Displays the sort criteria window. Select the group of samples you want to review.

The maximum number of samples that can be selected for sort is 1,000. If you have more samples than 1,000 to be sorted, you must restart the sort after the last selected sample.

Entries: 574		Selected:	0	Tagged: O Saved: O
ID# 1	ID#	2	Date	Time Mode Opr Flg Outpu
				Sort Criteria
				DATE
				From : 03/03/99To :03/04/
				TIME
				From : / / TO : / /
				ID# 1
				From :
				To :
				ID# 2
				From :
				To :
				STATUS FLAGS
				Flagged Notflagged Both

Sort Rules

- 1. You can sort by either ID#1 or ID#2, but not both at the same time.
- 2. If you sort by numeric ID, make all numbers the same length (use leading zeros if necessary).
- 3. Time requires entry of date, hour, minute and seconds.
- 4. Use the correct (upper or lower) case when sorting with alphanumeric characters.
- 5. Select results F (Flagged), N (Non-flagged) or B (Both). Non-flagged samples are sorted and listed first.
- 6. If you do not choose any sort criteria, the samples in the data base are sorted chronologically by date and time.

Screen-Specific Function Keys:

F2 Reset

Restores the sort criteria set up to the last time you sorted the data.

F6 Clear

Erases the sort criteria the cursor is on.

F8 Execute

Executes the sorting process after all sort criteria are entered. The samples matching the sort criteria are displayed on the screen.

F7 Tag

Tags or untags a highlighted sample for batch processing.

F8 Tag All

Tags or untags all samples for batch processing.

F12 DB

Home

End

Page Up

Page Down

Displays the sample result graphics screen of the highlighted sample on the Run Samples Database screen. You can look at other sample DB results, from the same sort, without leaving this screen.

Displays first sample of the sort.

Displays last sample of the sort.

Displays the previous sample.

Displays next sample.





F12

Returns to Data Base Query screen.

Editing

Edit samples in the data base with this option. If a field is edited, an E appears in the field in:

- Sample Analysis displays
- Data Base displays
- Transmission to host
- Printouts.

E overrides an H/L flag and appears in the same position.

You can edit parameter results of ++++, --- or :::::. If you edit a result, an E appears next to it. The system backlights edited non-cycled parameter labels.

Do Not Edit

- 1. You cannot edit samples with a NO MATCH or PART. ASP message in the Status field.
- 2. You cannot edit the primary identifier, sequence number, or the date and time the sample was processed.
- 3. Do not edit values that have dependent parameters without also changing the dependent parameters. For example, you must change diff absolute numbers to reflect a change in the WBC.

Edit a Sample

- 1. Select Sample Analysis → Data Base Query.
- 2. Perform a sort that includes the sample you want to edit.
- 3. Highlight the patient sample to edit.
- 4. Press **F3 Edit** to go to the Sample Results screen.

Node	2			ID# 1			DATE		TIME:	Status
P		CBC		8927837	9000		01/2	7/99	13:56:45	
ID#								ence #		
Loci	ation								e / .	/ :
	sician							Field		
Date	e of Bin	th	11	Sex			User			
com	wents						User	Field	3	
	Normal	NBC	Pop		Abnorma	l RI	BC Pop		Abnormal	PLT Pop
										L 10^3/uL
	÷.		#	HGB	5.6	L	g/dL	MPV	9.8	fL
NE				HCT	17.6	L	4			
LΥ					90.3					
NO				MCH	28.5		pg			
ΕO					C 31.5					
BA								Pi	cess <fl></fl>	for valid
							*		parameter	r ranges.
				RET	#		10^6/uL			

- 5. Move to fields that need to be edited with ↑ ↓ ← and → keys.
 Highlight the field and type the new data. If the date of birth is prior to 1990, enter all four digits of the year.
- 6. An E appears in all edited results fields.
- 7. When you edit a non-cycled parameter, the system backlights the result field. When you edit either the RBC result or RET% result, the system computes RET# and displays an e next to RET#, indicating that it is computed using an edited parameter. The system also displays an H or L if RET# is higher or lower than the defined limits.
- 8. Press F10 Save/Esc.

Results of Changed Parameters

If you change any parameter result:

- All population Suspect and Definitive messages are deleted from the data base.
- The message EDITED DATA appears in the Population message field.
- No Population Suspect or Definitive messages are printed or transmitted to a host computer.
- The EDITED DATA message appears on all printouts.
- An E and/or e appears on all printouts next to the edited result.
- Data transmitted to a host computer includes the EDITED DATA message and the E/e flags.

Batch Processing

You can batch print in graphics format, batch transmit to a host computer, or archive a batch of sample results to a diskette. Perform only one batch process at a time.

Batch Print

Note: DF2 and DF3 scatterplots are not available with the print batch option.

- 1. Select Sample Analysis → Data Base Query.
- 2. Perform a sort that includes the samples you want to batch print.
- 3. Use F7 or F8 to tag the samples you want to batch print.
- 4. Press **F5 Batch** to display the Batch Process window.
- 5. Move the cursor to the **Print:** field and use the Spacebar to toggle to YES.
- 6. Press **F8 Execute**. Sample results print in graphics format.

Note: During batch printing, PR[↑] changes to BA[↑], and then to PR[↑].

Batch Transmit

- 1. Select Sample Analysis → Data Base Query.
- 2. Perform a sort that includes the samples you want to batch transmit.
- 3. Use F7 or F8 to tag the samples you want to batch transmit.
- 4. Press **F5 Batch** to display the Batch Process window.
- 5. Move the cursor to the **Host**: field and use the Spacebar to toggle to YES.
- 6. Press F8 Execute.

Archive

The DMS Archive feature lets you copy patient result data from the DMS onto a diskette and retrieve it on another computer in a spreadsheet format. Use a spreadsheet program that is compatible with the WKS format.



Data Base Query

		Data	Base Q1	uery				
Entries:	1000	Selected:	6	Tagge	d: 3	Sav	red:	0
ID# 1	ID# 2		Date	Time	Node	Opr	Flg	Output
128765		02	/23/99	14:23:49	s	OPR	F	
124567		02	/23/99	14:42:39	RET	OPR	F	
▶892837345		02	/21/99	16:04:13	RET			
▶892837347		02	/21/99	16:05:01	S	OPR	F	
892837352		02	/21/99	16:08:58	S	OPR		
▶892837355		02	/21/99	16:11:22	RET	OPR	F	
				17	Bat	ch Pro	ces:	
					Batch	n is In	act	ive
					Sample	es left		0
				l l		Print:		
						Host:		
						Archiv		
								h:\0221

To Archive

- 1. Select Sample Analysis → Data Base Query.
- 2. Perform a sort that includes the samples you want to archive.
- 3. Use F7 or F8 to tag the samples you want to archive.
- 4. Press **F5 Batch** to display the Batch Process window.
- 5. Move the cursor to the Archive field then press F2 Choice List.
- 6. Use the Spacebar to highlight your choice then press Enter.
 - If you select New, all tagged samples that have not yet been archived will be processed.
 - If you select All, all tagged samples will be processed, even if they have already been archived.
 - If you select No, Archive is inactive.
- Move the cursor to the Filename: field and enter a file name of your choice.
 Type A:\ then up to eight characters. An extension is not required.

Example: A:\022199 could be the file name for sample results archived on February 21, 1999.

- 8. Insert a formatted diskette into the DMS diskette drive.
- 9. Press F8 Execute.

Note: If a power failure occurs during the archiving process, the samples from this archiving session are incorrectly marked as archived but the data file is empty. Reselect the samples from the session and select **All** to ensure all of the samples in process are correctly archived.

		Dat	a Base Q	lery				
Entries:	1000	Selected	: 6	Tagge	d: 3	Sa	ved:	0
ID# 1	ID# 2		Date	Time	Node	Opr	Flg	Out
128765			02/23/99	14:23:49	s	OPR	F	
124567			02/23/99	14:42:39	RET	OPR	F	
▶892837345			02/21/99	16:04:13	RET	OPR	F	
▶892837347			02/21/99	16:05:01	s	OPR	F	
892837352			02/21/99	16:08:58	S	OPR	F	
▶892837355			02/21/99	16:11:22	RET	OPR	F	
					в	atch Pro	oces:	s—
					Bat	ch is I	nact	ive
					Samp	les lef	t:	0
				l l		Print:		
				I		Host:		
				I		Archiv		
						Filena		

IMPORTANT Do not remove the diskette from the drive until the *Batch is Inactive* message appears in the Batch Process window. Removing the disk sooner can cause disk corruption.

10. Wait until the *Batch is Inactive* message appears, then remove the diskette from the diskette drive.

Note: If the space on the diskette is insufficient for archiving all of the tagged samples, the DMS displays the error *DISK FULL - ARCHIVING DISCONTINUED*. Remove the full diskette from the DMS diskette drive and insert an empty formatted diskette. Ensure the Archive option selected is **New** then press **F8 Execute**. Any samples tagged but not archived yet are copied onto the new diskette.

To Review Archived Files

IMPORTANT Risk of reporting erroneous results. Review of archived data in a report format (US, SI1, SI2, and so on) different than the report format used when the data was archived can display incorrect results because the units do not change from the archived units. Only review and report archived data in the same report format used when the data was originally archived.

- 1. Insert the diskette into a computer with a spreadsheet program that is compatible with the WKS format.
- 2. Retrieve the file you want.

Each column is labeled, but some of the labels are condensed. To view the complete column label either

- widen the column, or
- move the active cell cursor to the label.

Some of the columns use one-character codes to represent what is in them. The key to these codes is as follows:

- In the ID1 Edit fields:
 - 0 = not edited
 - 1 = edited
- In the Status field:
 - 0 = Blank/Not used/Matched
 - 1 = Partial aspiration
 - 2 = No Match

- For WBC/RBC/Plt Population:
 - 0 = Normal
 - 1 = Abnormal
 - 2 = Edited
- For all Suspect and Definitive flags except Imm Grans/Bands:

blank = no flag

1 = flag

• For the Imm Grans/Bands Suspect flag:

blank = no flag

1 = IMM GRANS/BANDS 1

- 2 = IMM GRANS/BANDS 2
- In the Mode of Aspiration field:
 - 1 = Primary mode
 - 2 = Secondary mode

4.9 WORKLOAD RECORDING

To access Workload Recording, select **Special Functions → Diagnostics → Workload Recording**.

The Workload Recording feature keeps a log of all samples cycled and separates patient tests from non-patient tests. Data is presented in tabular form and as a bar graph. Each test is color-coded on the bar graph.

Patient Tests Bar Graph

In the Patient Test Status mode, the colors and their designations are:

- Dark magenta Primary mode, CBC
- Light magenta Secondary mode, CBC
- Dark blue Primary mode, CBC and differential
- Light blue Secondary mode, CBC and differential



Non-Patient Tests Bar Graph

In the Non-Patient Test Status mode, the colors and their designations are:

- Dark green CBC and CBC+Diff Control
- Light green LATRON
- White Calibration
- Red Other tests



DATA REVIEW WORKLOAD RECORDING

5.1 SHUT DOWN

Shut down your HmX Hematology Analyzer for at least 30 minutes each day it is in use.

- 1. Make sure the status line displays SELECT FUNCTION.
- 2. Select **Diluter Functions → Shut Down**.
- 3. Press Enter to begin.

Allow cleaning agent to remain in the instrument for a minimum of 30 minutes.

Perform Start Up before running samples or controls.

5.2 CLEAN CYCLE

The Clean Cycle consists of a Shut Down cycle followed 30 minutes later by a Start Up cycle.

To initiate the Clean Cycle:

- 1. Go to the Access screen (F1 from the Main Menu).
- 2. Press F3 CLEAN.
- 3. Press Enter to begin.

After the Shut Down portion of the cycle finishes, a window displays.

Your options are:

- Do nothing and allow the Clean Cycle to complete.
- Press F4 to abort the Clean Cycle. Cleaning agent remains in the system until you perform Start Up.
- Press **F5** to begin the Start Up cycle immediately.

		00:09
	Clean Cycle in progress	
This cy	cle takes approximately 35 Please wait	minutes
	F4: Abort the cycle F5: Run Startup now	

5.3 PROLONGED SHUTDOWN PROCEDURE

If you turn off the power at night and the instrument is going to be idle for more than 48 hours, perform the following procedure.

- 1. Go to the Access screen and press F3 CLEAN.
- 2. Once the cycle is complete, turn OFF the instrument using the On/Off switch on the back of the main unit.
- 3. When it is time to use the instrument
 - a. Turn power ON
 - b. Prime the HmX PAK
 - c. Perform Start Up.
- 4. Perform and verify QC checks according to your laboratory's protocol.
- 5. Operate as usual.

5.4 AUTOPURGE CYCLE

WARNING To prevent injury, turn the power OFF when performing any manual cleaning, replacement or adjustment procedures if the instrument has been in Shut Down more than 22 hours. The Autopurge cycle turns on the pneumatics power supply and performs a special Diluter cycle automatically 23 hours after a Shut Down cycle has been initiated. This cycle repeats every 24 hours after that.

After 23 hours in Shut Down, with the power ON and the pneumatics OFF, the system automatically:

- Turns ON the pneumatics.
- Purges the flow cell and sample lines with diluent.
- Turns OFF the pneumatics.
- Repeats this cycle every 24 hours until a Start Up is performed.

6.1 CHAPTER OVERVIEW

This chapter presents all of the options available in the Set Up area of the DMS software.

In Heading 6.2, Control Set Up, you will find information about:

- CBC/DIFF file
- Latex file
- CBC file
- RETIC file
- Auto-Stop

In Heading 6.3, Sample Analysis Set Up, you will find information about:

- Action limits
 - XB limits
 - Definitive flag limits
 - ► High/low flag limits
 - Laboratory Normal Ranges
- Location list
- Physician list
- Display formats
 - Screen Labels
 - Parameter Selection
 - Reporting Units

- Delete database
- Delete host spooler
- Clear printer spooler queue
- Print options
 - Auto Print Format
 - Ticket Options
 - Spooler Priority
 - Graphics Options
 - Optional Printer

In Heading 6.4, System Set Up, you will find information about:

- Shift
- Reagents
- Institution
- Communication def
 - Host Computer Definition
- IQAP ID#
- Set Date/Time
- Supervisor Password
- Optimize Hard Disk

6.2 CONTROL SET UP

CBC/DIFF file

- 1. Select Special Functions → Set Up → Control set up → CBC/DIFF file.
- 2. Select a file to set up.
- 3. Insert the 5C cell control diskette into the diskette drive of the computer.
- 4. Press F5 Upload Assay Values.

FILE : 2 LEVEL:		LOT EXP DATE HOST	: / /		ID # 7501 HIFT: OPR:	.2-1-10-1
Parameter	WBC	NE%	NE#	LY%	LY#	H0%
Assigned Values	0.0	0.0	0.0	0.0	0.0	0.0
Expected Range	0.0	0.0	0.0	0.0	0.0	0.0
Parameter	no#	EO%	EO#	BA%	BA#	
Assigned Values	0.0	0.0	0.0	0.0	0.0	
Expected Range	0.0	0.0	0.0	0.0	0.0	
Parameter	RBC	HGB	HCT	HCV	NCH	MCHC
Assigned Values	0.00	0.0	0.0	0.0	0.0	0.0
Expected Range	0.00	0.0	0.0	0.0	0.0	0.0
Parameter	RDW	PLT	MPV			
Assigned Values	0.0	0	0.0			
Expected Range	0.0	0	0.0			

- 5. Press the function key for the desired level of control.
 - **F1** for Normal
 - F2 for Abnormal I
 - F3 for Abnormal II

PLACE 5C CONTROL DISK IN DRIVE A

- Select Control Level: F1: Normal
 - F1: Normal F2: Abnormal I F3: Abnormal II

- 6. Manually enter Shift and Operator ID.
- 7. Check that HOST: is set according to your laboratory protocol. ON means that control run results are transmitted to your host computer at the time of the run. Spacebar toggles between ON and OFF.
- 8. Check all entries to make sure they are correct then press F10 to save and escape.
- 9. Repeat steps 2 through 8 for the other levels of control. Once you are finished, remove the 5C cell control diskette from the diskette drive of the computer.

If the 5C cell control diskette fails to upload, you can enter all data manually.

- Refer to the package insert for lot specific information and assigned values.
- The system automatically enters the level and expected ranges based on the first two digits of the lot number.
- Press Enter after each entry.
- Press 🛃 at the end of each row of assigned values unless you are also entering your own expected ranges.

Latex file

- 1. Select Special Functions → Set Up → Control set up → Latex file.
- 2. Select a file to set up.
- 3. Manually enter the name of the file, Lot #, expiration date, and Operator ID. The system automatically enters assigned values, expected ranges, and expected %CVs.
- 4. Check that HOST: is set according to your laboratory protocol. ON means that control run results are transmitted to your host computer at the time of the run. Spacebar toggles between ON and OFF.
- 5. Check all entries to make sure they are correct then press F10 to save and escape.

	1 LATRON E: 02/20/99		LOT: 107332 OPR: LS	104	P ID # 75012-T6-1 HOST: OFF
			ASSIGNED Mean Channel		EXPECTED % CV
DIFF	Volume	(V)	27.7	2.0	7.0
MODE	Conductivity Scatter		27.7 90.0	2.0	10.0 9.0
RETIC	Volume	(∀)	27.7	2.0	7.0
NODE	Conductivity	(C)	27.7	2.0	10.0
	Scatter	(ន)	192.0	10.0	9.0

CBC file

- 1. Select Special Functions → Set Up → Control set up → CBC file.
- 2. Select a file to set up.
- 3. Manually enter data.
- 4. Check that HOST: is set according to your laboratory protocol. Spacebar toggles between ON and OFF.
- 5. Verify all entries then press **F10** to save and escape.

RETIC file

- 1. Select Special Functions → Set Up → Control set up → RETIC file.
- 2. Select a file to set up.
- 3. Manually enter the data from the package insert, Shift, and Operator ID. If you enabled the MRV and IRF parameters, enter 99.9 for their assigned values and expected ranges. Use these values until you establish your own.
- Check that HOST: is set according to your laboratory protocol. ON means that control run results are transmitted to your host computer at the time of the run.
 Spacebar toggles between ON and OFF.
- 5. Check all entries to make sure they are correct then press **F10** to save and escape.

Note: If you report Retic number (RET #), it is important that you enter the correct RBC value from your assay sheet. If you enter the wrong number and then correct it after running controls, the DMS does not recalculate the incorrect RET # results.

Auto-Stop

You can set up the instrument to stop automatically if any of the errors in table 6.1 occur during a control run.

If you set Auto-Stop to ON:

The instrument stops and a beeping alarm sounds when a control error listed in Table 6.1 occurs.

	FILE 12 CBC		
	LOT:		
	EXP DATE:	1 1	
	OPR:		
	HOST :		
	IQAP ID #	75012-1-T6-1	
	ASSAY	LIMITS +/-	
WB	. 0.0	0.0	
RBG	0.00	0.00	
HGI	3 0.0	0.0	
HC'	0.0	0.0	
MC	7 0.0	0.0	
MCI	H 0.0	0.0	
MCI	HC 0.0	0.0	
RDI	/ 0.0	0.0	
PL'	0 7	0	
MPV	7 0.0	0.0	

FILE : 3 LEVEL: Le	evel I EXP	LOT: 313 DATE: 02/ HOST: OFF	14/99	IQAP ID # 75012-1- SHIFT: 0 OPR: LS
Ref RBC:	4.76			
	Parameter	RET*	MRV	IRF
	Assigned Values	0.90	99.9	99.9
	Expected Range	0.60	99.9	99.9
	Parameter	RET#		
	Computed Value	0.0431		
	Computed Limit	0.0286		

Operator response:

- 1) Press Alt+End to stop the beeping.
- 2) Press Cttl+F2 to display the Error File.
- 3) Take appropriate action to resume operation.

If you set Auto-Stop to OFF:

The instrument continues analyzing samples when a control error occurs.

To set Auto Stop:

- 1. Select Special Functions → Set Up → Control set up → Auto-Stop
- 2. Press Spacebar to choose between ON and OFF.
- 3. Press F10 to save and escape.

Note: The arrow next to QC on the status line indicates whether the Auto Stop option is ON or OFF.

QC[↑]- ON QC[↓] - OFF

Table 6.1 Control Error Message Status and Action

Message	System Status	Data Status	Action		
Control Out of Range	System continues or if Auto-Stop ON, stops.	Results in Control file	 Review results. Follow your laboratory's protocol. 		
Control Expired	System continues or if Auto-Stop ON, stops.	Results in Control file	 Review file setup. Verify Lot # & Exp. date. Correct error. 		
File Full	System continues or if Auto-Stop ON, stops.	Bar code-labeled results lost.Results without bar-code labels saved in data base unless Control Run screen is on display.If Control Run screen is on display and no bar code read, results lost.	 Print file, if necessary. Delete file. Rerun control. 		
File not Found (CBC/DIFF only)	System continues or if Auto-Stop ON, stops.	Bar code-labeled results lost.	 Review file setup. Correct error. Rerun control. 		
Disk Drive C: Full	System continues or if Auto-Stop ON, stops.	Bar code-labeled results lost. Results without bar-code labels saved in data base.	Call your Beckman Coulter representative.		

6.3 SAMPLE ANALYSIS SET UP

Action limits

Here you set the limits for XB, Definitive flags and High/Low flags according to your laboratory protocol. Enter your Laboratory Normal Ranges in the DMS if you want them to print on the report. Access to this area of the software requires the supervisor password.

For more information on XB, refer to Chapter 2. For more information on flags, refer to chapter 4.

Note: If flagging limits are changed, flag assignments on previously stored data will not update and will not correspond to the new limits.

XB limits

Enter XB target values and thier limits here.

- 1. Select Special Functions → Set Up → Sample analysis set up → Action limits → XB limits.
- 2. Move the cursor to the desired field.
- 3. Type the data then press Enter.
- 4. Repeat steps 2 and 3 until all data has been entered.
- 5. Press **F10** to save and escape.

XB LIMITS XB Target Values and Limits Target Limit% MCU B955 3.0 MCH 30.5 3.0 MCH 34.8 3.0

Definitive flag limits

Enter your definitive flag limits here. As you highlight each limit, the flag associated with it appears at the top of the screen. If a particular limit does not have a flag associated with it, the area at the top of the screen will be blank.

- 1. Select Special Functions → Set Up → Sample analysis set up → Action limits → Definitive flag limits.
- 2. Move the cursor to the desired field.
- 3. Type the numeric limit then press Enter.
- 4. Repeat steps 2 and 3 until all data has been entered.
- 5. Press **F10** to save and escape.

		Leu	kopenia		
	Low limit	High limit		Low limit	High limit
WBC	3.6	10.0	RBC	3.50	6.00
NEX:	37.0	75.0	HGB	12.0	18.0
LY%	20.0	55.0	HCT	36.0	54.0
MO%	2.5	10.0	MCU	80.0	100.0
EO%	0.5	11.0	MCH	27.0	34.0
BA%	0.0	2.0	MCHC	33.0	35.0
NE#	1.4	6.5	RDW	11.6	16.5
LY#	1.2	3.4	PLT	150	450
M0#	0.0	0.7	MPU	7.4	11.0
E0#	0.0	0.7			
BA#	0.0	0.Z			
BC <	low limit ar	ıd RBC < low lim	it and Pl	.T≮low lin	nit = Pancytopeni

High/low flag limits

Enter High/Low flag limits here. The H or L will appear next to the numeric result that exceeds the limit.

- 1. Select Special Functions → Set Up → Sample analysis set up → Action limits → High/low flag limits.
- 2. Move the cursor to the desired field.
- 3. Type the numeric limit then press Enter.
- 4. Repeat steps 2 and 3 until all data has been entered.
- 5. Press **F10** to save and escape.

Note: MRV and IRF parameters only appear on the screen if you enabled these parameters.

Laboratory Normal Ranges

Enter your laboratory's normal ranges here. These do not trigger any flags. They serve only as a reference on printed reports.

- 1. Select Special Functions → Set Up → Sample analysis set up → Action limits → Laboratory Normal Ranges.
- 2. Move the cursor to the desired field.
- 3. Type the data then press Enter.
- 4. Repeat steps 2 and 3 until all data has been entered.
- 5. Press F10 to save and escape.

Note: MRV and IRF parameters only appear on the screen if you enabled these parameters.

	Low limit	High limit	Low limit	High limit
WBC	3.6	9.6	RBC 3.90	5.70
NEX	37.0	73.0	HGB 12.1	17.2
LYz	20.0	55.0	HCT 36.1	50.3
M0%	2.5	10.0	MCU 82.2	97.4
E0%	0.5	11.0	MCH 27.6	33.3
BAX	0.0	2.0	MCHC 33.0	34.8
NE#	1.4	6.5	RDW 11.6	13.7
LY#	1.2	3.4	PLT 202	386
M0#	0.0	0.7	MPU 7.8	11.0
E0#	0.0	0.7		
BA#	0.0	0.2		
RETX	0.60	2.60	RET# 0.0000	0.9990
MRU	0.0	999.9	IRF 0.0	100.0

		Labors	acory	Normal	Ranges			
Low	High			Low	High		Low	High
4.8	10.8	RBC	male	4.70	6.10	female	4.20	5.40
43.0	65.0	HGB	male	14.0	18.0	female	12.0	16.0
20.5	45.5	HCT	male	42.0	52.0	female	37.0	47.0
5.5	11.7	MCV	male	80.0	94.0	female	81.0	99.0
0.9	2.9	MCH		27.0	31.0			
0.2	1.0	MCHC		32.0	36.0			
2.2	4.8	RDW		11.5	15.5			
1.3	2.9	PLT		130	400			
0.3	0.8	MPV		7.4	10.4			
0.0	0.2							
0.0	0.1							
		RETS	male	0.60	2.60	female	0.60	2.60
		RET#		0.0000	0.9999		0.0000	0.9999
		MRV	male	0.0	999.9	female	0.0	999.9
		IRF	male	0.9	100.0			100.0
	4.8 43.0 20.5 5.5 0.9 0.2 2.2 1.3 0.3 0.0	4.8 10.8 43.0 65.0 20.5 45.5 5.5 11.7 0.9 2.9 0.2 1.0 2.2 4.8 1.3 2.9 0.3 0.8 0.0 0.2	4.8 10.8 PBC 43.0 65.0 HGB 20.5 45.5 HGT 5.5 11.7 MCV 0.9 2.9 MCH 0.2 1.0 MCH 0.2 4.8 PDW 1.3 2.9 PLT 0.3 0.8 MPV 0.0 0.2 0.0 0.1 PET% RET%	4.8 10.8 PRC male 4.8 10.8.0 HGB male 20.5 45.5 HCT male 0.9 2.9 MCH 0.2 1.0 MCK 2.2 4.8 RDW 1.3 2.9 MCH 0.3 0.8 MPV 0.0 0.2 1.0 RET% male RET% male RET% male RET% male	4.8 10.8 FEC male 4.70 4.8 10.8 HGE male 14.0 20.5 45.5 HGT male 42.0 5.5 11.7 MCV male 80.0 0.2 2.9 MCH 27.0 0.2 1.0 MCH 32.0 2.2 4.6 FDV 11.5 1.3 2.9 PLT 130 0.3 0.8 HFV 7.4 0.0 0.1 RET* male 0.600 RET* male 0.060 RKF male 0.16	4.8 10.8 PBC male 4.70 6.10 3.0 65.0 HGB male 14.0 18.0 20.5 \$1.7 MCV male 42.0 52.0 0.9 2.9 MCH 27.0 31.0 0.2 1.0 MCW male 24.0 52.0 1.3 2.6 PUT 11.5 15.5 1.3 0.6 PUT 1.0 400 0.0 0.2 0.0 10.0 MCH 27.0 31.0 0.13 2.6 PUT 1.15 15.5 10.1 10.4 400 0.0 0.2 1.0 MCO 7.4 10.4 10.4 0.0 0.1 PUT 1.0 4000 0.999.9 MEW male 0.00 9.999.9	4.8 10.8 PBC male 4.70 6.10 female 3.0 65.0 HGS male 14.0 15.0 female 20.5 11.7 HCT male 82.0 52.0 female 0.9 2.9 MCN 27.0 31.0 0 0.2 1.0 MCN 32.0 56.0 2.2 2.2 MCN 27.0 31.0 0 0.2 1.3 0.8 PU 11.5 15.5 1.7 0.4 1.3 0.2 PU 10.0 40.4 female 0.0 0.4 0.0 0.2 RFW 7.4 10.4 0.4 0.0 0.4 0.0 0.2 MFV 7.4 10.4 0.4 0.5 0.2 0.0 10.1 0.4 0.5 0.5 0.1 10.4 0.5 0.5 10.4 0.5 0.5 10.4 0.5 0.5 10.4 10.4 0.5 0.5 <	4.8 10.8 RBC male 4.70 6.10 female 4.20 3.0 65.0 HGB male 14.0 18.0 female 12.0 20.5 \$45.5 HCT male 42.0 52.0 female 37.0 0.5 \$11.7 HCV male 42.0 52.0 female 37.0 0.9 2.9 HCH 27.0 31.0 0 0.2 1.0 NCHC 22.0 36.0 2.2 4.8 RDW 11.5 15.5 1.3 0.6 PL 130 40.0 0.0 0.2 10.0 NCHC 23.0 36.0 2.2 HPV 7.4 10.4 10.0 0.0 0.2 BFW 13.5 15.5 1.3 0.0 PL 130.4 40.4 0.0 0.2 IPV 7.4 10.4 0.0 0.1 IPV 7.4 10.4 RET% male 0.00000 0.999.5 female 0.600 10.0 RETH male 0.00000 9.999.5 female 0.0

Location list

Create a list of up to 30 location names. The maximum number of characters per name is 16. Select from this list using F2 Choice list when entering demographic data on a Worklist or when editing data in Data Base Query.

- 1. Select Special Functions → Set Up → Sample analysis set up → Location list.
- 2. Type a location name then press Enter.
- 3. Repeat step 2 until all locations have been entered.
- 4. Press **F10** to save and escape.

Physician list

Create a list of up to 30 physician names. The maximum number of characters per name is 22. Select from this list using F2 Choice list when entering demographic data on a Worklist or when editing data in Data Base Query.

- 1. Select Special Functions → Set Up → Sample analysis set up → Physician list.
- 2. Type a physician name then press Enter.
- 3. Repeat step 2 until all physicians have been entered.
- 4. Press **F10** to save and escape.

Sample	Analysis	Controls	Diluter	Functions	Special Functions
					Diagnostics Set Up
	Location	Location	List		Control set up Sample analysis set up
		tient			Action limits Location list Physician list Display formats Delete dackabase Delete host spooler Clear printer spooler queue Frint Options

Sample	<i>ànalysis</i>	Controls	Diluter	Functions	Special Functions
					Diagnostics Set Up
		Physician	List		ontrol set up
Dr	. James V. Thomas B Anthony	Jones			ample analysis set up limits n list formass database host spooler rinter spooler queue ptions

Display formats

Here you set up your laboratory's choice of format for screen labels, select which parameters to display and select the reporting units you are going to use. Access to this area of the software requires the supervisor password.

Screen Labels

Your laboratory can rename various screen labels to personalize the system and your reports. For instance, if ID#2 is the patient's name, change the label from ID#2 to NAME. New labels appear on the Worklist, Run Samples screen, Data Base Query screen and printouts.

Note: You must delete the database before changing any of the screen labels.

- Select Special Functions → Set Up → Sample analysis set up → Display formats → Screen Labels.
- 2. Move the cursor to each label you want to change and type the new label.
- 3. Press **F10** to save and escape.

Parameter Selection

Select Yes for each parameter you want to display and report.

Within the United States and other countries under U.S. FDA jurisdiction, PCT and PDW are For Research Use Only. Not for Use In Diagnostic Procedures.

Note: MRV and IRF only appear in the window if you enabled these parameters. See the Reference manual for more information on MRV and IRF.

- 1. Select Special Functions → Set Up → Sample analysis set up → Display formats → Parameter Selection.
- 2. Move the cursor to the desired parameter.
- 3. Use the Spacebar to toggle between No and Yes.
- 4. Press F10 to save and escape.

Reporting Units

Select the Reporting Units you want to use.

Choose between:

- US 1
- US 2 (Retic only)
- SI 1
- SI 2
- SI 3
- SI 4
- SI 5 (Retic only)
- SI 6 (Retic only)
- SI 7 (Retic only)
- JAPA (Japanese)
- 1. Select Special Functions → Set Up → Sample analysis set up → Display formats → Reporting Units.
- 2. Use the Spacebar to toggle to the desired reporting units.
- 3. Press F10 to save and escape.

Para	meter	selec	tion	
	PCT	No		
	PDW	No		
	RET#	Yes		
	MRV	Yes		
	IRF	Yes		



Note: MRV and IRF only appear in the window if you enabled these parameters.
Delete database

The patient sample database stores the results of up to 5,000 samples. Sample 5,001 overwrites the oldest sample not marked for saving. Routine deletion of the database is not necessary. Delete the database only in special cases such as changing screen labels. Access to this area of the software requires the supervisor password.

1. Select Special Functions → Set Up → Sample analysis set up → Delete database.

> The following message appears: You have asked to delete the ENTIRE Database. Are you sure you want to delete?: No.

2. Use the Spacebar to toggle to Yes then press Enter.

This deletes all sample result data and resets the system.

Delete host spooler

Use this feature to clear the buffer of results waiting to be transmitted to the host computer. Access to this area of the software requires the supervisor password.

- Select Special Functions → Set Up → Sample analysis set up → Delete host spooler.
- 2. Press the Spacebar to answer Yes to the displayed question.
- 3. Press Enter.

Clear printer spooler queue

Use this feature to stop a print job and clear the DMS printer spooler of all data not yet sent to the printer. Access to this area of the software requires the supervisor password.

- 1. Select Special Functions → Set Up → Sample analysis set up → Clear printer spooler queue.
- 2. Move the cursor to the appropriate option.
- 3. Press the Spacebar to toggle from N to Y.
- 4. Press **F10**.
- 5. Press the Spacebar to answer Yes to the displayed question.
- 6. Press Enter.

Print options

Use print options to set up how you print sample results. Access to some of the options requires the supervisor password.

Auto Print Format

Choose either a graphics format or a ticket format for printouts generated automatically on the printer. Examples of both formats are presented in the Reference manual.

- 1. Select Special Functions → Set Up → Sample analysis set up → Print options → Auto Print Format.
- 2. Use the Spacebar to toggle between graphics format and ticket format.
- 3. Press F10 to save and escape.

Ticket Options

Use to customize the ticket format printout. Choose from these options:

PRINT UNITS Y/N

If Y, the unit strings (such as % and $10^{3}\mu$ L) print after the data values.

PRINT NORMAL RANGES: Y/N

If Y, the laboratory normal ranges section prints on the report. The ticket report will be 2/3 of a page instead of the normal 1/3 of a page.

PRINT PARAMETER LABELS: Y/N

If Y, parameter labels (WBC, RBC) print along with parameter data.

S./D. FLAGS: Y/N

If Y, suspect and definitive flags print on the report.

DIFF ORDER:

Selects the order that the diff parameters print on the ticket. Options are HmX Standard or STKS (LY prints first).

TICKET FORMAT START OF NEXT FORM:

- If set to Continuous, tickets print with no forms skipped between tickets. The length of the ticket is 1/3 or 2/3 of a form, depending on the setting of the Normal Ranges option.
- If set to Skip One Form, tickets print with one form skipped between tickets depending on the setting of the Normal Ranges option.
- If set to Form Feed, the printer issues a form feed between tickets.



To change an option:

- 1. Select Special Functions → Set Up → Sample analysis set up → Print options → Ticket Options.
- 2. Move the cursor to an option.
- 3. Use the Spacebar to toggle between Y and N.
- 4. After you have made your choices, press **F10** to save and escape.



Spooler Priority

If you request multiple print jobs, the printer spooler sends the data to the printer based on the priority you set here.

- 1. Select Special Functions → Set Up → Sample analysis set up → Print options → Spooler Priority.
- 2. Use f or it to move the cursor to the item you want to reorder.
- 3. Press Enter.
- 4. Use f or ↓ to move the item to its new position.
- 5. Press Enter.
- 6. Repeat steps 2 through 5 to reorder other items, if necessary.
- 7. Press F10 to save and escape.

Graphics Options

Use to customize the graphics format printout. Choose from these options:

Page Format:Width/Font

Use this option to select width (Narrow/Wide) and font (Small/Large).

Wide width = 8.5 in. Narrow width = 4 in.

- When you select Narrow width, you cannot select Large font.
- If you use Narrow/Small and set all graphics options to Yes, printouts may exceed 11 in. paper.
- DF2, DF3 and VCS Histograms only print when you select Wide width.

DF1, RBC, PLT: Yes/No

If Yes, the DF1 scatterplot, RBC histogram, and Plt histogram print.

DF2, DF3: Yes/No

If Yes, the DF2 and DF3 scatterplots print.

Note: DF2 and DF3 scatterplots are not available with the print batch option. You must use the Automatic Print option, or press **F4 Print** at the Run Sample screen or the Data Base Query screen to print DF2 and DF3 scatterplots.

VCS Histograms: Yes/No

If Yes, the VCS histograms print.

Demographics: Yes/No

If Yes, the patient demographics, including user fields and comments, print.

S/D Flags: Yes/No

If Yes, the suspect and definitive flags print.

Sample Analysis	Controls Dil	uter Funct:	ions Special Functions	ons
			Diagnostics Set Up	
			Control set up Sample analysi:	s set up
ſ	Graphics Optic Nidth Page format: Narrow DF 1, R&C, PLT DF 2, DF 3 VCS Histograms Demographics S./D. flags Print Units Print Diff Box Print Diff Box Print Normal Ranges DF 5, DF 6	 / Font Yes No No Yes Yes No Yes Yes Yes Yes 	Action limits Location list Physician list Display formats Delett database Delett database Delett host spoler Clear printer spoler Clear printer spoles Auto Print Format Ticket Options Spoler Priority Graphics Options	c queue

Print Units: Yes/No

If Yes, reporting units print.

Print Diff Box: Yes/No

If Yes, the Differential Box prints. This area allows you to handwrite manual diff results on the report.

Print Normal Ranges: Yes/No

If Yes, Laboratory Normal Ranges print.

DF 5, DF 6: Yes/No

If Yes, DF5 and DF6 Retic scatterplots print.

To change an option:

- Select Special Functions → Set Up → Sample analysis set up → Print options → Graphics Options.
- 2. Move the cursor to an option.
- 3. Use the Spacebar to toggle between settings.
- 4. After you have made your choices, press **F10** to save and escape.

Optional Printer

You can add a second printer to your system to print exclusively in ticket format. Connect the second printer to the DMS using LPT2.

- 1. Select Special Functions → Set Up → Sample analysis set up → Print options → Optional Printer.
- 2. Use the Spacebar to toggle between Y and N.
- 3. Press F10 to save and escape.

Sample	Analysis	Controls	Diluter	Functi	ons	Special Func	tions
						Diagnostic Set Up	3
						Control set Sample analy	
		Graphics C W Page format: Na DF 1, RBC, PLT DF 2, DF 3 VCS Histograms Demographics S./D. flags Print Units Print Diff Box Print Normal Ra DF 5, DF 6	idth / Fo rrow / Sm : Yes : No : No : No : Yes : No : Yes mges: Yes	all	Loca Phys Disp Dele Clea Åuto Tick Spoo Grap	on limits tion list lay formats te database te host spoole r printer spoo Print Format et Options ler Priority hics Options onal Printer	

6.4 SYSTEM SET UP

Shift

You can use the same bar code-labeled lots of 5C cell control on different shifts and store them in different files. In this way, you can generate separate control statistics for each shift.

To set this up:

- 1. Select Special Functions → Set Up → System set up → Shift.
- 2. Type in the starting times for each shift. Press Enter to move the cursor from field to field.
 - The system automatically calculates the end of the shift to prevent overlap.
 - If you only need two shifts, set the third shift to 1 minute. The time periods add up to 24 hours automatically.
- 3. Press F10 to save and escape.

Sample Analysis	Controls	Dilute	r Functio	ons	Special Functions
					Diagnostics Set Up
					Control set up Sample analysis set up Shift
		Shift	Time	Range	eagents nstitution ommunication def
		1	07:00 -	14:59	QAP ID # et Date/Time
		2	15:00 -	22:59	upervisor Password ptimize Hard Disk
		3	23:00 -	06:59	
	-				

Reagents

Use this option to record reagent information at installation or whenever you change a reagent. For the complete procedure on how to replace a reagent container, refer to the Special Procedures and Troubleshooting manual, Chapter 4.

- 1. Select Special Functions → Set Up → System set up → Reagents.
- 2. Key in the new reagent information, pressing Enter after each item:
 - lot number
 - date reagent opened

Note: Pressing Enter automatically gives you today's date.

• expiration date

Note: Do not forget to enter revised expiration dates where appropriate, for example, 60 days from date opened for Lyse and Pak, 90 days for Cleaner.

- 3. Verify that all entries are correct.
- 4. Press F10 to save and escape.

Institution

Use this option to determine what institution information prints on the header of your printed reports. Access to this option requires the supervisor password.

- 1. Select Special Functions → Set Up → System set up → Institution.
- 2. Move the cursor from field to field and type in your institution's information. Use the Spacebar to toggle between Yes and No under the **Printed on graphics report** column.
- 3. Press F10 to save and escape.

		-REAGENTS-			Diagnostics Set Up
Diluent Lyse Cleener	050806f 101649f	DATE OPENED 03/02/99 01/30/99 01/12/99	09/15/99 03/31/99	OPR OPR	Control set up Sample analysis set
Pak	110869 k	01/30/99	03/31/99	OPR	Shift Reagents Institution Communication def IQAP ID # Set Date/Time Supervisor Passwo Optimize Hard Dis

ample Analysis	Controls Diluter	Functions Spec	ial Functions
	INSTITUTION	-	gnostics
		Printed on graphics report	Up
Name	Coulter Corporation	Yes	ol set up e analysis set up
Lab Director	W. Coulter	Yes	ft
Åddress	11800 S W 147th Ave Miami, FL 33196	Yes	gents titution munication def
Phone	(305) 380-3800	Yes	P ID # Date/Time
Instrument SN	SNU12345	Yes	ervisor Password ptimize Hard Disk

Communication def

Host Computer Definition

Use this option to choose the communication format for transfer of sample information to a host computer. Refer to the Host Specifications manual for information on the transmission of data to a host computer.

- 1. Select Special Functions → Set Up → System set up → Communication def → Host Computer Definition.
- 2. Move the cursor from field to field and type or use the Spacebar to set up each definition.
- 3. Press F10 to save and escape.

IQAP ID#

Use this option to enter your identification number if you participate in the Interlaboratory Quality Assurance Program (IQAP). This number then appears automatically on all control setup and control review and report displays.

- 1. Select Special Functions → Set Up → System set up → IQAP ID#.
- 2. Type your IQAP identification number.
- 3. Press F10 to save and escape.

umple Analysis Co	ntrols	Diluter Functions	Special Functions
Host	Computer	Definition	Diagnostics Set Up
STKS 21 Host Mode	No	Retics transmission	
		Overall Retics	No ntrol set up
Timeout (secs)	9	Graphics	mple analysis set
Baud rate	9600	DF 5	No
Parity	odd	DF 6	No Shift
Stop bits	1		Reagents
Handshake	Yes	Enable Spooler	Yes Institution
Block size	256	Replace NULL by SP	No
			uter Definition
Graphic transmissi	on		
DF 1	No		Set Date/Time
DF 2	No		Supervisor Password
VCS histograms	No		Optimize Hard Disk
RBC histogram	No		
PLT histogram	No		

Set Date/Time

Use this option to:

- Set the date and time at installation.
- Change the time for a reason such as daylight savings time.

Note: This is not a routine procedure. Date and time continue to update even if you turn off instrument power.

- 1. Select Special Functions → Set Up → System set up → Set Date/Time.
- 2. Type the date and time using Enter to move from one field to the other.
- 3. Press F10 to save and escape.

Supervisor Password

Use this option to set up a password to restrict entry into **Sample analysis set up** and parts of **System set up**. Access to this option requires the supervisor password.

- 1. Select Special Functions → Set Up → System set up → Supervisor Password.
- 2. Type the old password.
- 3. Type the new password.
- 4. Press F10 to save and escape.

Optimize Hard Disk

Use this option to enable the OPTune utility so that it automatically optimizes the hard disk when you reset the system. For more information about OPTune, see Optimize the DMS Hard Disk in chapter 4 of the Special Procedures and Troubleshooting manual. Access to this option requires the supervisor password.

- 1. Select Special Functions → Set Up → System set up → Optimize Hard Disk.
- 2. Verify that Yes is displayed. If it is not, press the Spacebar.
- 3. Press F10 to save and escape.

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