OPERATOR MANUAL

FLUOROMETER SERIES-4EX

VICAM®

A Waters Business

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SECTION 1. INTRODUCTION

This manual provides an identification of controls and features and an explanation of the basic operating procedures of the VICAM Series-4EX Fluorometer.

SPECIAL FEATURES

The VICAM Series-4EX Fluorometer has designed with the following special features:

- Full menu of test protocols stored on-board
- Ultra-stable optics & calibrator memory minimizes test recalibration
- On board thermal printer for hard copy printout of test results
- "Print Summary Data" feature prints test results history
- Bright illuminated 2-line display
- On-board real time & date clock
- RS-232C serial port with a 38400 baud rate
- USB port
- Alphanumeric keypad

INTENDED USE

The VICAM Series-4EX Fluorometer is an easy to use instrument that measures the fluorescence of a liquid sample and converts that measurement into a quantitative concentration value. It is intended for use with VICAM Mycotoxin testing systems.

SYSTEM DESCRIPTION

The VICAM Series-4EX Fluorometer optical system uses a high intensity pulsed Xenon lamp, together with photodiode detectors and selected fluorescence excitation and emission filters. The sample fluorescence is measured and converted to PPM (Parts per Million), PPB (Parts per Billion), PPT (Parts per Trillion), mg/kg, µg/kg or ng/kg concentration units according to the protocol for the selected test.

The instrument 2-line display is a highly visible illuminated type. An on-board printer provides a copy of each test result and can also provide multiple copies if desired. A "Print Summary Data" function prints the results of up to 375 test results.

Test methods are stored in memory by name for easy recall. Calibration values for each test are also stored with a time and date stamp of their most recent run. The instrument alerts the operator when a new calibration is needed.

SPECIFICATIONS

System

Dimensions	14" wide x 12" deep x 7" high (36cm x 30cm x 18cm)
Weight	14.5 lbs (6.6 Kg), packaged weight 20.5 lbs. (9.3 Kg)
Light Source	Xenon pulsed flash lamp
Lamp Life	> 10,000,000 flashes
Detector Silicon	Photodiode
Wavelength Selection	Optimized for QSO_4, Filter changes made at the factory 340-700 nm Capable
Stability	Drift < 1.0% of reading in 8 hours
Dynamic Range	6 decades
Range Selector	Automatic; 1000, 100, 10, 1, 0.1 PPB QSO_4 full scale
Precision	$\pm$ 3 PPT QSO_4 or $\pm$ 0.5% of reading (blank not subtracted) whichever is greater
Accuracy	10 PPT QSO_4 or 1.0% of reading whichever is greater
Calibration	Auto-calibrating using QSO_4 reference standards
Sample Tube	12 x 75 mm Glass tube or calibrator ampule
Sample Volume	1 mL minimum

Data Handling

Data Input	Tactile membrane keypad, alphanumeric & function keys
Display	2-line x 20-characters illuminated
Printer	On-board 24-column character printer
Data Reduction	Single point & Linear regression
Memory	32K RAM, 128K ROM
Computer Interface	RS-232, DB-9 connector USB connector
Clock	Date & time, International or U.S. format

Electrical/Environmental

Power Supply	100, 120, 220, 230 VAC ± 10%, 50/60 Hz., Universal Power Supply with IEC connection
Operating Temperature	5 - 35° Celsius
Operating Humidity	10 - 90% Non-condensing

SECTION 2. INSTALLATION

UNPACKING

After examining the outside of the container for visible damage, open the shipping carton and examine the VICAM Series-4EX Fluorometer and components.

The shipping carton should contain:

- VICAM Series-4EX Fluorometer
- Power Supply
- Power cord
- 2 Rolls of thermal printer paper
- Paper Roll Spindle
- 1 Spare fuse
- Operator's Manual
- Short Instructions flip chart

NOTE:
If damage has occurred or a part is missing, please contact your VICAM representative.

LOCATION

The VICAM Series-4EX Fluorometer should be placed on a flat horizontal surface, away from strong sources of electromagnetic interference (e.g. centrifuge motors). The rear of the instrument should be clear of obstruction. Allow approximately six inches (15cm) for access to the power connector and power switch.

The VICAM Series-4EX Fluorometer has been designed to be resistant to dust and variations in temperature and humidity. To ensure maximum useful life, it is recommended that the instrument be installed in a laboratory location that is protected from extreme environmental conditions.

POWER REQUIREMENTS

Figure 2.1. Rear Instrument Panel

With the power in the OFF position, connect the appropriate power cord for the country of use between the main outlet and the universal power supply. Connect the output of the universal power supply to the POWER INPUT connector at the rear of the VICAM Series-4EX Fluorometer system.

WARNING

For safety and proper operation, the 3-conductor power cord of the instrument must be connected to a grounded power source. Do not use any 2-conductor adapter to connect the external power supply to an ungrounded power source.

If the electrical outlet to be used does not have a third (ground) contact, a properly grounded receptacle (VDE 0107 approved) with a third (ground) contact must be installed before applying power to the Fluorometer system.

PREPARING FOR OPERATION

Power On

With the unit connected to a suitable power source, turn the VICAM Series-4EX Fluorometer **ON (1)** via the rear panel power switch (see Figure 2.1).

When the power is first turned **ON (1)**, the instrument display should light and briefly display "Passed Self-Test", followed by " V**ICAM 4EX Ready** ". The printer mechanism will index and advance the equivalent of 2 lines of paper.

Loading Printer Paper

To install printer paper into the printer mechanism:

1. Lift the printer cover.
2. Remove the old paper roll (if any) from the paper compartment.
3. With the paper roll oriented so the leading edge of the printer paper leaves from the bottom of the roll, insert this leading edge into the slot at the bottom rear of the printer mechanism to position for loading.
4. Load the paper by depressing the [**ADVANCE PAPER]** key. It will be necessary to depress the [**ADVANCE PAPER]** key several times to advance the paper sufficiently.
5. Insert the paper spindle in the new roll of printer paper.
6. Place the printer paper roll in the printer paper compartment.
7. Feed the leading edge of the paper through the opening of the printer paper cover and close the printer paper cover.

Operational Precautions

1. Be careful to read calibrators and samples in proper sequence. All data analysis assumes that the calibrators and samples are read in the proper order as prompted by the display.

2. Make sure that the exterior surfaces of the calibrator ampules and assay tubes are clean and dry. Finger marks, scratches, foreign material or water droplets on the exterior of calibrator ampoule or sample tube surfaces may cause erroneous readings.

3. Air bubbles should not be visible in the calibrators or sample liquids, as these may cause erroneous readings.

4. If the printer runs out of paper, STOP processing immediately to avoid damage to the print head and loss of printed results. (Test data can be recovered using the "Print Summary Data" function once the printer paper roll has been renewed). Data can be displayed on the screen by turning the printer OFF. (See the “Set Printer” section of this manual)

SECTION 3. CONTROLS AND FEATURES

VICAM Series-4EX Instrument

Display

The display is an illuminated 2-line x 20-character display that provides prompts and messages to the operator on procedure status.

Keypad

The keypad consists of 18 keys:

KEY FUNCTION

[1-9] with alphabet **ABC**, **DEF**, etc. Dual function: Alpha & Numeric
[0] Zero
[-] Negative sign
[.] Decimal point

KEY FUNCTION

[ADVANCE PAPER / BACKSPACE] Dual function: Advance Paper /Backspace
[SELECT TEST] Select Test review
[PRINT] Dual function: Prints test and summary results

[OPTIONS] Options review
[ENTER] Entry confirmation
[STOP] Stop or Exit command

Figure 3.2. Keypad and Display

Number Zero, Decimal, Negative Sign and Alphanumeric Keys

The number zero **[0]**, Decimal Point **[.]**, Negative Sign **[-]** and Alphanumeric keys **[1]-[9]** (with alphabet ABC, DEF, etc.) offer the user a selection of digits 0 to 9, the letters of the alphabet, as well as a negative sign and a decimal point. These keys are used when the user must input a number or to type in a name of a test.

Dual functions incorporated in the keys are context sensitive. This is illustrated in A & B below:

Example A: If a concentration value is to be entered f or a calibrator during the Calibrate Test sequence, the numeric function (1, 2, 3, etc.) of the alphanumeric keys is active.

Example B: If a new test name is to be entered during the Create Test sequence, the alpha character capability (ABC, DEF, GHI, etc) of the respective keys is active.

ADVANCE PAPER and BACKSPACE Dual Function Key

The dual functions incorporated in the **[ADVANCE PAPER / BACKSPACE]** key are context sensitive. When the instrument display reads "**VICAM 4EX Ready**", depressing this key will advance the printer paper three print lines. If the user is using the alphanumeric keys during data or test name entry it will function as a backspace key, moving the cursor in the display back to the previous position.

SELECT TEST Key

The **[SELECT TEST]** key allows the user to select a test name from the list of available protocols stored in memory so that the user may Run, Calibrate, Print, Delete, or Edit a test method. Pressing the [**SELECT TEST]** key repeatedly allows the operator to successively review the available choices stored in memory. Pressing the **[ENTER]** key when the appropriate menu choice appear s confirms the selection. Pressing the **[STOP]** key will exit the menu.

PRINT Key

The **[PRINT]** key may be used to print a copy of the most recent test result in the current run. Pressing **[PRINT]** if no tests were run since the unit was turned ON will print the most recent test data stored in memory.

OPTIONS Key

The **[OPTIONS]** key allows the user to select Calibrate Test, Real Time Test, Test Functions, Diagnostic Functions and Settings modes. Pressing the [**OPTIONS]** key repeatedly allows the operator to successively review the available choices. Pressing the **[ENTER]** key when the appropriate menu choice appears confirms the selection. Pressing the **[STOP]** key will exit the menu.

ENTER Key

The user will press the **[ENTER]** key to instruct the VICAM Series-4EX Fluorometer to accept the options and inputs selected by the user. This moves the procedure and display prompt to the next step.

STOP Key

The **[STOP]** key ends the currently selected function or test and returns the instrument to the ready state. After pressing **[STOP]**, the instrument display reads "**VICAM 4EX Ready**".

SECTION 4. OPERATION

NOTE:
The operating instructions detailed in the following sections are presented in a dual column format.

The left-hand column shows the name of the keypad button which is to be pressed by the operator, confirmation of displayed prompt instructions and related information.

The right-hand column shows the corresponding message which will then be read on the Display after each step

RUN TEST

The following procedure is for running a test after the instrument has been calibrated.

Operator Press	Display Reads
	VICAM 4EX Ready
[SELECT TEST]----------	**(test name)**
(repeat to scroll through list)	**(test name selected)**
[**ENTER]**	**Open The Lid**
(operator opens the lid)	**Insert Sample**
(operator inserts sample)	**Close the Lid**
(operator closes the lid)	**Waiting xxx sec.**
	Reading Sample. . .
	Open the Lid
(operator opens the lid)	**Remove Sample**
(operator removes sample)	**Insert Sample**
(operator inserts next sample, or presses:)	
[STOP]----------	**VICAM 4EX Ready**

For a second printed copy of the test result, press **[PRINT]** before inserting next sample and pressing [**STOP].**

CALIBRATE/RUN TEST

The following procedure is for running a test if the previous calibration procedure has expired.

Operator Press	Display Reads
	VICAM 4EX Ready
[SELECT TEST] ----------	**(test name)**
(repeat to scroll through list)	**(test name selected)**
[ENTER] ----------	**Start Calibration . . .**
	Open The Lid
(operator opens the lid)	**Insert Red Vial**
(operator inserts red vial)	**High Cal XX PPB**
(operator accepts displayed value, or keys in new value)	
[ENTER] ----------	**Close the Lid**
(operator closes the lid)	**Reading High Cal . . .**
	Open the Lid
(operator opens the lid)	**Remove Red Vial**
(operator removes red vial)	**Insert Green Vial**
(operator inserts green vial)	**Low Cal XX PPB**
(operator accepts displayed value, or keys in new value)	
[ENTER] ----------	**Close the Lid**
(operator closes the lid)	**Reading Low Cal . . .**
	Open the Lid
(operator opens the lid)	**Remove Green Vial**
(operator removes green vial)	
(calibration values printed)	**Printing…**
	Saving
	Writing
	VICAM 4-EX Ready
[SELECT TEST] ----------	**(test name)**
(repeat to scroll through list)	**(test name selected)**
[ENTER] ----------	**Open The Lid**
(operator opens the lid)	**Insert Sample**
(operator inserts sample)	**Close the Lid**
(operator closes the lid)	**Waiting xxx sec.**
	Reading Sample . . .
	Printing
	Open the Lid
(operator opens the lid)	**Remove Sample**
(operator removes sample)	**Insert Sample**
(operator inserts next sample, or presses)	
[STOP]----------	**VICAM 4EX Ready**

CALIBRATE TEST

The following procedure is for calibrating a test at any time, even if the display in the Run Test procedure does not indicate calibration is required.

Operator Press	Display Reads
	VICAM 4EX Ready
[OPTIONS]----------	**Calibrate Test**
[ENTER]----------	**(test name)**
[SELECT TEST]----------	
(repeat to scroll through list)	**(test name to be calibrated)**
[ENTER]----------	**Open The Lid**
(operator opens the lid)	**Insert Red Vial**
(operator inserts red vial)	**High Cal XX PPB**
(operator accepts displayed value, or keys in new value)	
[ENTER]----------	**Close the Lid**
(operator closes the lid)	**Reading High Cal . . .**
	Open the Lid
(operator opens the lid)	**Remove Red Vial**
(operator removes red vial)	**Insert Green Vial**
(operator inserts green vial)	**Low Cal XX PPB**
(operator accepts displayed value, or keys in new value)	
[ENTER]----------	**Close The Lid**
(operator closes the lid)	**Reading Low Cal . . .**
	Open the Lid
(operator opens the lid)	**Remove Green Vial**
	Printing
(operator removes green vial)	**VICAM 4EX Ready**
(calibration values printed)	

PRINT SUMMARY DATA

The following procedure is used to Print Summary Data. Up to 375 of the most recent test results are stored in memory and available for recall.

Operator Press	Display Reads
	VICAM 4EX Ready
[OPTIONS] ----------	**Calibrate Test**
(repeat)	**Real Time Test**
(repeat)	**Test Functions**
[ENTER] ----------	**Edit Test**
[OPTIONS] ----------	**Create Test**
(repeat)	**Print Test**
(repeat)	**Delete Test**
(repeat)	**Print Test Names**
(repeat)	**Print Summary Data**
[ENTER] ----------	**VICAM 4EX Ready**
(printer prints test results stored in Summary Data Memory)	

CLEAR SUMMARY DATA

The following procedure is used to Clear Summary Data. The test results stored in memory will be cleared.

Operator Press	Display Reads
	VICAM 4EX Ready
[OPTIONS] ----------	**Calibrate Test**
(repeat)	**Real Time Test**
(repeat)	**Test Functions**
[ENTER] ----------	**Edit Test**
[OPTIONS] ----------	**Create Test**
(repeat)	**Print Test**
(repeat)	**Delete Test**
(repeat)	**Print Test Names**
(repeat)	**Print Summary Data**
(repeat)	**Clear Summary Data**
[ENTER] ----------	
(if no test data is present in memory)	**VICAM 4EX Ready**
(if test data is present in memory)	**Clear Summary Data?**
	Press 1 for YES
[1] (Alphanumeric key) or **[STOP]** to escape	**VICAM 4EX Ready**
The storage of test results (up to 375) has been cleared.	

PRINT TEST

The following procedure is used to print the parameters of a test protocol stored in memory. The parameters listed are:

Test : (Name)
Low Cal. Value :
High Cal. Value :
Delay Time (sec) :
Result Format : (Integer/Decimal)
Results Unit : (PPM, PPB, PPT, mg/kg, µg/kg or ng/kg)
Cal. Expire (Hrs.) :
Test Calibrated :

Operator Press	Display Reads
	VICAM 4EX Ready
[OPTIONS] ----------	**Calibrate Test**
(repeat)	**Real Time Test**
(repeat)	**Test Functions**
[ENTER] ----------	**Edit Test**
[OPTIONS] ----------	**Create Test**
(repeat)	**Print Test**
[ENTER] ----------	**(test name)**
[SELECT TEST]----------	
(repeat to scroll through list)	**(test name to be printed)**
[ENTER] ----------	**Printing…**
(printer prints protocol of selected test)	**VICAM 4EX Ready**

PRINT TEST NAMES

The following procedure is used to print the test names of protocols stored in memory:

Operator Press	Display Reads
	VICAM 4EX Ready
[OPTIONS] ----------	**Calibrate Test**
(repeat)	**Real Time Test**
(repeat)	**Test Functions**
[ENTER] ----------	**Edit Test**
[OPTIONS] ----------	**Create Test**
(repeat)	**Print Test**
(repeat)	**Delete Test**
(repeat)	**Print Test Names**
[ENTER] ----------	
(prints list of available test protocols)	**VICAM 4EX Ready**

READ TUBE

The **Read Tube** function gives a comparative (non-dimensioned) fluorescence intensity reading of a sample based on a control blank tube as the zero setting calibrator.

Operator Press	Display Reads
	VICAM 4EX Ready
[OPTIONS] ----------	**Calibrate Test**
(repeat)	**Real Time Test**
(repeat)	**Test Functions**
(repeat)	**Diagnostic Functions**
[ENTER] ----------	**Read Tube**
[ENTER] ----------	**Open the Lid**
(operator opens the lid)	**Insert Blank**
(operator inserts blank tube) (tube must contain liquid)	**Close the Lid**
(operator closes the lid)	**Reading Blank . . .**
(prints result)	**Open the Lid**
(operator opens the lid)	**Remove Sample**
(operator removes blank)	**Insert Sample #1**
(operator inserts sample)	**Close the Lid**
(prints result)	**Reading Sample . . .**
	Open the Lid
	(Value xxx)
(operator opens the lid)	**Remove Sample**
(operator removes sample)	**Insert Sample #2**
(operator inserts new sample, or press:	
[STOP]----------	**VICAM 4EX Ready**

REAL TIME TEST

The Real Time Test procedures are similar to RUN TEST (Page 12) or CALIBRATE / RUN TEST (Page 13) except that the Delay Time specified in the test protocol is not used. The readings will also printout as negative values if less than zero.

The following procedure is used to run a test after the instrument has been calibrated.

Operator Press	Display Reads
	VICAM 4EX Ready
[OPTIONS] ----------	**Calibrate Test**
(repeat)	**Real Time Test**
[ENTER] ----------	**(test name)**
[SELECT TEST]----------	**(test name)**
(repeat to scroll through list)	**(test name selected)**
[ENTER] ----------	
	Open The Lid
(operator opens the lid)	**Insert Sample**
(operator inserts sample)	**Close the Lid**
(operator closes the lid)	**Reading Sample. . .**
	Printing ...
	X.X
	Open the Lid
(operator opens the lid)	**Remove Sample**
(Operator removes sample)	**Insert Sample**
(operator insert next sample, or press:	
[STOP]----------	**VICAM 4EX Ready**

For a second printed copy of the test result, press **[PRINT]** before inserting next sample and pressing [**STOP].**

CREATE TEST

Operator Press	Display Reads
	VICAM 4EX Ready
[OPTIONS] ----------	**Calibrate Test**
(repeat)	**Real Time Test**
(repeat)	**Test Functions**
[ENTER] ----------	**Edit Test**
[OPTIONS] ----------	**Create Test**
[ENTER] ----------	**Test Name:**
(operator keys in new name, pressing alphanumeric keys repeatedly until desired letter appears, then presses [OPTIONS] after each letter. Use the YZ( ) key three times for a space)	
	(test name)
When complete, press **[ENTER]** ----------	**High Cal XX PPB**
(operator accepts displayed value, or keys in new value)	
[ENTER] ----------	**Low Cal XX PPB**
(operator accepts displayed value, or keys in new value)	
[ENTER] ----------	**Select Result Format**
	Integer Format
[OPTIONS] ----------	**Decimal Format**
(repeat toggles between Integer Format and Decimal Format)	
[ENTER] ----------	**Select Result Unit**
	PPM, PPB, PPT, mg/kg,
[OPTIONS] ----------	**µg/kg or ng/kg**
(repeat toggles between units)	
[ENTER] ----------	**Delay (0-120s):XXX**
(operator accepts displayed value, or keys in new value)	
[ENTER] ----------	**Cal Exp(hrs): XXXXX**
(operator accepts displayed value, or keys in new value)	
[ENTER] ----------	**VICAM 4EX Ready**

The new test name has been added to the available list of protocols and is stored in the non-volatile memory.

EDIT TEST

Operator Press	Display Reads
	VICAM 4EX Ready
[OPTIONS] ----------	**Calibrate Test**
(repeat)	**Real Time Test**
(repeat)	**Test Functions**
[ENTER] ----------	**Edit Test**
[ENTER] ----------	**(test name)**
[SELECT TEST]----------	**(test name)**
(repeat to scroll through list)	**(test name to be edited)**
[ENTER] ----------	**High Cal XX PPB**
(operator accepts displayed value, or keys in new value)	
ENTER ----------	**Low Cal XX PPB**
(operator accepts displayed value, or keys in new value)	
[ENTER] ----------	**Select Result Format**
	Integer Format
[OPTIONS] ----------	**Decimal Format**
(repeat toggles between Integer Format and Decimal Format)	
[ENTER] ----------	**Select Result Unit**
	PPM, PPB, PPT, mg/kg,
[OPTIONS] ----------	**µg/kg or ng/kg**
(repeat toggles between units)	
[ENTER] ----------	**Delay (0-120s):XXX**
(operator accepts displayed value, or keys in new value)	
[ENTER] ----------	**Cal Exp(hrs): XXXXX**
(operator accepts displayed value, or keys in new value)	**Writing . . .**
[ENTER] ----------	**VICAM 4EX Ready**

The modifications to the named protocol will be stored in non-volatile memory.

DELETE TEST

Operator Press	Display Reads
	VICAM 4EX Ready
[OPTIONS] ----------	**Calibrate Test**
(repeat)	**Real Time Test**
(repeat)	**Test Functions**
[ENTER] ----------	**Edit Test**
[OPTIONS] ----------	**Create Test**
(repeat)	**Print Test**
(repeat)	**Delete Test**
[ENTER] ----------	**(test name)**
SELECT TEST----------	**(test name)**
(repeat to scroll through list)	**(test name to delete)**
[ENTER] ----------	**Delete Protocol ?**
[SELECT TEST]----------	**Test Name**
	Press 1 for YES
[1] (Alphanumeric key) or **[STOP]** to escape	**VICAM 4EX Ready**

The selected test name and its protocol will now have been deleted from the non-volatile memory.

SET DATE and TIME

Operator Press	Display Reads
	VICAM 4EX Ready
[OPTIONS] ----------	**Calibrate Test**
(repeat)	**Real Time Test**
(repeat)	**Test Functions**
(repeat)	**Diagnostic Functions**
(repeat)	**Settings**
[ENTER] ----------	**Set Date and Time**
[ENTER] ----------	**American - MM/DD/YY**
[OPTIONS] ----------	**European - DD/MM/YY**
(repeat toggles between American and European format)	
[ENTER]	
(Key in new values in the format shown with a period between values)	**mm.dd.yy.hh.mm.ss (or dd.mm.yy.hh.mm.ss)**
[ENTER] ----------	**VICAM 4EX Ready**

NOTE

When the display reads VICAM 4EX Ready", pressing the number [2] will cause the clock time and date to be continuously displayed. Press [STOP] to cancel this function.

SET PRINTER

The **Set Printer** function allows the operator to turn the printer on or off. The printer must be turned off if there is no paper in the printer to avoid damage to the printhead.

Operator Press	Display Reads
	VICAM 4EX Ready
[OPTIONS] ----------	**Calibrate Test**
(repeat)	**Real Time Test**
(repeat)	**Test Functions**
(repeat)	**Diagnostic Functions**
(repeat)	**Settings**
[ENTER] ----------	**Set Date and Time**
[OPTIONS] ----------	**Set Serial Port**
[OPTIONS] ----------	**Enable Sample Name**
[OPTIONS] ----------	**Comment Line Spacing**
[OPTIONS] ----------	**Set Printer**
[ENTER] ----------	**Turn Printer On**
[OPTIONS] ----------	**Turn Printer Off**
(repeat toggles between Turn Printer On and Turn Printer Off)	
[ENTER] ----------	**VICAM 4EX Ready**

SET SERIAL PORT

The **Set Serial Port** function allows the operator to select between a RS232 or USB port.

Operator Press	Display Reads
	VICAM 4EX Ready
[OPTIONS] ----------	**Calibrate Test**
(repeat)	**Real Time Test**
(repeat)	**Test Functions**
(repeat)	**Diagnostic Functions**
(repeat)	**Settings**
[ENTER] ----------	**Set Date and Time**
[OPTIONS] ----------	**Set Serial Port**
[ENTER] ----------	**RS232**
[OPTIONS] ----------	**USB**
(repeat toggles between USB and RS232)	
[ENTER] ----------	**VICAM 4EX Ready**

COMMENT LINE SPACING

The **Comment Line Spacing** function allows the operator to set the printer spacing to single, double, or triple line.

Operator Press	Display Reads
	VICAM 4EX Ready
[OPTIONS] ----------	**Calibrate Test**
(repeat)	**Real Time Test**
(repeat)	**Test Functions**
(repeat)	**Diagnostic Functions**
(repeat)	**Settings**
[ENTER] ----------	**Set Date and Time**
[OPTIONS] ----------	**Set Serial Port**
[OPTIONS] ----------	**Enable Sample Name**
[OPTIONS] ----------	**Comment Line Spacing**
[ENTER] ----------	**Double**
[OPTIONS] ----------	**Triple**
[OPTIONS] ----------	**Single**
(repeat toggles between Single, Double or Triple Spacing)	
[ENTER] ----------	**VICAM 4EX Ready**

SET DATA FORMAT

The **Set Data Format** function allows the operator to set the data output to either text or Excel format.

Operator Press	Display Reads
	VICAM 4EX Ready
[OPTIONS] ----------	**Calibrate Test**
(repeat)	**Real Time Test**
(repeat)	**Test Functions**
(repeat)	**Diagnostic Functions**
(repeat)	**Settings**
[ENTER] ----------	**Set Date and Time**
[OPTIONS] ----------	**Set Serial Port**
[OPTIONS] ----------	**Enable Sample Name**
[OPTIONS] ----------	**Comment Line Spacing**
[OPTIONS] ----------	**Set Printer**
[OPTIONS] ----------	**Set Data Format**
[ENTER] ----------	**Text**
[OPTIONS] ----------	**Excel**
(repeat toggles between Text and Excel)	
[ENTER] ----------	**VICAM 4EX Ready**

DATA TRANSFER TO EXCEL

The ExReader Data Collection Software is designed to allow the user of a VICAM Series-4EX fluorometer to have their data transferred directly into an Excel spreadsheet. This software is designed to be used only with the VICAM Series-4EX fluorometer and a computer running Windows 2000 or Windows XP operating systems.

The USB drivers for the VICAM Series-4EX fluorometer, the ExReader software and Instruction Manual are all located on the VICAM Series-4EX Distribution Disk that accompanied your new fluorometer. The USB driver must be installed before the ExReader software is installed. The ExReader Data Collection Software Instruction manual gives detailed instructions for installation and use of the Excel transfer features. If you need assistance please contact your local distributor or VICAM Technical Service.

ENABLE SAMPLE NAME

The **Enable Sample Name** function allows the operator to enter in a sample name of up to 20 characters immediately after the sample results are printed or displayed.

Operator Press	Display Reads
	VICAM 4EX Ready
[OPTIONS] ----------	**Calibrate Test**
(repeat)	**Real Time Test**
(repeat)	**Test Functions**
(repeat)	**Diagnostic Functions**
(repeat)	**Settings**
[ENTER] ----------	**Set Date and Time**
[OPTIONS] ----------	**Set Serial Port**
[OPTIONS] ----------	**Enable Sample Name**
[ENTER]----------	**Disable**
[OPTIONS]----------	**Enable**
(repeat toggles between Disable and Enable)	
[ENTER] ----------	**VICAM 4EX Ready**

When Sample Name has been enabled the display will show the prompt "**Sample name?"** after the fluorometer has finished measuring each sample and before the results are displayed. The operator needs to key in the sample name by pressing the alphanumeric keys until the desired letter or number appears then pressing the **[OPTIONS]** key. Press the YZ key three times for a space. When the sample name is complete, press **[ENTER].**

DIAGNOSTIC FUNCTIONS

The Diagnostic Function menu contains a number of less frequently used utilities. Instructions for the Read Tube function can be found in this manual. The other functions (Repeatability, Linearity and Drift Tests) are utilities intended only for use by VICAM authorized service agents.

SECTION 5. MAINTENANCE

The VICAM Series-4EX Fluorometer has no components that require routine maintenance activities.

CLEANING INSTRUCTIONS

Use the following cleaning procedures with the Series-4EX Fluorometer on an "as-needed" basis, as dictated by good laboratory practices.

VICAM Series-4EX Fluorometer EXTERIOR

WARNING
DO NOT USE ORGANIC SOLVENTS, BLEACH, OR PETROCHEMICAL PRODUCTS TO CLEAN THE INSTRUMENT'S EXTERIOR CASE

Spills on the instrument casing:

1. Immediately wipe the spill with absorbent paper.
2. Use a mild soap solution to clean the exterior case.
3. Remove all residual soap from the instrument with a damp paper towel.
4. Dry the instrument surface with a lint-free cloth or paper towel.
5. Moisten another towel with isopropanol disinfectant (70% solution with water) and wipe the instrument surface.
6. Allow the surface to air dry.

SECTION 6. FUSE REPLACEMENT

Should the fuse open, the replacement is a T2.0, 5 x 20 mm fuse.

SECTION 7. DATA COMMUNICATIONS PORT

RS-232
Unidirectional
38400 baud
8 data bits
1 stop bit
No parity

ELECTRICAL INTERFACE

The VICAM Series-4EX Fluorometer's Communication Port implements a subset of the RS232-C serial communication standard as follows:

Connector: The VICAM Series-4EX Fluorometer provides a standard DB9 connector for interface to an external serial printer or host computer.

Pin Assignments:

Pin Number	Description Signal	Flow
2 Receive	Data	Input
3 Transmit	Data	Output
5 Signal	Ground	N/A

Cable Length: In accordance with RS232-C specifications, the cable connecting the VICAM Series-4EX Fluorometer with any external device should not exceed 50 feet in length.

TRANSMISSION CHARACTERISTICS

Format:	The data follows a standard serial data communications format with 8 data bits, no parity and 1 stop bit.
Baud Rate:	The communications baud rate is 9600 baud for the VICAM Series-4EX Fluorometer serial port.
Flow Control:	No flow control for the serial data stream is implemented.

DATA STREAM CHARACTERISTICS

Activation:	The VICAM Series -4EX Fluorometer Communications Port is always active. It can be directed to either the RS-232 or the USB connectors.
Data Format:	In the default mode, the data transmitted from the VICAM Series-4EX Fluorometer Communications Port is an exact image of the data printed on the internal printer. Only the printing ASCII characters are used. Each line is terminated with a carriage return **ONLY**. This mode can be changed to comma delimiting, for easier importing into an Excel spreadsheet. Detailed information for transferring data to Excel is located in a separate instructional guide.

USB COMMUNICATION PORT

USB 1.1 standard. Requires a USB – COM port driver installed on the connected computer (supplied with system). The USB drivers for the VICAM Series-4EX fluorometer are located on the VICAM Series-4EX Distribution Disk that accompanied your new fluorometer. If you need assistance please contact your local distributor or VICAM Technical Service.

SECTION 8. TROUBLESHOOTING

TROUBLESHOOTING GUIDE

SYMPTOM	RECOMMENDATION
Instrument does not operate: no display, no printer movement.	1. Insure the appropriate Power Cord for the country of use is properly connected to an active main power source. 2. Turn the power switch **ON** (1) and verify the presence of electrical power by observing the illumination of the Display, "**Passed Self Test**" followed by "**VICAM 4EX Ready**." 3. Continue normal operation by accessing the keypad. If normal operations cannot be resumed at this point, contact your VICAM Technical Representative.
Power fluctuation occurs. Instrument suspends operation, display remains steady (does not change), no response from keypad or printer.	1. Turn Power OFF 2. Wait 1 minute. 3. Turn Power ON 4. Resume Operation.

TECHNICAL ASSISTANCE

For assistance please contact your local distributor or VICAM Technical Services:

Phone: 800-338-4381 Canada, Mexico and the United States

508-482-4935 International and United States customers

Fax: 508-482-4972

email: techservice@vicam.com

SECTION 9. LIABILITY

This VICAM fluorometer is designed and manufactured to VICAM specifications and is intended for use in connection or conjunction with appropriate VICAM products, procedures and methods, together ensuring a consistent and high fidelity application of VICAM's specialized and proprietary technology. Therefore, any use of this VICAM fluorometer with or in conjunction with any non-VICAM product may compromise the integrity of the application/procedure and may result in physical damage to the product, for which damage, including any warranty repair or replacement thereof, the buyer shall not hold VICAM responsible. Any use of the VICAM fluorometer with or in conjunction with non-VICAM products, regardless of damage caused to the product, shall excuse VICAM from performing repair or replacement of the product under or after the warranty period.

CE Notice

Marking by the symbol CE indicates compliance of the VICAM system to the EMC directive of the European Community. Such marking is indicative that this VICAM system meets or exceeds the following technical standards:

Test Specification		Requirement
Radiated Emissions	CISPR 11 EN55011 1995 EN61326-1: 2000	Class A
Conducted Emissions	CISPR 11 EN55011 1995 EN61326-1: 2000	Class A
Electrostatic Discharge	EN61000-4-2 EN61326-1: 2000	8kV air
Radiated Susceptibility	EN61000-4-3 EN61326-1: 2000	3V/m
Electrical Fast Transient Burst1	EN61000-4-4 EN61326-1: 2000	1 kV (A/C) 2 kV (I/O)
Surge	EN61000-4-5 EN61326-1: 2000	2 kV common mode 1 kV differential mode

A "Declaration of Conformity" in accordance with the above standards has been made and is on file at:

Source Scientific, LLC
2144 Michelson Dr
Irvine, CA 92612