ABBOTT
ADD

INDEX
TECHNICAL SERVICE BULLETIN

PRODUCT:	DATE:
LCx® Probe System (69)	**25-AUG-97**

TSB #	IMPLEMENTATION	SUBJECT	EFFECTIVITY DATE
69-005	O - See TSB	LCx® Analyzer Version 2 Software Upgrade	25-Aug-97
69-004	N - 80,850 & below	Error Codes 163 (NRMSE too high) or 164 (Correlation Coefficient too low) on Chlamydia	23-JUL-96
69-003	I - See TSB	LCx® Manual Amplification Vial Retainer Retrofit and Boom Assembly Manufacturability	06-MAR-96
69-002	I - See TSB	LCx® Manual Amplification Vial Retainer Retrofit: Installation and Alignment (Superseded by TSB 69-003)	OBSOLETE
69-001	I - See TSB	Touchpad Assembly Replacement	09-AUG-95

PENDING - TSB index number has been reserved for a future TSB.
CANCELLED - TSB index number is cancelled.
INCORPORATED - TSB was incorporated into another document or manual.
OBSOLETE - TSB no longer applies.
COMPLETE - TSB implementation is complete.

END OF DOCUMENT

ABBOTT ADD

TECHNICAL SERVICE BULLETIN

SUBJECT:
LCx® Analyzer Version 2 Software Upgrade (System Software Module Version 2 and Assay Software Module 2 Version 1.0)

TSB#: **69-005**

ORIGINATOR: **Kyle Hranitzky**
APPROVED: **Mark A. Slater**

PRODUCT:

REF. ECO:

IMPLEMENTATION: ○ Immediate ○ Next Service Call ○ Next Failure ● Optional Instruments Requiring Modification: **See Administrative Notes**	TSB Part/Kit #: **LN 03D44-01** TSB Effectivity/ Part(s) Availability: **25-Aug-97** **TSB Tracking by Serial # required (IMMEDIATE TSB's ONLY)** ○ YES ● NO	Upgrade Time: **30 Minutes** Validation Time: **3 Hrs 30 Min** Total Mod. Time: **4 Hours** ****NOTE** The instrument must be at TSB Level n/a prior to performing this TSB.**

I. DISTRIBUTION:

Worldwide

II. PURPOSE:

The purpose of this TSB is to:

- provide an overview of the new features introduced in Version 2 software
- instruct the field on how to install Version 2 software
- introduce the field to the ASTM bi-directional interface
- describe the configuration of a carousel load list
- provide a list of the deleted, renumbered, redefined, and new error codes
- indicate the reorganization of the System Parameter files

III. ADMINISTRATIVE NOTES:

This modification will need to be performed on all instruments. It has an effectivity of **OPTIONAL**.

The upgrade is designed to be Customer-installable. A decision regarding the level of FSR involvement in supporting this upgrade is country-specific. Direction will be provided within each country organization.

International: This software will be distributed through the order entry system. Each country should send forecast requirements to its respective logistics organization. Please reference LN 03D44-01 in forecast requirements.

USA: This software version will be distributed through the RZZ system. The software will be mailed directly to the Customer. If an FSR installs the software, he/she should follow the installation instructions in this TSB.

CONTENTS OF THIS TSB

WHAT'S NEW IN VERSION 2?

The major enhancements in Version 2 software include:

- Improved Sample Management.
  These improvements have been made to the Sample Management Function:
  - Sample, reagent, and technician IDs may now consist of alphanumeric characters. Alpha characters have been added to the keypads on new analyzers. Alpha character overlays are available for installation on existing analyzers. The Carousel ID must be numeric.
  - The load list is only cleared from within Sample Management or upon completion of an assay run.
  - Auto increment feature allows the technician to automatically increment sample IDs within the load list.
  - The number of valid sample IDs is determined by the number of tests remaining on the given reagent pack.

Improved Sample Management (cont)

- The soft key layout has been modified so that the [EXIT] key in a lower submenu is not in the same location as the [CANCEL] key in the next higher submenu.
- All sample management viewing and editing functions are now accessible during the main assay run sequence execution through the menu displayed at that time.

- The assay activation procedure has been simplified.

- Additional system and error messages have been added.

WHAT'S NEW IN VERSION 2? (cont)

- The host interface is now bi-directional. This bi-directional communication feature allows communication between the LCx® analyzer and a host computer in order to send load lists to the analyzer and, in turn, allow the analyzer to send results to the host for processing.

- External Printer. An optional external printer may be interfaced to the LCx® analyzer in order to make a permanent copy of the printouts generated by the analyzer. A system parameter can be configured to allow printouts from both the analyzer and the external printer or from the external printer only. If an external printer is not used, printouts will be generated from the LCx® analyzer's internal printer.

- Assay list numbers are now included on load list and assay results printouts.

- Continuity between system and assay printouts. The headings on all printouts have been standardized.

- The level sense function has been improved.
  - A liquid level sense lower limit error message (CODE 167 DI/AS 08 VIAL) has been added to provide differentiation between an empty vial (CODE 167 DI/AS 05 VIAL) and a vial with insufficient volume.
  - The sample windowing high and low limit parameters have been moved from the system module and placed on the assay module to allow flexibility of the window for each assay.

- Level sense over wash station. During probe rinsing operations, two level senses are implemented. The first level sense is performed prior to rinsing to ensure no liquid is present, an indication that the drain is not clogged. The second level sense is performed after rinsing to ensure that liquid is present, an indication that there is sufficient system diluent for proper rinsing.

WHAT'S NEW IN VERSION 2? (cont)

- The MULTI TASK key has been eliminated. The Multitasking menu is displayed during the main assay and inactivation sequence executions. The time remaining for the current sequence's execution and access to Sample Management, Assay Database, and execution Status are always displayed and active during protocol execution. The multitask menu must be displayed in order for the analyzer to inititate the inactivation process or to print results at the end of a run.

- The inactivation protocol has been modified in order to alleviate pressure build-up within the amplification vial. This will reduce the splashing and the brown residue sometimes visible on the interior of the access chamber door.

- Four-digit year representation. In all occurrences of the date, the year is represented by 4 digits.

- Manual inactivation can be accessed through the UTILITY menu using the superuser mode, independent of the previous assay run's completion status.
  NOTE: The INACT submenu is hidden until SUPERUSER is enabled.

- All superuser codes have been changed. (See page 58 in this TSB.)

- The INACT soft key is selected in order to perform the Manual Inactivation procedure for amplification product that is in the amplification vial of an interrupted run. The soft key is only accessible if a run was interrupted or aborted, and the error message "83 SAMPLE INACTIVATION FAILED XXX" was displayed indicating that the inactivation procedure was not performed. Inactivation protocol execution status is now tracked so that the success or failure of each sample's inactivation procedure is known. This information is then used by manual inactivation to inactivate only the failed samples.

WHAT'S NEW IN VERSION 2? (cont)

- Additional parameters have been added to the Assay Parameters.
- Some System Parameters have been renumbered; additional parameters have been added.
- A short click now corresponds to every registered keypress to provide positive feedback to the operator's keystrokes. System Parameter 1.27 Key Clicks may be set to either 1 (ON) or 2 (OFF).
- Equivocal Zone Flag. For assays that require the use of an equivocal zone, samples with results in the equivocal range will be flagged with an "EQV" flag in the NOTE column. Assay parameters 6 EQUIV ZONE LO and 7 EQUIV ZONE HI define the minimum and maximum limits.
- High-titer sample read errors and Code 166 errors. Code 166 errors occur when raw counts exceed the CUTOFF value calculated by the analyzer. A new post processing routine has been added to reduce the number of reads from 8 to as few as 5 in order to eliminate error messages from high-titer samples. When a Code 166 is encountered, the analyzer assesses which raw counts exceed the calculated CUTOFF value. Those reads exceeding the CUTOFF will be discarded, and the rate calculated only with those values less than the computed CUTOFF.
- Automatic dimming of the analyzer control panel by 40% after a period without any keyboard activity. The display intensity returns to full strength as soon as a key is pressed. System Parameter 1.26 DISPLAY DIM (the time delay) may be edited from 10 to 99 seconds.

IV. SPECIAL TOOLS:

None

V. PARTS:

REPLACED PARTS:
The upgrade kit includes an alphanumeric overlay to be installed on the existing Display.

If either the Display Assembly or Keypad Enclosure fails, order the appropriate one of these:

Item	Old Catalog Number	New Catalog Number	Notes
Display Assembly (includes Display and Keypad Enclosure)	3-04531-02	3-79281-01	not part of the upgrade kit
Keypad Enclosure	3-47312-02	3-79280-01	not part of the upgrade kit

COMPATIBILITY:
After this software has been installed, the LCx® Analyzer CANNOT be downgraded to a previous software version. For a limited time, the current detection reagent packs will be compatible with the new software. Detection reagent packs with bar codes that are recognized only by the LCx® System Module Version 2.0 software will be released approximately 8-10 weeks after the LCx® System Module V2 software has been shipped to all customers. Customers who have not yet upgraded to LCx® System Module V2.0 will need to complete the upgrade in order to run assays on their LCx® Analyzers.

The old versions of software should be discarded per each country's guidelines.

VI. PROCEDURE:

INSTALLING THE VERSION 2 SOFTWARE

Time: 3 to 5 hours

CAUTION !

It is extremely important to perform these procedures in the order listed below.

WARNING ! Potential biohazard

Perform VP-60: Decontamination Procedure prior to installing the software.

NOTE: After replacing diluents or dispense components, ERROR CODE 48: DILUENT INSUFFICIENT/EMPTY may appear during a Prime if there is not adequate diluent in the Wash Station for initial level sensing. To resolve this error code:

1. Press: [ALARM OFF].
2. Press: [EXIT].
3. Continue to Prime the system until diluent has filled the buffer tubing and is dispensed into the Wash Station.

Installing the Version 2 Software (cont)

Overview

The procedures to perform when installing the new software include:

• Preparation	Step 1
• Install System and Assay modules	Steps 2 - 5
• Edit System File 1 (Configuration) parameters	Steps 6 - 8
• Enable communications between analyzer and an external printer (COM1 port)	Step 9
• Enable bi-directional communications with a host computer (COM2 RS-232 port)	Step 10
• Edit System File 2 (System Parameters)	Steps 11-12
• Install Keypad Overlay (if appropriate)	Step 13
• Activate assays	Step 14
• Perform system calibrations and checks	Step 15
• Mark TSB Modification Sticker	Step 16

Installing the Version 2 Software (cont)
Preparation

- Verify that all of the components were shipped in the software enhancement kit.
- If a detection reagent pack is used with both Version 1 and Version 2 software, the "Tests Left" number on the bottom of the assay printout (and available through the Monitor Menu) will not be accurate with Version 2. To minimize this occurrence, deplete as many open detection reagent packs as possible before upgrading the software to Version 2.
  [MONITOR] [TESTS] [TEST_LEFT]

1. Print the parameters from the current system files. (These will be edited into the new system files after the LCx® System Software Module Version 2.0 and LCx® Assay Software Module 2 Version 1.0 have been installed and before assays can be run on the LCx® Analyzer.)

   With the System Module Version 1 and Assay Module 1 installed, print these Version 1 System Parameter files: File 1 (Configuration), File 2 (System Parameters), and File 38 (Photo Parameters)

   To print System File 1 parameters, press: [SYSTEM] [FILES] [1] [PRINT]
   After File 1 parameters are printed, press: [CLEAR] [2] [PRINT]
   After File 2 parameters are printed, press: [CLEAR] [38] [PRINT]

   Save these printouts; label the printouts "Step 1". You will be editing these parameters into the Version 2 System software after the Version 2 software is installed.

Installing the Version 2 Software (cont)
Install System and Assay modules

2. Remove software and assay modules from analyzer:
   a. Turn analyzer power switch **OFF**.
   b. Wait 10 seconds.
   c. Open software module door located on the top, right side of analyzer.
   d. Remove System Module from the left module port.
   e. Remove Assay Module from the right module port.
3. To install the new System module, plug new System Module 2.0 into the **left** module port. Press module firmly into place.
4. To install the new Assay Module, plug Assay Module 2 into the **right** module port. Press module firmly into place.
5. a. Verify that modules are in the correct ports.
   b. Turn analyzer power switch **ON**.
   c. When new modules are properly installed, analyzer performs an internal power-up routine.

      This message will be displayed: **102 Initialize Data Base**

      Press: [EXIT] (until Main Menu is displayed)

Installing the Version 2 Software (cont)
Edit System File 1 (Configuration) parameters

6. On the printouts made in step 1, circle the values that correspond to these parameters:

1.3 SERIAL NUMBER	1.17 LINE FEEDS
1.5 DATE FORMAT	1.19 CRSL ID 1=ON

7. To edit the circled values into your new System Module Version 2.0, press:

   [SYSTEM] [FILES] [1.3] [DISPLAY]

   Enter the circled value for parameter 1.3. Then press: [STORE]

   Press : [EXIT] (until Main Menu is displayed)

   Repeat for parameters 1.5, 1.17, and 1.19.

8. Confirm that the values for System parameters 1.3, 1.5, 1.17, and 1.19 have been edited correctly.
   a. Print System File 1. Press: [SYSTEM] [FILES] [1] [PRINT]

      Press: [EXIT] (until the Main Menu is displayed)

   b. Compare the edited values to the values that were circled on the printout made in step 1.

Installing the Version 2 Software (cont)
Enable communications between analyzer and external printer (COM1 port) (cont)

NOTE: If you do not want to enable communications with an external printer, skip step 9. Go to step 10.

9. Enable communications with an external printer. (To enable the user to obtain a permanent record of printouts.) (The interface is through the analyzer's COM1 port.) The connector is a female DB25. The cable should be a straight-through, 25-pin DB connector cable. (i.e, Pin 1 on the analyzer connects to Pin 1 on the printer, etc.)

   a. Edit System Parameter 1.6 COM1 BAUD to 9600
   Press: [SYSTEM] [FILES] [1.6] [DISPLAY] [9600] [STORE]
   Press: [EXIT] (until Main Menu is displayed)

   The following parameters remain set at the default values:
   1.7 COM 1 CHR LEN = 8
   1.8 COM 1 STOP BIT = 1
   1.9 COM 1 PARITY = 0

   Set the printer for the above configuration according to the printer's operations manual.

Installing the Version 2 Software (cont)
Enable communications between analyzer and external printer (COM1 port)

Step 9 (cont)

b. To select the desired printer(s), edit System Parameter 1.28 REPORT REDIR.
Press: [SYSTEM] [FILES] [1.28] [DISPLAY]
Indicate desired destination printer(s):
Enter 0 [internal (analyzer) printer only]
Enter 100 (external printer only), or
Enter 1100 (both internal printer and external printer)
Press: [STORE]
Press: [EXIT] (until Main Menu is displayed)

NOTE: For additional information about the interface specifications and recommended printer settings, refer to the newest LCx® Analyzer Operations Manual (LN 9A43-02) Section 4 (interface specifications) and Section 2 (interfacing with an external printer).

Installing the Version 2 Software (cont)
Enable bi-directional communications with a host computer (COM2 RS-232 port)

NOTE: If you do not want to interface with a computer, skip step 10. Go to step 11.

10. a. Edit System Parameter 1.18 HOST INTERFACE.

Press: [SYSTEM] [FILES] [1.18] [DISPLAY] [7598] [STORE]

b. Edit additional COM2 RS-232 parameters based on LIS system requirements.

1.10	COM2 BAUD	(editable to 300, 1200, 2400, 4800, 9600, or 19200)
1.11	COM2 CHR LEN	(editable to 7 or 8)
1.12	COM2 STOP BIT	(editable to 1 or 2)
1.13	COM2 PARITY	(editable to 0, 1, or 2)
1.20	SPOOLER WARN	(editable to 1, 2, or 3)

NOTE: For additional information about parameters and specifications, refer to Section 5 in the LCx® Operations Manual (LN 9A43-02) (parameters) and the LCx® RS-232 Interface Manual (LN 9A43-50) (specifications).

Installing the Version 2 Software (cont)
Edit System File 2: System Parameters

11. Refer to the printout for System File 2: System Parameters from the Version 1 system module from step 1. Circle the printed value that corresponds to each of these parameters:

    2.3 CURRENT DIL 2 (This was 2.3 CURRENT BUF 2 in Version 1 software.)
    2.6 CURRENT DIL 1 (This was 2.6 CURRENT BUF 1 in Version 1 software.)

    To edit the circled values into your new System Module:
    Press: [SYSTEM] [FILES] [2.3] [DISPLAY]
    Enter the circled value for parameter 2.3.
    Press: [STORE]
    Press: [EXIT] (until Main Menu is displayed)

    Repeat for parameter 2.6.

    To confirm that the values for System parameters 2.3 and 2.6 have been edited correctly, print System File 2 and check the edited values against those circled on the printout that was generated in step 1.

    Press: [SYSTEM] [FILES] [2] [PRINT]
    Press: [EXIT] (until Main Menu is displayed)

Installing the Version 2 Software (cont)
Edit System File 2: System Parameters (cont)

12. Refer to the printout for System File 38: PHOTO PARAMETERS from your LCx® System Module (Version 1) from step 1. Circle the printed value that corresponds to each of these parameters:

    38.12 MEIA STD M
    38.25 MEIA LMP REF #

    a. Edit the circled values into your new System Module. Circled values will be entered into System File 31 Photo Parameters. Note that the file number has been changed from 38 to 31.

    CAUTION !

    Edit only these two parameters in this file. Editing other parameters in this file may interfere with system operation.

    Press: [SYSTEM] [FILES] [31.12] [DISPLAY]
    Enter the circled value for parameter 38.12.
    Press: [STORE]
    Press: [EXIT] (until Main Menu is displayed)

    b. Repeat for parameter 31.25. (Enter the circled value for parameter 38.25.)

    c. To confirm that the values for parameters 31.12 and 31.25 have been edited correctly, print System File 31 and check the edited values against those circled on the printout produced in step 1.

    Press: [SYSTEM] [FILES] [31] [PRINT]
    Press: [EXIT] (until Main Menu is displayed)

Installing the Version 2 Software (cont)
Install Keypad Overlay

13. The LCx® Keypad Overlay may be used to facilitate the entry of alpha characters into a Sample, Reagent Lot, or Technician ID. To install the overlay:
    a. Ensure that keypad surface is dry and free of contaminants.
    b. Peel adhesive liner backing from overlay.
    c. Position overlay over keypad, ensuring overlay does not overlap keys. Press firmly.
    NOTE: Overlay can be repositioned for a short time, until adhesive bond strengthens.

Activate assays

14. The assays on the LCx® Assay Module 2 are not visible until they have been activated. It is necessary to activate the assays that you intend to run in your laboratory. These assays are available on your assay module:

United States:	#12 GC LCR
	#16 CHLAMYDIA LCR (Note the assay number change.)
Other countries:	#10 CHLAMYDIA LCR (Note the assay number change.)
	#12 GC LCR
	#14 MTB LCR

Activate the assays that you will be running in your lab:

a. Obtain a Detection Reagent Pack for the appropriate assay.

Installing the Version 2 Software (cont)
Step 14: Activate Assays (cont)

b. Locate the correct assay number in the list above.

c. Activate the assay.
Press: [ASSAY] [ASSAY_FILES]
Enter assay number.
Press: [ACTIVATE]
This message will be displayed:
Insert Reagent Pack and Press Start

Without opening the reagent caps, load the detection reagent pack into the reagent heater block. Press: [START]

The bar code reader will scan the bar code.

The analyzer activates the assay and displays this message:

ASSAY# ASSAY NAME ACTIVATED: CHK PARAMS

This message indicates that the assay has been successfully activated.

Before you perform the first run, check assay parameters to ensure that they are set as required by the assay-specific package insert or customer letter.

d. Press: [EXIT] (until Main Menu is displayed)

e. Repeat for additional assays if necessary.

Installing the Version 2 Software (cont)
Perform system calibrations and checks

15. a. To complete the installation of the new System Software Module and Assay Module, perform all of the system calibration and system check procedures shown below.

> **CAUTION !**
>
> To ensure temperature equilibrium, the analyzer must be powered up for a minimum of 45 minutes before starting the system calibration and system check procedures. (Turning the power off for 10 seconds in step 2 does not affect the temperature equilibration.)

Perform these procedures in the order listed. Refer to the new LCx® Analyzer Service Manual (3-47277-01) for detailed descriptions of these procedures.

Step	VP	Procedure
(1)	VP-30	MEIA Carousel Calibration
(2)	VP-8	Boom Calibration
(3)	VP-13	Dispense Check
(4)	VP-29	MEIA Temperature Calibration
(5)	VP-27	MEIA Photo Calibration

Installing the Version 2 Software (cont)

Step 15: Perform System Calibrations and Checks (cont)

b. When all required calibrations and checks have been completed, print System Files 1, 2, 3, 30, and 31.

   Press: [SYSTEM] [FILES] [1] [PRINT]

   Press: [EXIT] (until Main Menu is displayed)

   Repeat for System Files 2, 3, 30, and 31.

c. Keep the copies of the system file printouts in the inside pocket of the LCx® Analyzer Operations Manual (No. 9A43-02) for future reference.

You are now ready to run assays. Refer to the assay package insert or customer letter for assay-specific information.

Step 16: Mark Modification Control Sticker.

Mark off TSB 5 on the Modification Control Sticker.

BI-DIRECTIONAL INTERFACE

This section of the TSB includes these topics:

Overview:	an introduction to the ASTM interface and its functions
Connecting to the host:	physical connections, cabling, pin assignments
System parameters:	parameters, defaults, DTE configuration requirements
Loadlist feature:	load list setup, host order loadlist, errors and troubleshooting

Overview

The purpose of the ASTM (American Society of Testing and Materials) interface is to allow communication between the LCx® Analyzer and a host computer system. The interface allows these communications:

Sent from analyzer to host computer...	Sent from host computer to analyzer...
Patient results	Order lists
Information to be processed, manipulated, reported, or stored	Patient ID
	Sample ID
	Test orders

Bi-directional Interface (cont)
Overview (cont)

In its default mode, the ASTM interface is OFF. The interface is activated by setting System Parameter 1.18 to a value of 7598 (procedures included in Version 2 software installation section in this TSB). After the interface is activated, the analyzer is available to communicate with the host system via the COM2 RS232 port. The interface remains activated even when the power is cycled.

If an Assay Run is canceled while in progress, the load list with the downloaded IDs are maintained intact so that the run can be started again or the IDs can be cleared from Sample Management.

Connecting to the Host computer

Physical connections
The designated port on the analyzer for ASTM communication is the COM2 RS232 port**.** According to the ASTM specification, the analyzer should be configured as data terminal equipment (DTE) and the host computer as data communication equipment (DCE). The following cabling must be used to make the analyzer appear as DTE, because by default it is configured as DCE.

Cable/connector
The connector is a female DB 25. The cable should be a straight-through 25-pin DB connector cable. A Null Modem cable adapter between LCx® COM2 and the host computer ties together pins 4&5 and 6&20. One end of the cable has pins 2&3 reversed.

Bi-directional Interface (cont)
Connecting to the Host computer (cont)
Physical connections (cont)
Pin assignments (on COM2 RS-232 port)

DCE	DTE	Pin	Signal	Function
Input	Output	2	TxD	Transmitted Data
Output	Input	3	RxD	Received Data
Input	Output	4	RTS	Request to Send
Output	Input	5	CTS	Clear to Send
Output	Input	6	DSR	Data Set Ready
N/A	N/A	7	SG	Signal Ground
Input	Output	20	DTR	Data Terminal Ready

NOTE: Hardware handshaking and XON/XOFF must NOT be used.
NOTE: The host communication software must NOT enable unlisted signals, Alternately, the unused pins must be disconnected.

Bi-directional Interface (cont)

System parameters

Parameter Number and Description	Default Configuration	Options
1.10 COM 2 BAUD	9600 baud	300, 1200, 2400, 4800, 9600 or 19200
1.11 COM 2 CHR LEN	8 data bits	7 or 8
1.12 COM 2 STOP BIT	1 stop bit	1 or 2
1.13 COM 2 PARITY	No parity	0,1, or 2
1.18 HOST INTERFACE	ACTIVE	must be edited to 7598 INACTIVE - any value 0-9999 except 7598
1.20 SPOOLER WARN	1	1,2, or 3
1.29 XOFF TIMEOUT	20	range 0 - 300

DSR always asserted
CTS always asserted

Bi-directional Interface (cont)

Load list feature

The load list feature enables the operator to enter the sample, reagent lot, technician, and carousel IDs before an assay run begins, or after an assay run has been started on the LCx® Analyzer. Sample IDs may be downloaded to the analyzer through the computer interface.

The host order load list contains:
- the Sample IDs that were downloaded from the computer, and
- the calibrator and control IDs which were automatically assigned by the LCx® Analyzer.

Load list setup procedure

1. Place the reagent pack in the analyzer.
2. Press: [ASSAY] [SAMPLE_MGMT] [START]
3. The bar code is read and reagent pack information is displayed.
4. Press:
   [CONTINUE] (to proceed) *or*
   [CANCEL] (to return to the assay menu)

Bi-directional Interface (cont)

Load list feature (cont)

Only one load list at a time is handled by the interface. After an order is downloaded, the interface is locked to new downloads.
To unlock the interface:

- clear the order from Sample Management, *or*
- allow the run to proceed to completion.

After the order is loaded, it is available to the operator via Sample Management. If the operator clears the load list, then the orders must be resent by the host system.

If the power to the analyzer is cycled, the load list is lost and must be resent.

If the instrument has an existing load list and an order is to be downloaded, the existing load list must be cleared from Sample Management before downloading a new order. Return to the READY menu when downloading the order.

If an Assay Run is canceled while in progress, the load list with the downloaded IDs are maintained intact so that the run can be started again or the IDs can be cleared from Sample Management.

Bi-directional Interface (cont)
Load list feature (cont)
Host order load list

1. HOST ORDER PENDING is displayed if a host order load list has been downloaded from the host computer.
2. During Sample Mangement or during the Assay Run, press one of these:

   [STORE] (to store the host order load list)
   Result: Sample management menu is displayed. After the host order load list is stored, it becomes the LCx® Analyzer load list*. If during an Assay Run, the run continues and the spooler capacity test is performed.
   * The load list contains the Sample IDs for the calibrators and controls that were automatically assigned by the analyzer. The remaining Sample IDs are those downloaded from the computer.

   [CLEAR] (to clear the host order load list)
   Result: Assay menu is displayed. If during an Assay Run, the run continues and the spooler capacity test is performed.
   [PRINT] (to print the host order load list)

3. If desired:
   - Manually edit a Sample ID, or enter a reagent lot, technician, or carousel ID, *OR*
   - Press: [EXIT] (until the main menu is displayed), then [RUN] to start the assay run

   NOTE: For information on manually entering IDs, refer to Section 5 of the LCx® Analyzer Operations Manual.

Bi-directional Interface (cont)

Spooler buffer

The analyzer incorporates a spooler buffer that holds up to 4 sets of results. The instrument can be set to generate a warning to the user when the spooler buffer is filled to a point determined by System Parameter 1.20 SPOOLER WARN. The warning is in the form of an error message displayed on the instrument screen indicating the remaining amount of assay runs the spooler can hold. The spooler capacity is checked after the reagent pack is read at the start of an assay run.

Responding to a spooler capacity warning

If the spooler warn error message appears, the operator may:

- continue the run, or
- cancel the run and establish contact with the host system to dump the spooler contents.

If the operator ignores the message:

- the current run results will be stored in the next available spooler buffer slot, if available, or
- the oldest record will be overwritten (if no slots are available).

Bi-directional Interface (cont)
Troubleshooting errors

Errors may be sent to either of two files: the ASTM error log or the system log file.

These error messages are sent to the ASTM error log file:
- errors that occur during link establishment
- errors that occur during communication between the instrument and host
- errors that occur during processing of an order

Spooler Run Capacity errors are sent to the system log file.

Printing the ASTM error log

The error log can printed on the LCx® Printer from the UTILITY\SERVICE menu.

Clearing the ASTM error log

To clear the log of ASTM errors, choose [CLR LOG] on the UTILITY\SERVICE menu.

Bi-directional Interface (cont)

Troubleshooting tips for the analyzer

To troubleshoot communication errors from the analyzer's perspective:

1. Ensure that system parameter 1.18 HOST INTERFACE is set to 7598.
2. Ensure that these system parameters match host values:

1.10	COM 2 BAUD	9600 baud
1.11	COM 2 CHR LEN	8 data bits
1.12	COM 2 STOP BIT	1 stop bit
1.13	COM 2 PARITY	no parity

3. Ensure that system parameter 1.20 SPOOLER WARN is set to the desired value (1, 2, or 3).
4. Ensure that system parameter 1.29 XOFF TIMEOUT is set to the default value of 20.
5. Ensure that the RS-232 cable is seated correctly.
6. Perform RS-232 Com Port Test (VP-44 in the LCx® Analyzer Service Manual).

   If test fails, replace the CPU board.

Bi-directional Interface (cont)

ASTM-specific Error Codes

EC	Description	Troubleshooting
213	Error While Parsing ASTM Message	A format error occurred in the messages sent by the host system to the analyzer. This only occurs when the host interface is activated.
214	Error Processing ASTM Order	Error occurs while processing the ASTM orders after the complete message has been received. This error only occurs when the host interface activated.
215	Spooler Run Capacity (logged) Spooler Capacity Remaining: N Run(s) (displayed)	The spooler capacity is checked after the reagent pack is read at the start of an assay run. If remaining capacity matches System Parameter 1.20, a message is displayed. Respond by pressing either [PROCEED] or [CANCEL]: • Press [PROCEED] to continue the run. If the spooler buffer is at partial capacity, the results of the current run will be written to the buffer. If the spooler buffer is full, the results of the current run will overwrite the oldest record in the buffer. • Press [CANCEL] to cancel the current assay run and establish contact with the host system to dump the spooler contents.

Bi-directional Interface (cont)
ASTM-specific Error Codes (cont)

EC	Description	Troubleshooting
216	ASTM COMM Timeout	Specified event did not occur within defined time constraints.
247	ASTM COMM Bad Message Length	The message length in a frame exceeds 240 characters.
248	ASTM COMM Invalid Frame Type	The frame is not an intermediate or end type.
249	ASTM COMM NUM Retries Exceeded	Analyzer is unable to send a frame to the host after 6 retries.
250	ASTM COMM Invalid Response	The response sent by the host is incorrect.
251	ASTM COMM Invalid Frame	The frame checksum or format is incorrect.

Bi-directional Interface (cont)
ASTM-specific Error Codes (cont)

EC	Description	Troubleshooting
252	ASTM Spooler Init	The spooler incorporates a checksum that is updated when results are saved and released. On analyzer power-up, this checksum is verified. If checksum test fails, the error will be logged in ASTM error log.
253	ASTM COMM Bad Frame Num	The frame number is incorrect.

ERROR CODES

The Version 2 software includes new, revised/redefined, and renumbered error codes and status messages. Some Version 1 codes have been deleted.

This chart indicates where these codes are described in this TSB.

Type of code	Section in this TSB	TSB page
ASTM bi-directional interface	Bi-directional Interface	35
Deleted in Version 2	Deleted codes	39
Renumbered in Version 2	Renumbered codes	40
Redefined in Version 2	Redefined codes	42
New in Version 2	New error codes	43

Error Codes (cont)

Deleted codes

These Version 1 codes are not valid in Version 2:

Code	Message	Code	Message
3	Task Busy	87	Check Data
9	Invalid Date And/Or Time	88	Duplicate Cycler ID Numbers
17	Diluent Valve Failed Home	89	Amplification Tube ID Read Error
27	Diluent Valve Missing Steps	227	Diluent Value Out of Range
45	Level Sense Error XXXX	237	Diluent Value Timed Out

These codes are logged, but they are no longer displayed:
202 Boom Calibration (Indicates a boom calibration has been performed.)
211 Boom Check (Indicates a boom check has been performed.)
218 Special Operation (Indicates Reagent Pack Management File has been reset.)

Error Codes (cont)

Renumbered codes

These Version 1 codes have been renumbered in Version 2:

New	Old	Message
140	150	H Below Threshold Value
141	151	H Is Not Linear
142	168	Slope/Intercept Out of Range
144	169	B Is Out of Range
145	170	M% Diff Out of Spec
146	171	H% Diff Out of Spec
147	174	Static Precision Out of Spec
148	175	Dynamic Precision Out of Spec
149	185	Level Sense Out of Range

Error Codes (cont)

Renumbered codes (cont)

New	Old	Message
150	186	Group 1 Failed
151	187	Group 2 Failed
152	188	Group 3 Failed
153	189	Group 4 Failed
154	176	Liquid Heater Block Out of Spec
155	181	Remote Temp Out of Range
156	177	Reagent Heater Block Out of Spec
157	178	Current Liquid Temp Out of Spec

Error Codes (cont)

Redefined codes

These Version 1 codes have been redefined in Version 2:

Code	New Message	Previous Message
44	Carousel ID Error: Carousel ID =	Barcode Error: Carousel ID =
48	Diluent Insufficient/Empty X	Buffer Insufficient/Empty X
60	Diluent Temperature Low __C	Buffer Temperature Low __C
61	Diluent Temperature High __C	Buffer Temperature High __C
113	CPU Board Configuration Error	CPU Configuration Error
244	Running	Status message
246	Not Running	Status message

Error Codes (cont)

New error codes

The error codes described below are new for Version 2 software. These codes appear in the display and/or printout.

EC	Description	Troubleshooting
30	Reagent Bar Code Mismatch (Replaces Error Code 30: Wrong Carousel.)	• Clear the load list. Re-enter the load list. • Replace the reagent pack so that the reagent pack bar code matches the bar code entered in sample management.
34	Insufficient Tests Left (Replaces Error Code 34: No Tests Left in Reagent Pack.)	• The number of tests left in the reagent pack is less than the number of samples loaded on the carousel.
38	Carousel Mismatch	• The carousel bar code read during an assay run prologue does not match the carousel ID stored through Sample Management, ASTM, or the last failed assay run. a. Edit the load list carousel ID to match the one on the carousel. b. Replace the carousel bar code ID.

Error Codes (cont)

New Error Codes (cont)

EC	Description	Troubleshooting
39	Invalid Mode Defintion	• Reload the software. • Replace the software.
45	Wash Station Overflow	Liquid is detected by the probe in the wash station prior to performing a rinse. • The wash station may be backed up. Check the tubing/fittings for obstructions. Replace the tubing/fittings. • Ensure that all tubing connections are secure. • Ensure that the probe is aligned vertically. • Clean any buffer spills or dried buffer from receiver plate surface. • Perform a boom calibration/check to ensure proper setting of the Z-ASP LIM parameters. • Troubleshoot as a level sense hardware problem. (ISA 69-009).

Error Codes (cont)

New Error Codes (cont)

EC	Description	Troubleshooting
46	Liquid Level Too High	Initial level sense reading appears to be in liquid when level sense is checked over a location. • Check for droplet on probe. • Perform a boom calibration/check to ensure proper setting of the Z-ASP LIM parameters. • Troubleshoot as a level sense hardware problem. (ISA 69-009).
49	Diluent Bottle Not Found	Indicates that the diluent bottle is not detected by the diluent sensor. • Follow IP-23 in the LCx® Analyzer Service Manual.

Error Codes (cont)

New Error Codes (cont)

EC	Description	Troubleshooting
90	COM1 Port Error	• Ensure that the RS-232 cable is seated correctly. • Perform RS-232 COM Port Test (VP-44 in LCx® Analyzer Service Manual). If test fails, replace the CPU Board. • Check these parameters: 1.6 COM1 BAUD is 9600 1.7 COM1 CHR LEN is 8 1.8 COM1 STOP BIT is 1 1.9 COM1 PARITY is 0 1.18 Host Interface is set to 7598 1.28 REPORT REDIRECT 0 to obtain printouts from the LCx® Printer 100 to obtain printouts from the external printer only 1100 to obtain printouts from both the LCx® Printer and the external printer

Error Codes (cont)
New Error Codes (cont)

EC	Description	Troubleshooting
92	Incompatible Assay Module	• The system and assay modules are mismatched.
93	Carousel Lock Arm Not Locked	Follow suggestions listed in ISA 69-005: • Sensor dirty or obstructed. • AVR arm is defective. Replace AVR. • Replace the LLS/Analog Cable. • Replace the Analog Board.
94	Invalid System Module	• Reload the system file. • Replace the system module. • Replace the CPU board.

Error Codes (cont)

New Error Codes (cont)

EC	Description	Troubleshooting
97	Level Sense Range Error	• Consecutive level sense readings at location XXXX are not stable. • Ensure all tubing connections are secure. • Ensure that the probe is aligned vertically. • Clean any buffer spills or dried buffer from the carousel and receiver plate surface. • Perform a boom calibration/check to ensure proper setting of the Z-ASP LIM parameters. • Troubleshoot as a level sense hardware problem. (ISA 69-009).
205	Level Sense Calibration (Pass or Fail)	• Status message.
212	Carousel Not Calibrated	• Perform MEIA Carousel Calibration (VP-30 in LCx® Analyzer Service Manual).

Error Codes (cont)

New Error Codes (cont)

215	Spooler Capacity Remaining: N Runs(s)	• The spooler buffer is filled to the capacity specified by system parameter 1.20 Spooler Warn. Select action a or b: a. Press [CANCEL] to cancel the current run. Press [EXIT] until the main menu is displayed. Download the contents of the spooler buffer to the host system. *OR* b. Press [PROCEED] to continue with the current run. The current run results will be stored, but the results of the oldest spooled run will be overwritten. • If a host system is not being utilized, edit System Parameter 1.18 HOST INTERFACE to 0. • Troubleshoot as above for 90 COM1 PORT ERROR.
243	Motor Timed-Out	
244	Running	• Indicates a request was made to Run task to run something while Run task was not idle. • Replace CPU board, Digital I/O board or Motor Driver board.

Error Codes (cont)

New Error Codes (cont)

EC	Description	Troubleshooting
246	Not Running	• Indicates that an abort request is sent to Run task, but Run task is idle. • Replace CPU board, Digital I/O board or Motor Driver board.
254	Invalid Message Parameters	Incorrect information regarding disposables was sent to Post Processor.

SYSTEM PARAMETERS LIST

1. CONFIGURATION PARAMETERS

.1	SYSTEM REVISION	.13	COM2 PARITY	.25	Not in use
.2	REVISION DATE	.14	DIL 1 V1 POS	.26	DISPLAY DIM
.3	SERIAL NUMBER	.15	DIL 2 V1 POS	.27	KEY CLICKS 1=ON
.4	DOOR SENSOR	.16	V1 DISP POS	.28	REPORT REDIR
.5	DATE FORMAT	.17	LINE FEEDS	.29	XOFF TIMEOUT
.6	COM1 BAUD	.18	HOST INTERFACE		
.7	COM1CHR LEN	.19	CRSL ID 1=ON		
.8	COM1 STOP BIT	.20	SPOOLER WARN		
.9	COM1 PARITY	.21	Not in use		
.10	COM2 BAUD	.22	NUM RGTS		
.11	COM2 CHR LEN	.23	Not in use		
.12	COM2 STOP BIT	.24	Not in use		

System Parameters List (cont)

2. SYSTEM PARAMETERS

.1 TOT DIL 2 VOL (1000)
.2 DEAD VOL 2 (50)
.3 CURRENT DIL 2
.4 TOT DIL 1 VOL (900)
.5 DEAD VOL 1 (50)
.6 CURRENT DIL 1
.7 Not in use
.8 Not in use
.9 Not in use
.10 RT SYRG SLOPE
.11 LT SYRG SLOPE
.12 PRIME VOL LT
.13 PRIME VOL RT
.14 PRIME SPEED
.15 PRIME CYCLES (6)
.16 Not in use
.17 REAG BC START (15)
.18 REAG BC END (200)
.19 LS CHECK (115)
.20 SAFETY DEPTH (24)
.21 LS CHECK LOW (55)
.22 RINSE CHECK (1)
.23 PBCD PROBE VOL
.24 PBCD PROBE REP
.25 PBCD RINSE VOL
.26 PBCD RINSE REP
.27 DSP CK AVG LO
.28 DSP CK AVG HI
.29 DSP CK RANGE

Default values in parentheses.

System Parameters List (cont)

3. MEIA CAROUSEL PARAMETERS

.1 CAR HFLG STEP (10)
.2 STEPS PER REV (1800)
.3 SLOTS
.4 SAMPLE DIR
.5 HOME SAMP NUM
.6 PIP1 SAMP NUM
.7 PIP2 SAMP NUM
.8 READ SAMP NUM
.9 DET. SAMP NUM
.10 HOME OFFSET
.11 PIPET1 OFFSET
.12 PIPET2 OFFSET
.13 READ OFFSET (24)
.14 DETECT OFFSET (24)
.15 BAR CODE START (75)
.16 BAR CODE END (1725)
.17 LOCK POS (623)
.18 UNLOCK POS (662)
.19 CAROUSEL ID (0)
.20 CRSL BC OFFSET (38)
.21 Not in use

Default values in parentheses.

System Parameters List (cont)
4. through 29.: BOOM LOCATIONS

Filenames for Files 4 through 29:

4. WASH STATION
5. REAGENT 1
6. REAGENT 2
7. REAGENT 3
8. REAGENT 4
9. REAGENT 5
10. MATRIX
11. PRE WASH
12. INC WELL FRT
13. INC WELL CTR 1
14. INC WELL CTR 2
15. MEIA PRE FRT
16. MEIA PRE CTR 1
17. MEIA PRE CTR 2
18. MEIA SMP WELL
19. BOOM PARK
20. DISP WELL
21. VIAL
22. LCx RCT WELL
23. WASH TARGET

24 BL 24*
25 BL 25*
26 BL 26*
27 BL 27*
28 BL 28*
29 BL 29*

* 24-29 (future/research use)

System Parameters List (cont)
4. through 29.: Boom Locations (cont)

For Files 4 through 29, these parameters are used:

.1	ON OFF CAR	.13	Z DISP 6	.25	LS GUARD BAND
.2	CAR OFFSET	.14	Z DISP 7	.26	LS BKGRND MAX
.3	R BOOM	.15	Z DISP 8	.27	Not in use
.4	Z LS DEFAULT	.16	Z ASPLIM		
.5	LS BKGRND	.17	Z BTMLIM		
.6	Z LS DELTA	.18	HVR		
.7	Z ABOVE	.19	5 BOTTL HVR ADJ		
.8	Z DISP 1	.20	DIVE DEPTH		
.9	Z DISP 2	.21	5 BOTTL R ADJ		
.10	Z DISP 3	.22	LS ADD		
.11	Z DISP 4	.23	LS GAIN		
.12	Z DISP 5	.24	LS DELTA		

System Parameters List (cont)

30. TEMPERATURE PARAMETERS

.1 through .14 Not in use

.15 IDLE REAG TP (35.0)

.16 MEIA AIR SET (36.0)

.17 MEIA WARMUP TP(53.0)

.18 MEIA PID DEV (0.5)

.19 MEIA ADJUST SP (36.0)

.20 MEIA INC TIME (1800)

.21 MEIA CAL TIME (600)

.22 MEIA DELTA SP (0.6)

.23 PID INFO 1= OFF (1)

.24 RMT ALARM DEV (1.5)

.25 PID CONTROL (0)

.26 PID GAIN (64.0)

.27 PID INTEGRAL (0.05)

.28 PID DERIVATIVE (0.0)

.29 PID BIAS (116.0)

.30 IDLE AIR TEMP (40.0)

Default values in parentheses.

31. PHOTO PARAMETERS

.1 through .10 Not in use
.11 MEIA STD B (0)
.12 MEIA STD M (1000)
.13 MEIA STD H (1)
.14 M % DIFF (5.00)
.15 H % DIFF (10.00)
.16 H THRESHOLD (10000)
.17 INIT SLOPE (0.0)
.18 INIT INTRCPT (0.0)
.19 MEIA SLOPE (7.7)
.20 MEIA INTRCPT (-41.0)
.21 B HI LIM (1000)
.22 STATIC PREC (0.50)
.23 DYNAMIC PREC (1.00)
.24 MEIA INC TIME (600)
.25 MEIA LMP REF# (1)
.26 MEIA LMP 1=ON (0)
.27 MEIA LOW I (4.20)
.28 MEIA CAL VOLT (0)
.29 MTRX DET VOLT (0)
.30 MTRX DET REF (0)
.31 CRSL CAL HOLE (0)
.32 CRSL CAL CELL (0)

Default values in parentheses.

Superuser Codes

Instructions: Select the code that corresponds to the day of the month. Enter the code using the numeric keypad.

Format: Use this format: .nnnn. *Example:* On March 29, enter .2988.

Day	Code	Day	Code	Day	Code	Day	Code	Day	Code	Day	Code
1	7121	6	0924	11	5121	16	0612	21	1999	26	8614
2	4103	7	1210	12	0706	17	0224	22	7230	27	7387
3	1222	8	5030	13	0424	18	9001	23	3624	28	1020
4	6211	9	1706	14	6109	19	3511	24	4784	29	2988
5	9171	10	6971	15	7220	20	0112	25	2935	30	2328
										31	8421

MODIFICATION STEPS:
See Steps 1 - 14 in software installation procedures.

CHECKOUT:
See Step 15 in software installation procedures.

MODIFICATION CONTROL STICKER UPDATE:
See Step 16 in software installation procedures.

END OF DOCUMENT

ABBOTT ADD

TECHNICAL SERVICE BULLETIN

SUBJECT: TSB#: **69-004**

Error Codes 163 (NRMSE too high) or 164 (Correlation Coefficient too low) on Chlamydia

ORIGINATOR: **Kyle Hranitzky**
APPROVED: **Mark Slater 7/23/96**

PRODUCT:
LCx® Probe System (69)

REF. ECO:

Trademark: LCx is a registered trademark of Abbott Laboratories.

IMPLEMENTATION:	TSB Part/Kit #: **N/A**	Upgrade Time: **0.20 Hr.**
○ **Immediate** ● **Next Service Call** ○ **Next Failure** ○ **Optional**	TSB Effectivity/ Part(s) Availability: **23-JUL-96**	Validation Time: **0.05 Hr.**
Instruments Requiring Modification: **S/N 80,850 & below**	**TSB Tracking by Serial # required (IMMEDIATE TSB's ONLY)** ○ YES ● NO	Total Mod. Time: **0.25 Hr.** ****NOTE** The instrument must be at TSB Level n/a prior to performing this TSB.**

I. DISTRIBUTION:

Worldwide

II. PURPOSE:

This TSB provides the World Wide Field Service Organizations the protocol for modification to LCx® Assay Module 1, Version 2. The Min Rate parameter (#31) for the LCx Chlamydia Assay (#11) will be increased from 10 to 40. The Min Rate parameter specifies the lowest rate for which the NRMSE and Correlation Coefficient parameters will be checked. The NRMSE and Correlation Coefficient parameters are both indicators of variability in the reads taken at the optics station. At low rates, these calculations have been found to be unreliable indicators of variability within the read, causing invalid results for which there is no functional cause.

This information was conveyed earlier in ISA 69-008.

III. ADMINISTRATIVE NOTES:

This TSB is applicable to all LCx® instruments.

U.S.A.: The performance of this TSB should be closed in Fieldwatch as normal for all LCx analyzers.

International: Because no parts are involved in this TSB, no forecast requirements are needed from the logistic organizations.

IV. SPECIAL TOOLS:

None

V. PARTS:

REPLACED PARTS:
No parts are involved in this TSB.

COMPATIBILITY:
Since this TSB provides for the modification of the Min Rate for the LCx® Chlamydia Assay, there is the potential that this modification will be lost if a factory set of the instrument or assay file occurs. If a factory set occurs, the TSB must be performed again.

VI. PROCEDURE:

MODIFICATION STEPS:

1. Enter the Superuser code for the day in the following format: **.XXXX.** (where **XXXX** is the Superuser code).

   SUPER will appear in the Ready Menu.
2. Press [ASSAY].
3. Press [ASSAY _ FILES].
4. Enter 11.31.
5. Press [DISPLAY].
6. Enter 40.
7. Press [STORE].
8. Press [EXIT].
9. Press [PRINT]. Verify that the Min Rate parameter (#31) has been changed to 40.
10. Exit the Superuser mode by entering the Superuser code as in step 1 above.

CHECKOUT:
See item 9 in MODIFICATION STEPS.

MODIFICATION CONTROL STICKER UPDATE:
Mark the 04 block of the TSB Modification Sticker.

U.S.A. - Close the service call in Fieldwatch accordingly:

Service Code (04)

Trouble Code (02)

Repair Code (93)

END OF DOCUMENT

ABBOTT ADD	TECHNICAL SERVICE BULLETIN

SUBJECT: TSB#: **69-003**
LCx® Manual Amplification Vial Retainer Retrofit and Boom Assembly Manufacturability

ORIGINATOR: **Kyle Hranitzky**
APPROVED: **Mark Slater 06-MAR-96**

PRODUCT:
LCx® Probe System (69)

REF. ECO:

IMPLEMENTATION:	TSB Part/Kit #: **See PARTS Below**	Upgrade Time: **5.0 Hrs.**
● Immediate ○ Next Service Call ○ Next Failure ○ Optional	TSB Effectivity/ Part(s) Availability: **06-MAR-96**	Validation Time: **3.0 Hrs.**
Instruments Requiring Modification: **See Administrative Notes**	**TSB Tracking by Serial # required (IMMEDIATE TSB's ONLY)** ● YES ○ NO	Total Mod. Time: **8.0 Hrs.** ****NOTE** The instrument must be at TSB Level n/a prior to performing this TSB.**

I. DISTRIBUTION:
Worldwide

II. PURPOSE:
This TSB provides for the incorporation of the manual Amplification Vial Retainer (henceforth referred to as the AVR) into the LCx Analyzer. The manual AVR (Figure 3) is an elongated hook mounted onto the left side of the Air Duct Cover and placed in front of the Reagent Heater Block. The manual AVR remains stationary during all testing. The operator locks the AVR into position by turning the knurled knob counterclockwise until the AVR clicks into position. The AVR is unlocked by turning the knurled knob clockwise. Because the AVR does not travel with the Boom Assembly and remains stationed over the amplification vial, there is no opportunity for bridging of fluid between the probe and AVR surface when the probe is situated over the diluent well of the reaction cell. The manual AVR must be locked during all assay testing and unlocked during all system checks and calibrations. The system software checks the lock sensor before and during the assay (ERROR CODE 93: "CAROUSEL LOCK ARM NOT LOCKED" will be displayed if the AVR is not locked). The AVR is electrically connected to the Analog Board via the LLS/Analog Cable Assembly. The functionality of the AVR home sensor may be verified at the level of the DISPENSE HAND CONTROLS.

To support the upgrade to the manual AVR, the integrated AVR must be removed from the Boom Assembly. This change is reflected in the C/N 3-47090-02 Boom Assembly. In addition, instrument manufacturing has removed the Z-Boom Motor Connector, located beneath the Boom Assembly platform, as an improvement in the manufacturability of the Boom Assembly. The connector has been observed to interfere with a support rib in the instrument. This interference is manifested as a "clicking" sound during R-Boom rotation. In rare cases, the problem results in actual failure of the connector, resulting in "Z-Boom Failed Home" or "Z-Boom Missing Steps" error messages. The removal of the connector is reflected in the C/N 3-47090-03 Boom Assembly and is communicated in ISA 69-007.

➔ **NOTE: This TSB supersedes and obsoletes TSB 69-002.**

III. ADMINISTRATIVE NOTES:
INSTRUMENTS REQUIRING MODIFICATION:

SN 80,000 - 80,041: To support the retrofit to the manual AVR, LCx® Instruments SN 80,000 - 80,041 require upgrading to the current Ground Cable Assembly, LLS/Analog Cable Assembly and Boom Assembly, along with installation of the manual AVR.

SN 80,042 - 80,340: To support the retrofit to the manual AVR, LCx Instruments SN 80,042 - 80,340

require upgrading to the Boom Assembly, along with installation of the manual AVR.

Instruments that have been upgraded, per TSB 69-002, with the Boom Assembly (C/N 3-47090-02) and manual AVR (TSB Modification Sticker will have the 02 block marked), will be upgraded to the C/N 3-47090-03 Boom Assembly on a **NEXT FAILURE** basis of the -02 Boom Assembly.

SN 80,341 - 80,418: LCx instruments SN 80,341 - 80,418 have been upgraded to the manual AVR and the -02 Boom Assembly per TSB 69-002. Instruments will be upgraded on a **NEXT FAILURE** basis of the -02 Boom Assembly to the C/N 3-47090-03 Boom Assembly. In this case, the 03 block of the TSB Modification Sticker should be marked.

U.S.A.: This upgrade is applicable to instruments in the U.S.A. that fall within the Serial Number effectivity specified. The modification will be installed and closed in Fieldwatch as normal for all LCx® Analyzers.

International: The International Service Managers should send forecast requirements to their responsible logistic organizations. Please reference TSB 69-003 on forecast requirements.

Europe: Completion of this TSB will be tracked. Country Service Managers are to report on a monthly basis the total number of TSBs to be performed, number of upgrades completed this month, and total systems upgraded to date.

IV. SPECIAL TOOLS:

LCx AVR Positioning Tool 3-79200-01

V. PARTS:

REPLACED PARTS:
The old boom assemblies (3-47090-01 and 3-47090-02) will be returned via current procedures; with the exception that in Europe boom assemblies should be returned on a weekly basis via special return shipments, until all 3-47090-01 and 3-47090-02 boom assemblies have been reworked and re-released to spare parts inventory as 3-47090-03 boom assemblies. The old cables can be discarded.

COMPATIBILITY:
The old boom assembly (3-47090-01) is not upward compatible with the manual AVR.

VI. PROCEDURE:

MODIFICATION STEPS:
For LCx Instruments SN 80,000 - 80,041, sections A, B, C, D and E must be followed.
For LCx Instruments SN 80,042 - 80,340, sections A and F only must be followed.
For LCx Instruments SN 80,341 - 80,418, replace the Boom Assembly on a NEXT FAILURE basis. (Ref. LCx Analyzer Service Manual RR 3.9 Boom Assembly.)

A. All LCx Instruments

1. Print out System Parameter Files 1, 2, 4, 37 and 38.
2. Turn system power OFF and unplug the instrument. Remove the System and Assay modules.
3. Decontaminate the analyzer cover, all exterior and exposed interior cover surfaces as specified in VP-60 Decontamination Procedure of the LCx Analyzer Service Manual.
4. Remove the lock screw from the front left enclosure latch. Unlatch the four enclosure latches and remove the enclosure (Ref. LCx Analyzer Service Manual RR 1.3 Enclosure Assembly).
5. Raise the Display to the upright position (Ref. LCx Analyzer Service Manual RR 8.1.1 Raise Display Procedure).
6. Remove the Probe Assembly (Ref. LCx Analyzer Service Manual RR 3.5 Probe Assembly). (CAUTION: Rotate the Boom Assembly by the Barcode Reader Arm, not by the probe support).

7. Remove the Protective Wire Cover (Ref. LCx Analyzer Service Manual RR 2.7 Protective Wire Cover).
   a. Disconnect the VDE Ground Cable.
   b. Remove the four (4) mounting screws.
   c. Remove the cover.
8. Remove the left VDE Cover.
   a. Remove the two (2) mounting screws and remove the cover.
9. Remove the Reagent Shroud (Ref. LCx Analyzer Service Manual RR 2.3 Reagent Shroud).
   a. Disconnect the Wash Station attached to the Reagent Shroud.
10. Tilt back Card Cage (Ref. LCx Analyzer Service Manual RR 8.0 Tilt Back Card Cage).
11. Remove the Boom Assembly (Ref. LCx Analyzer Service Manual RR 3.9 Boom Assembly).
    a. Disconnect the Boom Assembly Cable from the Motor Driver Board (P5).
    b. Remove the cable from the cable clamp.
    c. Disconnect the Retainer Clip Assembly Cable P1 (with green heat shrink) and Carousel Receiver Cable P4 (with red heat shrink) at the LLS Board.
    d. Remove the three (3) Boom Assembly mounting screws.
    e. Lift the Boom Assembly out.

B. Removal of LLS/Analog Cable Assembly and Ground Cable Assembly

1. Remove the diluent bottles.
2. Remove the four (4) screws attaching the Pump Assembly to the pump bracket and move the pump forward.
   Ensure that the Pump Assembly does not pinch or crimp the Buffer Sensor Cables.
3. Disconnect the LLS/Analog Cable Assembly Connector PA from the Buffer Tray Assembly connector JA.
4. Remove the screw and clamp securing the cable to the boss (clamp is located behind the pump next to the left sheet metal wall).
5. Loosen the one (1) screw securing the LLS Board. Slide the board out and disconnect the LLS/Analog Cable Assembly connector P2 from the LLS Board connector J2, located at the top right of the board.
6. Open up the cable clamps located on the base behind the boom assembly and the carousel motor.
7. Disconnect the LLS/Analog Cable Assembly connector P6 from the Analog Board and Drain wire from the Card Cage.
8. Remove the LLS/Analog Cable Assembly.
9. Loosen the two (2) screws attaching the Reagent Receiver/Heater Block (Ref. LCx Analyzer Service Manual RR 3.2 Reagent Receiver/Heater Block).
10. Disconnect the ground wires (Ref. LCx Analyzer Service Manual PL 9 Ground Cable) from each of these:
    a. Buffer Tray Assembly.
    b. Power Supply Ground Lug Assembly (located below the LLS Board).
    c. Left Side Wall (behind pump).
    d. Liquid Heater Block Assembly.
    e. Reagent Heater Block Assembly.
    f. Left side of the Air Duct Cover Assembly.
    g. Modified Fan (air heater fan next to the Reagent Heater Block).
    h. Card Cage Assembly (clip under Card Cage retains wire).
    i. MEIA Optics Assembly.
11. Disconnect the tie wrap securing the Ground Cable Assembly from the post next to the PMT HV Power Supply.
12. Remove the Ground Cable Assembly from the analyzer.

C. Installation of Ground Cable Assembly C/N 3-47077-01

1. Install the Ground Cable Assembly. (Figure 1)
   a. Install the ground terminal lug E5 to the Power Supply Ground Lug Assembly.
   b. Route the Buffer Tray ground terminal lug E11 under the pump frame and attach to the Buffer Tray Assembly.
   c. Attach the ground terminal lug E6 to the left side wall.
   d. Route the Modified Fan ground terminal lug E10 under the Reagent Heater Block Assembly and attach to the Modified Fan.
   e. Attach the Air Duct Cover Assembly ground terminal lug E9 to the left side of the Air Duct Cover Assembly.
   f. Attach the Reagent Heater Block Assembly ground terminal lug E8 to the Reagent Heater Block Assembly.

g. Attach the Liquid Heater Block Assembly ground terminal lug E7 to the Liquid Heater Block Assembly.
h. Attach the Card Cage Assembly ground terminal lug E4 to the Card Cage Assembly.
i. Route the Ground Cable Assembly through the cable clamps along the base of the sheet metal assembly.
j. Loosen the screw securing the PMT HV Power Supply and route the Ground Cable Assembly behind the post and under the PMT HV Power Supply.
k. Attach the MEIA Optics Assembly ground terminal lug E1 to the MEIA Optics Assembly. ***NOTE:*** *Attach the Protective Wire Cover ground terminal lug E2 to the Protective Wire Cover after cover is reinstalled.*

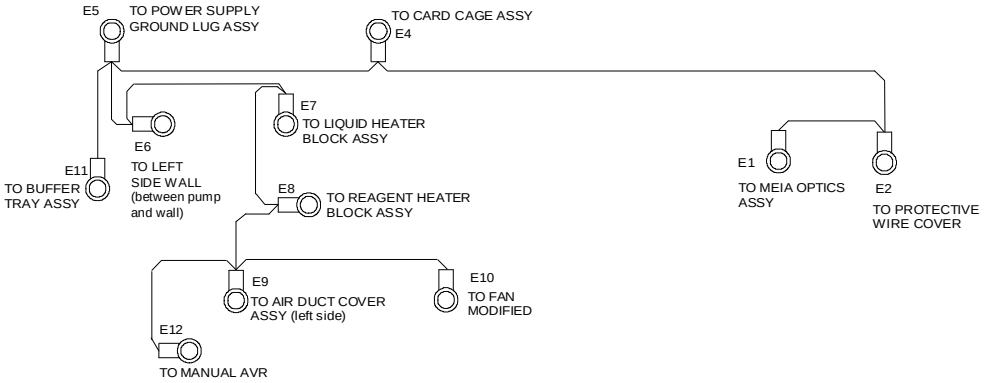


Figure 1: Ground Cable Assembly

D. Installation of the LLS/Analog Cable Assembly C/N 3-47075-01

1. Connect the LLS/Analog Cable Assembly connector PA to the Buffer Tray Assembly connector JA. See (Figure 2)
2. Secure only the cable to the Buffer Tray Assembly to the boss, located behind the Pump Assembly and next to the left sheet metal wall, using clamp and screw removed earlier.
3. Connect the LLS/Analog Cable Assembly connector P2 to the LLS Board.
4. Route the manual AVR connector PC along the left side of the Reagent Receiver/Heater Block Assembly.
5. Route the cable along the base and secure with the two (2) cable clamps.
6. Connect the LLS/Analog Cable Assembly connector P6 to the Analog Board.
7. Connect the Drain Wire to the Card Cage.

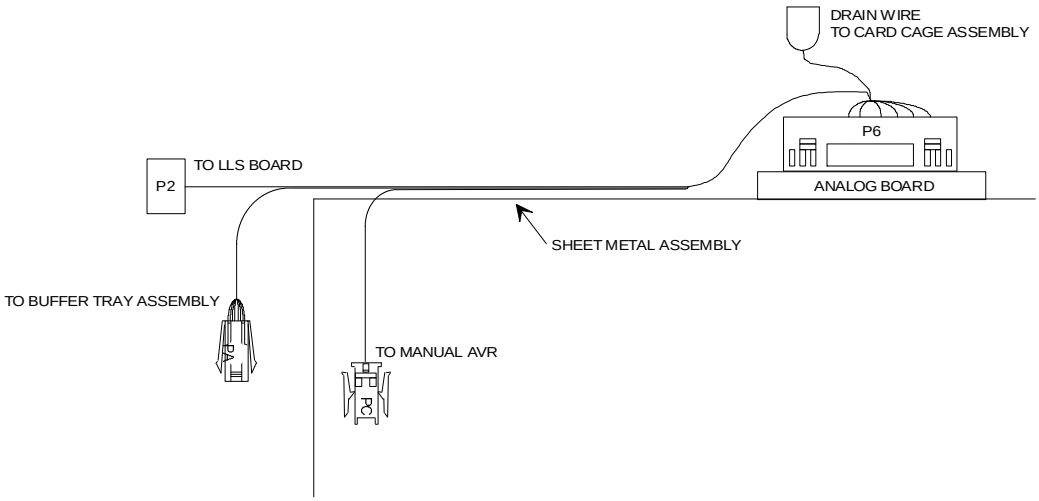


Figure 2: LLS/Analog Cable Assembly

E. Installation of Boom Assembly (C/N 3-47090-03) and Manual AVR (C/N 3-47002-01)

1. Install the Boom Assembly, without integrated AVR, and attach the Probe Assembly to the Boom Assembly (Ref. LCx Analyzer Service Manual RR 3.9 Boom Assembly).
2. Secure the LLS Board to its holding bracket with one (1) screw.
3. Secure the Pump Assembly to the pump bracket with four (4) screws.
4. Install the manual AVR. (Figure 3)
   a. Place the manual AVR on the Air Duct Cover Assembly.
   b. Attach the cable connector J6, from the AVR, to the LLS/Analog Cable Assembly Cable

connector PC.
   c. Attach AVR ground terminal lug E12 to the AVR.
   d. Loosely secure the AVR to the Air Duct Cover Assembly with three (3) screws and washers.
5. Attach the Protective Wire Cover and secure the ground cable terminal lug E2 to the cover (Ref. LCx Analyzer Service Manual RR 2.7 Protective Wire Cover).
6. Tighten the two (2) screws used to mount the Reagent Receiver/Heater Block Assembly.
7. Perform a continuity check, using a calibrated Digital Voltmeter (DVM), between the ground terminal pin of the power cord receptacle and several contact points. Attach the ground lead to the ground terminal pin. Measured resistance should be less than one Ohm (1) at the following contact points:
   a. Top of the Card Cage Assembly.
   b. Ground strap of the Touchpad Assembly.
   c. Any of several attachment screws on the Power Supply.
   d. Any of several attachment screws on the Buffer Tray Assembly.
   e. Any non-painted metallic surface of the Pump Assembly.
   f. Any of several attachment screws of the Air Duct Cover Assembly.
   g. Surface of the Liquid Heater Block Assembly.
   h. Surface of the Reagent Heater Block Assembly.
   i. Surface of the Modified (air heater) Fan.
   j. Ground terminal lug E1 and any of several attachment screws of the MEIA Optics Assembly.
   k. Ground terminal lug E12 and any of several attachment screws of the AVR.
   l. Ground terminal lug E2 and any of several attachment screws of the Protective Wire Cover.
8. Attach the Reagent Shroud (Ref. LCx Analyzer Service Manual RR 2.3 Reagent Shroud).
9. Secure the Wash Station to the Reagent Shroud.
10. Attach the left VDE Cover with two (2) screws.
11. Attach the right VDE Cover with three (3) screws.
12. Reposition and secure the Display (Ref. LCx Analyzer Service Manual RR 8.1 Display Assembly).
13. Reposition and secure the Card Cage Assembly (Ref. LCx Analyzer Service Manual RR 8.0 Tilt Back Card Cage).
14. Install the two (2) diluent bottles.
15. Install the Enclosure Assembly (Ref. LCx Analyzer Service Manual RR 1.3 Enclosure Assembly).
16. Perform Reagent Heater Block Adjustment (Ref. LCx Analyzer Service Manual VP- 21).
17. Perform Boom Calibration and Level Sense Check (Ref. LCx Analyzer Service Manual VP- 8 and VP- 11).
18. Align the AVR.
   a. Place the alignment tool in carousel position 1 of the LCx carousel, lock the carousel and place the carousel into the analyzer.
   b. Lock the AVR arm by turning the knob counterclockwise.
   c. From the MAIN MENU:
      Press MONITOR.
         HND-CTRL
         OTHER
         OTHER
         LS
         OTHER
         OTHER
         CR_POS1
   d. Visually align the oval shaped opening at the end of the arm with the corresponding recessed oval area of the target on the alignment tool. (Figure 3)
   e. Tighten the three (3) screws securing the AVR to the Air Duct Cover Assembly.
   f. Press CR-POS1 and verify that the alignment has not changed.
   g. If necessary, loosen the three (3) screws and repeat the alignment.

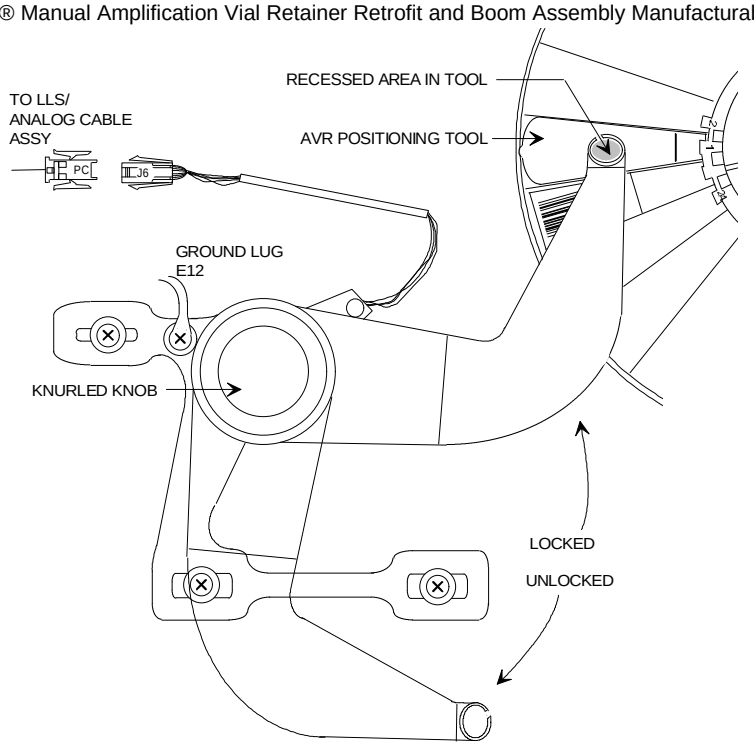
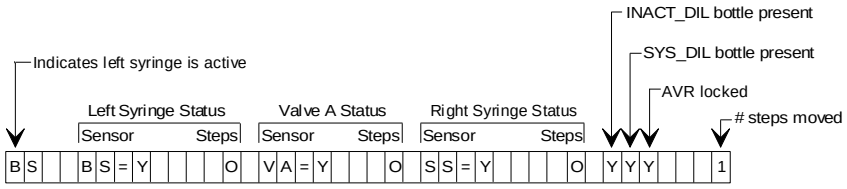


Figure 3: Amplification Vial Retainer (AVR)

19. Verify the functionality of the AVR sensor.
    a. From the MAIN MENU:
       Press MONITOR
       HND-CTRL
       DISPENSE
    b. The top line of the display shows (if the AVR arm is locked):



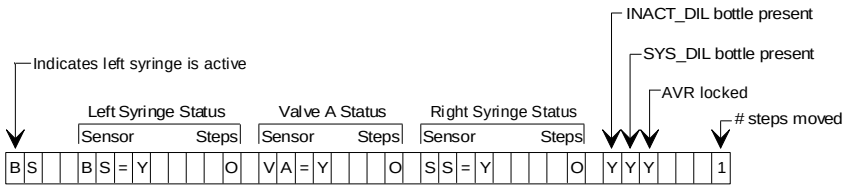
    c. If the display shows YYN, this indicates that the AVR arm is in the open position (not home). Close the AVR arm, the display should change from YYN to YYY. If the display does not change to YYY, this may indicate:
       1) the sensor is dirty or obstructed. Clean the sensor or remove the obstruction.
       2) the sensor is defective. Replace the AVR arm.
       3) the LLS/Analog Cable Assembly is not attached to the AVR or is defective. Reattach the cable to the AVR or replace the LLS/Analog Cable Assembly.
       4) the Analog Board is defective. Replace the Analog Board.
20. Perform VP-15 Buffer Sensor Check.
21. Perform the Total Service Call Procedure.
22. Mark the 02 and 03 blocks of the TSB Modification Sticker.
    U.S.A. - Close the service call in Fieldwatch accordingly:
    Service Code (03)
    Trouble Code (03)
    Repair Code (93)

F. Installation of Boom Assembly (C/N 3-47090-03) and Manual AVR (C/N 3-47002-01) in SN 80,042 - 80,340

1. Install the Boom Assembly, without integrated AVR, and attach the Probe Assembly to the Boom Assembly (Ref. LCx Analyzer Service Manual RR 3.9 Boom Assembly).
2. Locate the AVR ground terminal lug E12 and LLS/Analog Cable Assembly Cable connector PC (both may located near the Liquid Heater or Reagent Receiver/Heater Block Assemblies).
3. Place the manual AVR onto the Air Duct Cover Assembly (Figure 3).

Potential Biohazard & Voltage Hazard. Observe Proper Safety Precautions.

4. Attach the cable from AVR J6 to LLS/Analog Cable Assembly Cable connector PC (Figure 2).
5. Attach AVR ground terminal lug E12 to the AVR with screw (Figure 1).
6. Loosely secure the AVR to the Air Duct Cover Assembly with three (3) screws and washers.
7. Attach the Protective Wire Cover (Ref. LCx Analyzer Service Manual RR 2.7 Protective Wire Cover).
8. Attach the Reagent Shroud (Ref. LCx Analyzer Service Manual RR 2.3 Reagent Shroud).
9. Secure the Wash Station to the Reagent Shroud.
10. Attach the left VDE Cover with two (2) screws.
11. Attach the right VDE Cover with three (3) screws.
12. Reposition and secure the Display Assembly (Ref. LCx Analyzer Service Manual RR 8.1 Display Assembly).
13. Reposition and secure the Card Cage (Ref. LCx Analyzer Service Manual RR 8.0 Tilt Back Card Cage).
14. Install the Enclosure Assembly (Ref. LCx Analyzer Service Manual RR 1.3 Enclosure Assembly).
15. Perform Reagent Heater Block Adjustment (Ref. LCx Analyzer Service Manual VP-21).
16. Perform Boom Calibration and Level Sense Check (Ref. LCx Analyzer Service Manual VP-8 and VP-11).
17. Align the AVR.
    a. Place the alignment tool in carousel position 1 of the LCx carousel, lock the carousel and place the carousel into the analyzer.
    b. Lock the AVR arm by turning the knob counterclockwise.
    c. From the MAIN MENU:
        Press MONITOR.
            HND-CTRL
            OTHER
            OTHER
            LS
            OTHER
            OTHER
            CR_POS1
    d. Visually align the oval shaped opening at the end of the arm with the corresponding recessed oval area of the target on the alignment tool. (Figure 3)
    e. Tighten the three (3) screws securing the AVR to the Air Duct Cover Assembly.
    f. Press CR-POS1 and verify that the alignment has not changed.
    g. If necessary, loosen the three (3) screws and repeat the alignment.
18. Verify the functionality of the AVR sensor.
    a. From the MAIN MENU:
        Press MONITOR
            HND-CTRL
            DISPENSE
    b. The top line of the display shows (if the AVR arm is locked):



    c. If the display shows YYN, this indicates that the AVR arm is in the open position (not home).
        Close the AVR arm, the display should change from YYN to YYY.
        If the display does not change to YYY, this may indicate:
        1) the sensor is dirty or obstructed. Clean the sensor or remove the obstruction.
        2) the sensor is defective. Replace the AVR arm.
        3) the LLS/Analog Cable Assembly is not attached to the AVR or is defective. Reattach the cable to the AVR or replace the LLS/Analog Cable Assembly.
        4) the Analog Board is defective. Replace the Analog Board.

CHECKOUT:

Perform the Total Service Call Procedure.

Potential Biohazard & Voltage Hazard. Observe Proper Safety Precautions.

MODIFICATION CONTROL STICKER UPDATE:

Mark the 02 and 03 blocks of the TSB Modification Sticker if the instrument has been upgraded with both the manual AVR and the Boom Assembly (C/N 3-4790-03).

Mark the 03 block of the TSB Modification Sticker if the instrument has been upgraded with only the Boom Assembly (C/N 3-47090-03) (instrument already has the manual AVR installed).

U.S.A. - Close the service call in Fieldwatch accordingly:
Service Code (03)
Trouble Code (03)
Repair Code (93)

END OF DOCUMENT
END OF DOCUMENT

ABBOTT ADD

TECHNICAL SERVICE BULLETIN

SUBJECT:
LCx® Manual Amplification Vial Retainer Retrofit: Installation and Alignment

TSB#: **69-002**

ORIGINATOR: **Kyle Hranitzky**
APPROVED: **Bob Schabel 11/7/95**

PRODUCT:
LCx® Probe System (69)

REF. ECO:

IMPLEMENTATION: ● **Immediate** ○ **Next Service Call** ○ **Next Failure** ○ **Optional** Instruments Requiring Modification: **See ADMINISTRATIVE NOTES below**	TSB Part/Kit #: **See PARTS Below** TSB Effectivity/ Part(s) Availability: **16-NOV-95** **TSB Tracking by Serial # required (IMMEDIATE TSB's ONLY)** ● YES ○ NO	Upgrade Time: **5.0 Hrs.** Validation Time: **3.0 Hrs.** Total Mod. Time: **8.0 Hrs.** ****NOTE** The instrument must be at TSB Level n/a prior to performing this TSB.**

I. DISTRIBUTION:
OBSOLETE. SUPERSEDED BY TSB 69-003.

II. PURPOSE:

III. ADMINISTRATIVE NOTES:

IV. SPECIAL TOOLS:

V. PARTS:

REPLACED PARTS:

COMPATIBILITY:

VI. PROCEDURE:

MODIFICATION STEPS:

CHECKOUT:

MODIFICATION CONTROL STICKER UPDATE:

END OF DOCUMENT
END OF DOCUMENT

ABBOTT ADD

TECHNICAL SERVICE BULLETIN

SUBJECT:
Touchpad Assembly Replacement

TSB#: **69-001**

ORIGINATOR: **Kyle Hranitzky**
APPROVED: **Bob Schabel 8/9/95**

PRODUCT:
LCx® Probe System (69)

REF. ECN: **N/A**

Trademark: LCx is a registered trademark of Abbott Laboratories.

IMPLEMENTATION:	TSB Part/Kit #: **3-04531-02**	Upgrade Time: **0.5 Hr.**
● Immediate ○ Next Service Call ○ Next Failure ○ Optional	TSB Effectivity/ Part(s) Availibility: **09-AUG-95**	Validation Time: **1.0 Hr.**
Instruments Requiring Modification: **See Below**	**TSB Tracking by Serial # required (IMMEDIATE TSB's ONLY)** ● YES ○ NO	Total Mod. Time: **1.5 Hr.** ****NOTE** The instrument must be at TSB Level n/a prior to performing this TSB.**

THIS TSB MUST BE TRACKED BY SERIAL NUMBER BY AREAS OF THE WORLD. COMPLETION DATE 30 NOVEMBER 1995.

INSTRUMENTS REQUIRING MODIFICATION:

S/N 80050 THROUGH 80109, EXCLUDING 80083,80096, 80099, 80102, 80106 and 80107

I. DISTRIBUTION:
Worldwide

II. PURPOSE:
To ensure that all LCx® instruments are in CE mark compliance, the Touchpad Assemblies in the above mentioned instrument serial number list are being replaced.

III. ADMINISTRATIVE NOTES:
U.S.A.: This upgrade is applicable to instruments in the U.S. that fall within the Serial Number effectivity specified. The modification will be installed and closed in Fieldwatch as normal for all LCx Systems.

International: **The International Service Manager should send forecast requirements to their responsible logistic organization. Please reference TSB 69-001 on forecast requirements.**

Europe: **Completion of this TSB will be tracked. Country Service Managers are to report on a monthly basis the total number of TSB's to be performed, number of upgrades completed this month, and total systems upgraded to date. Please send this information to J. P. Bernou in Delkenheim by the end of each month.**

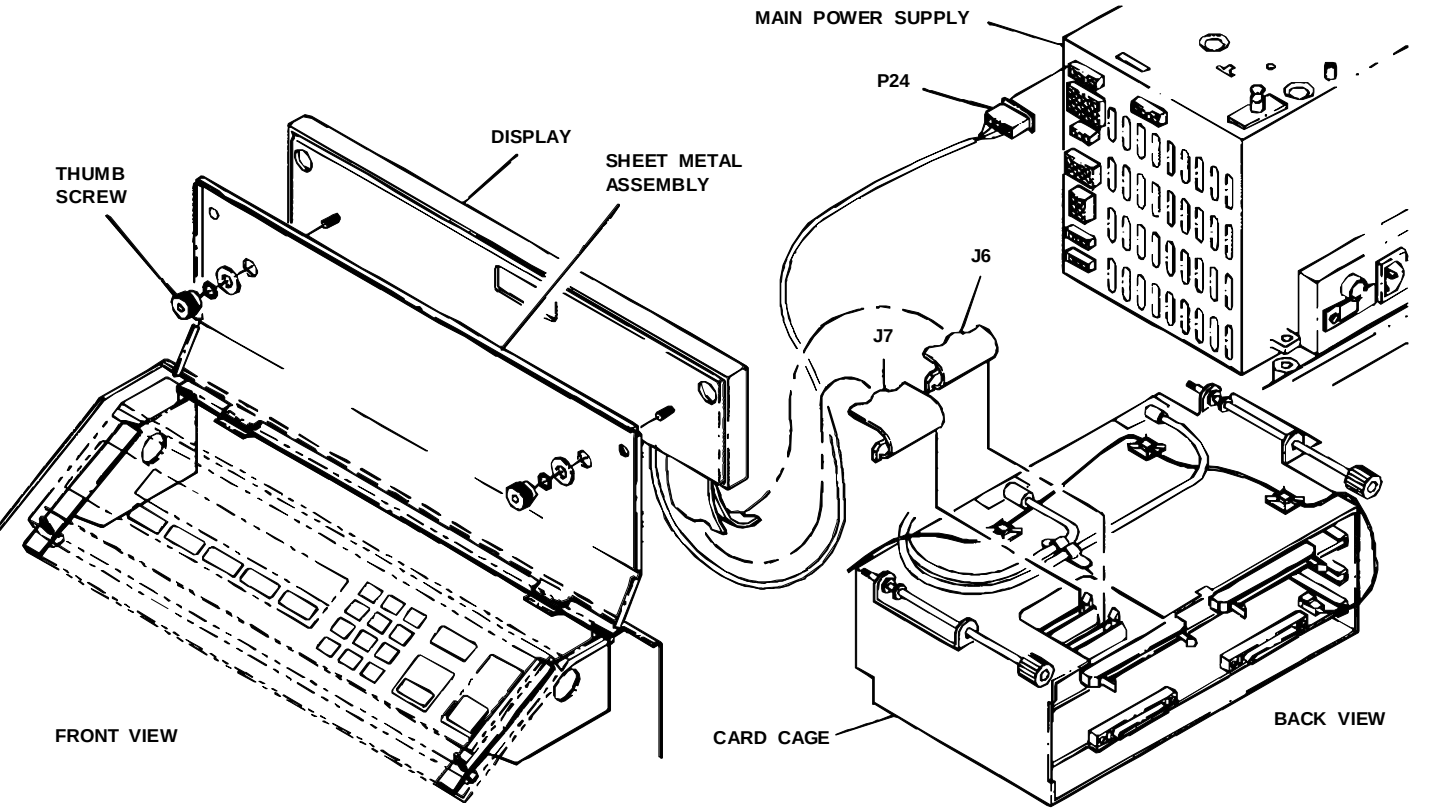
IV. PARTS:

Catalog Number	Description
3-04531-02	Touchpad Assembly

V. PROCEDURE:
1. Print out System Files 1,2,4, 37 and 38.
2. Turn system power OFF and unplug the instrument. Remove the System and Assay modules.

Potential Biohazard & Voltage Hazard. Observe Proper Safety Precautions.

3. Decontaminate the analyzer cover, all exterior and exposed interior cover surfaces as specified in VP-60 DECONTAMINATION PROCEDURE of the LCx® Analyzer Service Manual.
4. Remove the lock screw from front left enclosure latch. Unlatch the four Enclosure latches and remove the enclosure. (See also LCx Analyzer Service Manual RR 1.3 for step 4.)
5. Remove the Analog/Digital I/O Cable from the Analog Board (at J1).
6. Remove the Motor Driver/Digital I/O Cable from the Motor Driver Board (at J1).
7. Loosen the Captive Post Thumb Screws which fasten the Card Cage and tilt the Card Cage back. (See also LCx Analyzer Service Manual RR 8.0 for step 5, 6 and 7.)
8. Disconnect the Display and Touchpad Cables (J6 and J7) from the Digital I/O Board (See Figure).
9. Disconnect the Touchpad Assembly Power Cable (P24) at the Main Power Supply (See Figure).
10. Remove Right VDE Cover (3 mounting screws).
11. Remove two (2) Thumbscrews and hardware attaching Touchpad Assembly to sheet metal assembly (See Figure) and remove the Touchpad Assembly. (See also LCx Analyzer Service Manual RR 8.1 for step 8, 9, 10 and 11.)
12. Install the new Touchpad Assembly. Attach Touchpad Assembly to sheet metal assembly. Secure Assembly with two (2) Thumbscrews and hardware.
13. Route the Touchpad Assembly power cable (P24) to the Main Power Supply and connect it (at J24) (See Figure).
14. Connect the Display Cable (J7) and the Touchpad Cable (J6) to the connectors on the Digital I/O Board (P7 and P6 respectively; J6 attaches to the top connector P6).
15. Connect the Analog/Digital I/O Cable to the Analog Board (at J1).
16. Connect the Motor Driver/Digital I/O Cable to the Motor Driver Board (at J1).
17. Reposition and secure the Card Cage by tilting the Card Cage forward and tightening the Captive Post Thumb Screws, securing the Card Cage to the base.
18. Install the Enclosure. It will be necessary to adjust the position of the Touchpad Assembly and ensure that the Card Cage is aligned properly. Refer to VP-2 and VP-3 in the LCx Analyzer Service Manual as necessary. Secure the four Enclosure latches.
19. Install the Right VDE Cover (3 mounting screws).
20. Insert the System and Assay Modules, plug the instrument in , and turn system power ON.
21. At the READY menu, perform the Keyboard (VP-42) and Display (VP-43) Tests. Both tests can be accessed by selecting UTILITY / OTHER / OTHER / SERVICE from the READY menu and then selecting either KEYBOARD or DISPLAY.
22. Perform MEIA Performance Panel Run Procedure (VP-47).
23. Mark the 01 block of the TSB Modification Sticker.
    U.S. - Close the service call in Fieldwatch accordingly:
    Service Code (03)
    Trouble Code (01)
    Repair Code (93)



Touchpad Assembly

END OF DOCUMENT