VistA Lab Enhancements – Microbiology

Release: Lab Micro Interface Release 1.0 (combined build for LA*5.2*90 and LR*5.2*474)

User Guide

April 2017

Document Version 1.8

Department of Veterans Affairs

Office of Information and Technology (OI&T)

Revision History

NOTE: The revision history cycle begins once changes or enhancements are requested after the document has been baselined.

Date	Revision	Description	Author
04/12/2017	1.8	Updated System Summary section.	Elizabeth Adams Van Blargan
01/10/2017	1.7	Addition of version number for Data Innovation's Instrument Manager.	Elizabeth Adams Van Blargan
01/06/2017	1.6	Removed version numbers from Patch Descriptions, section 1.2.6.	Elizabeth Adams Van Blargan
01/04/2017	1.5	Updated cover page and references.	Elizabeth Adams Van Blargan
12/19/2016	1.4	Clarifying information added to section 1.2.6; deletion of section 4.2.	Elizabeth Adams Van Blargan
12/15/2016	1.3	Minor revision of table 2 text and a sentence in section 2.	Elizabeth Adams Van Blargan
12/14/2016	1.2	Addition of section 5.2. Figure 7 updated with example provided by Randal Frommater.	Elizabeth Adams Van Blargan
12/13/2016	1.1	Section 4.1 updated for preliminary and final status.	Elizabeth Adams Van Blargan
12/13/2016	1.0	Document baselined.	Elizabeth Adams Van Blargan

Artifact Rationale

Per the Veteran-focused Integrated Process (VIP) Guide, the User's Guide is required to be completed prior to Critical Decision Point #2 (CD2), with the expectation that it will be updated as needed. A User Guide is a technical communication document intended to give assistance to people using a particular system, such as VistA end users. It is usually written by a technical writer, although it can also be written by programmers, product or project managers, or other technical staff. Most user guides contain both a written guide and the associated images. In the case of computer applications, it is usual to include screenshots of the human-machine interfaces, and hardware manuals often include clear, simplified diagrams. The language used is matched to the intended audience, with jargon kept to a minimum or explained thoroughly. The User Guide is a mandatory, build-level document, and should be updated to reflect the contents of the most recently deployed build.

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1. Introduction

1.1. Purpose

This guide describes the important features of the Lab Micro Interface Release 1.0 Kernel Installation and Distribution System (KIDs) combined build. The combined build contains the LR*5.2*474 and the LA*5.2*90 releases in support of the VistA Laboratory Microbiology initiative.

Patch LR*5.2*474 will provide new functionality to the Enter/Verify Data option of the Lab Universal Interface (UI) package. Three new release actions will now be available to the Technologist with the authority to release results. Results will be available to the applicable authorized clinicians and providers. In addition, the patch will allow a VA Medical Center the option of setting release defaults at the Package or User level.

Patch LA*5.2*90 will provide the constructs necessary to allow Microbiology or MI subscripted tests to be added to an Auto Instrument entry. An enhancement is also included for antibiotic susceptibility result processing which will now allow laboratories the ability to report susceptibilities to antimicrobial agents by utilizing SNOMED CT codes such as Positive and Negative. The handling of variations is also included in the build, such as the reporting of extended-spectrum beta-lactamases or ESBL enzymes that are resistant to most beta-lactam antibiotics. Locally mapped codes using an "L" for code set ID will now be processed for antibiotic susceptibilities.

All of the following SNOMED CT codes shall be supported with the release of patch LA*5.2*90:

- 131196009 Susceptible
- 260357007 Moderately susceptible
- 264841006 Intermediately susceptible
- 30714006 Resistant
- 10828004 Positive
- 260385009 Negative

1.2. Document Orientation

1.2.1. Organization of the Manual

This guide is arranged in a manner in which Laboratory Information Manager (LIM) and Automated Data Processing Application Coordinator (ADPAC) staff members who are well versed in the VistA Laboratory package will utilize the software.

The manual provides users with an explanation of the features that are a part of the Lab Micro Interface Release 1.0 build.

1.2.2. Assumptions

This guide was written with the following assumed experience/skills of the audience:

- User has basic knowledge of the operating system (such as the use of commands, menu options, and navigation tools).
- User has been provided the appropriate active roles, menus, and security keys required.
- User is familiar with the VistA Laboratory software package.
- User has an understanding of Generic Instrument Managers (GIMs), such as Data Innovation's Instrument Manager™ (IM).

1.2.3. Coordination

The Microbiology initiative is a collaborative solution between the VistA Laboratory Enhancement (VLE) Team and Clinical Laboratory personnel. This solution provides Microbiology Laboratory Technologists a system that integrates with the existing VistA Microbiology system, specifically, the Laboratory Universal Interface.

Deployment will be performed by Local Facility staff and supported by team members from one or more of the operations organizations: Enterprise Systems Engineering (ESE), Field Operations (FO), Enterprise Operations (EO), Lab Subject Matter Experts (SME) and / or others.

1.2.4. Disclaimers

1.2.4.1. Software Disclaimer

This software was developed at the Department of Veterans Affairs (VA) by employees of the Federal Government in the course of their official duties. Pursuant to title 17 Section 105 of the United States Code this software is not subject to copyright protection and is in the public domain. VA assumes no responsibility whatsoever for its use by other parties, and makes no guarantees, expressed or implied, about its quality, reliability, or any other characteristic. We would appreciate acknowledgement if the software is used. This software can be redistributed and/or modified freely if any derivative works bear some notice that they are derived from it, and any modified versions bear some notice that they have been modified.

1.2.4.2. Documentation Disclaimer

The appearance of external hyperlink references in this manual does not constitute endorsement by the Department of Veterans Affairs (VA) of this Web site or the information, products, or services contained therein. The VA does not exercise any editorial control over the information you may find at these locations. Such links are provided and are consistent with the stated purpose of the VA.

1.2.5. Documentation Conventions

This section includes descriptions of any formatting or symbols and their meaning.

Various symbols are used throughout the documentation to alert the reader to special information. Table 1 gives a description of each of these symbols.

Table 1: Text Conventions

Font	Use	Example
Blue text, underlined	Hyperlink to another document or URL	For further instructions, refer to the following link: http://www.va.gov/vdl
Courier New	Menu options	`MDRO Tools Parameter Setup`
	Screen prompts	`Want KIDS to INHIBIT LOGONs during the install? YES//`
	VistA filenames	`XYZ file #798.1`
	VistA field names	"In the `Indicator` field, enter the logic that is to be used to determine if the test was positive for the selected MDRO."
Courier New, bold	User responses to screen prompts	**NO**
Courier New, bold	Keyboard keys	**< F1 >, < Alt >, < L >, <Tab>, <Enter>**
Courier New	Report names	`Procedures` report
Times New Roman	Body text (Normal text)	"There are no changes in the performance of the system once the installation process is complete."
Times New Roman Bold	Emphasis	**Note**: You can also type the access code, followed by a semicolon, followed by the verify code.
Times New Roman Bold	Very Important	 symbol

1.2.6. References and Resources

Documentation is also available on the VistA Document Library (VDL) The online versions will be updated as needed. Please look for the latest version on the VDL:

http://www.va.gov/vdl

The following documents were used in preparation of this guide:

- Technical Manual and Security Guide for Lab Micro Interface Release 1.0. December 2016, version 1.0.
- LA*5.2*90 Patch Description. November 2016. **Note:** this document is available via Forum only.

- LR*5.2*474 Patch Description. November 2016. **Note:** this document is available via Forum only.

1.3. National Service Desk and Organizational Contacts

The four tiers of support documented herein are intended to restore normal service operation as quickly as possible and minimize the adverse impact on business operations, ensuring that the best possible levels of service quality and availability are maintained.

Table 2 lists organizational contacts needed by site users for troubleshooting purposes. Support contacts are listed by name of service responsible to fix the problem, description of the incident escalation, associated tier level, and contact information.

Table 2: Tier Support Contact Information

Name	Role	Organization	Contact Information
Site Laboratory Information Manager (LIM)	Tier 0 Support	VHA	Local to each facility
OI&T National Service Desk	Tier 1 Support	OI&T	Nationalservicedeskanr@va.gov 1-855-673-4357
OI&T Local Support	Tier 2 Support	OI&T	OI&T Local Helpdesk
Health Product Support	Tier 2 Support	VHA	Nationalservicedeskanr@va.gov 1-855-673-4357
OI&T System Admin/Field Operation Support	Tier 2 & 3 support	OI&T	Nationalservicedeskanr@va.gov 1-855-673-4357
VistA Patch Maintenance	Tier 3 Application Support	OI&T	Nationalservicedeskanr@va.gov 1-855-673-4357
Enterprise Operations	Tier 3 & 4 Support	OI&T	OI&T Enterprise Operations Helpdesk

Table 3: Tier Support Contact Information for COTS Software

Name	Role	Organization	Contact Information
LIM	Tier 0 Support	VHA	Local to each facility
Commercial of-the-shelf (COTS) Vendor	Tier 2 Support	Vendor	Data Innovations http://www.datainnovations.com/

2. System Summary

The combined build, Lab Micro Interface Release 1.0, which contains LR*5.2*474 and LA*5.2*90, are enhancements to the VistA Legacy Laboratory module to support the ability to electronically transfer organism identification and drug susceptibility testing results (generated by an automated instrument) to VistA.

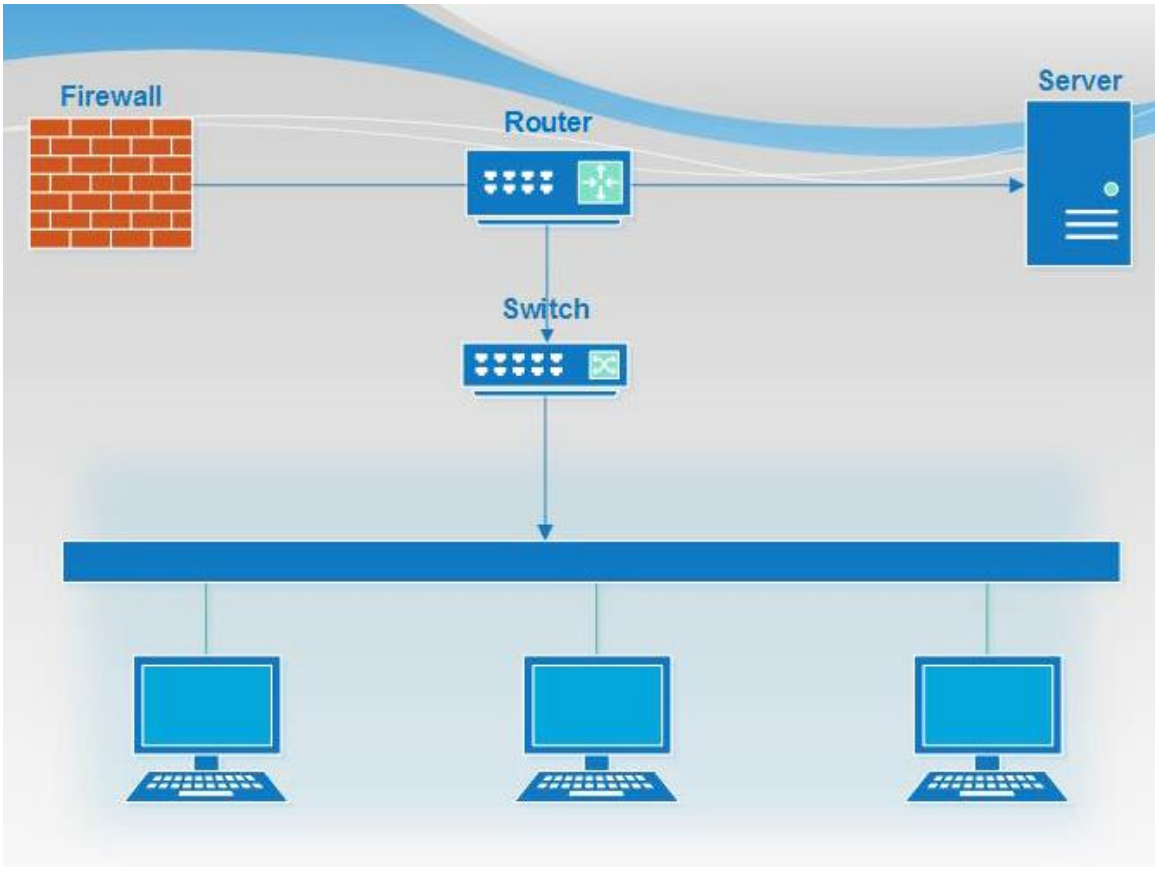
Lab Micro Interface Release 1.0 is an upgrade to the VistA Laboratory UI and will work in conjunction with the functionality in the Auto Release 1.0 (LR*5.2*458 and LA*5.2*88) software build and Data Innovation's enhanced IM driver software. Thus, the prerequisites for the utilization of the full functionality in the Lab Micro Interface Release 1.0 build includes the following:

- **Auto Release 1.0 (LR*5.2*458 and LA*5.2*88).**
- **Data Innovations IM version 8.13.03 or greater.**

2.1. System Configuration

The following diagram depicts the high-level network configuration for a Veteran Affairs Medical Center (VAMC).

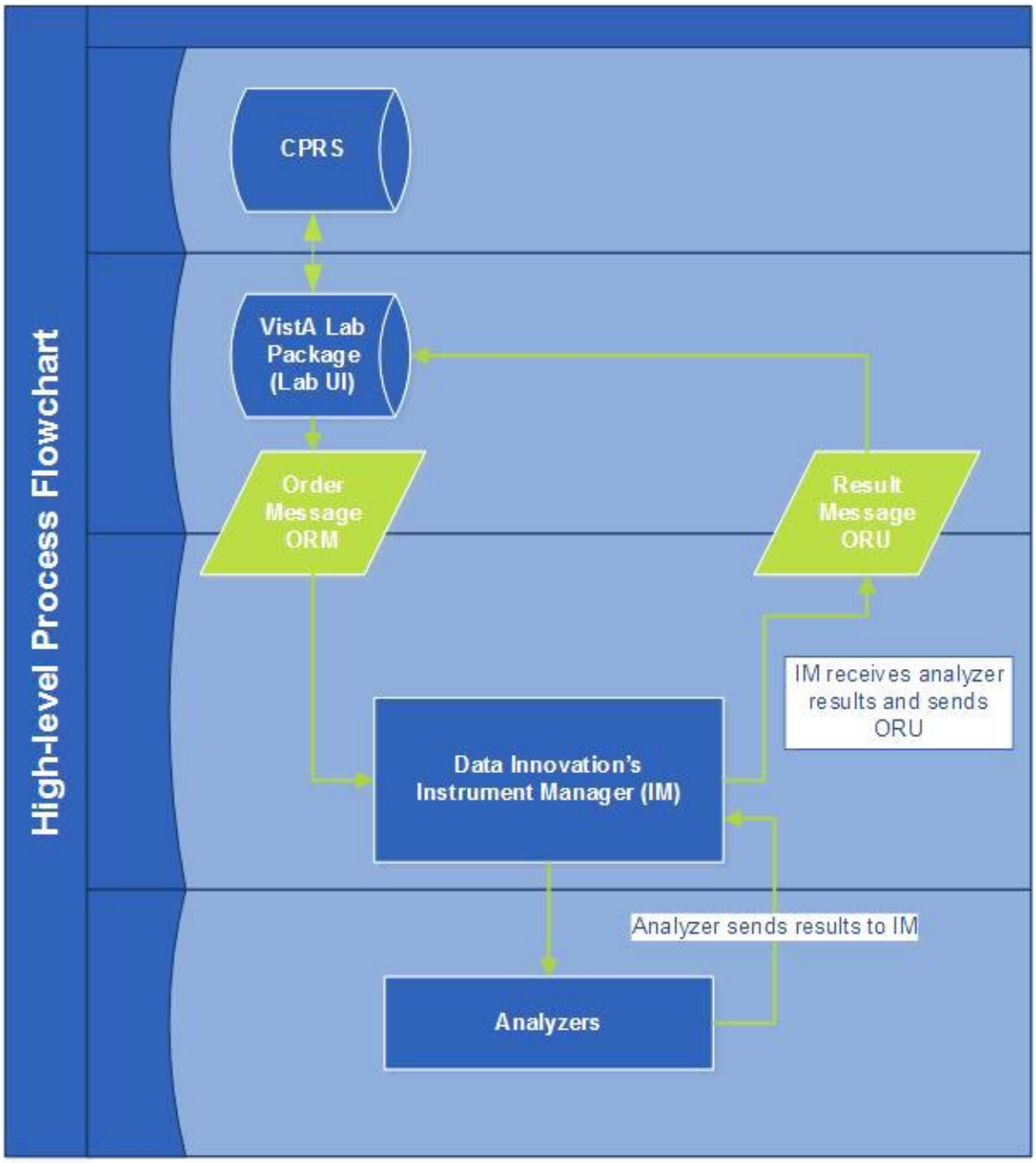
Figure 1: Simplified Topology for a VAMC



2.2. Data Flows

The following illustration depicts the data flow between the VistA/Laboratory UI, Data Innovation's IM, and the analyzers. The Laboratory UI generates the HL7 ORM, which is sent to the COTS middleware IM; the IM interfaces with the various instruments to receive data and sends an HL7 ORU back to the VistA Laboratory UI. Lab results are available through the VistA or the Computerized Patient Record System (CPRS).

Figure 2: Data Flow Diagram



The diagram below depicts the sequence of events for both an inbound and an outbound message regarding messages and acknowledgments.

Figure 3: Inbound and Outbound Messaging

2.3. User Access Levels

The core intended user base of the Lab Micro Interface Release 1.0 software build includes the following: laboratory staff; laboratory staff includes microbiology medical technologists and LIMs.

2.4. Continuity of Operation

In the event of an emergency, disaster, or accident, please contact the National Service Desk for support: Nationalservicedeskanr@va.gov or 1-855-673-4357.

3. Using the Software

3.1 Enter/verify data (auto instrument)

The Enter/verify data (auto instrument) option will allow the releasing technologist the following release actions:

- 0 Quit
- 1 Release
- 2 Comments/Release
- 3 Edit (full)

Entering 0 will abort review/release.

Entering 1 will allow release 'as is' with no editing.

Entering 2 will allow you to enter/edit comments then release.

Entering 3 will allow you to enter full edit, similar to 'Results entry' option.

Selections 1-3 will allow editing of status and approved date/time.

3.2. Setting the Release Default at the Package Level

A new parameter LR MI UI RELEASE DEFAULT is included with this patch which provides the VAMC site the ability to set the release default at the package and/or user levels.

To update the release default at the package level, perform the following steps:

1. At the prompt, enter **CC** for **Update CPRS Parameters**.
2. At the prompt, enter **PP** for **Package Level Parameter Edit**.
3. Enter a default release action at the prompt **Default Micro Instrument Release Action**.
4. If desired, set other applicable parameters and exit.

An example configuration is provided below.

Figure 4: Example for setting the default release option at the Package Level

```
Select Update CPRS Parameters <TEST ACCOUNT> Option: PP Package Level
Parameter Edit

Lab Package Level Parameters for Package: LAB SERVICE
------------------------------------------------------------------------------
Collect on Monday                                YES
Collect on Tuesday                               YES
Collect on Wednesday                             YES
Collect on Thursday                              YES
Collect on Friday                                YES
Collect on Saturday                              YES
Collect on Sunday                                YES
Lab Collects on Holidays                         YES
Lab Collect Days Allowed in Future               7
Maximum Days for Continuous Orders
Default manual verify method
Default load/work list verify method
Display Provider in Micro Result Entry
Default Micro Instrument Release Action VITEK    Edit (full)
Prompt CPRS Alert in Micro Result Entry          Don't Ask
Prompt CPRS Alert in CH Result Entry
EGFR Creatinine IDMS-traceable Method
EGFR Patient's Age Cutoff
EGFR Result Cutoff
Send an alert after AP release
Default AP Report Selection Prompt
Ask Performing Lab AP                            YES
Ask Performing Lab Micro                         YES
Print SNOMED Code System                         SNOMED I
Document Surgery Package Case Info               NO
Chemistry GUI Report Right Margin
Microbiology GUI Report Right Margin
AP GUI Report Right Margin
Method of Assigning AP Accession Number
Default Accessioning Specimen
Default Accessioning Collection Sample
Default Accessioning Lab Test
Exclude removed tests from building
Use default accession dates
Print Reporting/Printing Facility                None
Days to keep of instrument data 1                2
Lab STS Default Mapping Files Directory
Lab STS Default Mapping Filespec                 *.TXT
```

```
-------------------------------------------------------------------------
COLLECT MONDAY: YES//
COLLECT TUESDAY: YES//
COLLECT WEDNESDAY: YES//
COLLECT THURSDAY: YES//
COLLECT FRIDAY: YES//
COLLECT SATURDAY: YES//
COLLECT SUNDAY: YES//
IGNORE HOLIDAYS: YES//
LAB COLLECT DAYS ALLOWED IN FUTURE: 7//
MAXIMUM DAYS FOR CONTINUOUS ORDERS:
Default manual verify method:

For Default load/work list verify method -
Select Accession Area:
Display Provider in Micro Result Entry:

For Default Micro Instrument Release Action -
Select Load/Work List: VITEK

Load/Work List: VITEK//   VITEK   VITEK
Default load/work list verify method: Edit (full)//

For Default Micro Instrument Release Action -
Select Load/Work List:
   NOTE: This parameter will allow the default release action to be
   Load/Work List specific.
```

3.3. Setting the Release Default at the User Level

To update the release default at the package level, perform the following steps:

1. Select the **Information Help** menu option.
2. At the prompt, enter **PP** for the **General Lab User Parameters** menu option.
3. Enter a default release action at the prompt **Default Micro Instrument Release Action**.
4. If desired, set other applicable parameters and exit.

An example configuration is provided below.

Figure 5: Example for setting the default release option at the User Level

```
Select Information-help menu <TEST ACCOUNT> Option: PP  General Lab User
Parameters

Lab User Level Parameters for User: TECH,MICRO
------------------------------------------------------------------------------
Default lab label printer
Display previous comments for test
Default Performing Laboratory
Ask Performing Lab AP
Ask Performing Lab Micro
Display Provider in Micro Result Entry
Prompt CPRS Alert in CH Result Entry
Prompt CPRS Alert in Micro Result Entry
Default Micro Instrument Release Action VITEK     Release
Default AP Report Selection Prompt
Send an alert after AP release
Default Accessioning Specimen
Default Accessioning Collection Sample
Default Accessioning Lab Test
Exclude removed tests from building
Use default accession dates
Lab Messaging - Parse HL7 Messages
Lab Messaging - Display using Browser
Lab Messaging - Show Identifiers
Chemistry GUI Report Right Margin
Microbiology GUI Report Right Margin              132
AP GUI Report Right Margin                        240
Lab STS Default Mapping Files Directory
Lab STS Default Mapping Filespec
------------------------------------------------------------------------------
For Default lab label printer -
Select Division:

For Display previous comments for test -
Select Laboratory Test:
Default Performing Laboratory:
Ask Performing Lab AP:
Ask Performing Lab for MICRO:
Display Provider in Micro Result Entry:
Send CPRS Alert in CH Result Entry:
Send CPRS Alert in Micro Result Entry:

For Default Micro Instrument Release Action -
Select Load/Work List: VITEK
Are you adding VITEK as a new Load/Work List? Yes//   YES

Load/Work List: VITEK//   VITEK   VITEK
Default load/work list verify method: Release
 For Default Micro Instrument Release Action -
Select Load/Work List:
   NOTE: This parameter will allow the default release action to be
   Load/Work List specific.
AP Report Selection Default: ^
```

3.4. Review of User Settings

If desired, the User Settings may be reviewed by performing the following steps:

1. At the **Lab Liaison** menu prompt select **OE/RR** for the **Interface Parameters** menu option.

2. At the **OE/RR Interface Parameters** prompt select **CC** for the **Update CPRS Parameters** menu option
3. At the **Update CPRS Parameters** prompt select **UL** for the **Display Lab User Parameters** menu option.

An example of how to review the user settings is illustrated below.

Figure 6: Example of Review User Settings option

```
Select Lab liaison menu <TEST ACCOUNT> Option: OE/RR interface parameters

   EH     Edit HOSPITAL SITE parameters
   AS     Edit a lab administration schedule
   IL     Inquire to a Lab administration schedule
   CC     Update CPRS Parameters ...

Select OE/RR interface parameters <TEST ACCOUNT> Option: CC Update CPRS
Parameters

   PA     Update CPRS with Lab order parameters
   SI     Update CPRS with Single Lab test
   UP     Update CPRS with all Lab test parameters
   DO     Domain Level Parameter Edit
   LO     Location Level Parameter Edit
   PP     Package Level Parameter Edit
   UL     Display Lab User Parameters

Select Update CPRS Parameters <TEST ACCOUNT> Option: UL Display Lab User
Parameters
Select PARAMETER DEFINITION NAME:    LR MI UI RELEASE DEFAULT   Default Micro
Instrument Release Action

Values for LR MI UI RELEASE DEFAULT

Parameter                      Instance             Value
-------------------------------------------------------------------------------
USR: TECH,MICRO                VITEK                Release
Enter RETURN to continue:
   PA     Update CPRS with Lab order parameters
   SI     Update CPRS with Single Lab test
   UP     Update CPRS with all Lab test parameters
   DO     Domain Level Parameter Edit
   LO     Location Level Parameter Edit
   PP     Package Level Parameter Edit
   UL     Display Lab User Parameters

Select Update CPRS Parameters <TEST ACCOUNT> Option:
```

4. Troubleshooting

4.1. HL7 ERR Segment

The ERR segment is used to add error comments to acknowledgment messages when receiving ORU Result Messages. The fields supported are listed below and can be utilized in troubleshooting issues.

ERR-3 HL7 Error Code

- If MSA-1 Acknowledgment Code is AA then ERR-3 will contain value 0 from HL7 Table 0357.
- If MSA-1 Acknowledgment Code is AE then ERR-3 will contain an error code/message from HL7 Table 0357.

ERR-4 Severity
- If MSA-1 Acknowledgment Code is AA then ERR-4 will be blank.
- If MSA-1 Acknowledgment Code is AE then ERR-4 will contain an error code/message from HL7 Table 0357

ERR-5 Application Error Code
- If MSA-1 Acknowledgment Code is AA then ERR-5 will be blank.
- If MSA-1 Acknowledgment Code is AE then ERR-5 will contain an error code/message from VistA Laboratory LA7 MESSAGE LOG BULLETINS FILE (#62.485)

ERR-8 User Message
- If MSA-1 Acknowledgment Code is AA then ERR-8 will be blank.
- If MSA-1 Acknowledgment Code is AE then ERR-8 will contain text message from ERR-5.

ERR-9 Inform Person Indicator
- If MSA-1 Acknowledgment Code is AA then ERR-9 will be blank.
- If MSA-1 Acknowledgment Code is AE then ERR-9 will contain "USR".

An example of an AE application error is shown below.

Figure 7: Example Message with an AE application error.

```
   DATE/TIME ENTERED: NOV 19, 2016@07:37:36
  TRANSMISSION TYPE: OUTGOING
  RELATED EVENT PROTOCOL: LA7UI1 ORU-R01 EVENT
MESSAGE TEXT:
 MSA|AE|AITC001|Msg # 469, specimen source HL7 MAR in message does not match
accession's UID 3716000013 related topography code. See file #61, TOPOGRAPHY entry #
70.

 ERR|||207^Application internal error^HL70357|E|49^Msg # 469, specimen source HL7
MAR in message does not match accession's UID 3716000013 related topography code.
See file #61, TOPOGRAPHY entry # 70.^99VA62.485||
|Msg # 469, specimen source HL7 MAR in message does not match accession's UID 3
716000013 related topography code. See file #61, TOPOGRAPHY entry # 70.|USR

  NO. OF CHARACTERS IN MESSAGE: 530   NO. OF EVENTS IN MESSAGE: 1
```

Glossary

Glossary of Terms	Definitions
Access Code	A code that allows the computer to identify you as a user authorized to gain access to the computer. Your code is greater than six and less than twenty characters long; can be numeric, alphabetic, or a combination of both; and is usually assigned by a site manager or application coordinator.
ADPAC	Automated Data Processing Coordinator. The ADPAC is the person responsible for planning and implementing new work methods and technology for employees throughout a medical center. ADPACs train employees and assist users when they run into difficulties, and needs to know how all components of the system work. ADPACs maintain open communication with their supervisors and Service Chiefs, as well as their counterparts in Fiscal and Acquisitions and Materiel Management (A&MM), or Information Resource Management (IRM). Also, the designated individual responsible for user-level management and maintenance of an application package (*e.g.*, Laboratory).
Auto Instruments	Automated instruments used in the Lab that identify and measure tissue or other specimens.
Bactec™	An automated instrument used for analyzing blood cultures within the Microbiology module.
COTS	Commercial off-the-shelf. Software or hardware that can be purchased as a packaged solution.
Driver	Computer program which transports electronic information such as data or commands going between two computers or devices.
FileMan	FileMan is a set of M utilities written in the late 1970s and early 1980s which allow the definition of data structures, menus and security, reports, and forms. Its first use was in the development of medical applications for the Veterans Administration (now the Department of Veterans Affairs). Since it was a work created by the government, the source code cannot be copyrighted, placing that code in the public domain. For this reason, it has been used for rapid development of applications

Glossary of Terms	Definitions
	across a number of organizations, including commercial products.
FORUM	FORUM is the VA's national-scale email system. FORUM uses the VistA mail software and provides an excellent interface for threaded messages that can take the form on ongoing discussions. The National Patch Module is a VistA application that helps developers to manage the numbering, inventory, and release of patches. Patches are developed in response to request submissions and an error reporting request system known as National Online Information Sharing. A process called the Kernel Installation Distribution System (KIDS) is used to roll up patches into text messages that can be sent to sites along with installation instructions. The patch builds are sent as text messages via email, and the recipient (e.g., a site administrator) can run a PackMan function to unpack the KIDS build and install the selected routines.
File Transfer Protocol (FTP)	A client-server protocol which allows a user on one computer to transfer files to and from another computer over a TCP/IP network. Also the client program the user executes to transfer files. It is defined in Internet Standard 9, Request for Comments 959.
Generic Instrument Manager (GIM)	Vendor system communicating with VistA is called a Generic Interface Manager (GIM).
Globals	M uses globals: variables which are intrinsically stored in files and which persist beyond the program or process completion. Globals appear as normal variables with the caret character in front of the name. For example, the M statement… SET ^A("first_name")="Brendan" …will result in a new record being created and inserted in the persistent just as a file persists in an operating system. Globals are stored, naturally, in highly structured data files by the language and accessed only as M globals. Huge databases grow randomly rather than in a forced serial order, and the strength and efficiency of M is based on its ability to handle all this flawlessly and invisibly to the programmer. For all of these reasons, one of the most common M programs is a database management system. FileMan is one such example. M allows the

Glossary of Terms	Definitions
	programmer much wider control of the data; there is no requirement to fit the data into square boxes of rows and columns.
Kernel	The VistA software that enables VistA applications to coexist in a standard operating system independent computing environment.
Kernel Installation and Distribution System (KIDS)	KIDS provides a mechanism to create a distribution of packages and patches; allows distribution via a MailMan message or a host file; and allows queuing the installation of a distribution for off-hours.
LIM	Laboratory Information Manager. The LIM manages the laboratory files in VistA. Additional duties include creation of new tests, interface set-up and maintenance of instruments, coordination with staff outside of lab to create quick orders, order sets and other Computerized Patient Record System (CPRS) functions.
M	M is a procedural, interpreted, multi-user, general-purpose programming language designed to build and control massive databases. It provides a simple abstraction that all data values are strings of characters, and that all data can be structured as multiple dimensional arrays. M data structures are sparse, using strings of characters as subscripts. M was formerly (and is still commonly) called MUMPS, for Massachusetts General Hospital Utility Multiprogramming System.
Massachusetts General Hospital Utility Multi-Programming System (MUMPS)	See M
MailMan	MailMan is an electronic messaging system that transmits messages, computer programs, data dictionaries, and data between users and applications located at the same or at different facilities. Network MailMan disseminates information across any communications medium.
Mass Spec™	An automated instrument used for organism identification within the Microbiology module.
MUMPS	See M
Namespace	A logical partition on a physical device that contains all the artifacts for a complete M system, including globals, routines, and libraries. Each namespace is unique, but data can be shared between namespaces with proper addressing

Glossary of Terms	Definitions
	within the routines. In VistA, namespaces are usually dedicated to a particular function. The MMMS namespace, for example, is designed for use by MRSA-PT.
PackMan	A specific type of MailMan message used to distribute KIDS builds.
SNOMED CT	Systematized Nomenclature of Medicine Clinical Terms was developed to standardize the coding of information regarding specific diseases.
VAMC	Department of Veterans Affairs Medical Center.
Vitek™	An automated instrument used for measuring antibiotic susceptibility within the Microbiology module.