



**LABORATORY HEWLET PACKARD (HP)  
CAREVUE INTERFACE  
Patch LR\*5.2\*254 and Patch LA\*5.2\*53  
INTERFACE SPECIFICATIONS**

Version 5.2

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Department of Veteran Affairs  
VISTA Software Service  
Clinical Specialties Product Line



## Introduction

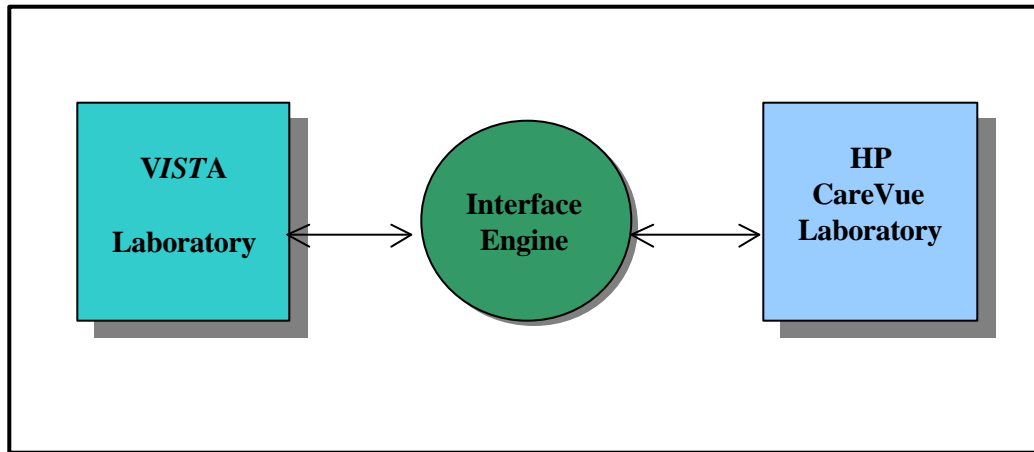
The purpose of this document is to describe the Veterans Health Information Systems and Technology Architecture (*VISTA*) Laboratory Test result system's use of the HL7 Interface Standard (Version 2.3) and to provide a reference guide for implementing this interface with the CareVue system.

The focus of this document is to describe the HL7 Observation Request Unsolicited (ORU) control message used for sending *VISTA* lab test results to the CareVue system. The interface is designed to generate an ORU message upon verification of lab results for any patient whose reporting location is identified as either a CareVue location.

# Overview - VISTA Laboratory Interface

The **VISTA** Laboratory interface provides the capability for **VISTA** to broadcast laboratory results that are entered into **VISTA**. Each time laboratory results are verified in **VISTA**, the laboratory interface determines if those results should be sent to the Interface Engine (see paragraph below).

**Figure 1: VISTA Laboratory Interface**



## VISTA Filtering of Results

Not all laboratory results are sent to the Interface Engine. Each time laboratory results are verified in **VISTA**, the location designated as the report routing location (this defaults to the ordering location entered at the time of ordering the laboratory tests in **VISTA**) is checked to see if the results should be sent to the CareVue. **VISTA** uses the FOREIGN INTERFACE file (#62.487) for this purpose.

If there is an entry in this file for the specified location, an HL7 message is generated and sent to the Interface Engine. The location must match exactly an entry in the FOREIGN INTERFACE and must be a valid location in the Hospital Location file (#44).

# VISTA System Environment

VISTA uses standardized HL7 messaging software, HLLP, for communicating with external systems. Within VISTA, different instances of the HLLP software (VMS processes) are associated with different applications. Each instance of the HLLP software is assigned a unique name in the VISTA device file.

Table 1 identifies the HLLP process names associated with the HOST integration.

## HLLP Operation - VISTA Results Interface

VISTA provides the optional capability to automatically restart HLLP's each time the running process is terminated (because of an interruption on the communications connection with the Interface Engine or other system interruption). This option should be selected for each HLLP communicating with the Interface Engine.

**Table 1: VISTA HLLP Processes - HOST Integration Example**

VISTA Interface	VISTA HLLP Process	VISTA Virtual Device
<b>VISTA Outgoing Interfaces (VISTA to Interface Engine)</b>		
ADT - Test	OG_TEST	LTA_9297
ADT - Production	OG_PROD	LTA_9299
Laboratory Results - Test	OG_LAB_TEST	LTA_9333
Laboratory Results - Production	OG_LAB_PROD	LTA_9334
<b>VISTA Incoming Interfaces (Interface Engine to VISTA)</b>		
Results - Test	IC_TEST	LTA_9161
Results - Production	IC_PROD	LTA_9296

# VISTA Network Connectivity to Interface Engine

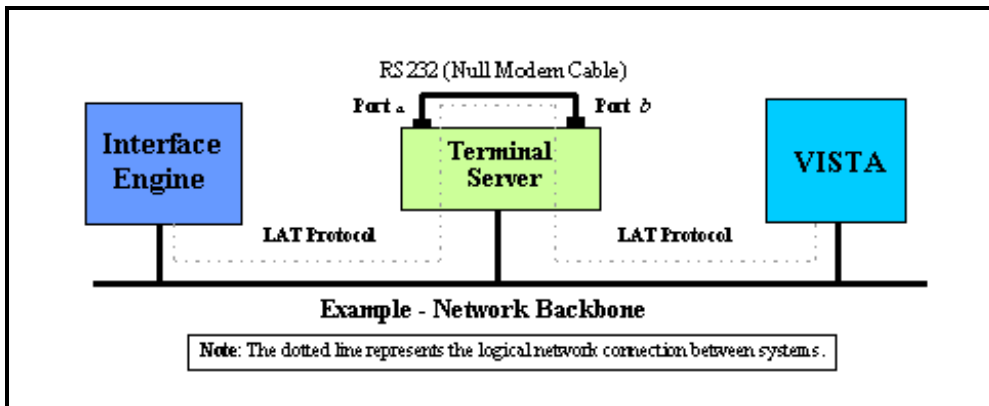
The VISTA HL7 software uses asynchronous type communications. Separate communications lines have been dedicated for each of the VISTA interfaces that have been implemented with the Interface Engine. Configuring the system to support both a test interface and a production interface requires an additional set of dedicated lines.

The communication lines between VISTA and the Interface Engine are implemented by dedicating ports on a Digital terminal server. Each of the lines requires two terminal server ports, one for the VISTA end of the communication and one for the Interface Engine end of the communication. The two terminal server ports are physically connected using a null modem cable.

Both VISTA and the Interface Engine communicate with the terminal server(s) using the Local Area Transport (LAT) protocol over the Ethernet backbone.

Figure 2 illustrates how the connections between VISTA and the Interface Engine are implemented.

**Figure 2: VISTA to Interface Engine Network Connections**



These ports can be provided by any terminal server(s) connected to the network with the only requirement being that each pair (VISTA end and Interface Engine end) be physically connected using a null modem cable.

Table 2 identifies the terminal server ports, which are being used to communicate between *VISTA* and the Interface Engine.

**Table 2: Terminal Server Ports - VISTA to Interface Engine Communications Example**

<b>VISTA Interface HL7 LLP</b>	<b>Terminal Server Port (VISTA Connection) VISTA Virtual Device</b>	<b>Terminal Server Port (Interface Engine Connection) Interface Engine Virtual Device</b>
Laboratory Results I/F - Production INTERFACE ENGINELABRESULTS LLP	DSV 104 Port 2 LTA_9334 OG_LAB_PROD	DSV 104 Port 1 LAT device 649 vista_ic_lab

**Laboratory Results Interface (vista\_ic\_lab)**

The laboratory interface is an outgoing interface from *VISTA* to the Interface Engine which transmits HL7 ORU messages to communicate laboratory results that have been verified in *VISTA*. The Interface Engine translates these incoming messages for communication to HP CareVue.

Communications lines and terminal server port designations are assigned in *VISTA* by the IRM operations staff and are defined as follows:

**Outgoing**

```

NAME: OG_LAB_PROD                                $I: _LTA9334:
  LOCATION OF TERMINAL: COMPUTER ROOM           ASK HOST FILE: YES
  SUBTYPE: C-OTHER                               TYPE: TERMINAL
  LAT SERVER NODE: DSV104                       LAT SERVER PORT: PORT_6
  
```

**Incoming**

```

NAME: IC_LAB_PROD                                $I: _LTA9296:
  LOCATION OF TERMINAL: IRM COMPUTER ROOM
  SUBTYPE: P-OTHER                               TYPE: TERMINAL
  LAT SERVER NODE: DSV104                       LAT SERVER PORT: PORT_8
  
```

Communication between *VISTA* and the Interface Engine is accomplished using an asynchronous serial communications protocol as if the systems were connected using a standard RS232 asynchronous serial communications line.



Table 3 and Table 4 identify the terminal server port settings for the **VISTA** interface with the Interface Engine. These settings are used for terminal server ports, one for the **VISTA** end, and the other for the Interface Engine end. IRM operations staff can modify terminal server port settings.

**Table 3: Terminal Server Port Settings - VISTA to Interface Engine ADT Interface**

Port <i>n</i>		Server: DSV <i>nnn</i>	
Character Size:	8	Input Speed:	9600
Flow Control:	XON	Output Speed:	9600
Parity:	None	Signal Control	Enabled
Stop Bits:	Dynamic	Signal Select:	CTS-DSR-RTS-DTR
Access:	Remote	Local Switch:	None
Backwards Switch:	None	Name:	PORT_ <i>n</i>
Break:	Remote	Session Limit	1
Forwards Switch:	None	Type:	Soft
Default Protocol:	LAT		
Preferred Service: None			
Authorized Groups: 0			
(Current) Groups: 0			
Enabled Characteristics:			
Autoconnect, DTRwait			

**Table 4: Terminal Server Port Settings - VISTA to Interface Engine Results Interface**

Port <i>n</i>		Server: DSV <i>nnn</i>	
Character Size:	8	Input Speed:	9600
Flow Control:	XON	Output Speed:	9600
Parity:	None	Signal Control	Enabled
Stop Bits:	Dynamic	Signal Select:	CTS-DSR-RTS-DTR
Access:	Remote	Local Switch:	None
Backwards Switch:	None	Name:	PORT_ <i>n</i>
Break:	Remote	Session Limit	1
Forwards Switch:	None	Type:	Soft
Default Protocol:	LAT		
Preferred Service: None			
Authorized Groups: 0			
(Current) Groups: 0			
Enabled Characteristics:			
Autoconnect, DTRwait			

## Detailed Description - VISTA Laboratory Results Interface

**VISTA** sends laboratory results messages to the INTERFACE ENGINE using an HL7 message format. The Interface Engine converts these messages to the message formats required by the CareVue systems and sends the messages to CareVue.

The **VISTA** Laboratory Results Interface Mapping describes the messages according to the HL7 format that is received from **VISTA**.

# VISTA Laboratory Results Interface Mapping

Laboratory results are sent to the Interface Engine as HL7 ORU Unsolicited Results messages. Table 5 identifies the HL7 message segments that comprise the message format for result messages being sent from **VISTA**.

**Table 5: ORU Message Layout**

<b>HL7 Segment</b>	<b>Description</b>
MSH	Message Header Segment
PID	Patient Identification Segment
OBR	Observation Request Segment
NTE	Optionally, one or more Notes and Comments Segments.
OBX	One or more Observation Segments

The following tables identify the specific data elements for each of the HL7 segments. These tables identify only those fields that are supported by the **VISTA** interface. All other fields in the HL7 segments are not currently used by **VISTA**.

**Note:** **VISTA** uses HL7 control characters in a different manner than defined in the current HL7 Standard.

**Table 6: MSH Message Header Segment**

HL7 Seq	HL7 Field Name	Req'd or Opt	Data Type	Length	VISTA Value/ Comments
1	Field Separator	R	ST	1	“^” see notes below
2	Encoding Characters	R	ST	4	“~\ &” see notes below
3	Sending Application		ST	15	VISTA sends as “DHCP CARELIFE”
4	Sending Facility		ST	20	VISTA sends station number
5	Receiving Application		ST	30	VISTA sends as “INTERFACE ENGINE CARELIFE”
6	Receiving Facility		ST	30	VISTA sends station number
7	Date/Time of Message		TS	26	YYYYMMDDHHMMSS
8	Security		NM	40	Not used
9	Message Type	R	CM	7	VISTA sends as “ORU^R01” see notes below
10	Message Control ID	R	ST	20	Unique message ID generated by the sending system
11	Processing ID	R	ID	1	VISTA sends as “P” see notes below
12	Version ID	R	ID	8	VISTA sends as “2.3”
15	Accept Acknowledgment Type		ID	2	VISTA sends as “AL” (Always)
16	Application Acknowledgment Type		ID	2	VISTA sends as “AL” (Always)
17	Country Code		ID	2	VISTA sends as “USA”

**MSH Segment Notes**

**Data Type:** ST: String data - left justified with optional trailing blanks

TS: time stamp always in the format YYYYMMDDHHMM[SS][+/-ZZZZ]

CM: A field that is the combination of other meaningful data fields.

ID: ST formatted data that corresponds to a table entry maintained by system

NM: Numeric

**Field Separator & Encoding Characters:**

VISTA Value	Description
^	field separator
~	component separator
	repetition separator
\	escape character
&	subcomponent separator

**Message Type:** <message type><trigger event>

**Processing ID:** “D” - Debugging messages sent from INTERFACE ENGINE Test Environment

“P” - Production messages sent from INTERFACE ENGINE Production Environment

**Table 7: PID – Patient Identification Segment**

<b>HL7 Seq</b>	<b>HL7 Field Name</b>	<b>Req'd or Opt</b>	<b>Data Type</b>	<b>Length</b>	<b>VISTA Value / Comment</b>
3	Patient ID (Internal ID)	R	CM	20	VISTA internal entry number.
6	Mother's Maiden Name		ST	48	VISTA Mother's maiden Name

**PID Segment Table Notes:**

**Data Type**CM: A field that is the combination of other meaningful data fields.

ST: String data - left justified with optional trailing blanks

**Patient ID (Internal ID):** <patient ID (ST)><check digit (NM)><check digit scheme (ID)>  
<assigning facility ID (ST)><type (ID)>

**Note:** VISTA calculates the check digit as the check digit scheme applied to the sum of the digits, where non-numeric digits are calculated as zero (0).

This check digit scheme **DOES NOT** conform to the HL7 standard.

**Table 8: OBR – Observation Request Segment**

HL7 Seq	HL7 Field Name	Req'd or Opt	Data Type	Length	VISTA Value / Comment
3	Filler Order Number	R	CM	75	VISTA Accession Number see notes below
4	Universal Service ID	R	CE	200	VISTA copies the accession area identification from Filler Order Number into the 1 <sup>st</sup> component. see note below
7	Observation Date/Time		TS	26	YYYYMMDDHHMMSS
14	Specimen Received Date/Time		TS	26	YYYYMMDDHHMMSS
15	Specimen Source		CM	300	VISTA limits to 150 characters. see notes below
22	Results Rpt/Status Chng - Date/Time		TS	26	Date/Time results are verified in VISTA.
24	Diagnostic Serv Sect ID		ID	10	VISTA sends as "LAB"
28	Result Copies To		CN	150	VISTA sends the location specified in the order as the 1 <sup>st</sup> component.

**OBR Segment Table Notes:**

**Data Type:** CM: composite field which may include multiple components

CE: Coded Element - contains six components in two groups as follows:

<identifier><text><name of coding system>

<alternate identifier><alternate text><name of alternate coding system>

TS: time stamp always in the format YYYYMMDDHHMM[SS][+/-ZZZZ]

ID: ST formatted data that corresponds to a table entry maintained by system

**Filler Order Number:** <unique filler ID><filler application ID>

<unique filler ID> contains VISTA accession number in the format

*xxxx nnnn aaaa*, where

*xxxx* is a numerical prefix whose value depends on when (day (*mdd*),  
month (*mm*) or year (*yy*)) the numeric accession number  
resets to 1.

*nnnn* is the numeric accession number and

*aaaa* is the VISTA accession area

<filler application ID> is not sent

**Specimen Source:** <specimen source (CE)><additives (TX)><free text (TX)><body site (CE)>

<site modifier>, where VISTA sends specimen source a s:

<SNOMED Code><Topography Name>

**Universal Service ID:**

<AU~AUTOPSY~L>

<BB~BLOOD BANK~L>

<CH~CHEMISTRY~L> or any other name

<CY~CYTOPATHOLOGY~L>

<EM~ELECTRON MICROSCOPY~L>

<MI~MICROBIOLOG~L>

<SP~SURGICAL PATHOLOGY~L>

Specimen Source: <SNOMED code1 ;Topography name1~ SNOMED code2 ;Topography name2>

**Example:** <0X400;Plasma~0X400;Plasma>

**Table 9: NTE – Notes and Comments Segment**

HL7 Seq	HL7 Field Name	Req'd or Opt	Data Type	Length	VISTA Value / Comment
2	Source of Comment		ID	8	VISTA sends as "L"
3	Comment		TX	64K	VISTA sends one line of comment text in each NTE segment and allows multiple segments.

**NTE Segment Table Notes:**

**Data Type:** ID: Value corresponds to a table entry maintained by system

TX: String data (including leading spaces)

**Table 10: OBX – Result Segment - VISTA Laboratory Interface**

HL7 Seq	HL7 Field Name	Req'd or Opt	Data Type	Length	VISTA Value / Comment
2	Value Type	R	ID	2	VISTA does not send.
3	Observation Identifier	R	CE	80	VISTA sends the lab test name as the 2 <sup>nd</sup> component.
5	Observation Results		ST	64K	Verified results VISTA limits to 20 characters
6	Units		CE	20	Verified units used in test, e.g. mg/dL, %, NEG-POS etc.
7	References Range		ST	40	"reference low - reference high" "critical low - critical high" "therapeutic low - therapeutic high"
8	Abnormal Flags		ID	10	VISTA sends as: "_" or "N" = Normal "H" = High "HH" = Dangerously High "L" = Low "LL" = Dangerously Low
11	Observe Result Status	R	ID	2	VISTA only sends results with a status of "F" = Final. Corrected results are also sent with a status of "F" = Final.

**OBX Segment Table Notes:**

**Data Type:** ID: Value corresponds to a table entry maintained by system

CE: Coded Element - contains six components in two groups as follows:

<identifier><text><name of coding system>



<alternate identifier><alternate text><name of alternate coding system>  
 ST: String data  
 CM: Composite field which may include multiple components.

**Table 11: MSA – Message Acknowledgement Segment**

<b>HL7 Seq</b>	<b>HL7 Field Name</b>	<b>Req'd or Opt</b>	<b>Data Type</b>	<b>Length</b>	<b>VISTA Value / Comment</b>
1	Acknowledgment Code	R	ID	2	“AA”, “AE”, “AR”
2	Message Control ID	R	ST	20	Message Control ID of the sending system. It is echoed back by the receiving system.
3	Text Message		ST	80	An optional text field that further describes an error condition.