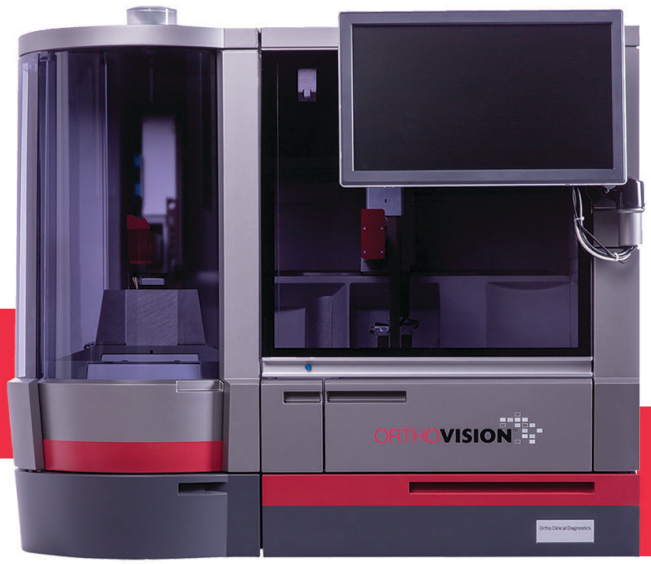
ORTHOVISION™ Analyzer

For ORTHO BioVue® Cassettes

Laboratory Information System (LIS) Guide



TRANSFUSION MEDICINE

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1. Introduction

1.1 Purpose

This Guide defines the communications interface between the ORTHO VISION™ Analyzer and a customer's Laboratory Information System (LIS). This Guide also explains the supporting requirements for the configuration of these interfaces.

1.2 Audience

This document serves as a reference for Information Technology personnel who are responsible for creating and maintaining the communication between the ORTHO VISION™ Analyzer and the Laboratory Information System (LIS).

1.3 Revision History

Version	Section Number	Section Title	Revision Details
2014-09-02	All	All	Initial Release

1.4 Definitions

AD	Application Data. Media that contains test or protocol rules that controls the ORTHO VISION™ Analyzer when tests are processed.
Assay	Part of a Test that uses one column of the cassette to analyze a Sample.
Cassette	Plastic container that contains six columns where reactions occur; cassette is the informal name for the ORTHO BioVue® System Cassette.
Column	One of 6 microtubes of a cassette where the reaction occurs.
Device	A specialized part of the ORTHO VISION™ Analyzer that performs a function, such as centrifuge, incubator, or pipettor.
Download	Data transfer from the Laboratory Information System to the ORTHO VISION™ Analyzer.
Error	1. A general type of error related to a handling strategy. 2. A specific error event related to a handling history.
Frame	The basic unit of communication at the Data Link Layer for ASTM protocol.
LIS	Laboratory Information System. In relation to the ORTHO VISION™ Analyzer, the LIS is a computer system in the laboratory responsible for tracking sample orders and results.
OCD	Ortho Clinical Diagnostics.
Order	A request to perform a profile (group of tests) for samples of a single patient (and several donors).
ORTHO VISION™ Analyzer	An instrument designed to automate in vitro Immunohematology testing of human blood.

Sample	A tube of patient or donor blood.
Test	A determination of a single analyte or a combination of values from other determinations of observations which constitute a measure of a single system attribute.
Upload	Data transfer from the ORTHO VISION™ Analyzer to the Laboratory Information System.
User	The operator of the ORTHO VISION™ Analyzer.

1.5 References

ASTM E 1381-02	ASTM E 1381-02 – Standard Specification for Low Level Protocol to Transfer Messages Between Clinical Laboratory Instruments and Computer Systems
ASTM E 1394-97	ASTM E 1394-97 – Standard Specification for Transferring Information Between Clinical Laboratory Instruments and Computer Systems
LIS1-A	ANSI/CLSI LIS1-A– Standard Specification for Low Level Protocol to Transfer Messages Between Clinical Laboratory Instruments and Computer Systems
LIS2-A	ANSI/CLSI LIS2-A – Specification for Transferring Information Between Clinical Laboratory Instruments and Information Systems

2. External Interface Design

2.1 Overview

The Laboratory Information System (LIS) interface is used to communicate between the ORTHO VISION™ Analyzer and a LIS.

2.2 The LIS Interface

The ORTHO VISION™ Analyzer implements an interface to a remote LIS connected through TCP/IP, RS232, or shared folders.

2.2.1 Purpose

The LIS Interface simplifies the management of multiple ORTHO VISION™ Analyzers. Analysis results can be managed centrally.

2.2.2 Data Elements

The LIS Interface supports three working modes: Upload, Download, and Host Query.

Upload Mode – Results are transferred to a connected LIS. The user cannot release unaccepted results to the LIS; the user can manually resend accepted individual results to the LIS.

With this mode, the user can select one of the following LIS result transmission options:

Disabled – The result transmission is disabled.

Manual – Accepted results are only transmitted upon user request. The user can release accepted results to the LIS.

Automatic – The results of an order are transmitted when all the results of the order are available and all the results have been automatically accepted. (Manually accepted results are only transmitted upon user request.)

Partial – Automatically accepted results are transmitted upon availability. (Manually accepted results are only transmitted upon user request.)

> NOTE: A result is only automatically accepted if all results of an order using the same test analysis are consistent, for example, are available.

Download Mode – The laboratory information system can transmit orders to the ORTHO VISION™ Analyzer. As soon as all required resources such as samples and reagents are available, the order is processed.

Host Query Mode – During an inventory check, if the instrument detects a sample without an order, the instrument sends a host query to the LIS for that sample. If the LIS does not respond, the instrument resends the query every 30 seconds. The response becomes a normal order. (See Download Mode.)

3. External Interface Communication Protocols

The ASTM layers involved in transferring data from the ORTHO VISION™ Analyzer to the LIS and from the LIS to the ORTHO VISION™ Analyzer are divided into these components:

Physical Layer – The physical layer is comprised of the actual hardware and software configuration used to communicate between the two systems.

For serial communications, this corresponds to Section 5 in ASTM E 1381.

For Ethernet communications, this corresponds to Sections 7 and 8.2.1.1 in ASTM E.

For file sharing, this corresponds to network file sharing protocols that are supported by the ORTHO VISION™ Analyzer. For specifications, refer to the appropriate Interface (Ethernet, Serial, or File Sharing).

Datalink Layer – The Datalink layer is responsible for the logical data frames comprised of the raw data exchanged with the physical layer. It ensures that packets can be transferred accurately between computers.

For serial communications this corresponds to the Datalink layer specified in Section 6 in ASTM E 1381.

For Ethernet communications, this corresponds to Section 8 in ASTM E 1381.

For file sharing this corresponds to custom protocols implemented internally by the ORTHO VISION™ Analyzer.

The ORTHO VISION™ Analyzer supports a configurable maximum frames size that supersedes values specified in ASTM E 1381.

3.1 Physical Layer

The ORTHO VISION™ Analyzer can be configured to communicate to the remote LIS by either TCP/IP via Ethernet, SerialRs232 or File sharing interface.

Physical TCP/IP – The ASTM protocol supports the use of TCP/IP communication for the physical transport layer. The ORTHO VISION™ Analyzer establishes a connection to the LIS at a configured IP address and port. This interface is bidirectional but is only initiated by the ORTHO VISION™ Analyzer.

Physical Serial Interface – The ASTM protocol described in ASTM E 1381 supports the use of serial communication (RS232) for the physical transport layer.

The System uses 1 start bit.

The System supports 1 or 2 stop bits.

The System supports EVEN, ODD, NONE, SPACE and MARK parity.

The System supports the following baud rates: 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, and 115200.

The System uses 8 data bits.

Physical File Sharing Interface – While the LIS1-A/ASTM E 1381 standard specifies the low-level serial and TCP/IP protocols for the exchange of ASTM messages, the LIS2-A/ASTM E 1394 standard applies only to the structure of ASTM messages and does not specify what communication protocols can be used. Systems are free to exchange ASTM messages using any defined communication protocol.

With the file sharing interface, ASTM messages are exchanged using message files and shared folders. An application sends an ASTM message by writing the message to a file in a shared folder. An application receives an ASTM message by first reading a file from a shared folder followed by deleting the file once it has been read. File naming conventions and the use of separate upload and download folders are methods used to avoid conflicts when exchanging messages.

The ORTHO VISION™ Analyzer designates folders that are shared on the network by the ORTHO VISION™ Analyzer for the exchange of messages, sharing of cassette images, and a message trace folder for troubleshooting.

The LIS sends an ASTM message to the ORTHO VISION™ Analyzer by writing the message to a file in the ORTHO VISION™ Analyzer's download folder. The ORTHO VISION™ Analyzer sends an ASTM message to the LIS by writing the message to a file in the ORTHO VISION™ Analyzer's upload folder. The ORTHO VISION™ Analyzer deletes all files in the download and upload folders that are older than 7 days.

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The LIS reads cassette images associated with results from the ORTHO VISION™ Analyzer's shared image folder. When the LIS connection is started, all images that are older than 7 days are deleted. After startup, images that are older than 7 days are deleted periodically.

The ORTHO VISION™ Analyzer deletes trace files that are older than 7 days and that are stored in the shared folder when the LIS connection is started. After startup, trace files that are older than 7 days are deleted periodically.

The LIS can access the ORTHO VISION™ Analyzer's shared folders using the type of paths shown in the example. The actual folder names are configurable when the ORTHO VISION™ Analyzer is set up.

Example:

\\<analyzer computer name>\download
\\<analyzer computer name >\upload
\\< analyzer computer name >\traces
\\< analyzer computer name >\images

Errors can occur if one computer is writing to a message file while the other computer tries to read it. To avoid such conflicts, the LIS and the ORTHO VISION™ Analyzer first write an ASTM message file to a temporary file in the designated ORTHO VISION™ Analyzer's shared folder. Temporary files are named tmp-<timestamp>.tmp (for example, tmp-20131018143212.tmp). Once the complete ASTM message has been written to the file and the file has been closed, the temporary file is renamed to its final name. Configured file names/patterns should not match the temporary file pattern used by the ORTHO VISION™ Analyzer. Because of limitations with the Windows WIN32 API, LIS temporary file names/patterns should not contain a substring that matches the final file name. The file extension .tmp is reserved for use by the ORTHO VISION™ Analyzer in the upload folder.

3.2 Datalink Layer

ASTM Datalink Serial Communication – The ORTHO VISION™ Analyzer supports the Establishment Phase (Link Connection) specified in Section 6.2 of ASTM E 1381. This includes establishment and contention.

The ORTHO VISION™ Analyzer supports the Transfer Phase specified in Section 6.3 of ASTM E 1381. This includes:

Frame Format in Section 6.3.1 of ASTM E 1381
Frame Numbering in Section 6.3.2 of ASTM E 1381
Frame Checksums in Section 6.3.3 of ASTM E 1381
Frame Acknowledgements in Section 6.3.4 of ASTM E 1381
Frame Receiver Interrupts in Section 6.3.5 of ASTM E 1381

The ORTHO VISION™ Analyzer supports the Termination Phase (Link Release) as specified in Section 6.4 of ASTM E 1381.
The ORTHO VISION™ Analyzer supports Error Recovery specified in Section 6.5 of ASTM E 1381. This includes:

Detecting and handling defective frames in Section 6.5.1 of ASTM E 1381
Timeouts in Section 6.5.2 of ASTM E 1381

The ORTHO VISION™ Analyzer supports the Restricted Message Characters requirement specified in Section 6.6 of ASTM E 1381.
ASTM Datalink Ethernet Communications – The System supports the Establishment Phase (Link Connection) specified in Section 6.2 of ASTM E 1381. This includes establishment and contention.
The ORTHO VISION™ Analyzer supports the Transfer Phase specified in Section 6.3 of ASTM E 1381. This includes:

Frame Format in Section 6.3.1 of ASTM E 1381
Frame Numbering in Section 6.3.2 of ASTM E 1381
Frame Checksums in Section 6.3.3 of ASTM E 1381
Frame Acknowledgements Section 6.3.4 of ASTM E 1381
Frame Receiver Interrupts in Section 6.3.5 of ASTM E 1381

The ORTHO VISION™ Analyzer supports the Termination Phase (Link Release) specified in Section6.4 of ASTM E 1381.
The ORTHO VISION™ Analyzer supports Error Recovery specified in Section 6.5 of ASTM E 1381. This includes:

Detecting and handling defective frames in 6.5.1 of ASTM E 1381
Timeouts in Section 6.5.2 of ASTM E 1381

The ORTHO VISION™ Analyzer supports the Restricted Message Characters requirement specified in Section 6.6 of ASTM E 1381.
ASTM Datalink Folder Communications – At startup if shared folder communications are enabled, the ORTHO VISION™ Analyzer validates the format of configured ASTM message file names and verifies that the ORTHO VISION™ Analyzer's download and upload folders exist and can be written to. The upload format must not end with ".tmp" or "*". The ORTHO VISION™ Analyzer communicates any error conditions to the operator.
The download folder is an ORTHO VISION™ Analyzer shared directory named \\< analyzer computer name>\download.
A **download file pattern** is defined for the ORTHO VISION™ Analyzer during system configuration and is used to monitor the download folder for message files. A download file pattern can be a regular file name or a file name pattern. Valid file names are file names that are valid for both the LIS and the ORTHO VISION™ Analyzer. A download filename can contain any number of alphanumeric characters, underscores, and the dot character ('.'), up to the maximum file name length. A download filename pattern can contain any number of alphanumeric characters, underscores, the dot character ('.'), or wildcard characters ('*', '?'), up to the maximum file name length. The file pattern ???.dnl is valid.
The maximum length of an upload or a download file name is 30 characters.
The following are acceptable wildcard characters:

A question mark (?) matches one character.
An asterisk (*) matches zero or more characters.

NOTE: An asterisk * at the directory level matches all files in the directory and, therefore, should never be used by itself. It will not only match the download files, but also match all the files in the directory.

NOTE: The ORTHO VISION™ Analyzer download file name/pattern is case sensitive; a file named LIS.DNL is considered a different file from lis.dnl.

Examples:

If the LIS writes a fixed file name, use that file name for the download file pattern: LIS writes LIS.dnl. Use LIS.dnl for the file pattern.

If the LIS writes a fixed length file name with some varying characters, use the question mark (?) for the characters that vary. LIS writes LIS01.dnl, LIS02.dnl, LIS03.dnl and so on. Use LIS??.dnl as the pattern, which mean the word LIS followed by two characters followed by the .dnl extension.

If the LIS writes a varying length file name, use a question mark (?) and an asterisk (*) for the characters that vary. LIS writes LIS1.dnl …, LIS9.dnl, on up to LIS9999.dnl, use LIS?*.dnl, which means the word LIS followed by one or more characters with a .dnl file extension.

When a matching file is present in the download folder, ORTHO VISION™ Analyzer does the following:

1. Copies the download file to a trace file in the folder "\\< analyzer computer name>\TRACES", (DNL<YYYYMMDDHHMMSS>.TRA). The TRACES folder is written to only by the ORTHO VISION™ Analyzer.
2. Reads the ASTM message file and import orders.
3. Deletes the ASTM message file.

The upload folder is an ORTHO VISION™ Analyzer shared directory named “\\<analyzer computer name>\upload”.

Upload and query file patterns are defined for the ORTHO VISION™ Analyzer with choices on the Setup software screen during system configuration; the file patterns are used to create upload message files that the LIS can recognize. Upload and query file patterns can be regular file names or file name patterns. Valid file names must be valid for both the LIS and the ORTHO VISION™ Analyzer. Upload and query file names can contain any number of alphanumeric characters, underscores, and the dot character (‘.’), up to the maximum file name length. Upload and query filename patterns can contain any number of alphanumeric characters, underscores, the dot character (‘.’), question marks ('?'), or asterisk (*), up to the maximum file name length. One or more consecutive question mark characters (‘?’) means a sequence of filenames where each file contains a sequence number that is incremented for each file, for example, if "LIS???.upl" is the file pattern, then files are named LIS001.upl through LIS999.upl. All question mark characters must be together in the file pattern (for example, the pattern “LIS??ABC???.upl” is invalid). The file pattern ???.upl is valid.

An asterisk (*) is used for a timestamp (YYYYMMDDhhmmss) with a resolution of one second. An upload pattern of LIS???-*.upl generates an upload file such as LIS004-2013103170016.upl.

Because the ORTHO VISION™ Analyzer can generate more than one upload file per second, a timestamp without a sequence number could cause messages to be lost. With the exception of the last upload message (within the same second), all messages would be overwritten. The ORTHO VISION™ Analyzer prevents messages from being lost by not overwriting existing messages and generating an error “APSW29: Unable to communicate with the LIS”.

To prevent errors when an upload file pattern contains a timestamp without a sequence number, the ORTHO VISION™ Analyzer appends a sequence to the end of the pattern. An upload pattern of *.upl is equivalent to *???.upl. An upload pattern of LIS*.upl generates an upload file such as LIS2013103170016004.upl, where the last 3 digits is a sequence number.

Error “APSW29: Unable to communicate with the LIS”, will occur if the Host Query File Pattern contains a fixed filename (such as: Query.upl) and there is more than one sample without orders in the sample racks.

The ORTHO VISION™ Analyzer completes these steps to write an upload file:

1. Check if a file with the same file name is present, if yes, then the ORTHO VISION™ Analyzer communicates an error condition to the operator. This condition might indicate that the LIS is not reading message files.
2. If the file is not present, write the message to a temporary filename so that the filename extension does not contain a substring that matches the upload file pattern extension.
3. Close the file.
4. Copy the file to a trace file in the folder "\\<analyzer computer name>\TRACES", (UPL<YYYYMMDDHHMMSS>.TRA or QU<???-YYYYMMDDHHMMSS>.TRA).
5. Rename the file to its final name, so that the LIS will recognize the file only after it has been fully written and closed.

The LIS deletes the file after reading it.

3.3 Common Record Specification

The ORTHO VISION™ Analyzer uses the following record specifications:
For all records, fields not supported are ignored on a download.
The ORTHO VISION™ Analyzer uploads null values for any field listed as *Not supported* for all records.
The ORTHO VISION™ Analyzer can transmit and receive messages using

- Unicode/UTF-8
- ISO8859/1 (ISO Latin-1)
- Windows-31J (Microsoft Shift-JIS CP932)
- Windows 1252 Code Page

The character encoding is configurable.
Only one character encoding is supported at a given time.
ASTM Message Format - The ORTHO VISION™ Analyzer is able to process ASTM Messages in the following format:

- Vision ASTM
- Enhanced ASTM
- ASTM

For backward compatibility, the ORTHO VISION™ Analyzer supports configuring the maximum length of an ASTM frame. ASTM records (plus overhead) bigger than maximum configured record length are sliced into intermediate frames. Some LIS contain hard coded maximum frame length limits when reading upload messages.
There is no size limit for the field length.
The ORTHO VISION™ Analyzer is configurable to include or trim delimiters for all trailing null fields (see Section 6.4.8 of ASTM E 1394). Some LIS systems will reject upload messages if a specific number of “pipes” (field delimiters) is not contained in each record. However, the system is capable to receive records where trailing null fields were omitted.
The ORTHO VISION™ Analyzer uploads records with the following number of delimiters. Note that all field delimiters are the same as the number of fields specified in ASTM E 1394.

H records	13 field delimiters
P records	34 field delimiters
O records	30 field delimiters
R records	13 field delimiters
Q records	12 field delimiters
M record	5 field delimiters

Escape Sequences – If the ORTHO VISION™ Analyzer is configured for the ASTM escape sequences, then the ORTHO VISION™ Analyzer accepts and ignores the following escape sequences:

&H&	Start highlighting text
&N&	Normal text (end highlighting)
&Zcccc&	Local (manufacturer) defined escape sequence

If the ORTHO VISION™ Analyzer is configured for ASTM escape sequences, then the ORTHO VISION™ Analyzer accepts and supports the following escape sequences:

&F&	Embedded field delimiter character
&S&	Embedded component field delimiter character
&R&	Embedded repeat field delimiter character
&E&	Embedded escape delimiter character
&Xhhhh&	hexadecimal data (e.g., &XA& is a linefeed character)

If the ORTHO VISION™ Analyzer is not configured for ASTM escape sequences, then the ORTHO VISION™ Analyzer accepts and supports the following escape sequences:

&|	Embedded field delimiter character
&^	Embedded component field delimiter character
&\	Embedded repeat field delimiter character
&&	Embedded escape delimiter character

All date fields are formatted as specified by Dates and Times defined in Section 6.6.2 of ASTM E 1394. The ORTHO VISION™ Analyzer rejects Date and Time values downloaded with an appended Time Zone value as defined in Section 6.6.2.1 of ASTM E 1394.

3.4 Vision ASTM

Vision ASTM is the most recent ASTM version. Comment, Result, Request Information, Scientific and Manufacturer Information record types are accepted and ignored on download. In the record field descriptions, all values are text, and meet the ASTM Common Field Types specification Section 6.6 of ASTM E 1394. If a field value has multiple components, they are differentiated by the component delimiter ('^') character Section 6.4.5 of ASTM E 1394.

The ORTHO VISION™ Analyzer supports the hierarchical message structure as defined in Sections 5.1.8 through 5.1.11 of ASTM E 1394.
The ORTHO VISION™ Analyzer does **not** support the Logical Information Storage and Logical Transmission Error Recovery Requirements defined in Sections 5.2.1 and 5.2.2 of ASTM E 1394.

3.4.1 Enhanced ASTM

The ORTHO VISION™ Analyzer is capable of sending and receiving ASTM messages in the predecessor format. The ASTM mode for the analyzer must be explicitly set to Enhanced ASTM to enable this backward compatibility mode. Some sources also call this format “AV2G “(AutoVue 2nd Generation).

3.4.2 ASTM

This format, another predecessor ASTM format, is identical to the Enhanced ASTM format with one exception. The ASTM format does not support manufacturer records. If ASTM mode is enabled, no manufacturer records are sent by the ORTHO VISION™ Analyzer (contains well grading results).

3.4.3 Vision ASTM

ASTM records are the components that make up ASTM Messages. In the tables that show the field sequences, shaded rows indicate fields that are not supported by the ORTHO VISION™ Analyzer. No data is sent in these field positions and they are marked *Unused*. Yellow rows mean that there is a difference between Vision ASTM and Enhanced ASTM.
The column labeled "#" contains the field index within the record. An ASTM field can contain multiple ASTM components separated by the repeat delimiter. Components are indexed as X.Y, where X is the field index and Y is the index of the component within the field. "D" and "U" indicate if the fields/components are optional in the record when downloading to the ORTHO VISION™ Analyzer (D) and uploading to the LIS (U). "R" indicates the repeatability.

Table 1 can be used as a key for the values in the D, U, and R columns.

Table 1: Abbreviations used in record tables

D	U	R
R = Required Field X = Required Field for cross match test Q= Only applies to QC Orders	A = Always Sent X = Always Sent for cross match test	Y=Field can repeat
O = Optional Field	S = Sometimes Sent P = When Provided	N= Field does not repeat
N = Never Used	N = Never Sent	-
- NA = not applicable	- NA = not applicable	-

In the record tables, the values for D, U, and R are included in three horizontal rows below the column headings.

#	D	U	R	Field	Notes
D	R: Required; X: Required for Xmatch; O: Optional; N: Never used; - NA				
U	A: Always sent; X: Always sent for Xmatch; S: Sometimes sent; N: Never sent; -NA				
R	Y: Field can repeat; N: Field does not repeat				

The column "Field" contains the field name (*cf.* also [2]). The column "Notes" contains descriptions and restrictions for the field
The ORTHO VISION™ Analyzer ignores incoming Comment, Result, Request Information, Scientific, and Manufacturing information record types.
Delimiters are variable on download and defined in the message header (see Section 6.4 of ASTM E 1394). In the following, the ORTHO VISION™ Analyzer upload delimiters are used for the purpose of describing escape sequences.

3.4.4 Vision ASTM H Header Record

The ORTHO VISION™ Analyzer supports the following fields (not shaded) of the ASTM Header (H) Record.
Defined in Section 7.1 of ASTM E 1394.

#	D	U	R	Field	Notes
D	R: Required; X: Required for Xmatch; O: Optional; N: Never used; - NA				
U	A: Always sent; x: Always sent for Xmatch; S: Sometimes sent; N: Never sent; -NA				
R	Y: Field can repeat; N: Field does not repeat				
1	R	A	N	Record Type ID	= "H" or "h"
2	R	A	N	Field Delimiters	= "|\^&", these are the Field, Repeat, Component and Escape Delimiters. All delimiters are fixed on upload. All delimiters can be variable on download.
3	N	N	N	Message Control ID	- *Unused*
4	N	N	N	Access Password	- *Unused*
5	O	A	N	Sender Name/ID	System Name field from system configuration
5.1	-	A	N	-	= "OCD", manufacturer name
5.2	-	A	N	-	= "VISION", product name
5.3	-	A	N		Software Version
5.4	-	A	N		Instrument ID
6	N	N	N	Sender Street Address	- *Unused*
7	N	N	N	Reserved Field	- *Unused*
8	N	N	N	Sender Telephone Number	- *Unused*
9	N	N	N	Characteristics of Sender	- *Unused*
10	N	N	N	Receiver ID	- *Unused*
11	N	N	N	Comment	- *Unused*
12	N	A	N	Processing ID	= "P” P-Production message
13	N	A	N	Version Number	ASTM protocol version “LIS2-A”
14	O	A	N	Date and Time of Message	Date and Time of transmission YYYYMMDDHHMMSS

3.4.5 **Vision ASTM L Trailer Record**

The ORTHO VISION™ Analyzer supports the following fields (not shaded) of the ASTM Trailer (T) Record.
Defined in Section 13.1 of ASTM E 1394.

#	D	U	R	Field	Notes
D	R: Required; X: Required for Xmatch; O: Optional; N: Never used; - NA				
U	A: Always sent; x: Always sent for Xmatch; S: Sometimes sent; N: Never sent; -NA				
R	Y: Field can repeat; N: Field does not repeat				
1	R	A	N	Record Type ID	= "L" or "l"
2	N	N	N	Sequence number	- *Unused*
3	N	N	N	Termination Code	- *Unused*

3.4.6 **Vision ASTM P Patient Record**

The ORTHO VISION™ Analyzer supports the following fields (not shaded) of the ASTM Patient (P) Record.
Defined in Section 8.1 of ASTM E 1394.

#	D	U	R	Field	Notes
D	R: Required; X: Required for Xmatch; O: Optional; N: Never used; - NA				
U	A: Always sent; X: Always sent for Xmatch; S: Sometimes sent; N: Never sent; -NA				
R	Y: Field can repeat; N: Field does not repeat				
1	R	A	N	Record Type ID	= "P" or "p"
2	O	A	N	Sequence number	Patient sequence number. Set to 1 for the first patient record; 2 for the 2nd record; and so on.

#	D	U	R	Field	Notes
D	R: Required; X: Required for Xmatch; O: Optional; N: Never used; - NA				
U	A: Always sent; X: Always sent for Xmatch; S: Sometimes sent; N: Never sent; -NA				
R	Y: Field can repeat; N: Field does not repeat				
3	O	P	N	Practice Assigned Patient ID	= Patient ID If present, the unique identifier for the patient. A Patient ID may contain one or more alphanumeric, symbols, and embedded blank characters up to a maximum length of 20 characters. Leading zeros in a Patient ID are retained and stored as part of the Patient ID. Patient IDs composed of only blank characters are treated as NULL. The System strips leading and trailing blanks. Embedded blanks are not removed and are considered as part of the Patient ID.
4	N	N	N	Lab Assigned Patient ID	- *Unused*
5.1	O	S	N	Patient ID No. 3	= National ID
5.2	O	S	N	-	= Medical Record
5.3	O	S	N	-	= Other ID
6.1	O	S	N	Patient Name	= Last Name
6.2	O	S	N	-	= First Name
6.3	O	S	N	-	= Middle Initial
6.4	N	N	N	-	= Suffix
6.5	N	N	N	-	= Title
7	O	P	N	Mother's Maiden Name	= Mother's Maiden Surname. May be required to distinguish between patients with the same birth date and last name.
8	O	P	N	Birth date	= Actual birth date (YYYYMMDD, YYYYMMDDHHMM, or YYYYMMDDHHMMSS). The upload format is: YYYYMMDDHHMMSS.
9	O	S	N	Patient Sex	= NULL, M, F, or U NULL=U. If Null, uploads U.
10	N	N	N	Patient Race/Ethnic Origin	- *Unused*

#	D	U	R	Field	Notes
D	R: Required; X: Required for Xmatch; O: Optional; N: Never used; - NA				
U	A: Always sent; X: Always sent for Xmatch; S: Sometimes sent; N: Never sent; -NA				
R	Y: Field can repeat; N: Field does not repeat				
11	N	N	N	Patient Address	- *Unused*
12	N	N	N	Reserved Field	- *Unused*
13	N	N	N	Patient Telephone Number	- *Unused*
14	O	P	N	Attending Physician	The System allows only one physician.
14.1	O	P	N	-	Physician ID
14.2	O	P	N	-	Last Name
14.3	O	P	N	-	First Name
14.4	O	P	N	-	Middle Initial
15	N	N	N	Special Field 1	- *Unused*
16	N	N	N	Special Field 2	- *Unused*
17	N	N	N	Patient Height	- *Unused*
18	N	N	N	Patient Weight	- *Unused*
19	N	N	N	Patient's Diagnosis	- *Unused*
20	N	N	N	Patient Active Medications	- *Unused*
21	N	N	N	Patient's Diet	- *Unused*
22	N	N	N	Practice Field 1	- *Unused*
23	N	N	N	Practice Field 2	- *Unused*
24	N	N	N	Admission and Discharge Dates	- *Unused*
25	N	N	N	Admission Status	- *Unused*
26	N	N	N	Location	- *Unused*
27	N	N	N	Nature of Alternative Diagnosis Code	- *Unused*
28	N	N	N	Alternative Diagnosis Code	- *Unused*
29	N	N	N	Patient Religion	- *Unused*
30	N	N	N	Marital Status	- *Unused*
31	N	N	N	Isolation Status	- *Unused*
32	N	N	N	Language	- *Unused*
33	N	N	N	Hospital Service	- *Unused*
34	N	N	N	Hospital Institution	- *Unused*

#	D	U	R	Field	Notes
D	R: Required; X: Required for Xmatch; O: Optional; N: Never used; - NA				
U	A: Always sent; X: Always sent for Xmatch; S: Sometimes sent; N: Never sent; -NA				
R	Y: Field can repeat; N: Field does not repeat				
35	N	N	N	Dosage Category	- *Unused*

3.4.7 **Vision ASTM O Order Record**

The ORTHO VISION™ Analyzer supports the following fields (not shaded) of the ASTM Order (O) Record.
Defined in Section 9.4 of ASTM E 1394.

Note: The information with asterisks (*) in the D column are explained in the **Notes** column in the same row.

#	D	U	R	Field	Notes
D	R: Required; X: Required for Xmatch; O: Optional; N: Never used; - NA				
U	A: Always sent; X: Always sent for Xmatch; S: Sometimes sent; N: Never sent; -NA				
R	Y: Field can repeat; N: Field does not repeat				
1	R	A	N	Record Type ID	= "O" or "o"
2	R	A	N	Sequence Number	Starts at 1. Sequence number increases by one for each result within an order. Reset with each new patient record.
3	R	A	Y	Specimen ID	= Sample ID. A maximum of two Sample IDs can be identified. A unique BRC sample ID is generated by the ORTHO VISION™ Analyzer for each execution of a BRC profile. The generated BRC sample ID always starts with “BRC” and contains a locale based date/timestamp and a sequence number. For example: BRC_19/03/20140809_01
4	N	N	N	Instrument Specimen ID	- *Unused*
5	R	A	N	Universal Test ID	-

#	D	U	R	Field	Notes
D	R: Required; X: Required for Xmatch; O: Optional; N: Never used; - NA				
U	A: Always sent; X: Always sent for Xmatch; S: Sometimes sent; N: Never sent; -NA				
R	Y: Field can repeat; N: Field does not repeat				
5.1	R	A	Y	Test ID	= Profile name Profiles are configured on the ORTHO VISION™ Analyzer and there is no standardization. Profiles must be known by the System and profile names are case sensitive (ABO and abo are considered different profile names). **On upload:** Only one profile per Order record. **On download:** Only one donor list per order record. **Cross Match:** On download, if the profile contains a cross match test then the following components are required: Number of donor samples One or more pairs containing the donor Sample ID and Sample type.
5.2	X	S	N	Number (N) of Donor Samples	= number of donor samples or NULL Component required for profiles containing cross match test. The value is optional (can be NULL). The component is required for cross match tests. The System does not use this value (compatibility with legacy systems).
5.a	X *	P	N	n^{th} Donor Specimen ID	= SampleID of n^{th} donor a=2*n+1, where 1<n≤N is the n^{th} donor ID *Required for each additional donor (see 5.1, cross match)
5.b	X *	P	N	Sample type of n^{th} Donor ID	= Sample type of n^{th} donor b=2*n+2, where 1<n≤N is the n^{th} donor ID *Required for each additional donor (see 5.1, cross match)

#	D	U	R	Field	Notes
D	R: Required; X: Required for Xmatch; O: Optional; N: Never used; - NA				
U	A: Always sent; X: Always sent for Xmatch; S: Sometimes sent; N: Never sent; -NA				
R	Y: Field can repeat; N: Field does not repeat				
5.c	Q	N	N	Number (M) of Cassette Lots to use	= number of subsequent cassette ID/lots. c=2*n+3, where 1<n≤N is the n^{th} donor ID. If 0 or NULL the System automatically[1] determines which lot(s) to use. Cassette Lot information is ignored for non QC Orders (Action Code is not = Q)
5.d	Q *	N	N	m^{th} Cassette ID	= Cassette ID d=2*n+2*m+2, where 1≤m≤M is the m^{th} Cassette Lot to specify, n is the n^{th} donor ID * Required for each cassette.
5.e	Q *	N	N	m^{th} Cassette Lot ID	= Cassette Lot number e=2*n+2*m+3, where 1≤m≤M is the m^{th} Cassette Lot to specify, n is the n^{th} donor ID * Required for each cassette.
5.f	Q	N	N	Number (P) of Reagent Lots to use	= number of subsequent reagent ID/lots. f=2*n+2*m+4, where m is the m^{th} Cassette Lot to specify, n is the n^{th} donor ID. If 0 or NULL the System determines automatically[2] which lot(s) to use. Reagent Lot information is ignored for non QC Orders (Action Code is not = Q)

[1] The system select lots (not expired) with the earliest expiry date first.

#	D	U	R	Field	Notes
D	R: Required; X: Required for Xmatch; O: Optional; N: Never used; - NA				
U	A: Always sent; X: Always sent for Xmatch; S: Sometimes sent; N: Never sent; -NA				
R	Y: Field can repeat; N: Field does not repeat				
5.g	Q *	N	N	p^{th} Reagent ID	= Reagent ID g=2*N+2*M+2*p+3, where 1≤p≤P is the p^{th} Reagent Lot ID to specify, N is the total number of donor samples, and M is the total number of Cassette IDs/Lots. * Required for each reagent.
5.h	Q *	N	N	p^{th} Reagent Lot ID	= Reagent Lot number h=2*N+2*M+2*p+4, where 1≤p≤P is the p^{th} Reagent Lot ID to specify, N is the total number of donor samples, and M is the total number of Cassette IDs/Lots. *Required for each reagent.
6	O	A	N	Priority	= NULL, S, A, R, C, P, or N. N is the same as R in LIS2-A, 9.4.6. NULL = R = N = C = P = routine priority. S = A = STAT priority.
7	O	A	N	Requested/Order Date and Time	= date and time of Request/Order YYYYMMDDHHMMSS
8	O	N	Y	Specimen Collection Date and Time	= date and time specimen was collected (YYYYMMDDHHMMSS) **On Upload**: NULL
9	N	N	N	Collection End Time	- *Unused*
10	N	N	N	Collection Volume	- *Unused*
11	N	N	N	Collector ID	- *Unused*
12	O	N	N	Action Code	= NULL, C, N, A, Q NULL = N = A C: cancel the described order, NULL|N|A: Add profiles on a known sample, new profiles on an unknown sample. Q: treat specimen as Q/C test specimen NULL on Result Upload

#	D	U	R	Field	Notes
D	R: Required; X: Required for Xmatch; O: Optional; N: Never used; - NA				
U	A: Always sent; X: Always sent for Xmatch; S: Sometimes sent; N: Never sent; -NA				
R	Y: Field can repeat; N: Field does not repeat				
13	N	N	N	Danger Code	- *Unused*
14	O	S	Y	Relevant Clinical Info –	Expected Test Results Ignored for non QC Orders (Action Code is not = Q) Test names are case sensitive and must be known by the system. This information overwrites predefined expected test results. Must be set for each performed test of Non-OCD QC Profile. An expected result has to be provided for each test executed by this order.
14.1	O	S	N	Test-Name	= Name of an Analysis type
14.2	O	S	N	Expected Result	= Expected Result
15	N	N	N	Date/Time Specimen Received	- *Unused*
16	R	A	Y	Specimen Descriptor	= Sample type Exactly one Specimen Descriptor required for each Specimen ID (see 3)
17	N	N	N	Ordering Physician	- *Unused*
18	N	N	N	Physician's Phone Number	- *Unused*
19	O	N	N	User Field 1	= NULL or S If S: save all the cassettes for all the profiles for manual review.
20	N	S	N	User Field 2	= comment Error message if this order could not be processed by the ORTHO VISION™ Analyzer.
21	N	N	N	Laboratory Field 1	- *Unused*
22	N	N	N	Laboratory Field 2	- *Unused*
23	N	A	N	Date/Time Results Reported or Last Modified	= YYYYMMDDHHMMSS

#	D	U	R	Field	Notes
D	R: Required; X: Required for Xmatch; O: Optional; N: Never used; - NA				
U	A: Always sent; X: Always sent for Xmatch; S: Sometimes sent; N: Never sent; -NA				
R	Y: Field can repeat; N: Field does not repeat				
24	N	N	N	Instrument Charge	- *Unused*
25	N	N	N	Instrument Section ID	- *Unused*
26	N	A	N	Report Types	= P, F, R, or X. P: partial results F: final results R: repeat results X: order cancelled on the instrument
27	N	N	N	Reserved Field	- *Unused*
28	O	S	N	Location or Ward of Specimen Collection	=Collection Location Identifies the location the specimen was collected.
29	N	N	N	Nosocomial Infection Flag	- *Unused*
30	N	N	N	Specimen Service	- *Unused*
31	N	N	N	Specimen Institution	- *Unused*

3.4.8 Vision ASTM R Result Record

A result record is transmitted to the LIS for each executed test.
The ORTHO VISION™ Analyzer supports the following fields (not shaded) of the ASTM Result (R) Record.
Defined in Section 10.1 of ASTM E 1394.

#	D	U	R	Field	Notes
D	R: Required; X: Required for Xmatch; O: Optional; N: Never used; - NA				
U	A: Always sent; X: Always sent for Xmatch; S: Sometimes sent; N: Never sent; -NA				
R	Y: Field can repeat; N: Field does not repeat				
1	-	A	N	Record Type ID	= "R" or "r"
2	-	A	N	Sequence number	Initial value is 1, reset for each new order; maximum length is unlimited.
3	-	A	N	Test ID	-
3.1	-	A	N	Analysis	= Analysis type
3.2	-	S	N	Donor Specimen ID	Included only if cross match test. = Sample ID of donor The System writes one R record per reaction. Analysis results returned by the ORTHO VISION™ Analyzer are configurable and may change.
4	-	A	N	Data or Measurement Value	= Analysis Result
5	-	N	N	Units of Measurement Value	- *Unused*
6	-	N	N	Reference Ranges	- *Unused*

#	D	U	R	Field	Notes
D	R: Required; X: Required for Xmatch; O: Optional; N: Never used; - NA				
U	A: Always sent; X: Always sent for Xmatch; S: Sometimes sent; N: Never sent; -NA				
R	Y: Field can repeat; N: Field does not repeat				
7	-	S	Y	Result Abnormal Flags	= NULL, M, Q, S, T, X, E, I, F, C, P, NA, R **M:** The result has been entered manually or one of the well results has been modified manually. **Q:** Out of QC. The test included at least one reagent or cassette whose periodic QC test is overdue. **S:** Out of maintenance service. There is an overdue maintenance task. **T:** Test mode. This result was simulated by the instrument. **X:** Errors from the imaging system **E:** Temperature/Humidity sensor reading out of the notification range **I:** Indeterminate results (no match from the AD) **F:** User defined protocol **C:** Discrepant result **P:** Above/below positive reaction threshold **NA:** Result expired **R:** Result expired for a result that has been entered manually
8	-	N	N	Nature of Abnormality Testing	- *Unused*
9	-	A	N	Result Status	= F, R, X F: final result R: repeat result X: result rejected or cancelled[3]

[3] The status cancelled is returned in any of the following cases:

- The corresponding test was cancelled by a LIS order cancel message (Action code = C).
- The corresponding test was cancelled by the user.
- The corresponding test was cancelled due to an unexpected, non-recoverable error (e.g., analytic or redundant analytic validation failed).
- The result was rejected by the user.

Note: In case of test restart (due to recovery) or unexpected errors, the analyzer does not send cancel messages to the LIS.

#	D	U	R	Field	Notes
D	R: Required; X: Required for Xmatch; O: Optional; N: Never used; - NA				
U	A: Always sent; X: Always sent for Xmatch; S: Sometimes sent; N: Never sent; -NA				
R	Y: Field can repeat; N: Field does not repeat				
10	-	N	N	Date of Change in Instrument Normative Values or Units	- *Unused*
11	-	S	N	Operator Identification	= Operator ID, Operator who accepts the test. Returns "Automatic" for tests accepted automatically.
12	-	N	N	Date/Time Test Started	- *Unused*
13	-	A	N	Date/Time Test Completed	= Date/Time of result YYYYMMDDHHMMSS
14	-	A	N	Instrument Identification	= Number

3.4.9 **Vision ASTM Q Request Record**

The ORTHO VISION™ Analyzer supports the following fields (not shaded) of the ASTM Request (Q) Record.
Defined in Section 12.1 of ASTM E 1394.

#	D	U	R	Field	Notes
D	R: Required; X: Required for Xmatch; O: Optional; N: Never used; - NA				
U	A: Always sent; X: Always sent for Xmatch; S: Sometimes sent; N: Never sent; -NA				
R	Y: Field can repeat; N: Field does not repeat				
1	-	A	N	Record Type ID	= "Q" or "q"
2	-	A	N	Sequence number	Initial value is 1, reset for each new message
3	-	-	N	Starting Range ID Number	-
3.1	-	N	N	Computer system patient ID	- *Unused*
3.2	-	A	N	Computer system specimen ID	= Computer System Sample ID. The sample ID of interest, only one allowed per record.
4	-	N	N	Ending Range ID Number	- *Unused*
5	-	N	N	Universal Test ID	- *Unused*
6	-	N	N	Nature of Request Time Limits	- *Unused*
7	-	N	N	Beginning Request Results Date and Time	- *Unused*
8	-	N	N	Ending Request Results Date and Time	- *Unused*
9	-	N	N	Requesting Physician Name	- *Unused*
10	-	N	N	Requesting Physician Phone Number	- *Unused*
11	-	N	N	User Field 1	- *Unused*
12	-	N	N	User Field 2	- *Unused*
13	-	A	N	Request Information Status Codes	= O O: Requesting test orders and demographics only

3.4.10 **Vision ASTM M E Result Record**

The ORTHO VISION™ Analyzer supports the following fields (not shaded) of the ASTM Result (M) Record.

Defined in Section 15.1 of ASTM E 1394.

Table 2. Results or Error

Grade	Meaning
0	“0” reaction
5	“(+)” reaction
10	“1+” reaction
20	“2+” reaction
30	“3+” reaction
40	“4+” reaction
-90	Well Not Found
-95	Wrong liquid level
-100	Light too low
-101	Light too high
-110	Contrast interference
-111	Empty column
-112	Too few cells
-113	Too many cells
-115	Mixed field
-116	Indeterminate
-117	Fibrin
-118	Bubble
-119	Cells detected
-201	Focus error
-203	Splash
-206	Tilt error
-207	Rotation error
-208	Skew error
-209	Well fluid error
-256	Cassette not detected
-260	Wrong position
-999	Not applicable

#	D	U	R	Field	Notes
D	R: Required; X: Required for Xmatch; O: Optional; N: Never used; - NA				
U	A: Always sent; X: Always sent for Xmatch; S: Sometimes sent; N: Never sent; -NA				
R	Y: Field can repeat; N: Field does not repeat				
1	-	A	N	Record Type ID	= "M" or "m"
2	-	A	N	Sequence number	=1 for initial order, then reset for each new order; maximum length is unlimited
3	-	A	N	Result Well Name	= Name of the test well For cross match: Donor sample ID
4.1	-	A	N	Type of Cassette	= Type of cassette
4.2	-	A	N	Number of the well	= 1..6
4.3	-	A	N	Cassette ID Number	= serial # as given in the barcode.
4.4	-	A	N	Cassette Lot Number	-
4.5	-	A	N	Cassette Expiration Date	= YYYYMMDDHHMMSS
4.6	-	S	N	Mono Image File Name	= The file name of the cassette image used in determining this result. The actual image data is stored in the Shared Images Folder even when this message not transferred through the shared folder interface.
4.7	-	S	N	Color Image File Name	= The file name of the cassette image used in determining this result. The actual image data is stored in the Shared Images Folder even when this message not transferred through the shared folder interface.
5	-	A	Y	Reagent Information	-
5.1	-	A	N	Reagent Name	= Reagent Name
5.2	-	A	N	Reagent Lot Number	-
5.3	-	A	N	Reagent Expiration Date	=YYYYMMDDHHMMSS
6.1	-	A	N	Final Result or Error	= from Table 2 Results or Error
6.2	-	A	N	Manual Correction Flag	=M or A M: Manual correction A: Automatic correction
6.3	-	S	N	Read Result or Error	= from Table 2 Results or Error
6.4	-	S	N	Operator ID	= The Operator ID of the operator that made the correction.

3.4.11 **Sample Vision ASTM Messages**

3.4.12 **Host Query**

A request for orders (Q Record) is sent from the instrument to the LIS when Send Host Query is enabled and samples are scanned that the instrument does not have orders for. The message contains one or more sample IDs. Upon receipt of the query message the LIS sends any orders associated with the sample IDs.

```
H|\^&|||OCD^VISION^0.84.0.39963^J123456|||||||P|LIS2-A|20140520155016
Q|1|^PID123456||||||||||O
L
```

3.4.13 **Simple Order**

```
H|\^&|||Mini LIS|||||||LIS2-A|20140530150531
P|1|PID123456||NID123456^MID123456^OID123456|Brown^Bobby^B|White|196501020304|U|||||PHY1234^ Kildare^James^P ||||||||||||||||||||
O|1|SID005||ABO-D|N|20140530151129|||||N||||CENTBLOOD|||||||||||||||
L||
```

3.4.14 **Result**

```
H|\^&|||OCD^VISION^0.84.0.39963^J123456|||||||P|LIS2-A|20140530151231
P|1|PID123456||NID123456^MID123456^OID123456|Brown^Bobby^B|White|19650102030400|U|||||PHY1234^ Kildare^James^P ||||||||||||||||||||
O|1|SID005||ABO-D|N|20140530151137|||||||||CENTBLOOD|||||||20140530151231|||F|||||
R|1|ABO|O|||||F||Automatic||20140530151231|J123456
M|1|Anti-A|ABO-Rh/Reverse^1^300002^00001^20150101235959^20140530_151226Grey.jpg^20140530_151226Color.jpg||0^A
M|2|Anti-B|ABO-Rh/Reverse^2^300002^00001^20150101235959^20140530_151226Grey.jpg^20140530_151226Color.jpg||0^A
M|3|Ctrl|ABO-Rh/Reverse^4^300002^00001^20150101235959^20140530_151226Grey.jpg^20140530_151226Color.jpg||0^A
R|2|Rh|NEG|||||F||Automatic||20140530151231|J123456
M|1|Anti-D|ABO-Rh/Reverse^3^300002^00001^20150101235959^20140530_151226Grey.jpg^20140530_151226Color.jpg||0^A
M|2|Ctrl|ABO-Rh/Reverse^4^300002^00001^20150101235959^20140530_151226Grey.jpg^20140530_151226Color.jpg||0^A
L
```

3.4.15 **Crossmatch Order**

```
H|\^&|||Mini LIS|||||||LIS2-A|20140530150531
P|1|PID123456||NID123456^MID123456^OID123456|Brown^Bobby^B|White|196501020304|U|||||PHY1234^ Kildare^James^P ||||||||||||||||||||
O|1|SID005||XM^2^SID006^CENTBLOOD^SID007^CENTBLOOD|N|20140530151326|||||N||||CENTBLOOD|||||||||||||||
L||
```

3.4.16 **Crossmatch Result**

```
H|\^&|||OCD^VISION^0.84.0.39963^J123456||||||P|LIS2-A|20140530151432
P|1|PID123456||NID123456^MID123456^OID123456|Brown^Bobby^B|White|19650102030400|U|||||PHY1234^ Kildare^James^P ||||||||||||||||||||
O|1|SID005||XM^2^SID006^CENTBLOOD^SID007^CENTBLOOD|N|20140530151328||||||||CENTBLOOD|||||||20140530151432|||F|||||
R|1|XM^SID007|INCMP|||||F||Automatic||20140530151432|J123456
M|1|SID007|AHG Polyspecific^4^200006^00001^20150101235959^20140530_151429Grey.jpg^20140530_151429Color.jpg|BLISS^0134^20160514235959|10^A
R|2|XM^SID006|INCMP|||||F||Automatic||20140530151432|J123456
M|1|SID006|AHG Polyspecific^5^200006^00001^20150101235959^20140530_151429Grey.jpg^20140530_151429Color.jpg|BLISS^0134^20160514235959|10^A
L
```

3.4.17 **Order with 2 Samples**

The LIS can send orders with a maximum of 2 samples.

```
H|\^&|||Mini LIS|||||||LIS2-A|20140530150531
P|1|PID123456||NID123456^MID123456^OID123456|Brown^Bobby^B|White|196501020304|U|||||PHY1234^ Kildare^James^P ||||||||||||||||||||
O|1|SID003\SID004||BG+AutoControl|N|20140530151502|||||N||||PACKEDCELLS\PLASMA|||||||||||||||
L||
```

3.4.18 **Result with 2 Samples**

```
H|\^&|||OCD^VISION^0.84.0.39963^J123456||||||P|LIS2-A|20140530151653
P|1|PID123456||NID123456^MID123456^OID123456|Brown^Bobby^B|White|19650102030400|U|||||PHY1234^ Kildare^James^P ||||||||||||||||||||
O|1|SID003\SID004||BG+AutoControl|N|20140530151508|||||||||PACKEDCELLS\PLASMA|||||||20140530151653|||F|||||
R|1|ABO|A|||T||F||Automatic||20140530151652|J123456
M|1|A1-Cells|Reverse diluent^1^300001^00001^20150101235959^20140530_151649Grey.jpg^20140530_151649Color.jpg|A1 Cells^0134^20160514235959|0^A
M|2|A2-Cells|Reverse diluent^2^300001^00001^20150101235959^20140530_151649Grey.jpg^20140530_151649Color.jpg|A2 Cells^0134^20160514235959|0^A
M|3|B-Cells|Reverse diluent^3^300001^00001^20150101235959^20140530_151649Grey.jpg^20140530_151649Color.jpg|B Cells^0134^20160514235959|40^A
M|4|O-Cells|Reverse diluent^4^300001^00001^20150101235959^20140530_151649Grey.jpg^20140530_151649Color.jpg|O Cells^0134^20160514235959|0^A
M|5|Anti-A|ADK^1^300001^00001^20150101235959^20140530_151621Grey.jpg^20140530_151621Color.jpg||40^A
M|6|Anti-B|ADK^2^300001^00001^20150101235959^20140530_151621Grey.jpg^20140530_151621Color.jpg||0^A
M|7|Ctrl|ADK^6^300001^00001^20150101235959^20140530_151621Grey.jpg^20140530_151621Color.jpg||0^A
R|2|Rh|NEG|||T||F||Automatic||20140530151652|J123456
M|1|Anti-D|ADK^3^300001^00001^20150101235959^20140530_151621Grey.jpg^20140530_151621Color.jpg||0^A
M|2|Anti-D|ADK^4^300001^00001^20150101235959^20140530_151621Grey.jpg^20140530_151621Color.jpg||0^A
M|3|Ctrl|ADK^6^300001^00001^20150101235959^20140530_151621Grey.jpg^20140530_151621Color.jpg||0^A
R|3|Kell|NEG|||T||F||Automatic||20140530151652|J123456
M|1|Anti-K|ADK^5^300001^00001^20150101235959^20140530_151621Grey.jpg^20140530_151621Color.jpg||0^A
M|2|Ctrl|ADK^6^300001^00001^20150101235959^20140530_151621Grey.jpg^20140530_151621Color.jpg||0^A
R|4|ABScr|NEG|||T||F||Automatic||20140530151653|J123456
M|1|Surg 1|AHG anti-IgG^1^300001^00001^20150101235959^20140530_151644Grey.jpg^20140530_151644Color.jpg|BLISS^0134^20160514235959\Surg
1^0134^20160514235959|0^A
```

M|2|Surg 2|AHG anti-IgG^2^300001^00001^20150101235959^20140530_151644Grey.jpg^20140530_151644Color.jpg|BLISS^0134^20160514235959\Surg 2^0134^20160514235959|0^A
M|3|Surg 3|AHG anti-IgG^3^300001^00001^20150101235959^20140530_151644Grey.jpg^20140530_151644Color.jpg|BLISS^0134^20160514235959\Surg 3^0134^20160514235959|0^A
R|5|Auto|NEG|||T||F||Automatic||20140530151653|J123456
M|1|Auto|AHG anti-IgG^4^300001^00001^20150101235959^20140530_151644Grey.jpg^20140530_151644Color.jpg|BLISS^0134^20160514235959|0^A
L

3.4.19 **Order with Multiple Profiles**

The LIS can send orders containing one or more profiles. Vision treats each profile as separate orders containing identical demographics.

H|\^&|||Mini LIS||||||||LIS2-A|20140530150531
P|1|PID123456||NID123456^MID123456^OID123456|Brown^Bobby^B|White|196501020304|U|||||PHY1234^ Kildare^James^P ||||||||||||||||||||
O|1|SID005||10021\10068|N|20140530150531|||||N||||CENTBLOOD|||||||||||||||
L||

3.4.20 **Cancelled Orders**

Orders can be cancelled by the LIS or by Vision. When the order is cancelled, the ORTHO VISION™ Analyzer sends a cancelation message to the LIS.

3.4.21 **Original Order**

H|\^&|||Mini LIS||||||||LIS2-A|20140604113246
P|1|PID123456||NID123456^MID123456^OID123456|Brown^Bobby^B|White|196501020304|U|||||PHY1234^ Kildare^James^P ||||||||||||||||||||
O|1|SID001||10021|N|20140604113246|||||N||||CENTBLOOD|||||||||||||||
L||

3.4.22 **LIS Order Cancelation Request**

H|\^&|||Mini LIS||||||||LIS2-A|20140604113259
P|1|PID123456||NID123456^MID123456^OID123456|Brown^Bobby^B|White|196501020304|U|||||PHY1234^ Kildare^James^P ||||||||||||||||||||
O|1|SID001||10021|N|20140604113246|||||C||||CENTBLOOD|||||||||||||||
L||

3.4.23 **Response sent to the LIS when LIS cancels an order**

H|\^&|||OCD^VISION^0.84.0.39963^J123456|||||||P|LIS2-A|20140604113301
P|1|PID123456||NID123456^MID123456^OID123456|Brown^Bobby^B|White|19650102030400|U|||||PHY1234^ Kildare^James^P ||||||||||||||||||||
O|1|SID001||10021|N|20140604113251|||||||||CENTBLOOD|||||||20140604113301|||F|||||
R|1|ABO||||||X||soladmin||20140604113301|J123456
R|2|Rh||||||X||soladmin||20140604113301|J123456
L

3.4.24 Response sent to the LIS when the ORTHO VISION™ Analyzer cancels an order

```
H|\^&|||OCD^VISION^0.84.0.39963^J123456||||||P|LIS2-A|20140604113522
P|1|PID123456||NID123456^MID123456^OID123456|Brown^Bobby^B|White|19650102030400|U|||||PHY1234^ Kildare^James^P ||||||||||||||||||||
O|1|SID001||10021|N|20140604113501|||||||||CENTBLOOD|||||||20140604113522|||X|||||
L
```

3.4.25 Quality Control Examples

Quality control tests can be ordered through the LIS. The QC test is ordered using a Profile that the QC sample ID is associated with. Quality

Control Order: Ortho Confidence WB control with cassette lots specified

```
H|\^&|||Mini LIS|||||||LIS2-A|20140602131041
P|1||||||||||||||||||||||||||||||||
O|1|QC036552022651||ABO-D^0^1^00^00001|N|20140602131041|||||Q||||ORTHO CONFIDENCE WB|||||||||||||||
L||
```

Quality Control Result: Ortho Confidence WB control with cassette lot specified

```
H|\^&|||OCD^VISION^0.84.0.39963^J123456||||||P|LIS2-A|20140602144535
P|1|||||||U||||||||||||||||||||||||
O|1|QC036552022651||ABO-D|A|20140602125531|||||||||ORTHO CONFIDENCE WB|||||||20140602125634|||F|||||
R|1|ABO|A|||||F||Automatic||20140602125629|J123456
M|1|Anti-A|ABO-Rh/Reverse^1^100001^00001^20150101235959^20140602_125628Grey.jpg^20140602_125628Color.jpg||40^A
M|2|Anti-B|ABO-Rh/Reverse^2^100001^00001^20150101235959^20140602_125628Grey.jpg^20140602_125628Color.jpg||0^A
M|3|Ctrl|ABO-Rh/Reverse^4^100001^00001^20150101235959^20140602_125628Grey.jpg^20140602_125628Color.jpg||0^A
R|2|Rh|NEG|||||F||Automatic||20140602125844|J123456
M|1|Anti-D|ABO-Rh/Reverse^3^100002^00001^20150101235959^20140602_125840Grey.jpg^20140602_125840Color.jpg||0^A
M|2|Ctrl|ABO-Rh/Reverse^4^100002^00001^20150101235959^20140602_125840Grey.jpg^20140602_125840Color.jpg||0^A
L
```

3.4.26 Quality Control Order: With 2 expected results and no lots specified

An LIS may include expected results when ordering a QC test. Expected results are only required for non-OCD sample ID's (result not known from barcode).

```
H|\^&|||Mini LIS|||||||LIS2-A|20140602125531
P|1||||||||||||||||||||||||||||||||
O|1|SID006||ABO-D|N|20140414230348|||||Q||ABO^A\Rh^POS||CENTBLOOD|||||||||||||||
L
```

3.4.27 Quality Control Results: With 2 expected results and no lots specified

```
H|\^&|||OCD^VISION^0.84.0.39963^J123456|||||||P|LIS2-A|20140602144535
P|1|||||||U|||||||||||||||||||||||||
O|1|SID006||ABO-D^0|N|20140414230351|||||||||CENTBLOOD|||||||20140414230510|||F|||||
R|1|ABO|A|||||F||Automatic||20140414230506|J123456
M|1|Anti-A|ABO-Rh/Reverse^1^100001^00001^20150101235959^20140414_230454Grey.jpg^20140414_230454Color.jpg||40^A
M|2|Anti-B|ABO-Rh/Reverse^2^100001^00001^20150101235959^20140414_230454Grey.jpg^20140414_230454Color.jpg||0^A
M|3|Ctrl|ABO-Rh/Reverse^4^100001^00001^20150101235959^20140414_230454Grey.jpg^20140414_230454Color.jpg||0^A
R|2|Rh|POS|||||F||Automatic||20140414230506|J123456
M|1|Anti-D|ABO-Rh/Reverse^3^100001^00001^20150101235959^20140414_230454Grey.jpg^20140414_230454Color.jpg||40^A
M|2|Ctrl|ABO-Rh/Reverse^4^100001^00001^20150101235959^20140414_230454Grey.jpg^20140414_230454Color.jpg||0^A
L
```

3.4.28

3.4.29 Quality Control Order: With cassette and reagent lots specified

```
H|\^&|||Mini LIS|||||||LIS2-A|20140414230703
P|1|||||||||||||||||||||||||||||||||
O|1|SID006||ABO-D^0^1^22^00001^1^00^0099|N|20140414230703|||||Q||Auto^NEG||CENTBLOOD|||||||||||||||
L||
```

3.4.30

3.4.31 Quality Control Order: With only cassette lots specified

```
H|\^&|||Mini LIS|||||||LIS2-A|20140414231233
P|1|||||||||||||||||||||||||||||||||
O|1|SID006||ABO-D^0^1^22^00001|N|20140414231233|||||Q||Auto^NEG||CENTBLOOD|||||||||||||||
L||
```

3.4.32

3.4.33 Quality Control Order: With only reagent lots specified

```
H|\^&|||Mini LIS|||||||LIS2-A|20140414231027
P|1|||||||||||||||||||||||||||||||||
O|1|SID006||ABO-D^0^0^1^00^0099|N|20140414231027|||||Q||Auto^NEG||CENTBLOOD|||||||||||||||
L||
```

3.4.34

3.4.35 **BRC Results**

BRC tests cannot be ordered by the LIS; however their results are uploaded to the LIS.

```
H|\^&|||OCD^VISION^0.84.0.39963^J123456||||||P|LIS2-A|20140603145128
P|1|||||||U|||||||||||||||||||||||||
O|1|BRC_6/3/20141448_02||BRC 00 Neg|A|20140603144834|||||||||||||||20140603145128|||F|||||
R|1|BRC|Pass|||||F||Automatic||20140603145033|J123456
M|1|BRC-|ABO-Rh/Reverse^1^100002^00001^20150101235959^20140603_145022Grey.jpg^20140603_145022Color.jpg|B Cells^0134^20160514235959|0^A
M|2|BRC-|ABO-Rh/Reverse^2^100002^00001^20150101235959^20140603_145022Grey.jpg^20140603_145022Color.jpg|A1 Cells^0134^20160514235959|0^A
M|3|BRC-|ABO-Rh/Reverse^3^100002^00001^20150101235959^20140603_145022Grey.jpg^20140603_145022Color.jpg|BRC-E3^0069^20160309235959|0^A
M|4|BRC-|ABO-Rh/Reverse^4^100002^00001^20150101235959^20140603_145022Grey.jpg^20140603_145022Color.jpg|BRC-E3^0069^20160309235959|0^A
M|5|BRC-|ABO-Rh/Reverse^5^100002^00001^20150101235959^20140603_145022Grey.jpg^20140603_145022Color.jpg|BRC-S1^0069^20160309235959\A1
Cells^0134^20160514235959|0^A
M|6|BRC-|ABO-Rh/Reverse^6^100002^00001^20150101235959^20140603_145022Grey.jpg^20140603_145022Color.jpg|BRC-S1^0069^20160309235959\B
Cells^0134^20160514235959|0^A
L
```

3.4.36

3.4.37 **BRC Result: Cancelled**

```
H|\^&|||OCD^VISION^0.84.0.39963^J123456||||||P|LIS2-A|20140603144748
P|1|||||||U|||||||||||||||||||||||||
O|1|BRC_6/3/20141447_01||BRC 00 Neg|A|20140603144713|||||||||||||||20140603144748|||X|||||
L
```

3.4.38

3.4.39 **Error Response**

The ORTHO VISION™ Analyzer cancels an order and optionally includes an error description when the ORTHO VISION™ Analyzer encounters an error with the order.

```
H|\^&|||OCD^VISION^0.84.0.39963^J123456||||||P|LIS2-A|20140527110252
P|1|PID123456||NID123456^MID123456^OID123456|Brown^Bobby^B|White|19650102030400|U||||| PHY1234^ Kildare^James^P|||||||||||||||||||
O|1|SID005||ABO-F|N|20140527110252|||||||||CENTBLOOD||||Profile with name [ABO-F] not found!|||20140527110252|||X|||||
L
```

3.5 ASTM and Enhanced ASTM

This section describes the predecessor ASTM format. This format can be used by enabling the ASTM or Enhanced ASTM compatibility mode.

3.5.1 ASTM Header Record

No compatibility issues. See Vision ASTM H Header Record.

3.5.2 ASTM L Trailer Record

No compatibility issues. See Vision ASTM L Trailer Record.

3.5.3 ASTM P Patient Record

The ORTHO VISION™ Analyzer supports the following fields (not shaded) of the ASTM Patient (P) Record.
Defined in Section 8.1 of ASTM E 1394.

#	D	U	R	Field	Notes
D	R: Required; X: Required for Xmatch; O: Optional; N: Never used; - NA				
U	A: Always sent; X: Always sent for Xmatch; S: Sometimes sent; N: Never sent; -NA				
R	Y: Field can repeat; N: Field does not repeat				
1	R	A	N	Record Type ID	= "P" or "p"
2	O	A	N	Sequence number	Patient sequence number. Set to 1 for the first patient record; 2 for 2nd record; and so on.
3	O	P	N	Practice Assigned Patient ID	= Patient ID If present, the unique identifier for the patient. If empty all following fields of this record are ignored.
4	N	N	N	Lab Assigned Patient ID	- *Unused*
5.1	O	P	N	Patient ID No. 3	= National ID
5.2	O	P	N	-	= Medical Record
5.3	O	P	N	-	= Other ID
6.1	O	P	N	Patient Name	= Last Name
6.2	O	P	N	-	= First Name
6.3	O	P	N	-	= Middle Initial
6.4	N	N	N	-	= Suffix
6.5	N	N	N	-	= Title
7	O	P	N	Mother's Maiden Name	= Mother’s Maiden Surname. May be required to distinguish between patients with the same birth date and last name.

#	D	U	R	Field	Notes
D	R: Required; X: Required for Xmatch; O: Optional; N: Never used; - NA				
U	A: Always sent; X: Always sent for Xmatch; S: Sometimes sent; N: Never sent; -NA				
R	Y: Field can repeat; N: Field does not repeat				
8	O	S	N	Birth Date	= actual birth date (YYYYMMDD, YYYYMMDDHHMM, or YYYYMMDDHHMMSS). Birthdate upload format is always YYYYMMDDHHMMSS.
9	O	A	N	Patient Sex	= NULL, M, F, or U NULL=U If Null, uploads U.
10	N	N	N	Patient Race/Ethnic Origin	*-Unused*
11	N	N	N	Patient Address	*-Unused*
12	N	N	N	Reserved Field	*-Unused*
13	N	N	N	Patient Telephone Number	*-Unused*
14.1	N	N	N	Attending Physician ID	*- Unused*
14.2	N	N	N	-	*-Unused*
14.3	N	N	N	-	*-Unused*
14.4	N	N	N	-	*-Unused*
15	N	N	N	Special Field 1	*-Unused*
16	N	N	N	Special Field 2	*-Unused*
17	N	N	N	Patient Height	*-Unused*
18	N	N	N	Patient Weight	*-Unused*
19	N	N	N	Patient's Diagnosis	*-Unused*
20	N	N	N	Patient Active Medications	*-Unused*
21	N	N	N	Patient's Diet	*-Unused*
22	N	N	N	Practice Field 1	*-Unused*
23	N	N	N	Practice Field 2	*-Unused*
24	N	N	N	Admission and Discharge Dates	*-Unused*
25	N	N	N	Admission Status	*-Unused*
26	N	N	N	Location	*-Unused*
27	N	N	N	Nature of Alternative Diagnosis Code	*-Unused*
28	N	N	N	Alternative Diagnosis Code	*-Unused*

#	D	U	R	Field	Notes
D	R: Required; X: Required for Xmatch; O: Optional; N: Never used; - NA				
U	A: Always sent; X: Always sent for Xmatch; S: Sometimes sent; N: Never sent; -NA				
R	Y: Field can repeat; N: Field does not repeat				
29	N	N	N	Patient Religion	*-Unused*
30	N	N	N	Marital Status	*-Unused*
31	N	N	N	Isolation Status	*-Unused*
32	N	N	N	Language	*-Unused*
33	N	N	N	Hospital Service	*-Unused*
34	N	N	N	Hospital Institution	*-Unused*
35	N	N	N	Dosage Category	*-Unused*

3.5.4 ASTM O Order Record

The ORTHO VISION™ Analyzer supports the following fields (not shaded) of the ASTM Order (O) Record.
Defined in Section 9.4 of ASTM E 1394.

Note: The information with asterisks (*) in the D column are explained in the **Notes** column in the same row.

#	D	U	R	Field	Notes
D	R: Required; X: Required for Xmatch; O: Optional; N: Never used; - NA				
U	A: Always sent; X: Always sent for Xmatch; S: Sometimes sent; N: Never sent; -NA				
R	Y: Field can repeat; N: Field does not repeat				
1	R	A	N	Record Type ID	= "O" or "o"
2	N	A	N	Sequence Number	Starts at 1. Sequence number increases by one for each result within an order. Reset for new patient.

#	D	U	R	Field	Notes
D	R: Required; X: Required for Xmatch; O: Optional; N: Never used; - NA				
U	A: Always sent; X: Always sent for Xmatch; S: Sometimes sent; N: Never sent; -NA				
R	Y: Field can repeat; N: Field does not repeat				
3	R	A	N	Specimen ID	= Sample ID A Sample ID may contain one or more alphanumeric, symbols, and embedded blanks characters up to a maximum length of 20 characters. Leading zeros in a Sample ID are retained and stored as part of the Sample ID. Sample IDs composed of only blank characters are treated as NULL. The System strips leading and trailing blanks. Embedded blanks are not removed and are considered as part of the Sample ID. Sample IDs are case sensitive and leading zeros are not ignored. A unique BRC sample ID is generated by the ORTHO VISION™ Analyzer for each execution of a BRC profile. The generated BRC sample ID always starts with “BRC” and contains a locale based date/timestamp and a sequence number. For example: BRC_19/03/20140809_01
4	N	N	N	Instrument Specimen ID	*-Unused*
5	R	A	Y	Universal Test ID	-

#	D	U	R	Field	Notes
D	R: Required; X: Required for Xmatch; O: Optional; N: Never used; - NA				
U	A: Always sent; X: Always sent for Xmatch; S: Sometimes sent; N: Never sent; -NA				
R	Y: Field can repeat; N: Field does not repeat				
5.1	R	A	Y	Test ID	= Profile name Profiles must be known by the System. Profile names are case sensitive (ABO and abo are treated as different profile names). **On upload:** Only one profile per Order record. **On download:** Only one donor list per order record. **Cross Match:** On download, if the profile contains a cross match test, the following components are required: Number of donor samples, and one or more pairs containing the donor Sample ID and Sample type.
5.2	X	N	N	Number (N) of Donor Samples	= number of donor samples or NULL Component required for profiles containing cross match test. The value is optional (can be NULL). The component is required for cross match tests. The System does not use this value (compatibility with legacy systems).
5.3	X	N	N	First Donor Specimen ID	= Sample ID of 1st donor
5.4	X	N	N	Sample type of First Donor ID	= Sample type of 1st donor
5.a	X*	N	N	n^{th} Donor Specimen ID	= Sample ID of n^{th} donor $a=2*n+1$, where $1<n\leq N$ is the n^{th} donor ID *Required for each additional donor (see 5.1, cross match)
5.b	X*	N	N	Sample type of n^{th} Donor ID	= Sample type of n^{th} donor $b=2*n+2$, where $1<n\leq N$ is the n^{th} donor ID *Required for each additional donor (see 5.1, cross match)
6	O	A	N	Priority	= NULL, S, A, R, C, P, or N. N is the same as R in LIS2-A, 9.4.6. NULL = R = N = C = P = routine priority. S = A = STAT priority.

#	D	U	R	Field	Notes
D	R: Required; X: Required for Xmatch; O: Optional; N: Never used; - NA				
U	A: Always sent; X: Always sent for Xmatch; S: Sometimes sent; N: Never sent; -NA				
R	Y: Field can repeat; N: Field does not repeat				
7	O	A	N	Requested/Order Date and Time	= Date and time the Request/Order was recorded YYYYMMDDHHMMSS If Null, the ORTHO VISION™ Analyzer uses the current time and always uploads a value.
8	N	N	N	Specimen Collection Date and Time	NULL in ASTM Enhanced compatibility mode YYYYMMDDHHMMSS
9	N	N	N	Collection End Time	*-Unused*
10	N	N	N	Collection Volume	*-Unused*
11	N	N	N	Collector ID	*-Unused*
12	O	N	N	Action Code	= NULL, C, N, A. NULL = N = A C: cancel the described order. NULL|N|A: Add profiles on a known sample, new profiles on an unknown sample. Q: Option not supported in ASTM Enhanced compatibility mode **On Upload**: NULL
13	N	N	N	Danger Code	*- Unused*
14	N	N	N	Relevant Clinical Info	*- Unused*
15	N	N	N	Date/Time Specimen Received	*- Unused*
16	R	A	N	Specimen Descriptor	=Sample type
17	N	N	N	Ordering Physician	*- Unused*
18	N	N	N	Physician's Phone Number	*- Unused*
19	O	N	N	User Field 1	= NULL or S S: save all the cassettes for all the profiles
20	N	S	Y	User Field 2	= Comment Error message if this order could not be processed by the ORTHO VISION™ Analyzer.

#	D	U	R	Field	Notes
D	R: Required; X: Required for Xmatch; O: Optional; N: Never used; - NA				
U	A: Always sent; X: Always sent for Xmatch; S: Sometimes sent; N: Never sent; -NA				
R	Y: Field can repeat; N: Field does not repeat				
21	N	N	N	Laboratory Field 1	- *Unused*
22	N	N	N	Laboratory Field 2	- *Unused*
23	N	A	N	Date/Time Results Reported or Last Modified	= YYYYMMDDHHMMSS
24	N	N	N	Instrument Charge	- *Unused*
25	N	N	N	Instrument Section ID	- *Unused*
26	N	A	N	Report Types	= P, F, R, or X P: partial results F: final results R: repeat results X: order cancelled on the instrument
27	N	N	N	Reserved Field	- *Unused*
28	N	N	N	Location or Ward of Specimen Collection	NULL in compatibility mode
29	N	N	N	Nosocomial Infection Flag	- *Unused*
30	N	N	N	Specimen Service	- *Unused*
31	N	N	N	Specimen Institution	- *Unused*

3.5.5 ASTM R Result Record

The ORTHO VISION™ Analyzer supports the following fields (not shaded) of the ASTM Result (R) Record.

Defined in Section 10.1 of ASTM E 1394.

#	D	U	R	Field	Notes
D	R: Required; X: Required for Xmatch; O: Optional; N: Never used; - NA				
U	A: Always sent; X: Always sent for Xmatch; S: Sometimes sent; N: Never sent; -NA				
R	Y: Field can repeat; N: Field does not repeat				
1	-	A	N	Record Type ID	= "R" or "r"
2	-	A	N	Sequence number	Initial value is 1, reset for each new order; maximum length is unlimited.
3.1	-	A	N	Name of Analysis	= Analysis type
3.2	-	S	N	Donor Specimen ID	Included only if cross match test. = Sample ID of donor The System writes one R record per reaction.
4	-	A	N	Data or Measurement Value	= Analysis Result
5	-	N	N	Units of Measurement Value	- *Unused*
6	-	N	N	Reference Ranges	- *Unused*
7	-	S	N	Result Abnormal Flags	= NULL or M M: The result has been entered manually or one of the well results has been modified manually.
8	-	N	N	Nature of Abnormality Testing	- *Unused*
9	-	A	N	Result Status	= F, R, or X F: final result R: repeat result X: test cancelled or result rejected[4]

[4] The status cancelled is returned in any of the following cases:

- The corresponding test was cancelled by a LIS order cancel message (Action code = C).
- The corresponding test was cancelled by the user.
- The corresponding test was cancelled due to an unexpected, non-recoverable error (e.g., analytic or redundant analytic validation failed).
- The result was rejected by the user.

Note: In case of test restart (due to recovery) or unexpected errors, the analyzer does not send cancel messages to the LIS

#	D	U	R	Field	Notes
D	R: Required; X: Required for Xmatch; O: Optional; N: Never used; - NA				
U	A: Always sent; X: Always sent for Xmatch; S: Sometimes sent; N: Never sent; -NA				
R	Y: Field can repeat; N: Field does not repeat				
10	-	N	N	Date of Change in Instrument Normative Values or Units	- *Unused*
11	-	S	N	Operator Identification	= Operator ID. Operator who accepts the test. Returns "Automatic" for results accepted automatically.
12	-	N	N	Date/Time Test Started	- *Unused*
13	-	A	N	Date/Time Test Completed	= Date/Time of result YYYYMMDDHHMMSS
14	-	A	N	Instrument Identification	= Instrument ID

3.5.6 Enhanced ASTM Q Request Record

No compatibility issues. See Vision ASTM Q Request Record

3.5.7 Enhanced ASTM M Manufacturer Record

This Record is not supported by the ASTM format. Whenever a result record is transmitted, there is one record M (manufacturer) for each well result utilized for the result.
The ORTHO VISION™ Analyzer supports the following fields of the Extended Result (M) Record. Defined in Section 15.1 of ASTM E 1394.

#	D	U	R	Field	Notes
D	R: Required; X: Required for Xmatch; O: Optional; N: Never used; - NA				
U	A: Always sent; X: Always sent for Xmatch; S: Sometimes sent; N: Never sent; -NA				
R	Y: Field can repeat; N: Field does not repeat				
1	-	A	N	Record Type ID	= "M" or "m"
2	-	A	N	Sequence number	=1 for initial order, then reset for each new order; maximum length is unlimited
3	-	A	N	Result Well Name	= Name of the test well For cross match: donor sample ID
4.1	-	A	N	Type of Cassette	= Type of cassette
4.2	-	A	N	Number of the well	= 1..6
4.3	-	A	N	Cassette ID Number	= serial # as given in the barcode.
4.4	-	A	N	Cassette Lot Number	-
4.5	-	A	N	Cassette Expiration Date	YYYYMMDDHHMMSS

#	D	U	R	Field	Notes
D	R: Required; X: Required for Xmatch; O: Optional; N: Never used; - NA				
U	A: Always sent; X: Always sent for Xmatch; S: Sometimes sent; N: Never sent; -NA				
R	Y: Field can repeat; N: Field does not repeat				
4.6	-	S	N	Image File Name	= The file name of the cassette image used in determining this result.
4.7	-	N	N	Color Image File Name	Not available in Enhanced ASTM Mode
5	-	A	Y	Reagent Information	
5.1	-	A	N	Reagent Name	= Reagent Name
5.2	-	A	N	Reagent Lot Number	-
5.3	-	A	N	Reagent Expiration Date	YYYYMMDDHHMMSS
6.1	-	A	N	Final Result or Error	= from Table 2 Results or Error
6.2	-	A	N	Manual Correction Flag	= M or A M: Manual correction A: Automatic correction
6.3	-	S	N	Read Result or Error	-
6.4	-	S	N	Operator ID	= The Operator ID of the operator that made the correction.

3.5.8 Sample ASTM and Enhanced ASTM Messages

3.5.8.1 Enhanced ASTM/ASTM: Host Query

A request for orders (Q Record) is sent from the instrument to the LIS when Send Host Query is enabled and samples are scanned that the instrument does not have orders for. The message contains one or more sample IDs. Upon receipt of the query message the LIS sends any orders associated with the sample IDs.

```
H|\^&|||OCD^VISION^0.84.0.39963^J123456||||||P|LIS2-A|20140520155333
Q|1|^SID007||||||||||O
L
```

3.5.8.2 Example Order

```
H|\^&|||Mini LIS||||||||LIS2-A|20140530144204
P|1|PID123456||NID123456^MID123456^OID123456|Brown^Bobby^B|White|196501020304|U|||||||||||||||||||||||||
O|1|SID005||ABO-D|N|20140530144925|||||N||||CENTBLOOD|||||||||||||||
L||
```

3.5.8.3 Example Mode ASTM Result Message

```
H|\^&|||OCD^VISION^0.84.0.39963^J123456||||||P|LIS2-A|20140530145032
P|1|PID123456||NID123456^MID123456^OID123456|Brown^Bobby^B|White|19650102030400|U|||||||||||||||||||||||||
O|1|SID005||ABO-D|N|20140530144931|||||||||CENTBLOOD|||||||20140530145032|||F|||||
R|1|ABO|B|||||F||Automatic||20140530145031|J123456
R|2|Rh|NEG|||||F||Automatic||20140530145031|J123456
L
```

3.5.8.4 Example Mode Enhanced ASTM Result Message

```
H|\^&|||OCD^VISION^0.84.0.39963^J123456||||||P|LIS2-A|20140530145835
P|1|PID123456||NID123456^MID123456^OID123456|Brown^Bobby^B|White|19650102030400|U|||||||||||||||||||||||||
O|1|SID005||ABO-D|N|20140530145736|||||||||CENTBLOOD|||||||20140530145835|||F|||||
R|1|ABO|AB|||||F||Automatic||20140530145834|J123456
M|1|Anti-A|ABO-Rh/Reverse^1^200006^00001^20150101235959^20140530_145826Grey.jpg||40^A
M|2|Anti-B|ABO-Rh/Reverse^2^200006^00001^20150101235959^20140530_145826Grey.jpg||40^A
M|3|Ctrl|ABO-Rh/Reverse^4^200006^00001^20150101235959^20140530_145826Grey.jpg||0^A
R|2|Rh|POS|||||F||Automatic||20140530145834|J123456
M|1|Anti-D|ABO-Rh/Reverse^3^200006^00001^20150101235959^20140530_145826Grey.jpg||40^A
```

M|2|Ctrl|ABO-Rh/Reverse^4^200006^00001^20150101235959^20140530_145826Grey.jpg||0^A
L

3.5.8.5 Cross Match Order

H|\^&|||Mini LIS|||||||LIS2-A|20140530145306
P|1|PID123456||NID123456^MID123456^OID123456|Brown^Bobby^B|White|196501020304|U|||||||||||||||||||||||||
O|1|SID005||XM^2^SID006^CENTBLOOD^SID007^CENTBLOOD|N|20140530145929|||||N||||CENTBLOOD|||||||||||||||
L||

3.5.8.6 Enhanced ASTM: Cross Match Result

H|\^&|||OCD^VISION^0.84.0.39963^J123456|||||||P|LIS2-A|20140530150046
P|1|PID123456||NID123456^MID123456^OID123456|Brown^Bobby^B|White|19650102030400|U|||||||||||||||||||||||||
O|1|SID005||XM|N|20140530145936|||||||||CENTBLOOD|||||||20140530150046|||F|||||
R|1|XM^SID007|INCMP|||||F||Automatic||20140530150046|J123456
M|1|SID007|AHG Polyspecific^1^200005^00001^20150101235959^20140530_150040Grey.jpg|BLISS^0134^20160514235959|10^A
R|2|XM^SID006|INCMP|||||F||Automatic||20140530150046|J123456
M|1|SID006|AHG Polyspecific^2^200005^00001^20150101235959^20140530_150040Grey.jpg|BLISS^0134^20160514235959|10^A
L

3.5.8.7 Order with 2 Samples

The LIS can send orders with a maximum of 2 samples.

H|\^&|||Mini LIS|||||||LIS2-A|20140530133130
P|1|PID123456||NID123456^MID123456^OID123456|Brown^Bobby^B|White|196501020304|U|||||||||||||||||||||||||
O|1|SID003\SID004||BG+AutoControl|N|20140530133828|||||N||||PACKEDCELLS\PLASMA|||||||||||||||
L||

3.5.8.8 Result with 2 Samples (Mode ASTM)

H|\^&|||OCD^VISION^0.84.0.39963^J123456|||||||P|LIS2-A|20140530141932
P|1|PID123456||NID123456^MID123456^OID123456|Brown^Bobby^B|White|19650102030400|U|||||||||||||||||||||||||
O|1|SID003\SID004||BG+AutoControl|N|20140530141739|||||||||PACKEDCELLS\PLASMA|||||||20140530141932|||F|||||
R|1|ABO|A|||||F||Automatic||20140530141932|J123456
R|2|Rh|NEG|||||F||Automatic||20140530141932|J123456
R|3|Kell|NEG|||||F||Automatic||20140530141932|J123456
R|4|ABScr|POS|||||F||Automatic||20140530141922|J123456
R|5|Auto|POS|||||F||Automatic||20140530141922|J123456
L

3.5.8.9 Order with Multiple Profiles

The LIS can send orders containing one or more profiles. Vision treats each profile as separate orders containing identical demographics.

```
H|\^&|||Mini LIS||||||||LIS2-A|20140530145306
P|1|PID123456||NID123456^MID123456^OID123456|Brown^Bobby^B|White|196501020304|U|||||||||||||||||||||||||
O|1|SID005||10021\10068|N|20140530145306|||||N||||CENTBLOOD|||||||||||||||
L||
```

3.5.8.10 Cancelled Orders

Orders can be cancelled by the LIS or by Vision. When the order is cancelled, the ORTHO VISION™ Analyzer sends a cancelation message to the LIS.

Original Order

```
H|\^&|||Mini LIS||||||||LIS2-A|20140604114147
P|1|PID123456||NID123456^MID123456^OID123456|Brown^Bobby^B|White|196501020304|U|||||||||||||||||||||||||
O|1|SID001||10021|N|20140604114147|||||N||||CENTBLOOD|||||||||||||||
L||
```

3.5.8.11 LIS Order Cancelation Request

```
H|\^&|||Mini LIS||||||||LIS2-A|20140604114156
P|1|PID123456||NID123456^MID123456^OID123456|Brown^Bobby^B|White|196501020304|U|||||||||||||||||||||||||
O|1|SID001||10021|N|20140604114147|||||C||||CENTBLOOD|||||||||||||||
L||
```

3.5.8.12 Response sent to the LIS when LIS cancels an order

```
H|\^&|||OCD^VISION^0.84.0.39963^J123456|||||||P|LIS2-A|20140604114201
P|1|PID123456||NID123456^MID123456^OID123456|Brown^Bobby^B|White|19650102030400|U|||||||||||||||||||||||||
O|1|SID001||10021|N|20140604114151|||||||||CENTBLOOD|||||||20140604114201|||F|||||
R|1|ABO||||||X||soladmin||20140604114200|J123456
R|2|Rh||||||X||soladmin||20140604114200|J123456
L
```

3.5.8.13 Response sent to the LIS when the ORTHO VISION™ Analyzer cancels an order

```
H|\^&|||OCD^VISION^0.84.0.39963^J123456|||||||P|LIS2-A|20140604114328
P|1|PID123456||NID123456^MID123456^OID123456|Brown^Bobby^B|White|19650102030400|U|||||||||||||||||||||||||
O|1|SID001||10021|N|20140604114320|||||||||CENTBLOOD|||||||20140604114328|||X|||||
L
```

3.5.8.14 Quality Control Examples

Quality control tests can be ordered through the LIS. The QC test is ordered using a Profile that the QC sample ID is associated with.

Quality Control Order: Ortho Confidence WB

```
H|\^&|||Mini LIS|||||||LIS2-A|20140602131041
P|1|||||||||||||||||||||||||||||||||
O|1|QC036552022651||ABO-D|N|20140602131041|||||N||||CENTBLOOD|||||||||||||||
L||
```

3.5.8.15 Quality Control Result: Ortho Confidence WB control

```
H|\^&|||OCD^VISION^0.84.0.39963^J123456|||||||P|LIS2-A|20140602144535
P|1|||||||U|||||||||||||||||||||||||
O|1|QC036552022651||ABO-D|A|20140602125531|||||||||CENTBLOOD|||||||20140602125634|||F|||||
R|1|ABO|A|||||F||Automatic||20140602125629|J123456
M|1|Anti-A|ABO-Rh/Reverse^1^100001^00001^20150101235959^20140602_125628Grey.jpg||40^A
M|2|Anti-B|ABO-Rh/Reverse^2^100001^00001^20150101235959^20140602_125628Grey.jpg||0^A
M|3|Ctrl|ABO-Rh/Reverse^4^100001^00001^20150101235959^20140602_125628Grey.jpg ||0^A
R|2|Rh|NEG|||||F||Automatic||20140602125844|J123456
M|1|Anti-D|ABO-Rh/Reverse^3^100002^00001^20150101235959^20140602_125840Grey.jpg||0^A
M|2|Ctrl|ABO-Rh/Reverse^4^100002^00001^20150101235959^20140602_125840Grey.jpg ||0^A
L
```

3.5.8.16 BRC Results

BRC tests cannot be ordered by the LIS; however their results are uploaded to the LIS.

```
H|\^&|||OCD^VISION^0.84.0.39963^J123456||||||P|LIS2-A|20140528141214
P|1|||||||U|||||||||||||||||||||||||
O|1|BRC_5/28/20141411_06||BRC 00 Neg|A|20140528141101|||||||||||||||20140528141214|||F|||||
R|1|BRC|Pass|||||F||Automatic||20140528141214|J123456
M|1|BRC-|ABO-Rh/Reverse^1^200005^00001^20150101235959^20140528_141208Grey.jpg|B Cells^0134^20160514235959|0^A
M|2|BRC-|ABO-Rh/Reverse^2^200005^00001^20150101235959^20140528_141208Grey.jpg|A1 Cells^0134^20160514235959|0^A
M|3|BRC-|ABO-Rh/Reverse^3^200005^00001^20150101235959^20140528_141208Grey.jpg|BRC-E3^0069^20160309235959|0^A
M|4|BRC-|ABO-Rh/Reverse^4^200005^00001^20150101235959^20140528_141208Grey.jpg|BRC-E3^0069^20160309235959|0^A
M|5|BRC-|ABO-Rh/Reverse^5^200005^00001^20150101235959^20140528_141208Grey.jpg|BRC-S1^0069^20160309235959\A1 Cells^0134^20160514235959|0^A
M|6|BRC-|ABO-Rh/Reverse^6^200005^00001^20150101235959^20140528_141208Grey.jpg|BRC-S1^0069^20160309235959\B Cells^0134^20160514235959|0^A
L
```

3.5.8.17 BRC Result: Cancelled

```
H|\^&|||OCD^VISION^0.84.0.39963^J123456||||||P|LIS2-A|20140528135432
P|1|||||||U|||||||||||||||||||||||||
O|1|BRC_5/28/20141349_03||BRC 00 Neg|A|20140528134929|||||||||||||||20140528135432|||X|||||
L
```

3.5.8.18 Error Response

The ORTHO VISION™ Analyzer cancels an order and optionally includes an error description when the ORTHO VISION™ Analyzer encounters an error with the order.

```
H|\^&|||OCD^VISION^0.84.0.39963^J123456||||||P|LIS2-A|20140527110118
P|1|PID123456||NID123456^MID123456^OID123456|Brown^Bobby^B|White|19650102030400|U|||||||||||||||||||||||||
O|1|SID005||ABO-F|N|20140527110118|||||||||CENTBLOOD||||Profile with name [ABO-F] not found!|||20140527110118|||X|||||
L
```

3.6 Appendix

This appendix provides a quick reference for the comparison of the ORTHO VISION™ Analyzer LIS to the ORTHO AutoVue® and ORTHO AutoVue® Ultra Systems LIS. This appendix can be used as an aide by LIS experts to transition an existing customer from the ORTHO AutoVue® Innova and ORTHO AutoVue® Ultra Systems to the ORTHO VISION™ Analyzer.

3.6.1 ORTHO VISION™ Analyzer LIS Interface compatibility with ORTHO AutoVue®

The ORTHO VISION™ Analyzer (VISION Analyzer) Laboratory Information System (LIS) interface was designed to be compatible with Laboratory Information Systems that currently support the ORTHO AutoVue® Innova/Ultra Analyzer (AutoVue). This document describes the differences between the two interfaces.

3.6.2 A Quick Look

The following example messages (Example 1 through 3) highlight some of the differences with the ASTM message content. These differences are discussed in the rest of the section.

Example 1: Order

```
H|\^&|||Mini LIS||||||||LIS2-A|20140530144204
P|1|PID123456||NID123456^MID123456^OID123456|Brown^Bobby^B|White|196501020304|U|||||||||||||||||||||||||
O|1|SID05||ABO-D|N|20140530144925|||||N||||CENTBLOOD|||||||||||||||
L||
```

Example 2: AutoVue Enhanced ASTM Result

```
H|\^&|||OCD^AV2G^1.0^J123456|||||||P|1|20140202232445
P|1|PID123456||NID123456^MID123456^OID123456|Brown^Bobby||19650102030400|U|||||||||||||||||||||||||
O|1|SID05||ABO-D|N|20140202232352|||||||||CENTBLOOD|||||||20140202232435|||F|||||
R|1|ABO|A|||M||F||theron||20140202232435|J123456
M|1|Anti-A|ABO-Rh/Reverse^1^000001^12345^20340202235959^22046516_001.bmp||0^A
M|2|Anti-B|ABO-Rh/Reverse^2^000001^12345^20340202235959^22046516_001.bmp||40^A
M|3|Ctrl|ABO-Rh/Reverse^4^000001^12345^20340202235959^22046516_001.bmp||40^A
R|2|Rh|POS|||M||F||theron||20140202232435|J123456
M|1|Anti-D|ABO-Rh/Reverse^3^000001^12345^20340202235959^22046516_001.bmp||40^A
M|2|Ctrl|ABO-Rh/Reverse^4^000001^12345^20340202235959^22046516_001.bmp||40^A
L
```

Example 3: VISION Analyzer Enhanced ASTM Result

```
H|\^&|||OCD^VISION^0.84.0.39963^J123456|||||||P|LIS2-A|20140530145835
P|1|PID123456||NID123456^MID123456^OID123456|Brown^Bobby^B|White|19650102030400|U|||||||||||||||||||||||||
O|1|SID005||ABO-D|N|20140530145736|||||||||CENTBLOOD|||||||20140530145835|||F|||||
R|1|ABO|AB|||||F||Automatic||20140530145834|J123456
M|1|Anti-A|ABO-Rh/Reverse^1^200006^00001^20150101235959^20140530_145826Grey.jpg||40^A
M|2|Anti-B|ABO-Rh/Reverse^2^200006^00001^20150101235959^20140530_145826Grey.jpg||40^A
M|3|Ctrl|ABO-Rh/Reverse^4^200006^00001^20150101235959^20140530_145826Grey.jpg||0^A
R|2|Rh|POS|||||F||Automatic||20140530145834|J123456
M|1|Anti-D|ABO-Rh/Reverse^3^200006^00001^20150101235959^20140530_145826Grey.jpg||40^A
M|2|Ctrl|ABO-Rh/Reverse^4^200006^00001^20150101235959^20140530_145826Grey.jpg||0^A
L
```

3.6.3 **Header Record**

Example 4 highlights the differences in header records:

- The product name (H.5.2) reflects the name of the instrument.
- The software version (H.5.3) reflects each instruments software version.
- The Version number (H.13) reflects the ASTM protocol supported by the instrument. In AutoVue, a value of 1 indicates E1394-97.

Example 4: Header Records

AutoVue	H|\^&|||OCD^AV2G^1.0^J123456|||||||P|1|20140202232445
VISION Analyzer	H|\^&|||OCD^VISION^0.62.0.36863^J123456|||||||P|LIS2-A|20140131113948

3.6.4 **Patient Record**

The VISION Analyzer supports the patients middle initial (P.6.3) and mother's maiden name (P.7), AutoVue does not. See Example 5.

Example 5: Order Patient Record

AutoVue	P|1|PID123456||NID123456^MID123456^OID123456|Brown^Bobby||19650102030400|U||||||||||||||||||||||
VISION Analyzer	P|1|PID123456||NID123456^MID123456^OID123456|Brown^Bobby^B|White|19650102030400|U||||||||||||||||||||||

The VISION Analyzer and AutoVue allow the LIS to send orders without patient demographics. Result messages from these orders differ between the two analyzers (see examples 6 and 7):

- AutoVue ignores other patient demographics fields when an order does not contain a patient ID (P.3 is null).
- The VISION Analyzer does not ignore other patient demographics fields when an order does not contain a patient ID (P.3 is null).
- When the patient ID (P.3) is null, AutoVue returns a zero for the patient id (P.3) and nulls for all other patient demographics fields.
- The VISION Analyzer returns Unknown (U) for patient sex (P.9) when it receives an order that does not contain the patient sex (P.9 is null).

Example 6: Patient Record without Patient Demographics

LIS Order	P|1||||||||||||||||||||||||||||||
AutoVue	P|1|0||||||||||||||||||||||||||||||
VISION Analyzer	P|1|||||||U||||||||||||||||||||||||

Example 7: Patient Record without Patient ID

LIS Order	P|1|||NID5^MID5^OID5|Brown^Bobby^B|White|19650102030405|M||||||||||||||||||||||
AutoVue	P|1|0|||||||||||||||||||||||||||||||
VISION Analyzer	P|1|||NID5^MID5^OID5|Brown^Bobby^B|White|19650102030400|M||||||||||||||||||||||

3.6.5 Manufacturer Information Record

Example 8 highlights the differences in Manufacturer Information Records.

- The cassette image file name (M.4.6) and image type differ between AutoVue and the VISION Analyzer. The AutoVue image type is BMP and the VISION Analyzer uses JPEG (JPG). The file base names differ as well (see M.4.6 in example 8 below).

Example 8: Enhanced ASTM Manufacturer Information Record

AutoVue	M|1|Anti-A|ABO-Rh/Reverse^1^000001^12345^20340202235959^22046516_001.bmp||0^A
VISION	M|1|Anti-A|ABO-Rh/Reverse^1^100001^00001^20150101235959^20140131_113947Grey.jpg||40^A

Analyzer	

3.6.6 **Download File Pattern is Case Sensitive**

Windows file systems are case-preserving and case-insensitive. The VISION Analyzer compares the download file pattern to the file name returned by Windows in a case-sensitive manner. The download file pattern LIS.DNL is considered by the VISION Analyzer as different from a file named lis.dnl.

AutoVue is case-insensitive.

3.6.7 **LIS Order Edits**

Patient demographic information may not be correct when it is first entered into an LIS. When the information is corrected, an LIS may update orders on AutoVue instruments with the correct information.

AutoVue allows the LIS to update patient demographics as follows:

1. LIS downloads an order.
2. Demographic information is corrected on the LIS.
3. LIS downloads the order again with the corrected demographic information.
4. AutoVue prompts the operator to accept or reject the changes. When the operator accepts the changes the associated patient demographics are updated in AutoVue.

When AutoVue receives an order it breaks it into three parts: sample, patient, and order. Only one copy of the Information about a sample is stored; the same is true for patient information and orders. If a new order is received for the same sample then the new order is associated with the existing sample and patient information.

AutoVue enforces that a sample can be associated with only one patient and one or more orders. A patient can be associated with one or more samples and orders.

When the VISION Analyzer receives an order it stores the order, the patient, and sample information together as one order. Additional orders create new orders in the VISION Analyzer without checking for conflicting patient or sample information in existing orders.

The VISION Analyzer does not support LIS order edits. If an LIS sends an order edit (update), the edit will be treated as a new order and will be scheduled.

The VISION Analyzer does not enforce or check that a sample is assigned to only one patient. Two or more orders with the same sample ID for different patients will be treated as new orders and will be scheduled.

3.6.8 **Operator Rejected Results**

When a user rejects some or all results of an order, AutoVue sends a result rejected message to the LIS; the VISION Analyzer does not. See Example 9.

- The AutoVue result rejected notification message, sets the rejected result records for each analysis with the Result Status set to test canceled (R.9 set to X).
- The VISION Analyzer only uploads accepted results. The VISION Analyzer does not upload a message to the LIS if all results are rejected.

Example 9: Rejected Results

<table>
<tr><td>AutoVue Result Message with rejected results</td><td>P|1|0|||||||||||||||||||||||||||||||||
O|1|Donor01||BG+AutoControl|N|20140212155224||||||||CENTBLOOD||||||20140212155307|||F|||||
R|1|ABO|?|||||X||theron||20140212155307|J123456
M|1|A1-Cells|Reverse diluent^1^000006^25110^20330507235959^123.bmp|A1 Cells^0017^20161230235959|0^A
M|2|A2-Cells|Reverse diluent^2^000006^25110^20330507235959^123.bmp|A2 Cells^0017^20161230235959|40^A
M|3|B-Cells|Reverse diluent^3^000006^25110^20330507235959^123.bmp|B Cells^0017^20161230235959|40^A
M|4|O-Cells|Reverse diluent^4^000006^25110^20330507235959^123.bmp|O Cells^0017^20161230235959|40^A
M|5|Anti-A|ADK^1^000002^02345^20340212235959^123.bmp||0^A
M|6|Anti-B|ADK^2^000002^02345^20340212235959^123.bmp||40^A
M|7|Ctrl|ADK^6^000002^02345^20340212235959^123.bmp||0^A
R|2|Rh|POS|||||X||theron||20140212155307|J123456
M|1|Anti-D|ADK^3^000002^02345^20340212235959^123.bmp||40^A
M|2|Anti-D|ADK^4^000002^02345^20340212235959^123.bmp||40^A
M|3|Ctrl|ADK^6^000002^02345^20340212235959^123.bmp||0^A
R|3|Kell|POS|||||X||theron||20140212155307|J123456
M|1|Anti-K|ADK^5^000002^02345^20340212235959^123.bmp||40^A
M|2|Ctrl|ADK^6^000002^02345^20340212235959^123.bmp||0^A
R|4|ABScr|POS|||||F||theron||20140212155313|J123456
M|1|Surg 1|AHG anti-IgG^1^000005^22310^20330507235959^123.bmp|BLISS^0028^20160128235959\Surg 1^0126^20160128235959|0^A
M|2|Surg 2|AHG anti-IgG^2^000005^22310^20330507235959^123.bmp|BLISS^0028^20160128235959\Surg 2^0126^20160128235959|40^A
M|3|Surg 3|AHG anti-IgG^3^000005^22310^20330507235959^123.bmp|BLISS^0028^20160128235959\Surg 3^0126^20160128235959|40^A
R|5|Auto|POS|||||F||theron||20140212155313|J123456

M|1|Auto|AHG anti-IgG^4^000005^22310^20330507235959^123.bmp|BLISS^0028^20160128235959|40^A</td></tr>
<tr><td>VISION Analyzer Result Message</td><td>P|||||||U||||||||||||||||||||||||||
O|1|Donor01||BG+AutoControl|N|20140213151036||||||||CENTBLOOD||||||20140213151319|||F|||||
R|1|ABScr|POS|||||F||soladmin||20140213151201|J123456
M|1|Surg 1|AHG anti-IgG^1^100002^00001^20150101235959^20140213_151158Grey.jpg|BLISS^0021^20160121235959\Surg 1^0021^20160121235959|0^A
M|2|Surg 2|AHG anti-IgG^2^100002^00001^20150101235959^20140213_151158Grey.jpg|BLISS^0021^20160121235959\Surg 2^0021^20160121235959|10^A
M|3|Surg 3|AHG anti-IgG^3^100002^00001^20150101235959^20140213_151158Grey.jpg|BLISS^0021^20160121235959\Surg</td></tr>
</table>

	3^0021^20160121235959|30^A R|2|Auto|NEG|||||F||soladmin||20140213151201|J123456 M|1|Auto|AHG anti-IgG^4^100002^00001^20150101235959^20140213_151158Grey.jpg|BLISS^0021^20160121235959|0^A

3.6.9 **Error Response**

The VISION Analyzer cancels an order and optionally includes an error description when it encounters an error reading the order.

AutoVue does not have this feature.

Example 10: Error Response

```
H|\^&|||OCD^VISION^0.84.0.39963^J123456|||||||P|LIS2-A|20140527110118
P|1|PID123456||NID123456^MID123456^OID123456|Brown^Bobby^B|White|19650102030400|U|||||||||||||||||||||||||
O|1|SID005||ABO-F|N|20140527110118|||||||||CENTBLOOD||||Profile with name [ABO-F] not found!|||20140527110118|||X||||
```

3.6.10 **Trace File Names**

AutoVue trace file name format is Prefix + Timestamp + Extension. Prefixes are DNL for download, UP for upload, and QU for query files. A timestamp follows the ASTM date/time format of YYYYMMDDhhmmss (i.e. 20140605103721). The file extension is the same for all types; ".TRA".

Example AutoVue trace file names:

- DNL20140605103721.TRA
- UP20140605103838.TRA
- QU20140605103058.TRA

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The download and upload trace file name format is Prefix + Timestamp + SequenceNumber + Extension. Prefixes are DNL for download, and UP for upload (same as AutoVue). A timestamp follows the ASTM date/time format of YYYYMMDDhhmmss (i.e. 20140605103721). The SequenceNumber is only written when more than one file is written within the same second. The file extension is the same for all types; ".tra".

The query trace file name format is Prefix + SequenceNumber + Timestamp + Extension. Prefix is QU for query trace files (same as AutoVue). The SequenceNumber is three digits followed by a dash and is always written. The timestamp follows the ASTM date/time format of YYYYMMDDhhmmss (i.e. 20140605103721). The file extension is the same for all types; ".tra".

Example VISION Analyzer trace file names:

- DNL20140530132501.tra
- DNL20140530132941-0.tra
- UP20140530132501.tra
- QU001-20140530135928.tra

3.6.11 **Physical Layer**

The VISION Analyzer can be configured to communicate to an LIS by either TCP/IP via Ethernet, Serial RS232 or Network File sharing.

AutoVue can be configured to communicate to an LIS by either FTP, Serial RS232 or Network File sharing.

	Physical Layer			
	Serial RS232	**TCP/IP via Ethernet**	**File sharing**	**FTP**
AutoVue	Kermit	**Not Supported**	via network shared folders	Connects to LIS FTP server
VISION Analyzer	ASTM E1381-02	ASTM E1381-02	via network shared folders	**Not Supported**

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