



# ***Abbott Standard Interface RS-232 Manual***

***List Number 06F71-05***

Abbott Laboratories  
Abbott Park, IL 60064

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## **Foreword**

This manual has been designed to help you familiarize yourself with all aspects of the Abbott Standard Interface for the ARCHITECT® System.

If you have any questions, do not hesitate to contact your local Abbott Laboratories Diagnostics Division Customer Support Representative to obtain prompt answers to your inquiries.

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## Agency approvals

The ARCHITECT® System has been tested and found to comply with the following agency standards:

- Underwriter's Laboratories: UL 3101-1 or UL61010A-1 Electrical Equipment for Laboratory Use Part 1: General Requirements  
cUL: CSA c22.2 No. 1010 Safety requirements for electrical equipment for measurement, control, and laboratory use Part 1: General Requirements
- 21CFR Part 1040.10: Performance Standards for Light Emitting Products
- IEC 60825-1: Safety of Laser Products (Class I Laser Products)
- CE Marking

	In Vitro Diagnostic Directive	98/79/EC
	Legal Manufacturer	Abbott Laboratories Abbott Park, IL 60064 USA
	Authorized Representative	Abbott Max-Planck-Ring 2 65205 Wiesbaden Germany +49-6122-580

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<b>Reference</b>	<b>Trademark</b>
ARM	ARCHITECT ARM™
<i>c</i> 8000	<i>c</i> 8000™
<i>i</i> 2000	<i>i</i> 2000®
<i>i</i> 2000 <sub>SR</sub>	<i>i</i> 2000 <sub>SR</sub> ™
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4,533,457	4,619,739	4,647,362	4,678,755
4,797,192	5,025,389	5,413,770	

The following U.S. Patents are relevant to the ARCHITECT® *i* System or its components.

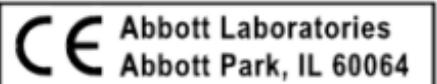
5,468,646	5,536,049	5,543,524	5,545,739
5,565,570	5,669,819	5,682,662	5,723,795
5,795,784	Des. 397,938	Des. 401,699	Des. 401,697
Des. 401,700	5,783,699	5,856,194	5,859,429
Des. 404,829	Des. 406,901	5,915,583	5,938,120
Des. 413,539	5,965,828	6,022,746	6,063,634
6,150,113	6,153,377	6,162,645	

There are other such patents and patent applications in the United States and worldwide.

## System labeling

The symbols in the following table are used on ARCHITECT® System labeling.

### Key to symbols used on labeling

Label	Description
	Authorized representative
	Legal manufacturer
	For <i>in vitro</i> diagnostic use
	Manufacturing location
	Date of manufacture
	Serial number
	AC input power
	Class 2 laser product
	Electrical shock

<b>SAMPLE CUPS</b>	Sample Cups
<b>ICT Cleaning Fluid</b>	ICT Cleaning Fluid
<b>ICT Lyophilized Cleaning Solution</b>	ICT Lyophilized Cleaning Solution
<b>Water Bath Additive</b>	Water Bath Additive

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<b>PRE-TRIGGER SOLUTION</b>	Pre-Trigger Solution
<b>TRIGGER SOLUTION</b>	Trigger Solution
<b>WASH BUFFER</b>	Wash buffer
<b>REACTION VESSELS</b>	Reaction Vessels
<b>SEPTUM</b>	Septum
<b>REPLACEMENT CAPS</b>	Replacement Caps
<b>REF</b>	List number

	Temperature limitation
	Use by/expiration date
	Consult instructions for use
	Caution, consult instructions for use
<b>LOT</b>	Lot number
<b>QTY</b>	Quantity
<b>UNIT</b>	Unit
	Biological risk

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# Introduction

The Abbott Standard Interface RS-232 Manual/ARCHITECT System Edition provides the necessary information for interfacing the ARCHITECT System to hospital or laboratory information systems across the serial RS-232 communications port.

Topics in this section include:

- Overview of the Manual
- Alternative Reference Materials

## NOTES

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# Overview of the Manual

All Abbott Standard Interface RS-232 Manuals are designed to provide clear and concise information on the communications capabilities of Abbott Diagnostic Instruments and Systems that support the Abbott Standard Interface (ASI). This interface is based on the following industry supported standards:

- ASTM E 1381-91 “Specification for Low-Level Protocol to Transfer Messages Between Clinical Laboratory Instruments and Computer Systems”
- ASTM E 1394-91 “Standard Specification for Transferring Information Between Clinical Instruments and Computer Systems”

The manuals provide specific information on the communications capabilities of Abbott ASI instruments and systems as well as general information on the Abbott implementation of the ASTM E 1381-91 and E 1394-91 communication protocols. Different editions exist for different instruments and systems, however they are all organized as follows:

- How to Use This Manual: Discusses the purpose of the manual and provides a good overview of the information contained within.
- Section 1: Discusses the Abbott implementation of the ASTM E 1381-91 and E 1394-91 standards. This section is common to all Abbott Standard Interface Manuals.
- Section 2 – Section 7: Discusses specific information about the instrument or system covered by that particular edition. They cover topics such as instrument overview, communications setup, content of communications messages and instrument communication diagnostics. These sections are unique for each instrument. Sections 2 – 7 of this edition describe the ARCHITECT System and its specific interface implementation.
- Section 8: Refers to the use of ASIST (Abbott Standard Interface Simulator Tool), the ARCHITECT Host/Instrument Interface Data Disk, and the ARCHITECT SCC Simulator (for LIS Vendors).
- Section 9: Discusses the differences between the ARCHITECT System and the AxSYM interface.

This manual assumes the reader is familiar with programming techniques and is capable of programming using a high level language. This manual also assumes the reader has a good working knowledge of serial communications as they relate to the computer system that interfaces with the Abbott instrument or system.

For readers not familiar with the ASTM E 1381-91 and E 1394-91 communications standards, we highly recommend ordering these standards by calling or writing ASTM using the information provided in "Alternative Reference Materials" on page 5: All readers should carefully study the "Overview of the Abbott Standard Interface" section and all subsequent sections to understand how Abbott instruments implement the ASTM standards. The reader should then be able to develop and program the logic required to effectively communicate with the ARCHITECT System as well as setup and diagnose communications.

Included with this manual is a data diskette containing the Instrument Specification File (ISF) for the ARCHITECT System. When this file is loaded as the "current instrument" in the ASIST environment, the user can perform comprehensive testing and validation of communication protocols.

- Instrument developers can use ASIST to emulate a Host computer. ASIST sends requests in user-generated test protocols to ensure that the equipment accepts and interprets these communications correctly.
- Host computer software developers can use ASIST to emulate Abbott instruments to test communications without having to invest in the instruments themselves. Test transmissions of report data, using established record layouts and communications protocols, ensure that host software properly interfaces with actual instruments after installation.

The data diskette is provided with the understanding that modifying originals or copies of the data files invalidates the data files. Do not use invalid data files to represent instrument output.

Abbott provides this software as a tool to assist the development of interface software to Abbott instruments and systems. Developers should not rely solely on the use of this product for verification and validation of their interface software.

ASIST software is provided with the understanding that Abbott does not guarantee its support or future availability.

---

# Alternative Reference Materials

Bibliography of standards and references.

ASTM Standards referenced within this document are available through:

American Society of Testing and Materials (ASTM)

100 BARR HARBOR DR

WEST CONSHOHOCKEN, PA. 19428-2959

Phone Orders: (610) 832-9585

Web: [www.astm.org](http://www.astm.org)

## NOTES

# Introduction

This section explains the Abbott implementation of the ASTM E 1381-91 and E 1394-91 communications standards.

Topics include:

- Overview of the Abbott Standard Interface (ASI)
- Layered Protocols
- Physical Layer – Electrical, Mechanical, and Signaling Characteristics
- Data Link Layer – Establishment, Transfer, and Termination
- Presentation Layer – Message Content
- Application Layer

**NOTES**

# Overview of the Abbott Standard Interface (ASI)

Abbott instruments and data management systems provide communications to external host computers via a serial connection conforming to the specifications and requirements set forth in the ASTM E 1381-91 and ASTM E 1394-91 standards. At the most basic level these standards allow host systems to download (*i.e.*, send) worklist messages to the Abbott instruments/systems. The Abbott instruments can then process the worklist, act on the tests that have been requested, and return the results associated with the worklist. The host computer can then process the results, generate reports, and store the information.

Although these standards form the basis of the type of information exchanged between clinical instruments and the manner that the information is transferred, they allow the instrument and system manufacturers considerable latitude in selecting field use and field substructure.

In order to ensure compatibility between Abbott instruments, systems, and external hosts, Abbott has taken the initiative to define the **Abbott Standard Interface (ASI)**. ASI consists of a series of interpretations and definitions of the ASTM standards that provide a strict but consistent compliance to the standards, while providing the needed flexibility to handle the unique data requirements of Abbott's multiple instruments and systems.

By ensuring compatibility and by defining the fields that are instrument specific, developers benefit by structuring their software to be configurable to the highest possible extent, thus minimizing development time and costs.

## Abbott Standard Interface

### Overview of the Abbott Standard Interface (ASI)

### Section 1

**Table 1.1: Terms and Definitions**

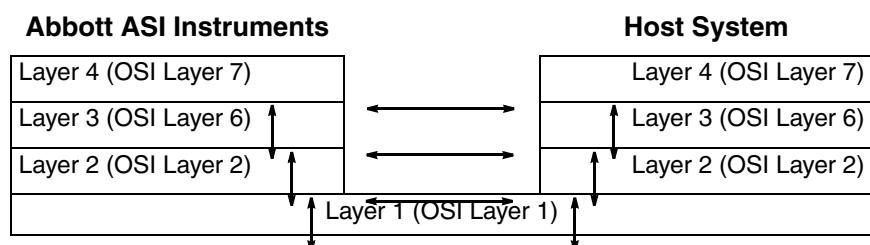
Term	Definition
ASI	Abbott Standard Interface: Abbott's implementation of the American Society for Testing and Materials (ASTM) Standard. E 1394-91, A Standard Specification for Transferring Information Between Clinical Instruments and Computer Systems. E 1381-91, Specification for Low-Level Protocol to Transfer Messages Between Clinical Laboratory Instruments and Computer Systems.
Allowed Data Formats	All data is represented in ASCII format within the range 0 – 255. Values 0 – 127 are defined by ANSI X3.4-1986 Standard. Values 128 – 255 are defined as needed by specific instruments. Values 0 – 31 cannot be used, with the exception of 13 (<CR>). The value 13 is reserved as a record terminator. Values 32 – 255 can be used, with the exception of 127 and 255. Within a data text field, only the ASCII characters 32 – 126 and 128 – 254 are permitted as usable characters. Characters used as delimiters in the transmission are excluded from the above permitted range. The sender is responsible for checking that a data text field does not contain any delimiters. The record identifier fields (H, P, O, R, L, C, M, and Q) are always uppercase when output from the Abbott instrument. On input, both upper- and lowercase record identifiers are accepted. Fields and records are variable in length with no restriction placed on the maximum length of a field or record. The high-level protocol depends on the receiver's buffering capability and the low-level communication ability to divide the information into workable lengths for transmission and processing purposes. All Abbott Standard Interface RS-232 manuals provide the maximum allowable length of each field transmitted and received.
E 1394-91 Message	A block of data that is transmitted in a format consistent with the ASTM E 1394-91 Standard. Data is transmitted in a series of records starting with a Header Record (H) and ending with a Terminator Record (L). When a transmission is lost, the Abbott instrument retransmits or accepts only complete messages.
E 1394-91 Record	An E 1394 Record is a string of characters starting with a capital ASCII alphabet character and ending with a carriage return (ASCII 13), as defined by the ASTM E 1394-91 Standard.
Reserved Characters	The following characters have special uses and should not be used for data: Vertical Bar ( ) Backslash (\) Ampersand (&) Carriage Return (<CR>) Caret (^)
E 1381-91 Message	A block of data that is transmitted in a format consistent with the ASTM E 1381-91 Standard. Abbott ASI instruments use an E 1394-91 Record as the E 1381-91 Message. Thus, an E 1381-91 Message may be transmitted using multiple (one or more) frames, based on the length of the message.
E 1381-91 Frame	A frame is a subdivision of a message and allows transmission of up to 247 characters (240 data characters and 7 control characters). The Abbott instrument transmits one record per frame. Messages more than 247 characters long can be divided into multiple frames, as long as each frame contains only information from one record at a time.

# Layered Protocols

The Abbott Standard Interface (ASI) is based on a four-layer protocol implementation, consistent with the terminology and definitions of the Organization for International Standards (ISO) reference model for Open Systems Interconnection (OSI). The OSI model is concerned with the interconnections between different systems and not with the internal functions that are performed by a given system. The OSI model provides a generalized view of a layered architecture. Using this approach, functions and services required to allow two systems to communicate are grouped in various functional layers. A given layer is responsible for performing a specific set of functions and for providing a specific set of services.

A communications architecture can then be defined in terms of the services provided by each layer and the interface between layers. Protocols define the services offered across a layer interface and the rules that are followed in the processing performed as part of a service. Data formats for the data exchanged across an interface are also defined as part of the architecture.

Two types of interfaces exist in a communications architecture. One set of interfaces exists between the layers in a given system. The second set of interfaces exists between comparable layers of different systems. ASI provides information on the second set of interfaces that allow similar layers of different systems to communicate.



**Figure 1.1: Layered Protocol Architecture**

The OSI layer designators are used as reference and do not imply compliance with actual ISO/OSI Standards.

Based on this architecture, ASI defines the following layers for implementation of communications software:

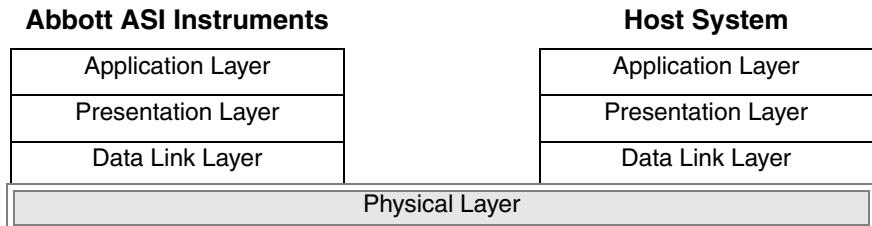
- Physical Layer (Layer 1) – Directs transmission of serial binary data bits between the Abbott instruments and systems and external host computers across a mechanical and electrical connection, as defined by this document and ASTM E 1381-91 section 5.
- Data Link Layer (Layer 2) – Provides services for establishing a link connection, transferring data, and releasing the connection. Also provides services for delimiting, synchronism, sequence control, error detecting and recovering of the link, as defined by this document and ASTM E 1381-91 section 6.
- Presentation Layer (Layer 3) – Provides services for building message content into a standard and interpretable form, as defined by this document and ASTM E 1394-91.
- Application Layer (Layer 4) – Provides services for processing test requests, running assays, reporting results, etc., as defined by this document and the instrument specific operations manual.

The following figure depicts the general implementation of these layers on new Abbott instruments and systems that support the ASTM Standards.

Abbott ASI Instruments	Host System
<b>Application Layer</b> Software to process test requests, run assays, report results	<b>Application Layer</b> Software to request tests, process, store, report, and manage patient data
<b>Message Content Layer</b> Software to convert above data into a standard and interpretable form	<b>Message Content Layer</b> Software to convert above data into a standard and interpretable form
<b>Data Link Layer</b> Software for link connection and release, delimiting and synchronism, sequence control, error detection and recovery	<b>Data Link Layer</b> Software for link connection and release, delimiting and synchronism, sequence control, error detection and recovery
<b>Physical Layer</b> Mechanical and electrical connection for serial binary data bit transmission between the instrument and the host	

Figure 1.2: ASI Implementations

# Physical Layer



**Figure 1.3: Physical Layer**

Abbott instruments and systems supporting the Abbott Standard Interface (ASI) implement the physical layer of the interface as specified by the ASTM E 1381-91 standard. This interface is based on the EIA RS-232D -1986 standards, for the mechanical and electrical characteristics and the ANSI X3.15-1976 and ANSI X3.16-1976 for the signaling characteristics, such as the structure of the characters being transmitted.

## Electrical Characteristics

Abbott instruments use a voltage more negative than minus three volts (with respect to signal ground) to indicate a marking condition (binary one). A voltage more positive than plus three volts (with respect to signal ground) indicates a spacing condition (binary zero). The relevant voltage and impedance levels of the signal generator and the signal receiver circuits of ASI instruments meet the requirements set forth in the RS-232D-1986 standard.

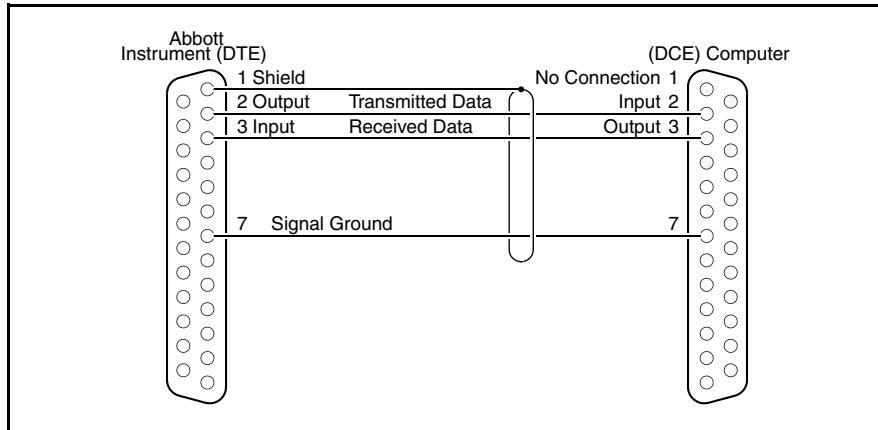
## Mechanical Characteristics

ASI instruments use a 25-pin connector to facilitate connection to an external computer system. The connection provided conforms to the requirements of the EIA RS-232D Standard. The Communication Setup section of each Abbott Standard Interface RS-232 manual covers the specifics for that instrument.

The cabling and pin-out requirements of Abbott instruments and systems conform to the specifications defined in the ASTM E 1381-91 standard. Only pins 1, 2, 3, and 7 of the connector are used. Refer to the following table and figure for pin assignment information. The ASTM E 1381-91 standard requires that the external Host computer is configured as a DCE device.

**Table 1.2: Pin Assignments for the 25-Pin Connector**

Pin No.	EIA Circuit	Description	Direction	
			Abbott Instrument	Computer
1	-	Shield	-	No Connection
2	BA	Transmitted Data	Output	Input
3	BB	Received Data	Input	Output
7	AB	Signal Ground	-	-

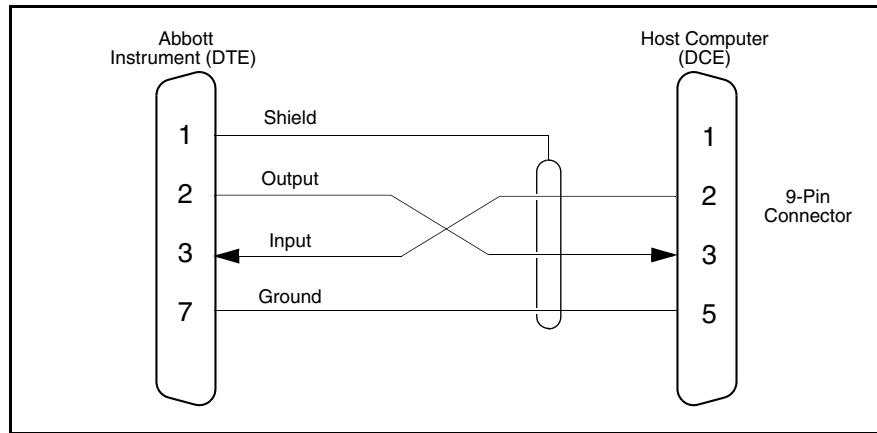


**Figure 1.4: Pin-to-Pin Connections (Wiring Diagram)**

**NOTE:** If a computer is configured as a DTE Device (*i.e.*, pin 2 is the output and pin 3 is the input), then the cable connecting the ASI instrument to the computer must have lines 2 and 3 crossed.

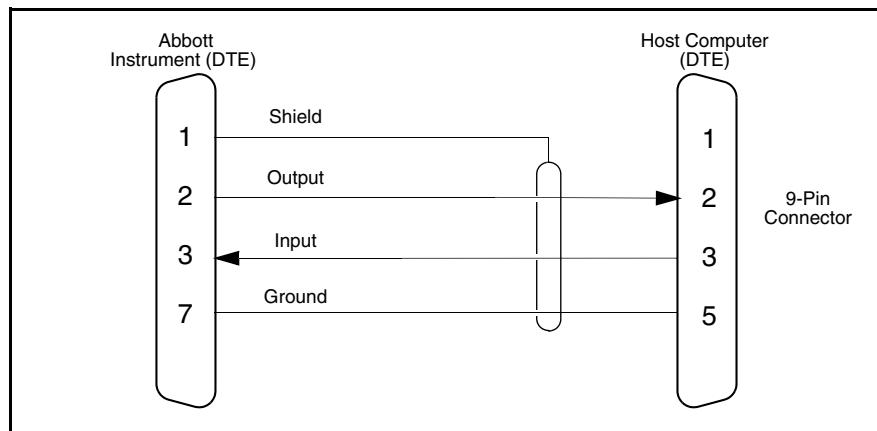
## Section 1

For Host computer systems that do not conform to the ASTM standard for the physical connection, other cabling schemes may be required as shown below. Many personal computers may have a 9-pin connector instead of the 25-pin required by the ASTM specifications.



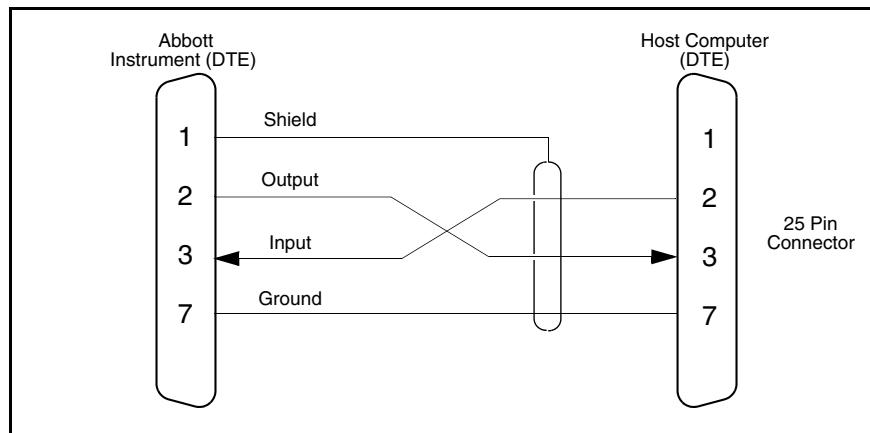
**Figure 1.5: Host computer (PC with 9-pin connector) with Non-ASTM compliant connector**

**NOTE:** Pin 1 is the shield connection and connects to the instrument's (DTE) frame. Leave the shield connection open at the computer (DCE) to avoid ground loops.



**Figure 1.6: Host Computer with 9-Pin PC-AT style connector**

If the same computer used a 25-pin connector configured as a DTE, the cabling requirements are as follows:



**Figure 1.7: Host computer (PC with 25-pin connector) with Non-ASTM compliant connector.**

ASI instruments and systems may optionally provide fixed length cables for connecting to external systems. When cable lengths greater than 50 feet are required, then “Low Capacitance” shielded cables are recommended. Local Building Fire Code standards may require the use of “Plenum” rated cables for connecting systems. Please check with your building personnel for specific requirements that apply to wiring and cabling in your specific environment.

## Signaling Characteristics

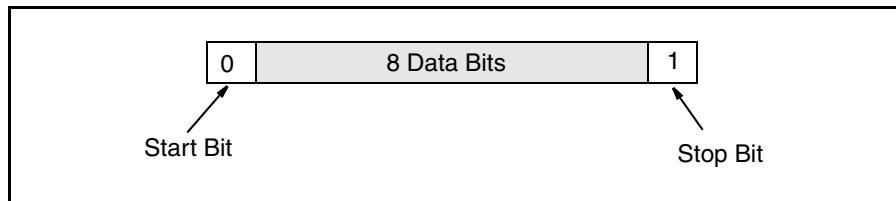
### Character Structure

Character bit patterns and bit rates determine how Abbott instruments communicate with computer systems.

The character bit sequencing, structure, and parity sense definitions conform to ANSI standards X3.15-1976 and X3.16-1976. The default structure for Abbott instruments character bit sequencing is:

1. A start bit with a value of zero.
2. The start bit is followed by eight bits that represent character data.

3. A stop bit with a value of one ends the character structure.



**Figure 1.8:** Default Abbott Instruments Character Structure. *The start and stop bits separate ASCII characters which are eight bits long.*

All ASI instruments support the ASTM required combinations of:

- Start bits
- Data bits
- Parity bits
- Stop bits

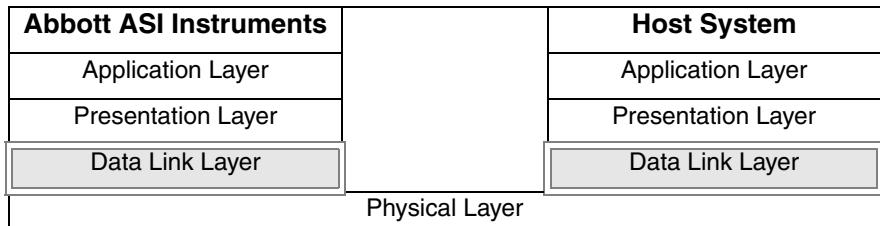
## Speed

Abbott instruments that implement ASI provide multiple baud rates for transmitting data to external systems. As a minimum, all ASI instruments support the ASTM preferred communications speed of 9600 baud, and may also support one or more of the following [1200, 2400, 4800, 14400, 19200, 28800, 38400, 57600, 115200]. The default setting of all ASI instruments for host communications is 9600 baud. For information on the exact baud rates supported by each instrument, refer to **Communication Setup**.

Abbott data management systems that are used as hosts support all four of the ASTM E 1381-91 required baud rates [1200, 2400, 4800, 9600]. Optionally, they may also support other baud rates [e.g., 19200, etc.] as required.

**NOTES**

# Data Link Layer



**Figure 1.9: Data Link Layer**

The data link layer covers methods for the following:

- Establishing communication connections with an external system
- Providing error detection and error recovery of communications
- Delimiting and synchronism
- Controlling sequence
- Sending and receiving messages
- Terminating the communications connections

In addition, the data link layer performs the following inter-layer functions:

- Interacts with higher layers in transferring data
- Handles requests for establishing and terminating connections
- Reports the data link layer status

The data link layer uses a character-oriented protocol to send messages between two systems that are directly connected. One system transmits while the other system monitors the communications link. Thus, information flows in only one direction at a time. Replies occur after information is sent, never at the same time.

Abbott instruments implement the data link layer as specified in the ASTM E 1381-91 standard. This standard defines conditions that apply to a device if the device is an instrument, and other conditions if the device is a host computer system. Because Abbott Data Management systems are sometimes used as hosts for other Abbott instruments and other times as a link communicating to Laboratory Information Systems, these systems implement both the ASTM host and the instrument logic of the data link protocol. The configuration of these systems allows them to communicate appropriately based on the role that they are serving.

The data link layer consists of the three following communications phases:

- Establishment phase
- Transfer phase
- Termination phase

Each phase is discussed in detail.

## **Establishment Phase**

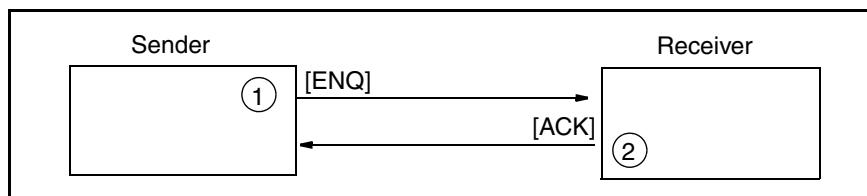
The establishment phase determines the direction of information flow and prepares the receiver to accept information. The system with data available for transmission initiates the establishment phase.

When Abbott ASI instruments and systems have data to send, they go into the establishment phase by transmitting the [ENQ] character. If a valid reply ([ACK], [NAK], or [ENQ]) is not received within the 15 second time period specified by ASTM E 1381-91, the Abbott instruments and systems enter the termination phase. The instrument returns to the establishment phase after waiting a certain amount of time (*e.g.*, 30 seconds, 60 seconds, etc.) specific to that instrument.

If after a certain number of attempts the instrument is unable to establish communications with the external system, the operator is informed via a dialog box (or error message) and an error message is posted to the error log file.

## **Sending an [ENQ] and Receiving an [ACK]**

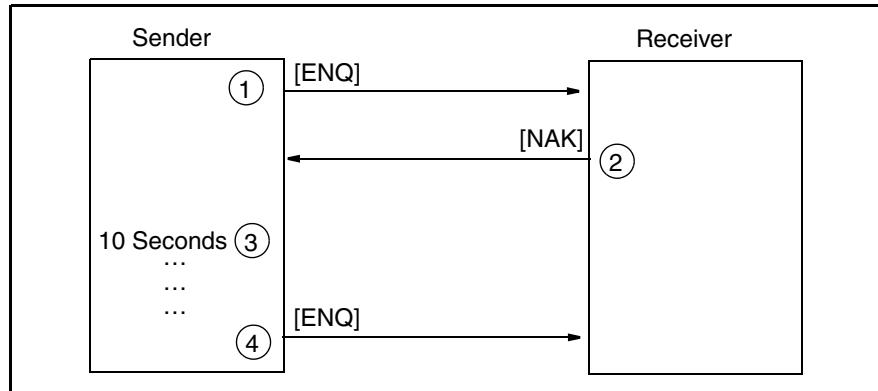
After determining that the data link is in a neutral state, the sender transmits an Enquiry [ENQ] transmission control character to the receiver, notifying the receiver that it has information to send. The receiver must send a Message Acknowledged [ACK] transmission character back to the sender before the information is sent. If the receiver is not ready to receive, it sends a Message Not Acknowledged [NAK] transmission character. All other characters are ignored by the sender and receiver. The only valid characters during the Establishment Phase are [ENQ], [ACK], and [NAK].



**Figure 1.10: Sender Initiating Establishment Phase.** The receiver returns a signal to the sender acknowledging that it is ready to receive.

### Sending an [ENQ] and Receiving a [NAK]

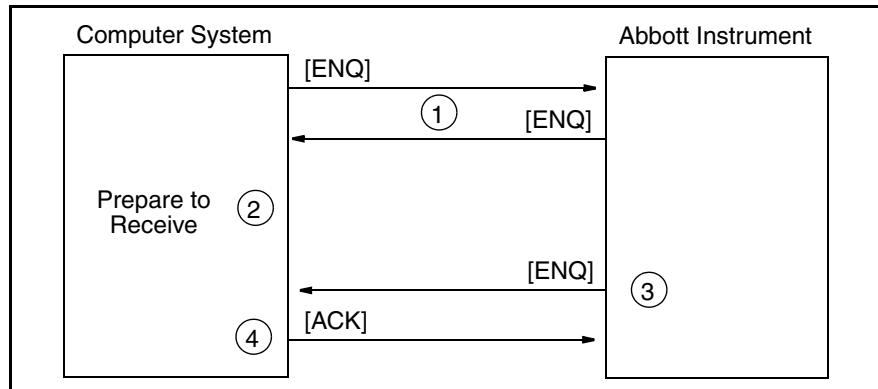
If the receiver is not ready to receive information, it sends a [NAK] in response to an [ENQ]. The sender must wait ten seconds before sending another [ENQ].



**Figure 1.11:** *Sender Receives a [NAK] Signal. If the sender receives a [NAK], the sender waits ten seconds before re-initiating the establishment phase.*

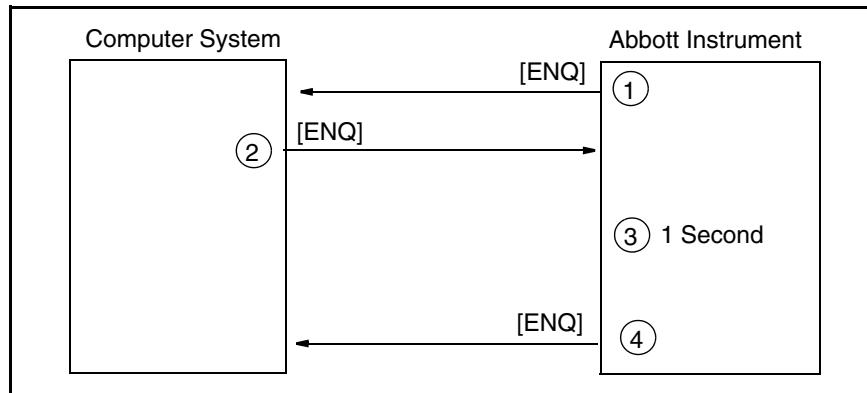
### Sending an [ENQ] and Receiving an [ENQ]

When both systems simultaneously send an [ENQ], they are in contention. In that case, the Abbott instrument has first priority to transmit information. For example, the following figure shows a computer and an Abbott instrument simultaneously sending an [ENQ]. The computer must immediately stop trying to transmit and prepare to receive. When the next [ENQ] is received by the computer, the computer replies with an [ACK], or a [NAK], depending on its readiness to receive.



**Figure 1.12:** *Sender Receives an [ENQ] after Sending an [ENQ]. The sender prepares to receive.*

In the example shown in the following figure, the instrument sends an [ENQ] and receives an [ENQ]. The instrument waits at least one second before re-sending another [ENQ]. The computer system must wait at least twenty seconds before trying to initiate the communications by sending another [ENQ].



**Figure 1.13: Instrument Receives an [ENQ] after Sending an [ENQ]. The instrument waits one second before re-sending another [ENQ].**

## Transfer Phase

During the transfer phase, the sender transmits messages to the receiver until all messages are sent. Messages are sent in frames which contain a maximum of 247 characters.

Special control characters identify the frame type, the beginning and end of a frame, and provide for error detection. The following table lists the special control characters.

**Table 1.3: Special Control Characters**

Symbol	Character	Description
[STX]	Start of Text transmission control character	First character transmitted at the beginning of a frame.
F#	Frame Number	The frame number is an ASCII digit from 0 to 7. Its purpose is to permit the receiver to distinguish between new and re-transmitted frames. This single digit is sent immediately after the STX character. The frame number begins with 1 when the transfer phase is initialized and increments by 1 each time a new frame is transmitted and acknowledged. After 7, the frame number returns to 0 and repeats the above sequence.
[ETB]	End of Transmission Block transmission control character	Character used to indicate end of an intermediate frame.
[ETX]	End of Text transmission control character	Character used to indicate the end of an end frame.

## Section 1

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**Table 1.3: Special Control Characters (*continued*)**

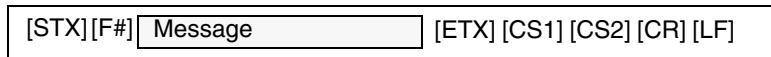
Symbol	Character	Description														
CS1	Most significant character of checksum 0 – 9 and A – F	The checksum determines if a frame is defective. The checksum is encoded as two characters and is sent after the ETB or ETX character. The checksum is computed by adding the binary values of the characters (modulo 256), keeping the least significant 8 bits of the result. The 8 bits can be considered as two groups of 4 bits which are converted to ASCII and represented in hexadecimal format. The two ASCII characters are transmitted as the checksum with the most significant character first. The STX character initializes the checksum to zero. The first character used in computing the checksum is the frame number. The last character used is the ETB or ETX. The STX, CR, or LF are not included. Using the following Frame as an example, the checksum for this frame is calculated.														
CS2	Least significant character of checksum 0 – 9 and A – F	<table style="margin-left: 20px; border-collapse: collapse;"> <tr> <td style="text-align: left;"><b>&lt;STX&gt; 1 ABCDEFGHI &lt;ETX&gt; A1 &lt;CR&gt; &lt;LF&gt;</b></td> </tr> <tr> <td style="text-align: right;">&lt;STX&gt; 002 Not included in calculation</td> </tr> <tr> <td style="text-align: right;">1 049 1st character for calculation</td> </tr> <tr> <td style="text-align: right;">A 065 2nd</td> </tr> <tr> <td style="text-align: right;">B 066 etc.</td> </tr> <tr> <td style="text-align: right;">C 067 etc.</td> </tr> <tr> <td style="text-align: right;">D 068 etc.</td> </tr> <tr> <td style="text-align: right;">E 069 etc.</td> </tr> <tr> <td style="text-align: right;">F 070 etc.</td> </tr> <tr> <td style="text-align: right;">G 071 etc.</td> </tr> <tr> <td style="text-align: right;">H 072 etc.</td> </tr> <tr> <td style="text-align: right;">I 073 etc.</td> </tr> <tr> <td style="text-align: right;">&lt;ETX&gt; 003 Last character for calculation</td> </tr> <tr> <td style="text-align: right;">Total= 673 Total sum value</td> </tr> </table> <p>Then 673 (decimal) = 2A1 (HEX)  The most significant byte (2) is discarded and the remainder is then transmitted as two characters, “A” (ASCII 65) and “1” (ASCII 49) to form the checksum.</p>	<b>&lt;STX&gt; 1 ABCDEFGHI &lt;ETX&gt; A1 &lt;CR&gt; &lt;LF&gt;</b>	<STX> 002 Not included in calculation	1 049 1st character for calculation	A 065 2nd	B 066 etc.	C 067 etc.	D 068 etc.	E 069 etc.	F 070 etc.	G 071 etc.	H 072 etc.	I 073 etc.	<ETX> 003 Last character for calculation	Total= 673 Total sum value
<b>&lt;STX&gt; 1 ABCDEFGHI &lt;ETX&gt; A1 &lt;CR&gt; &lt;LF&gt;</b>																
<STX> 002 Not included in calculation																
1 049 1st character for calculation																
A 065 2nd																
B 066 etc.																
C 067 etc.																
D 068 etc.																
E 069 etc.																
F 070 etc.																
G 071 etc.																
H 072 etc.																
I 073 etc.																
<ETX> 003 Last character for calculation																
Total= 673 Total sum value																
[CR]	ASCII character for carriage return	Character used to end an E 1394-91 record ( <i>i.e.</i> , E1381-91 message) and the second to last character transmitted in a frame.														
[LF]	ASCII character for line feed	The LF character is used as the last character of a frame. The LF character may not display in the message text.														

## Frames

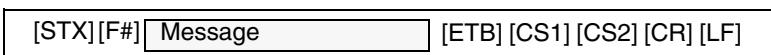
Abbott instruments and systems supporting ASI handle an ASTM E 1394-91 record as an ASTM E 1381-91 message. If the E 1394-91 record is longer than 240 characters, the message is transmitted in multiple frames consisting of end frames and intermediate frames. If the message (*i.e.*, E 1394-91 record) is less than or equal to 240 characters, the single frame transmitted is an end frame.

Each new message begins in a new frame. A frame never contains more than one message or parts of more than one message. Two types of frames are used:

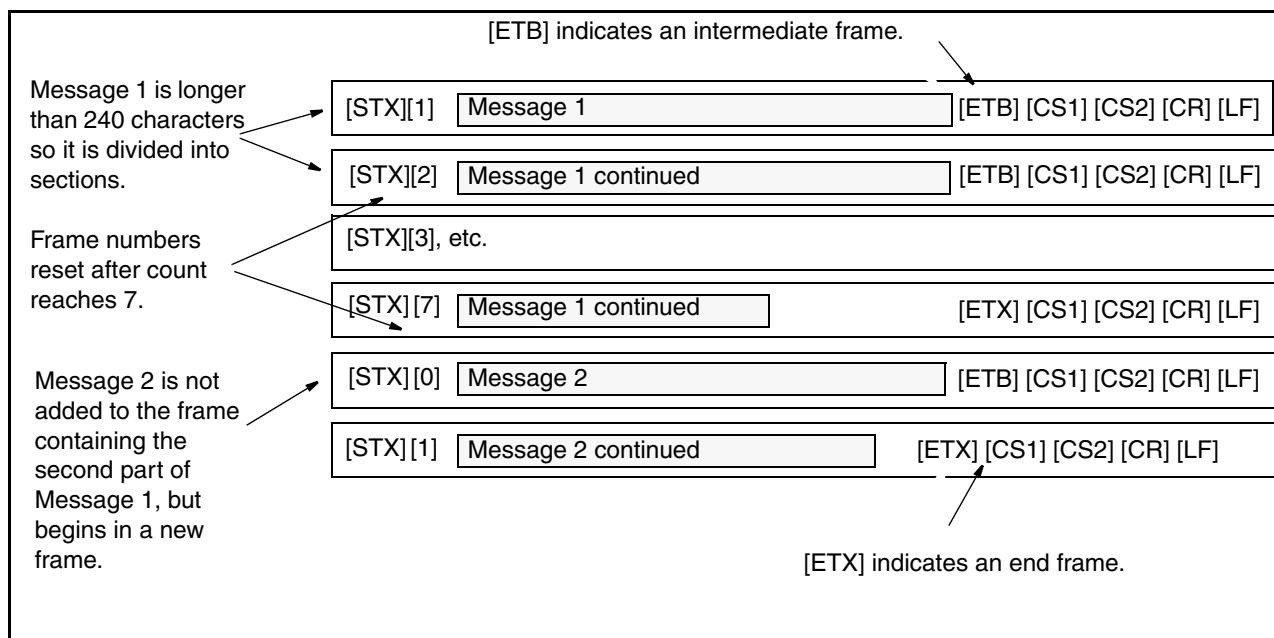
- End frames. A message with 240 characters or less is sent in a single end frame.



- Intermediate frames. Messages that are longer than 240 characters are broken into pieces that are 240 characters or less in length and sent in multiple or intermediate frames with the last part of the message sent in an end frame



The following figure shows how a message with more than 240 characters is sent.



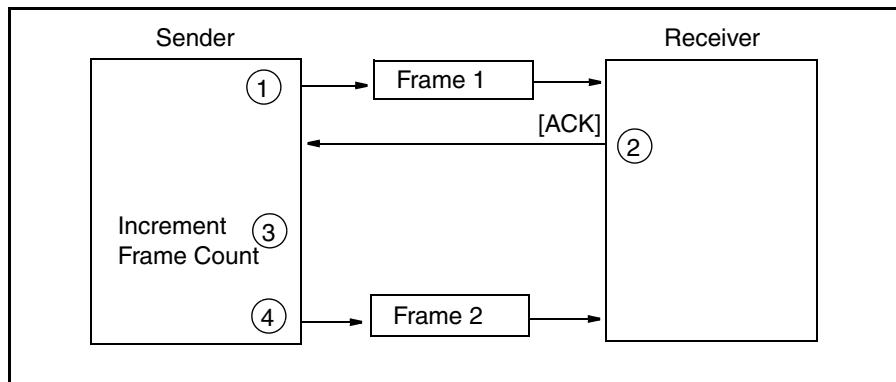
**Figure 1.14: Intermediate and End Frames.** Multiple frame messages start with intermediate frames and end with end frames containing only the end of one message.

After a frame is sent, the sender stops transmitting and waits for an acknowledgment [ACK] from the receiver. The receiver responds to every frame and when it is ready to receive another frame, it sends one of the following replies:

- Message Acknowledged [ACK]
- Message Not Acknowledged [NAK]
- End of Transmission [EOT]

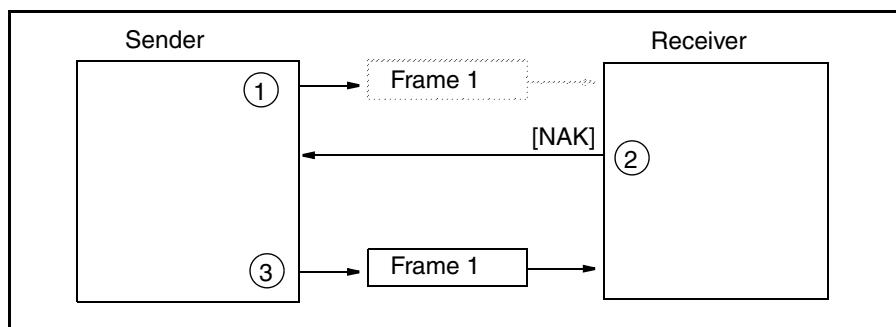
Each of the replies is discussed below.

A reply of [ACK] acknowledges that the last frame was received successfully and that the receiver is ready for another frame. The sender must increment the frame number and transmit another frame or terminate the message transfer.



**Figure 1.15:** **Sender Transmitting After Receiving [ACK].** *The sender sends another frame after successfully transferring a frame.*

A reply of [NAK] means that the last frame was not received successfully and that the receiver is ready to receive the frame again. The sender may re-transmit the frame or proceed to the termination phase.



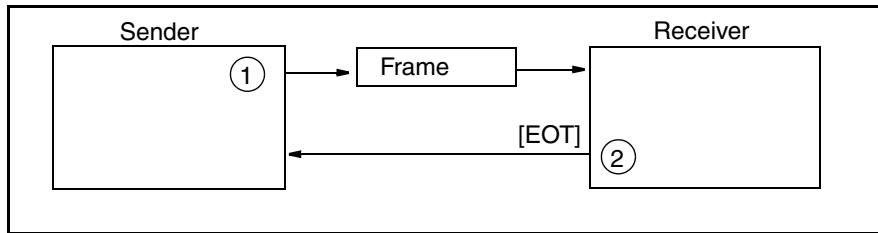
**Figure 1.16:** **Sender Retransmitting a Frame After Transmission Failure.** *The receiver indicates transmission failure with [NAK].*

Abbott ASI instruments and systems [NAK] a frame for the following reasons:

- Improperly framed transmission received after [STX]. Certain situations cause a time-out condition to occur if insufficient information is received to properly process the frame. Under these conditions, ASI instruments return to idle state without transmitting a [NAK] or any other characters.
- Invalid frame number or frame number out of sequence.
- Restricted character received in message text.
- Invalid checksum received.

Characters received before [STX] are ignored. Once [STX] is received, the ASI instrument expects a complete frame.

A reply of [EOT] acknowledges that the last frame was received successfully and that the receiver is ready for another frame, but the receiver is requesting that the sender stop transmitting. The sender must send a reply within the time-out period.



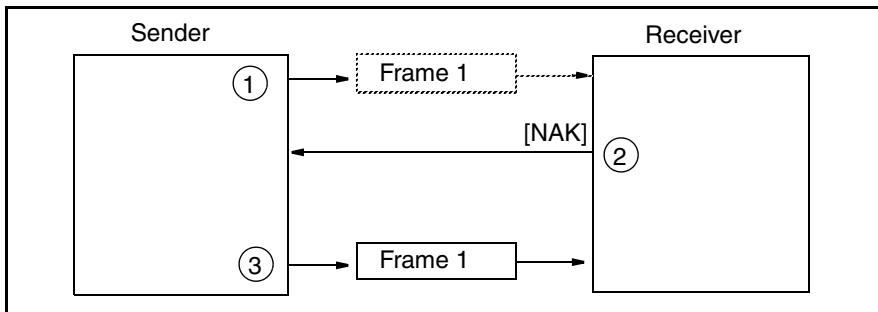
**Figure 1.17:** *End of Transmission. The receiver indicates successful receipt of the complete message with an [EOT], but requires an interrupt.*

The sender can ignore the request and continue transmitting. In this case, the receiver must re-request the interrupt for the request to remain valid. Abbott ASI instruments and systems (acting as senders) do not honor the interrupt requests originating from the receiver. Receiving the [EOT] character in place of an [ACK] character is treated equivalent to receiving the [ACK] character. Abbott ASI instruments transmit all available data before entering the termination phase and relinquishing control of the data link (return to neutral state).

## Error Handling

When errors in the data transmission occur, both the receiver and sender must have orderly recovery procedures.

The receiver checks every frame for defects. The receiver sends a [NAK] reply if it receives a defective frame. When the sender receives a [NAK], it re-transmits the last frame using the same frame number.



**Figure 1.18:** *Re-sending a Frame After a Transmission Failure. The receiver indicates a transmission failure with a [NAK].*

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ASI instrument communication software depends on properly framed transmissions being received. If an [STX] is received, it is an indication that a frame is being transmitted. If all of the components of a frame are not received in proper relationship to one another, the frame is rejected.

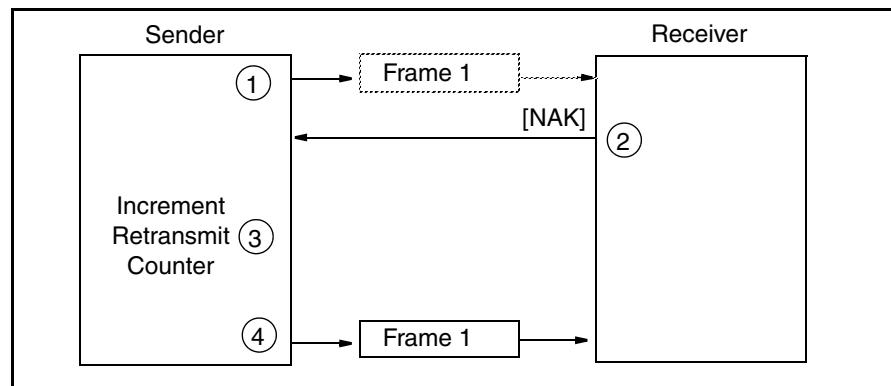
A frame is rejected by the receiver for several reasons, including:

- Character structure errors are detected in parity, baud rate, etc., or transmission is improperly framed.
- The frame checksum from the sender does not match the checksum on the receiving end.
- The frame number is incorrect. The number must be the same as the last one rejected or one number higher than the last one accepted by the receiver.

When the sender receives anything other than an [ACK] or an [EOT], it updates a re-transmit counter by one and re-sends the frame. A frame can be re-transmitted a maximum of six times. After that, the sender must abort the message and proceed to the termination phase.

If an [EOT] is encountered by the ASI instruments during the processing of a frame, the instruments return to idle state assuming that the sender terminated transmission prematurely. The sender must re-establish the connection in order to continue.

**NOTE:** If the [ACK] is corrupted during transmission, the sender of data retransmits the last frame, since any character received other than an [EOT] or [ACK] is treated as a [NAK]. However, since the [ACK] was already transmitted for that frame, the receiver [NAK] duplicates frames to avoid any possibility of infinite loops. This leads to Termination Phase after six attempts.



**Figure 1.19: Incrementing the Frame Counter.** The sender keeps track of retransmissions with a frame counter.

## Time-outs

The sender and receiver have timers to control the coordination between them and to allow a recovery method in the event a communication line fails to respond.

### During the Establishment Phase

The sender sets a timer when sending an [ENQ]. If a reply is not received within 15 seconds, a time-out occurs and the sender proceeds to the termination phase. If the host computer, acting as the receiver, detects contention, it sets a timer. If an [ENQ] is not received from the instrument within 20 seconds, a time-out occurs and the receiver regards the link as being in a neutral state.

### During the Transfer Phase

The sender sets a timer when transmitting the last character of a frame. If a reply is not received within 15 seconds, a time-out occurs and the sender proceeds to the termination phase. The receiver sets a timer when first entering the transfer phase or when replying to a frame. If no reply is received within 30 seconds, a time-out occurs and the receiver regards the link as being in a neutral state. A time out also occurs if an incomplete frame is received and the timer expires. For example, if ASI instruments do not receive the [CR] [LF] characters at the end of a frame, a time-out may occur while the instrument is waiting for the last characters, before processing the frame.

## Termination Phase

During the termination phase, the sender transmits the [EOT] transmission control character, notifying the receiver that all of the information has been sent. The sender regards the link to be in a neutral state. After receiving the [EOT], the receiver regards the link to be in a neutral state.

## Restricted Message Characters

Certain characters cannot be used in messages. The following table lists characters not allowed in message text.

**Table 1.4: Restricted Message Characters**

<b>Character Symbol</b>	<b>Definition</b>
[SOH]	Start of Header
[STX]	Start of Text Transmission
[ETX]	End of Text Transmission

**Table 1.4: Restricted Message Characters**

<b>Character Symbol</b>	<b>Definition</b>
[EOT]	End of Transmission
[ENQ]	Enquiry
[ACK]	Acknowledge
[DLE]	Data Link Escape
[NAK]	No Acknowledge
[SYN]	Synchronous Idle
[ETB]	End of Transmission Block
[LF]	Line Feed
[DC1]	Device Control Character 1
[DC2]	Device Control Character 2
[DC3]	Device Control Character 3
[DC4]	Device Control Character 4

## ASTM E 1381-91 Sender/ Receiver State Diagram

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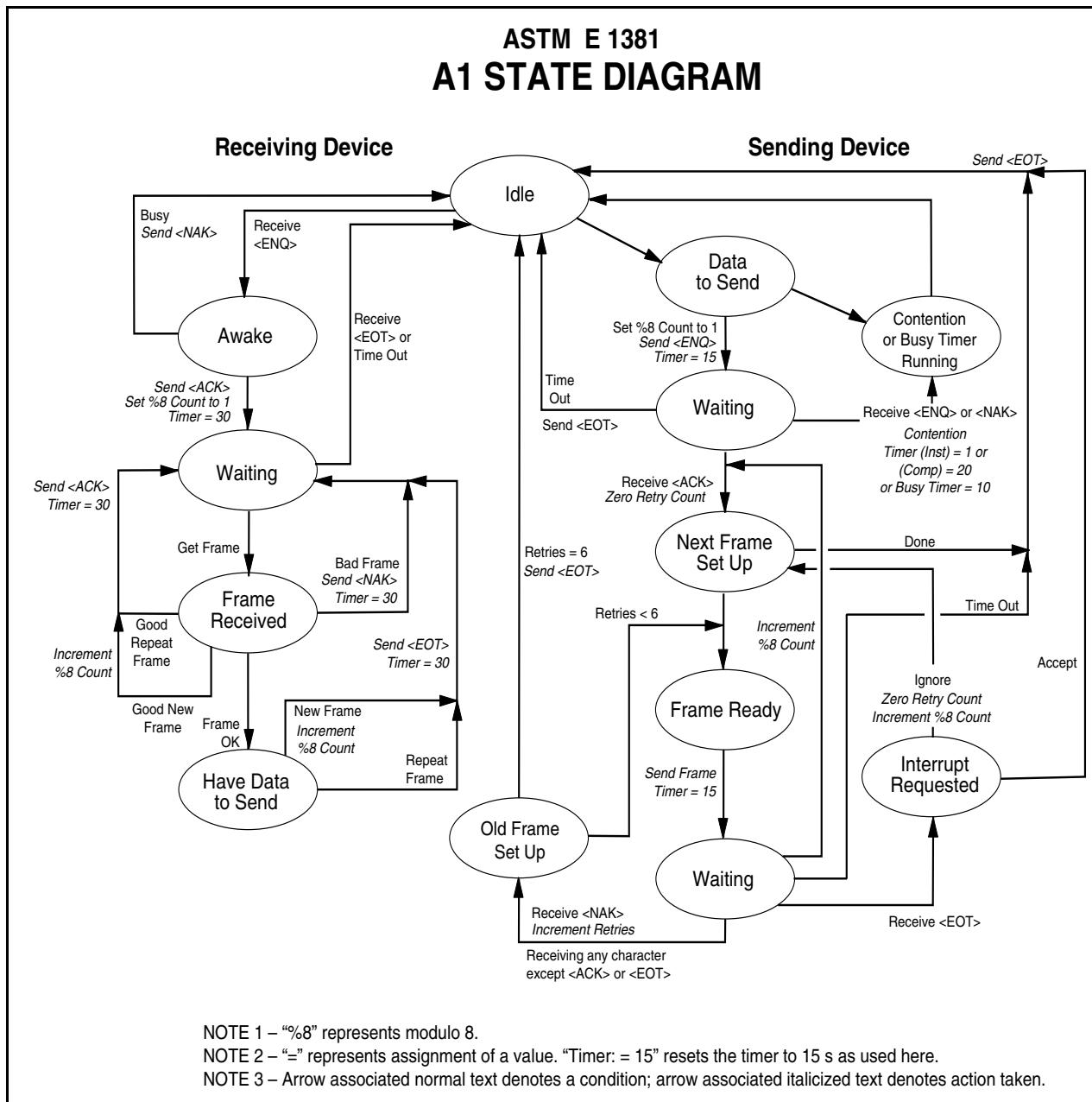


Figure 1.20: Sender/Receiver State Diagram

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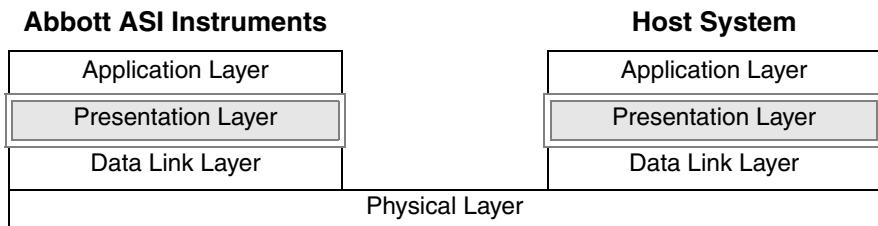
---

**Table 1.5: ASTM E 1381-91 Communication States (for Instrument)**

<b>Initial State</b>	<b>Condition</b>	<b>Action</b>	<b>Final State</b>
idle	Have data to send (periodic check) ContentTimer <=0 BusyTimer <=0	send ENQ transTimer = 15	transENQ
	Received ENQ Have Data to Send ContentTimer <=0 BusyTimer <=0	send NAK	idle
	Received ENQ ContentTimer <=0 BusyTimer <=0	send ACK	rcvWait
	Received ENQ ContentTimer > 0 or BusyTimer > 0	Protocol error	idle
transENQ	Received ENQ (from Host)	ContentTimer = 1	idle
	Received NAK	BusyTimer = 10	idle
	Received ACK	Send Frame numNAK = 0 transTimer = 15	transWait
	Received other characters	Ignore	transENQ
	Received EOT	Ignore	transENQ
	transTimer <=0	Send EOT	idle
transWait	Received ACK	Send next Frame numNAK = 0 transTimer = 15	transWait
	Received NAK	Send old frame numNAK = numNAK + 1	transWait
	Received EOT	Send next Frame numNAK = 0 transTimer = 15	transWait
	transTimer <=0	Send EOT	idle
	numNAK = 6	Send EOT	idle
rcvWait	Received Good Frame	send ACK rcvTimer = 30 increment frame #	rcvWait
	Received Bad Frame	send NAK rcvTimer = 30	rcvWait
	Received EOT	discard last incomplete message	idle
	rcvTimer <= 0	discard last incomplete message	idle

**NOTES**

# Presentation Layer – Message Content

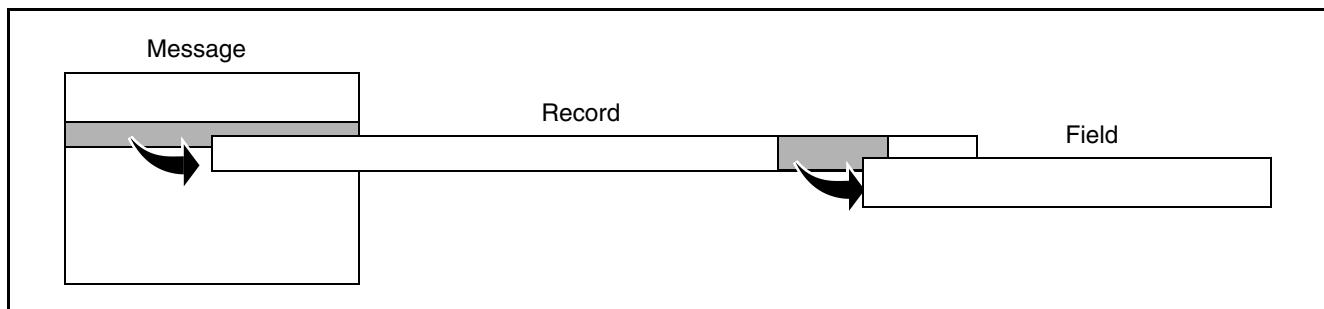


**Figure 1.21:** Presentation Layer

The Abbott Standard Interface (ASI) uses the protocol defined by ASTM E 1394-91 standard as the basis for the message content layer of instrument communications software. This layer specifies the conventions used in structuring information (messages) for transmission to external host systems and for receiving information from these host systems.

## Messages

The Presentation Layer requires that transmission and reception of all data must be performed using messages. A message consists of complete study files on one or more patients. Each message is a string of records which in turn are made up of fields. The following figure shows the basic structure of a message.



**Figure 1.22:** Message Logical Structure. Messages are subdivided into records which are made up of fields.

The high-level protocol follows two general conventions:

- A hierarchical convention is implemented where records higher in the hierarchy contain information that is common to all records lower in the hierarchy.
- A positional convention is used to define the structure of the records.

These conventions allow the fields, and thus the records, to vary in length. The ASTM E 1394-91 standard allows manufacturers the flexibility to:

- Create new record types through the use of the Manufacturer Record.
- Define the structure of certain existing fields.
- Define the structure of new manufacturer records.

This manual describes how Abbott instruments use this flexibility.

## Records

Records are collections of related information within a message. For example, one record may contain information about the system sending the message and the system receiving the message while another record may contain personal information about a patient who is to undergo tests. Records begin with an ASCII alphabetical character, called a *record identifier*, and end with a carriage return. In the following example, the record identifier is "H", which is used to identify the Header Record.

H	[CR]
---	------

ASI instruments use uppercase letters for all record identifiers transmitted. ASI instruments can receive upper or lowercase letters for record identifiers. The following table describes the records that Abbott instruments use and their associated record identifier fields.

**Table 1.6: Record Types**

Record Type	Record ID Field	Level	Description	For Field Contents Refer to <b>ASTM E 1394-91, Section</b>
Header	H	0	Identifies the message. Contains information about the sender and receiver of the message, such as location and type of equipment used to send and receive the message.	7
Patient Information	P	1	Contains information about a patient.	8
Request Information (Query)	Q	1	Used to request information on a range of test results or test orders from another system.	12
Test Order	O	2	Contains information defining tests performed or requested.	9
Result	R	3	Contains information about test results.	10
Comment	C	1 – 4	Contains comment text on the preceding record.	11

**Table 1.6: Record Types (*continued*)**

Record Type	Record ID Field	Level	Description	For Field Contents Refer to ASTM E 1394-91, Section
Manufacturer Information	M	1 – 4	Provided for custom use by the instrument or computer system manufacturer.	15
Scientific	S	N/A	Not used.	14
Message Terminator	L	0	Terminates the message.	13

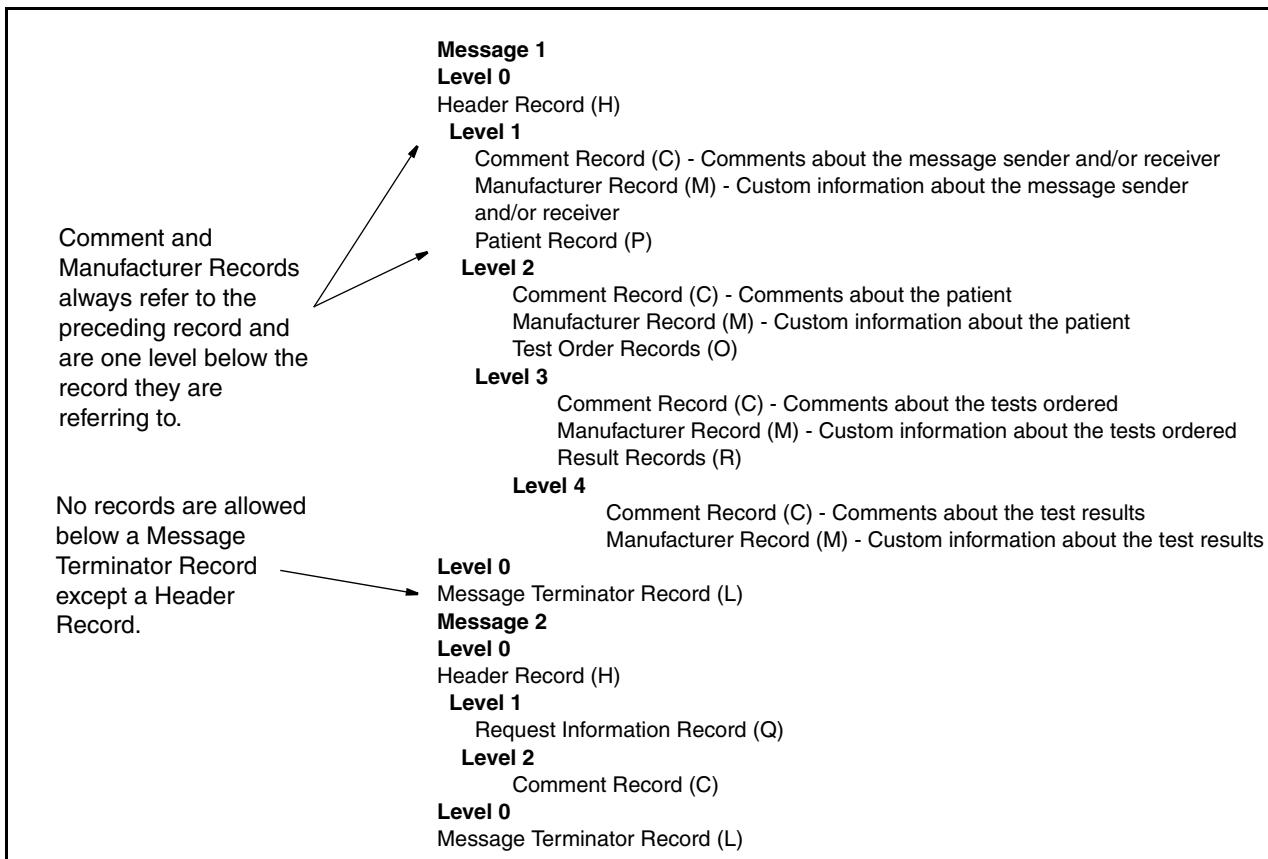
The records within a message are arranged in a hierarchy of levels. The records higher in the hierarchy contain information that is common to all records that are lower in the hierarchy. The lowest number is the highest in the hierarchy. For example a Level 2 record is higher than a Level 3 record.

Manufacturer's Records and Comment Records may be used within any level except Level 0.

Each level, other than Level 0, must be preceded by a higher level. The Manufacturer and Comment Records can be inserted at any level in the hierarchy and are considered to be one level below the preceding record.

For example, a Comment Record below a Patient Record at Level 1 is considered a Level 2 record and contains comments about the patient in the Patient Record. A Comment Record below a Test Order Record (O) is considered a Level 3 record and contains comments about tests described in the Test Order Record.

The following figure shows how the Comment and Manufacturer Records fit into a message hierarchy.



**Figure 1.23: Comment and Manufacturer Records.** These records can be placed anywhere in a message between the Header and Message Terminator Records.

ASI instruments may optionally support the use of the Request Information Record (Q). Refer to the instrument specific section of each Abbott Standard Interface RS-232 manual for details on that instrument's support of the Request Information Record.

ASI instruments do not accept the Request Information Record as part of a message containing Patient (P) and Order (O) Records. Also, ASI instruments do not transmit the Request Information Record as part of a message containing Patient (P), Order (O), and Result (R) Records. When used, the message only includes the following:

**Header Record (H)**  
**Request Information Record (Q)**  
**Terminator Record (L)**

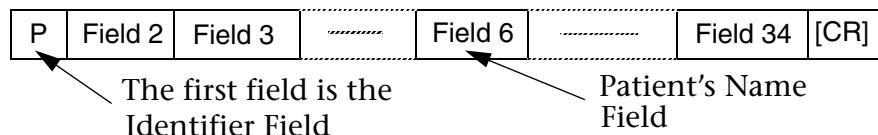
Manufacturer and Comment records may be used in conjunction with the Request Information Records, as needed by specific instruments.

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ASI instruments and systems may be batch as well as real time. Batch instruments and systems communicate the results of a run all at one time, usually at the end of that run. The results message consists of information on multiple samples. Real time systems, however, communicate the information as it becomes available. These systems normally communicate a shorter results message consisting of information on the results of only one sample test (the one that was just completed).

**Fields**

Fields are groups of characters that define a specific piece of information within a record, such as a patient's name, telephone number, or street address. For example, the Patient's Name field in the Patient Record is shown below:



Fields are position dependent. That is, fields are identified by their relative position in the record. For example, the field representing a patient's name is always the sixth field in the Patient Record. Fields are all variable length. The Instrument Specific section of the Abbott Standard Interface RS-232 manual provides the maximum allowed length of each field transmitted or received by that instrument.

**Delimiters**

The ASTM E 1394-91 standard allows for the use of special characters to be used to separate:

- Adjacent fields
- Repeating information within a field
- Components of a field

**Table 1.7: Delimiter Summary**

Delimiter Type	Character	Description
Field		Separates fields within records.
Repeat	\	Separates multiple occurrences for the same type of information within a field.
Component	^	Separates a field into smaller groups of characters.
Escape	&	Allows imbedding of special characters within the data.

The standard also indicates the use of special characters, such as delimiters, carriage returns, line feeds, etc. imbedded within text fields.

The Abbott Standard Interface defines the delimiters used by Abbott Instruments for transmission to be as follows:

- Field DelimiterVertical Bar (|)
- Repeat DelimiterBackslash (\)
- Component DelimiterCaret (^)
- Escape DelimiterAmpersand (&)

ASI instruments accept any characters defined in the header record and transmitted by the external system as the delimiters for that message.

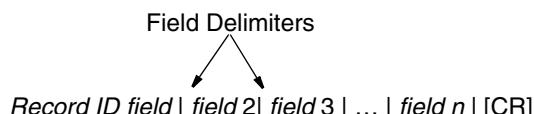
If a received data field contains a character that conflicts with the ASI defined delimiters (| \ ^ &), ASI instruments and systems may optionally use the Escape Delimiter to return the original data (*i.e.*, conflicting character) back to the external system. Refer to the instrument specific sections to determine if this feature is supported by the instrument or the system.

ASI instruments and systems may optionally support the ability to delete contents of specific fields that were previously transmitted by using the ASCII 34 quote character ("") as specified by ASTM E 1394-91 standard. Refer to the instrument specific sections to determine if this feature is supported by the instrument or the system.

Following is a description of how delimiters work.

### **Field Delimiters (|)**

The record is read one character at a time. When the first field delimiter is read, the instrument knows that it has come to the end of the first field. All characters read after that delimiter are considered to be part of the second field until the second field delimiter is read. When a second field delimiter is read, all characters past that delimiter are considered to be part of the next field until another field delimiter is read. This process continues until the entire record has been read.



### **Delimiters and Empty Fields**

A message can have empty fields. The fields that do not contain information are indicated by two delimiters in a row, as shown below.

The diagram shows a record structure with a header 'R|1||' followed by a series of empty fields represented by '|'. An arrow points from the text 'Empty fields' to the final '|'. The record ends with '|198327132247[CR]'.  
R|1||0295||||||198327132247[CR]

If a carriage return is introduced, this indicates that all the remaining fields in the record are empty. A carriage return can also indicate the end of the last field in a record.

### Repeat Delimiters (\)

Certain fields may be augmented by the use of repeat delimiters to separate equal elements of the same set. When used, the repeat elements of a field relate to the rest of the record in the same way as if the whole record were replicated, with the only difference being the repeat field.

When only one field is repeating within a record, then the repeat information relates to the rest of the record in a similar fashion as the first.

0|1|Sample#1|^/^Test1\^/^Test2\^/^Test3...[CR]

is equivalent to:

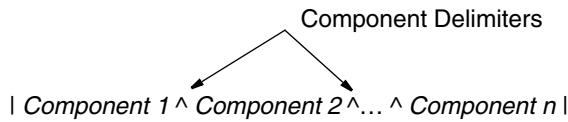
0|1|Sample#1|^/^Test1 ...  
0|2|Sample#1|^/^Test2 ...  
0|3|Sample#1|^/^Test3 ...

Patient ID fields may never repeat since this would violate the hierarchy of records. Sample ID fields may utilize repeat delimiters to indicate the use of multiple samples required for a test.

ASI instruments do not use repeat delimiters in the primary record fields (*i.e.*, Sample IDs and Universal Test IDs) when returning results. ASI instruments that support repeat delimiters specify the fields that may repeat.

### Component Delimiters (^)

Some fields are made of more than one string of characters or components. These strings use carets (^) as delimiters, as shown below:



For example, the Patient Name field uses component delimiters to differentiate between first name, last name, middle name, suffix, and title:

|BLAKE^LINDSEY^ANN^MISS|

### **Escape Delimiters (&)**

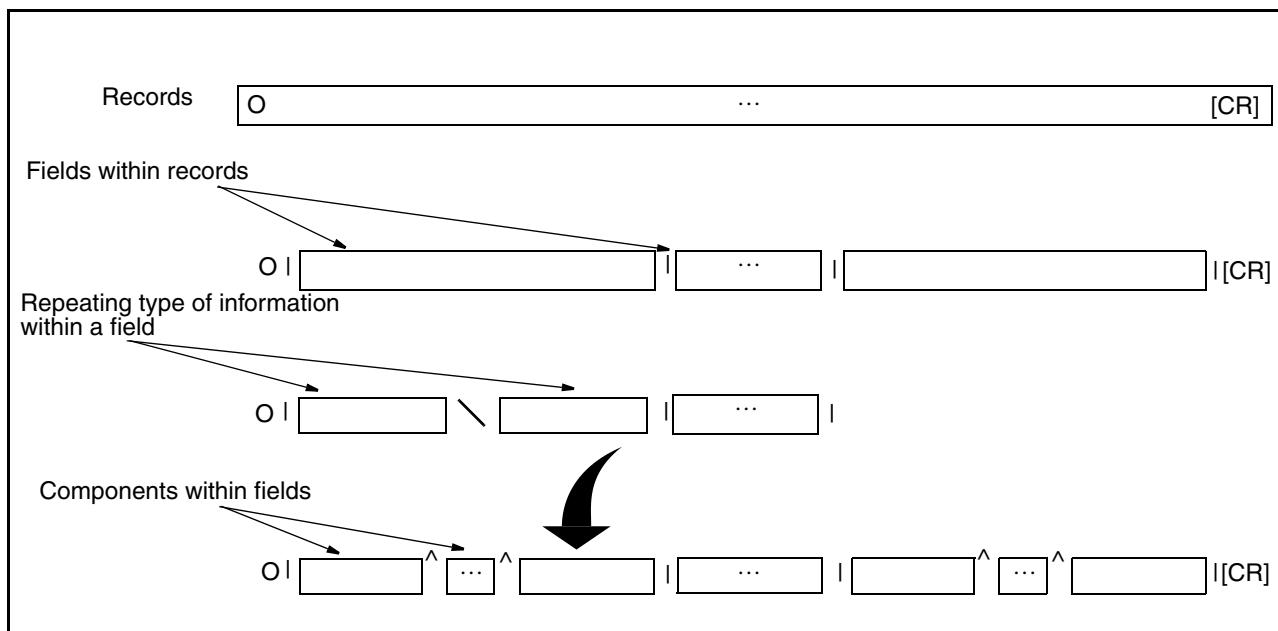
The ASTM E 1394-91 protocol allows the use of escape delimiters to provide a method for communicating control characters (*i.e.*, nonprintable ASCII characters, or protocol control characters) that would otherwise create abnormal conditions to occur on the receiving end. The Abbott Standard Interface recognizes the need for using the escape delimiters, and identifies specific conditions that may be supported by ASI instruments. The use of escape delimiters is limited to communication data characters that are in direct conflict with the delimiters used by the communicating system.

- Field delimiter imbedded within data is communicated as &F&
- Component delimiter imbedded within data is communicated as &S&
- Repeat delimiter imbedded within data is communicated as &R&
- Escape delimiter imbedded within data is communicated as &E&

where & is the escape delimiter used by the communicating system

These four conditions may be checked at input and converted to their equivalent characters for viewing. On output, the data are parsed and any delimiters imbedded within data are converted to their escape strings. All other uses of the escape delimiters are not recommended.

The following figure summarizes the delimiters used by the Abbott instrument.



**Figure 1.24:** **Delimiter Summary.** Field delimiters separate fields within records, repeat delimiters separate multiple occurrences of the same type of data within a field, component delimiters separate components within fields.

## ASI Defined Fields

The ASTM E 1394-91 standard allows each manufacturer the ability to define certain fields based on their needs. The following fields are defined by the Abbott Standard Interface:

- Sender Name or ID (ASTM E 1394-91 Field 7.1.5)
- Universal Test ID (ASTM E 1394-91 Field 6.6.1)
- Specimen IDs (ASTM E 1394-91 Field 9.4.3, 9.4.4)
- Patient IDs (ASTM E 1394-91 Fields 8.1.3, 8.1.4, and 8.1.5)
- Action Codes (ASTM E 1394-91 Field 9.4.12)
- Report Type (ASTM E 1394-91 Field 9.4.26)
- Date and Time

### Sender Name or ID (ASTM E 1394-91 Field 7.1.5)

This field is used within the Header Record of the Message to provide a unique identification of the instrument communicating, as well as to provide information on the interface version of the instrument. This field consists of the following four components:

- Instrument/System Name
- Instrument/System Software Version Number

- Instrument/System Serial Number
- Interface Version Control

The Interface Version Control is of the form “XnXn...” (without quotes). The “X” is used to indicate the record types the instrument supports. The “n” is used to indicate the implemented version of that record, and “n” can be any number. The valid characters for “X” are (H, P, O, R, L, C, M, and Q). The S (Scientific) record is not supported by ASI instruments.

Thus, the Interface Version Control string “H1P1O1R1L1” indicates an instrument that supports the header, patient, order, result, and terminator records. Any changes to the interface that would affect a particular record, would increment the version number of that record.

An interface version of “H1P1O2R2Q1L1” would indicate that the interface has changes to the order record, the result record, and the instrument/system is now supporting the query record. This allows host systems to compare the interface version control strings and focus their attention on the records that have changed. The component is optional and may not be supported by all instruments. Refer to the instrument specific section for details.

When all components are supported, this field is transmitted as follows:

|Instrument\_name^Software\_version^Serial\_number^Interface\_version\_control|

This field can be used to assist with field upgrades of interfaced instruments. If host systems support E-mail links to the developers, then this field can be used to inform the interface development team of a potential problem due to a mismatch of interface software between a host and an instrument.

#### **Universal Test ID** (ASTM E 1394-91 Field 6.6.1)

The Universal Test ID is used as a unique identifier for requesting test orders and for identifying results associated with those orders. This field is used within the following records:

- Test Order Record
- Results Record
- Request Information Record

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The Universal Test ID is composed of four major parts. The first three parts are reserved for future ASTM usage and are not used by ASI instruments and systems. As specified by the ASTM Standard E 1394-91 (section 6.6.1.4), the fourth part of the Universal Test ID is defined by each manufacturer. ASI instruments use the following components for the manufacturer's code:

- Test or Assay Code
- Test or Assay Name
- Dilution or Neutralization Protocol
- Test Qualifier
- Result Qualifier

When all components of the manufacturer's code are used, the Universal Test ID is transmitted as follows:

|^Test\_Code^Test\_Name^Dilution^Test\_Qualifier^  
Result\_Qualifier|

For downloading orders to instruments or systems, the Test\_Code is the only required component of the Universal Test ID. Other components are optional and may be used as needed. The Result\_Qualifier component is never downloaded from Host (LIS) systems.

The first three parts are reserved for future use and are not currently used by the Abbott instrument. The valid "Test\_Code" and "Test\_Name" components for each instrument and system may be obtained by reviewing the Test or Assay Parameter screens on each instrument. Valid assay protocols such as Dilutions or neutralization protocols are also defined per test or assay code.

Two continuous component delimiters indicate default dilution for that assay. When the Universal Test ID is used in a Result Record, the last component contains a result type code.

### **Test\_Qualifier**

This component may be optionally used to provide a modifier for the test\_code. Hematology instruments may use this component to allow an LIS vendor to selectively request only results associated with predefined parameter sets to be returned.

### **Result\_Qualifier**

The result qualifier is used as the last component of the Universal Test ID field when transmitting results. ASI instruments and systems use the Result\_Qualifier to identify the nature of the result data being communicated. Several codes are defined for use to describe the most common result types returned by Abbott instruments and systems. They are:

**Final (F)** – Used to identify the calculated values for primary results such as concentrations. The data field contains the actual value of the result. The Units field identifies the units (*i.e.*, type) of the result.

**Preliminary (P)** – Used to identify the raw instrument readings such as RATES, or POLARIZATIONS, etc. The data field contains the actual value of the result. The units field contains the type of preliminary result.

**Interpreted (I)** – Used to identify an interpretation such as POSITIVE or NEGATIVE that is based on the ranges defined on the instrument for those interpretations. The data field contains the actual interpretation.

**Final Avg. (Favg)** – Identifies the average of a set of final results. Returned in cases where multiple repetitions of a test are run for a specific specimen. The data field contains the actual calculated average of the result. The Units field identifies the units of the final result average (*e.g.*, µg/ml, etc.).

**Preliminary Avg (Pavg)** – Identifies the average of a set of preliminary results. Returned in cases where multiple repetitions of a test are run for a specific specimen. The data field contains the actual calculated average of the preliminary result. The Units field identifies the type of preliminary result average (*e.g.*, RATES, Net Polarization, etc.).

**Interpreted Average (Iavg)** – Identifies the interpretation associated with the average final result (Favg). The data field contains the actual interpretation such as POSITIVE, NEGATIVE, REACTIVE, etc.

Abbott instruments and systems also communicate other calculated information based on the above result types. For example, it is common for instruments and systems to calculate coefficient of variances, standard deviations, root mean square errors, or curve fit information on final and preliminary results when tests are performed in replicates. In these cases, the result type flag identifies the group of

data used (*i.e.*, Final or Preliminary results), the data field contains the actual calculated data, and the units field identifies the type of calculation (*i.e.*, %CV, RMSE, STD, etc.). Refer to instrument specific sections for the complete set of results (*i.e.*, result types) handled by that particular system.

### **Specimen IDs** (ASTM E 1394-91 Field 9.4.3, 9.4.4)

ASI instruments and systems use the following definition for specimen ID fields in the Order Record:

- Specimen ID
- Location\_ID or Group Number
- Position

The only required component is the Specimen ID. The Location\_ID and position are optional components that may be used to:

1. Uniquely identify replicate tests of a sample
2. Match orders and results to previously pipetted samples (specimens)
3. Provide a way to identify specimens processed as a group or batch

When all components are transmitted, the field is as follows:

|specimen ID^location\_ID^position|

### **Patient IDs** (ASTM E 1394-91 Fields 8.1.3, 8.1.4, and 8.1.5)

The ASTM specification allows for the use of multiple patient IDs that uniquely identify the patient.

The following Patient ID fields are specified for use:

- Practice Patient ID (ASTM E 1394-91 Field 8.1.3)
- Laboratory Patient ID (ASTM E 1394-91 Field 8.1.4)
- Instrument Patient ID (ASTM E 1394-91 Field 8.1.5)

Due to the nature of laboratory instrumentation, it is not possible for all instruments to utilize all three Patient IDs. Therefore, ASI instruments follow these rules for interfacing purposes:

1. ASI recommends that an external host computer provide the Patient ID in the Laboratory Patient ID field (8.1.4). This field is displayed on the instrument screen as the Patient ID. This ID is returned unchanged in the same field to the external host computer when the instrument returns results.
2. If the Patient ID is entered at the instrument or changed at the instrument, the new information is returned to the external host computer in the Instrument Patient ID field (8.1.5). Changes or edits done by an instrument operator to the Patient ID field do not overwrite the previously downloaded Laboratory Patient ID.
3. Other Patient IDs such as Admission IDs may be communicated in the Practice Patient ID field (8.1.3). These fields may be optionally supported by ASI instruments. Also instruments may optionally allow this ID to be mapped to the Patient ID if no Laboratory Patient ID (8.1.4) is defined.

For example, if an institution uses the social security numbers as patient IDs, but also uses unique admission IDs that are specific to each time the patient receives medical services, then the following would need to be communicated.

```
HI.....<CR>
PI1|ADMIT1111|SSN123456789|Doe^Johnl...<CR>
OI1|SID101||^Test1|.....<CR>
OI2|SID102||^Test2|.....<CR>
LI1IN<CR>
```

**Figure 1.25:** Institution Using Laboratory and Practice Patient IDs.

If the instrument supports patient IDs as well as admission IDs then it assigns the following:

**Patient ID = SSN123456789 {admission id = ADMIT1111}**

**Patient name = John Doe**

**Specimen 1 ID = SID101 Tests Ordered = Test1**

**Specimen 2 ID = SID102 Tests Ordered = Test2**

The admission ID is only captured if supported by the instrument. If the institution wanted to track laboratory results by the admission ID, the host computer would need to communicate the patient IDs as follows:

```
HI.....<CR>
PI1|ADMIT1111|Doe^Johnl...<CR>
OI1|SID101||^Test1|.....<CR>
OI2|SID102||^Test2|.....<CR>
LI1IN<CR>
```

**Figure 1.26:** Institution Using Laboratory Patient ID only.

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ASI instruments then use the following:

**Patient ID = ADMIT1111**

**Patient name = John Doe**

**Specimen 1 ID = SID101 Tests Ordered = Test1**

**Specimen 2 ID = SID102 Tests Ordered = Test2**

These rules are followed by ASI instruments in order to simplify the interfacing concerns associated with patient IDs.

### Action Codes (ASTM E 1394-91 Field 9.4.12)

A test order, for a particular patient, is always identified by the combination of sample ID and test code provided in the order record. The Action Code provides ASI instruments additional information on how to process that test order.

Currently the following codes are defined for use:

**Cancel (C)** – This code is used to cancel a previously transmitted test request (test order). The instrument searches its queue of scheduled test orders and deletes the order matching the specimen ID and test code in this order record. The instrument may optionally return a Test Order Canceled message to the external system with the comment record indicating the reason the order was canceled (*i.e.*, Canceled by Host!) If a match is not found, the instrument ignores this record. If the order is being processed, the instrument ignores this cancel request and returns results upon completion. The instrument may indicate the status by returning the Order record with the flag (I) indicating Instrument Pending.

**New (N)** – This code is used to indicate a new test order to an instrument. ASI instruments check their queue of scheduled test orders for matching specimen IDs and test codes. If no match is found, this order is scheduled for processing. If a match is found, this order is assumed to be a duplicate request and is flagged as an error.

**Additional (A)** – This code is used to indicate that an additional test of a previously transmitted test order is being requested. ASI instruments check the scheduled test orders for a matching specimen ID and test codes. If a match is found, this order is added to the previous order. If a match is not found, this order is created and scheduled for processing.

**Quality Control (Q)** – This code is used to indicate that this specimen should be treated as a control for the specified test code. The instrument checks the predefined controls of that test code for a matching ID. If a match is found, the order is scheduled for processing. If a match is not found, the order is canceled. A Test Order Canceled message may optionally be returned to the Host with the comment record containing the reason for cancellation.

#### **Report Type** (ASTM E 1394-91 Field 9.4.26)

The report type flag identifies the purpose of the patient/order or patient/order/result transmission. Refer to the instrument specific section to identify what each instrument supports. The allowed flags and usage of these flags are as follows:

**Order (O)** – Used to indicate a normal Patient/Order request from a host.

**Final Report (F)** – Used to indicate a normal report of results (Patient/Order/Results) to a host system.

**Query (Q)** – Used to indicate that the Patient/Order or Patient/Order/Result transmission is in response to a request for information or Query record. This is the case where an instrument or system had made a request for patient orders or final results.

**Canceled (X)** – Used to indicate that no results are forthcoming for this order or that no orders are sent in response to a Request Information record. This code may be used to indicate that an instrument error occurred while processing that order and no results are expected from the instrument. An ASI instrument or system may return a comment record containing the reason for this condition.

**Instrument Pending (I)** – Used to indicate that results are not available for the order (specimen/test) identified in this order record. This flag is used to respond to a query for results when the results are not yet available. This flag also indicates that the order (specimen and test) are valid and known to the responding system. It may also be used in response to a test order cancel request.

**No Such Test Ordered (Y)** – Used in response to a query for results on a specific test for a specimen. If the ASI instrument or system supports the ability to query by specific test for a specimen, that instrument or system uses this flag to indicate that the test has not been ordered.

#### **Date and Time**

Dates are represented in the following format, as required by ANSI X3.30:

**YYYYMMDD**

Where:

- YYYY is the year
- MM is the month
- DD is the day

For example, May 14, 1960, would be represented as 19600514.

Time is represented in the following format, as required by ANSI X3.43.9:

**HHMMSS**

Where:

- HH is the hour (24 hour clock)
- MM is the minute
- SS is the second

Date and time together are specified as a fourteen character string:

**YYYYMMDDHHMMSS**

ASI instruments do not support time zone designations in the date and time fields. The sender is responsible for insuring that all dates and times transmitted are of the form specified above.

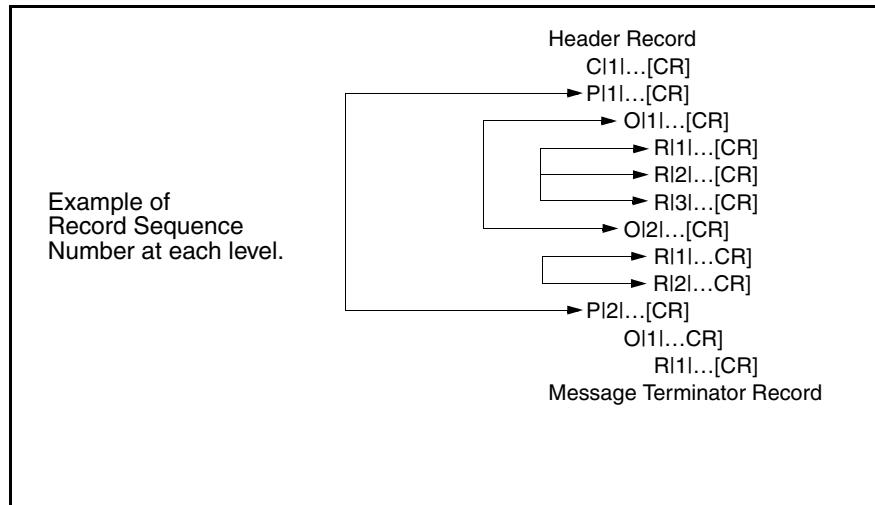
## Record Sequence Number

The second field in all record types, other than the Header, contains a Record Sequence Number field.

The field contains a number that indicates how many times the same record type is used at a particular hierarchical level. The number is reset to one under the following conditions:

- Whenever a record of greater hierarchical significance (lower number) is transmitted.
- If the same record is used at a different hierarchical level.

An example of the numbering scheme follows.



**Figure 1.27: Record Sequence Numbers.** Record Sequence Numbers keep track of the number of records of the same type and at the same hierarchical level.

**NOTE:** When the high level messages are parsed, ASI instruments check for proper sequencing as defined by the ASTM standards. If a record is encountered with an invalid sequence, an error is logged locally and the remainder of the message is ignored. Records that were parsed prior to the sequencing error are accepted and processed further. An error code is not transmitted to the external system, indicating that the sequencing error occurred.

## Records and Fields

The ASI defines the rules of use for fields supported by different instruments and systems. The length of the fields is always assumed to be of variable length. The data type associated with a field is specified by individual instruments and systems. At this time, ASI does not determine the data type for a field (*i.e.*, numeric vs. alphanumeric vs. extended character, etc.). However, as a general rule, fields are assumed to be of variable length and character, unless explicitly defined by a specific instrument.

Instruments and systems may support a subset of the records and fields defined by ASI. If a defined record or field is communicated to an instrument and that instrument does not support that record or field, the instrument ignores it. If, however, records not defined by ASI are received by an instrument, that instrument logs an error and does not process that message.

Certain key fields are identified as required fields if supported by an instrument. These fields are:

- Specimen ID field
- Test Code component of Universal Test ID
- Action Code field

The following tables define the location and contents of each field in a specific type of record. The records and corresponding tables are as follows:

- [Table 1.8 Message Header Record](#)
- [Table 1.9 Patient Record](#)
- [Table 1.10 Order Record](#)
- [Table 1.11 Result Records](#)
- [Table 1.12 Comment Record](#)
- [Table 1.13 Request Information Record](#)
- [Table 1.14 Terminator Record](#)
- [Table 1.15 Manufacturer's Record](#)

**Table 1.8: Message Header Record**

<b>ASTM Field</b>	<b>Field Name</b>	<b>Transmitted (To Host)</b>	<b>Received (From Host)</b>	<b>Description</b>
7.1.1	Record Type	H	H	ASI instruments transmit upper case characters, receive upper or lower case.
7.1.2	Delimiters  Field Repeat Component Escape	 \ ^ &	*	ASI instruments accept any valid delimiters specified in the header record.
7.1.3	Message Control ID			Not supported
7.1.4	Access Password			Not supported

\* Indicates supported field. Refer to instrument sections for size of supported fields.

**Table 1.8: Message Header Record (*continued*)**

<b>ASTM Field</b>	<b>Field Name</b>	<b>Transmitted (To Host)</b>	<b>Received (From Host)</b>	<b>Description</b>
7.1.5	Sender Name or ID  Name ^Software version ^Serial Number ^Interface version	*	*	This field is made up of the following four (4) components. When transmitting, ASI instruments send their name, software version, and serial number and may also send the interface version control string specified in the fourth component of the field.  Name of instrument. Version of system software. Serial number of instrument or system. ASI instruments may use this field to implement an interface version control scheme that indicates the record type and version of the record supported by the instrument. "X" is the record type and "n" is the version number. The possible characters for "X" are (H, P, O, R, L, Q, C, M). See the instrument specific section for handling this field.
7.1.6	Sender Address			Not supported
7.1.7	Reserved			Not supported
7.1.8	Sender Telephone			Not supported
7.1.9	Characteristics of Sender			Not supported
7.1.10	Receiver ID  Host_Name ^IP_Address	*	*	Not supported for serial (point-to-point) connections.  Network implementations use this field to contain the name and network address (TCP/IP address) of the Host (LIS) system. The structure of this field is Host_name^IP_address.
7.1.11	Comment			Not supported

\* Indicates supported field. Refer to instrument sections for size of supported fields.

**Table 1.8: Message Header Record (*continued*)**

<b>ASTM Field</b>	<b>Field Name</b>	<b>Transmitted (To Host)</b>	<b>Received (From Host)</b>	<b>Description</b>
7.1.12	Processing ID	P	P	(P)roduction – Treat message as an active message to be completed according to standard processing. If the field is blank, this is the default.
		D	D	(D)ebugging – Message is initiated for the purpose of testing the interface. ASI instruments may use this flag to provide transfer of messages for diagnostic purposes. The diagnostic message consists of at least one record of each type transmitted by the instrument or system. The transmission of this type of message is under operator control and is part of the diagnostics of the instrument/system. Instruments may optionally receive (D)agnostic messages consisting of header, patient, and order records.
		Q		(Q)uality Control. Message contains only quality control information. See Instrument specific section for information on how this field is handled.
7.1.13	Version Number	1	1	See the instrument specific section for handling this field.
7.1.14	Date and Time	YYYYMMDDH HMMSS	YYYYMMDDH HMMSS	See the instrument specific section for handling this field. This field contains the message transmission time and date.

\* Indicates supported field. Refer to instrument sections for size of supported fields.

**Table 1.9: Patient Record**

<b>ASTM Field</b>	<b>Field Name</b>	<b>Transmitted (To Host)</b>	<b>Received (From Host)</b>	<b>Description</b>
8.1.1	Record Type	P	P	ASI instruments receive upper or lower case characters.
8.1.2	Sequence Number	*	*	Sequential number starting with one (1) and continuing until the last patient in the message. (This field follows the sequence number rules set forth by ASTM E 1394-91 Standard Section 6.6.7.)
8.1.3	Practice PID	*	*	ASI instruments accept the Practice PID if it is transmitted by the Host and return it, unchanged, to the Host. Otherwise this field is not used.
8.1.4	Laboratory PID	*	*	ASI instruments accept the Laboratory PID transmitted by the Host and return it unchanged to the Host. This field is the recommended field for an LIS to communicate Patient IDs to an instrument.

\* Indicates supported field. Refer to instrument sections for size of supported fields.

**Table 1.9: Patient Record (continued)**

<b>ASTM Field</b>	<b>Field Name</b>	<b>Transmitted (To Host)</b>	<b>Received (From Host)</b>	<b>Description</b>
8.1.5	Instrument PID	*	*	ASI instruments may ignore any PID downloaded in this field. This field is used by the instrument or system to communicate a patient ID entered by the Lab operator or read by the instrument, to a Host (LIS).
8.1.6	Patient Name	*	*	ASI instruments may optionally handle this field. When used, this field has the following components: Last_name, First_name, Middle_initial, suffix (Jr.,Sr., etc.), and title (Mr., Mrs., Ms., etc.). See the instrument specific section for handling this field.
8.1.7	Mother's Maiden Name	*	*	ASI instruments may optionally handle this field. See the instrument specific section for handling this field.
8.1.8	Birthdate	*	*	ASI instruments may optionally handle this field. See the instrument specific section for handling this field.
8.1.9	Patient Sex	M F U	M F U	ASI instruments may optionally handle this field. When used, this field has the following flags: (M)ale (F)emale (U)nknown See the instrument specific section for handling this field.
8.1.10	Patient Race – Ethnic Origin	*	*	ASI instruments may optionally handle this field. See the instrument specific section for handling this field.
8.1.11	Patient Address	*	*	ASI instruments may optionally handle this field. See the instrument specific section for handling this field.
8.1.12	Reserved			Not supported
8.1.13	Patient Phone	*	*	ASI instruments may optionally handle this field. See the instrument specific section for handling this field.
8.1.14	Attending Physician	*	*	ASI instruments may optionally handle this field. See the instrument specific section for handling this field.
8.1.15	Special Field 1			Not supported
8.1.16	Special Field 2			Not supported
8.1.17	Patient Height	*	*	ASI instruments may optionally handle this field. See the instrument specific section for handling this field.
8.1.18	Patient Weight	*	*	ASI instruments may optionally handle this field. See the instrument specific section for handling this field.

\* Indicates supported field. Refer to instrument sections for size of supported fields.

**Table 1.9: Patient Record (*continued*)**

<b>ASTM Field</b>	<b>Field Name</b>	<b>Transmitted (To Host)</b>	<b>Received (From Host)</b>	<b>Description</b>
8.1.19	Patient Diagnosis  Code  ^Description	*	*	Identifies the ICD-9 code for the diagnosis.  Text description for the code.  Both components are optional and are provided as known. Multiple diagnosis may be communicated via the use of repeat delimiters. Refer to instrument specific section for support of this field and support of repeat delimiters within this field.
8.1.20	Patient Medications  Name  ^Level  ^Start_Date  ^End_Date	*	*	Identifies the therapy name or generic drug name (e.g., Aspirin).  Identifies the amount or dosage of drug or therapy as well as the frequency (e.g., 2 tablets every 4 hours).  Refers to the beginning date of the therapy or medication.  Refers to the stop date of the therapy or medication.  Multiple Medications may be communicated via the use of repeat delimiters. Refer to instrument specific section for support of this field and support of repeat delimiters within this field.
8.1.21	Patient Diet	*	*	ASI instruments may optionally handle this field. See the instrument specific section for handling this field.
8.1.22	Practice Field 1			Not supported
8.1.23	Practice Field 2			Not supported
8.1.24	Admission or Discharge Dates	*	*	ASI instruments may optionally handle this field. See the instrument specific section for handling this field.
8.1.25	Admission Status	*	*	ASI instruments may optionally handle this field. See the instrument specific section for handling this field.
8.1.26	Location	*	*	ASI instruments may optionally handle this field. See the instrument specific section for handling this field.
8.1.27	Nature of Diagnostic Codes			Not supported
8.1.28	Alternative Diagnostic Codes			Not supported
8.1.29	Patient Religion			Not supported
8.1.30	Marital Status			Not supported

\* Indicates supported field. Refer to instrument sections for size of supported fields.

**Table 1.9: Patient Record (*continued*)**

<b>ASTM Field</b>	<b>Field Name</b>	<b>Transmitted (To Host)</b>	<b>Received (From Host)</b>	<b>Description</b>
8.1.31	Isolation Status	*	*	ASI instruments may optionally handle this field. See the instrument specific section for handling this field.
8.1.32	Language			Not supported
8.1.33	Hospital Service			Not supported
8.1.34	Hospital Institution	*	*	Name of hospital or lab.
8.1.35	Dosage Category	*	*	Hematology instruments may use this field to communicate Limit Set Information relating to the category the patient/sample should be analyzed against. See instrument specific section for the structure of this field. ASI instruments may optionally handle this field. See the instrument specific section for handling this field.

\* Indicates supported field. Refer to instrument sections for size of supported fields.

**Table 1.10: Order Record**

<b>ASTM Field</b>	<b>Field Name</b>	<b>Transmitted (To Host)</b>	<b>Received (From Host)</b>	<b>Description</b>
9.4.1	Record Type	O	O	ASI instruments receive upper- or lowercase characters.
9.4.2	Sequence Number	*	*	Sequential number starting with one (1) and continuing until the last order for a given patient in the message. (This field follows the sequence number rules set forth by ASTM E 1394-91 Standard Section 6.6.7.)
9.4.3	Specimen ID field			ASI Instruments accept the Specimen ID received in this field and return it unchanged to the Host (LIS) when transmitting.
	Specimen ID	*	*	
	^location ID	*	*	The Location Information (location_ID^position) components may be used to uniquely identify replicates of a single sample. This component is optional when downloading orders to ASI instruments and systems.
	^position	*	*	ASI instruments may optionally accept the location ID and position information. (Recommended for batch systems.)

\* Indicates supported field. Refer to instrument sections for size of supported fields.

**Table 1.10: Order Record (*continued*)**

<b>ASTM Field</b>	<b>Field Name</b>	<b>Transmitted (To Host)</b>	<b>Received (From Host)</b>	<b>Description</b>
9.4.4	Instrument SID field  Specimen_ID ^location_ID ^position	*	*	ASI Instruments ignore the contents in this field when receiving information. This field is used by the instrument or system to communicate a specimen ID entered by the lab operator, or read by the instrument to a Host (LIS).  The Location Information (location_ID^position) components may be used to uniquely identify replicates of a single sample.
9.4.5	Universal Test ID  ^^Assay_code ^Assay_name  ^Assay protocol  ^Test Qualifier  ^Result Qualifier	*	*	As defined by ASTM 1394-91 section 6.6.1.4. The manufacturer's local code is made up of five (5) component fields as defined below. ASI instruments handle repeat delimiters in this field.  The Test Information (Assay_code^Assay_name) is used to uniquely identify the test or tests to be done on the specimen.  Dilution or neutralization protocols defined per assay code. See the instrument specific section for applicable assay protocols.  Optional qualifier for test code. See the instrument specific section for handling this field.  Not applicable on Order Records.
9.4.6	Priority	S R	S R	(S)tat (R)outine – default value See the instrument specific section for handling this field.
9.4.7	Requested Date and Time	*	*	See the instrument specific section for handling this field.
9.4.8	Collection Date and Time	*	*	Date and time of sample collection. See the instrument specific section for handling this field.
9.4.9	Collection End Time			Not supported
9.4.10	Collection Volume			Not supported
9.4.11	Collector ID	*	*	See the instrument specific section for handling this field.

\* Indicates supported field. Refer to instrument sections for size of supported fields.

**Table 1.10: Order Record (*continued*)**

<b>ASTM Field</b>	<b>Field Name</b>	<b>Transmitted (To Host)</b>	<b>Received (From Host)</b>	<b>Description</b>
9.4.12	Action Code		C A N Q	(C)ancel – Used to cancel a previously downloaded Test Order.  (A)dd – Used to add a test to a known specimen.  (N)ew – Used to identify new Test Orders for an unknown specimen. If the specimen is known by the instrument/system, this message is ignored as a duplicate transmission.  (Q)uality Control Specimen See the instrument specific section for handling this field.
9.4.13	Danger Code	*	*	See the instrument specific section for handling this field.
9.4.14	Relevant Clinical Info	*	*	See the instrument specific section for handling this field.
9.4.15	Date/Time Specimen Received	*	*	Date and Time specimen received in the Lab. See the instrument specific section for handling this field.
9.4.16	Specimen Descriptor Specimen Type ^Specimen Source	*	*	See the instrument specific section for handling this field.
9.4.17	Ordering Physician	*	*	See the instrument specific section for handling this field.
9.4.18	Physician's Phone	*	*	See the instrument specific section for handling this field.
9.4.19	User Field No. 1	*	*	See the instrument specific section for handling this field.
9.4.20	User Field No. 2	*	*	See the instrument specific section for handling this field.
9.4.21	Lab Field No. 1			Not supported
9.4.22	Lab Field No. 2			Not supported
9.4.23	Date/Time Reported			Not supported
9.4.24	Instrument Charge			Not supported
9.4.25	Instrument Section	*	*	Abbott Data Management systems use this field to assign test instruments.
9.4.26	Report Type	*	*	See the instrument specific section for handling this field.
9.4.27	Reserved Field			Not supported

\* Indicates supported field. Refer to instrument sections for size of supported fields.

**Table 1.10: Order Record (*continued*)**

<b>ASTM Field</b>	<b>Field Name</b>	<b>Transmitted (To Host)</b>	<b>Received (From Host)</b>	<b>Description</b>
9.4.28	Location or Ward for Collection	*	*	See the instrument specific section for handling this field.
9.4.29	Nosocomial Infection Flag			Not supported
9.4.30	Specimen Service			Not supported
9.4.31	Specimen Institution			Not supported

\* Indicates supported field. Refer to instrument sections for size of supported fields.

**Table 1.11: Result Records**

<b>ASTM Field</b>	<b>Field Name</b>	<b>Transmitted (To Host)</b>	<b>Received (From Host)</b>	<b>Description</b>
10.1.1	Record Type	R		Result records are never accepted from an LIS or Host system. ASI instruments and systems use separate result records for replicates, averages of replicates, intermediate, final, and interpreted results.
10.1.2	Sequence Number	*		Sequential number starting with one and continuing until the last result record for a given order in the message. (This field follows the sequence number rules set forth by ASTM E 1394-91 Standard Section 6.6.7.)

\* Indicates supported field. Refer to instrument sections for size of supported fields.

**Table 1.11: Result Records (*continued*)**

<b>ASTM Field</b>	<b>Field Name</b>	<b>Transmitted (To Host)</b>	<b>Received (From Host)</b>	<b>Description</b>
10.1.3	Universal Test ID			The manufacturer's local code is made up of five (5) component fields as defined below. ASI instruments do not use repeat delimiters in this field.
	^^Assay_code	*		The Test Information (Assay_code^Assay_name) component is used to uniquely identify the test or tests done on the specimen.
	^Assay_name			
	^Assay_protocol	*		Dilution or neutralization protocols defined per assay code. See the instrument specific section for applicable assay protocols.
	^Test Qualifier	*		Further qualification of the test or assay code.
	^Result type	F		(F)inal –Indicates final calculated values of concentrations, etc.
		I		(I)nterpreted –Indicates interpretations of final results based on user-defined criteria.
		P		(P)reliminary – Indicates raw instrument readings such as the RATE.
		Favg		Identifies the average of a set of final results.
		Pavg		Identifies the average of a set of preliminary results.
		Iavg		Identifies the interpretation associated with the average final result. See the instrument specific section for handling this field.
10.1.4	Data/Measurement	*		See the instrument specific section for handling this field.
10.1.5	Units	*		See the instrument specific section for handling this field.
10.1.6	Reference Ranges			This field is used to communicate the laboratory-defined ranges for this assay. It is composed of two components separated by the component delimiter (^).
	Range	*		Multiple ranges may be communicated using repeat delimiters. The range is of the form, value to value. See the instrument specific section for specific ranges communicated.
	^Description	*		Label assigned by the laboratory to the preceding range. See the instrument specific section for handling this field.

\* Indicates supported field. Refer to instrument sections for size of supported fields.

**Table 1.11: Result Records (*continued*)**

<b>ASTM Field</b>	<b>Field Name</b>	<b>Transmitted (To Host)</b>	<b>Received (From Host)</b>	<b>Description</b>
10.1.7	Result Abnormal Flags	L H LL HH QC > < EXP		(L)ess than normal range (H)igher than normal range (LL) – Less than extreme range (HH) – Higher than extreme range (QC) – Result based on a QC out of range (>) – Above dynamic range of assay (<) – Below dynamic range of assay (EXP) - Result based on expired reagent. Additional abnormal flags may be defined as needed by instruments.
10.1.8	Nature of Abnormality	*		See the instrument specific section for handling this field.
10.1.9	Result Status	F R X		(F)inal Results – Used to indicate initial transmission of results. (R)epeat – Used to indicate previously transmitted results. (X) – Test cannot be completed. Used to indicate error during processing.
10.1.10	Date of Change in Instrument Values	*		This field may be used to indicate the date of the last calibration of an instrument.
10.1.11	Operator IDs operator  ^approver	*		(operator) – When used, this field contains the ID or name of the operator who performed the test. (approver) – When used, this field contains the ID or name of the operator who approved the test results. See the instrument specific section for handling this field.
10.1.12	Date/Time Test Started	*		See the instrument specific section for handling this field.
10.1.13	Date/Time Test Completed	*		See the instrument specific section for handling this field.
10.1.14	Instrument ID	*	MANUALLY ENTERED	Used by Abbott Data Management Systems to indicate the source of results. When used, this field contains the serial number or a unique identifier for each instrument returning results. If results are manually entered, this field contains the string MANUALLY ENTERED, and the Operator Id (10.1.11) contains the ID or name of the person entering the results.

\* Indicates supported field. Refer to instrument sections for size of supported fields.

**Table 1.12: Comment Record**

<b>ASTM Field</b>	<b>Field Name</b>	<b>Transmitted (To Host)</b>	<b>Received (From Host)</b>	<b>Description</b>
11.1.1	Record Type	C	C	Comment records.
11.1.2	Sequence Number	*	*	Sequential number starting with one. (This field follows the sequence number rules set forth by ASTM E 1394-91 Standard Section 6.6.7.)
11.1.3	Comment Source	I D	L	(I)nstrument (L)IS (Computer System) (D)ata Management Systems
11.1.4	Comment Text	*	*	As described by each instrument.
11.1.5	Comment Type	G I	G	(G)eneric free form comments entered by the lab operator. (I)nstrument generated exception string.

\* Indicates supported field. Refer to instrument sections for size of supported fields.

## **Request Information Record**

The Request Information Record allows one system to request specific information from another. Each system may request patient demographics and patient/test orders and results. Instruments and systems may request results that were previously transmitted in order to use the information in their analysis of current samples or tests, or to provide time-based comparisons (or tracking) for test results relating to a patient. The request status code (12.1.13) identifies the purpose of the request.

Refer to the instrument specific sections to identify which type of request of those defined below are supported by that specific instrument and system. The allowed requests for information may be made based on the following types of data:

**Patient IDs** – Requests can be made based on single patient IDs or a range of patient IDs. The “ALL” qualifier may be used to request information on all the patient IDs known by this system. This qualifier is not recommended for common use since it returns all of the relevant information stored in the receiving systems database. Ranges of patient IDs may be requested by providing the starting patient ID (12.1.3) and the ending patient ID (12.1.4). Repeat delimiters may not be used to indicate multiple patient IDs or ranges.

**Specimen IDs** – Requests can be made based on specimen IDs or a range of specimen IDs. The “ALL” qualifier may be used to request information on all the specimen IDs known by this system. This qualifier is not recommended for common use since it returns all the relevant information stored in the receiving systems database. Ranges

of specimen IDs may be requested by providing the starting specimen ID (12.1.3) and the ending specimen ID (12.1.4). The specimen ID is the second component in these fields. If the request is made based on the specimen ID only, it would be transmitted as "|^specimen\_ID|". If the request is made based on patient ID and Specimen ID, it would be transmitted as "|patient\_ID^Specimen\_ID|". Repeat delimiters may not be used to indicate multiple specimen IDs or ranges.

**Test Code** – Requests can be made based on the test code.

**Date/Time** – Requests can be made based on a specific date and/or time, or a range of date/time. For a single date/time, only field 12.1.7 should be used. If a time is not specified, the entire day is assumed for that date. Field 12.1.6 specifies what type of time and date is being requested.

**Ranges** – A range may be specified by utilizing the Starting Range (12.1.3) and Ending Range (12.1.4) fields for patient IDs or specimen IDs. The range is interpreted using ASCII byte ordering (numbers before all alphabetic letters and upper case letters before lower case letters) to identify the matched IDs that fall between the starting and ending values. For example, using the following data set:

{Abcd, abcd, ABcd, AB123, aBcd, 12ab, 12bb}

The sort of this data (in ascending order) generates the following order:

{12ab, 12bb, AB123, ABcd, Abcd, aBcd, abcd}

Therefore, if the range had been specified as **12ab** and **abcd** the data associated with all the IDs above would be returned. Some systems may support only upper case letters (or assign equivalent values to upper and lower case letters). A system that treats upper and lower case as equivalent would treat {ABcd, Abcd, aBcd, abcd} as equivalent IDs.

**NOTE:** Each condition specified in the Request Information Record narrows the request further. The request returns records with information matching all the conditions specified (logical AND operation).

**NOTE:** ASI instruments and systems may not honor the request that uses only the "ALL" qualifiers for patient and sample IDs together. ASI instruments and systems do not generate queries using the "ALL" qualifier for patient and sample IDs together (*i.e.*, no queries for information on ALL samples of ALL patients).

### **Nature of Request Time Limits (12.1.6)**

Since an instrument or system may track the date and time of several events, ASI instruments and systems use this field to identify the date and time an information request is made. Refer to the instrument specific sections to identify which defined flags are supported by each instrument. The currently allowed values for this field are:

- **Specimen Collection Date/Time (S)** – Identifies the date and time a specimen was collected. Relates to field 9.4.9 (Collection End Time) of the Order Record.
- **Order Request Date/Time (O)** – Identifies the date and time the order (specimen/test) was requested for processing. Relates to field 9.4.7 (Request Date/Time) of the Order Record. If no specific information is provided in the Request Date/Time field (field 9.4.7) then the date and time the order message was received is used as the Request Date/Time for this order.
- **Result Date/Time (R)** – Identifies the date and time that a test was completed (*i.e.*, result was generated).

### **Request Status Codes (12.1.3)**

The Request Status Code field is used to identify the nature of the request for information. ASI instruments may support all or a subset of the following types of requests. Refer to the instrument specific section in which requests for information are supported by a specific instrument. The allowable request types are as follows:

**Final Report (F)** – This indicates a request for results. Based on the information provided in the query record and the ability of the instrument or system, this request returns all results (final, preliminary, interpreted, averages, calculations, etc.) associated with that patient, sample and/or test. This query returns previously transmitted results as well as any new results waiting to be transmitted. This request may be made based on single or ranges of patient(s), specimen(s), date(s)/time(s), and/or test code.

**New/Edited Results (N)** – This indicates a request for results that have not been previously transmitted or that have been edited. ASI instruments and systems supporting this feature do not return previously transmitted results in response to this query. This request may be made based on single or ranges of patient(s), specimen(s), date(s)/time(s), and/or test code.

**Orders/Demographics (O)** – This indicates a request for patient and order records. This request returns all patient and order records meeting the request criteria. The request may be made based on single or ranges of patient(s), specimen(s), date(s)/time(s), and/or test code.

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**Patient Demographics (D)** – This indicates a request for patient demographics only. This request returns all patient records meeting the request criteria. This request may be made based on single or ranges of patient(s).

**Canceled – Cannot be Done (X)** – This indicates that the request previously made cannot be performed with the information provided. ASI instruments and systems may return a Comment record following the Request Information Record (Q) with the reason for not completing the request.

**Abort Last Request (A)** – This indicates that the requesting system would like to cancel the previously transmitted request.

**Table 1.13: Request Information Record**

ASTM Field	Field Name	Transmitted (To Host)	Received (From Host)	Description
12.1.1	Record Type	Q	Q	Request Information Records may be used to request information on patients, samples, and tests. These requests may be specific to a date and time or may apply to a time period with a start date and time and an end date and time. Patient IDs, Sample IDs, Test IDs, and Date/Times are AND conditions to make the request more specific.
12.1.2	Sequence Number	1	1	Sequence number is always one (1). Only one Request Information Record is sent at any one time.
12.1.3	Starting Range ID Patient ID  ^Specimen ID	* ALL  * ALL	* ALL  * ALL	From Host: (ALL) indicates return all information associated with all known Patient IDs and/or Specimen IDs.  From Instrument: (ALL) indicates return all requested information associated with known Patient IDs and/or Specimen IDs assigned to this instrument.
12.1.4	Ending Range ID Patient ID  ^Specimen ID	* *  *	* *  *	Used when Patient and/or Specimen IDs are sequential. Standard string comparison rules apply to determine if a Patient ID Specimen ID falls within the range provided by fields 12.1.3 and 12.1.4.

\* Indicates supported field. Refer to instrument sections for size of supported fields.

**Table 1.13: Request Information Record (continued)**

<b>ASTM Field</b>	<b>Field Name</b>	<b>Transmitted (To Host)</b>	<b>Received (From Host)</b>	<b>Description</b>
12.1.5	Universal Test ID  ~~~Assay_code ^Assay_name	~~~ALL  *	~~~ALL  *	Used to request test results for the specified test (assay code) on a specific sample or patient ID. Also used to request test orders on a specific sample ID.  This field becomes an AND condition to the previous fields. (ALL) indicates all test codes and result types.  The Test Information (Assay_code ^ Assay_name) component is used to uniquely identify the test or tests to be done on the specimens.
12.1.6	Request Time Limits	S R	S R	(S) Specimen order dates. (R) Result test dates.
12.1.7	Beginning Request Date and Time	*	*	Instrument's Date and Time. When a time is not specified, the 24-hour range for that date is assumed.
12.1.8	Ending Request Date and Time	*	*	Instrument's Date and Time. When used, the date and time specified is the end of the time range of interest. When a beginning Date and Time is not specified (field 12.1.7), this field is interpreted as known information up to and including this date and time. If a time is not specified, 12:00 p.m. is used as the default.
12.1.9	Requesting Physician Name	*	*	See the instrument specific section for handling this field.
12.1.10	Requesting Physician Phone #			Not supported
12.1.11	User Field No. 1			Not supported
12.1.12	User Field No. 2			Not supported
12.1.13	Request Status Codes	A F N O D X	A F N O D X	(A)bort – Cancel last request. (F)inal Report (N)ew or Edited Results (O)rders and Demographics (D)emographics only (X) – Request cannot be done.

\* Indicates supported field. Refer to instrument sections for size of supported fields.

**Table 1.14: Terminator Record**

<b>ASTM Field</b>	<b>Field Name</b>	<b>Transmitted (To Host)</b>	<b>Received (From Host)</b>	<b>Description</b>
13.1.1	Record Type	L	L	Terminator records indicate the end of a message.
13.1.2	Sequence Number	1	1	Sequential number always equal to one (1).

**Table 1.14: Terminator Record (*continued*)**

<b>ASTM Field</b>	<b>Field Name</b>	<b>Transmitted (To Host)</b>	<b>Received (From Host)</b>	<b>Description</b>
13.1.3	Termination Code	N	N	(N)ormal termination. If this field is not transmitted, (N) is assumed.
		I	I	(I)nformation not available on last request.
		F	F	(F)inished processing last request.

**Table 1.15: Manufacturer's Record**

<b>ASTM Field</b>	<b>Field Name</b>	<b>Transmitted (To Host)</b>	<b>Received (From Host)</b>	<b>Description</b>
15.1.1	Record Type	M		(M)anufacturer Defined Records Refer to instrument specific sections on support and structure of manufacturer – Instrument record types. These records are used to supplement the information provided in the PATIENT/ORDER/RESULT records. They are used specifically to provide a mechanism for communicating information that does not fit within the PATIENT/ORDER/RESULT structure.
15.1.2	Sequence Number	*		Any sequential number within a level.
15.1.3	Abbott Record Type  Record Class  ^Instrument_Record_Type	I  ^DM  ^SM  ^GR  ^CL  P		Defines the usage of the Abbott Manufacturer record. It contains two components.  Identifies the information content of the record. Valid Classes of manufacturer records are as follows:  (I)nstrument Information Records. Examples of instrument information record types are as follows:  (DM) – Destination Maps for pipetting information  (SM) – Source Maps for pipetting information  (GR) – Graphics Record  (CL) – Instrument Calibration information  (P)atient class – Contains information relevant to patient demographics.

\* Indicates supported field. Refer to instrument sections for size of supported fields.

**Table 1.15: Manufacturer's Record (*continued*)**

ASTM Field	Field Name	Transmitted (To Host)	Received (From Host)	Description
		O R		(O)rder Class – Contains information relevant to order information.  (R)esult Class – Contains information relevant to result information.

\* Indicates supported field. Refer to instrument sections for size of supported fields.

Refer to instrument specific sections for information on supported Manufacturer Records. Additional Abbott Record Types may be created by ASI instruments and systems as needed, to communicate information not covered by the ASTM standards and this document.

### **Example Messages**

Below are examples of messages which conform to the requirements defined for instruments implementing the Abbott Standard Interface as described in the preceding section.

#### ***Specimen Query from an ASI Instrument***

The following example shows a simple request for test information and patient demographics for a range of specimens (SID1000 through SID1008).

```
HI\&|||ASI^1.0^s/n^H1P1O1R1Q1L1C1||||My^Host^System||P1|19930631[CR]
QI1^SID1000^SID1008|^ALL|||||O[CR]
LI1N[CR]
```

**Figure 1.28: Example of Specimen Test Order Query**

#### ***Test Ordering by an External Host Computer***

The following figure shows the partial Test Request message from an external host system to an ASI instrument. It contains patient demographics and test orders associated with each patient. The download of the Test Request message may be initiated by the external system or may be in reply to a query from the ASI instrument as indicated above.

```
HI\&|||My^Host^Computer||||ASI^1.0^s/n||P1|19930631[CR]
P1||PID1234||Doe^John|Smith|19500522|M|||Jones^Bob^^Dr|||300.0^Anxiety\311.0^Depression|[CR]
OI1SID1000|^10^Test10^protocol1|SI19930631|19930629|||N|||SERUM|Miller^John^^Dr||||||QI|[CR]
OI2SID1000|^22^Test22|SI19930631|19930629|||A|||SERUM|Miller^John^^Dr||||||QI|[CR]
P1||PID2222||Small^Jane|Smith|19400820|M|||Jones^John^^Dr|||.....[CR]
OI1SID1001|^20^Test20^protocol4|R|19930631|19930629|||N|||SERUM|Ahmad^Joe^^Dr||||||QI|[CR]
PI3|.....[CR]
.....[CR]
LI1IF [CR]
```

**Figure 1.29:** Example of Test Ordering

The Report Type field of the Order record as well as the Terminator record (L|1|F [CR]) indicate that the Test Request message was in response to a query (Report Type = Q, Termination Code = F). Also, the two test orders for patient John Doe (PID1234, SID1000) could be communicated in one order record with the use of the repeat delimiters in the Universal Test ID field. The Test Request message would have been transmitted as follows:

```
HI^&|||My^Host^Computer|||||ASI^1.0^s/n||PI1||19930631[CR]
PI1||PID1234||Doe^John|Smith|19500522|M|||||Jones^Bob^^Dr|||300.0^Anxiety\311.0^Depression|[CR]
OI1||SID1000||^10^Test10^protocol1|^22^Test22|SI19930631||19930629|||||SERUM|Miller^John^^Dr|||||||OI|[CR]
PI2||PID2222||Small^Jane|Smith|19400820|M|||||Jones^John^^Dr|||||||CR}
OI1||SID1001||^20^Test20^protocol4|R|19930631||19930629|||||SERUM|Ahmad^Joe^^Dr|||||||OI|[CR]
PI3|.....
.....|
LI1IN [CR]
```

**Figure 1.30:** Example of Test Ordering With Repeat Delimiters

The above message was not a response to a query (Report Type = O, Termination Code = N).

### ***Results from an ASI Instrument to a Computer System***

The following figure shows a partial Test Results message from an ASI instrument to an external host computer. This message may contain the results for multiple patients and tests if they have been completed and approved. One or more result records associated with a test follows each order record. All result records for that test (per specimen) are communicated together.

```
HI^&|||ASI^1.0^s/n^H1P1O1R1Q1L1C1|||||My^Host^System||PI1||19930631[CR]
PI1||PID1234||Doe^John|Smith|19500522|M|||||Jones^Bob^^Dr|||300.0^Anxiety\311.0^Depression|[CR]
OI1||SID1000||^10^Test10^protocol1|SI19930631||19930629|||||SERUM|Miller^John^^Dr|||||||OI|[CR]
RI1|^10^Test10^protocol1^PI500.56|R||OPERATOR12^SUPER12||199306310930|MANUALLY ENTERED|[CR]
CI1||Accidentally deleted result and had to reenter|G [CR]
RI2|^10^Test10^protocol1^PI56.33|ng/ml|25 to 60^normal||F||OPERATOR12 ^SUPER12||199306310930|[CR]
OI2||SID1000||^22^Test22|SI19930631||19930629|||||SERUM|Miller^John^^Dr|||||||OI|[CR]
RI1|^22^Test22||REACTIVE||F||OPERATOR#5^SUPER12||199306310930|[CR]
PI2|.....
.....|
LI1IN [CR]
```

**Figure 1.31:** Example of Test Results From an ASI Instrument

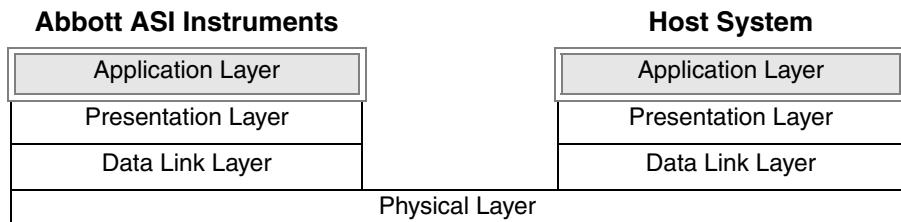
***Query for Final Results***

The following example shows a simple request for final results associated with previously run samples and tests for a patient (PID1234). This query may be used to provide a lab operator with a temporary view of patient history to facilitate approval of current results.

```
HI\\&|||ASI^1.0^s/n^H1P1O1R1Q1L1C1|||||My^Host^System||P11|19930631[CR]
QI1|PID1234^ALL||^^ALL||||||F[CR]
LI1|N[CR]
```

Figure 1.32: Example of ASI Instrument Query for Test Results

# Application Layer



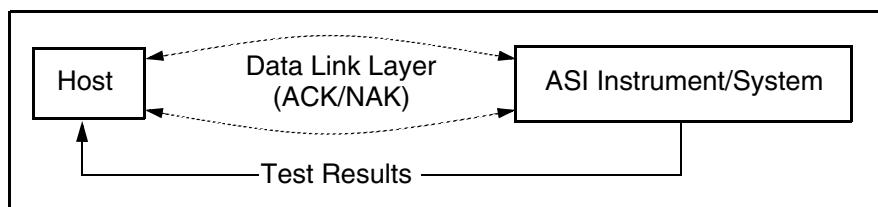
**Figure 1.33: Application Layer**

Generally, the Application Layer of ASI instruments and systems provides services for user interaction, instrument operation, maintenance, communication, etc. These services vary considerably from instrument to instrument and system to system, based on instrument capability, target market, and other design considerations.

In terms of communications, the Application Layer of each ASI instrument and system defines the type of messages that an instrument or system can support. In order to clarify this point, ASI instruments are grouped in the following four categories.

All ASI instruments and systems, regardless of the category, implement the Data Link layer in a similar fashion. Also, ASI instruments and systems, regardless of category, assay implement Comment and Manufacturer records as part of their supported messages in order to pass back information that does not fit within the ASTM defined records.

## Category I

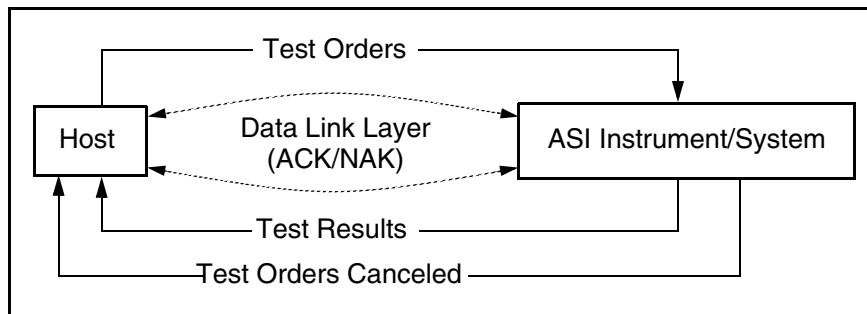


**Figure 1.34: Category I Instruments and Systems**

Category I instruments and systems have the ability to return test result messages to a host system in accordance with ASTM E 1394-91 standard and as described in this document. The Test Result messages consist of Header, Patient, Order, Result, and Terminator Records.

Because of the minimal data management capabilities of these instruments and systems, patient demographics is unlikely to be supported (with the possible exception of patient IDs).

## **Category II**



**Figure 1.35: Category II Instruments and Systems**

Category II instruments and systems have the ability to accept Test Order messages from an external host and return Test Result messages to that host system in accordance with ASTM E 1394-91 standard and as described in this document. In addition, these instruments and systems also return Test Order Canceled messages if an invalid order is received.

Test Order messages minimally consist of Header, Patient, Order, and Terminator records.

Test Result messages minimally consist of Header, Patient, Order, Result, and Terminator records.

Test Orders Canceled messages consist of Header, Patient, Order, and Terminator records. The Report Type field of the Order record contains an "X" (without quotes). The Test Order Canceled message may also contain a Comment record with the specific reason why the test was canceled.

The extent that patient demographics are supported (with the exception of patient IDs) by these instruments and systems varies based on their data management capabilities.

## Category III

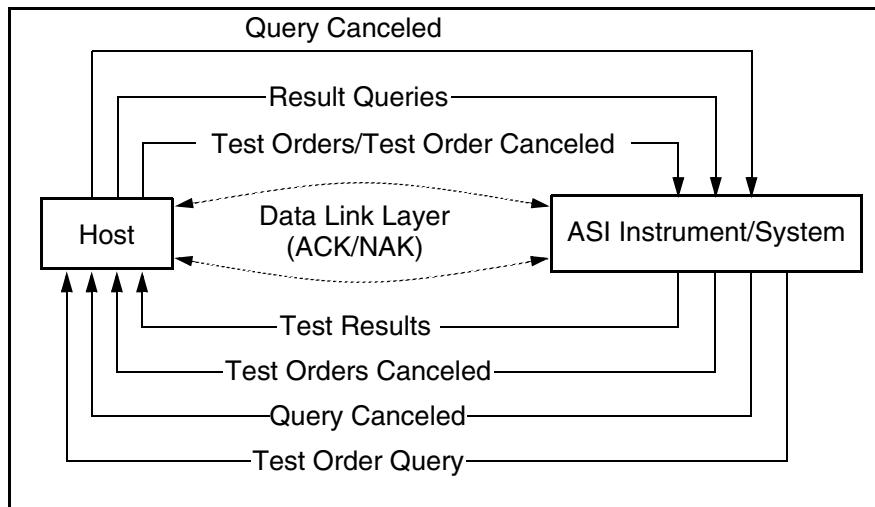


Figure 1.36: Category III Instruments and Systems

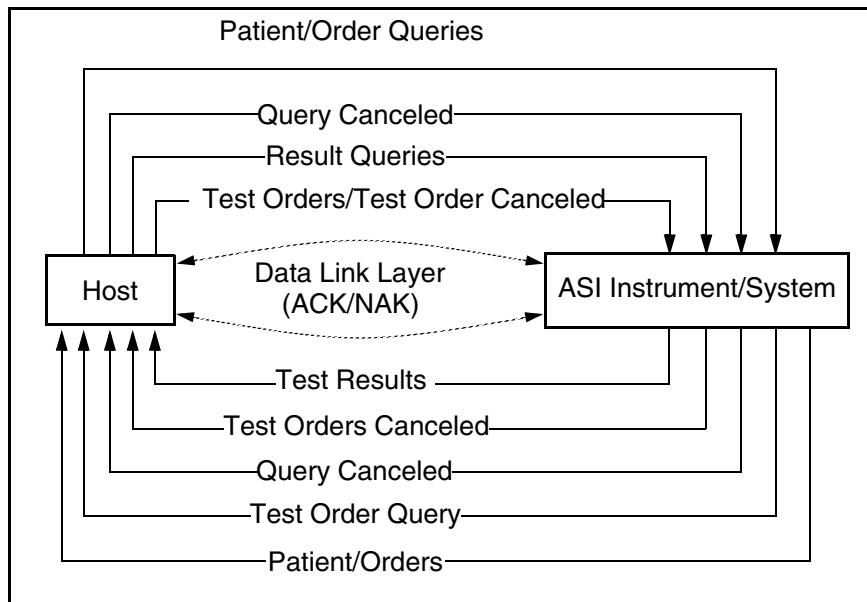
In addition to the capabilities described for Category II instruments and systems, Category III instruments accept the Result Query message and return a Query Canceled message whenever they are unable to perform the requested query. Also, they may submit a Test Order Query message requesting test orders assigned to this instrument. Instruments also accept the Query Canceled message if the host is unable to satisfy the request.

Result Query messages consist of Header, Request Information, and Terminator records. The Request Status Code field in the Request Information record contains an F to indicate final results or an N to indicate new or updated results from a certain start date. The Test Order Query message is similar. The Request Status Code field contains an O.

Query Canceled messages consist of Header, Request Information, and Terminator records. The Request Information record contains an X in the Request Status Code field to indicate that the request cannot be done. A variation of the Query Canceled message is used to abort a previously made query.

The extent that patient demographics are supported (with the exception of patient IDs) by these instruments and systems varies based on their data management capabilities. A variation of the Test Order Canceled message is used to abort a previously made test order.

## **Category IV**



**Figure 1.37: Category IV Instruments and Systems**

In addition to the abilities described for Category III instruments and systems, Category IV instruments and systems can accept Patient Demographics Query and Test Order Query messages from an external host and return Patient and Order messages to that host system, in accordance with ASTM E 1394-91 standard and as described in this document. In addition, these systems may generate Patient Demographics Queries and Test Order Queries.

The Patient Demographics Query messages and the Test Order Query messages consist of Header, Request Information, and Terminator records. When requesting patient demographics only, the Request Status Code field in the Request Information record contains a D. When requesting orders also, the field contains an O.

The Patient messages minimally consist of Header, Patient, and Terminator records while the Test Order messages consist of Header, Patient, Order, and Terminator records.

All instruments and systems in Category IV support complete demographic and order information as described in the ASTM E 1394-91 standard and this document. The instruments and systems provide maximum flexibility for a lab environment. They allow the generation and input of patient demographics and test orders on any interconnected system. Through the use of the Query messages, the systems are able to synchronize the data bases on all relevant patients and orders without requiring redundant manual input of information.

## Introduction

The modular design and integration capabilities of the ARCHITECT® family of analyzers provide a single workstation capable of processing a variety of assays.

With an intuitive software interface, real-time display of system statuses, and a “to do” list of scheduled maintenance activities, you can minimize system interaction and optimize your productivity.

Use or function topics include:

- *ARCHITECT® System overview*, page 3  
Provides a general description of the available ARCHITECT® System configurations.
- *System control center*, page 9  
Provides a detailed description of the computer system, both hardware and software, that provides the interface to your ARCHITECT® System.
- *Processing modules*, page 27  
Provides a detailed description of each processing module including all related hardware components.
- *Sample handlers*, page 92  
Provides a detailed description of each sample transport system including all related hardware components.
- *System statuses*, page 103  
Lists and describes the various statuses of each system.

**NOTES**

## ARCHITECT® System overview

The modular design of the ARCHITECT® family of analyzers allows multiple processing modules, which perform all sample processing activities, to be physically joined to form a single workstation or system. The processing module(s) determines your system configuration.

ARCHITECT® Systems can be configured to process samples using potentiometric and photometric methods and/or CMIA (chemiluminescent microparticle immunoassay) methods.

System overview topics include:

- *Primary components of an ARCHITECT® System*, page 3
- *ARCHITECT® ci 8200™ integrated system*, page 3
- *ARCHITECT® c 8000™ System*, page 4
- *i 2000® System*, page 5
- *ARCHITECT® i 2000SR™ System*, page 6

### Primary components of an ARCHITECT® System

Each ARCHITECT® System, regardless of type, consists of three primary components:

- SCC (system control center) – provides a common user interface across all ARCHITECT® System configurations.
- Processing module(s) – performs all sample processing activities from aspiration to final read. The type(s) and number(s) of processing module(s) determines your system configuration.
- Sample handler – transports samples through an ARCHITECT® System. Each system has a single, primary sample handler regardless of the number of processing modules and types.

### ARCHITECT® ci 8200™ integrated system

The *ci* 8200 integrated system is a fully-automated clinical chemistry and immunoassay system consisting of a *c* 8000™ and an *i* 2000<sub>SR</sub>™ processing module that form a single workstation.

Figure 2.1: Primary components of a ci 8200 integrated system

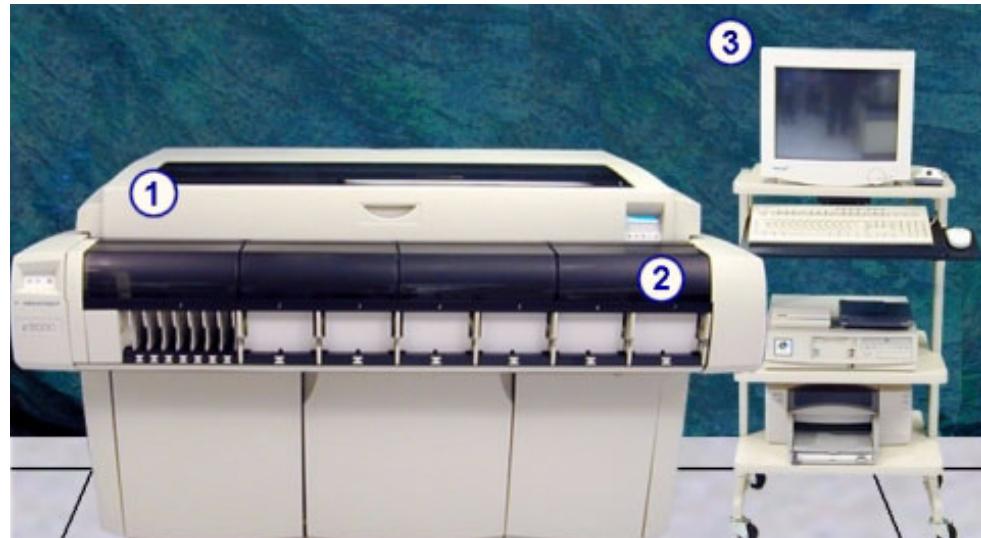


1. SCC (system control center): Computer system that provides user control of the processing module(s) and related components through a centralized interface.	2. <i>c</i> 8000™ processing module: Diagnostic module that performs sample processing using potentiometric and photometric methods.
3. <i>i</i> 2000 <sub>SR</sub> ™ processing module: Diagnostic module with priority processing capability that performs sample processing using the CMIA (chemiluminescent microparticle immunoassay) method.	4. RSH – retest sample handler: Transport module that presents samples to the processing module(s) for analysis and retesting.

## ARCHITECT® *c* 8000™ System

The ARCHITECT® *c* 8000 System is an open, fully-automated, clinical chemistry system allowing random and continuous access, and priority processing.

*Figure 2.2: Primary components of a c System*



- |   |   |
|---|---|
| 1. <i>c</i> 8000™ processing module:<br>Diagnostic module that performs sample processing using potentiometric and photometric methods.                           | 2. RSH – retest sample handler:<br>Transport module that presents samples to the processing module(s) for analysis and retesting. |
| 3. SCC (system control center):<br>Computer system that provides user control of the processing module(s) and related components through a centralized interface. |   |

## *i* 2000® System

The *i* 2000 System is a fully-automated immunoassay system allowing random and continuous access, and priority processing. Up to four processing modules can be joined to form a single workstation.

*Figure 2.3: Primary components of an i 2000 System*

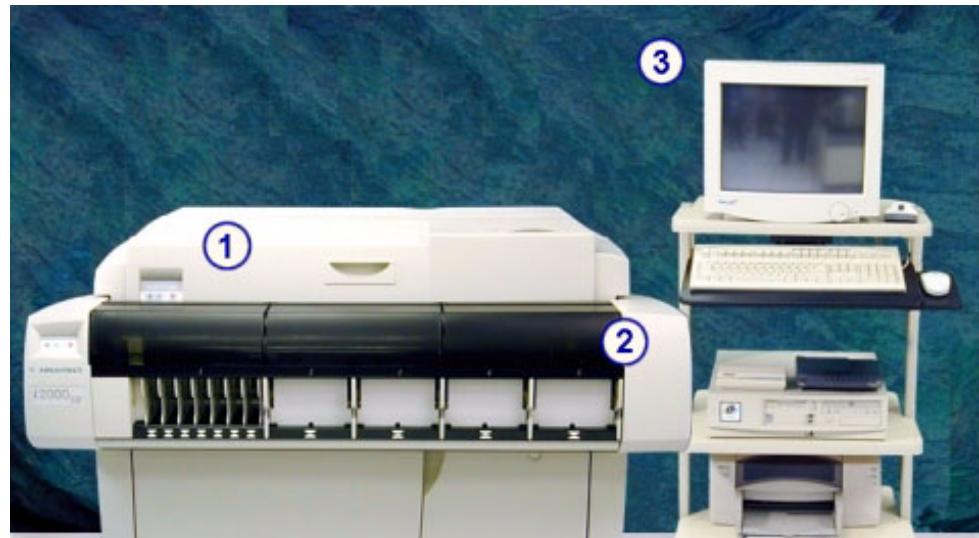


- |   |   |
|---|---|
| 1. <i>i</i> 2000® processing module:<br>Diagnostic module that performs sample processing using the CMIA (chemiluminescent microparticle immunoassay) method.     | 2. SSH – standard sample handler:<br>Transport module that presents samples to the processing module(s) for analysis. |
| 3. SCC (system control center):<br>Computer system that provides user control of the processing module(s) and related components through a centralized interface. |   |

## ARCHITECT® *i* 2000<sub>SR</sub>™ System

The ARCHITECT® *i* 2000<sub>SR</sub>™ System is a fully-automated immunoassay system allowing random and continuous access as well as priority and automated rerun processing.

*Figure 2.4: Primary components of an i 2000<sub>SR</sub>™ System*



- |  |   |
|--|---|
| <p>1. <i>i</i> 2000<sub>SR</sub>™ processing module:<br/>Diagnostic module with priority<br/>processing capability that performs<br/>sample processing using the CMIA<br/>(chemiluminescent microparticle<br/>immunoassay) method.</p> | <p>2. RSH – retest sample handler:<br/>Transport module that presents<br/>samples to the processing<br/>module(s) for analysis and retesting.</p> |
| <p>3. SCC (system control center):<br/>Computer system that provides user<br/>control of the processing module(s)<br/>and related components through a<br/>centralized interface.</p>  |   |

**NOTES**

## System control center

The SCC (system control center) is a computer system that provides the software interface to the ARCHITECT® System and can provide an interface to a host computer. From the SCC you can:

- Configure the system
- Enter patient, control, and calibration orders
- Review patient results, control data, and calibration results
- Control the processing module(s) and the sample handler
- Perform system diagnostics and maintenance procedures
- Receive test orders and diagnostic data from a host computer
- Transfer test results to a host computer

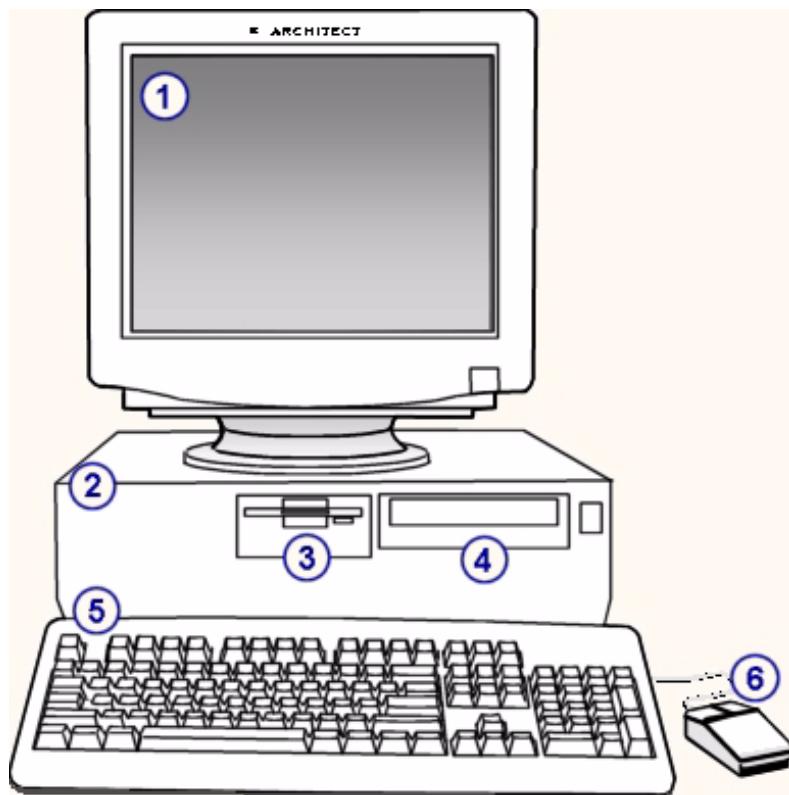
System control center topics include:

- SCC standard components, page 2-9
- SCC optional components, page 2-12
- ARCHITECT® System software, page 2-13

### SCC standard components

The following illustration shows the standard components of the SCC (system control center).

Figure 2.5: SCC standard components



1. Touch-screen monitor: Allows you to make on-screen selections by touching text areas and graphics, icons and menu items, and function bar buttons.	2. CPU (central processing unit): Houses the microprocessor and other computer components. <b>NOTE:</b> Upgrades to the computer hardware may change the location of CPU components.
3. Floppy drive: Used to: <ul style="list-style-type: none"><li>– Collect system logs for troubleshooting purposes.</li><li>– Import and export assay files (c System).</li></ul>	4. CD-RW drive: Used to: <ul style="list-style-type: none"><li>– Install assay, maintenance, and diagnostic files</li><li>– Upgrade system software</li><li>– Archive patient and quality control results</li><li>– Collect system logs for troubleshooting purposes</li></ul>

**Section 2**

5. Keyboard: Used with the mouse and/or touch-screen monitor to enter information. You can use the keyboard as an alternate means of performing most functions.	6. Mouse (pointing device): Used with the touch-screen monitor and/or keyboard to make onscreen selections.
7. Network hub and CPU back panel (not shown): Provides the connection between the SCC and modules for information exchange.	

***Related information...***

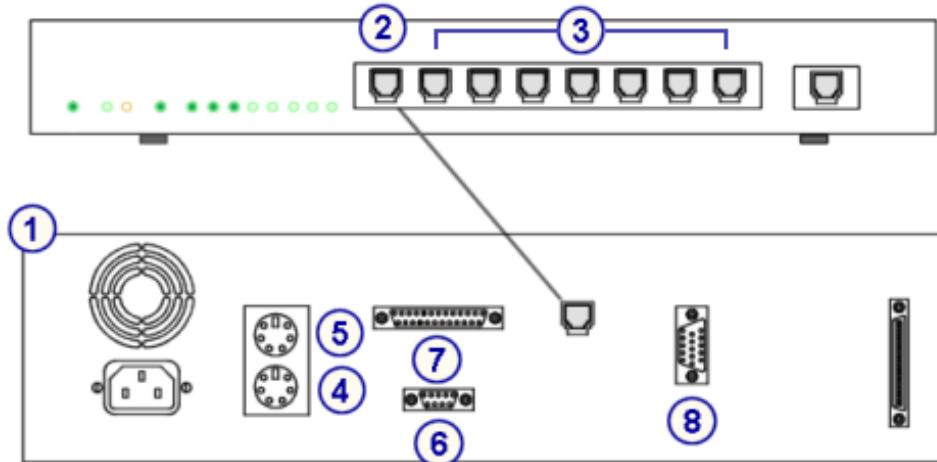
- *Network hub*, page 11
- *SCC optional components*, page 12

**Network hub**

The network hub is an external device that joins communication lines and enables the electronic transfer of information between the SCC (system control center) and processing module(s). Cables run from the hub to ethernet connectors on the back of the SCC and processing module(s).

Additional I/O (input/output) ports and connectors on the back panel of the CPU (central processing unit) provide connections to other external devices, such as a keyboard, mouse, printer, and monitor.

**Figure 2.6: Network hub**



1. CPU (central processing unit – rear view): Provides the I/O (input/output) ports and connectors for external devices. <b>NOTE:</b> Upgrades to the computer hardware may change the location of CPU components.	2. Ethernet connector: Provides the physical connection between the network hub and the SCC and allows communication between the SCC and the processing module(s).
3. Ethernet connectors: Provides the physical connection between the network hub and each module, and allows communication between the processing module(s) and the SCC.	4. Scanner and keyboard connector: Provides the connection for the bar code scanner and keyboard.
5. Mouse connector: Provides the connection for the mouse.	6. Com1 port: Provides the connection for the touch-screen interface
7. Printer port: Provides the connection for the printer.	8. Video connector: Provides the connection for the monitor.

## SCC optional components

Optional components available for the SCC (system control center) include:

- Printer – provides a hard copy of test results and printed reports.
- Bar code scanner – provides a convenient means of scanning sample bar codes to allow positive sample identification.
- UPS (uninterruptible power supply) – provides a temporary, continuous flow of power to the CPU (central processing unit) during a power failure, allowing you to save data as necessary and perform a correct shutdown procedure.

- External modem – connects the ARCHITECT® System to a telephone line, which allows communication with Abbott personnel for training and troubleshooting purposes.
- Cart – supports the SCC components.
- Speakers – provide audio output.

## **ARCHITECT® System software**

ARCHITECT® System software is the computer program or set of computer instructions that interprets system and assay information, calculates results, and provides the interface for controlling the system hardware.

System software topics include:

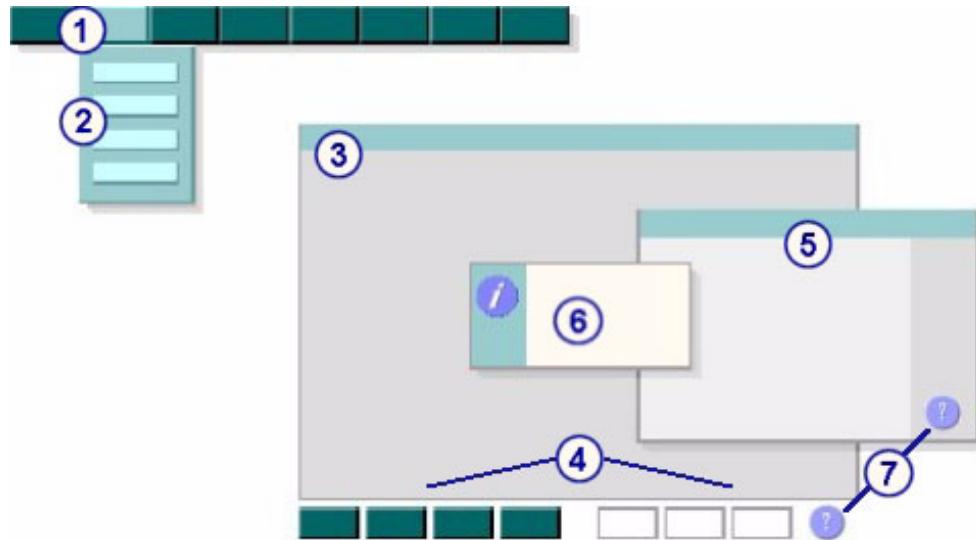
- *Software interface description*, page 13
- *Software navigation*, page 19
- *Snapshot screen*, page 20

### **Software interface description**

The software interface is the portion of the computer program with which you interact by making selections and entering information. The interface provided by the ARCHITECT® System software is a GUI (graphical user interface), which is a type of display format. A GUI allows you to initiate commands or make choices by selecting icons, buttons, items from lists, and so forth. You can use the mouse, touch-screen monitor, and/or keyboard to make your selections.

The software interface is common between all ARCHITECT® Systems.

Figure 2.7: Software interface layout



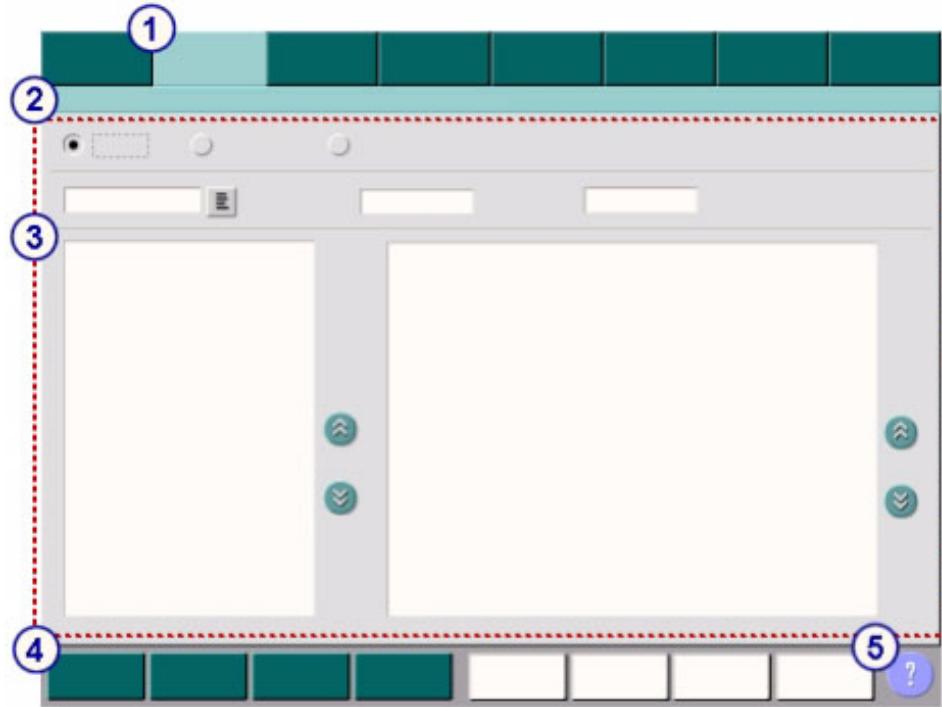
1. Icons: Represent a category of screens. When you select an icon, its color changes from green to blue and a menu displays below the icon.	2. Menu: Lists the available screens for the selected category (icon). When you select a menu item, the associated screen displays.
3. Screen: Provides access to all related system information and functions.	4. Function bar buttons: Allow you to perform actions associated with the active screen and correspond to the function keys on the keyboard. Some may be unavailable until you make a selection on the screen.
5. Window: Provides additional details or functions related to the active screen.	6. Message or prompt: Provides informational or error messages that allow you to complete a procedure or address the current situation.
7. Help button: Provides access to context-sensitive Help for the active screen, window, or error message.	

## Screens

When you select an icon, and then a menu item, the associated screen displays. This screen is considered the active screen and provides access to all related system information and functions.

A screen can have different views (information displays) based on module type and your onscreen selections.

*Figure 2.8: Example of a screen*

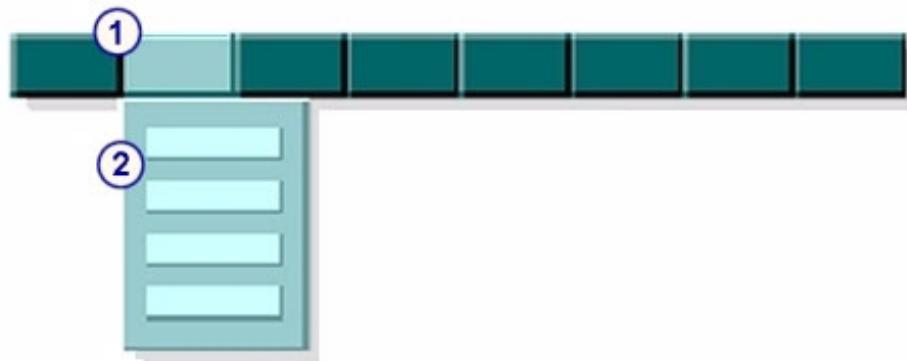


1. Icons: Provide access to a menu that lists related screens.	2. Title bar: Identifies the active screen.
3. Information area: Displays data and allows you to make selections and/or enter information to perform various functions.	4. Function bar buttons: Allow you to perform actions associated with the active screen and correspond to the function keys on the keyboard. Some may be unavailable until you make a selection on the screen.
5. Help button: Provides access to context-sensitive Help for the active screen, window, or error message.	

### Icons and menus

Icons and menus are the navigational elements that allow you to display specific screens. Additionally, icons serve as blinking indicators to inform you that a condition requires your attention.

Figure 2.9: Example of icons and a menu



- |  |   |
|--|---|
| 1. Icons: Represent a category of screens. When you select an icon, its color changes from green to blue and a menu displays below the icon. | 2. Menu: Lists the available items for the selected category (icon). When you select a menu item, the associated screen displays. |
|--|---|

NOTE: The SCC (system control center) keyboard is labeled to show the key equivalents for the icons.

Figure 2.10: Keyboard label



### Function bar buttons

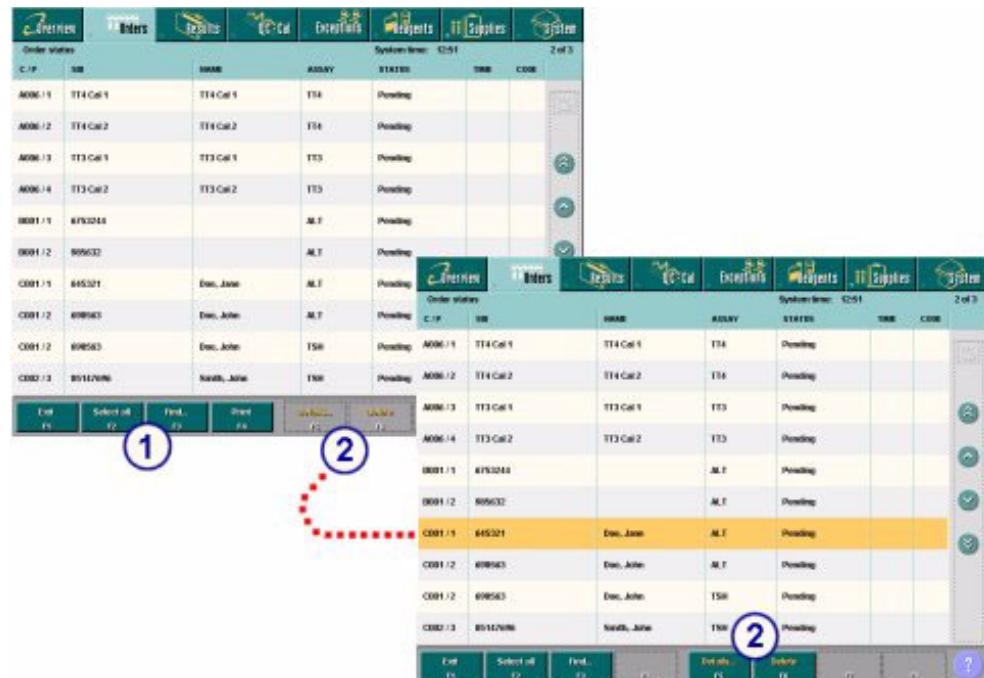
Function bar buttons are the buttons at the bottom of each screen that allow you to perform actions or access windows associated with the screen. They correspond to the function keys on the keyboard. You can use either the function bar buttons or the keyboard function keys.

There are two types of function bar buttons:

- Screen available – have white lettering and are always available (green background). For example, from the Order status screen you can always select F3 - Find.
- Context available – have yellow lettering and are available (green background) or unavailable (gray background) based on selections you make from the screen. For example, from the Order status screen you can only select the F5 - Details function key after you select an order.

## Section 2

*Figure 2.11: Screen and context function bar buttons*



- |  |   |
|--|---|
| <p>1. Screen available function bar buttons: Are always available for the active screen.</p> | <p>2. Unavailable context function bar buttons: Are available after you make a selection on the screen.</p> |
|--|---|

## Windows

Windows provide additional information or functions related to the active screen. You access windows by selecting a button on the screen. The window displays on top of, or in front of, the screen.

Figure 2.12: Example of a window



- |  |   |
|--|---|
| 1. Title bar: Identifies the active window.  | 2. Information area: Displays data and allows you to make selections and/or enter information to perform various functions. |
| 3. Help button: Provides access to context-sensitive Help for the active screen, window, or error message. |   |

## Messages

Messages provide important information during the course of normal system operation. They display in front of the currently displayed screen or window and require an acknowledgement. All interaction with the user interface is suspended as long as the message displays.

Figure 2.13: Example of a message



## Section 2

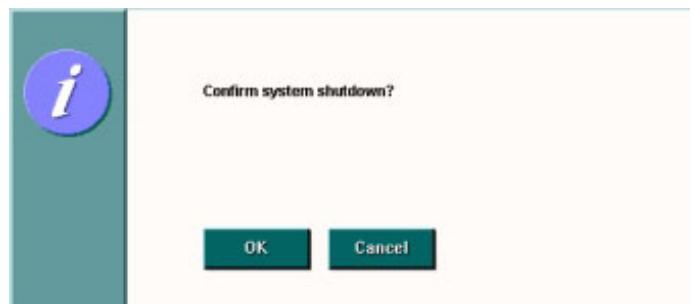
The type of message is indicated by one of two symbols at the left of the window.

	Caution: Indicates a condition that requires you to take corrective action as described in the text of the message.
	Information: Provides feedback or other useful information.

## Prompts

Prompts allow you to continue or cancel the requested operation. They display in front of the currently displayed screen or window and require a response. All interaction with the user interface is suspended as long as the prompt displays.

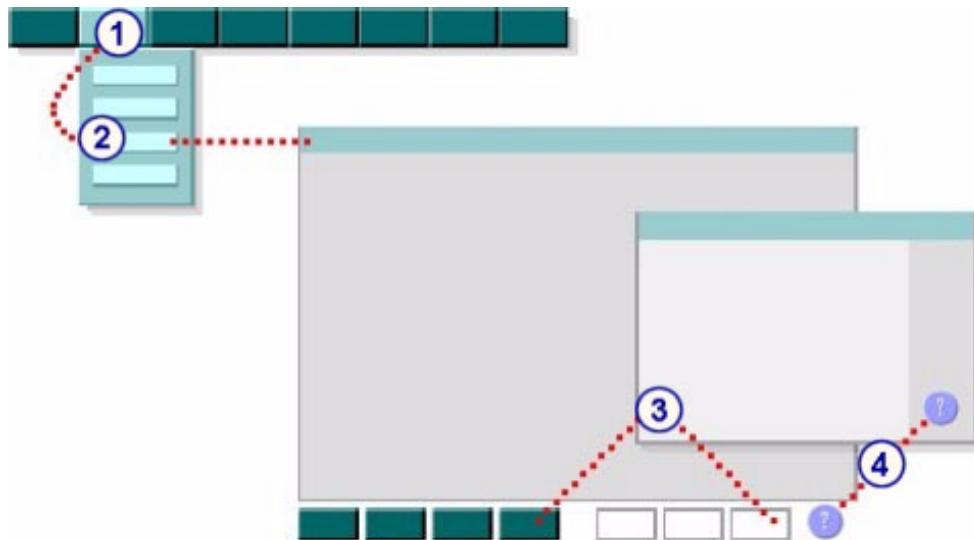
*Figure 2.14: Example of a prompt*



## Software navigation

The ARCHITECT® System software interface is designed to provide consistent and easy access to system information, software functions, and context-sensitive Help. You can navigate through the screens and windows by using the mouse (pointing device), touch-screen monitor, and/or keyboard.

Figure 2.15: Software navigation



- |  |  |
|--|--|
| 1. Select an icon to display a menu that lists related screens.  | 2. Select a menu item from the menu to display that screen.  |
| 3. Select a function bar button to perform an action or access a window associated with the screen.<br><b>NOTE:</b> Some function bar buttons may be unavailable until you make a selection on the screen. | 4. Select the help button to access context-sensitive help for the screen, window, or error message. |

## Snapshot screen

From the Snapshot screen you can view key system information such as:

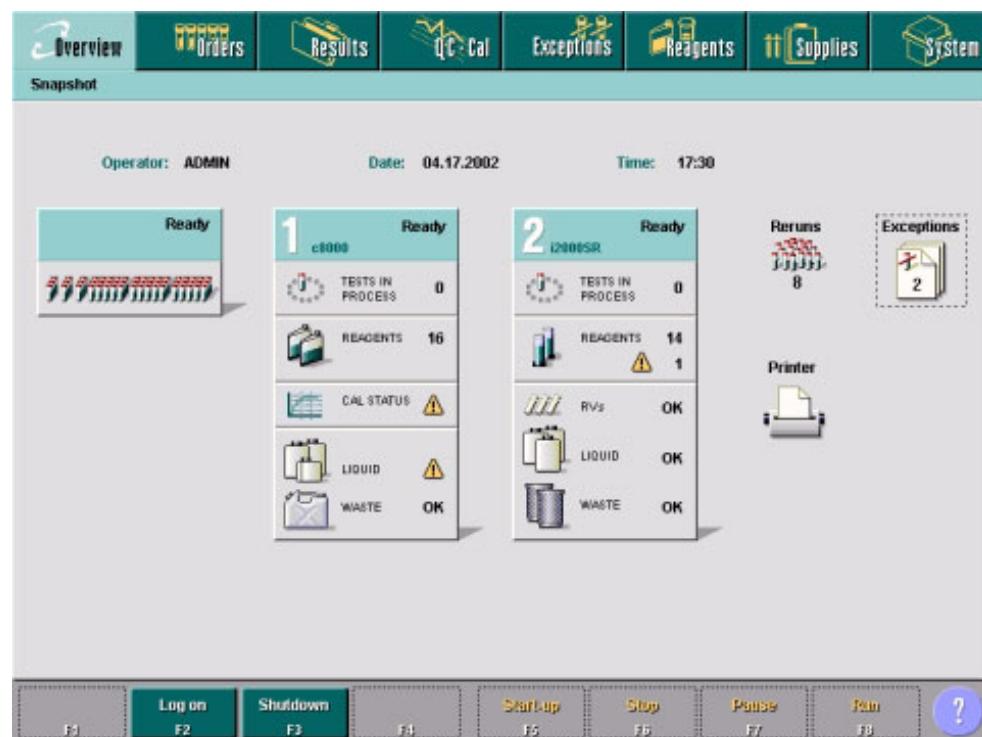
- Sample handler status – displays on the sample handler graphic.
- Processing module status – displays on the processing module graphic(s).
- Test processing status – displays on the order status button. You can select this button to display the Order status screen.
- Reagent status – displays on the reagent status button. You can select this button to display the Reagent status screen.
- Calibration curve status (*c* System) – displays on the calibration status button. You can select this button to display the Calibration status screen.
- Supply and waste status – displays on the supply status button (*c* System) or the supply status button (*i* System). You can select this button to display the Supply status screen.
- Number of orders pending rerun – displays on the Reruns status button. You can select this button to display the Rerun status screen.

## Section 2

- Number of exceptions pending review – displays on the Exceptions status button. You can select this button to display the Exception status screen.

Additionally, the Printer, LIS, ARM, and LAS status buttons display if your system is configured with these optional components. A caution symbol indicates a condition that requires attention.

**Figure 2.16: Snapshot screen**



To display this screen, see *Access the Snapshot screen*, page 21.

### Related procedures...

- Log on (general operator)*, page 23
- Log on (system administrator)*, page 23
- Log off*, page 25

### Access the Snapshot screen

Perform this procedure to display the Snapshot screen.

<b>Prerequisite</b>	NA
<b>Module status</b>	Any
<b>User access level</b>	General operator
<b>Supplies</b>	NA

To access the Snapshot screen:

Select **Overview** from the menu bar, and then select **Snapshot**.

The Snapshot screen displays. The information is dependent on your system configuration and test processing status.

**Related information...**

- *Snapshot screen*, page 20
- *Sample handler status*, page 103
- *Processing module status*, page 107

**Window – Snapshot screen**

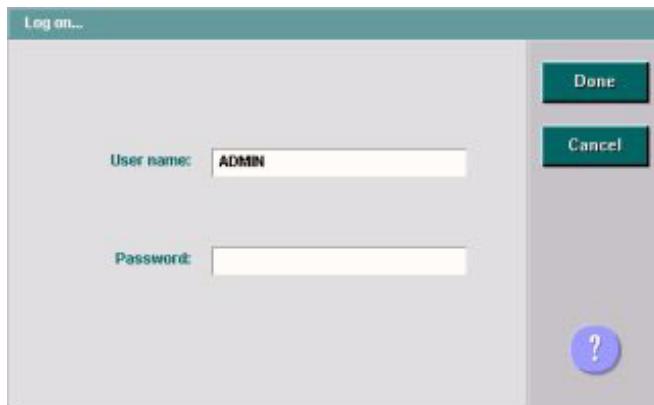
The window you can access from the Snapshot screen is the *Log on window*, page 22.

**Log on window**

From the Log on window, you can log on as:

- General operator – required to display your operator ID on printouts and reports
- System administrator – required to perform system configuration, specific diagnostic procedures, and approve the maintenance log

**Figure 2.17: Log on window**



**Related procedures...**

- *Log on (general operator)*, page 23
- *Log on (system administrator)*, page 23
- *Log off*, page 25

**User logon**

Logon is the process of signing in or gaining access to certain SCC (system control center) functionality. There are two types of logon:

- General operator – used to log on to the system so that your operator ID displays on printouts and reports

- Administrator – required to perform administrator functions such as configuring settings, performing specific diagnostic procedures, and approving the maintenance log

Additionally, Abbott area customer support may provide a user name and temporary password to operators who call for troubleshooting assistance. This logon authorizes selected functions in addition to those allowed by the system administrator logon.

### **Log on (general operator)**

Perform this procedure so that your operator ID displays on various screens and reports.

To log on as a system administrator, see *Log on (system administrator)*, page 23.

**NOTE:** Although you can run the system without logging on, you must log on if your operator ID is needed on system printouts and reports.

<b>Prerequisite</b>	Access the Snapshot screen, page 2-21
<b>Module status</b>	Any
<b>User access level</b>	General operator
<b>Supplies</b>	N/A

To log on (general operator):

1. Select **F2 - Log on** on the Snapshot screen.

The Log on window displays.

2. Type your operator ID in the **User name** data entry box (maximum of 12 alphanumeric characters).

3. Select **Done** to log on.

Your operator ID displays in the upper left-hand corner of the Snapshot screen.

#### **Related information...**

- *User logon*, page 22
- *Snapshot screen*, page 20
- *Log on window*, page 22

### **Log on (system administrator)**

Perform this procedure to complete system administrator functions such as configuring settings, performing specific diagnostic procedures, and approving the maintenance log.

To log on as a general operator, see *Log on (general operator)*, page 23.

To change the system administrator password, see *Change the system administrator password*, page 24.

<b>Prerequisite</b>	Access the Snapshot screen, page 2-21
<b>Module status</b>	Any
<b>User access level</b>	System administrator
<b>Supplies</b>	NA

To log on (system administrator):

1. Select **F2 - Log on** on the Snapshot screen.  
The Log on window displays.
2. Type ADMIN (all capital letters) in the **User name** data entry box.
3. Type the system administrator password in the **Password** field.
4. Select **Done** to log on.

ADMIN displays in the upper left-hand corner of the Snapshot screen.

**Related information...**

- *User logon*, page 22
- *Snapshot screen*, page 20
- *Log on window*, page 22

### **Change the system administrator password**

Perform this procedure to configure a new system administrator password.

<b>Prerequisite</b>	Access the Configuration screen – System settings view, page 3-21
<b>Module status</b>	Stopped, Warming, or Ready
<b>User access level</b>	System administrator
<b>Supplies</b>	NA

To change the system administrator password:

1. Select **Password** from the **System categories** list on the Configuration screen.
2. Select **F6 - Configure**.  
The Configure password window displays.
3. Enter the new password in the **System administrator password** data entry box.

4. Enter the new password in the **System administrator password** confirm data entry box to confirm the new password.
5. Select **Done** to save your changes.

**Log off**

Perform this procedure to log off if you are currently logged on to the system.

<b>Prerequisite</b>	Access the Snapshot screen, page 2-21
<b>Module status</b>	Any
<b>User access level</b>	Any
<b>Supplies</b>	NA

To log off:

1. Select **F2 - Log on** on the Snapshot screen.  
The Log on window displays.
2. Press the **Delete** key on the keyboard to delete the user name.
3. Select **Done** to log off.
4. Verify that a logon identifier does not display in the upper left-hand corner of the Snapshot screen.

**Related information...**

- *User logon*, page 22
- *Snapshot screen*, page 20
- *Log on window*, page 22

**NOTES**

## Processing modules

Processing modules perform all sample processing activities from aspiration to final read.

Unless otherwise indicated, the term processing module is used generically throughout this documentation to refer to all types.

Processing module topics include:

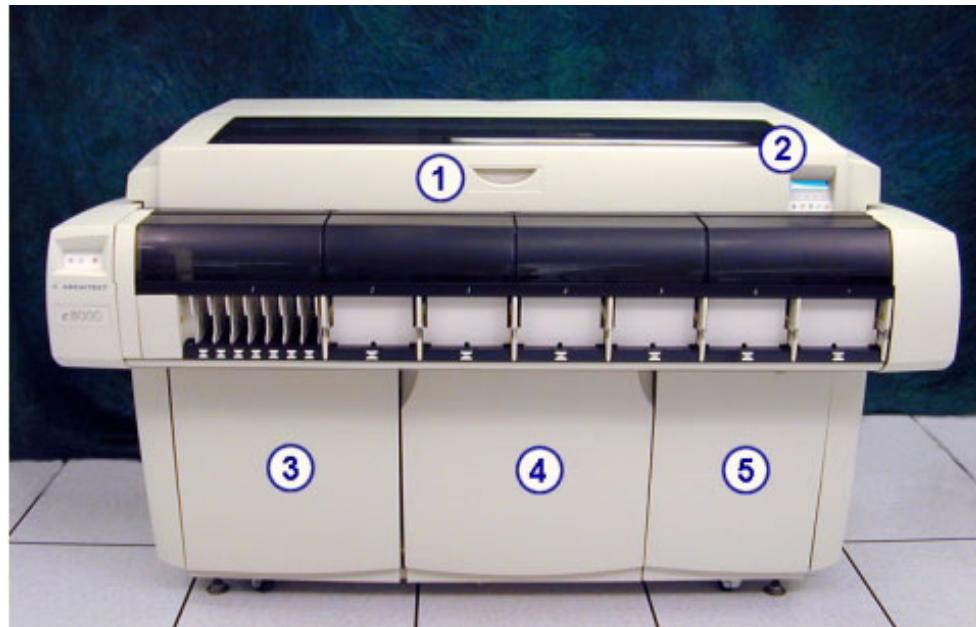
- *Processing module (c 8000)*, page 27
- *Processing modules (ARCHITECT® i System)*, page 48

### Processing module (c 8000)

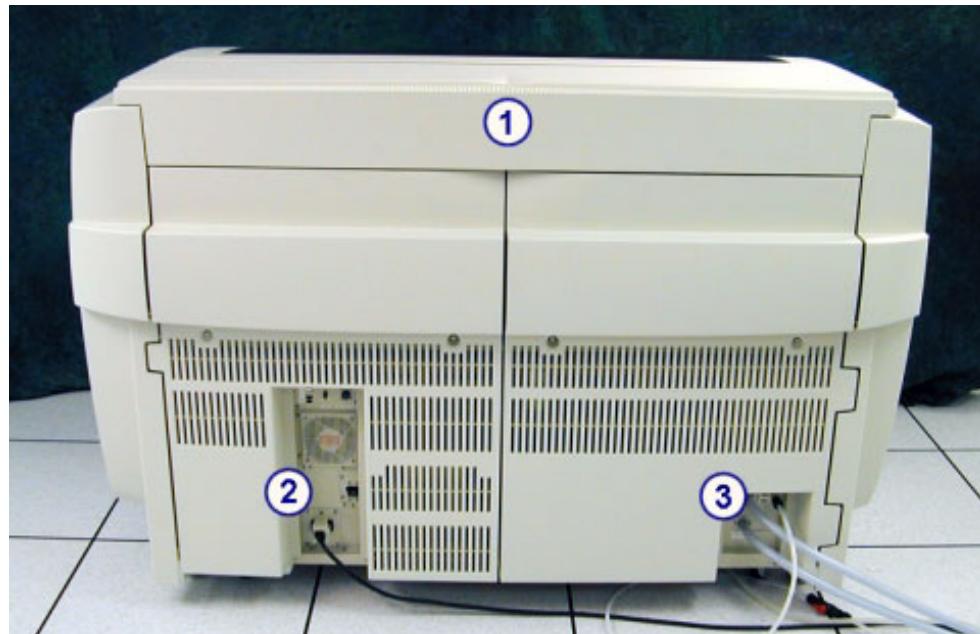
The *c 8000*™ processing module is a chemistry analyzer that performs sample processing. It processes up to 800 photometric and 600 potentiometric tests per hour making use of up to 56-65 onboard reagents in two temperature-controlled reagent supply centers.

For the *c 8000*™ processing module, the sample handler configuration is the retest sample handler, which automatically positions samples for retest.

Figure 2.18: c 8000™ processing module (front view)



1. Front processing center cover: Provides access to the components that perform assay processing activities.	2. Processing module keypad: Provides a local user interface for controlling the processing center.
3. Supply center door: Provides access to the bulk storage supply center.	4. Pump center door: Provides access to the pump center.
5. Card cage door: Provides access to the card cage.	

*Figure 2.19: c 8000™ processing module (rear view)*

- |   |  |
|---|--|
| 1. Rear processing center cover:<br>Provides access to the components that perform assay processing activities. | 2. Main power supply: Provides power to the processing module. |
| 3. Water management unit: Provides the water supply connection.   |  |

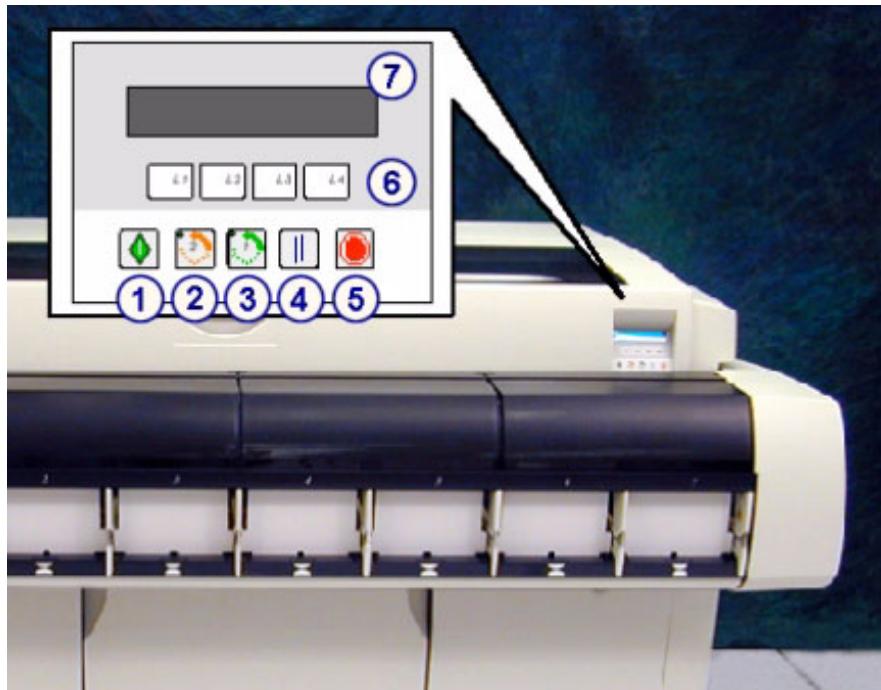
***Related information...***

- *Processing center (c System)*, page 30
- *Bulk solution supply center (c System)*, page 46
- *Optional components (c 8000™ processing module)*, page 47
- *ARCHITECT® ci 8200™ integrated system*, page 3
- *ARCHITECT® c 8000™ System*, page 4

**Processing module keypad (c System)**

The processing module keypad, located on the right side of the processing module, is an input device used by the operator to direct the processing center activities.

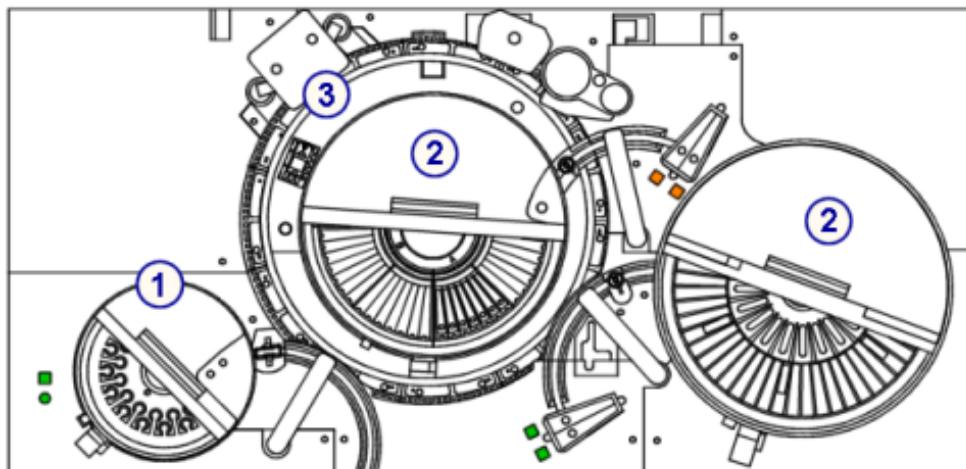
*Figure 2.20: Components of the c 8000™ processing module keypad*



<p>1. Run key:</p> <ul style="list-style-type: none"> <li>– Places the processing module into a Running status and prepares the module to accept samples.</li> <li>– Restarts the processing center after a Scheduled Pause.</li> </ul>	<p>2. Carousel advance key (2): Aligns, if necessary, and then advances reagent supply center 2 by 1/3 turn to aid in loading and unloading reagents. The LED illuminates when access to the reagent supply center is allowed.</p>
<p>3. Carousel advance key (1): Aligns, if necessary, and then advances reagent supply center 1 by 1/3 turn to aid in loading and unloading reagents. The LED illuminates when access to the reagent supply center is allowed.</p>	<p>4. Pause key: Places the processing module into a Scheduled Pause status and stops aspiration of new tests. Tests already in progress continue to completion.</p>
<p>5. Stop key: Stops all processing module activity, but does not shut down power to the processing module.</p>	<p>6. L1, L2, L3, L4 keys: Used when performing some diagnostic and maintenance procedures.</p>
<p>7. Display area: Displays text during some maintenance and diagnostic procedures.</p>	

## Processing center (c System)

The processing center is the main activity area of the processing module. Samples and reagents are dispensed and mixed in a reaction carousel where assay processing is performed.

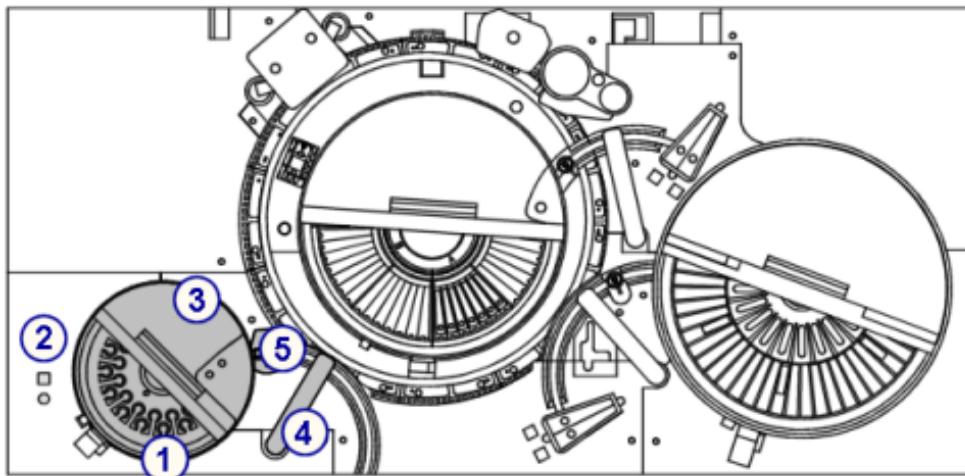
*Figure 2.21: ARCHITECT® c System processing center components*

- |   |  |
|---|--|
| <ul style="list-style-type: none"><li>1. Sample hardware components:<br/>Provide sample aspiration,<br/>dispense, and positive identification.</li><li>3. Reaction carousel hardware<br/>components: Position the cuvettes<br/>for sample and reagent aspiration,<br/>mixing, photometric or<br/>potentiometric analysis, and cuvette<br/>cell washing.</li></ul> | <ul style="list-style-type: none"><li>2. Reagent hardware components:<br/>Provide reagent aspiration,<br/>dispense, and positive identification.</li></ul> |
|---|--|

### **Sample hardware components (c System)**

Sample hardware components are devices that provide sample aspiration, dispense, and positive identification.

*Figure 2.22: Sample hardware components*



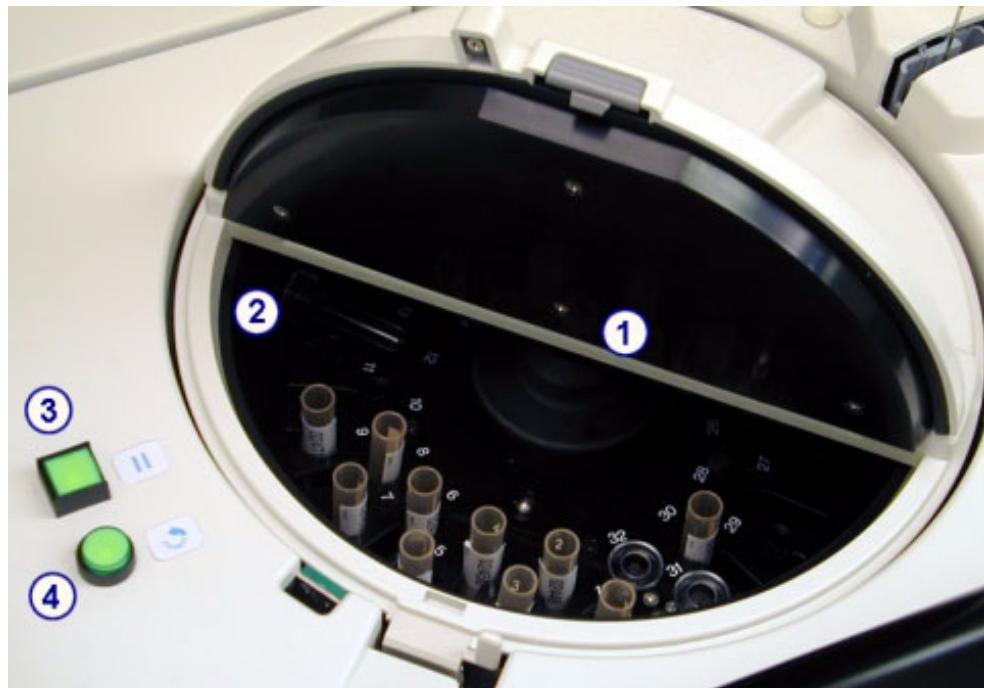
1. Sample carousel: Used for loading patient samples, calibrators and controls.	2. Indicator lights: Used to access and advance the sample carousel.
3. Sample bar code reader: Reads the carousel ID and sample ID.	4. Sample pipettor: Aspirates and dispenses samples into cuvettes.
5. Sample probe wash cup: Used to wash remaining fluid from the probe exterior, interior, and tip.	

#### ***Sample carousel (c System)***

The sample carousel is a local sample handler with 32 refrigerated positions used for loading clinical chemistry patient samples, calibrators, and controls. Positions 31 and 32 are reserved for onboard solutions that are used in maintenance procedures.

Samples can be loaded in tubes and sample cups. Patient samples and controls in tubes can be bar code labeled to provide positive identification. Bar codes cannot be used for calibrator samples.

In the event of RSH (retest sample handler) failure, the sample carousel can be used as the primary area for loading clinical chemistry samples. Under normal operating conditions when both the sample carousel and the RSH are functional, samples on the carousel take priority over those on the RSH.

**Figure 2.23: Sample carousel and indicator lights**

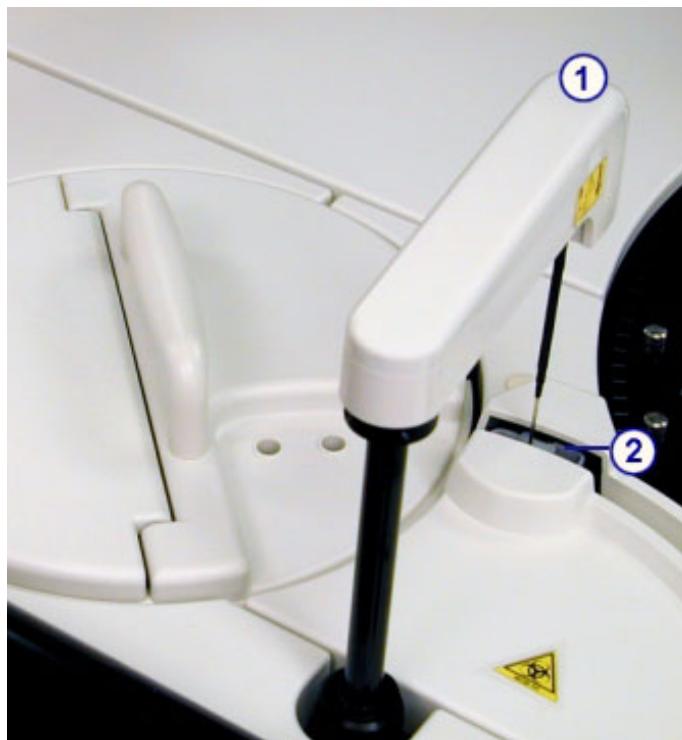
1. Sample carousel: Used for loading patient samples, calibrators and controls.	2. Sample bar code reader: Reads the carousel ID and bar coded labels on samples.
3. Sample carousel access indicator (square): Indicates when you can access the sample carousel and provides a method to pause. When the access indicator light is: <ul style="list-style-type: none"><li>- Off – the sample carousel is moving and cannot be accessed</li><li>- Blinking – the access indicator has been pressed and the sample carousel is in the process of pausing</li><li>- On – the sample carousel can be accessed</li></ul>	4. Sample carousel advance indicator (round): Indicates when you can advance the sample carousel. When the advance indicator light is: <ul style="list-style-type: none"><li>- On – the sample carousel can be advanced</li><li>- Off – the advance indicator button has been pressed and the sample carousel is in the process of advancing a 1/3 rotation or the sample carousel is closed</li></ul>

***Sample pipettor and sample probe wash cup (c System)***

The sample pipettor is a device that detects, aspirates, transfers, and dispenses samples into the cuvettes. It also transfers diluted samples from the cuvette used to make the dilution into the cuvette used for the reaction. This pipettor assembly includes a fluid sense/pressure monitoring system that helps to identify errors in aspiration.

The sample probe wash cup is a passive wash station used to wash any remaining fluid from the probe exterior, interior, and tip. The sample probe is washed between samples to eliminate carryover.

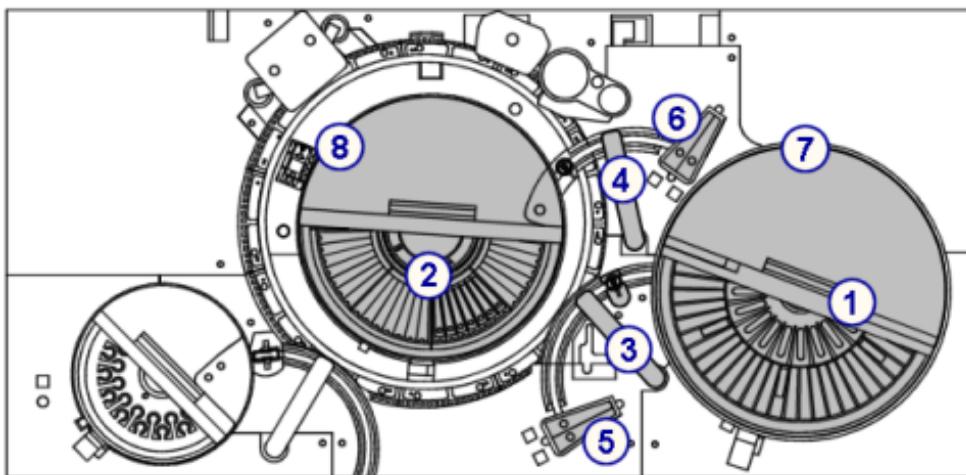
*Figure 2.24: Sample pipettor and sample probe wash cup*



- |  |  |
|--|--|
| 1. Sample pipettor: Aspirates and dispenses samples into cuvettes. | 2. Sample probe wash cup: Washes remaining fluid from the probe exterior, interior, and tip. |
|--|--|

### **Reagent hardware components (c System)**

Reagent hardware components are devices that provide reagent aspiration, dispense, and positive identification.

**Figure 2.25: Reagent hardware components**

1. Reagent supply center 1 (R1): Provides refrigerated storage for reagent kits and diluents.	2. Reagent supply center 2 (R2): Provides refrigerated storage for reagent kits and onboard solutions.
3. Reagent pipettor 1 and wash cup: Pipettor aspirates and dispenses reagents into cuvettes. Wash cup washes the probe exterior, interior, and tip.	4. Reagent pipettor 2 and wash cup: Pipettor aspirates and dispenses reagents into cuvettes. Wash cup washes the probe exterior, interior, and tip.
5. R1 onboard solution area: Holds probe wash solutions for the SmartWash™ function and maintenance procedures.	6. R2 onboard solution area: Holds probe wash solutions for the SmartWash™ function and maintenance procedures.
7. R1 bar code reader: Reads 2D (two-dimensional) bar code labels on reagent cartridges.	8. R2 bar code reader: Reads 2D (two-dimensional) bar code labels on reagent cartridges.

***Reagent supply centers (c System)***

Reagent supply centers (R1 and R2) are refrigerated reagent carousels for onboard storage of reagent kits and sample diluents. These reagent supply centers and their associated reagent pipettors are separately controlled to allow reagents to be independently aspirated and dispensed by each reagent pipettor.

Reagent supply center 1 consists of an inner and outer carousel that is segmented to store a maximum of 56 - 65 reagent cartridges depending on the configuration of the segments.

Reagent supply center 2 consists of one carousel that is segmented to store a maximum of 36 - 56 reagent cartridges depending on the configuration of the segments.

Reagents can be bar code labeled to provide positive identification.

*Figure 2.26: Temperature-controlled reagent supply centers*

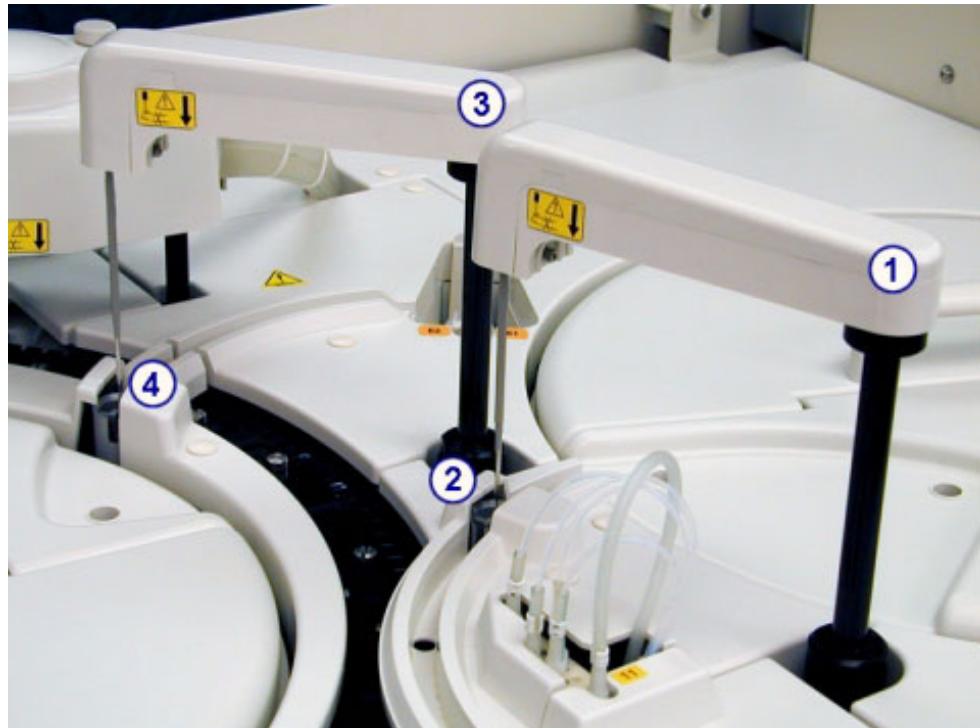


- |  |   |
|--|---|
| 1. Reagent supply center 1 (R1):<br>Provides onboard storage for<br>reagent kits and diluents. | 2. Reagent supply center 2 (R2):<br>Provides onboard storage for<br>reagent kits. |
|--|---|

***Reagent pipettors and wash cups (c System)***

Reagent pipettors 1 and 2 are devices that detect, aspirate, transfer, and dispense reagents into the cuvette. Reagent pipettor 1 also transfers sample diluents from reagent supply center 1 into a cuvette to be used for onboard sample dilution.

Reagent pipettor wash cups are active wash stations that wash any remaining fluid from the probe exterior, interior, and tip.

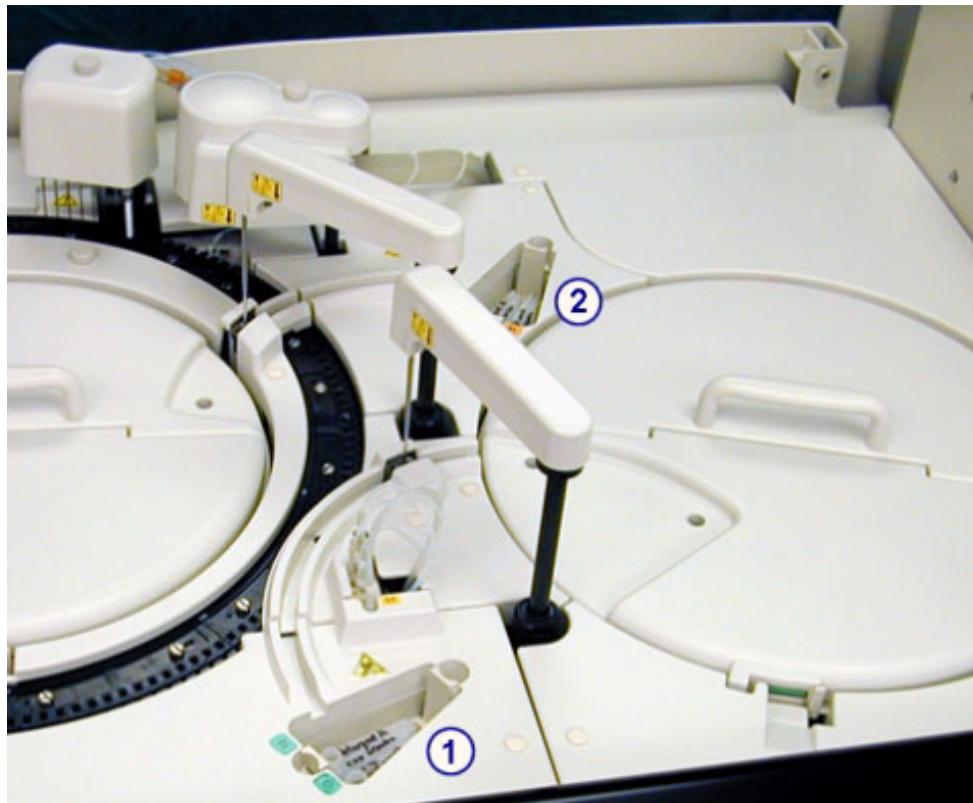
*Figure 2.27: Reagent pipettors and wash cups*

1. Reagent pipettor 1: Aspirates and dispenses reagents into cuvettes.	2. Reagent pipettor 1 wash cup: Washes the probe exterior, interior, and tip.
3. Reagent pipettor 2: Aspirates and dispenses reagents into cuvettes.	4. Reagent pipettor 2 wash cup: Washes the probe exterior, interior, and tip.

***Onboard solution areas (c System)***

Reagent onboard solution areas are storage locations for probe wash solutions, which are used for the SmartWash™ function and maintenance procedures. A rack within each area holds two 90 mL cartridges in positions E1 and E2.

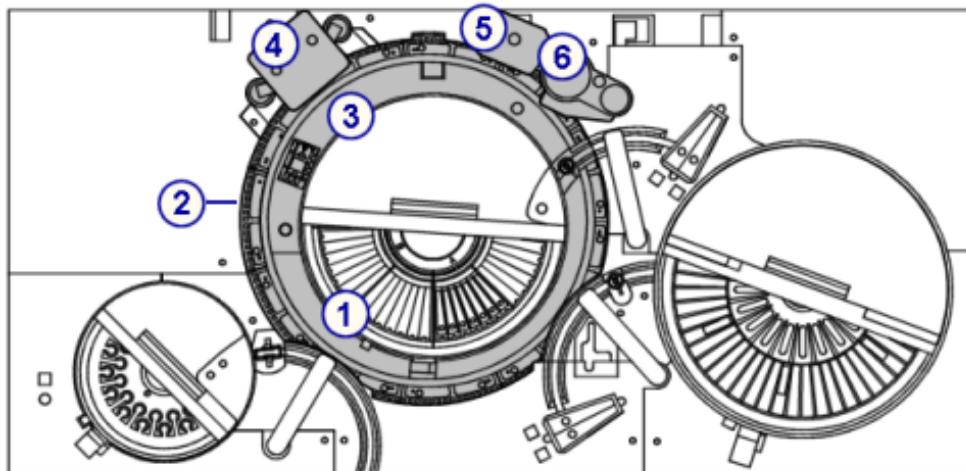
*Figure 2.28: Onboard solution areas*



- |  |  |
|--|--|
| 1. Reagent supply center 1 (R1)<br>onboard solution area: Holds probe wash solutions for the SmartWash™ function and maintenance procedures. | 2. Reagent supply center 2 (R2)<br>onboard solution area: Holds probe wash solutions for the SmartWash™ function and maintenance procedures. |
|--|--|

### **Reaction carousel hardware components (c System)**

Reaction carousel hardware components are devices that position the cuvettes for sample and reagent aspiration, mixing, photometric or potentiometric analysis, and cuvette washing.

**Figure 2.29: Reaction carousel hardware components**

1. Reaction carousel: Positions the cuvettes for sample processing.	2. Cuvette segments: Hold cuvettes in the reaction carousel.
3. Lamp: Measures the intensity of a photometric reaction.	4. Mixer unit: Houses the mixers that mix sample with reagent.
5. Cuvette washer: Washes and dries the cuvettes.	6. ICT unit: Measures potentiometric assays (electrolytes) using ICT (integrated chip technology).

***Reaction carousel (c System)***

The reaction carousel is a device that:

- Accommodates a variety of assay protocols
- Consists of 11 cuvette segments
- Is surrounded by a 37°C water bath
- Rotates counter-clockwise to position the cuvettes at the following locations:
  - Sample dispense
  - R1 reagent dispense
  - R2 reagent dispense
  - ICT electrolyte aspiration
  - Mixing positions (2)
  - Photometric read position
  - Diluted sample aspiration

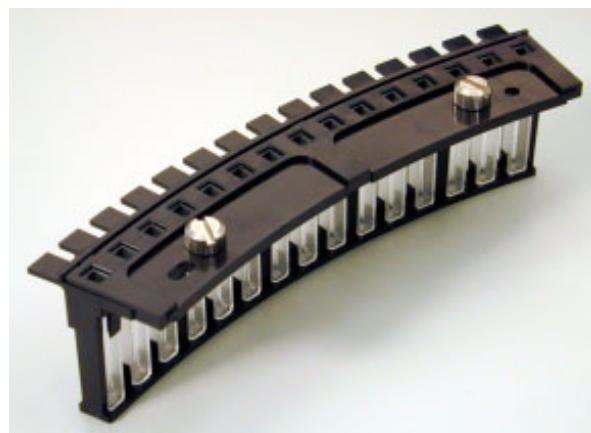
*Figure 2.30: Reaction carousel*



***Cuvette segments (c System)***

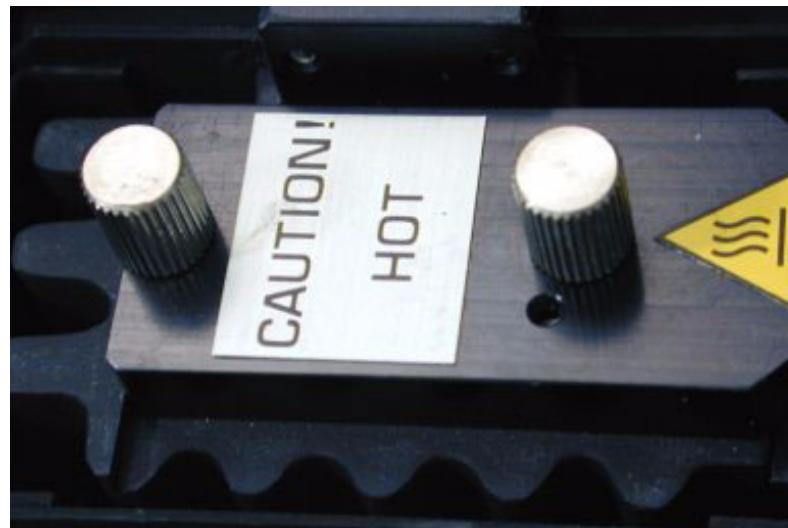
Cuvette segments are racks that sit in the reaction carousel and hold cuvettes. Each cuvette segment holds 15 cuvettes. With 11 segments, the reaction carousel can hold 165 cuvettes.

*Figure 2.31: Cuvette segment*



***Lamp (c System)***

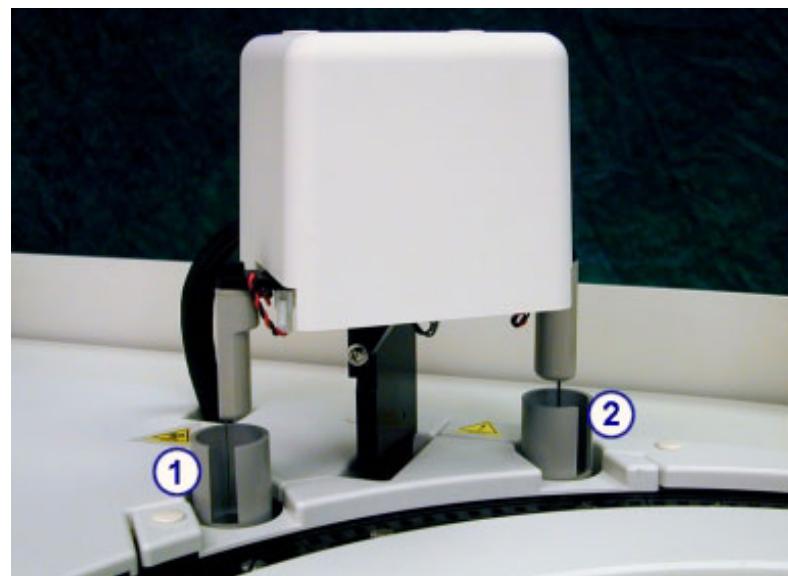
The lamp is an optical device used to provide the light source for photometric measurement.

*Figure 2.32: Lamp****Mixer unit (c System)***

The mixer unit is a device that houses two mixers (1 and 2) that mix the sample and reagent together.

- Mixer 1 (left side) mixes the sample (undiluted or diluted) with reagent 1.
- Mixer 2 (right side) mixes the sample/reagent 1 mixture with reagent 2.

The exterior of each mixer is washed after each mixing operation.

*Figure 2.33: Mixer unit and mixers*

- |  |  |
|--|--|
| 1. Mixer 1: Mixes the sample with reagent 1. | 2. Mixer 2: Mixes the sample/reagent 1 mixture with reagent 2. |
|--|--|

**Cuvette washer (c System)**

The cuvette washer is a device with eight nozzles that, from left to right, perform the following functions before and after each cuvette is used:

- Nozzle 1 – aspirates sample and reagent mixture to waste
- Nozzle 2 – dispenses Alkaline Wash to clean the cuvette, and then aspirates it to waste
- Nozzle 3 – dispenses Acid Wash to clean the cuvette, and then aspirates it to waste
- Nozzles 4 and 5 – dispense water to rinse the cuvette, and then aspirate it to waste
- Nozzle 6 – dispenses water into the cuvette for the water blank measurement, which ensures cuvette integrity
- Nozzle 7 – aspirates the remaining water in the cuvette to waste
- Nozzle 8 – dries the cuvette

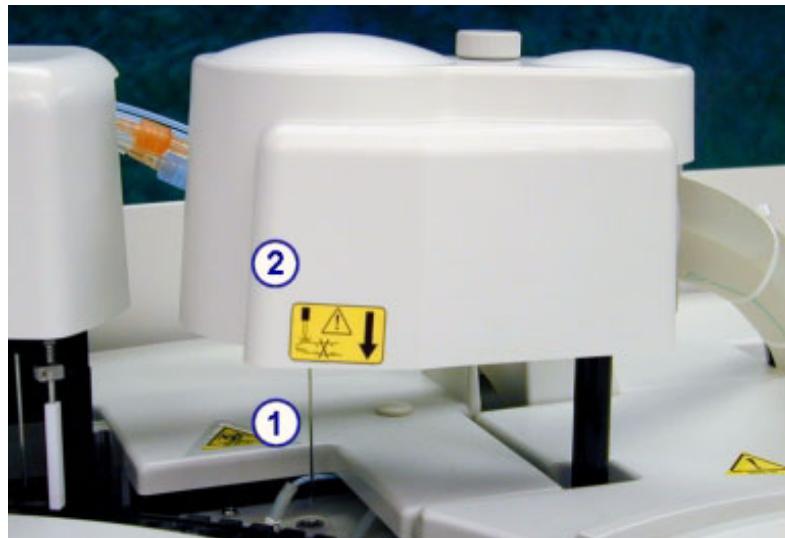
**Figure 2.34: Cuvette washer**



***ICT unit (c System)***

The ICT unit is a device that consists of the ICT probe and ICT module and is used to perform indirect potentiometric analysis. The ICT probe aspirates the sample. The ICT module simultaneously measures Na+, K+, and Cl- using integrated chip technology.

*Figure 2.35: ICT unit*

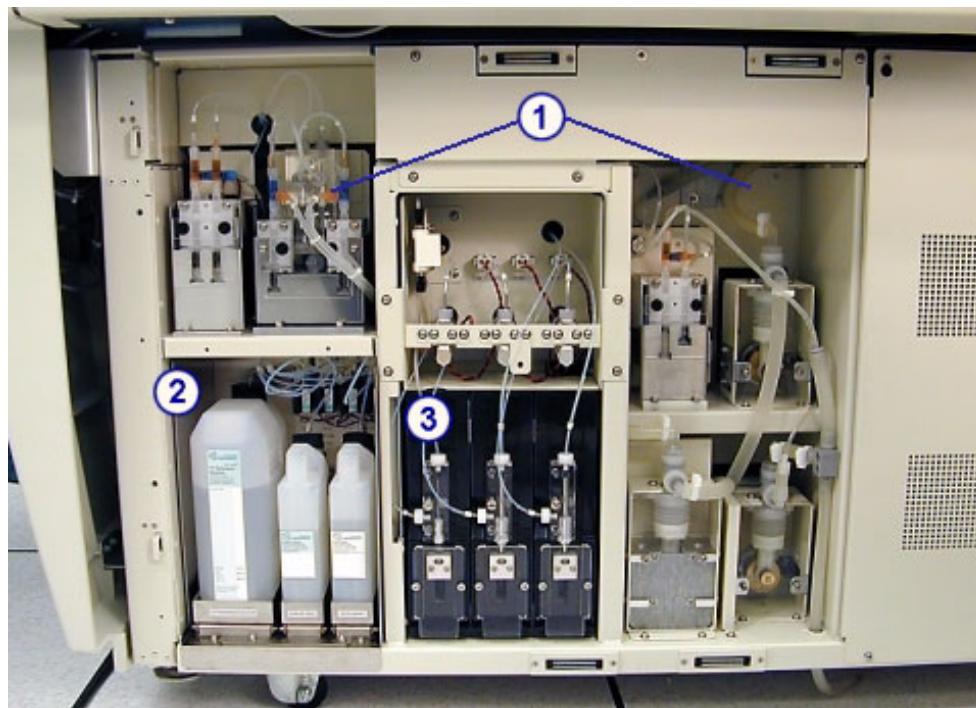


- |   |  |
|---|--|
| 1. ICT probe: Aspirates the sample or ICT reference solution into the ICT module. | 2. ICT module: Measures potentiometric assays (electrolytes) using ICT (integrated chip technology). |
|---|--|

## Supply and pump center (c System)

The supply and pump center is the storage area for processing module pumps, bulk solutions, and sample and reagent syringes and drives.

*Figure 2.36: Supply and pump center*

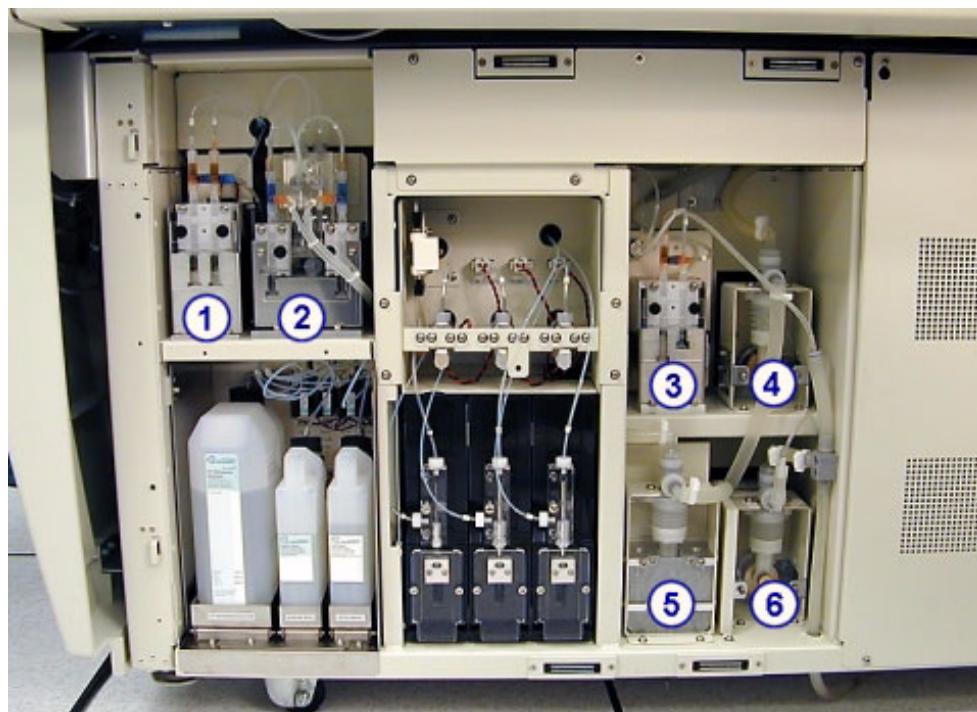


1. Pump center: Houses the processing module pumps.	2. Bulk solution supply center: Provides onboard storage for ICT Reference Solution, Alkaline Wash, and Acid Wash.
3. Sample and reagent syringes area: Houses the sample and reagent syringes and drives.	

**Pump center (c System)**

The pump center is the area that houses the processing module pumps. These pumps provide the pressure needed to aspirate and dispense liquids into the appropriate components in the processing center and to the sample and reagent syringes.

*Figure 2.37: Processing module pumps*



1. ICT reference solution pump: Aspirates ICT Reference Solution through the ICT reference solution pre-heater into the ICT reference solution cup, and then drains the cup when completed.	2. Wash solution pump: Delivers diluted alkaline and acid wash solutions to the cuvette washer to wash cuvettes during daily operation and maintenance procedures.
3. ICT aspiration pump: Aspirates samples or ICT reference solution into the ICT module for measurement, and then moves the waste into the water bath/waste overflow area.	4. Cuvette wash pump: Delivers Reagent Grade Type II water to the cuvette washer.
5. Probe wash pump: Uses Reagent Grade Type II water to flush the sample and reagent probes.	6. High-concentration waste pump: Works with the cuvette washer to aspirate waste from the cuvettes to the optional high concentration waste container or the drain.

### Bulk solution supply center (c System)

The bulk solution supply center is an onboard storage area for ICT Reference Solution, Alkaline Wash, and Acid Wash. The quantity of each bulk solution is verified by individual weight sensors. The sensor is tripped when the volume of the solution decreases to approximately 20% remaining.

*Figure 2.38: Bulk solution supply center*

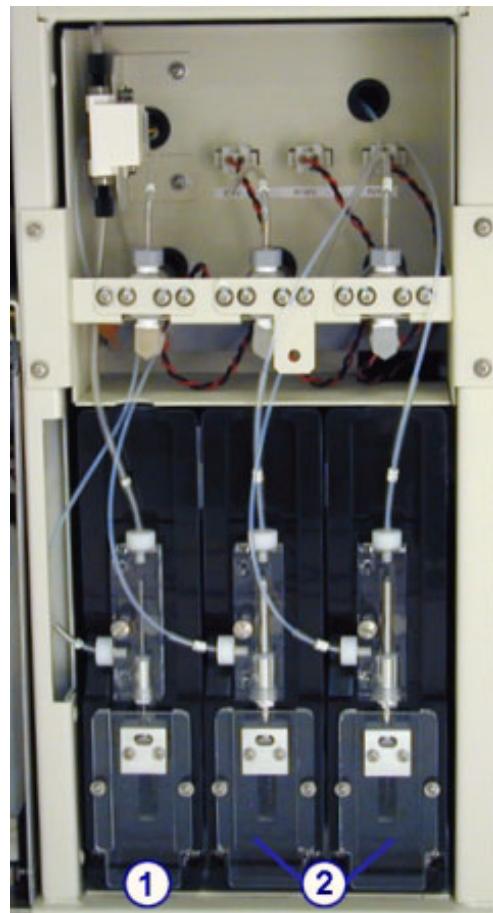


1. ICT Reference Solution: Aspirated and analyzed by the ICT module before and after each sample, to provide a reference concentration used to calculate results.	2. Alkaline Wash: Used by the cuvette washer to clean the cuvettes after sample analysis.
3. Acid Wash: Used by the cuvette washer to clean the cuvettes after sample analysis.	

**Sample and reagent syringe area (*c* System)**

The sample and reagent syringe area is the location for the sample and reagent syringes and drives. Each drive supports a syringe that controls the aspiration and dispense of samples or reagents.

*Figure 2.39: Sample and reagent syringes*



- |  |   |
|--|---|
| 1. Sample syringe: Aspirates and dispenses the sample. | 2. Reagent syringes 1 and 2: Aspirates and dispenses the reagent. |
|--|---|

**Optional components (*c* 8000™ processing module)**

Optional components for the *c* 8000™ processing module include:

- UPS (uninterruptible power supply) – provides a temporary, continuous flow of power to the processing module during a power failure.
- High-concentration waste container – collects the high-concentration liquid waste from the cuvettes and the ICT™ unit.

## **Processing modules (ARCHITECT® *i* System)**

The *i* System processing modules perform all sample processing activities from aspiration to final read. The two types of *i* System processing modules are:

- *i 2000® processing module*, page 48
- *i 2000SR™ processing module*, page 53

### ***i 2000® processing module***

An *i 2000®* processing module is an immunoassay analyzer that performs sample processing. It processes up to 200 CMIA (chemiluminescent microparticle immunoassay) tests per hour making use of up to 25 onboard reagent kits (100 and/or 500 tests) in a temperature-controlled reagent carousel.

The *i 2000®* processing module can be configured with either the SSH (standard sample handler) or LAS (laboratory automation system) carousel sample handler. The following illustrations show the:

- *i 2000® processing module (front view – SSH)*, page 49
- *i 2000® processing module (rear view – SSH)*, page 50
- *i 2000® processing module (front view – LAS carousel sample handler)*, page 51
- *i 2000® processing module (rear view – LAS carousel sample handler)*, page 52

*Figure 2.40: i 2000® processing module (front view – SSH)*



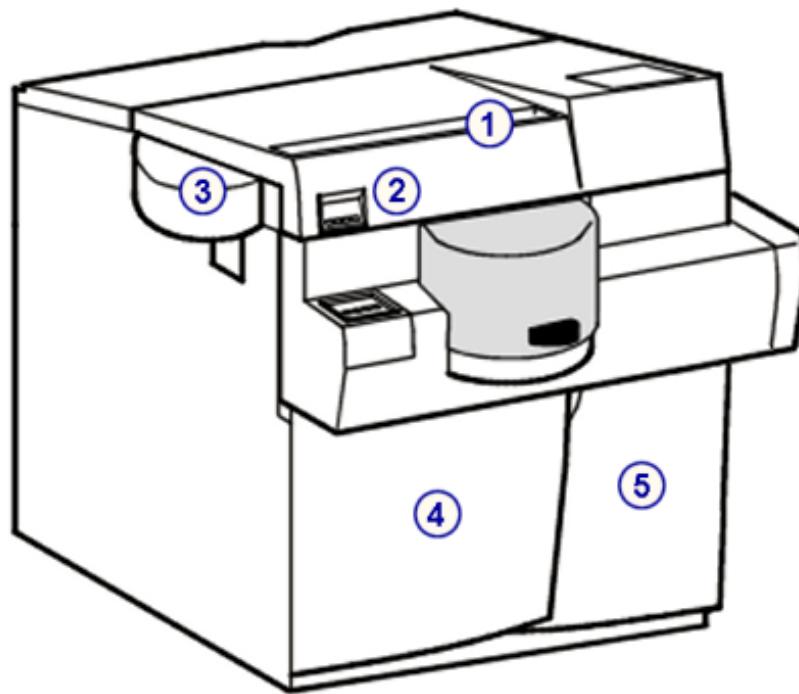
1. Front processing center cover: Provides access to the components that perform assay processing activities.	2. Processing module keypad: Provides a local user interface for controlling the processing center.
3. Supply and waste center door: Provides access to the bulk storage and solid waste storage area.	4. Card cage door: Provides access to the pump center.

*Figure 2.41: i 2000® processing module (rear view – SSH)*



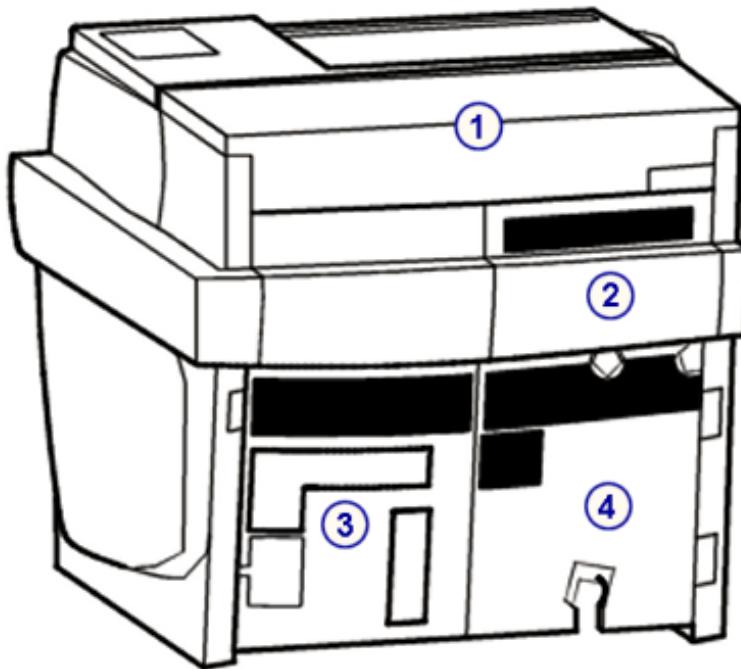
1. Rear processing center cover: Provides access to the components that perform assay processing activities.	2. Rear processing center access panel: Provides access to the processing center components.
3. Power supply panel: Provides access to the power supply components.	4. Pump bay panel: Provides access to the pumps and vacuum center.

*Figure 2.42: i 2000® processing module (front view – LAS carousel sample handler)*



1. Front processing center cover: Provides access to the components that perform assay processing activities.	2. Processing module keypad: Provides a local user interface for controlling the processing center.
3. Sample pipettor cover: Covers the sample pipettor as it accesses samples on the LAS track.	4. Supply and waste center door: Provides access to the bulk storage and solid waste storage area.
5. Card cage door: Provides access to the card cage.	

*Figure 2.43: i 2000® processing module (rear view – LAS carousel sample handler)*



1. Rear processing center cover: Provides access to the components that perform assay processing activities.	2. Rear processing center access panel: Provides access to the processing center components.
3. Power supply panel: Provides access to the power supply components.	4. Pump bay panel: Provides access to the pumps and vacuum system.

**Related information...**

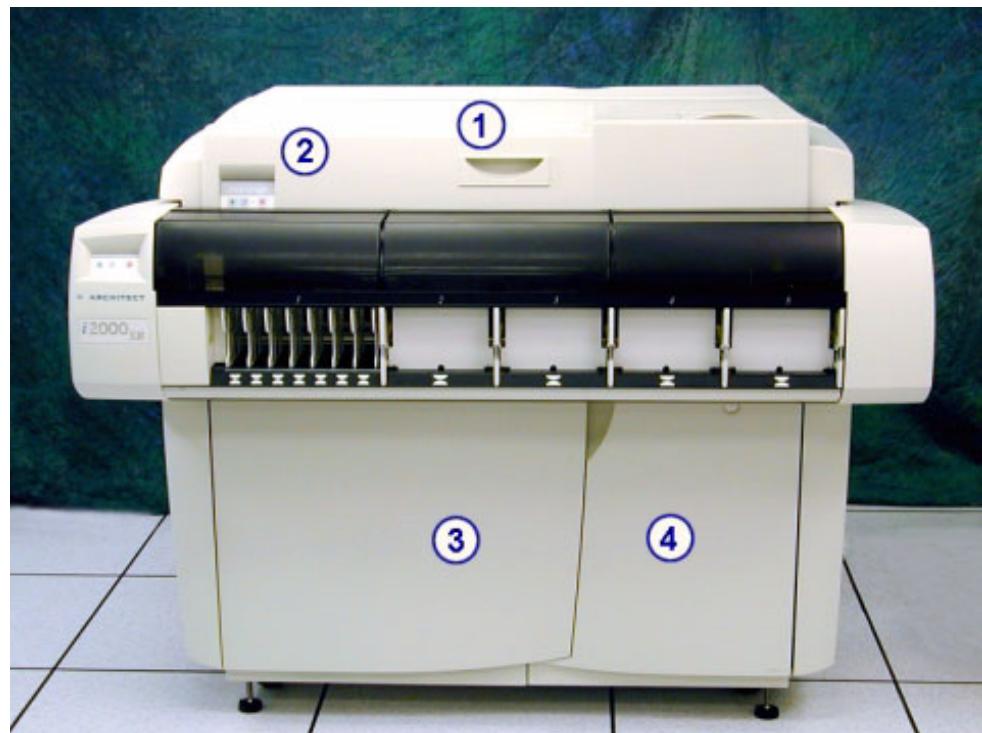
- *Processing module keypad (i System)*, page 55
- *Processing center (i System)*, page 56
- *Supply and waste center (i System)*, page 75
- *Optional components (i System)*, page 85
- *i 2000® System*, page 5

***i* 2000<sub>SR</sub><sup>TM</sup> processing module**

An *i* 2000<sub>SR</sub><sup>TM</sup> processing module is an immunoassay analyzer that performs sample processing. It processes up to 200 CMIA (chemiluminescent microparticle immunoassay) tests per hour making use of up to 25 onboard reagent kits (100 and/or 500 tests) in a temperature-controlled reagent carousel and provides stat processing.

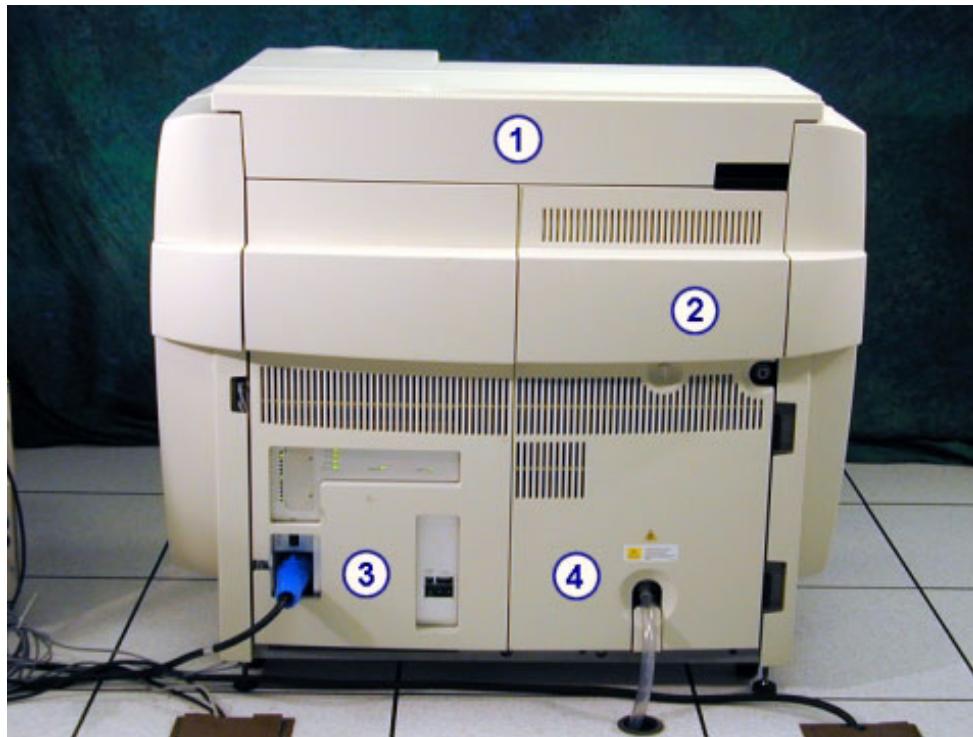
For the *i* 2000<sub>SR</sub><sup>TM</sup> processing module, the sample handler configuration is the retest sample handler, which automatically positions samples for retest.

**Figure 2.44: *i* 2000<sub>SR</sub><sup>TM</sup> processing module (front view – RSH)**



1. Front processing center cover: Provides access to the components that perform assay processing activities.	2. Processing module keypad: Provides a local user interface for controlling the processing center.
3. Supply and waste center door: Provides access to the bulk storage and solid waste storage area.	4. Card cage door: Provides access to the card cage.

Figure 2.45: *i* 2000<sub>SR</sub><sup>TM</sup> processing module (rear view – RSH)



1. Rear processing center cover: Provides access to the components that perform assay processing activities.	2. Rear processing center access panel: Provides access to the processing center components.
3. Power supply panel: Provides access to the power supply components.	4. Pump bay panel: Provides access to the pumps and vacuum system.

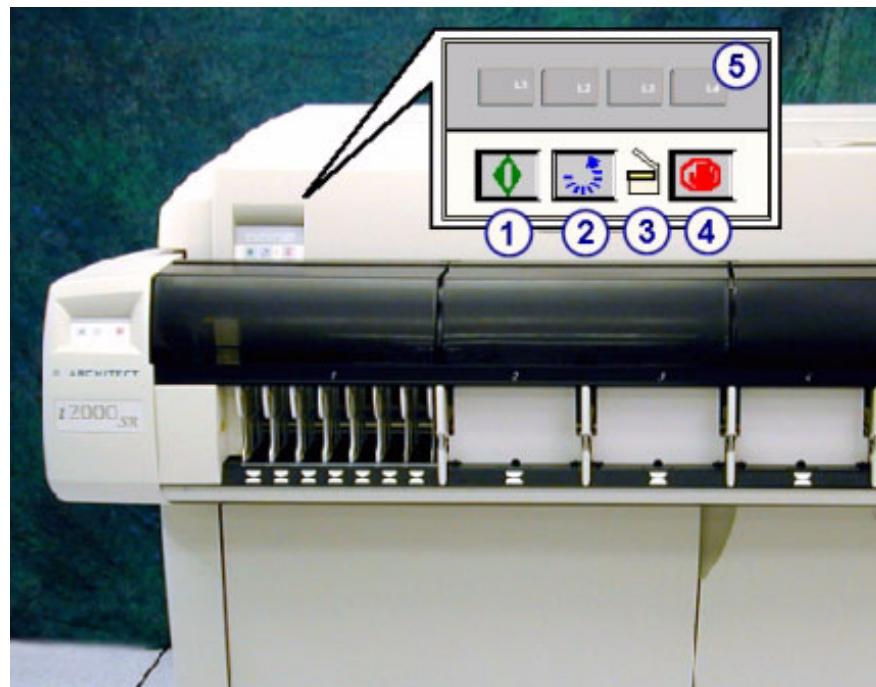
**Related information...**

- *Processing center (*i* System), page 56*
- *Supply and waste center (*i* System), page 75*
- *Optional components (*i* System), page 85*
- *ARCHITECT® ci 8200<sup>TM</sup> integrated system, page 3*
- *ARCHITECT® *i* 2000SR<sup>TM</sup> System, page 6*

**Processing module keypad (*i* System)**

The processing module keypad, located on the left side of the processing module, is an input device used by the operator to direct the processing center activities.

*Figure 2.46: Components of an *i* System processing module keypad*

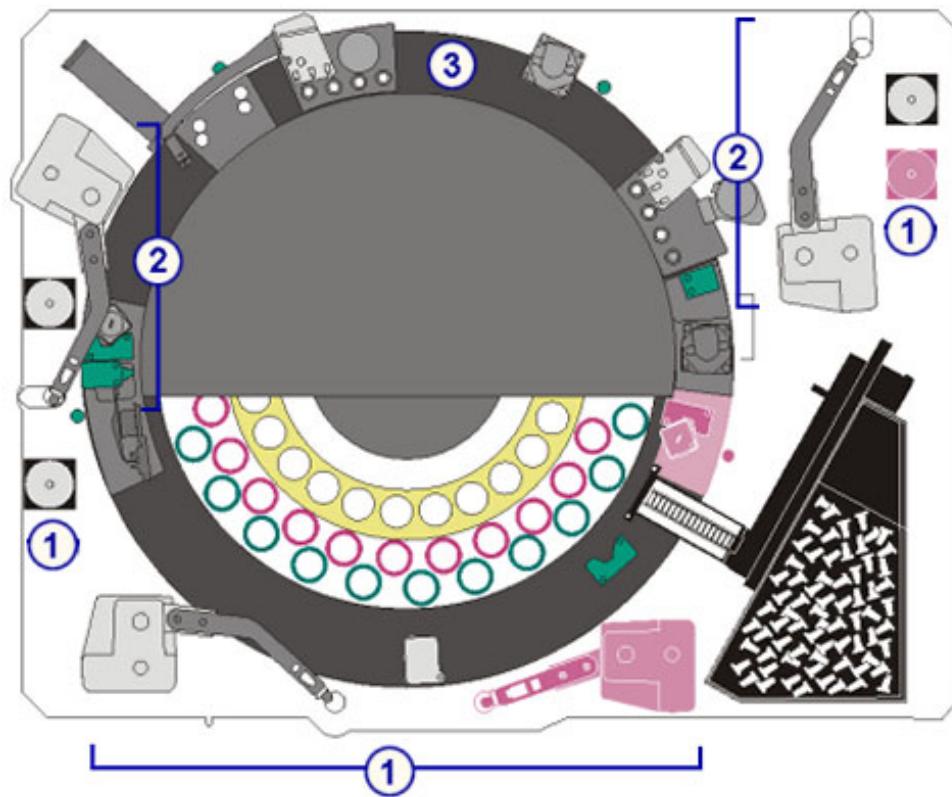


1. Run key: <ul style="list-style-type: none"><li>– Places the processing module into Running status and prepares the module to accept samples.</li><li>– Restarts the processing center after a Scheduled Pause.</li></ul>	2. Carousel advance key: Aligns the reagent carousel and advances the reagent carousel five positions to aid in loading reagents.
3. Access indicator light: Illuminates to indicate that the processing module is in the Warming or Ready status and you can access the reagent carousel.	4. Stop key: Stops all processing module activity, but does not shut down power to the processing module.
5. L1, L2, L3, L4 keys: Used when performing some diagnostic and maintenance procedures.	

## Processing center (*i* System)

The processing center is the main activity area of the processing module. Samples and reagents are dispensed and mixed into the RVs (reaction vessels) in the process path where assay processing is performed.

*Figure 2.47: ARCHITECT® i System processing center hardware components*



1. Sample hardware components: Provide sample aspiration and dispense.	2. Reagent hardware components: Provide reagent aspiration and dispense.
3. Process path hardware components: Position the RVs for sample and reagent aspiration, mixing, washing, and CMIA processing.	

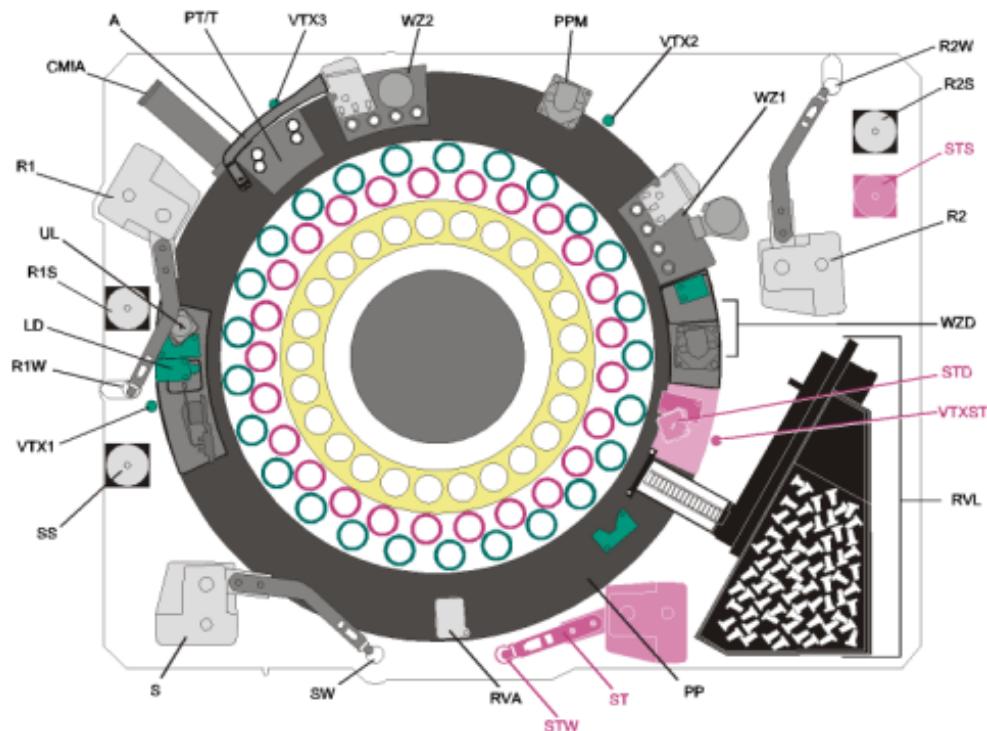
### Related information...

- *Processing center map (i System)*, page 57

**Processing center map (*i* System)**

The *i* System processing center maps are attached to the front and rear processing center covers to assist you in locating components when you are performing component replacement procedures or troubleshooting processing module problems. The map displays a letter and/or number identifier for each component. The *i* 2000<sub>SR</sub><sup>TM</sup> processing module has additional components which display on the map in pink (ST, STW, VTXST, STD, STS). These components are used when processing STAT assay protocols.

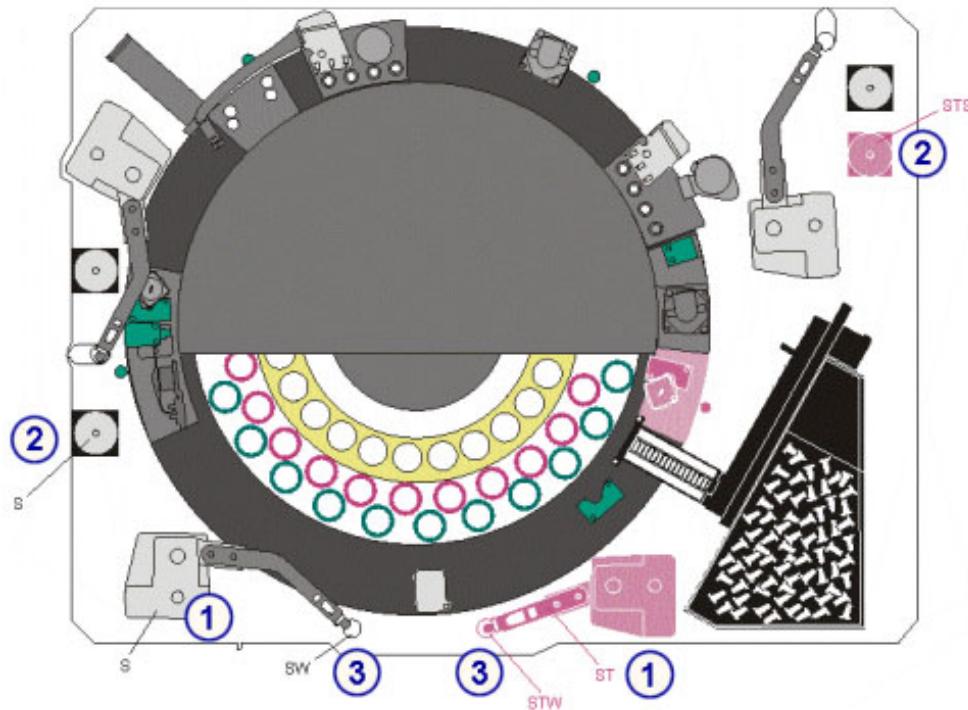
*Figure 2.48: Processing center map*



### Sample hardware components (*i* System)

Sample hardware components are devices that provide sample aspiration and dispense.

*Figure 2.51: Sample hardware components of the processing center*



- |  |   |
|--|---|
| 1. Sample and STAT pipettors (S and ST): Aspirate and dispense samples into the RVs (reaction vessels).      | 2. Sample and STAT syringes (SS and STS): Control the aspiration and dispense of samples. |
| 3. Sample and STAT wash stations (SW and STW): Used to wash remaining fluid from the probe interior and tip. |   |

### Sample and STAT pipettors (*i* System)

The sample and STAT pipettors (S and ST, respectively, on the processing center map) are devices that detect, aspirate, transfer, and dispense samples into the reaction vessel. The sample pipettor also transfers pretreated samples into a new reaction vessel after the appropriate incubation period. These pipettor assemblies include a fluid sense/pressure monitoring system that helps to identify errors in aspiration.

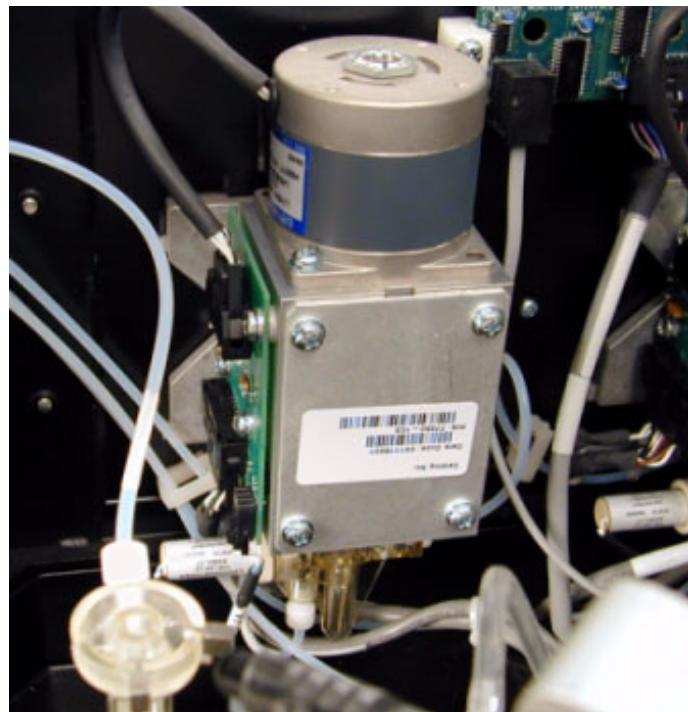
*Figure 2.52: Sample and STAT pipettors*

1. Sample pipettor

2. STAT pipettor

***Sample and STAT syringes (i System)***

The sample and STAT syringes (SS and STS, respectively, on the processing center map) are devices that control the aspiration and dispense of samples.

*Figure 2.53: Example of a sample or STAT syringe*

***Sample and STAT wash stations (i System)***

The sample and STAT wash stations (SW and STW, respectively, on the processing center map) are passive wash stations that dispense excess sample and wash any remaining fluid from the probe interior and tip.

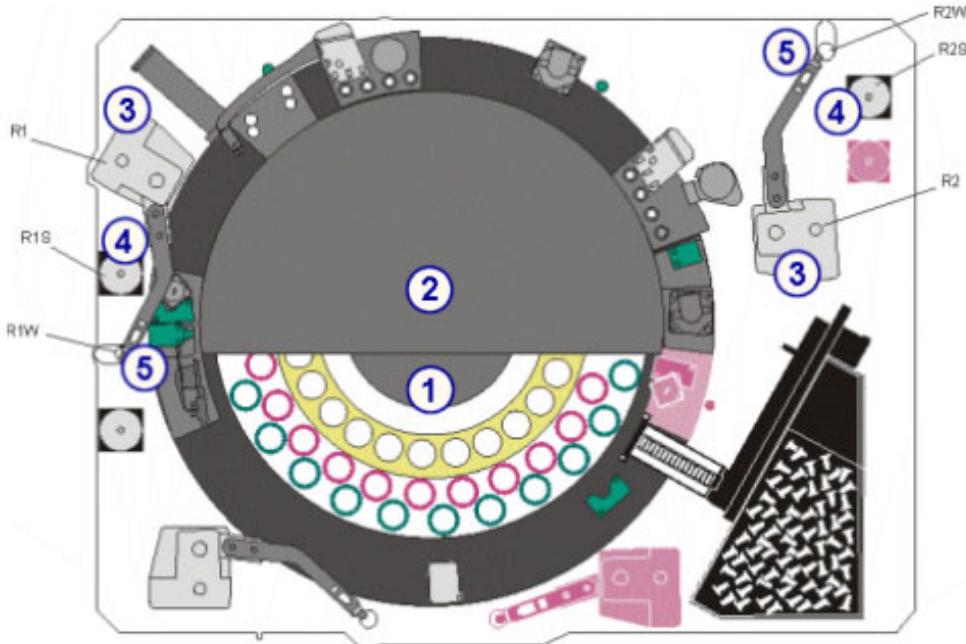
***Figure 2.54: Example of a sample or STAT wash station***



**Reagent hardware components (*i* System)**

Reagent hardware components are devices that provide reagent aspiration, dispense, and positive identification.

*Figure 2.55: Reagent hardware components of the processing module*



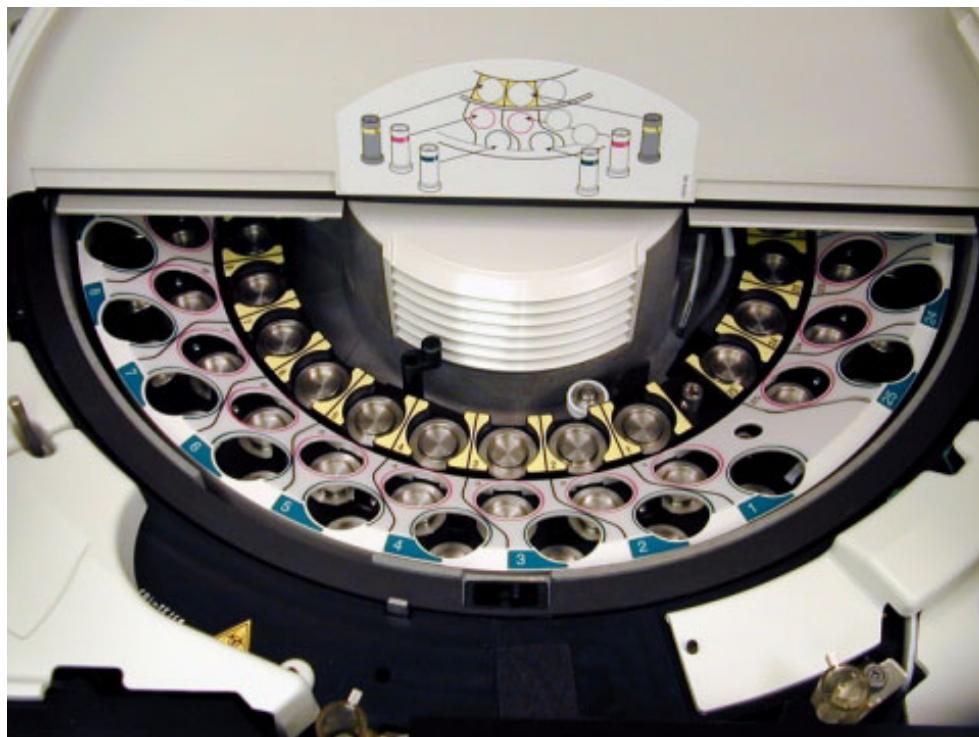
1. Reagent carousel: Provides cooled, temperature-controlled storage for reagent kits.	2. Reagent bar code reader: Reads two dimensional (2D) bar code labels on reagent bottles.
3. Reagent pipettors (R1 and R2): Aspirate and dispense reagents into RVs (reaction vessels).	4. Reagent syringes (R1S and R2S): Aspirate and dispense reagents.
5. Reagent wash stations (R1W and R2W): Washes any remaining fluid from the probe interior and exterior surfaces.	

***Reagent carousel (i System)***

The reagent carousel is a rotating circular device that:

- Holds up to 25 bar coded, reagent kits (75 individual bottles) in a cooled, temperature-controlled environment
- Consists of three rings that are color coded to match the color stripe at the top of the reagent bottle labels
- Provides microparticle dispersion by continuously rotating the microparticle reagent bottles
- Rotates to position bottles for reagent aspiration and dispense

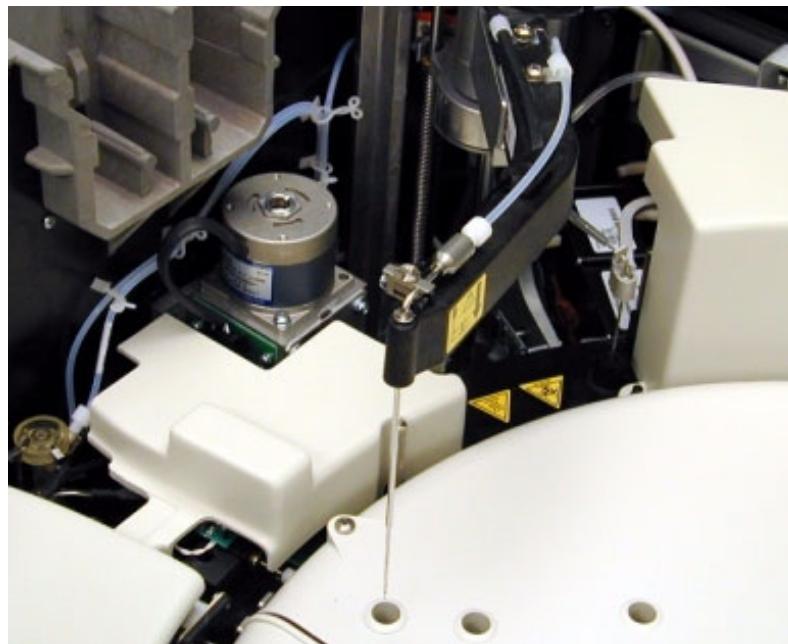
***Figure 2.56: Reagent carousel***



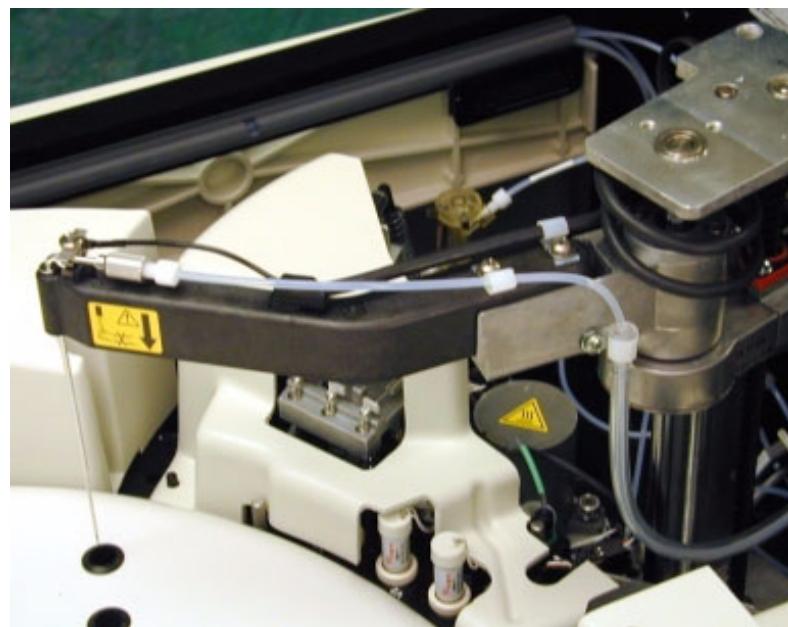
***Reagent pipettors (i System)***

Reagent pipettors (R1 and R2 on the processing center map) are devices that detect, aspirate, transfer, and dispense reagents into the RV (reaction vessel). Each pipettor assembly includes a fluid sense/pressure monitoring system that helps to identify errors in aspiration.

*Figure 2.57: Reagent pipettor (R1)*



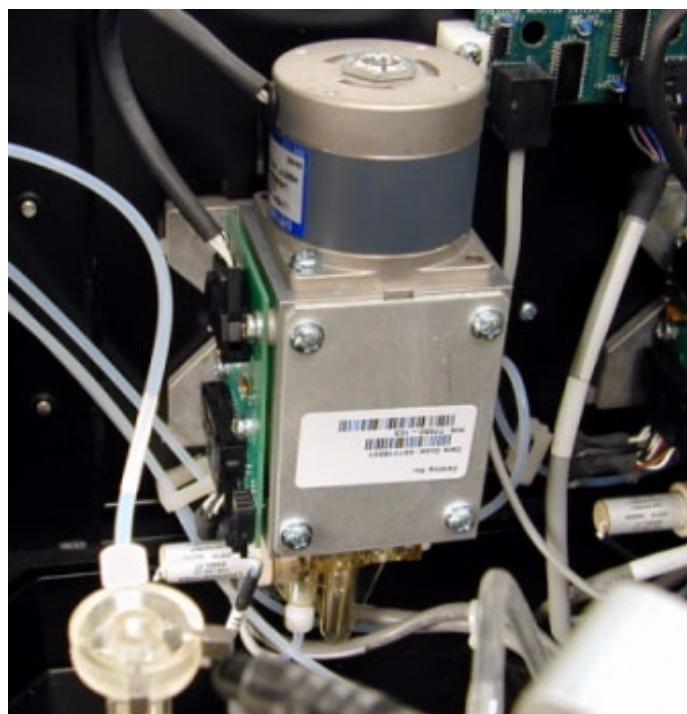
*Figure 2.58: Reagent pipettor (R2)*



***Reagent syringes (i System)***

The reagent syringes (R1S and R2S on the processing center map) are devices that control the aspiration and dispense of reagents.

*Figure 2.59: Example of a reagent syringe (R1 or R2)*



***Reagent wash stations (i System)***

The reagent wash stations (R1W and R2W on the processing center map) are active wash stations that are used to wash any remaining fluid from the probe interior and exterior surfaces. In addition, a vacuum source dries the exterior of the probe. The portion of the probe that enters the reagent bottle is washed and dried in this wash station.

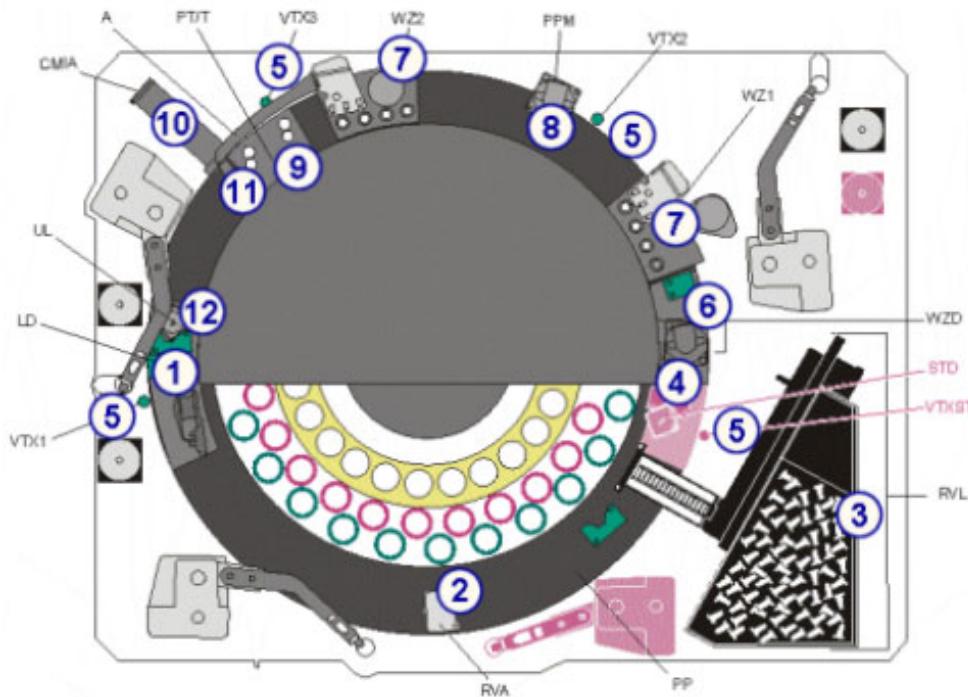
*Figure 2.60: Example of a reagent wash station (R1 or R2)*



### Process path hardware components (*i* System)

The process path is a covered circular track that provides incubation temperatures, liquid aspiration, and wash points as necessary for the assay protocol. The process path advances RVs (reaction vessels) every 18 seconds and positions them at the designated locations in order to process the CMIA reaction.

**Figure 2.61: Process path hardware components**



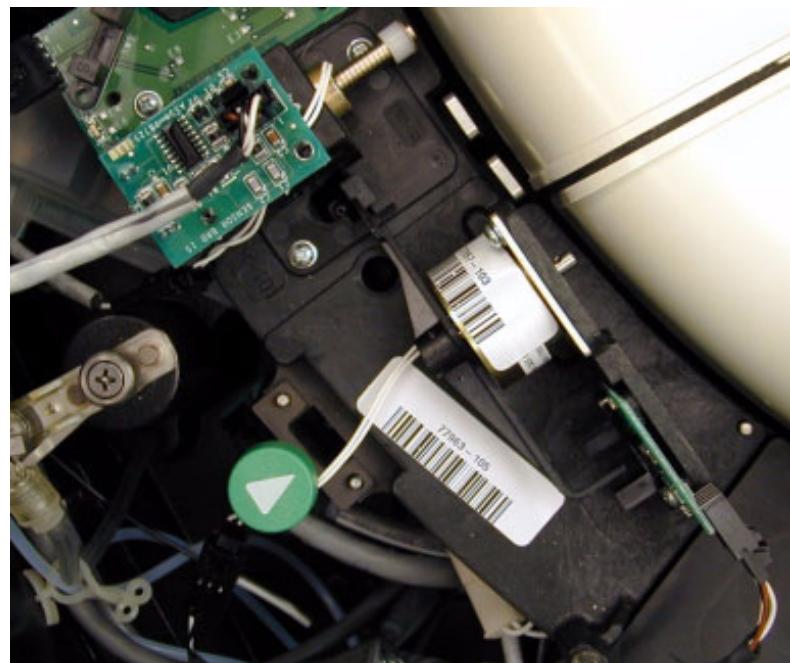
1. Load diverter (LD): Moves RVs from the inner track to the outer track of the process path when reaction vessels are needed for processing.	2. RV access door (RVA): Used for diagnostic purposes only. This door allows access to one position on the outer track.
3. RV loader and hopper assembly (RVL): Provides onboard storage for RVs and transports RVs into the process path.	4. STAT diverter (STD): Moves reaction vessels on an <i>i</i> 2000 <sub>SR</sub> <sup>TM</sup> processing module from the inner track to the outer track of the process path when RVs are needed for STAT processing.
5. Vortexers (VTX1, VTX2, VTX3, VTXST): Mix the reaction mixture to suspend microparticles.	6. Wash zone diverter (WZD): Directs RVs to one of two paths. One path moves RVs through the wash zone where a wash occurs. The other path moves RVs around the wash zone.

<p>7. Wash zone manifolds (WZ1, WZ2): Dispenses wash buffer, and removes and discards unbound analyte from the reaction mixture in the RV.</p>	<p>8. Process path drive motor (PPM): Rotates the process path disk, which holds RVs in place, and advances the RVs from position to position.</p>
<p>9. Pre-trigger/trigger manifold (PT/T): Dispenses Pre-Trigger Solution, and then Trigger Solution into the RVs.</p>	<p>10. CMIA reader (CMIA): Measures the chemiluminescent emission from RVs and outputs data corresponding to the quantity of emission detected.</p>
<p>11. Liquid waste arm (A): Removes liquid from RVs prior to unloading it to the solid waste container.</p>	<p>12. RV unloader (UL): Removes used RVs from the process path and discards them into the solid waste container after assay processing.</p>

***Load diverter (i System)***

The load diverter (LD on the processing center map) is a device that moves RVs (reaction vessels) from the inner track to the outer track of the process path when RVs are needed for routine processing.

**Figure 2.62: Load diverter**



***RV access door (i System)***

The RV access door (RVA on the processing center map) is an opening that allows access to one position on the outer track. You use this door for diagnostic purposes only and should always make sure it is closed during system operation.

*Figure 2.63: RV access door*



***RV loader and hopper assembly (i System)***

The RV loader and hopper assembly (RVL on the processing center map) is a device that provides onboard storage for RVs (reaction vessels) and transports the RVs into the process path.

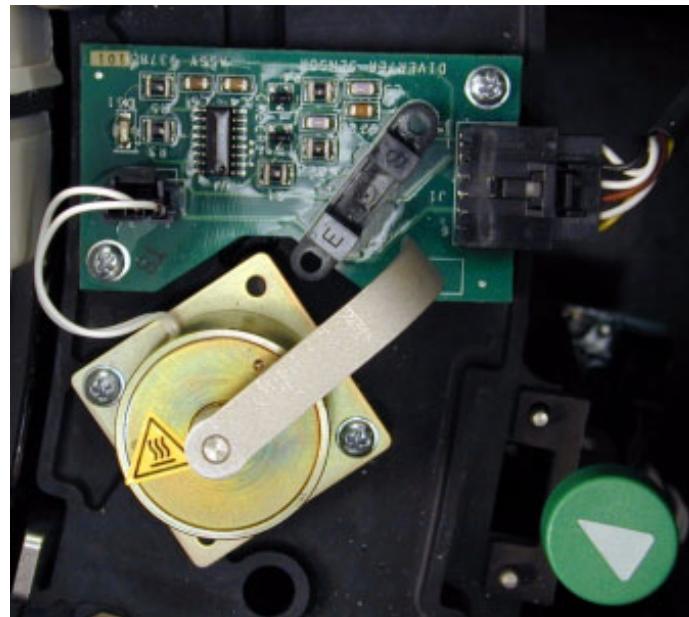
*Figure 2.64: RV loader and hopper assembly*



***STAT diverter (i 2000<sub>SR</sub>)***

The STAT diverter (STAT on the processing center map) is a device that moves RVs (reaction vessels) from the inner track to the outer track of the process path when the RVs are needed for STAT processing.

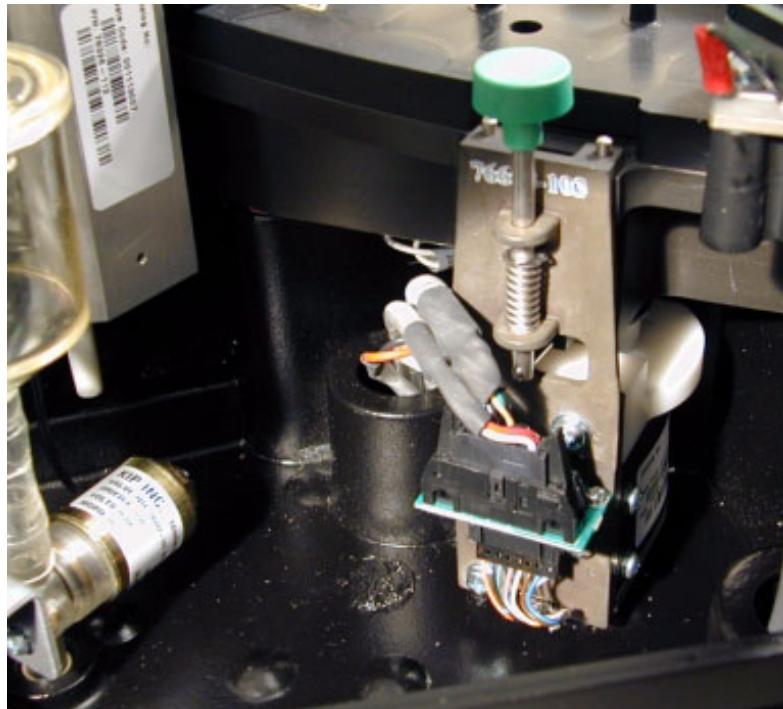
***Figure 2.65: STAT diverter***



**Vortexers (i System)**

The vortexers (VTX1, VTX2, VTX3, and VTXST on the processing center map) are devices that mix the reaction mixture to suspend microparticles. The RVs are vortexed in the process path.

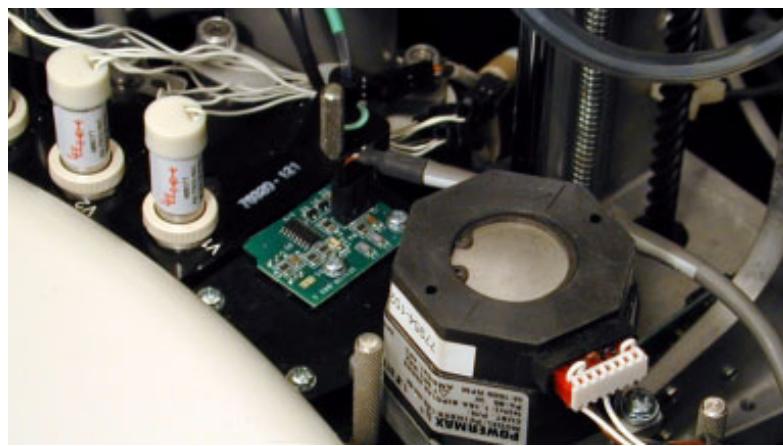
**Figure 2.66: Vortexers**



**Wash zone diverter (i System)**

The wash zone diverter is a device that directs RVs (reaction vessels) to one of two paths. One path moves RVs through the wash zone where a wash occurs. The other path moves RVs around the wash zone.

**Figure 2.67: Wash zone diverter**

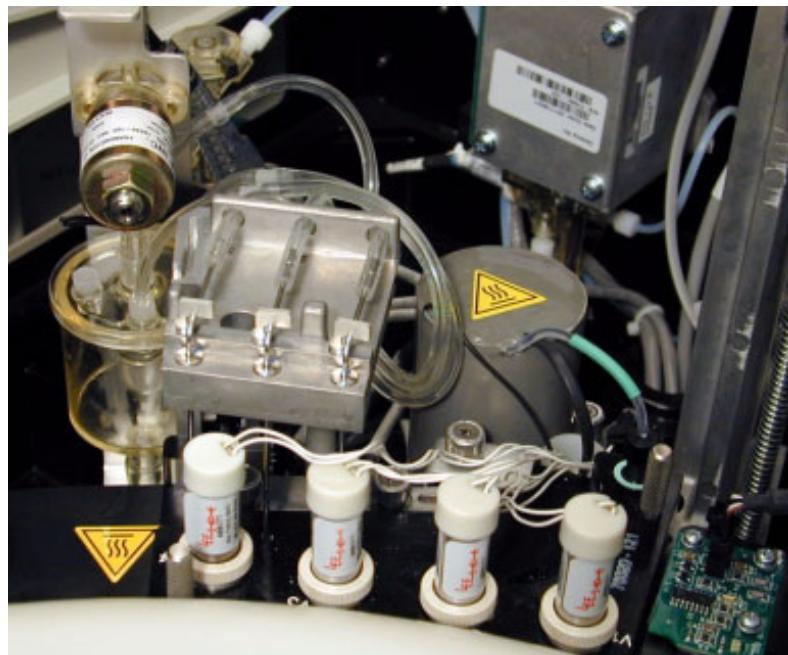


***Wash zone manifolds (i System)***

The wash zone manifolds (WZ1 and WZ2 on the processing center map) are devices that remove and discard unbound analyte from the reaction mixture in an RV (reaction vessel). Each wash zone has four positions where the following actions occur:

- Position 1 – A magnet attracts paramagnetic microparticles to the wall of the RV and a dispense nozzle dispenses wash buffer into the RV.
- Positions 2 and 3 – A vacuum is applied to the aspiration probes as they move to the bottom of the RV. In addition, nozzles dispense wash buffer into the RV. Additional wash/aspiration cycles occur at these positions.
- Position 4 – An aspiration probe aspirates liquid waste from the RV.

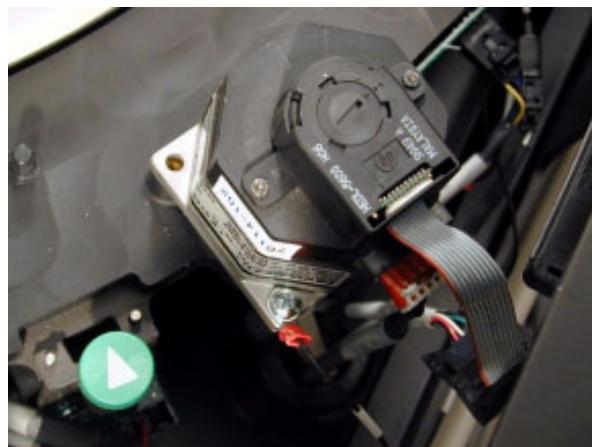
*Figure 2.68: Wash zone manifold (WZ1)*



***Process path drive motor (i System)***

The process path drive motor (PPM on the processing center map) is a device that rotates the process path disk, which holds the RVs in place, and advances the RVs from position to position.

***Figure 2.69: Process path drive motor (PPM)***



***Pre-trigger/trigger manifold (i System)***

The pre-trigger/trigger manifold (PT/T on the processing center map) is a device that dispenses Pre-Trigger Solution, and then Trigger Solution into RVs (reaction vessels).

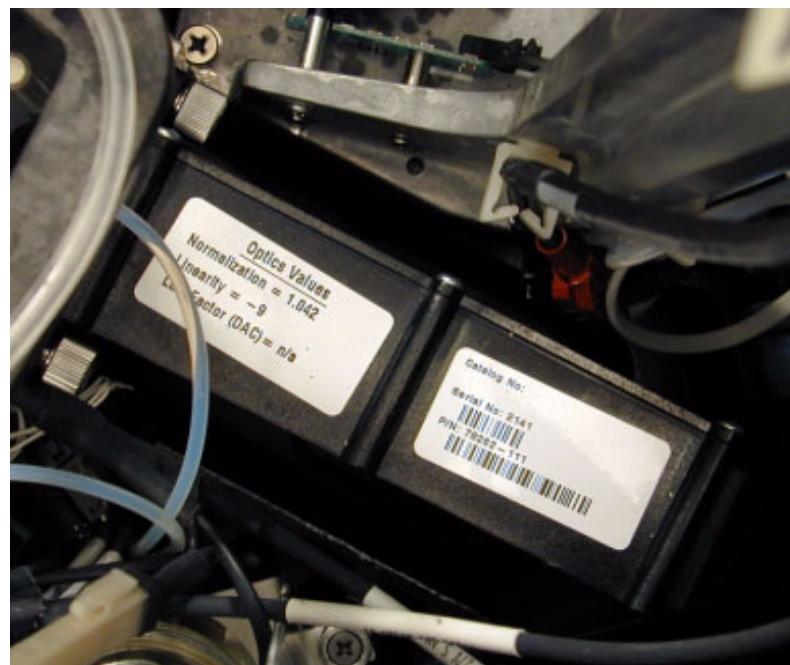
***Figure 2.70: Pre-trigger/trigger manifold (PT/T)***



**CMIA reader (*i* System)**

The CMIA reader (CMIA on the processing center map) is a device that measures the chemiluminescent emission from RVs (reaction vessels) and reports the quantity of emission detected.

**Figure 2.71: CMIA reader (CMIA)**



**Liquid waste arm (*i* System)**

The liquid waste arm (A on the processing center map) is a device that removes liquid from RVs (reaction vessels) prior to unloading them to the solid waste container.

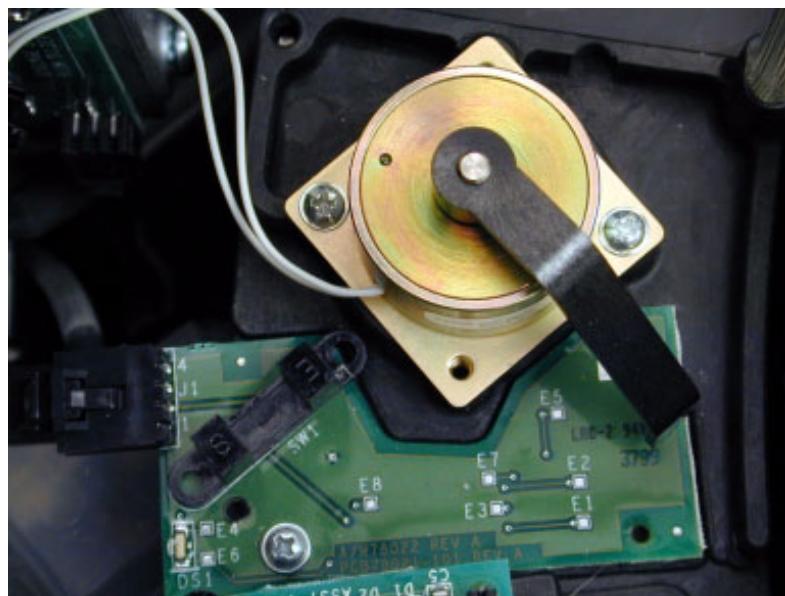
*Figure 2.72: Liquid waste arm (A)*



**RV unloader (*i* System)**

The RV unloader (UL on the processing center map) is a device that removes used RVs (reaction vessels) from the process path and discards them into the solid waste container after assay processing.

*Figure 2.73: RV unloader (UL)*



**Supply and waste center (*i* System)**

The supply and waste center is the onboard storage area for bulk solutions and solid waste.

*Figure 2.74: Supply and waste center*



- |  |  |
|--|--|
| <ul style="list-style-type: none"><li>1. Pre-trigger and trigger storage area: Provides onboard storage for Pre-Trigger and Trigger Solution.</li><li>3. Solid waste storage area: Provides storage for the used RVs (reaction vessels).</li></ul> | <ul style="list-style-type: none"><li>2. Wash buffer storage area: Provides onboard storage for the wash buffer.</li></ul> |
|--|--|

### Pre-trigger/trigger storage area (*i* System)

The pre-trigger/trigger storage area is the location in the supply and waste center that provides onboard storage for the Pre-Trigger and Trigger Solution, which are necessary for test processing.

*Figure 2.75: Pre-trigger/trigger storage area*



- |  |  |
|--|--|
| <ul style="list-style-type: none"><li>1. Pre-trigger/trigger tray: Holds the pre-trigger and trigger bottles.</li><li>3. Pre-trigger level sensor: Detects the volume of remaining pre-trigger solution.</li></ul> | <ul style="list-style-type: none"><li>2. Trigger level sensor: Detects the volume of remaining trigger solution.</li></ul> |
|--|--|

**Pre-trigger/trigger tray (i System)**

The pre-trigger/trigger tray is a platform in the supply and waste center that holds the Pre-Trigger Solution and Trigger Solution bottles.

*Figure 2.76: Pre-trigger/trigger tray*



- |  |  |
|--|--|
| 1. Trigger solution: Used to produce the chemiluminescent reaction that provides the final read. | 2. Pre-trigger solution: Used to split the acridinium dye off the conjugate bound to the microparticle complex. This process prepares the acridinium dye for the addition of trigger solution. |
|--|--|

***Pre-trigger level sensor (i System)***

The pre-trigger level sensor is an assembly with a magnetic float sensor located in the pre-trigger bottle that indicates when the liquid level is low. When the sensor trips, approximately 70 mL of usable solution remains.

*Figure 2.77: Pre-trigger level sensor*



**Trigger level sensor (i System)**

The trigger level sensor is an assembly with a magnetic float sensor located in the trigger bottle that indicates when the liquid level is low. When the sensor trips, approximately 70 mL of usable solution remains.

*Figure 2.78: Trigger level sensor*



### Wash buffer storage area (*i* System)

The wash buffer storage area is the location in the supply and waste center for onboard storage of wash buffer, which is used in test processing.

*Figure 2.79: Wash buffer storage area*



1. Wash buffer reservoir: Provides onboard storage for up to 25 liters of wash buffer.	2. Wash buffer level sensor: Draws wash buffer from the reservoir and measures the remaining volume of wash buffer.
3. Wash buffer inlet assembly: Dispenses wash buffer into the reservoir from the wash buffer preparation container or ARCHITECT ARM™ (Automatic Reconstitution Module).	4. Wash buffer filter: Protects the fluidics components by eliminating particulates.

***Wash buffer reservoir (i System)***

The wash buffer reservoir is an onboard container in the supply and waste center that holds up to 25 liters of wash buffer.

***Figure 2.80: Wash buffer reservoir***



***Wash buffer level sensor (i System)***

The wash buffer level sensor, located in the wash buffer reservoir, is an assembly containing a tube with three magnetic float sensors that indicate when the wash buffer reservoir is full (top sensor), needs to be filled by the ARCHITECT ARM™ (Automatic Reconstitution Module) accessory (middle sensor), or is empty (lower sensor).

The tube draws wash buffer from the reservoir during test processing. The inlet assembly dispenses wash buffer into the reservoir from the wash buffer preparation container or ARM.

***Figure 2.81: Wash buffer level sensor***



***Wash buffer filter (i System)***

The wash buffer filter, located in the wash buffer storage area, is an assembly containing material used to eliminate particulates that might damage the fluidics components of the system.

***Figure 2.82: Wash buffer filter***



### Solid waste storage area (*i* System)

The solid waste storage area is the location in the supply and waste center that provides a storage area for the solid waste container that holds used RVs (reaction vessels). The RVs are directed into the container by a waste chute.

*Figure 2.83: Solid waste storage area*



**Waste chute and trap door (*i* System)**

The waste chute is a device in the supply and waste center that receives used RVs (reaction vessels) by gravity and directs them into the solid waste container. The trap door holds up to 50 RVs when you remove the solid waste container during processing.

*Figure 2.84: Waste chute and trap door*

**Optional components (*i* System)**

Optional components available for an *i* System processing module include:

- UPS (uninterruptible power supply) – provides a temporary, continuous flow of power to the processing module during a power failure
- ARM optional accessory (*i* System), page 85 – dilutes Concentrated Wash Buffer to the proper concentration and delivers it to the wash buffer reservoir.

**ARM optional accessory (*i* System)**

The ARCHITECT ARM<sup>TM</sup> (Automatic Reconstitution Module) accessory is an optional ARCHITECT® *i* System accessory that automatically dilutes Concentrated Wash Buffer to the proper concentration and delivers it to the wash buffer reservoir.

The ARM is connected to a water supply and is loaded with a 10 L container of concentrated wash buffer. A single motor operating at a constant speed is geared to drive two pumps at a 9:1 ratio to each other, pumping the necessary proportions of water and concentrated wash buffer into a mixing chamber.

Sensors verify that incoming water and outgoing wash buffer meet predetermined specifications for ion content and temperature. If the standards are not met, the ARM motor stops automatically.

*Figure 2.85: ARM (front view)*



1. ARM keypad: Provides a local user interface for controlling the ARM.	2. Tubing assembly: Detects the level of concentrated wash buffer in the 10 liter container and transfers the concentrated wash buffer to the mixing chamber inside the ARM.
3. Fluidics and electronics bay: Provides access to the pump and circuit boards.	4. Concentrated Wash Buffer (10 L container): Concentrated buffer diluted by the ARM and delivered to the processing modules.

*Figure 2.86: ARM (rear view)*



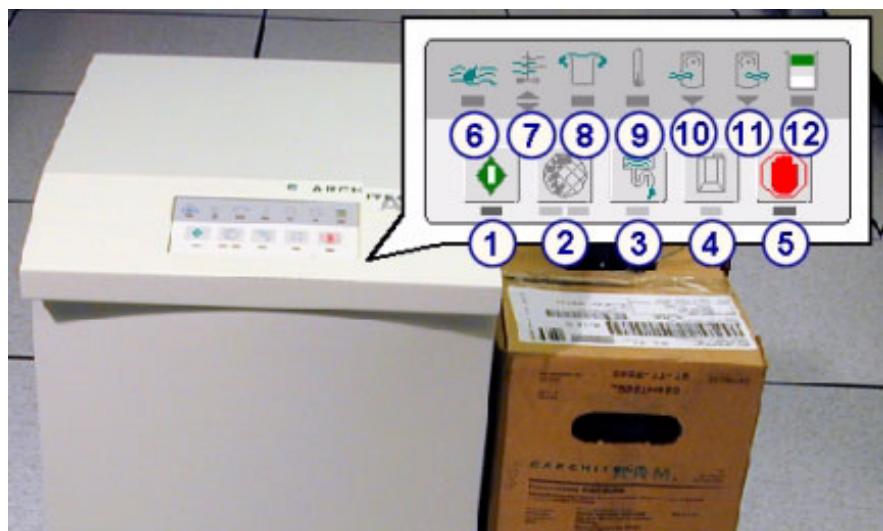
***Related information...***

- *ARM connectors (i System), page 89*

**ARCHITECT ARM™ keypad (i System)**

The ARM keypad is an input device used by the operator to operate the ARCHITECT ARM™ (Automatic Reconstitution Module) accessory.

*Figure 2.87: Components of the ARM keypad*



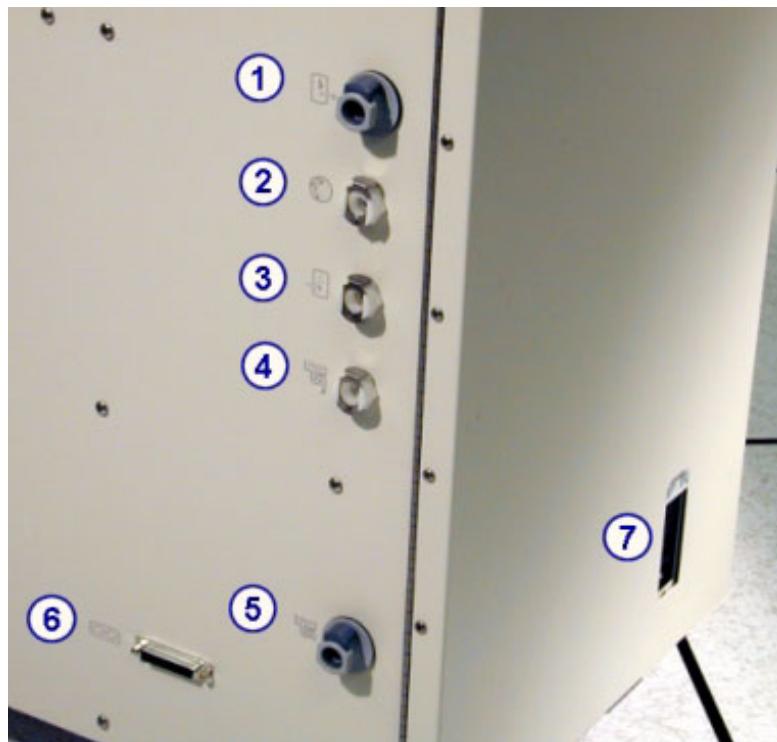
1. Start key: Initiates operation. The green indicator below the key illuminates during operation and flashes when wash buffer is being pumped to the wash buffer reservoir in the processing module.	2. Decontamination key (used by Abbott service representatives): Initiates the decontamination procedures.
3. Flush to drain key: Initiates a flush. This key is not functional when your wash buffer transfer option is set to Automatic.	4. Replace buffer key: Initiates loading of the 10 L container of Concentrated Wash Buffer. The amber indicator illuminates during this procedure.
5. Stop key: Stops the procedure currently in progress and/or interrupts communication to the SCC (system control center). The red indicator illuminates when you press the stop key.	6. Water quality error indicator: Illuminates red if the incoming water does not meet the NCCLS Type II resistivity standard. When this occurs, transfer of buffer stops.
7. Buffer quality error indicator: Illuminates red if the diluted buffer mixture is outside acceptable limits. The up arrow indicates too much water. The down arrow indicates too little water. When either occurs, the system stops transfer of buffer.	8. Flood indicator: Illuminates red if liquid is detected in the flood pan. When this occurs, transfer of buffer stops.

<p>9. Water temperature indicator: Illuminates red if incoming water temperature is outside the range of 15-37°C. When this occurs, transfer of buffer stops.</p> <p>11. High outlet pressure indicator: Illuminates red if the outgoing wash buffer pressure exceeds the pressure limit of the inlet valves. When this occurs, transfer of buffer stops.</p>	<p>10. Low inlet pressure indicator: Illuminates red if incoming water pressure or the flow rate is too low. When this occurs, transfer of buffer stops.</p> <p>12. Inventory level indicator: Indicates the volume of buffer remaining in the container. 3 bars illuminated = full 2 bars illuminated = mid (50%) 1 bar illuminated = low (20%) No bar illuminated = empty (&lt;2%) The red indicator illuminates and the ARM stops.</p>
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***ARM connectors (i System)***

Connectors on the ARCHITECT ARM™ (Automatic Reconstitution Module) accessory are ports that provide the connections for transporting fluids to and from the ARM and communicating with the SCC (system control center).

*Figure 2.88: Connectors on rear of ARM*



1. Diluted wash buffer outlet: Provides the connection that allows diluted wash buffer to be transferred to the wash buffer reservoir in the processing module.		2. Decontamination port 1: Provides the connection that allows a 0.5% sodium hypochlorite solution to be flushed through the ARM for decontamination.	
3. Water inlet: Provides the connection from the deionized water system to the ARM.		4. Waste 1 (pressurized) port: Provides pressurized waste from the internal drip pan located inside the ARM to the external waste pump or floor drain.	
5. Waste 2 (gravity) port: Provides gravity waste from the internal drip pan, located inside the ARM, to the external waste pump or floor drain.		6. RS232 port: Provides communication between the ARM and the SCC.	
7. Power switch: Used to cycle the power.			

Figure 2.89: Connectors on top of ARM



1. Sensor cable: Provides the connection from the tubing assembly to the ARM.		2. Concentrated wash buffer inlet: Provides the connection that allows the concentrated wash buffer to be transferred to the mixing chamber of the ARM.	
3. Decontamination port 2: Provides the connection that allows the ARM system to be flushed with water to remove the 0.5% sodium hypochlorite solution.			

## Sample handlers

The sample handler is a transport system used for loading calibrators, controls, and patient samples and presenting them to the processing module(s).

A single primary sample handler transports samples through an ARCHITECT® System regardless of the number of processing modules and types.

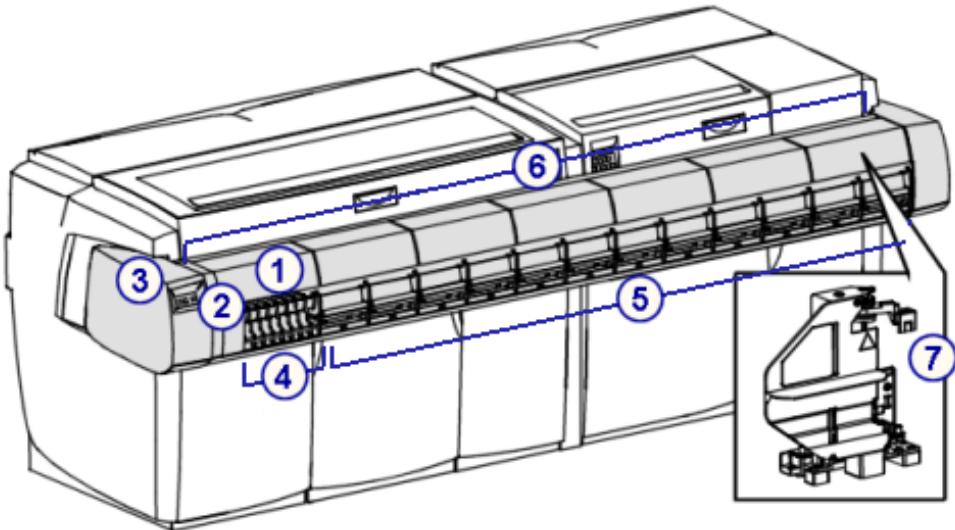
**NOTE:** Unless otherwise indicated, the term sample handler is used generically throughout this documentation to refer to all configurations.

Sample handler topics include:

- *RSH – retest sample handler (c 8000 or i 2000SR)*, page 92
- *SSH – standard sample handler (i 2000)*, page 97
- *LAS carousel sample handler (i 2000)*, page 101

### **RSH – retest sample handler (c 8000 or i 2000<sub>SR</sub>)**

The RSH (retest sample handler) is a transport system used for loading calibrators, controls, and patient samples and presenting them to a *c 8000*™ and/or *i 2000<sub>SR</sub>*™ processing module. The design of the RSH allows random and continuous access, and sample positioning for automatic retesting. Two types of bays position samples for either routine or priority processing.

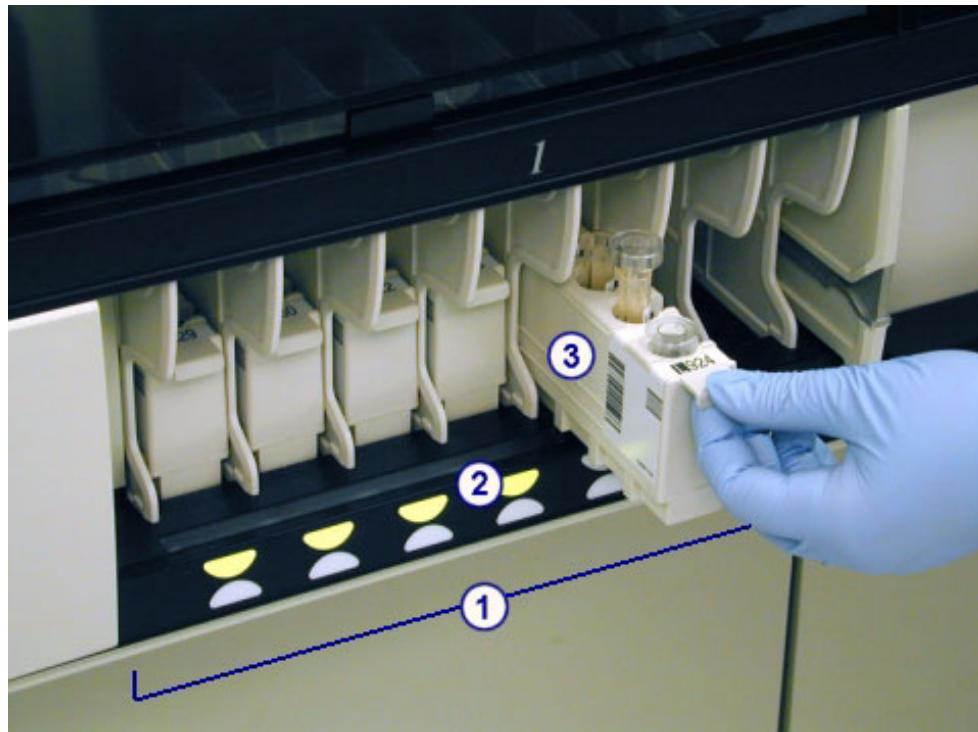
*Figure 2.90: Retest sample handler components*

1. RSH cover: Provides access to the RSH components.	2. RSH keypad: Provides a local user interface for controlling the sample handler.
3. RSH bar code reader: Reads the sample and sample carrier ID.	4. Priority bay: Positions samples for priority processing.
5. Routine bays: Positions samples for routine processing.	6. Carrier positioner: Positions carriers for sample aspiration.
7. Carrier transport: Transfers sample carriers from the bays to the carrier positioner and back.	

### Priority bay (RSH)

The priority bay is a holding area that positions samples for priority processing. You place samples in sample carriers and load them into the priority bay. The carrier transport picks up each carrier and moves it past the bar code reader. The bar code reader identifies the samples, the carrier transport moves the carriers back to the priority bays, and then the carrier transport moves the carriers to the appropriate processing module for sample aspiration.

Figure 2.91: Priority bay



<p>1. Priority bay: Holds carriers and positions samples for priority processing.</p> <p>3. Sample carrier: Holds five primary tubes, aliquot tubes, or sample cups. You may mix different types of sample vessels in a sample carrier.</p>	<p>2. Status indicator: Indicates the status of sample processing and when you can access samples:</p> <ul style="list-style-type: none"><li>– Indicators off – no samples are loaded in the position.</li><li>– Green (steady) – samples are loaded, but processing has not begun. You can access the samples.</li><li>– Amber (steady) – samples are processing and you cannot access them.</li><li>– Green (blinking) – processing is complete and you can access the samples.</li><li>– Amber and green (alternating) – bar code scan or other error occurred. You can access the samples.</li></ul>
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**Routine bay (RSH)**

The routine bay is a holding area that positions samples for routine processing. You place samples in sample carriers, load the carriers onto carrier trays, and then slide the trays into a routine bay. The carrier transport picks up each carrier and moves it past the bar code reader. The bar code reader identifies the samples, the carrier transport moves the carriers back to the routine bay, and then the carrier transport moves the carriers to the appropriate processing module for sample aspiration.

Figure 2.92: Routine bay

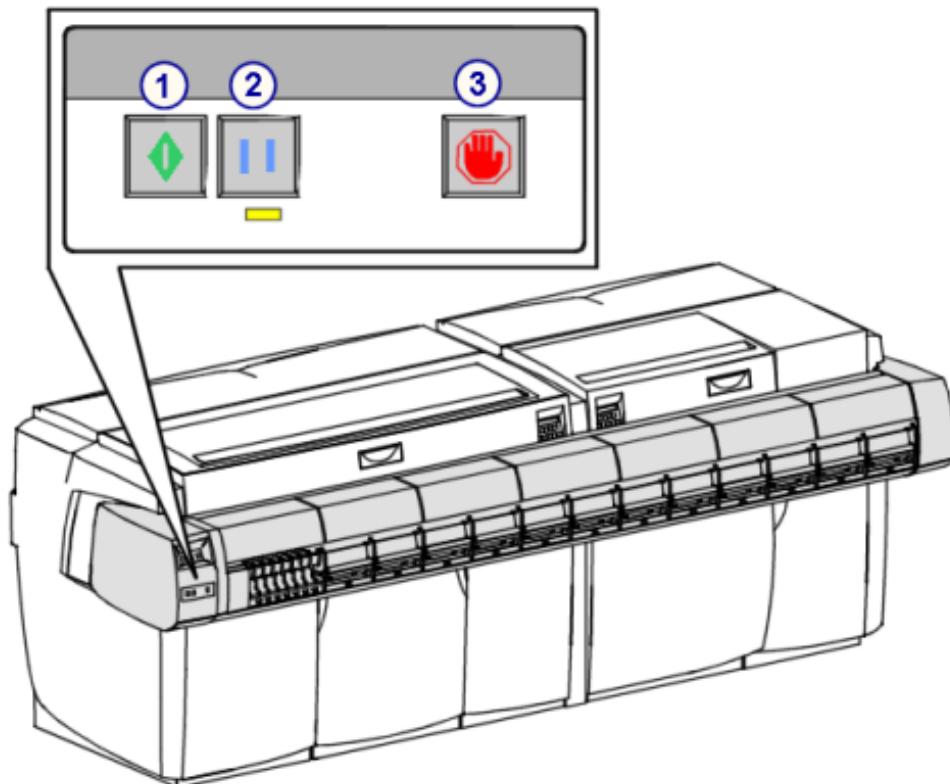


<p>1. Status indicator: Indicates the status of sample processing and when you can access samples:</p> <ul style="list-style-type: none"><li>– Indicators off – no samples are loaded in the position.</li><li>– Green (steady) – samples are loaded, but processing has not begun. You can access the samples.</li><li>– Amber (steady) – samples are processing and you cannot access them.</li><li>– Green (blinking) – processing is complete and you can access the samples.</li><li>– Amber and green (alternating) – bar code scan or other error occurred. You can access the samples.</li></ul>	<p>2. Carrier tray: Holds up to five sample carriers.</p>
<p>3. Bay door: Provides access to the routine bay.</p>	

**RSH keypad**

The RSH (retest sample handler) keypad is an input device used by the operator to control the sample handler.

*Figure 2.93: Components of the RSH keypad*



- |  |  |
|--|--|
| 1. Run key: Resumes or begins the transport of samples that are located in the bays.       | 2. Pause key: Pauses the sample handler. |
| 3. Stop key: Stops the sample handler, but does not shut down power to the sample handler. |  |

**SSH – standard sample handler (*i* 2000)**

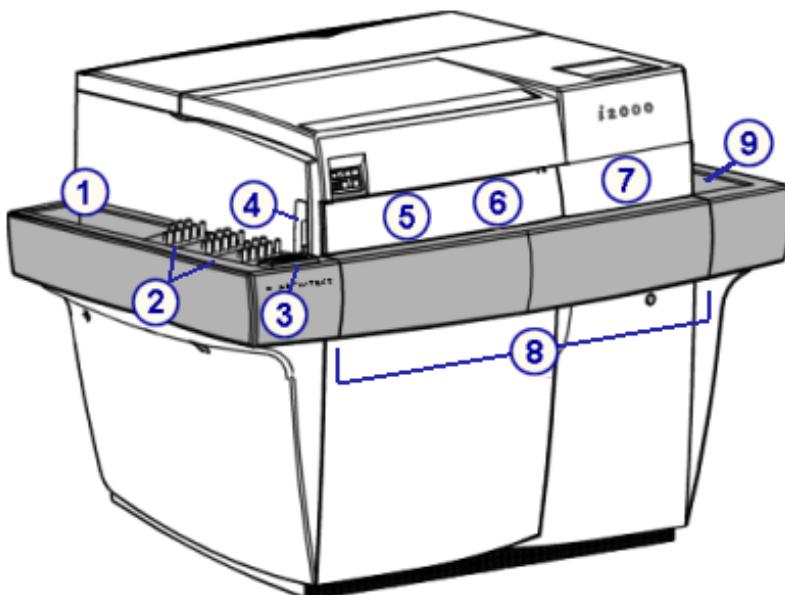
The SSH (standard sample handler) is a transport system used for loading calibrators, controls, and patient samples and presenting them to an *i* 2000® processing module(s).

You place samples in sample carriers, and then load them onto the sample load queue. Bar code readers identify the samples, and then the sample handler transports the carriers to the processing queue for sample aspiration. Once aspiration is complete, the processing queue transports the carriers to the unload queue.

Depending on the number of processing modules, there are two SSH configurations:

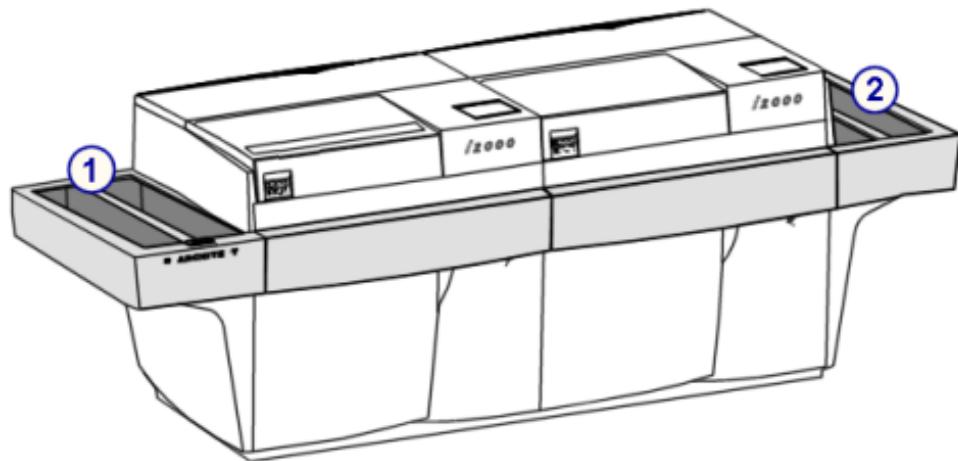
- Single lane – provides sample handling for a single processing module. The maximum capacity is 125 samples (25 sample carriers, 5 samples per carrier).
- Double lane – provides sample handling for multi-module (up to four processing modules) systems. The maximum capacity is 250 samples (50 sample carriers, 5 samples per carrier).

**Figure 2.94: SSH components (single lane)**



1. Sample load queue (single lane): Transfers the sample carriers to the sample processing queue.	2. Sample carriers: Hold five primary tubes, aliquot tubes, or sample cups. Different types of sample vessels may be mixed on each carrier.
3. Sample handler keypad: Provides a local user interface for controlling the sample handler.	4. Sample load queue bar code reader: Reads the sample carrier ID, position, and sample ID.
5. Sample processing queue bar code reader: Reads the sample carrier ID and position. Does not read the sample ID.	6. Left processing queue access door: Provides access to the sample processing queue.
7. Right processing queue access door: Provides access to the sample processing queue.	8. Sample processing queue: Transfers the sample carrier to the sample pipettor. Once samples are aspirated, the sample carrier is transferred to another processing module or to the sample unload queue.
9. Sample unload queue (single lane): Provides the location where sample carriers are unloaded.	

*Figure 2.95: SSH configuration (double-lane)*

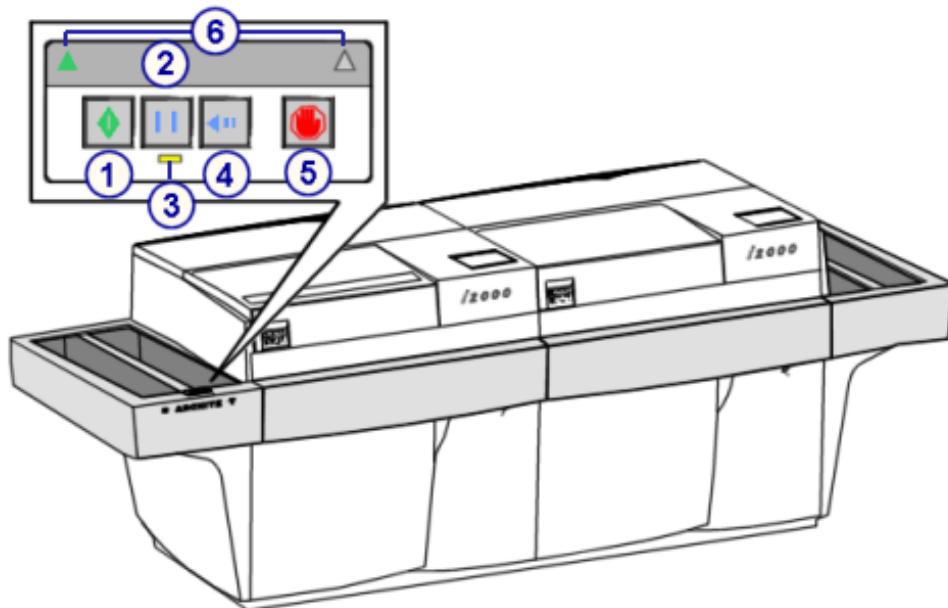


- |  |  |
|--|--|
| 1. Sample load queue (double lane):<br>Transfers the sample carriers to the sample processing queue. | 2. Sample unload queue (double lane):<br>Provides the location where sample carriers are unloaded. |
|--|--|

## SSH keypad

The SSH (standard sample handler) keypad is an input device used by the operator to control the sample handler.

*Figure 2.96: Components of the SSH keypad*



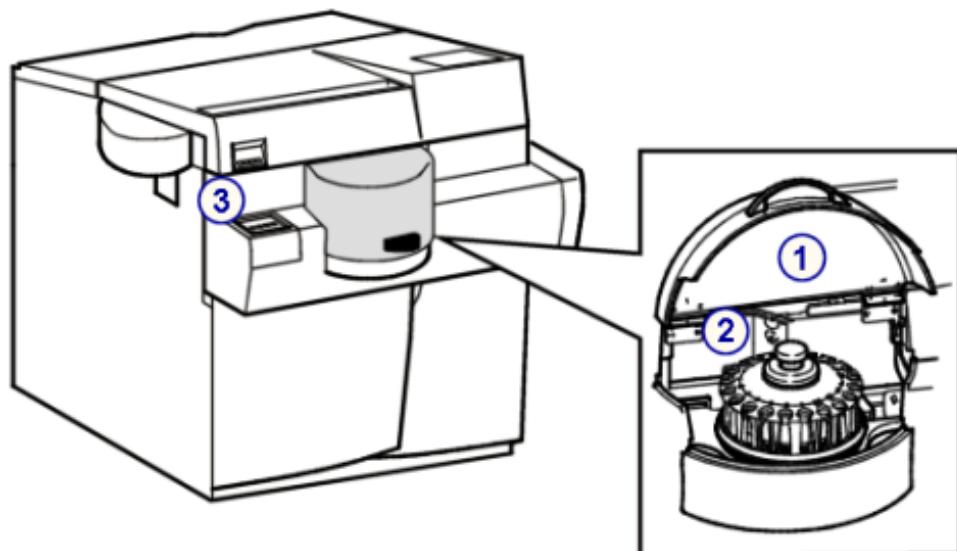
1. Run key: Resumes or begins the transport of samples that are located on the sample load queue.	2. Pause key: Pauses the sample load queue so you can load sample carriers or perform priority loading.
3. Pause indicator (yellow): Illuminates to indicate that the sample load queue is paused and ready for loading of sample carriers.	4. Reverse key: Reverses the sample load queue direction for ease of loading priority sample carriers. Functional only when the pause indicator is illuminated.
5. Stop key: Stops the sample handler, but does not shut down power to the sample handler.	6. Active lane indicators (green; active on double load queues only): Indicate the currently active lane. The lane indicator is used to facilitate priority loading on multi-module systems.

## LAS carousel sample handler (*i* 2000)

The LAS (laboratory automation system) carousel sample handler is a transport system used for loading calibrators, controls, and patient samples and presenting them to an *i* 2000® processing module that is integrated with an LAS track system.

In the event of a track failure, the LAS carousel can be used as the primary area for loading samples. Under normal operating conditions when both the LAS track and LAS carousel are functional, samples on the carousel take priority over those on the LAS track.

*Figure 2.97: LAS carousel sample handler*

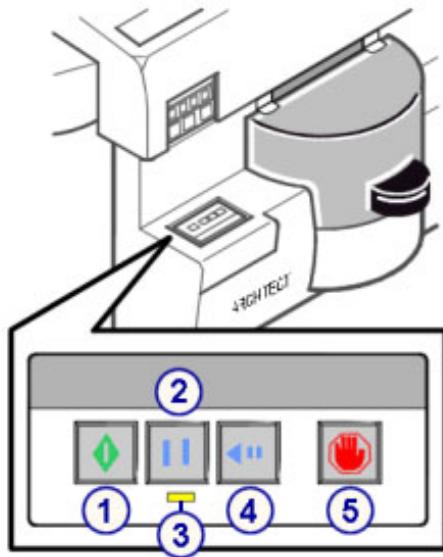


- |   |  |
|---|--|
| 1. LAS carousel cover: Provides access to the LAS sample carousel.  | 2. LAS sample carousel: Holds 20 primary tubes, aliquot tubes, or sample cups. Different types of sample vessels may be mixed on the carousel. |
| 3. LAS carousel sample handler keypad: Provides a local user interface for the control of the LAS carousel. |  |

### LAS carousel sample handler keypad

The LAS (laboratory automation system) carousel sample handler keypad is an input device used by the operator to control the sample handler.

*Figure 2.98: Components of the LAS carousel sample handler keypad*



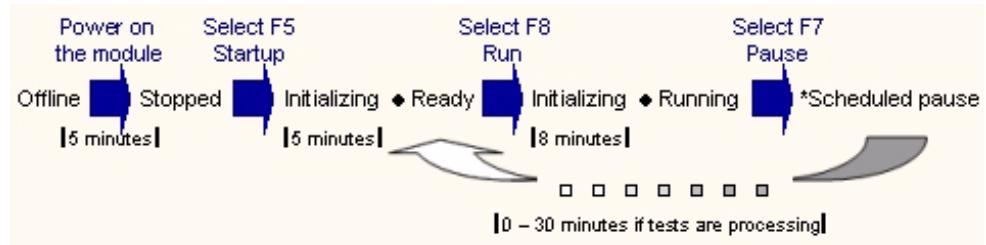
1. Run key: Resumes or begins the processing of samples located on the LAS carousel.	2. Pause key: Pauses the LAS carousel after completing aspiration of the current sample or current group of calibrators.
3. Pause indicator (yellow): Illuminates to indicate that the LAS carousel is paused and ready for loading or unloading samples.	4. Carousel advance key: Moves the LAS carousel clockwise 5 positions. Functional only when the pause indicator is illuminated.
5. Stop key: Stops the LAS carousel, but does not shut down the power to the carousel.	

## System statuses

System status refers to the operational modes of the ARCHITECT® System. Key information displays on the Snapshot screen, providing an immediate overview of your system.

The processing modules and sample handlers have several status types. The following diagram illustrates the progression of statuses from Offline to Running. The transition times are approximate and may vary between the processing module and sample handler.

**Figure 2.99:** Processing module and sample handler status sequence



System status topics include:

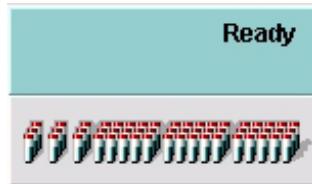
- *Sample handler status*, page 103
- *Processing module status*, page 107

## Sample handler status

The sample handler graphic on the Snapshot screen indicates the status of the sample handler. Sample handler status types depend upon your sample handler configuration:

- *RSH status types*, page 104
- *SSH status types*, page 105
- *LAS carousel sample handler status types*, page 106

**Figure 2.101: Sample handler graphic**



## RSH status types

The RSH (retest sample handler) has six possible status types. The following table provides a description of each.

**Table 2.1: RSH status types**

Status	Indicates
<b>Offline</b>	One of the following exists: <ul style="list-style-type: none"> <li>• Power to the sample handler is off.</li> <li>• Power has been turned on, but communication between the sample handler and SCC (system control center) has not been re-established.</li> <li>• Communication between the sample handler and the SCC has been lost due to a software or system error.</li> </ul>
<b>Stopped</b>	One of the following exists: <ul style="list-style-type: none"> <li>• Power to the sample handler is on, but F5 - Startup on the Snapshot screen has not been selected.</li> <li>• F6 - Stop on the Snapshot screen was selected.</li> <li>• Stop key on the sample handler keypad was selected.</li> <li>• A sample handler diagnostic procedure has completed.</li> <li>• One of the RSH covers was opened while the sample handler was running.</li> <li>• Sample handler detected a fatal error while processing.</li> </ul>
<b>Ready</b>	One of the following exists: <ul style="list-style-type: none"> <li>• Startup is complete.</li> <li>• Scheduled pause status is complete.</li> </ul>
<b>Running</b>	One of the following exists: <ul style="list-style-type: none"> <li>• F8 - Run on the Snapshot screen was selected.</li> <li>• Run key on the sample handler keypad was selected.</li> </ul>
<b>Scheduled Pause</b>	One of the following exists: <ul style="list-style-type: none"> <li>• F7 - Pause on the Snapshot screen was selected.</li> <li>• Pause key on the sample handler keypad was selected.</li> <li>• All processing modules are unavailable for sample processing.</li> </ul>
<b>Initializing</b>	Either the run key, F8 - Run, or F5 - Startup was selected. This status is a temporary status during which the system performs the following initialization functions: <ul style="list-style-type: none"> <li>• Homes all moving parts on the sample handler</li> <li>• Checks the RSH bar code reader</li> </ul> Once initialization is complete, the status changes to Running or Ready depending on whether run or startup was selected.

## SSH status types

The SSH (standard sample handler) has six possible status types. The following table provides a description of each.

**Table 2.2: SSH status types**

<b>Status</b>	<b>Indicates</b>
<b>Offline</b>	One of the following exists: <ul style="list-style-type: none"> <li>• Power to the sample handler is off.</li> <li>• Power has been turned on, but communication between the sample handler and SCC (system control center) has not been re-established.</li> <li>• Communication between the sample handler and the SCC has been lost due to a software or system error.</li> </ul>
<b>Stopped</b>	One of the following exists: <ul style="list-style-type: none"> <li>• Power to the sample handler is on, but F5 - Startup on the Snapshot screen has not been selected.</li> <li>• F6 - Stop on the Snapshot screen was selected.</li> <li>• Stop key on the sample handler keypad was selected.</li> <li>• A sample handler diagnostic procedure has completed.</li> <li>• One of the processing queue access doors was opened while the sample handler was running.</li> <li>• Sample handler detected a fatal error while processing.</li> </ul>
<b>Ready</b>	Startup is complete.
<b>Running</b>	One of the following exists: <ul style="list-style-type: none"> <li>• F8 - Run on the Snapshot screen was selected.</li> <li>• Run key on the sample handler keypad was selected.</li> </ul>
<b>Load queue paused</b>	One of the following exists: <ul style="list-style-type: none"> <li>• F7 - Pause on the Snapshot screen was selected.</li> <li>• Pause key on the sample handler keypad was selected.</li> <li>• 60 seconds has elapsed without samples being loaded and a run initiated.</li> <li>• The sample unload and processing queues are full.</li> <li>• All processing modules are unavailable for sample processing.</li> </ul>
<b>Initializing</b>	Either the run key, F8 - Run, or F5 - Startup was selected. This status is a temporary status during which the system performs the following initialization functions: <ul style="list-style-type: none"> <li>• Checks the load and processing queue bar code readers</li> <li>• Homes all moving parts on the sample handler</li> <li>• Starts the load and processing queue</li> </ul> Once initialization is complete, the status changes to Running or Ready depending on whether run or startup was selected.

## LAS carousel sample handler status types

The LAS (laboratory automation system) carousel sample handler has six possible status types. The following table provides a description of each.

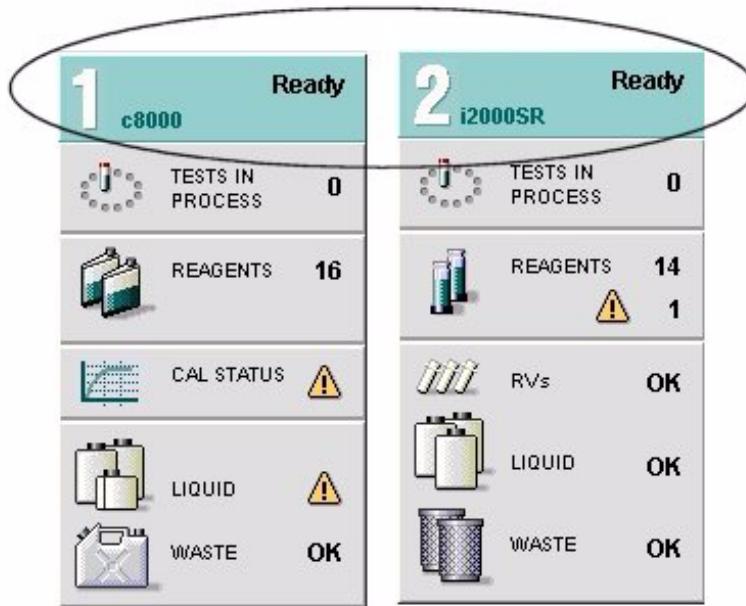
**Table 2.3: LAS carousel sample handler status types**

Status	Indicates
<b>Offline</b>	One of the following exists: <ul style="list-style-type: none"> <li>• Power to the LAS carousel is off.</li> <li>• Power has been turned on, but communication between the LAS carousel and SCC (system control center) has not been re-established.</li> <li>• Communication between the sample handler and the SCC has been lost due to a software or system error.</li> </ul>
<b>Stopped</b>	One of the following exists: <ul style="list-style-type: none"> <li>• Power to the LAS carousel is on, but F5 - Startup on the Snapshot screen has not been selected.</li> <li>• F6 - Stop on the Snapshot screen was selected.</li> <li>• Stop key on the LAS carousel sample handler keypad was selected.</li> <li>• A sample handler diagnostic procedure has completed.</li> <li>• The LAS carousel cover was opened while the LAS carousel was running.</li> <li>• Sample handler detected a fatal error while processing.</li> </ul>
<b>Ready</b>	One of the following exists: <ul style="list-style-type: none"> <li>• Startup is complete.</li> <li>• All samples on the LAS carousel have completed sampling.</li> <li>• Scheduled pause status is complete.</li> </ul> <b>NOTE:</b> The pause indicator illuminates.
<b>Running</b>	One of the following exists: <ul style="list-style-type: none"> <li>• F8 - Run on the Snapshot screen was selected.</li> <li>• Run key on the LAS carousel sample handler keypad was selected.</li> </ul>
<b>Scheduled pause</b>	One of the following exists: <ul style="list-style-type: none"> <li>• F7 - Pause on the Snapshot screen was selected.</li> <li>• Pause key on the LAS carousel sample handler keypad was selected.</li> <li>• All processing modules are unavailable for sample processing.</li> </ul>
<b>Initializing</b>	Either the run key, F8 - Run, or F5 - Startup was selected. This status is a temporary status during which the system performs the following initialization functions: <ul style="list-style-type: none"> <li>• Homes the LAS carousel sample handler</li> <li>• Checks the processing queue bar code reader</li> </ul> Once initialization is complete, the status changes to Running or Ready depending on whether run or startup was selected.

## Processing module status

The processing module graphic(s) on the Snapshot screen indicates the status of the processing module and displays other key system information.

*Figure 2.102: Processing module status*



Processing module status types depend upon the configuration of your system. For a description of the various statuses, see:

- *Processing module status types (c 8000)*, page 108
- *Processing module status types (i 2000 and i 2000SR)*, page 109

## Processing module status types (c 8000)

The *c* 8000™ processing module has nine possible status types. The following table provides a description of each.

**Table 2.4:** *c* 8000™ processing module status types

Status	Indicates	Prohibited activities
<b>Offline</b>	One of the following exists: <ul style="list-style-type: none"> <li>Power to the processing module is off.</li> <li>Power has been turned on, but communication between the processing module and SCC (system control center) has not been re-established.</li> <li>Communication between the processing module and the SCC has been lost due to a software or system error.</li> </ul>	You cannot run samples on the module. You cannot load or unload reagents because the reagent supply center is not aligned correctly.
<b>Stopped</b>	One of the following exists: <ul style="list-style-type: none"> <li>Power to the processing module is on, but F5 - Startup on the Snapshot screen has not been selected.</li> <li>F6 - Stop on the Snapshot screen was selected.</li> <li>Stop key on the processing module keypad was selected.</li> <li>A processing module diagnostic procedure has completed.</li> <li>Processing module detected a fatal error while processing.</li> </ul>	You cannot run samples on the module. You cannot load or unload reagents because the reagent supply center is not aligned correctly.
<b>Warming</b>	Startup is complete, but temperature initialization is not.	You cannot run samples on the module.
<b>Ready</b>	One of the following exists: <ul style="list-style-type: none"> <li>Startup is complete (including temperature initialization).</li> <li>Scheduled Pause status is complete.</li> </ul>	
<b>Scheduled Pause</b>	One of the following exists: <ul style="list-style-type: none"> <li>F7 - Pause on the Snapshot screen was selected.</li> <li>Supplies ran out.</li> <li>Processing module detected an error while processing.</li> </ul>	
<b>Running</b>	One of the following exists: <ul style="list-style-type: none"> <li>F8 - Run on the Snapshot screen was selected.</li> <li>Run key on the processing module keypad was selected.</li> </ul>	You cannot open the reagent supply center covers.

**Table 2.4: *c* 8000<sup>TM</sup> processing module status types (*continued*)**

<b>Status</b>	<b>Indicates</b>	<b>Prohibited activities</b>
<b>Initializing</b>	<p>A temporary status that occurs when the run key, F8 - Run, or F5 - Startup is selected.</p> <p>The following initialization functions are performed by the system:</p> <ul style="list-style-type: none"> <li>• Initialization after F5 - Startup is selected:           <ul style="list-style-type: none"> <li>– Homes motors</li> <li>– Initializes the reagent bar code reader</li> </ul> </li> <li>• Initialization after the run key or F8 - Run is selected:           <ul style="list-style-type: none"> <li>– Checks cover sensors</li> <li>– Scans reagents</li> <li>– Washes probes</li> <li>– Checks inventory</li> </ul> </li> </ul> <p>Once initialization is complete, the status changes to Running or Ready depending on whether run or startup was selected.</p>	<p>You cannot run samples on the module.</p> <p>You cannot load or unload reagents because the reagent supply center is not aligned correctly.</p>
<b>Scanning</b>	<p>A temporary status that occurs when F4 - Scan on the Reagent status screen is selected. Once the scan is complete, the status changes to Ready.</p>	<p>You cannot open the processing center covers.</p>
<b>Maintenance</b>	<p>A temporary status that occurs when certain maintenance procedures are performed.</p>	<p>You cannot run samples on the module.</p>

### **Processing module status types (*i* 2000 and *i* 2000<sub>SR</sub>)**

The *i* 2000<sup>®</sup> and *i* 2000<sub>SR</sub><sup>TM</sup> processing modules have eight possible status types. The following table provides a description of each.

**Table 2.5: *i* 2000 and *i* 2000<sub>SR</sub><sup>TM</sup> processing module status types**

<b>Status</b>	<b>Indicates</b>	<b>Prohibited activities</b>
<b>Offline</b>	<p>One of the following exists:</p> <ul style="list-style-type: none"> <li>• Power to the processing module is off.</li> <li>• Power has been turned on, but communication between the processing module and SCC (system control center) has not been re-established.</li> <li>• Communication between the processing module and the SCC has been lost due to a software or system error.</li> </ul>	<p>You cannot run samples on the module.</p> <p>You cannot load or unload reagents because the reagent supply center is not aligned correctly.</p>

Table 2.5: *i* 2000 and *i* 2000<sub>SR</sub><sup>TM</sup> processing module status types (*continued*)

Status	Indicates	Prohibited activities
<b>Stopped</b>	One of the following exists: <ul style="list-style-type: none"> <li>• Power to the processing module is on but F5 - Startup on the Snapshot screen has not been selected.</li> <li>• F6 - Stop on the Snapshot screen was selected.</li> <li>• Stop key on the processing module keypad was selected.</li> <li>• Processing module diagnostic procedure has completed.</li> <li>• Processing module detected a fatal error while processing.</li> </ul>	You cannot run samples on the module. You cannot load or unload reagents because the reagent supply center is not aligned correctly.
<b>Warming</b>	Startup is complete but temperature initialization is not.	You cannot run samples on the module.
<b>Ready</b>	One of the following exists: <ul style="list-style-type: none"> <li>• Startup is complete (including temperature initialization).</li> <li>• Scheduled Pause status is complete.</li> </ul>	
<b>Scheduled Pause</b>	One of the following exists: <ul style="list-style-type: none"> <li>• F7 - Pause on the Snapshot screen was selected.</li> <li>• Supplies ran out.</li> <li>• Processing module detected an error while processing.</li> </ul>	You cannot open the processing center covers.
<b>Running</b>	One of the following exists: <ul style="list-style-type: none"> <li>• F8 - Run on the Snapshot screen was selected.</li> <li>• Run key on the processing module keypad was selected.</li> </ul>	You cannot open the processing center covers.

**Table 2.5: *i* 2000 and *i* 2000<sub>SR</sub><sup>TM</sup> processing module status types (*continued*)**

Status	Indicates	Prohibited activities
<b>Initializing</b>	<p>A temporary status that occurs when the run key, F8 - Run, or F5 - Startup is selected. The following initialization functions are performed by the system:</p> <ul style="list-style-type: none"> <li>• Initialization after F5 - Startup is selected: <ul style="list-style-type: none"> <li>– Homes motors</li> <li>– Initializes the reagent bar code reader</li> <li>– Fills the inner ring in the process path with RVs (reaction vessels)</li> <li>– Clears any unused RVs from the outer ring of the process path</li> </ul> </li> <li>• Initialization after the run key or F8 - Run is selected: <ul style="list-style-type: none"> <li>– Checks door sensors</li> <li>– Scans reagents and starts microparticle dispersion</li> <li>– Washes probes</li> <li>– Checks inventory</li> <li>– Performs a background read</li> </ul> </li> </ul> <p>Once initialization is complete, the status changes to Running or Ready depending on whether run or startup was selected.</p>	<p>You cannot run samples on the module.</p> <p>You cannot load or unload reagents because the reagent supply center is not aligned correctly.</p> <p>You cannot load wash buffer.</p>
<b>Scanning</b>	<p>A temporary status that occurs when F4 - Scan on the Reagent status screen is selected. Once the scan is complete, the status changes to Ready.</p>	<p>You cannot run samples on the module.</p>

**NOTES**

# Introduction

This section describes powering the ARCHITECT System and configuring communications to a host computer to meet your site's specific requirements. Configuration is performed at time of installation and may be changed at a later time if necessary.

The following topics are included in this section:

- *System startup, pause, and shutdown, page 3*
- *Setting Communications, page 15*

**NOTES**

# System startup, pause, and shutdown

You may need to start up, pause, shut down, cycle power to, or power off the system and its components to:

- Load samples, reagents, and solutions
- Perform maintenance or diagnostic procedures
- Replace components

System startup, pause, and shutdown topics include:

- *SCC power off and power on*, page 3
- *Processing module and sample handler cycle power, startup, and pause*, page 6

## SCC power off and power on

You may need to shut down and power off the SCC (system control center) prior to:

- Replacing SCC components
- Reseating cables or connectors
- Configuring the system

Refer to specific procedures to determine if you must shut down the SCC.

To resume normal operation, you must then *Power on the SCC*, page 3.

SCC power off and power on procedures include:

- *Power on the SCC*, page 3
- *Power off the SCC*, page 4
- *Cycle power to the SCC*, page 5

### Power on the SCC

Perform this procedure to apply power to the SCC (system control center).

<b>Prerequisite</b>	<i>Power off the processing module and/or sample handler</i> , page 7
<b>Module status</b>	Offline, Stopped, Warming, or Ready
<b>User access level</b>	General operator
<b>Supplies</b>	N/A

To power on the SCC:

1. Verify the processing module power is off before applying power to the SCC.

**NOTE:** If the processing module(s) power is on when you power on the SCC, communication is not properly initialized between the system components.

2. Press the power switch on the CPU (central processing unit) to turn on the SCC.

### **Power off the SCC**

Perform this procedure to shut down and power off the SCC (system control center) and to ensure that all data is stored before powering off the system.

To cycle power to the SCC, see *Cycle power to the SCC*, page 5.

<b>Prerequisite</b>	<i>Access the Snapshot screen, page 2-21</i>
<b>Module status</b>	Offline, Stopped, Warming, or Ready
<b>User access level</b>	General operator
<b>Supplies</b>	NA

To power off the SCC:

1. Select **F3 - Shutdown** on the Snapshot screen.

**NOTE:** The sample handler and processing module(s) are not functional when the system control center is off. To prevent flooding when your system is connected to an ARCHITECT ARM™ (Automatic Reconstitution Module) accessory, do not shut down the SCC if the ARM is in the process of filling the wash buffer reservoir.

A confirmation message displays.

2. Select **OK** to initiate shutdown.
3. Wait for the information window to display, and then simultaneously press the **CTRL+ALT+DELETE** keys on the keyboard.

The Confirm Exit window displays.

4. Leave the **Shutdown Computer** option selected, and then select **OK**.

5. Wait for the information window to display, and then press and hold the power switch on the front of the CPU (central processing unit) to turn off power to the SCC.

**NOTE:** The SCC may power off immediately, or it may take up to 10 seconds depending on the type of SCC you have.

### Cycle power to the SCC

Perform this procedure to cycle power to the SCC (system control center) to reestablish communication to the system control center, to store configuration information, or when indicated for troubleshooting purposes.

<b>Prerequisite</b>	<i>Access the Snapshot screen, page 2-21</i>
<b>Module status</b>	Offline, Stopped, Warming, or Ready
<b>User access level</b>	General operator
<b>Supplies</b>	NA

To cycle power to the SCC:

1. Select **F3 - Shutdown** on the Snapshot screen.

**NOTE:** The sample handler and processing module(s) are not functional when the system control center is off. To prevent flooding when your system is connected to an ARCHITECT ARM™ (Automatic Reconstitution Module) accessory, do not shut down the SCC if the ARM is in the process of filling the wash buffer reservoir.

A confirmation message displays.

2. Select **OK** to confirm the shutdown.
3. Wait for the information window to display, and then simultaneously press the **CTRL+ALT+DELETE** keys on the keyboard.

The Confirm Exit window displays.

4. Leave the **Shutdown Computer** option selected, and then select **OK**.

5. Wait for the information window to display, and then press and hold the power switch on the front of the CPU (central processing unit) to turn off power to the SCC.

**NOTE:** The SCC may power off immediately, or it may take up to 10 seconds depending on the type of SCC you have.

6. Move the power switch on the lower left rear of the processing module(s) down to turn off the power.
7. Press the power switch on the front of the CPU to turn on power to the SCC.
8. Wait for the Snapshot screen to display. It may take several minutes to display.
9. Ensure the processing module(s) has been powered off for five minutes, and then move the power switch up to turn on power.

To change the status of the processing module from Stopped to Ready, see *Start up the processing module and/or sample handler*, page 9.

***Related information...***

- *Snapshot screen*, page 2-20
- *System control center*, page 2-9

## **Processing module and sample handler cycle power, startup, and pause**

It may be necessary for you to remove power to the processing module(s) and sample handler to perform certain procedures.

Cycling power involves powering off the processing module and sample handler followed by applying power. Once the power is on, you must perform a startup to attain a Ready status.

You are required to pause the sample load queue to load samples on the SSH (standard sample handler), and you must pause the sample carousel (*c System*) to load samples in the carousel.

You are required to pause the processing module and sample handler to load reagents, and solutions and to perform maintenance or diagnostic procedures.

Processing module and sample handler cycle power, startup, and pause procedures include:

- *Power on the processing module and/or sample handler*, page 7
- *Power off the processing module and/or sample handler*, page 7
- *Cycle power to the processing module and/or sample handler*, page 8

- *Start up the processing module and/or sample handler, page 9*
- *Pause the processing module, page 10*
- *Pause the RSH, page 11*
- *Pause the sample carousel (c System), page 12*
- *Pause the sample load queue (SSH), page 12*
- *Pause the LAS carousel sample handler, page 13*

### Power on the processing module and/or sample handler

Perform this procedure to apply power to the processing module and/or sample handler.

<b>Prerequisite</b>	<i>Power on the SCC, page 3</i>
<b>Module status</b>	Offline
<b>User access level</b>	General operator
<b>Supplies</b>	NA

To power on the processing module and/or sample handler:

1. Ensure that the SCC (system control center) power is on and that the Snapshot screen displays.
2. Move the power switch on the lower left rear of the processing module up to turn on the power.

**NOTE:** In a single module system, powering off the processing module also turns off power to the sample handler.

In a multi-module system, powering off the processing module furthest to the right (when facing the front of the system) also powers off the sample handler.

To change the status of the processing module and sample handler from Stopped to Ready, see *Start up the processing module and/or sample handler, page 9*.

#### **Related information...**

- *Snapshot screen, page 2-20*
- *Processing module (c 8000), page 2-27*
- *Processing modules (ARCHITECT® i System), page 2-48*

### Power off the processing module and/or sample handler

Perform this procedure to power off the processing module and sample handler during component replacement, troubleshooting activities.

To cycle power to the processing module and sample handler, see *Power on the processing module and/or sample handler, page 7.*

<b>Prerequisite</b>	NA
<b>Module status</b>	Offline, Stopped, Warming, or Ready
<b>User access level</b>	General operator
<b>Supplies</b>	NA

To power off the processing module and/or sample handler:

1. Determine the module to power off.
2. Verify the processing module and/or sample handler are in Offline, Stopped, Warming, or Ready status. The processing module MUST be in one of these statuses to ensure that test processing is not interrupted.
3. Move the power switch on the lower left rear of the processing module down to turn off the power.

**NOTE:** In a single module system, powering off the processing module also turns off power to the sample handler.

In a multi-module system, powering off the processing module furthest to the right (when facing the front of the system) also powers off the sample handler.

***Related information...***

- *Snapshot screen, page 2-20*
- *Processing module (c 8000), page 2-27*
- *Processing modules (ARCHITECT® i System), page 2-48*

**Cycle power to the processing module and/or sample handler**

Perform this procedure to cycle power to the processing module and/or sample handler when indicated for troubleshooting purposes and to reestablish communication to the SCC (system control center).

<b>Prerequisite</b>	NA
<b>Module status</b>	Offline, Stopped, Warming, or Ready
<b>User access level</b>	General operator
<b>Supplies</b>	NA

To cycle power to the processing module and/or sample handler:

1. Determine the module to power off.
2. Verify the processing module and/or sample handler are in Offline, Stopped, Warming, or Ready status. The processing module MUST be in one of these statuses to ensure that test processing is not interrupted.
3. Move the power switch on the lower left rear of the processing module down to turn off the power.

**NOTE:** In a single module system, powering off the processing module also turns off power to the sample handler.

In a multi-module system, powering off the processing module furthest to the right (when facing the front of the system) also powers off the sample handler.

4. Ensure that the SCC (system control center) power is on and that the Snapshot screen displays.
5. Ensure the processing module has been powered off for five minutes, and then move the power switch up to turn on the processing module and/or sample handler.

To change the status of the processing module and sample handler from Stopped to Ready, see *Start up the processing module and/or sample handler*, page 9.

***Related information...***

- *Snapshot screen, page 2-20*
- *Processing module (c 8000), page 2-27*
- *Processing modules (ARCHITECT® i System), page 2-48*

### **Start up the processing module and/or sample handler**

Perform this procedure to change the status of the processing module and/or sample handler from Stopped to Ready to:

- Initialize the processing module and/or sample handler
- Prepare for sample processing

<b>Prerequisite</b>	<i>Power on the SCC, page 3</i> <i>Power on the processing module and/or sample handler, page 7</i> <i>Access the Snapshot screen, page 2-21</i>
<b>Module status</b>	Stopped
<b>User access level</b>	General operator
<b>Supplies</b>	NA

To start up the processing module and/or sample handler:

1. Select the **processing module** graphic and/or **sample handler** graphic on the Snapshot screen, and then select F5 - Start-up.
2. Verify the status(es) when startup is complete:
  - Ready or Warming (processing module)
  - Ready (sample handler)

**Related information...**

- *Snapshot screen, page 2-20*
- *Processing modules, page 2-27*

## **Pause the processing module**

Perform this procedure to change the status of the processing module from Running to Ready to:

- Load reagents
- Load bulk solutions
- Perform maintenance or diagnostic procedures
- Perform component replacement

<b>Prerequisite</b>	<i>Pause the RSH, page 11</i> <i>Pause the sample carousel (c System), page 12</i> <i>Pause the sample load queue (SSH), page 12</i> <i>Pause the LAS carousel sample handler, page 13</i> <i>Access the Snapshot screen, page 2-21</i>
<b>Module status</b>	Sample handler - All except Running Processing module - Running
<b>User access level</b>	General operator
<b>Supplies</b>	NA

To pause the processing module:

1. Verify the sample handler is not in the Running status.

**NOTE:** If you do not pause the sample handler and wait for all scheduled tests to aspirate before you pause the processing module, all tests with a status of Scheduled become exceptions and are not processed.

2. Verify all tests have a status of Pending or Running.
3. Select the desired **processing module** graphic on the Snapshot screen, and then select F7 - Pause.

A confirmation message displays.

4. Select OK to pause the processing module.

**NOTE:** If you are pausing a *c* System processing module, do not open the R1 and R2 reagent supply center covers until the access indicators on the processing module keypad illuminate.

**NOTE:** If you are pausing an *i* System processing module, do not open the module covers until the access indicator on the processing module keypad illuminates, indicating the status is Ready.

#### ***Related information...***

- *Snapshot screen, page 2-20*
- *Processing module (c 8000), page 2-27*
- *Processing modules (ARCHITECT® i System), page 2-48*

### **Pause the RSH**

Perform this procedure to pause the RSH (retest sample handler) so you can:

- Remove a sample carrier from the priority bay when the amber indicator is illuminated
- Remove a carrier tray from a routine bay(s) when the amber indicator is illuminated

You may also perform this procedure to pause the RSH prior to pausing a processing module(s) so that samples are not transported to the module(s).

**NOTE:** When you pause the RSH, the sample handler status transitions from Running to Scheduled pause. The processing module completes aspirations for all scheduled tests, and the RSH returns the carriers to their original locations. It may take up to 45 minutes for the sample handler to complete this process. If you do not initiate a run on the sample handler during that time, the sample handler status changes to Ready.

To pause the processing module, see *Pause the processing module, page 10*.

<b>Prerequisite</b>	<i>Access the Snapshot screen, page 2-21</i>
<b>Module status</b>	Running
<b>User access level</b>	General operator
<b>Supplies</b>	NA

To pause the RSH:

1. Select the **sample handler** graphic on the Snapshot screen, and then select **F7 - Pause**.

A confirmation message displays.

2. Select **OK** to pause the RSH.

The pause indicator illuminates on the sample handler keypad.

***Related information...***

- *Snapshot screen, page 2-20*

### **Pause the sample carousel (c System)**

Perform this procedure to pause the sample carousel when the sample carousel access indicator is not illuminated. In the Paused status, you can:

- Load patient samples, calibrators, or controls for priority processing
- Remove samples when they are no longer needed

<b>Prerequisite</b>	NA
<b>Module status</b>	Running
<b>User access level</b>	General operator
<b>Supplies</b>	NA

To pause the sample carousel:

1. Press the **sample carousel access** indicator button (square) next to the sample carousel.

The sample carousel access indicator blinks to indicate the sample carousel is in the process of pausing.

2. Verify the illuminated **sample carousel access** indicator is no longer blinking.

### **Pause the sample load queue (SSH)**

Perform this procedure to change the status of the SSH (standard sample handler) from Running to Load queue paused so you can:

- Load a sample carrier
- Priority load a sample carrier

You may also perform this procedure to pause the SSH prior to pausing a processing module(s) so that samples are not transported to the module(s).

**NOTE:** When you pause the sample load queue, the sample handler status transitions from Running to Load queue paused. The sample load queue stops routing any new carriers, but the processing queue and unload queue remain active for approximately 20 minutes after the last carrier is unloaded. If you do not initiate a run on the sample handler during that time, the sample handler status changes to Ready.

To pause the processing module see, *Pause the processing module*, page 10.

<b>Prerequisite</b>	<i>Access the Snapshot screen, page 2-21</i>
<b>Module status</b>	Running
<b>User access level</b>	General operator
<b>Supplies</b>	NA

To pause the sample load queue:

1. Select the **sample handler** graphic on the Snapshot screen, and then select **F7 - Pause**.  
A confirmation message displays.
2. Select **OK** to pause the SSH.  
The pause indicator illuminates on the sample handler keypad.

#### ***Related information...***

- *Snapshot screen, page 2-20*

#### **Pause the LAS carousel sample handler**

Perform this procedure to pause the LAS (laboratory automation system) carousel sample handler so you can:

- Priority load a sample or calibrator
- Remove samples when they are no longer needed

You may also perform this procedure to pause the LAS carousel sample handler prior to pausing the processing module.

**NOTE:** When you pause the LAS carousel sample handler, the sample handler status transitions from Running to Scheduled pause. The processing module completes aspirations for the current sample or for all scheduled calibrators. If you do not initiate a run on the sample handler during that time, the sample handler status changes to Ready.

To pause the processing module see, *Pause the processing module*, page 10.

<b>Prerequisite</b>	<i>Access the Snapshot screen, page 2-21</i>
<b>Module status</b>	Running
<b>User access level</b>	General operator
<b>Supplies</b>	NA

To pause the LAS carousel sample handler:

1. Select the **sample handler** graphic on the Snapshot screen, and then select F7 - **Pause**.

A confirmation message displays.

2. Select **OK** to pause the LAS carousel sample handler.

The pause indicator illuminates on the sample handler keypad.

**NOTE:** If you open the LAS carousel cover before the indicator illuminates, all tests in process on the carousel become exceptions and do not complete.

***Related information...***

- *Snapshot screen, page 2-20*

## Setting Communications

This subsection provides information on configuring the ARCHITECT System communication settings to meet your site-specific requirements.

System configuration categories include:

- *Host – Release Mode Configuration Windows, page 17*
- *System Control Center Configuration Windows, page 24*
- *Serial Ports Configuration Windows, page 28*

To access the Configuration screen, select the **System** icon, then select **Configuration** from the drop-down menu (Figure 3.1). The Configuration screen for System settings is displayed (Figure 3.2).

Figure 3.1: Accessing the System Configuration Screen

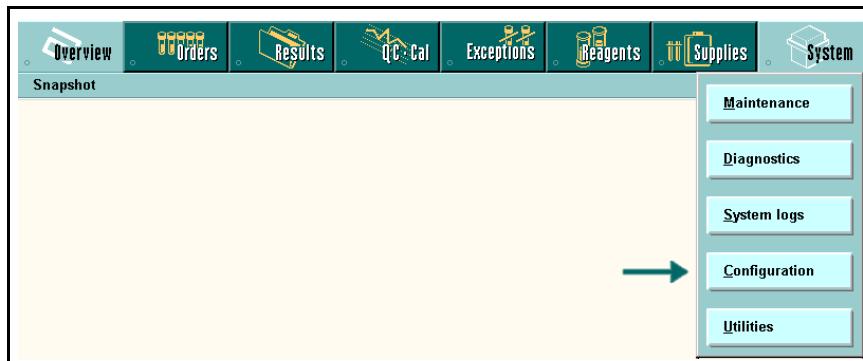
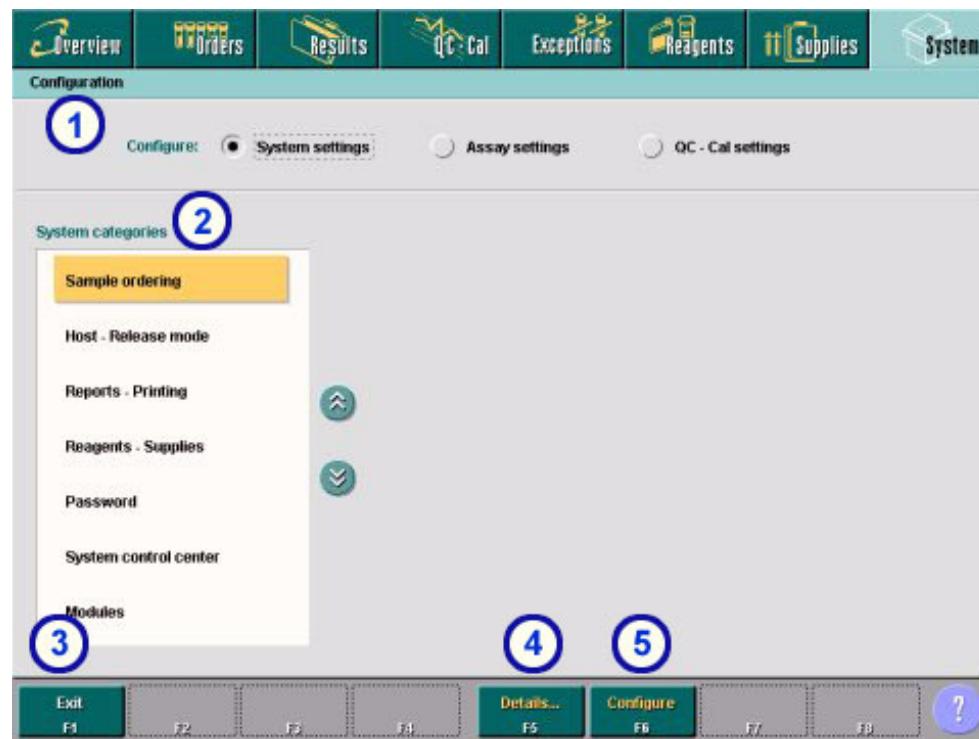


Figure 3.2: Configuration screen - System settings view



<p>1. Configure: Allows you to select one of the following categories for configuration: System settings Assay settings QC-Cal settings</p>	<p>2. System categories: Allows you to select the following system configuration items:</p> <ul style="list-style-type: none"><li>• Sample ordering</li><li>• Host-Release mode</li><li>• Reports - Printing</li><li>• Reagents - Supplies</li><li>• Password</li><li>• System control center</li><li>• Modules</li><li>• Sample handler</li><li>• Sample bar code readers</li><li>• Serial ports</li></ul>
<p>3. F1 - Exit: Displays the Snapshot screen.</p> <p>5. F6 - Configure: Displays the configuration window allowing you to configure the information for the selected item(s).</p>	<p>4. F5 - Details: Displays the details window allowing you to view detailed information for the item(s) you selected.</p>

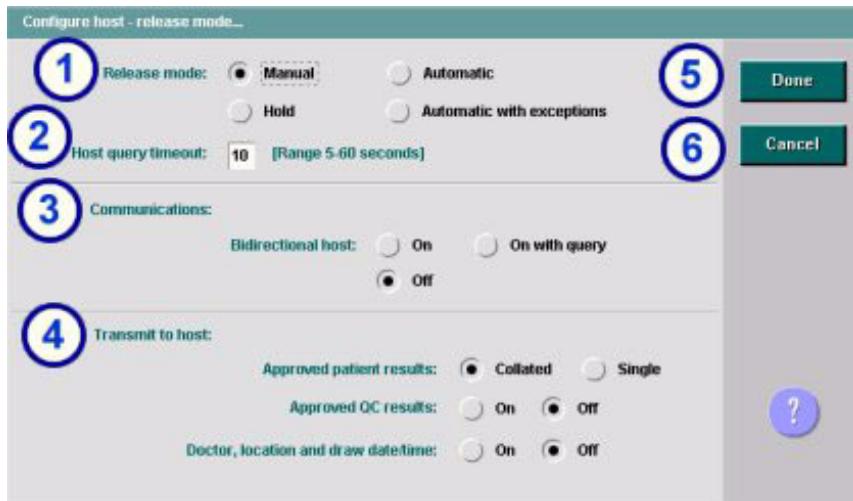
## **Host – Release Mode Configuration Windows**

There are two Host - Release mode windows that allow you to either view or configure the settings for host - release mode.

### Configure host - release mode window

From the Configure host - release mode window, the system administrator can configure the settings for release mode, communication type, and result reporting to a host computer.

Figure 3.3: Configure host - release mode window



<p><b>1.</b> Release mode: Allows the general operator to select the release mode for results.</p> <p>Options are:</p> <ul style="list-style-type: none"> <li>Manual - All results must be manually released. (Default)</li> <li>Hold - All results with flags must be manually released.</li> <li>Automatic - Results are released automatically.</li> <li>Automatic with exceptions - Results and exceptions are automatically released.</li> </ul>	<p><b>2.</b> Host query timeout: Allows the general operator to enter the maximum time period (in seconds) that the system waits for the host computer to respond to a query.</p> <p>Range: 5 – 60 seconds (Default: 10 seconds)</p> <p><b>NOTE:</b> System throughput may degrade if this timeout period is greater than ten seconds.</p>
<p><b>3.</b> Communications: Allows the general operator to enable the bidirectional host mode, so the system can receive orders from and transmit results to a host computer.</p> <p>Options are:</p> <ul style="list-style-type: none"> <li>On</li> <li>On with query</li> <li>Off (Default)</li> </ul> <p><b>NOTE:</b> Turning bidirectional host <b>off</b> allows you to clear all results waiting to be sent to the host.</p>	<p><b>4.</b> Transmit to host: Allows the general operator to define the method for transmitting patient and quality control results to the host computer.</p>
<p><b>5.</b> Done: Accepts your selection(s) and returns to the Configuration screen.</p>	<p><b>6.</b> Cancel: Cancels your selection(s) and returns to the Configuration screen.</p>

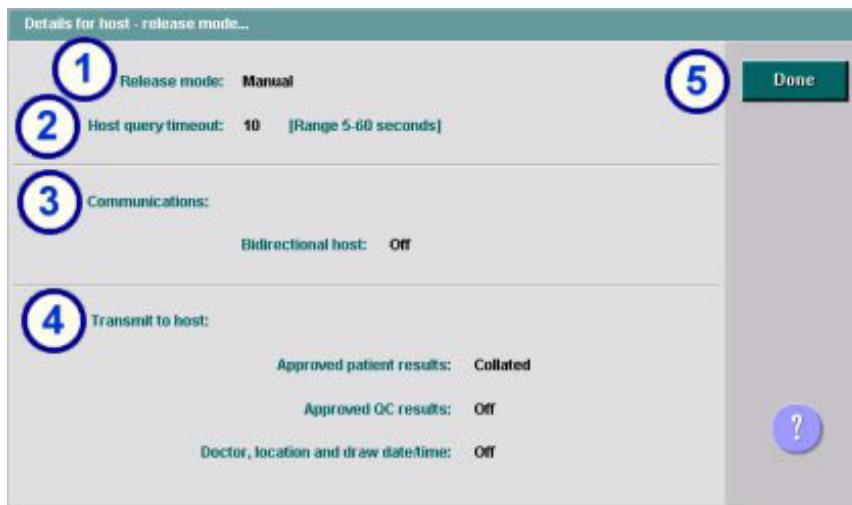
**Related procedures...**

- Configure host interface settings, page 22

**Details for host - release mode window**

From the Details for host - release mode window you can view the current settings for release mode, communication type, and result reporting to a host computer.

Figure 3.4: Details for host - release mode window



1. Release mode: Displays the current setting for result release mode.	2. Host query timeout: Displays the maximum time period (in seconds) that the system waits for the host computer to respond to a query.
3. Communications: Displays the current setting for bidirectional host transmissions.	4. Transmit to host: Displays the method for transmitting patient and quality control results to the host computer.
5. Done: Returns to the Configuration screen.	

**Related procedures...**

- *View the host communication settings, page 21*

**Table 3.1: Options for Transmitting to Host Computer**

Approved patient results (Default: Collated)	
Collated	Allows for results for multiple orders for a single sample ID to be sent within a message.  <b>NOTE:</b> Results (both completed results and exceptions) are collated by sample ID. Released Results are held in Pending collation status until all completed results for a sample ID are released and all exceptions for the sample ID have been reported. All test orders for the sample ID must produce an outcome, either a completed result or an exception, before any released results for the sample ID are sent to the host computer.
Single	Allows for a single result for a single patient to be sent within a message.
Approved QC results (Default: Off)	
On	Allows approved QC results and QC exceptions to be released to the host computer.
Off	Approved QC results and QC exceptions are not sent to the host computer.
Doctor, Location, and Draw Date/Time (Default: Off)	
On	Doctor, location, and draw date/time are sent to the host computer (if data is available) in result messages.
Off	Doctor, location, and draw date/time are not sent to host computer in result messages (even if data is available).

## Configuration screen – System settings view

From the System settings view of the Configuration screen the general operator can access windows to view detailed information for configured system settings.

The system administrator can access windows to configure these settings, which include:

- Sample ordering
- Host - Release mode
- Reports - Printing
- Reagents - Supplies
- Password

- System control center
- Modules
- Sample handler
- Sample bar code reader
- Serial ports

### Access the Configuration screen – System settings view

Perform this procedure to display the System settings view of the Configuration screen.

<b>Prerequisite</b>	NA
<b>Module status</b>	Any
<b>User access level</b>	General operator
<b>Supplies</b>	NA

To access the Configuration screen – System settings view:

Select **System** from the menu bar, and then select **Configuration**.

The Configuration screen – System settings view displays.

#### **Related information...**

- *Configuration screen – System settings view, page 20*

### View the host communication settings

Perform this procedure to display the Details for host - release mode window. From this window you can view the current settings for host communication which include the release mode, communication type, and result reporting to a host computer.

<b>Prerequisite</b>	<i>Access the Configuration screen – System settings view, page 3-21</i>
<b>Module status</b>	Any
<b>User access level</b>	General operator
<b>Supplies</b>	NA

To view the host communication settings:

1. Select **Host - Release mode** from the **System categories** list on the Configuration screen.
2. Select **F5 - Details**.

The Details for host - release mode window displays.

#### **Related information...**

- *Configuration screen – System settings view, page 20*

- *Details for host - release mode window, page 19*

### **Configure host interface settings**

Perform this procedure to configure the host interface settings for release mode, communications, and transmitting results to the host.

<b>Prerequisite</b>	<i>Access the Configuration screen – System settings view, page 3-21</i>
<b>Module status</b>	Stopped, Warming, or Ready (Exceptions are noted in steps 4 and 5.)
<b>User access level</b>	General operator
<b>Supplies</b>	NA

To configure host interface settings:

1. Select **Host - Release mode** from the **System categories** list on the Configuration screen.
2. Select **F6 - Configure**.  
The Configure host-release mode window displays.
3. Select the desired **Release mode** option.
  - Manual - All results must be released manually.
  - Hold - All results with flags and interpretations that are configured for results review must be released manually.
  - Automatic - All results are released automatically.
  - Automatic with exceptions - All results and exceptions are released automatically.
4. Enter the timeout interval (in seconds) in the **Host query timeout** data entry box. (*optional*)

**NOTE:** You can configure this value in any system status. System throughput may be degraded if the time interval is greater than 10 seconds.

5. Select the desired **Bidirectional host** option.

**NOTE:** You can configure this value in any system status.

**NOTE:** Turning Bidirectional host off allows you to clear all results waiting to be sent to the host.

6. Select the desired **Transmit to host** option:

- **Approved patient results** - transmits collated or single patient results to the host after release

**NOTE:** Results are collated by sample ID when you select the collated option. If the release mode is configured for automatic release, results are held in Pending collation status until all results for a sample ID are released.

- **Approved QC results** - transmits control results to the host after release
- **Doctor, location, and draw date / time** - transmits doctor, location, and draw date and time information to the host after release

7. Select **Done** to save your changes.

#### ***Related information...***

- *Configuration screen - System settings view*, page 16
- *Configure host - release mode window*, page 18

#### **Cancel result transmission**

Perform this procedure to clear all results that are pending transmission to the host.

<b>Prerequisite</b>	<i>Access the Configuration screen – System settings view, page 3-21</i>
<b>Module status</b>	Any
<b>User access level</b>	General operator
<b>Supplies</b>	NA

To cancel result transmission:

1. Select **Host-Release mode** from the **System categories** list on the Configuration screen.

2. Select **F6 - Configure**.

The Configure host - release mode window displays.

3. Select the **Bidirectional host: Off** option, and then select **Done**.

A message displays when you have results that are pending transmission to the host.

4. Select **OK** to cancel result transmission.

**NOTE:** If you select Cancel to leave the Bidirectional host on, the results pending transmission remain until transmission is successful.

Results with a status of Pending Transmission go to a status of complete. Error message 8465, Host transmission canceled by the user, is logged in the Message History log.

**NOTE:** To resume host communication, you must reset the bidirectional host option.

***Related information...***

- *Configuration screen – System settings view, page 20*
- *Details for host - release mode window, page 19*
- *Configure host - release mode window, page 18*

## **System Control Center Configuration Windows**

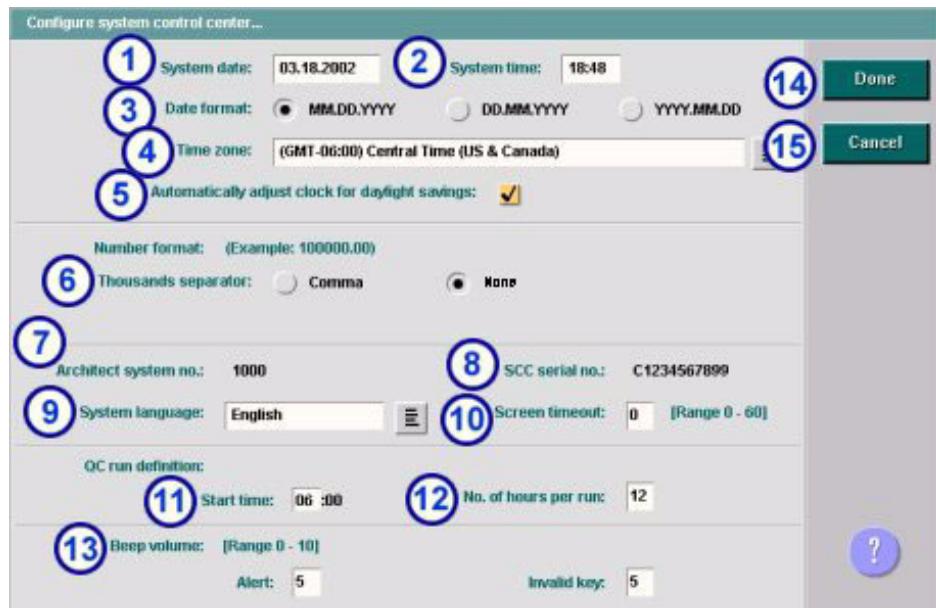
There are two System control center windows that allow you to either view or configure the settings for the system control center.

### **Configure system control center window**

From the Configure system control center window, the system administrator can configure the settings for the SCC (system control center), which include:

- System date, date format, time, time zone, and automatic adjustment for daylight savings time
- Number format for thousands separator
- System language and screen time out
- QC run definition
- Beep volume

Figure 3.5: Configure system control center window



1. System date: Allows you to edit the system date.	2. System time: Allows you to edit the system time.
3. Date format: Allows you to edit the date format setting.  Options are: MM.DD.YYYY (Default) DD.MM.YYYY YYYY.MM.DD	4. Time zone (list): Allows you to select the area-specific time zone used to automatically adjust for daylight savings time.
5. Automatically adjust for daylight savings time: Allows you to select the check box to automatically adjust the clock for daylight savings.  Default: checked.	6. Thousands separator: Allows you to select the number format for the thousands separator.  Options are: Comma None (Default)  <b>NOTE:</b> Previously generated results are not updated to the new format.
7. Architect system no.: Allows the Abbott service representative to enter the ARCHITECT® serial number.	8. SCC serial no.: Allows the Abbott service representative to enter the SCC serial number.
9. System language (list): Allows the general operator to select the system language.  Option is: English	10. Screen timeout: Allows you to edit the setting for screen timeout.  Range: 0 – 60 minutes Default: 0  <b>NOTE:</b> System generated information or information messages do not remove the screen saver. To restore the screen, press Enter on the keyboard

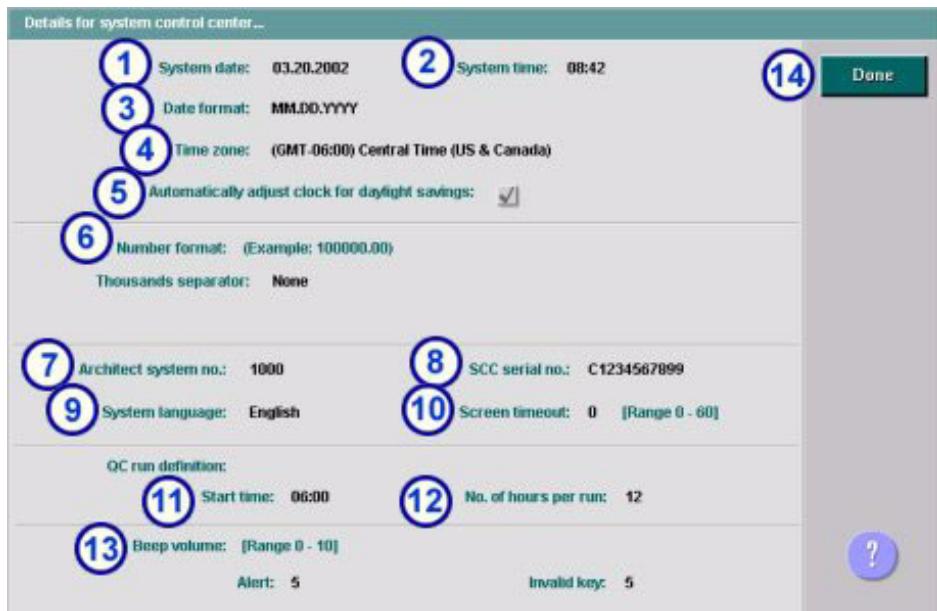
<p><b>11.</b> QC run definition - Start time: Allows you to enter the run definition start time. This information is used during Westgard rule analysis.</p> <p>Default: Start time - 6:00</p>	<p><b>12.</b> QC run definition - No. of hours per run: Allows you to enter the run definition number of hours per run. This information is used during Westgard rule analysis.</p> <p>Default: Hours per run - 12</p>
<p><b>13.</b> Beep volume: Allows you to enter a value for the beep volume for the following audible tones:</p> <p>Alert (occurs when an information message displays) Invalid key (occurs when you press an invalid keyboard key)</p> <p>Range: 0 – 10 Default: 5</p> <p><b>NOTE:</b> This setting is only available if your system is configured with speakers.</p>	<p><b>14.</b> Done: Accepts your selection(s) and returns to the Configuration screen.</p>
<p><b>15.</b> Cancel: Cancels your selection(s) and returns to the Configuration screen.</p>	

### Details for system control center window

From the Details for system control center window, you can view the current settings for the SCC (system control center), which include:

- System date, date format, time, time zone, and automatic adjustment for daylight savings time
- Number format for thousands separator
- System language and screen time out
- QC run definition
- Beep volume

**Figure 3.6: Details for system control center**



1. System date: Displays the current system date.	2. System time: Displays the current system time.
3. Date format: Displays the current date format setting.	4. Time zone: Displays the area-specific time zone used to automatically adjust for daylight savings time.
5. Automatically adjust for daylight savings: If selected, indicates the system automatically adjusts the clock for daylight savings.	6. Number format - Thousands separator: Displays the current number format for the thousands separator.  <b>NOTE:</b> Previously generated results are not updated to the new format.
7. Architect system no.: Displays the ARCHITECT® System number.  <b>NOTE:</b> Only an Abbott service representative can edit this setting.	8. SCC serial no.: Displays the SCC serial number.  <b>NOTE:</b> Only an Abbott service representative can edit this setting.
9. System language: Displays the current setting for system language.	10. Screen timeout: Displays the current setting for screen timeout.
11. QC run definition Start time: Displays the run definition start time. This information is used during Westgard rule analysis.	12. QC run definition No. of hours per run: Displays the run definition number of hours per run. This information is used during Westgard rule analysis.
13. Beep volume: Displays the beep volume settings for the Alert and Invalid key audible tones.  <b>NOTE:</b> Displays only if your system is configured with speakers.	14. Done: Returns to the Configuration screen.

**NOTE:** If a date is entered when you change the date format, the new format does not display in the system date field until you select **Done** and the dialog window is accessed again.

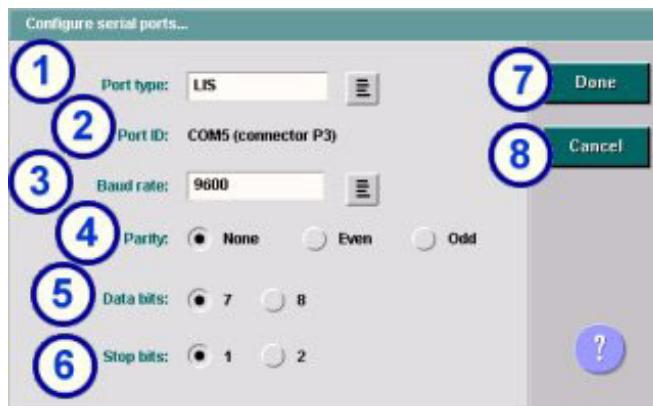
## Serial Ports Configuration Windows

There are two Serial ports windows that allow you to either view or configure the settings for serial ports.

### Configure serial ports window

From the Configure serial ports window the system administrator can configure communication settings for the serial ports.

Figure 3.7: Configure serial ports window



<p><b>1.</b> Port type: Allows you to select the list button to view the port types supported by the system, and then select the desired port type(s).</p> <p>Options are: LIS (Default) ARM LAS</p>	<p><b>2.</b> Port ID: Displays the unique ID for the port.</p> <p>Options are: COM5 (LIS) Connector P3 (Default) COM6 (LAS) Connector P4 COM7 (ARM) Connector P5</p>
<p><b>3.</b> Baud rate: Allows you to select the baud rate for the selected port.</p> <p>Options are: 1200 2400 4800 9600 (Default) 14400 19200 28800 38400 57600 115200</p> <p><b>NOTE:</b> You cannot edit the baud rate for the ARCHITECT ARM™ serial port.</p>	<p><b>4.</b> Parity: Allows you to select from the following parity options: None (Default) Even Odd</p> <p><b>NOTE:</b> You cannot edit the parity option for the ARCHITECT ARM™ serial port.</p>

5. Data bits: Allows you to select from the following options: 7 8 (Default)  <b>NOTE:</b> You cannot edit data bits for the ARCHITECT ARM™ serial port.	6. Stop bits: Allows you to select from the following options: 1 (Default) 2  <b>NOTE:</b> You cannot edit stop bits for the ARCHITECT ARM™ serial port.
7. Done: Accepts your selection(s) and returns to the Configuration screen.	8. Cancel: Cancels your selection(s) and returns to the Configuration screen.

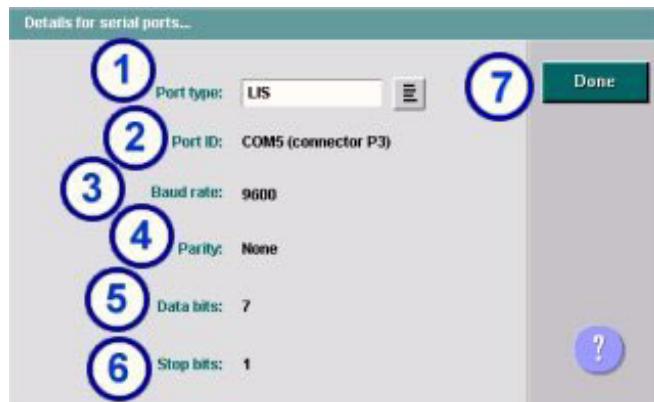
**Related procedures...**

- *Change the LIS serial port settings*, page 29

**Details for serial ports window**

From the Details for serial ports window you can view the current communication settings for the port types.

Figure 3.8: Details for serial ports window



1. Port type (list): Displays the selected port type supported by the system. Select the list button to view all port types.	2. Port ID: Displays the unique ID and the communication connector number for the port.
3. Baud rate: Displays the selected baud rate.	4. Parity: Displays the selected parity.
5. Data bits: Displays the selected data bits.	6. Stop bits: Displays the selected stop bits.
7. Done: Returns to the Configuration screen.	

**Change the LIS serial port settings**

Perform this procedure to change the LIS (laboratory information system) serial port settings.

<b>Prerequisite</b>	Access the Configuration screen – System settings view, page 3-21
<b>Module status</b>	Stopped, Warming, or Ready
<b>User access level</b>	System administrator

<b>Supplies</b>	NA
-----------------	----

To change the LIS serial port settings:

1. Select **Serial ports** from the **System categories** list on the Configuration screen.
2. Select **F6 - Configure**.

The Configure serial ports window displays.

3. Select the **Port type** list button, and then select **LIS**.
4. Select the **Baud rate** list button, and then select the desired value.
5. Select the desired **Parity** option.
6. Select the desired **Data bits** option.
7. Select the desired **Stop bits** option.
8. Select **Done**.

A confirmation message displays.

9. Select **OK** to save your changes.

The serial port changes take effect the next time the system control center power is cycled.

To cycle power to the system control center, see *Cycle power to the SCC, page 3-5*.

***Related information...***

- *Configuration screen - System settings view, page 16*
- *Configure serial ports window, page 28*

# Introduction

This section outlines the ASTM records and field contents needed to establish communication from the ARCHITECT System to a host computer.

Topics include:

- [Communication: ARCHITECT System to Host](#)
- [Unicode Support](#)

For information on communicating from the host to the ARCHITECT System, refer to [ARCHITECT System-specific Incoming Messages](#) on page 5-1.

**NOTES**

# Communication: ARCHITECT System to Host

Transmission of Patient test results, Quality control results and Order Query Requests utilize the high-level ASTM records and fields described in this section. Unused fields are not listed.

The generation of System to Host messages involves validation to application level requirements. An application level requirement is defined to be a requirement, which is independent of the particular standard governing the message content layer, in this case, Standard ASTM E 1394-91.

The data defining the message are validated to application level requirements. If a given application level requirement is violated, the user is notified and the data set which contains the error is considered invalid and is not transmitted to the host.

When generating a System to Host message, the system is only required to transmit the record, up to and including the last populated field of the record and then the trailing carriage return. All empty fields subsequent to the last populated field of the record can be suppressed from transmission to the host.

The system provides the ability to transmit the outcome (result or exception) of Patient and Control test orders to the host. Calibrator results and exceptions are suppressed when transmitting to the host. System ordered constituent results and exceptions are suppressed when transmitting to the host (part of a calculated result).

## QC Results Transmission

A Control test result is queued for transmission to the host (and considered pending transmission) if the following conditions are satisfied: (1) it is released, (2) if, at the time of its release, the Approved QC results transmission option is On and (3) if, at the time of its release, the Host Bidirectional Mode is On or On with query. The record hierarchy is in the same format as Single Approved Patient results, see Patient Results Transmission.

A Control test exception is queued for transmission to the host (and considered pending transmission) if the following conditions are satisfied: (1) if the control test exception is manually selected for Release or the Release Mode is Automatic with Exceptions, (2) if, at the time of its release, the Approved QC results transmission Option is On, and (3) if, at the time of its release, the Bidirectional Host Mode is On or On with query

## Patient Results Transmission

The system is capable of providing Patient results and exceptions to the host in one of two ways: Single or Collated, based upon the selected Approved Patient results transmission option:

### **Single**

When the Approved Patient results transmission option is Single, a Patient test result or exception is queued for transmission to the host (and considered pending transmission), if the result is released (available for transmission), and if, at the time of its release, the Bidirectional Host Mode is On or On with query.

The record hierarchy of outgoing messages for Patient results and exceptions is as follows:

Message Header Record

Patient Information Record

Test Order Record

Result Record (Final)

Comment Record (optional)

Result Record (Interpretation- optional)

Result Record (Preliminary- optional)

Message Terminator Record

### **Collated**

When the Approved Patient results transmission option is Collated, the system waits until the outcome (results or exceptions) of all Patient test orders and reruns for a sample are reported, before queuing any outcomes for transmission to the host.

All test results for a given sample are queued for transmission to the host (and be considered pending transmission) if the following conditions are satisfied: (1) all test results for the sample in question are released (available for transmission), (2) all test exceptions for the sample are reported (result or exception), and (3) the Bidirectional Host Mode is On or On with query.

The system assigns the Pending collation status to any released test outcomes for a sample while it waits for all other patient test orders and reruns to be completed for the sample. The record hierarchy of outgoing messages is as follows:

```
Message Header Record
  Patient Information Record
    Test Order Record (Result)
      Result Record (Final)
        Comment Record (optional)
      Result Record (Interpretation - optional)
      Result Record (Preliminary - optional)
    Test Order Record (Exception)
      Comment Record
    Test Order Record (Result)
      Result Record (Final)
        Comment Record (optional)
      Result Record (Interpretation - optional)
      Result Record (Preliminary - optional)
  Message Terminator Record
```

## **Order Query Transmission**

A Test Order Query Request is transmitted by the system to the host that requests all test orders be run on a given sample, which has been encountered at the bar code reader, when the following conditions exist: (1) no pending test orders exist on the system for that sample, (2) the sample is not a configured control on the system, (3) the sample is a bar coded sample (the system does not query by carrier and position), (4) a batch is not in progress on the system and (5) the Bidirectional Host Mode is On with query. Only one Test Order Query Request is issued by the system to the host at any given time. The system must complete an existing Test Order Query Request prior to initiating a new request. Test Order Query Requests are only made for a single sample.

The system only accepts a Negative Query Response or a Test Order Request(s) from the host in response to a Test Order Query Request.

A Test Order Query Request is considered complete under any of the following conditions:

- The system receives a Negative Query Response for the sample ID in the query
- The system receives a Test Order Request(s) for the sample ID in the query
- The system does not receive a response of a Negative Query Response or a Test Order Request for the sample ID in the query within the configured host query time out period
- A connection has been established with the host, but the system is unable to successfully transmit the Test Order Query Request to the host on its first attempt, due to a communication failure
- A connection cannot be successfully established with the host and the Bidirectional Host Mode is transitioned to Off

The system notifies the user if no Test Order Request(s) is received for the Sample ID.

The system does not retry transmission of the Test Order Query Request message in the event of a communication failure.

After three consecutive query time out errors, the system disables the query mode, pause the sample handler and notify the user.

If the system receives a Negative Query Response for a sample ID other than the sample ID in the issued Test Order Query Request, the system notifies the user and the Negative Query Response is ignored.

If the system receives a Negative Query Response and there are no outstanding Test Order Query Requests, the system notifies the user and the Negative Query Response is ignored.

If the system receives a Test Order Request, which is indicated as a query response for a sample ID other than the sample ID in the issued Test Order Query Request, the system notifies the user and the Test Order Request is handled as an unsolicited Test Order Request.

If the system receives a Test Order Request which is indicated as a query response and there are no outstanding Test Order Query Requests, the system notifies the user and the Test Order Request is handled as a an unsolicited Test Order Request.

The record hierarchy for a Test Order Query Request is as follows:

**Message Header Record**  
**Request Information Record**  
**Message Terminator Record**

## Priority of outgoing Transmissions

The system prioritizes outgoing message transmissions to the host as follows:

1. Queued Test Order Query Request, which has been waiting the predefined maximum amount of time.
2. Released Test Results and Released Exceptions, which have been waiting the predefined maximum amount of time.
3. Queued Test Order Query Request, which has not been waiting the predefined maximum amount of time.
4. Released Test Results and Released Exceptions, which have not been waiting the predefined maximum amount of time.

The system completes the outgoing message transmission that has already started; regardless of the priority of the next message queued for transmission.

When a Test Order Query Request is transmitted to the host, no other outgoing message transmissions are allowed until the Test Order Query Request is complete.

In order to provide the host the opportunity to download Test Order Requests to the system, the system ceases transmission of all outgoing messages to the host, for a predefined amount of time, if a predefined maximum number of consecutive Released Test Results and Released Exception messages have been transmitted to the host.

## Logical Transmission Error Recover Requirements

Data is presumed to be saved at the host whenever any decremental change in the hierarchical level is observed.

In the case of transmission line failure of a Test Order Query Message transmission is not retried and the user is notified.

In the case of transmission line failure of a Test Result/Exception Message, the user is notified and transmission is retried based upon the reason for failure and the exact record at which failure occurred, as described below:

If the record fails due to rejection of data content by the Host, the message is re-sequenced based upon the failed record. Transmission of the re-sequenced message is only retried if a complete message with at least one Result can be constructed. The re-sequencing must use the following rules:

- If failure occurs on a record, which is part of a Result, all records comprising the Result are skipped (not included in the re-sequenced message), and the rest of the message is re-sequenced.
- If failure occurs on a record, which is not part of a Result, that record (and all records at a lower level in the hierarchical record structure) is skipped, and the rest of the message is re-sequenced.
- If the record fails due to other communication errors (i.e. timeout waiting for acknowledgement from the Host), then the Test Result/Exception Message is re-sequenced and transmission retried.

The example below illustrates the decremental change in the hierarchical level that defines the point where the data is presumed to be saved at the host. At these level changes, all the data received, not including the record at which the decremental change occurred, is saved. In the example below at the left, storage would occur at points E, G, I, M, O, Q and T. (Refer to ASTM E 394-91 standard, section 5.2).

In order to fulfill hierarchical record level requirements, all logical records necessary to reach the restart record point are sent prior to transmitting the record where the line failure originally occurred. A list of which records would be resent in case of a transmission failure is shown at the right.

Line #	Record Type	(Level)	Increment	Action of Host:	Line # where failure occurred	ARCHITECT would retransmit:
A	Header	(Level 0)	+0		A	A
B	Patient1	(Level 1)	+1		B	AB
C	Order1	(Level 2)	+1		C	ABC
D	Result1	(Level 3)	+1		D	ABCD
E	Order2	(Level 2)	-1	← at this point, saves A thru D	E	ABCDE
F	Comment1	(Level 3)	+1		F	ABEF
G	Order3	(Level 2)	-1	← at this point, saves E thru F	G	ABEGF
H	Comment1	(Level 3)	+1		H	ABGH
I	Patient2	(Level 1)	-2	← at this point, saves G thru H	I	ABGHI
J	Order1	(Level 2)	+1		J	AIJ
K	Result1	(Level 3)	+1		K	AIJK
L	Comment1	(Level 4)	+1		L	AIJKL
M	Result2	(Level 3)	-1	← at this point, saves I thru L	M	AIJKLM
N	Result3	(Level 3)	+0		N	AIJMN
O	Order2	(Level 2)	-1	← at this point, saves M thru N	O	AIJMNO
P	Comment1	(Level 3)	+1		P	AIOP
Q	Patient3	(Level 1)	-2	← at this point, saves O thru P	Q	AIOPQ
R	Order1	(Level 2)	+1		R	AQR
S	Result1	(Level 3)	+1		S	AQRS
T	Terminator	(Level 0)	-3	← at this point, saves Q thru S	T	AQRST

(Terminator record is assumed as saved.)

Figure 4.1: Example of Logical Transmission Error Recovery (ARCHITECT® to Host)

## Format Detail

The following sections detail the exact formats for these ASTM records:

- Message Header Record
- Patient Information Record
- Request Information Record
- Result Record
- Test Order Record
- Comment Record
- Message Terminator Record

ASTM records that are not used:

- Scientific Record
- Manufacturer Information Record

### Message Header Record

The following table details the exact format of the Message Header Record which shall be sent by the ARCHITECT System to the Host.

# ARCHITECT System-specific Outgoing Messages

Communication: ARCHITECT System to Host

**Section 4**

**Table 4.1: Message Header: ARCHITECT System to Host**

ASTM Field	Field Name	Maximum Characters	Field Contents	Field Description
7.1.1	Record Type ID	1	H	Header
7.1.2	Delimiter Definition	4		Field delimiter: vertical bar
			\	Repeat delimiter: backslash
			^	Component delimiter: caret
			&	Escape delimiter: ampersand
7.1.5	Sender Name or ID	9	ARCHITECT	Instrument Name
	Software Version	4	^Version Number (numeric)	Version number in the format 1.23
	Serial Number	25	^Serial Number (alphanumeric)	SCC Serial Number
	Interface Version	16	^Interface Version (alphanumeric)	Record types the system supports
7.1.12	Processing ID	1	P	Production: Treat message as an active message to be completed according to standard processing
7.1.13	Version No.	1	1	Mandatory Field
7.1.14	Date and Time	14	YYYYMMDDHHMMSS	Date and Time of transmission in ASTM format.

H|^\&|||ARCHITECT^1.00^123456789^H1P1O1R1C1Q1L1||||||P|1|19930330133346[CR]

**Figure 4.2: Example of Message Header Record: ARCHITECT System to Host**

## Patient Information Record

The following table details the exact format of the Patient Information Record which shall be sent by the ARCHITECT System to the Host.

**Table 4.2: Patient Information Record: ARCHITECT System to Host**

ASTM Field	Field Name	Maximum Characters	Field Contents	Field Description
8.1.1	Record Type	1	P	Patient
8.1.2	Sequence Number	5	1 to 65535	Must be consistent with sequence number rules, described in ASTM E 1394-91.
8.1.3	Practice-Assigned Patient ID	20	Printable string	<ul style="list-style-type: none"> <li>Returned unchanged during transmission to the host for patient test orders placed from the host.</li> <li>Returned empty for test orders placed on the system.</li> <li>Field returned empty for Control orders.</li> </ul>

Table 4.2: Patient Information Record: ARCHITECT System to Host (*continued*)

ASTM Field	Field Name	Maximum Characters	Field Contents	Field Description
8.1.4	Laboratory-Assigned Patient ID	20	Printable string	<ul style="list-style-type: none"> <li>Returned unchanged during transmission to the host for patient test orders placed from the host.</li> <li>Returned empty for test orders placed on the system.</li> <li>Field returned empty for Control orders.</li> </ul>
8.1.5	Patient ID No. 3	20	Printable string	<ul style="list-style-type: none"> <li>Optional for Patient test orders.</li> <li>Field contains the data displayed in the optional PID attribute on the system for patient test orders</li> <li>Empty for Control orders</li> </ul>
8.1.6	Patient Name	20	Last (printable string)	<ul style="list-style-type: none"> <li>Last, first and middle patient name</li> <li>Optional for Patient test orders.</li> <li>Empty for Control orders</li> </ul>
		20	^First (printable string)	
		12	^Middle (printable string)	
8.1.8	Birth Date	8	YYYYMMDD date $\geq$ 18000101 date $\leq$ current system date	<ul style="list-style-type: none"> <li>Patient birth date</li> <li>Optional for Patient test orders.</li> <li>Empty for Control orders</li> </ul>
8.1.9	Patient Gender	1	M, F, U	<ul style="list-style-type: none"> <li>Patient's gender (Male, Female or Unknown)</li> <li>Optional for Patient test orders.</li> <li>Empty for Control orders</li> <li>Field is returned unchanged in transmission to the host for patient test orders placed from the host.</li> </ul>
8.1.14	Doctor	20	Printable String	<p>Patient Doctor's name</p> <ul style="list-style-type: none"> <li>Field contains the data displayed in the optional Doctor attribute on the UI for Patient Test Orders if "Transmit to host: Doctor, location and draw date/time" configuration option is On.</li> <li>Field is empty for patient test orders if "Transmit to host: Doctor, location and draw date/time" configuration option is Off.</li> <li>Field is empty for Control test orders</li> </ul>

## ARCHITECT System-specific Outgoing Messages

Communication: ARCHITECT System to Host

## Section 4

Table 4.2: Patient Information Record: ARCHITECT System to Host (*continued*)

ASTM Field	Field Name	Maximum Characters	Field Contents	Field Description
8.1.26	Location	20	Printable String	<p>The general clinic location or nursing unit, or ward or bed or both of the patient.</p> <ul style="list-style-type: none"><li>• Field contains the data displayed in the optional Location attribute on the UI for Patient Test Orders if “Transmit to host: Doctor, location and draw date/time” configuration option is ON.</li><li>• Field is empty for patient test orders if “Transmit to host: Doctor, location and draw date/time” configuration option is Off.</li><li>• Field is empty for Control test orders</li></ul>

```
P|1|||PIDSID13|Patient^Im^A||19320122|F||||Dr.Amesbury|||||ParkClinic[CR]
```

Figure 4.3: Example of Patient Information Record for Patient order: ARCHITECT System to Host

```
P|1<CR>
```

Figure 4.4: Example of Patient Information Record for Control order: ARCHITECT System to Host

Contents of fields 8.1.14 and 8.1.26 are not transmitted to the host if the system configuration of Transmit to host: Doctor, location, draw date and time is configured to Off.

## Test Order Record

The following table details the exact format of the Test Order Record which shall be sent by the ARCHITECT System to the Host.

Table 4.3: Test Order Record: ARCHITECT System to Host

ASTM Field	Field Name	Maximum Characters	Field Contents	Field Description
9.4.1	Record Type	1	O	Order
9.4.2	Sequence Number	5	1 to 65535	Must be consistent with sequence number rules (described in ASTM E 1394-91).
9.4.3	Specimen ID	20	Printable String	Sample ID downloaded from Host, for Host-originated orders, or entered on the system, for user-originated orders.

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**Table 4.3: Test Order Record: ARCHITECT System to Host (*continued*)**

ASTM Field	Field Name	Maximum Characters	Field Contents	Field Description
9.4.4	Instrument specimen ID	20	Printable String	Instrument Specimen ID, Carrier/CrsI ID and Position are returned for all specimens tested. The position is blank for LAS orders.
	Carrier/Carousel ID	4	^alphanumeric	
	Position	2	^numeric	
9.4.5	Universal Test ID Code	4	^^Assay Number (numeric)	Specific number that identifies the test
	Name	10	^Assay Name (printable string)	Assay test name
	Assay Protocol	10	^Dilution (printable string)	<ul style="list-style-type: none"> <li>Dilution protocol name</li> <li>Empty for calculated results</li> </ul>
	Assay Status	1	^Status (P or C)	<p>Assay status:</p> <ul style="list-style-type: none"> <li>P if assay is installed as the primary version</li> <li>C if the assay is installed as the correlation version</li> </ul>
9.4.6	Priority	1	S	Test specified as STAT.
			R	Routine
9.4.8	Collection Date and Time	14	YYYYMMDDHHMM SS ≥ 19700101000000 and ≤ current system date	<p>Date and time of sample collection</p> <ul style="list-style-type: none"> <li>Field contains the data displayed in the optional Draw date/time attribute on the UI for Patient Test Orders if "Transmit to host: Doctor, location and draw date/time" configuration option is ON.</li> <li>Field is empty for Patient Test Orders if "Transmit to host: Doctor, location and draw date/time" configuration option is OFF.</li> <li>Field is Empty for Control Test Orders</li> </ul>
9.4.12	Action Code	1	Q	Quality Control Result
			Empty	Empty for Patient result
9.4.26	Report Types	1	F	Final Result
			X	Test could not be performed

```
O|1|SID13|SID3^A123^5|^^123^Assay1^UNDILUTED^P|R|20010223081223|||||||||F[CR]
```

**Figure 4.5: Example of Test Order Record (Patient): ARCHITECT System to Host**

```
O|1|TSHBIORAD 2|TSHBIORAD 2^A123^2|^^0241^TSH^UNDILUTED^P|R||||Q|||||F[CR]
```

**Figure 4.6: Example of Test Order Record (Control): ARCHITECT System to Host**

The Report Type field (9.4.26) of the Test Order Record contains an X, when the test request cannot be processed. A comment record follows the order record and specifies the reason why the test could not be done.

The content of field 9.4.8 is not transmitted to the host if the system configuration of Transmit to host: Doctor, location, draw date and time is configured to Off.

## Result Record

The following table details the exact format of the Result Record which shall be sent by the ARCHITECT System to the Host.

The system shall be capable of transmitting Patient and Control test results to Host systems.

Separate Result Records identifiable by Universal Test ID shall be sent for each of the following (since multiple result records may be sent for a single test result):

- The final result (concentration)
  - *Result type "F" in field 10.1.3*
- An optional interpretation
  - *Result type "I" in field 10.1.3*
- The instrument response used to calculate a concentration/result. (This Record is not sent for calculated results.)
  - *Result type "P" in field 10.1.3*

A Comment record shall follow a Result Record type F if information is entered into the comment section of the Order or Results Review screen, or downloaded from the Host with a Host-originated order.

**Table 4.4: Result Record: ARCHITECT System to Host**

ASTM Field	Field Name	Maximum Characters	Field Contents	Field Description
10.1.1	Record Type	1	R	Result
10.1.2	Sequence Number	5	1 to 65535	Must be consistent with sequence number rules, described in ASTM E 1394-91.

**Table 4.4: Result Record: ARCHITECT System to Host (*continued*)**

<b>ASTM Field</b>	<b>Field Name</b>	<b>Maximum Characters</b>	<b>Field Contents</b>	<b>Field Description</b>
10.1.3	Universal Test ID Code	4	^Assay Number (numeric)	Specific number that identified the test
	Name	10	^Assay Name (printable string)	Test name
	Assay Protocol	10	^Dilution (printable string)	Dilution protocol name (empty for calculated test results)
	Assay Status	1	^Status (P or C)	Assay Status: • P if assay is installed as primary version • C if assay is installed as correlation version
	Reagent Lot	15	^alphanumeric	Reagent Master Lot # (empty for calculated results)
	Reagent Serial Number	5	^alphanumeric	Serial number of reagent kit used to process the test result (empty for calculated results)
	Control Lot Number	20	Printable String	Lot number of the control material (empty for patient results and calculated results)
	Result Type	1	^F or P or I	Final result concentration patient, or control result
			P	Preliminary instrument result
			I	Interpretation of final result for patient test results
10.1.4	Data Value	20	Printable String	For Result Type F (concentration value if within dynamic range -- may include > or <)
				For Result Type P (numeric instrument response)
				For Result Type I (interpretation)
10.1.5	Units	7	Result Units (printable string)	Result Type F
			RLU, Abs, or mV (printable string)	Result Type P (RLU, Abs, or mV)
			Empty	Result Type I

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**Table 4.4: Result Record: ARCHITECT System to Host (*continued*)**

ASTM Field	Field Name	Maximum Characters	Field Contents	Field Description
10.1.6	Reference Ranges	At least 35	Normal/Therapeutic Ranges (printable string formatted as minimum value to maximum value) or Control Range (printable string formatted as minimum value to maximum value) or Empty	For Result Type F for Patient Result  For Result Type F for Control Result  For Result Type I or P and for Result Type F, if range undefined.
10.1.7	Result Abnormal Flags	25	IUO EDIT 1-2S 1-3S 2-2s1R1M 2-2s1RxM 2-2sxR1M R-4s 4-1s1M 4-1sxM 10-x1M 10-xxM EXP EXPC A#1 A#2 CNTL < or > INDX FLEX LL or HH PSHH LOW or HIGH CORR	For Result Type F: This field can be blank or contain one of the following flags: LOW, HIGH, LL, HH, <, >, or EDIT, EXP, EXPC, CNTL, Westgard Flags, A#1, A#2, CORR, FLEX, PSHH, IUO, INDX (post launch).  For Result Type P and I: This field is blank.  <b>NOTE:</b> Multiple flags can be sent when the Result Type in field 10.1.3 is F. Multiple flags are sent separated by component delimiters (which are used as a repeat delimiter).  The following flags are Westgard analysis flags and only display if the result is a control: 1-2S, 1-3S, 2-2s1R1M, 2-2s1RxM, 2-2sxR1M, R-4s, 4-1s1M, 4-1sxM, 10-x1M, 10-xxM
10.1.9	Result Status	1	F or R	Final Results  Previously Transmitted Results
10.1.11	Operator Identification	12	Order Operator ID (printable string)	ID of Operator logged into system at time of order
		12	^Release Operator ID (printable string)	ID of Operator logged in at time of result release
10.1.13	Date/Time Test Complete	14	YYYYMMDDHHMMSS	Date and time the test processing completed.
10.1.14	Instrument Identification	25	Alphanumeric	Serial # of the module which performed the test. Module serial number for all tests except calculated test results, which returns the system serial number.

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```
R|1|^0021^B-hCG^UNDILUTED^P^47331M100^00788^^F|<1.20|mIU/mL|0.35 TO  
4.94|EXP^<||F||||19990715081030|I20100[CR]
```

**Figure 4.7:** Example of Result Record (Result Type F) for a Patient Result: System to Host

```
R|2|^0021^B-hCG^UNDILUTED^P^47331M100^00788^^I|NEGATIVE|||||F||||  
19990715081030|I20100[CR]
```

**Figure 4.8:** Example of Result Record (Result Type I) for a Patient Result: System to Host

```
R|3|^0021^B-hCG^UNDILUTED^P^47331M100^00788^^P|9245|RLU||||F||||  
19990715081030|I20100[CR]
```

**Figure 4.9:** Example of Result Record (Result Type P) for a Patient Result: System to Host

```
R|1|^0241^TSH^UNDILUTED^P^0607M200^01824^40080^F|4.6011|mIU/mL|4.292500 TO  
5.397300||||F||ECB^RY||19990715081030|I20100[CR]
```

**Figure 4.10:** Example of Result Record (result type F) for a Control Result: System to Host

The following list of field contents of 10.1.7 (Result Abnormal Flags) are not part of the ASTM standard: EXP, CORR, the Westgard Analysis flags (Example: 1-2S, 1-3S, 2-2S, R-4S, 4-1S, 10X), IUO, EXPC, A#1, A#2, PSHH, FLEX, EDIT, CNTL and INDX.

NOTE: The number format for the P value is transmitted as configured by the user. Options are:

Comma  
None

### Comment Record

The following table details the exact format of the Comment Record which shall be sent by the ARCHITECT System to the Host.

**Table 4.5: Comment Record: ARCHITECT System to Host**

ASTM Field	Field Name	Maximum Characters	Field Contents	Field Description
11.1.1	Record Type	1	C	Comment
11.1.2	Sequence Number	5	1 to 65535	Must be consistent with sequence number rules, described in ASTM E 1394-91.
11.1.3	Comment Source	1	I	Instrument
11.1.4	Comment Text	At least 260	Printable String	Result Comment or Exception String

## ARCHITECT System-specific Outgoing Messages

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Table 4.5: Comment Record: ARCHITECT System to Host (*continued*)

ASTM Field	Field Name	Maximum Characters	Field Contents	Field Description
11.1.5	Comment Type	1	G or I	Result Comment  Exception String

C|1|I|Example Result Comment|G[CR]

Figure 4.11: Example of Comment Record: ARCHITECT System to Host

For test results, a comment record follows the final result record if information is entered in the comment field of the patient or QC order or result, or downloaded from the Host.

For test exceptions, a comment record follows the order record and contain the reason for the test exception.

## Request Information Record

A Request Information Record is used to request that the host immediately send any outstanding orders for a single specified patient sample.

Only one test order query request is issued by the system to the Host at any given time. The system completes an existing test order request prior to initiating a new request.

The following table details the exact format of the Request Information Record which shall be sent by the ARCHITECT System to the Host.

Table 4.6: Request Information Record: ARCHITECT System to Host

ASTM Field	Field Name	Maximum Characters	Field Contents	Field Description
12.1.1	Record Type ID	1	Q	Query
12.1.2	Sequence Number	1	1	Always contains 1
12.1.3	ID Number	20	^Specimen ID	Sample ID read from the bar code label on the sample tube
12.1.5	Universal Test ID	3	^^ALL	System always requests that ALL outstanding orders are sent
12.1.13	Status Code	1	O	System only requests Orders

Q|1|^SID12345||^^ALL|||||||o[CR]

**Figure 4.12:** Example of Request Information Record: ARCHITECT System to Host**Message Terminator Record**

The following table details the exact format of the Message Terminator Record which shall be sent by the ARCHITECT System to the Host.

**Table 4.7: Message Terminator Record**

ASTM Field	Field Name	Maximum Characters	Field Contents	Field Description
13.1.1	Record Type	1	L	Last
13.1.2	Sequence Number	1	1	Always set as 1

L|1[CR]

**Figure 4.13:** Example of Terminator Record: ARCHITECT System to Host

**NOTES**

# Unicode Support

**NOTE:** The following information does not apply to the ARCHITECT System as supplied at market launch. Unicode support is planned for a future version of ARCHITECT System software.

The ARCHITECT System host interface port can be configured to transmit and receive 8 or 16 bit characters. Sixteen bit characters are encoded using Unicode. All eight bit characters assume use of the Code Page 850 (same as AxSYM).

## Control Characters

When the ARCHITECT System host interface port is configured to support UNICODE, all control characters ([ENQ], [ACK], [NAK], [STX], [ETB], [ETX], [EOT]) are represented using sixteen bits.

## UNICODE ASTM Frames

When the ARCHITECT System host interface port is configured to support UNICODE, the maximum length of an ASTM frame has the same limitation of 240 characters as with standard ASCII, but requires 480 bytes of transmitted data.

## Checksum

When the ARCHITECT System host interface port is configured to support UNICODE, the checksum is encoded as four characters sent after the ETB or ETX character. The checksum is computed by adding the binary values of the characters (modulo 65536), keeping the least significant 16 bits of the result. The 16 bits are considered as 4 groups of 4 bits. Each group is converted to a character representing a hexadecimal number. The four characters are transmitted as the checksum in order of numeric significance. Each of the checksum characters is represented using 16 bits.

## NOTES

# Introduction

This section outlines the ARCHITECT System records and field contents needed to establish communications from a host computer to the ARCHITECT System.

For information on communicating from the ARCHITECT System to a host computer refer to [ARCHITECT System-specific Outgoing Messages](#) on page 4-1.

**NOTES**

## Communication: Host to the ARCHITECT System

Transmission of Patient Demographics, Patient ID, Sample ID, Test Orders, and Query Responses utilize the high level ASTM records and fields described in this section.

Each message is validated to record/message level requirements. The record hierarchy of all Host to System messages adheres to the requirements established in the specific message format (which supplement the ASTM E 1394-91 Standard requirements). The format (data content) of all records adheres to the requirements established in the specific record format in the following sections.

If a received record is found to violate a given record/message level requirement (hierarchical or format), the user is notified of the error and the rest of the message (including this record) is ignored. The system processes the records of the message received prior to this record.

The format (data content) of a record of a Host to System message is validated against the following criteria in addition to the ASTM E 1394-91 Standard record format:

- The system only accepts multiple values for a field (through the use of repeat delimiters) in the Universal Test ID field of the Test Order Record.
- If the system receives a record or field of a record, which is not defined by the ASTM E 1394-91 Standard the user is notified of the error and the rest of the message (including this record) is ignored. The system processes the records of the message received prior to this record.
- The system only validates those fields and components, which it utilizes, as defined in the specific record format. The system ignores the contents of fields and components not defined in these records, but supported by the ASTM E 1394-91 Standard.
- The system does not support Manufacturer or Scientific Records from the Host. If either of these records is received in a message, it is ignored.
- The system does not accept Negative Query Responses in the same message as the Test Order Requests. The system accepts the first part of the message (Negative Query Response or Test Order Request), and ignores the rest of the message, from violating Negative Query Response or Test Order Request to the end of the message.

- The system accepts Negative Query Responses within the same communication session as Test Order Requests.

Each message is validated to application level requirements. The data extracted from all valid records of a given message adheres to the application level requirement portion of the record that is denoted with an asterisk. If a given application level requirement is violated, the user is notified and the data set which contains the error is considered invalid.

Transmission of patient orders to the ARCHITECT System from the host takes place according to the following logical record hierarchy as a single or multiple request(s).

```
Message Header Record
  Patient Information Record
    Test Order Record
  Patient Information Record
    Test Order Record
    Test Order Record
      Comment Record (optional)
  Patient Information Record
    Comment Record (optional)
  Test Order Record
  Test Order Record
Message Terminator Record
```

Transmission of a Negative Query Response (those responses that indicate that the Query Request SID is unknown, or has no outstanding orders) utilizes the following logical record hierarchy.

```
Message Header Record
  Request Information Record
  Message Terminator Record
```

NOTE: In the case of a negative Query Response, the Request Information Record is a copy of the original record sent from ARCHITECT System, with the Status Code field set to X.

## **Logical Transmission Error Recovery Requirements**

The ARCHITECT System stores segments of the message as received, according to the following criteria:

- At decremental changes in the hierarchical level. Any unsaved data is saved prior to this record.
- At receipt of a test order. Any unsaved test order record and associated comment record(s) received prior to this record are saved.

According to the hierarchical record level requirements, all logical records necessary to reach the point [record] where transmission failure occurred must be retransmitted.

An example message, showing save points, is provided below at left. A list of which records would need resending in case of transmission failure is shown at right.

Line #	Record Type	(Level)	Increment	Action by ARCHITECT:	Line # where failure occurred	ARCHITECT would require retransmission of:
A	Header	(Level 0)	+0		A	A
B	Patient1	(Level 1)	+1		B	AB
C	Order1	(Level 2)	+1		C	ABC
D	Order2	(Level 2)	+0	← at this point, saves A thru C	D	ABCD
E	Comment1	(Level 3)	+1		E	ABDE
F	Order3	(Level 2)	-1	← at this point, saves D thru E	F	ABDEF
G	Comment1	(Level 3)	+1		G	ABFG
H	Patient2	(Level 1)	-2	← at this point, saves F thru G	H	ABFGH
I	Order1	(Level 2)	+1		I	AHI
J	Order2	(Level 2)	+0	← at this point, saves H thru I	J	AHIJ
K	Comment1	(Level 3)	+1		K	AHK
L	Patient3	(Level 1)	-2	← at this point, saves J thru K	L	AHKJL
M	Comment1	(Level 2)	+1		M	ALM
N	Order1	(Level 2)	+0		N	ALMN
O	Comment1	(Level 3)	+1		O	ALMNO
P	Terminator	(Level 0)	-3	← at this point, saves L thru O	P	ALMNOP
(Terminator record is assumed as saved.)						

Figure 5.1: Example of Logical Transmission Error Recovery (Host to ARCHITECT®)

## Format Detail

The ARCHITECT System recognizes only fields associated with the following records:

- Message Header Record
- Patient Information Record
- Request Information Record
- Test Order Record
- Comment Record
- Message Terminator Record

The following records are not used by the ARCHITECT System:

- Scientific Record
- Manufacturer Information Record

## Message Header Record

Table 5.1: Message Header: Host to ARCHITECT System

ASTM Field	Field Name	Maximum Characters	Field Contents	Field Description
7.1.1	Record Type	1	H or h	Header
7.1.2	Delimiter Definition	4		Bytes 2 and 6 of the record must be the same and bytes 2, 3, 4, and 5 must be different.
7.1.12	Processing ID	1	P or p	Production: Treat message as an active message to be completed according to standard processing
7.1.13	Version Number	1	1	Must be 1

```
H|\^&|||||||P|1[CR]
```

Figure 5.2: Example of Message Header Record: Host to ARCHITECT System

Processing ID must be P and Version Number must be 1 or the message “Message Header Record to Terminator Record” is ignored.

## Patient Information Record

The following table details the exact format of the Patient Information Record which shall be sent by the Host to the system.

Table 5.2: Patient Information Record: Host to ARCHITECT System

ASTM Field	Field Name	Maximum Characters	Field Contents	Field Description
8.1.1	Record Type	1	P or p	Patient
8.1.2	Sequence Number	5	1 to 65535	Must be consistent with sequence number rules, described in ASTM E 1394-91.
8.1.3	Practice-Assigned Patient ID	20*	Printable String	<ul style="list-style-type: none"> <li>• Returned unchanged during transmission to the host</li> <li>• Optional for Patient test orders</li> <li>• Default = empty field</li> <li>• The system does not use contents of this field for Control test orders</li> </ul>

\*The data extracted from all valid records of a given message adhere to the application level requirement portion of the record that is denoted with an asterisk.

Table 5.2: Patient Information Record: Host to ARCHITECT System (*continued*)

ASTM Field	Field Name	Maximum Characters	Field Contents	Field Description
8.1.4	Laboratory-Assigned Patient ID	20*	Printable String	<ul style="list-style-type: none"> <li>Returned unchanged during transmission to the host</li> <li>Optional for Patient test orders</li> <li>The system does not use contents of this field for Control test orders</li> </ul>
8.1.5	Patient ID No. 3	20*	Printable String	<ul style="list-style-type: none"> <li>Optional for Patient test orders</li> <li>Empty for Control test orders</li> </ul>
8.1.6	Patient Name	20*	Last (printable string)	<ul style="list-style-type: none"> <li>Last, first, and middle patient name for Patient test orders</li> <li>The system does not use contents of this field for Control test orders</li> </ul>
		20*	^First (printable string)	
		12*	^Middle (printable string)	
8.1.8	Birth Date	8	YYYYMMDD date $\geq$ 18000101* date $\leq$ Current System Date*	<ul style="list-style-type: none"> <li>Patient birth date</li> <li>Optional for Patient test orders</li> <li>The system does not use contents of this field for Control test orders.</li> </ul>
8.1.9	Patient Sex	1	M, F, U	<ul style="list-style-type: none"> <li>Patient sex (Male, Female, Unknown)</li> <li>Optional for Patient test orders</li> <li>The system does not use contents of this field for Control test orders.</li> </ul>
8.1.14	Doctor	20*	Printable string	<p>Patient Doctor's name</p> <ul style="list-style-type: none"> <li>Optional for Patient test orders</li> <li>The system does not use contents of this field for Control test orders</li> </ul>
8.1.26	Location	20*	Printable string	<p>The general clinic location or nursing unit, or ward or bed or both of the patient</p> <ul style="list-style-type: none"> <li>Optional for Patient test orders</li> <li>The system does not use contents of this field for Control test orders</li> </ul>

\*The data extracted from all valid records of a given message adhere to the application level requirement portion of the record that is denoted with an asterisk.

### Examples:

#### *Patient Test Order*

```
P|1|Practice PID|Lab PID||Doe^John^Q||19320122|F|||||Dr. Amesbury|||||||ParkClinic[CR]
```

Figure 5.3: Example of Patient Information Record: Host to ARCHITECT System

***Control Test Order***

**Figure 5.4: Example of Patient Information Record for a control: Host to ARCHITECT System**

**NOTE:** If the Date of birth field is left empty, the age on the system (for result flagging purposes) is considered to be 0 (zero) years.

The field contents of Practice Assigned Patient ID (8.1.3) shall be copied into the Patient ID No. 3 field upon transmission back to the host (8.1.5) if the field contents of both the Laboratory Assigned Patient ID (8.1.4) and the Patient ID No. 3 (8.1.5) are blank. The field contents of Laboratory Assigned Patient ID (8.1.4) shall be copied into Patient ID No. 3 field upon transmission back to the host (8.1.5), if the field of the Patient ID No. 3 (8.1.5) is blank.

**Test Order Record**

The ARCHITECT System Control Center accepts unsolicited Patient and Control test orders from the LIS regardless of whether the host query option is enabled or not.

The assay name field is ignored when an order record mismatches an assay name with an assay number. An error message is not generated. The correct assay is returned with the result.

Replicates for an assay may be ordered using one of the two methods:

- Use of Repeat Delimiter in Universal Test ID (Field 5) of Test Order Record.
- Multiple Order Records containing Action Code A for Patient test orders.

**NOTE:** The only field in which the ARCHITECT System supports the repeat delimiters, within Incoming Messages, is the Universal Test ID of the Test Order Record.

The following table details the exact format of the Test Order Record which shall be sent by the Host to the system.

**Table 5.3: Test Order Record: Host to ARCHITECT System**

<b>ASTM Field</b>	<b>Field Name</b>	<b>Maximum Characters</b>	<b>Field Contents</b>	<b>Field Description</b>
9.4.1	Record Type	1	O or o	Order
9.4.2	Sequence Number	5	1 to 65535	Must be consistent with sequence number rules, described in ASTM E 1394-91.
9.4.3	Specimen ID	20*	Printable String	Sample ID downloaded from Host
	Carrier ID	4	^alphanumeric	Carrier ID and position are ignored on input
	Position	2	^numeric	
9.4.4	Instrument specimen ID	N/A	N/A	Field ignored on input
	Carrier ID			
	Position			
9.4.5	Universal Test ID  (The only required component of this field is the assay number)	4*	^^^(numeric)*	Specific number that identifies the test
		10*	^(printable string)	Assay test name -- optional for all test orders. The system ignores the assay name sent by the Host and place the test order according to the assay number.
		10*	^(printable string)	Dilution protocol name -- optional for all test orders. If left blank, the system places the test order for the default dilution.
		1	^(P, p, C, or c)	Assay status <ul style="list-style-type: none"> <li>P or p if assay is installed as the primary version</li> <li>C or c if the assay is installed as the correlation version (optional for all test orders. If left blank, the system places the test order for the primary version of the assay)</li> </ul>
9.4.6	Priority	1	S or s	STAT (any other printable character or blank for Routine)
9.4.8	Collection Date and Time	14	YYYYMMDDHHMMSS  ≥ 19700101000000*  ≤ current system date*	Date and time of sample collection <ul style="list-style-type: none"> <li>Optional for Patient test orders</li> <li>The system does not use contents of this field for Control test orders</li> </ul>
9.4.12	Action Code	1	N or A or C or Q	New order for a patient sample
			Unconditional Add order for a patient sample	
			Cancel or Delete the existing order	
			Control Sample	

\*The data extracted from all valid records of a given message adhere to the application level requirement portion of the record that is denoted with an asterisk.

Table 5.3: Test Order Record: Host to ARCHITECT System (*continued*)

ASTM Field	Field Name	Maximum Characters	Field Contents	Field Description
9.4.13	Danger Code	15	Printable String	Part of the Test Order Comment Field (optional)
9.4.14	Clinical Information	15	Printable String	Part of the Test Order Comment Field (optional)
9.4.16	Specimen Type	5	Printable String	Part of the Test Order Comment Field (optional)
	Specimen Source	15	^(printable string)	
9.4.26	Report Types	1	O or o or Q or q	Order
				Order in response to a Query Request.

\*The data extracted from all valid records of a given message adhere to the application level requirement portion of the record that is denoted with an asterisk.

```
O|1|MCC1||^^^16\^^^606|||20010223081223||||A|Hep|lipemic||serum|||||||Q[CR]
```

Figure 5.5: Example of Test Order Record: Host to ARCHITECT System

Refer to the ARCHITECT System configuration details for assay parameters to determine assay numbers and dilution protocol names to be used for Universal Test IDs.

Before a test order is created on the system, the system validates the Test Order Request received from the LIS. The system validates the assay information in each Test Order Request as follows:

- If a Test Order Request received from the host specifies an assay (defined by Assay Number and Assay Status) that is not defined (or is disabled) by the system, the system considers this request invalid and notifies the user.
- If a Test Order Request received from the host does not specify the Assay Protocol (Dilution), the system requests the test order for the default dilution of the assay.
- If a Test Order Request received from the host does specify the dilution, the system considers the specified dilution as valid and requests the test order for the specified dilution of the assay if all of the following conditions are met: the dilution protocol exists for that assay (dilution names are case sensitive) and the specified sample (SID) does not have a manual (offline) dilution factor specified. If the specified dilution is not valid, the system notifies the user and the Test Order Request is considered invalid.
- If a Test Order Request received from the host does not specify the Assay Status, the system requests the test order for the primary version of the assay.

If the field content of 9.4.12 (Action Code) is N for Patient test orders, the test order is considered a new test. However, if the same test order for this sample ID already exists (Pending, Scheduled, or Running), the system considers this an invalid request and error message is generated.

If the field content of 9.4.12 (Action Code) is A, the test order shall be processed as a mandatory added test order. It shall be added to the test order list regardless of whether or not the same test order exists (Pending, Scheduled, or Running) in the instrument's database.

If the field content of 9.4.12 (Action Code) is C, the test order shall be processed as a request to cancel the specified test order. The instrument shall cancel the first pending test order found, from its pending test order list which has the same SID, Assay Number, Dilution Name, and Assay Status. If no such order is found, the system ignores this request.

If the field content of 9.5.12 (Action Code) is Q, the sample is established and verified as a control for the requested analytes. If verified, the QC tests are created.

### **Comment Record**

The following table details the exact format of the Comment Record which shall be sent by the Host to the system following the patient record, or the test order record.

**Table 5.4: Comment Record: Host to ARCHITECT System**

ASTM Field	Field Name	Maximum Characters	Field Contents	Field Description
11.1.1	Record Type	1	C or c	Comment
11.1.2	Sequence Number	5	1 to 65535	Must be consistent with sequence number rules, described in ASTM E 1394-91.
11.1.3	Comment Source	1	L	Computer system
11.1.4	Comment Text	at least 50	Printable characters	Comment text
11.1.5	Comment Type	1	G	Generic comment

C|1|L|Example Comment|G[CR]

**Figure 5.6: Example of Comment Record: Host to ARCHITECT System**

When the Comment Record follows a patient record, the comment in 11.1.4 refers to that patient sample and is duplicated in the comment field for each test order for that patient sample.

When the Comment Record follows a test order, it refers only to that test order.

The following comment text—limited to a maximum of 50 characters in length—is placed in the comment field of an ARCHITECT System test order in the following sequence:

1. Text in field 11.1.4 (refer to table 5.4 – Comment Record) of one or more comment records associated with the patient record.

*then*

2. Text in fields 9.4.13, 9.4.14 and two components of 9.4.16 (refer to table 5.3 – Test Order Record).

*then*

3. Text in field 11.1.4 of one or more comment records associated with the test order.

## Negative Query Response Record

The system shall accept a Negative Query Response from the Host system. The Negative Query Response is used to indicate that an earlier Query Request from the system resulted in no orders being sent, either due to:

- The sample ID specified in the original Query Request was unknown to the Host system
- or*
- The sample ID specified had no outstanding orders at the time the Query Request was received.

The following table details the exact format of the Negative Query Response Record which shall be sent by the Host to the system.

Table 5.5: Negative Query Response Record: Host to ARCHITECT System

ASTM Field	Field Name	Maximum Characters	Field Contents	Field Description
12.1.1	Record Type ID	1	Q or q	Query
12.1.2	Sequence Number	1	1	Always contains 1
12.1.3	ID Number	20*	^Specimen ID (printable string)	Sample ID that was originally sent by the system
12.1.5	Universal Test ID	3	^^ALL	Field contents originally sent by the system
12.1.13	Status Code	1	X	Indicates that either the Sample ID is unknown to the Host, or there are no outstanding orders for the specified Sample ID

\*The data extracted from all valid records of a given message adhere to the application level requirement portion of the record that is denoted with an asterisk.

```
Q|1|^SID1234||^ALL||||||X[CR]
```

**Figure 5.7: Example of Negative Query Response: Host to ARCHITECT System**

The system shall discontinue waiting for either Test Orders or a Negative Query Response in response to an earlier issued Query Request, as defined in the user-configurable option “Host timeout”.

After a predefined number of allowed consecutive host time-out errors (currently set to 3), the software shall:

- Log an error
- Disable the query mode

### Message Terminator Record

The following table details the exact format of the Message Terminator Record which shall be sent by the Host to the system.

**Table 5.6: Message Terminator Record: Host to ARCHITECT System**

ASTM Field	Field Name	Maximum Characters	Field Contents	Field Description
13.1.1	Record Type	1	L or I	Last
13.1.2	Sequence Number	1	1	Must be 1

```
L|1[CR]
```

**Figure 5.8: Example of Message Terminator Record: Host to ARCHITECT System**

**NOTES**

# Introduction

This section describes ARCHITECT System Support of ASI Options. The following items are defined as optional by the Abbott Standard Interface. The ARCHITECT System supports these items as defined in this section.

The following topics are included in this section:

- [Establishment Phase](#)
- [ASI Code Page for the ARCHITECT System](#)

**NOTES**

# ARCHITECT System Support of ASI Options

## Establishment Phase

The system meets the requirements of the ASTM E 1381-91 Standard Specification for Low-Level Protocol to Transfer Messages between Clinical Instruments and Computer Systems, and in addition, meets the following requirements. Where these requirements are in conflict with the ASTM E 1381-91 Standard, these requirements take precedence.

The <EOT> character is a restricted message character and may not display in the message text part of a frame (per ASTM E 1381-91 Section 6.6.2). However, when the system is acting as the receiver, during the Transfer Phase of communication with a sender, and an <EOT> character is received, the system interprets this as an attempt by the sender to terminate the current communication session, and proceeds to the Termination Phase of communication with the sender (see ASTM E 1381-91 Section 6.4.1).

When the system is acting as the sender, during the Transfer Phase of communication with a receiver, and an <EOT> character is received in response a sent frame (a request by the receiver to interrupt the current communication session per ASTM E 1381-91 Section 6.3.5), the system ignores the request to interrupt the current communication session, and process the <EOT> character the same as a received <ACK> character (see ASTM E 1381-91 Sections 6.3.4.2 and 6.3.4.4).

When the system is acting as the sender during the Establishment Phase of communication with a prospective receiver (see ASTM E 1381-91 Section 6.2), and is unable to establish a connection after a predefined number of consecutive attempts (10), the system toggles the Host Communications Mode to OFF. The system waits a predefined period of time (15 seconds) between consecutive attempts to establish a connection, when a given attempt fails to establish a connection.

Any of the following conditions is considered one failed attempt at establishing a connection:

- The prospective receiver is busy or does not have the ability to receive information (per ASTM E 1381-91 Sections 6.2.6 and 6.2.7),

- Contention still exists after a predefined number of consecutive attempts (3) to resolve the contention per ASTM E 1381-91 Section 6.2.7.1, or
- The prospective receiver does not respond within the required time period (per ASTM E 1381-91 Section 6.5.2.1).

## ASI Code Page for the ARCHITECT System

Table 6.1 shows the ASI code page (a subset of MS-DOS® code page 850) supported by the ARCHITECT System. ASCII characters with values between 0 and 127 are as defined by the ASTM E 1381-91 and ANSI X3.4-1986 Standards. Characters with values between 128 and 255 are defined as shown. Certain values are not supported by the ARCHITECT System. These characters are translated to the copyright symbol (©) when received via the host port and again when transmitted to the host system. An incoming record is rejected if character 127 or 255 is present in the field.

Table 6.1: ASI Code Page for ARCHITECT

Decimal		0	16	32	48	64	80	96	112	128	144	160	176	192	208	224	240	
	Hex	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
0	0	NUL	DLE	SP	0	@	P	`	p	ç	É	á	*	*	*	Ó	*	
1	1	SOH	DC1	!	1	A	Q	a	q	ü	æ	í	*	*	*	ß	*	
2	2	STX	DC2	"	2	B	R	b	r	é	Æ	ó	*	*	Ê	Ô	*	
3	3	ETX	DC3	#	3	C	S	c	s	â	ô	ú	*	*	Ë	Ò	*	
4	4	EOT	DC4	\$	4	D	T	d	t	ä	ö	ñ	*	*	È	ð	*	
5	5	ENQ	NA_K	%	5	E	U	e	u	à	ò	Ñ	Á	*	*	Õ	*	
6	6	AC_K	SYN	&	6	F	V	f	v	å	û	*	Â	ã	í	µ	*	
7	7	BEL	ETB	'	7	G	W	g	w	ç	ù	*	À	Ã	ì	p	*	
8	8	BS	CA_N	(	8	H	X	h	x	ê	ÿ	¸	*	*	*	Í	P	*
9	9	HT	EM	)	9	I	Y	i	y	ë	Ö	*	*	*	*	Ú	*	
10	A	LF	SUB	*	:	J	Z	j	z	è	Ü	*	*	*	*	Û	*	
11	B	UT	ESC	+	;	K	[	k	{	í	*	*	*	*	*	Ù	*	
12	C	FF	FS	,	<	L	\	l		î	*	*	*	*	*	y'	*	
13	D	CR	GS	-	=	M	]	m	}	ì	*	í	*	*	*	Y'	*	
14	E	SO	RS	.	>	N	^	n	~	Ã	*	*	*	*	í	*	*	
15	F	SI	US	/	?	O	_	o	*	Å	*	*	*	*	*	*	*	

\* – Unsupported characters.

# Introduction

This section describes error codes and observed problems that are specific to the host interface of the ARCHITECT System. In addition, it describes the probable causes and corrective actions.

If the corrective actions do not solve the problem, call the ARCHITECT System Customer Support Center.

United States: 1-800-527-1869

Canada: 1-800-387-8378 (English speaking customers)

1-800-465-2675 (French speaking customers)

International: Call your local Abbott Customer Support representative.

Topics include:

- [Error codes](#)
- [Observed Problems](#)

## NOTES

## Error codes

ARCHITECT System error codes are grouped into ten (10) basic categories (Table 7.1). Each code within a category has been assigned a unique four (4) digit error code number to aid in error identification.

**Table 7.1: ARCHITECT System Error Codes**

Error Code Categories	Description
0000-0999 General	Identifies non-critical messages that provide direct feedback to an operator action.
1000-1999 Assay-Specific	Identifies that an assay calibration or patient sample test result has passed or failed the assay-specific parameters specifications.
2000-2999 Maintenance	Identifies that a maintenance procedure passed, failed, or was canceled.
3000-3999 Level Sense	Identifies a liquid level sense problem.
4000-4999 Bar Code Reader	Identifies bar code reader failures or bar code label misreads.
5000-5999 Robotic and Sensor	Identifies hardware problems and failures or that a system sensor has detected a hardware problem.
6000-6999 Optics	Identifies optical system problems or failures.
7000-7999 Temperature	Identifies temperature control conditions on the system that may impact test results.
8000-8999 Computer Hardware	Identifies problems or failures with system initialization, the printer, the host interface, the hard disk drive, and system shutdown.
9000-9999 Software	Identifies system software problems or problems with system files.

### Error Messages Specific to the RS-232 Interface

Information on error messages specific to the host interface, all from the Computer Hardware category (8000-8999), is provided on the following pages. Corrective action for each error regarding the host interface should initially include resending the test request. If the error repeats, proceed with the additional corrective actions listed.

## Computer hardware error codes (8000-8999)

### Error code: 8004

UNICODE data could not be sent to (x).

x = Remote system

Probable cause	Corrective action
Hardware failure: – Digiboard	Contact your Area Customer Support to resolve any hardware failure.

### Error code: 8005

Communication error reading data from port (x).

x = Remote system

Probable cause	Corrective action
Hardware failure: – Digiboard	Contact your Area Customer Support to resolve any hardware failure.

### Error code: 8050

Unable to open (x) port for (y).

x = Serial port (COM1 - COM10)

y = Remote system

Probable cause	Corrective action
Hardware failure: – Cable from LIS to SCC (COM5, Connector 3) has a poor connection or failed – Digiboard	Contact your Area Customer Support to resolve any hardware failure.

### Error code: 8053

Failed opening CLI serial port.

Probable cause	Corrective action
• Serial port configuration.	Refer to Section 3: Communication Setup.
• Hardware failure: – LIS cables have a poor connection or failed – Digiboard failure	Contact your Area Customer Support to resolve any hardware failure.

**Error code: 8102**

ASCII data could not be sent to (x).

x = Remote system

Probable cause	Corrective action
<ul style="list-style-type: none"><li>• Hardware failure:<ul style="list-style-type: none"><li>– Cable from LIS to SCC (COM5, Connector 3) has a poor connection or failed</li><li>– Digiboard failure</li></ul></li></ul>	Contact your Area Customer Support to resolve any hardware failure.

**Error code: 8150**

Invalid Host order, Sample ID (x) already exists.

x = Sample ID

Probable cause	Corrective action
The system received an order from the host and the order already exists. The new order from the host is ignored by the system.	If this error occurs frequently without obvious explanation check the function of the host interface.

**Error code: 8151**

Invalid Host cancel, Sample ID (x) does not exist.

x = Sample ID

Probable cause	Corrective action
The system received a cancellation request from the host on a test order and the order does not exist in the database. The cancellation request from the host is ignored by the system.	If this error occurs frequently without obvious explanation check the function of the host interface.

**Error code: 8152**

Orders received for Sample ID (x) did not match the Sample ID sent to the Host.

x = Sample ID

Probable cause	Corrective action
<p>The Sample ID returned from the host did not match the Sample ID queried for by the system.</p> <ul style="list-style-type: none"><li>• The host is responding to a previous query request which has timed out on the system.</li><li>• The host sent an order that was not requested by the system.</li></ul>	<p>Increase the host query timeout value. Refer to Section 3: Communication Setup. Refer to Section 5: ARCHITECT System-specific Incoming Messages.</p>

**Error code: 8153**

Invalid Host order, no quality control information for Assay (x) number (y).

x = Assay name

y = Assay number

Probable cause	Corrective action
The system received a QC order for an assay from the host but no control is configured for that assay. The order from the host is ignored by the system.	Use the Control configuration screen to configure a control for the requested assay then download the order from the host. Refer to the ARCHITECT System Operations Manual for information on control configuration.

**Error code: 8154**

Invalid Host order for Sample ID (x), specified dilution for Assay number (y) not found.

x = Sample ID

y = Assay number

Probable cause	Corrective action
The system received a test order from the host requesting a dilution that does not exist for the specified assay. The order from the host is ignored by the system.	Order a dilution available for the specified assay. Dilution Name is case sensitive, ensure the host dilution name is exactly the same as the Dilution Name in the SCC.

**Error code: 8155**

Invalid Host order for sample ID (x), Assay number (y) not installed.

x = Sample ID

y = Assay number

Probable cause	Corrective action
The system received a test order from the host requesting an assay that is not installed. <ul style="list-style-type: none"> <li>• The assay has not been installed.</li> <li>• The assay number is incorrectly defined in the host.</li> </ul>	Perform 6114 Install/Delete Assays to install the requested assay. Correct the assay number in the host system.

**Error code: 8156**

Error detected when parsing record (x) from (y).

x = Record string or field string

y = Remote system

Probable cause	Corrective action
An error was detected when parsing an ASTM record received. The record may not utilize the delimiters correctly.  <b>Host:</b> <ul style="list-style-type: none"><li>• Incorrectly formatted record or message received from the host.</li></ul> <b>ARM:</b> <ul style="list-style-type: none"><li>• Software error.</li></ul>	Refer to Section 5: ARCHITECT System-specific Incoming Messages.  Contact your Area Customer Support. Please provide information specifying the operation you were attempting to perform when this error occurred.

**Error code: 8158**

Required data (x) is missing from message received from (y).

x = Component string

y = Remote system

Probable cause	Corrective action
Required data is missing from the message received.  <b>Host:</b> <ul style="list-style-type: none"><li>• Incorrectly formatted record or message received from the host.</li></ul> <b>ARM:</b> <ul style="list-style-type: none"><li>• Software error.</li></ul>	Refer to Section 5: ARCHITECT System-specific Incoming Messages.  Contact your Area Customer Support. Please provide information specifying the operation you were attempting to perform when this error occurred.

**Error code: 8159**

Incoming frame from (x) is too long. <NAK> has been sent.

x = Remote system

Probable cause	Corrective action
<p>Frame received exceeds ASTM length limit.</p> <p><b>Host:</b></p> <ul style="list-style-type: none"> <li>• Incorrectly formatted record or message received from the host.</li> </ul> <p><b>ARM:</b></p> <ul style="list-style-type: none"> <li>• Communication failure.</li> </ul>	<p>Refer to Section 5: ARCHITECT System-specific Incoming Messages.</p> <p>Condition may be temporary, if so, no corrective action is required. If condition is not temporary, a 3901 error code occurs. Follow the corrective action for this specific code in the ARCHITECT System Operations Manual.</p>

**Error code: 8160**

Field (x) received from (y) is not repeatable.

x = Field name

y = Remote system

Probable cause	Corrective action
<p>Data field in a record received contains an illegal repeat delimiter.</p> <p><b>Host:</b></p> <ul style="list-style-type: none"> <li>• Incorrectly formatted record or message received from the host.</li> </ul> <p><b>ARM:</b></p> <ul style="list-style-type: none"> <li>• Software error.</li> </ul>	<p>Refer to Section 5: ARCHITECT System-specific Incoming Messages.</p> <p>Contact your Area Customer Support. Please provide information specifying the operation you were attempting to perform when this error occurred.</p>

## Section 7

**Error code: 8161**

(x) sent illegal record type (y). The remainder of the message is ignored.

x = Remote system

y = Record text

Probable cause	Corrective action
Record received is an invalid record type not defined by the ASTM E 1394 Standard. <b>Host:</b> <ul style="list-style-type: none"><li>• Incorrectly formatted record or message received from the host.</li></ul> <b>ARM:</b> <ul style="list-style-type: none"><li>• Software error.</li></ul>	Refer to Section 5: ARCHITECT System-specific Incoming Messages.  Contact your Area Customer Support. Please provide information specifying the operation you were attempting to perform when this error occurred.

**Error code: 8162**

(x) sent record (y) which contained an incorrect sequence number.

x = Remote system

y = Record received

Probable cause	Corrective action
Message received contained a record which was out of sequence. <b>Host:</b> <ul style="list-style-type: none"><li>• Incorrectly formatted record or message received from the host.</li></ul> <b>ARM:</b> <ul style="list-style-type: none"><li>• Software error.</li></ul>	Refer to Section 5: ARCHITECT System-specific Incoming Messages.  Contact your Area Customer Support. Please provide information specifying the operation you were attempting to perform when this error occurred.

**Error code: 8163**

Host sent record (x) for a negative query response.

x = Record received

Probable cause	Corrective action
Record received from the host contains an invalid query response.	Refer to Section 5: ARCHITECT System-specific Incoming Messages.

**Error code: 8165**

(x) sent record (y) which contained an improper level transition.

x = Remote system

y = Record received

Probable cause	Corrective action
<p>Message received contained a record which caused an improper message hierarchy level transition.</p> <p><b>Host:</b></p> <ul style="list-style-type: none"> <li>• Incorrectly formatted record or message received from the host.</li> </ul> <p><b>ARM:</b></p> <ul style="list-style-type: none"> <li>• Software error.</li> </ul>	<p>Refer to Section 5: ARCHITECT System-specific Incoming Messages.</p> <p>Contact your Area Customer Support. Please provide information specifying the operation you were attempting to perform when this error occurred.</p>

**Error code: 8166**

Invalid ASTM record (x) in test order message.

x = Record name

Probable cause	Corrective action
<p>Test order message received from the host contains an unacceptable ASTM record. Acceptable records in a test order message: Header, Patient, Test Order, Comment and Terminator records.</p>	<p>Refer to Section 5: ARCHITECT System-specific Incoming Messages.</p>

**Error code: 8169**

Invalid message sent by (x).

x = Remote system

Probable cause	Corrective action
<p><b>Host:</b></p> <ul style="list-style-type: none"> <li>• Incorrectly formatted record or message received from the host.</li> </ul> <p><b>ARM:</b></p> <ul style="list-style-type: none"> <li>• Software error.</li> </ul>	<p>Refer to Section 5: ARCHITECT System-specific Incoming Messages.</p> <p>Contact your Area Customer Support. Please provide information specifying the operation you were attempting to perform when this error occurred.</p>

**Error code: 8170**

Negative query response for Sample ID (x) received after a host query timeout.  
 x = Sample ID

Probable cause	Corrective action
<p>Negative query response message contained a SID which was different than the one contained in the earlier issued query message.</p> <ul style="list-style-type: none"> <li>The host is responding to a previous query request which has timed out on the system.</li> <li>A query message was never issued to the Host.</li> </ul>	<p>Increase the host query timeout value.            Refer to Section 3: Communication Setup.</p> <p>Refer to Section 4: ARCHITECT System-specific Outgoing Messages.</p>

**Error code: 8172**

Host query time-out exceeded for Sample ID (x).  
 x = Sample ID

Probable cause	Corrective action
The host did not respond to the query message within the time period specified in the configuration.	<p>Increase the host query timeout value.            Refer to Section 3: Communication Setup.</p>

**Error code: 8173**

Message received from (x) did not end with a terminator record.  
 x = Remote system

Probable cause	Corrective action
<p><b>Host:</b></p> <ul style="list-style-type: none"> <li>Host is busy or not responding.</li> <li>Incorrectly formatted record or message received from the host.</li> <li>Hardware failure:               <ul style="list-style-type: none"> <li>Cable from LIS to SCC (COM5, Connector P3) has a poor connection or failed</li> </ul> </li> </ul> <p><b>ARM:</b></p> <ul style="list-style-type: none"> <li>Hardware failure:               <ul style="list-style-type: none"> <li>Cable from ARM to SCC (COM7, Connector P5) has a poor connection or failed</li> </ul> </li> <li>Software error.</li> </ul>	<p>Ensure the host system is functional.            Refer to Section 1: Abbott Standard Interface for information about the ASTM protocol.            Contact your Area Customer Support to resolve any hardware failure.</p> <p>Contact your Area Customer Support to resolve any hardware failure.</p> <p>Contact your Area Customer Support. Please provide information specifying the operation you were attempting to perform when this error occurred.</p>

**Error code: 8174**

Record (x) received from (y) did not terminate in a carriage return.

x = Record string

y = Remote system

Probable cause	Corrective action
<p>Record received was not terminated by a carriage return as required by the ASTM standard.</p> <p><b>Host:</b></p> <ul style="list-style-type: none"> <li>• Incorrectly formatted record or message received from the host.</li> <li>• Cabling not properly shielded or too long.</li> </ul> <p><b>ARM:</b></p> <ul style="list-style-type: none"> <li>• Software error.</li> </ul>	<p>Refer to Section 5: ARCHITECT System-specific Incoming Messages.</p> <p>Use shorter or shielded cable.</p> <p>Contact your Area Customer Support. Please provide information specifying the operation you were attempting to perform when this error occurred.</p>

**Error code: 8175**

Length of data (x) received from (y) exceeded specified maximum length.

x = Component string

y = Remote system

Probable cause	Corrective action
<p>Data field in a record received is longer than the maximum allowed.</p> <p><b>Host:</b></p> <ul style="list-style-type: none"> <li>• Incorrectly formatted record or message received from the host.</li> </ul> <p><b>ARM:</b></p> <ul style="list-style-type: none"> <li>• Software error.</li> </ul>	<p>Refer to Section 5: ARCHITECT System-specific Incoming Messages.</p> <p>Contact your Area Customer Support. Please provide information specifying the operation you were attempting to perform when this error occurred.</p>

**Error code: 8176**

Data field (x) received from (y) must be a numeric value.

x = Data field

y = Remote system

Probable cause	Corrective action
<p>The specified data field must be a numeric value.</p> <p><b>Host:</b></p> <ul style="list-style-type: none"><li>• Incorrectly formatted record or message received from the host.</li></ul> <p><b>ARM:</b></p> <ul style="list-style-type: none"><li>• Software error.</li></ul>	<p>Refer to Section 5: ARCHITECT System-specific Incoming Messages.</p> <p>Contact your Area Customer Support. Please provide information specifying the operation you were attempting to perform when this error occurred.</p>

**Error code: 8177**

Data field (x) received from (y) must be an alphanumeric value.

x = Data field

y = Remote system

Probable cause	Corrective action
<p>The specified data field must be an alphanumeric value.</p> <p><b>Host:</b></p> <ul style="list-style-type: none"><li>• Incorrectly formatted record or message received from the host.</li></ul> <p><b>ARM:</b></p> <ul style="list-style-type: none"><li>• Software error.</li></ul>	<p>Refer to Section 5: ARCHITECT System-specific Incoming Messages.</p> <p>Contact your Area Customer Support. Please provide information specifying the operation you were attempting to perform when this error occurred.</p>

**Error code: 8178**

Data field (x) received from (y) must be an alpha value.

x = Data field

y = Remote system

Probable cause	Corrective action
<p>The specified data field must be an alphabetic value.</p> <p><b>Host:</b></p> <ul style="list-style-type: none"> <li>• Incorrectly formatted record or message received from the host.</li> </ul> <p><b>ARM:</b></p> <ul style="list-style-type: none"> <li>• Software error.</li> </ul>	<p>Refer to Section 5: ARCHITECT System-specific Incoming Messages.</p> <p>Contact your Area Customer Support. Please provide information specifying the operation you were attempting to perform when this error occurred.</p>

**Error code: 8179**

Invalid host order for Sample ID (x), Assay number (y) status type does not exist.

x = Sample ID

y = Assay number

Probable cause	Corrective action
<p>The system received a test order from the host for an assay that is not installed.</p> <ul style="list-style-type: none"> <li>• The assay has not been installed.</li> <li>• The assay number is incorrectly defined in the host.</li> </ul>	<p>Perform 6114 Install/Delete Assays to install the requested assay.</p> <p>Correct the assay number in the host system.</p>

**Error code: 8180**

Required field (x) was not populated by (y).

x = Field name

y = Remote system

Probable cause	Corrective action
Mandatory ASTM field was blank in the message received. The remainder of the message is ignored by the system.  <b>Host:</b> <ul style="list-style-type: none"><li>• Incorrectly formatted record or message received from the host.</li></ul> <b>ARM:</b> <ul style="list-style-type: none"><li>• Software error.</li></ul>	Refer to Section 5: ARCHITECT System-specific Incoming Messages.  Contact your Area Customer Support. Please provide information specifying the operation you were attempting to perform when this error occurred.

**Error code: 8181**

Invalid host order, incorrect birth date (y) for Sample ID (x).

x = Sample ID

y = Birth date

Probable cause	Corrective action
The system received an order from the host and the order contained a birth date that is later than the current date.	Correct birth date in the host, then resend the order from the host.

**Error code: 8182**

Unsupported character received from the host in a record. Original: (x), Translated: (y).

x = Input string

y = Output string

Probable cause	Corrective action
Record received from the host contained a character that is not supported in the ASI Code page. This character is translated as the copyright symbol (© or code 0169).	Refer to Section 6: ARCHITECT System Support of ASI Options.

**Error code: 8183**

Unsupported character sent to the host in a record. Original: (x), Translated: (y).

x = Input string

y = Output string

Probable cause	Corrective action
Record sent to the host contained a character that is not supported in the ASI Code page. This character is translated as the registered mark (® or code 0174).	Refer to Section 6: ARCHITECT System Support of ASI Options.

**Error code: 8193**

Invalid host order, incorrect draw date (x) for Sample ID (y).

x = Sample draw date

y = Sample ID

Probable cause	Corrective action
Host order received which contained a draw date that is later than the current date.	Correct the draw date in the host, then resend the order from the host.

**Error code: 8250**

Invalid frame number received from (x). <NAK> has been sent.

x = Remote system

Probable cause	Corrective action
<p>Record received did not contain the frame in sequence.</p> <p><b>Host:</b></p> <ul style="list-style-type: none"> <li>• Incorrectly formatted record or message received from the host.</li> </ul> <p><b>ARM:</b></p> <ul style="list-style-type: none"> <li>• Communication failure.</li> </ul>	<p>Refer to Section 5: ARCHITECT System-specific Incoming Messages.</p> <p>Condition may be temporary, if so, no corrective action is required. If condition is not temporary, a 3901 error code displays as an alert popup. Follow the corrective action for this specific code in the ARCHITECT System Operations Manual.</p>

**Error code: 8251**

Received <NAK> for outgoing frame from (x).

x = Remote destination name

Probable cause	Corrective action
<b>Host:</b> <ul style="list-style-type: none"><li>• Incorrectly formatted record or message received from the host.</li></ul> <b>ARM:</b> <ul style="list-style-type: none"><li>• Communication failure.</li></ul>	Refer to Section 5: ARCHITECT System-specific Incoming Messages.  Condition may be temporary, if so, no corrective action is required. If condition is not temporary, a 3901 error code displays as an alert popup. Follow the corrective action for this specific code in the ARCHITECT System Operations Manual.

**Error code: 8252**

No terminating <CR> in received frame from (x). <NAK> has been sent.

x = Remote system

Probable cause	Corrective action
Frame received did not terminate in a carriage return.  <b>Host:</b> <ul style="list-style-type: none"><li>• Incorrectly formatted record or message received from the host.</li></ul> <b>ARM:</b> <ul style="list-style-type: none"><li>• Communication failure.</li></ul>	Refer to Section 5: ARCHITECT System-specific Incoming Messages.  Condition may be temporary, if so, no corrective action is required. If condition is not temporary, a 3901 error code displays as an alert popup. Follow the corrective action for this specific code in the ARCHITECT System Operations Manual.

**Error code: 8253**

Invalid checksum received in incoming frame from (x). <NAK> has been sent.

x = Remote system

Probable cause	Corrective action
<p>Frame received contained an invalid checksum.</p> <p><b>Host:</b></p> <ul style="list-style-type: none"> <li>• Incorrectly formatted record or message received from the host.</li> </ul> <p><b>ARM:</b></p> <ul style="list-style-type: none"> <li>• Communication failure.</li> </ul>	<p>Refer to Section 5: ARCHITECT System-specific Incoming Messages.</p> <p>Condition may be temporary, if so, no corrective action is required. If condition is not temporary, a 3901 error code displays as an alert popup. Follow the corrective action for this specific code in the ARCHITECT System Operations Manual.</p>

**Error code: 8254**

Restricted character in message text from (x). <NAK> has been sent.

x = Remote system

Probable cause	Corrective action
<p>Message received contained a restricted character.</p> <p><b>Host:</b></p> <ul style="list-style-type: none"> <li>• Incorrectly formatted record or message received from the host.</li> </ul> <p><b>ARM:</b></p> <ul style="list-style-type: none"> <li>• Communication failure.</li> </ul>	<p>Refer to Section 5: ARCHITECT System-specific Incoming Messages.</p> <p>Condition may be temporary, if so, no corrective action is required. If condition is not temporary, a 3901 error code displays as an alert popup. Follow the corrective action for this specific code in the ARCHITECT System Operations Manual.</p>

**Error code: 8255**

No terminating <LF> in received frame from (x). <NAK> has been sent.  
x = Remote system

Probable cause	Corrective action
Frame received did not contain a terminating line feed. <b>Host:</b> <ul style="list-style-type: none"><li>• Incorrectly formatted record or message received from the host.</li></ul> <b>ARM:</b> <ul style="list-style-type: none"><li>• Communication failure.</li></ul>	Refer to Section 5: ARCHITECT System-specific Incoming Messages.  Condition may be temporary, if so, no corrective action is required. If condition is not temporary, a 3901 error code displays as an alert popup. Follow the corrective action for this specific code in the ARCHITECT System Operations Manual.

**Error code: 8256**

Data field (x) received from (y) must be a printable string.

x = Data field

y = Remote system

Probable cause	Corrective action
The specified data field must be a printable string. <b>Host:</b> <ul style="list-style-type: none"><li>• Incorrectly formatted record or message received from the host.</li></ul> <b>ARM:</b> <ul style="list-style-type: none"><li>• Software error.</li></ul>	Refer to Section 5: ARCHITECT System-specific Incoming Messages.  Contact your Area Customer Support. Please provide information specifying the operation you were attempting to perform when this error occurred.

**Error code: 8257**

Data field (x) received from (y) must be a valid date.

x = Data field

y = Remote system

Probable cause	Corrective action
<p>The specified data field must be a valid date.</p> <p><b>Host:</b></p> <ul style="list-style-type: none"> <li>• Incorrectly formatted record or message received from the host.</li> </ul> <p><b>ARM:</b></p> <ul style="list-style-type: none"> <li>• Software error.</li> </ul>	<p>Refer to Section 5: ARCHITECT System-specific Incoming Messages.</p> <p>Contact your Area Customer Support. Please provide information specifying the operation you were attempting to perform when this error occurred.</p>

**Error code: 8258**

Record (x) was received in message from (y) prior to a required header record.

x = Record string which was received as the first record of the message

y = Remote system

Probable cause	Corrective action
<p>Message received without the Header record as the first record of the message.</p> <p><b>Host:</b></p> <ul style="list-style-type: none"> <li>• Incorrectly formatted record or message received from the host.</li> </ul> <p><b>ARM:</b></p> <ul style="list-style-type: none"> <li>• Software error.</li> </ul>	<p>Refer to Section 5: ARCHITECT System-specific Incoming Messages.</p> <p>Contact your Area Customer Support. Please provide information specifying the operation you were attempting to perform when this error occurred.</p>

## Section 7

**Error code: 8259**

Record received from (x) contained an invalid field (y).

x = Remote system

y = Field name

Probable cause	Corrective action
<p>Record received contained an invalid data field.</p> <p><b>Host:</b></p> <ul style="list-style-type: none"> <li>• Incorrectly formatted record or message received from the host.</li> </ul> <p><b>ARM:</b></p> <ul style="list-style-type: none"> <li>• Software error.</li> </ul>	<p>Refer to Section 5: ARCHITECT System-specific Incoming Messages.</p> <p>Contact your Area Customer Support. Please provide information specifying the operation you were attempting to perform when this error occurred.</p>

**Error code: 8260**

(x) sent an unsupported record type (y). The record is ignored.

x = Remote system

y = Record received

Probable cause	Corrective action
<p>Record received was a valid ASTM format but is not supported by the system.</p> <p><b>Host:</b></p> <ul style="list-style-type: none"> <li>• Unsupported record or message received from the host.</li> </ul> <p><b>ARM:</b></p> <ul style="list-style-type: none"> <li>• Software error.</li> </ul>	<p>Refer to Section 5: ARCHITECT System-specific Incoming Messages.</p> <p>Contact your Area Customer Support. Please provide information specifying the operation you were attempting to perform when this error occurred.</p>

**Error code: 8261**

Negative query received for Sample ID (x), in Carrier/Position (y).

x = Sample ID

y = Carrier or CRSL and Position number

Probable cause	Corrective action
• The sample ID has not been entered into the host computer.	Enter the sample ID and test order(s) for the sample ID into the host computer.
• There are no ARCHITECT® System test orders for the specified sample ID.	Enter the test order(s) for the sample ID into the host computer.
• Host computer is not functioning properly.	If unable to place test order in the host, manually order the required tests on the SCC.

**Error code: 8274**

Result for Sample ID (x), Assay Number (y) could not be transmitted to the Host.

x = Sample ID

y = Assay number

Probable cause	Corrective action
<ul style="list-style-type: none"> <li>Temporary communication error</li> </ul>	Retransmit the result.
<ul style="list-style-type: none"> <li>Host is not configured for the expected result format.</li> </ul>	Refer to Section 4: ARCHITECT System-specific Outgoing Messages.

**Error code: 8350**

Maximum number of query timeouts exceeded. Host query mode disabled.

Probable cause	Corrective action
<p>Three consecutive timeouts received while requesting orders from the host. The host port is disabled after this error.</p> <ul style="list-style-type: none"> <li>Host did not respond within the time period configured.</li> <li>Incorrect baud rate on host port.</li> <li>Host query not configured on the SCC.</li> <li>Hardware failure:           <ul style="list-style-type: none"> <li>Cable from LIS to SCC (COM5, Connector P3) has a poor connection or failed</li> </ul> </li> </ul>	<p>Increase host query timeout value. Refer to Section 3: Communication Setup.</p> <p>Reconfigure the host baud rate. Refer to Section 3: Communication Setup.</p> <p>Re-enable the Bidirectional host option in system settings. Refer to Section 3: Communication Setup.</p> <p>Contact your Area Customer Support to resolve any hardware failure.</p>

**Error code: 8351**

(x) connection cannot be established because of contention.

x = Remote system

Probable cause	Corrective action
<b>Host:</b> <ul style="list-style-type: none"> <li>Both systems request a connection at the same time by sending an &lt;ENQ&gt; and this creates contention.</li> </ul>	Refer to Section 4: ARCHITECT System-specific Outgoing Messages and Section 5: ARCHITECT System-specific Incoming Messages.
<b>ARM:</b> <ul style="list-style-type: none"> <li>Communication failure.</li> </ul>	Condition may be temporary, if so, no corrective action is required. If condition is not temporary, a 3901 error code displays as an alert popup. Follow the corrective action for this specific error code in the ARCHITECT System Operations Manual.

**Error code: 8353**

Maximum retries exceeded for outgoing frame sent to (x).

x = Remote system

Probable cause	Corrective action
<p>Unable to send frame to the remote system, because the remote system sends a negative acknowledgment &lt;NAK&gt; for the frame received.</p> <p><b>Host:</b></p> <ul style="list-style-type: none"> <li>• Incorrectly formatted record or message received from the host.           <ul style="list-style-type: none"> <li>– Checksum is invalid.</li> <li>– Frame is not received in sequence.</li> </ul> </li> <li>• Hardware failure:           <ul style="list-style-type: none"> <li>– Cable from LIS to SCC (COM5, Connector P3) has a poor connection or failed</li> </ul> </li> </ul> <p><b>ARM:</b></p> <ul style="list-style-type: none"> <li>• Communication failure.</li> </ul>	<p>Refer to Section 5: ARCHITECT System-specific Incoming Messages.</p> <p>Contact your Area Customer Support to resolve any hardware failure.</p> <p>Condition may be temporary, if so, no corrective action is required. If condition is not temporary, a 3901 error code displays as an alert popup. Follow the corrective action for this specific error code in the ARCHITECT System Operations Manual.</p>

**Error code: 8354**

(x) connection cannot be established, no response was received.

x = Remote system

Probable cause	Corrective action
<p>The system is unable to establish a connection to the remote system</p> <p><b>Host:</b></p> <ul style="list-style-type: none"> <li>• Host is busy or not responding.</li> <li>• Incorrect baud rate on host port.</li> <li>• Message response is incorrectly defined for the host.</li> <li>• Hardware failure:           <ul style="list-style-type: none"> <li>– Cable from LIS to SCC (COM5, Connector P3) has a poor connection or failed</li> </ul> </li> </ul> <p><b>ARM:</b></p> <ul style="list-style-type: none"> <li>• Communication failure.</li> </ul>	<p>Ensure host system is functional.</p> <p>Reconfigure the host baud rate.</p> <p>Refer to Section 3: Communication Setup.</p> <p>Refer to Section 1: Abbott Standard Interface for information about the ASTM protocol.</p> <p>Contact your Area Customer Support to resolve any hardware failure.</p> <p>Condition may be temporary, if so, no corrective action is required. If condition is not temporary, a 3901 error code displays as an alert popup. Follow the corrective action for this specific error code in the ARCHITECT System Operations Manual.</p>

**Error code: 8355**

Time out on frame sent to (x)

x = Remote system

Probable cause	Corrective action
<p>System timed out waiting for confirmation that the remote system received a frame. The connection is terminated by the system.</p> <p><b>Host:</b></p> <ul style="list-style-type: none"> <li>• Host is busy or not responding.</li> <li>• Message response is incorrectly defined for the host.</li> <li>• Hardware failure: <ul style="list-style-type: none"> <li>– Cable from LIS to SCC (COM5, Connector P3) has a poor connection or failed</li> </ul> </li> </ul> <p><b>ARM:</b></p> <p>Communication failure.</p>	<p>Ensure host system is functional.</p> <p>Refer to Section 1: Abbott Standard Interface for information about the ASTM protocol.</p> <p>Contact your Area Customer Support to resolve any hardware failure.</p> <p>Condition may be temporary, if so, no corrective action is required. If condition is not temporary, a 3901 error code displays as an alert popup. Follow the corrective action for this specific error code in the ARCHITECT System Operations Manual.</p>

**Error code: 8356**

Query for sample ID (x) has been deleted.

x = Sample ID

Probable cause	Corrective action
<ul style="list-style-type: none"> <li>• Host is busy or not responding.</li> </ul>	Ensure host system is functional.
<ul style="list-style-type: none"> <li>• Host query option was turned off due to a previous communication error or was turned off by the user.</li> </ul>	<p>Re-enable the Bidirectional host option in system settings.</p> <p>Refer to Section 3: Communication Setup.</p>
<ul style="list-style-type: none"> <li>• Incorrect baud rate on host port.</li> </ul>	<p>Reconfigure the host baud rate.</p> <p>Refer to Section 3: Communication Setup.</p>
<ul style="list-style-type: none"> <li>• Message response is incorrectly defined for the host.</li> </ul>	Refer to Section 1: Abbott Standard Interface for information about the ASTM protocol.
<ul style="list-style-type: none"> <li>• Hardware failure: <ul style="list-style-type: none"> <li>– Cable from LIS to SCC (COM5, Connector P3) has a poor connection or failed</li> </ul> </li> </ul>	Contact your Area Customer Support to resolve any hardware failure.

**Error code: 8357**

Unable to transmit results to Host, Host access turned off.

Probable cause	Corrective action
System attempted to transmit approved results but the host is turned off <ul style="list-style-type: none"><li>• Host is not responding or is turned off.</li><li>• Bidirectional host option is turned off.</li></ul>	Turn on the host interface and re-transmit the data. Re-enable the Bidirectional host option in system settings. Refer to Section 3: Communication Setup.

**Error code: 8358**

Time out on incoming frame from (x).

x = Remote system

Probable cause	Corrective action
<p>System timed out waiting to receive a frame. The connection is terminated by the system.</p> <p><b>Host:</b></p> <ul style="list-style-type: none"><li>• Host is busy or not responding.</li><li>• Message response is incorrectly defined for the host.</li><li>• Hardware failure:<ul style="list-style-type: none"><li>– Cable from LIS to SCC (COM5, Connector P3) has a poor connection or failed</li></ul></li></ul> <p><b>ARM:</b></p> <ul style="list-style-type: none"><li>• Communication failure.</li></ul>	<p>Ensure host system is functional.</p> <p>Refer to Section 1: Abbott Standard Interface for information about the ASTM protocol.</p> <p>Contact your Area Customer Support to resolve any hardware failure.</p> <p>Condition may be temporary, if so, no corrective action is required. If condition is not temporary, a 3901 error code displays as an alert popup. Follow the corrective action for this specific error code in the ARCHITECT System Operations Manual.</p>

**Error code: 8363**

(x) connection cannot be established, remote system is busy.

x = Remote system

Probable cause	Corrective action
<p>System attempted to connect with the remote system, but the remote system was busy and responded with a &lt;NAK&gt;.</p> <p><b>Host:</b></p> <ul style="list-style-type: none"> <li>• Host is busy.</li> </ul> <p><b>ARM:</b></p> <ul style="list-style-type: none"> <li>• Communication failure.</li> </ul>	<p>Wait for host system to become available.</p> <p>Condition may be temporary, if so, no corrective action is required. If condition is not temporary, a 3901 error code displays as an alert popup. Follow the corrective action for this specific error code in the ARCHITECT System Operations Manual.</p>

**Error code: 8364**

The maximum number of connection attempts has been reached for (x).

x = Remote system

Probable cause	Corrective action
<p>Multiple failures while attempting to establish communication with the remote system.</p> <p><b>Host:</b></p> <ul style="list-style-type: none"> <li>• Host is busy or not responding.</li> <li>• Incorrect baud rate on host port.</li> <li>• Message response is incorrectly defined for the host.</li> <li>• Hardware failure: <ul style="list-style-type: none"> <li>– Cable from LIS to SCC (COM5, Connector P3) has a poor connection or failed</li> </ul> </li> </ul> <p><b>ARM:</b></p> <ul style="list-style-type: none"> <li>• Communication failure.</li> </ul>	<p>Ensure host system is functional.</p> <p>Reconfigure the host baud rate.</p> <p>Refer to Section 3: Communication Setup.</p> <p>Refer to Section 1: Abbott Standard Interface for information about the ASTM protocol.</p> <p>Contact your Area Customer Support to resolve any hardware failure.</p> <p>Condition may be temporary, if so, no corrective action is required. If condition is not temporary, a 3901 error code displays as an alert popup. Follow the corrective action for this specific error code in the ARCHITECT System Operations Manual.</p>

## Section 7

**Error code: 8457**

(x) port disabled.

x = Remote system

Probable cause	Corrective action
<p>The communication port is disabled due to multiple failures while attempting to establish communication with the remote system.</p> <p><b>Host:</b></p> <ul style="list-style-type: none"><li>• Host is busy or not responding.</li><li>• Incorrect baud rate on host port.</li><li>• Message response is incorrectly defined for the host.</li><li>• Hardware failure:<ul style="list-style-type: none"><li>– Cable from LIS to SCC (COM5, Connector P3) has a poor connection or failed</li></ul></li></ul> <p><b>ARM:</b></p> <ul style="list-style-type: none"><li>• ARM Is busy or not responding</li><li>• Hardware failure:<ul style="list-style-type: none"><li>– Cable from ARM to SCC (COM7, Connector P5) has a poor connection or failed</li></ul></li></ul>	<p>Re-enable the Bidirectional host option, after ensuring that the host system is functional. Refer to Section 3: Communication Setup.</p> <ol style="list-style-type: none"><li>1. Reconfigure the host baud rate. Refer to Section 3: Communication Setup.</li><li>2. Re-enable the Bidirectional host option, after correcting the baud rate. Refer to Section 3: Communication Setup.</li></ol> <p>Refer to Section 1: Abbott Standard Interface for information about the ASTM protocol.</p> <p>Contact your Area Customer Support to resolve any hardware failure.</p> <p>Re-enable the Wash buffer transfer option for automatic buffer transfer, after ensuring that the ARM is functional. See Configure reagents-supplies window in the ARCHITECT System Operations Manual.</p> <p>Contact your Area Customer Support to resolve any hardware failure.</p>

**Error code: 8458**

Unable to accept test orders from Host.

Probable cause	Corrective action
System has reached unreleased result capacity, regardless if you are connected to a host or not. This includes unreleased patient and QC results, test orders, and exceptions.	<ol style="list-style-type: none"> <li>1. If configured for host, release patient and QC results.</li> <li>2. Delete or release exceptions or pending orders below 10% of maximum capacity. (Currently, maximum capacity is 6,500, therefore 90% = 5,850). Once unreleased patient results, QC results, and exceptions have been released or deleted, the system resumes accepting test orders from the host.</li> </ol> <p><b>NOTE:</b> If not configured for a host, this message should be ignored.</p>

**Error code: 8459**

Test orders may be downloaded from the Host.

Probable cause	Corrective action
The number of unreleased patient and QC results, pending orders, and exceptions was reduced to a level that is 10 percent below the maximum capacity.	Test orders from the host are now be accepted if the feature is enabled in the system configuration.

**Error code: 8460**

Unable to process backup or restore request, host transfer in process.

Probable cause	Corrective action
Backup or restore requested when data is transferring to the host.	Wait until all host transfers are complete, or cancel result transmission before performing the backup or restore procedure.

**Error code: 8462**

Negative query response for Sample ID (x), did not match the Sample ID sent to the host.  
x = Sample ID

Probable cause	Corrective action
The Sample ID returned from the host did not match the Sample ID queried for by the system. <ul style="list-style-type: none"> <li>• The host is responding to a previous query request which has timed out on the system.</li> <li>• The host sent an order that was not requested by the system.</li> </ul>	Increase the host query timeout value. Refer to Section 3: Communication Setup. Refer to Section 1: Abbott Standard Interface for information about the ASTM protocol.

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Section 7**Error code: 8463**

Unable to change configuration, host transmission is in process.

Probable cause	Corrective action
Attempting to configure a new processing module while a host transmission is in process.	Wait until all host transfers are complete, or cancel result transmission before configuring the new processing module.

**Error code: 8465**

Host transmission canceled by the user.

Probable cause	Corrective action
User cancelled result transmission to the host.	Status message. No corrective action is required.

**Error code: 8466**

Incoming connection from (x) has been rejected, unreleased result capacity has been reached on the system.

x = Remote system

Probable cause	Corrective action
The number of unreleased results is at the maximum.	Release or delete unreleased patient results, quality control results, and exceptions currently on the system.

## NOTES

## Observed Problems

The following information describes problems that may be observed on the ARCHITECT System. Corrective action steps to help resolve these problems are also included.

Observed Problem	Probable Cause	Corrective Action
QC exceptions are sent to the host when Transmit to host option “Approved QC results” is configured to Off.	QC exceptions are transmitted to the host if the Release mode selected is “Automatic with exceptions.”	If you do not want QC exceptions to be sent to the host, configure Release mode to any selection except Auto with exceptions.
Results were sent to the host twice.	Test results are resent to the host as initial results if the SCC is shutdown in the middle of a transmission.	Prior to shutting down the SCC, view the LIS status icon on the Snapshot screen to verify no results are pending transmission.
Unable to delete results.	<ol style="list-style-type: none"> <li>1. Results are being transmitted to the host.</li> <li>2. Transmission requested when System is configured for host and there is no host connected. Result status is pending transmission.</li> <li>3. The host mode is set to collate and not all of the results for the SID have been released. Result status is pending collation.</li> </ol>	<ol style="list-style-type: none"> <li>1. Wait until transmission is complete, then delete the required results.</li> <li>2. Reconfigure the host communication to Off. A popup displays. Select OK to clear results waiting to be sent to the host, then delete results. Refer to Refer to Section 3: Setting Communications, Host-Release Mode.</li> <li>3. Release or delete associated SIDs, then delete the result.</li> </ol>

**NOTES**

# **Introduction**

This section provides information about the Abbott ARCHITECT Host/Instrument Interface tools. Tools include:

- ASIST (Abbott Standard Interface Simulator Tool)
- Abbott ARCHITECT Host/Instrument Interface Data Disk
- ARCHITECT SCC Simulator (for LIS Vendors)

**NOTES**

# ASIST Tool Overview

Abbott customers and LIS vendors can use the ASIST Tool to simulate new Abbott instruments and systems by communicating previously captured data files to their new interfaces. This allows testing of the communications interface to Abbott instruments, and reduces the amount of testing required in a live lab environment.

Extensive logging capabilities provide software developers with an audit trail of communication activity for easy troubleshooting and diagnostics. Erroneous transactions can be created which can be used to test the interfaced instruments' or systems' responses to error conditions.

### ***Installation***

The ASIST (Abbott Standard Interface Simulator Tool) can run on a Windows® 95 or Windows® NT (version 4.0 only) System.

#### **Minimum System Requirements for installation:**

- INTEL® 486/25 mhz processor
- 8 MB RAM (16 MB recommended)
- 15 MB free disk space (20 MB recommended)
- VGA or higher resolution display

#### **To install ASIST on your computer:**

1. Select **My Computer** from the Windows desktop.
2. Select **Control Panel**, and then **ODBC Data Sources**.
3. Select the **Drivers** tab and verify the Microsoft Access Driver (\*.mdb) is listed in the drivers window.
4. Close all applications and place floppy disk 1 into the floppy drive.
5. Select **Start** from the Windows desktop, and then select **Run**.
6. Type A:\setup.exe (where A: is the location of the floppy drive on your computer), and then select **OK**. The ASIST setup window displays.

**NOTE:** You may cancel the installation at any time by selecting F3 or the EXIT button.

7. Select **Next** at the prompt to continue with the setup.
8. Select the drive and directory, and then select **Next** to continue.
9. Select **Next** to add the shortcut icon.

10. Select **Finish** to start the software installation.

**NOTE:** If a window displays asking whether or not a file should be overwritten, respond by selecting **No**.

11. Insert disk 2 - 5 when prompted, and then select **Finish** to complete the installation.

12. Remove the floppy disk from the drive.

### **Setup**

Before you begin testing using ASIST the following setup functions are required:

- Setting Up Files and Paths
- Set Communication Port Settings

Use the ASIST HELP 2.1 for instructions on performing the setup. To access the ASIST HELP 2.1:

1. Select **Start** from the Windows desktop.
2. Select **Programs**, and then **Asist V 2.1**.
3. Double-click on **ASIST HELP 2.1**.
4. Select **How do I ...?**, and then select the appropriate item under the Getting started with ASIST section.

Refer to the ASIST Version 2.0/2.1 Installation/Quick Reference Guide (List No. 6D02-01) for more information.

# Abbott ARCHITECT Host/Instrument Interface Data Disk

This data diskette is for use concurrently with the ASIST Tool. It provides scripts and examples to simulate different scenarios of ASTM interface functioning with the Abbott ARCHITECT System. In this diskette, there are 3 subdirectories:

- A:\arch subdirectory contains necessary scripts, and data files to simulate the data sent by the ARCHITECT System. Use the **arch.scr** script file with ASIST Tool to simulate different pre-defined scenarios. Refer to the **ReadmeA.txt** and the **arch.scr** script files, under this subdirectory, for details.
- A:\host subdirectory contains necessary scripts, and data files to simulate the data expected by the ARCHITECT System from a Host system. Use the **host.scr** script file with ASIST Tool to simulate different pre-defined scenarios. Refer to the **ReadmeH.txt** and the **host.scr** files, under this subdirectory, for details.
- A:\specs subdirectory contains common configuration files, that need to be installed, for successful simulations of bi-directional communication from and to the ARCHITECT System. Refer to the **ReadmeA.txt** and **ReadmeH.txt** files for installation instructions.

**NOTES**

# ARCHITECT SCC Simulator (for LIS Vendors)

The ARCHITECT SCC (System Control Center) Simulator is intended as a tool for LIS (Laboratory Information System) developers. This tool simulates communication between the LIS and the ARCHITECT System. Using this tool and the Abbott Standard Interface RS-232 Manual, the LIS developers can test the LIS functionality as if the LIS is attached to the ARCHITECT System.

## Installation

The SCC Simulator can run on a Windows® 2000 System with a COM port connected to an LIS. The connection requires a three wire RS-232 interface with configurable settings for baud rate, data bits, parity, and stop bits. Prior to running the SCC Simulator, you must set up your system or systems with an RS-232 cable and null modem.

### Minimum System Requirements for installation:

- Windows 2000
- PENTIUM® 350 MHz processor
- 640 MB RAM

**NOTE:** Do not load the ARCHITECT SCC Simulator software on the SCC that is part of the ARCHITECT System.

To install the ARCHITECT SCC Simulator (for LIS vendors):

1. Close all applications and place floppy disk 1 into the floppy drive.
2. Select **Start** from the Windows 2000 desktop, and then select **Run**.
3. Type A:\setup.exe (where A: is the location of the floppy drive on your computer), and then select **OK**.
4. Select **Next** at each screen prompt, and then when prompted insert disk 2.
5. Select **Finish** when prompted to complete the installation.
6. Remove the floppy disk from the drive.

## **SCC Simulator components**

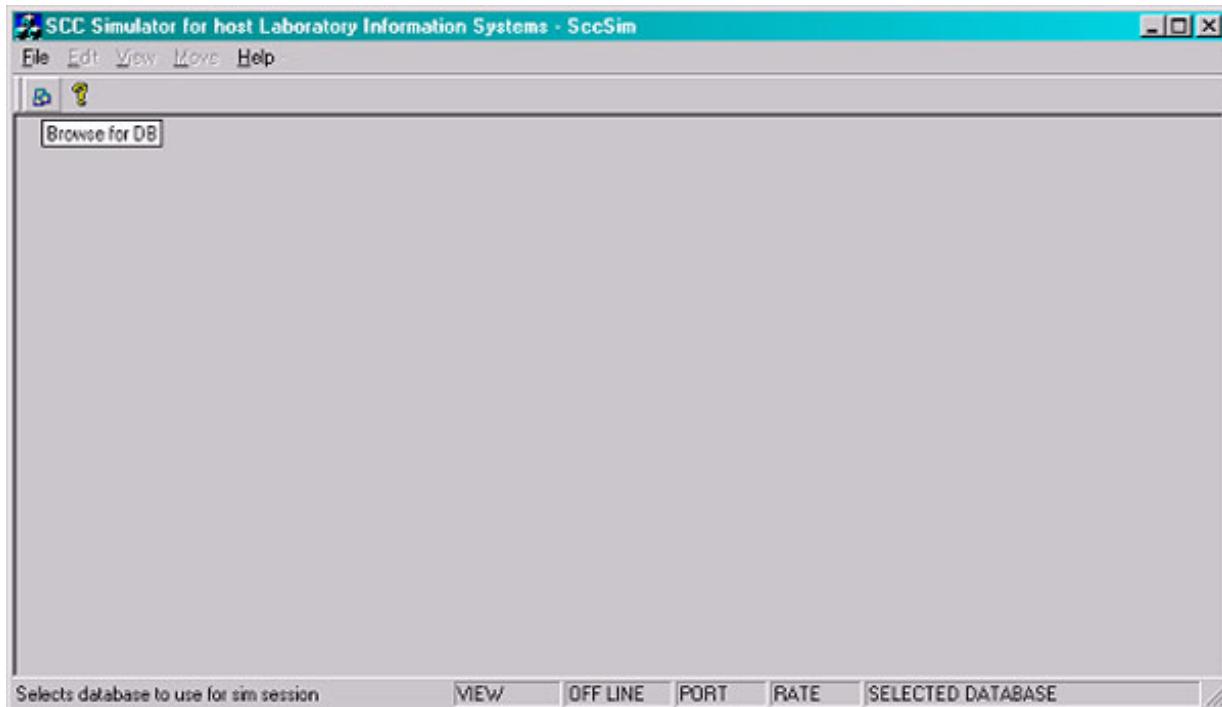
The SCC Simulator is an Abbott-developed software application which includes a database. A log file (SccMessageLog.txt), located in the C:\ directory, contains all low-level messages sent to or from the LIS. The SCC Simulator simulates the communication interface between the external LIS and the ARCHITECT System. It does not simulate the software behavior internal to those devices.

## **Using the simulator**

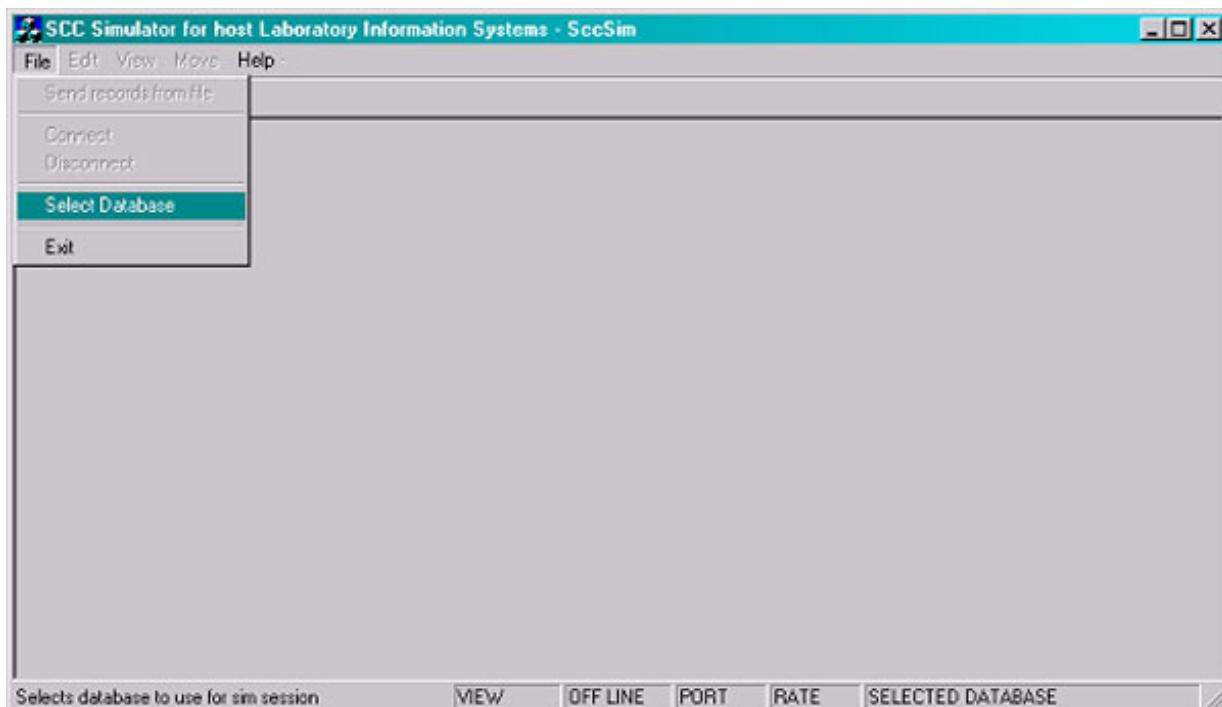
Using the simulator includes selecting a database, configuring and connecting to a communication port, installing and deleting assay information, and other various activities prior to developing or testing the LIS functionality. The simulator can be started by running the executable IcwSim.exe located in the C:\SCC Simulator (LIS Vendors) folder.

### **Selecting simulator database**

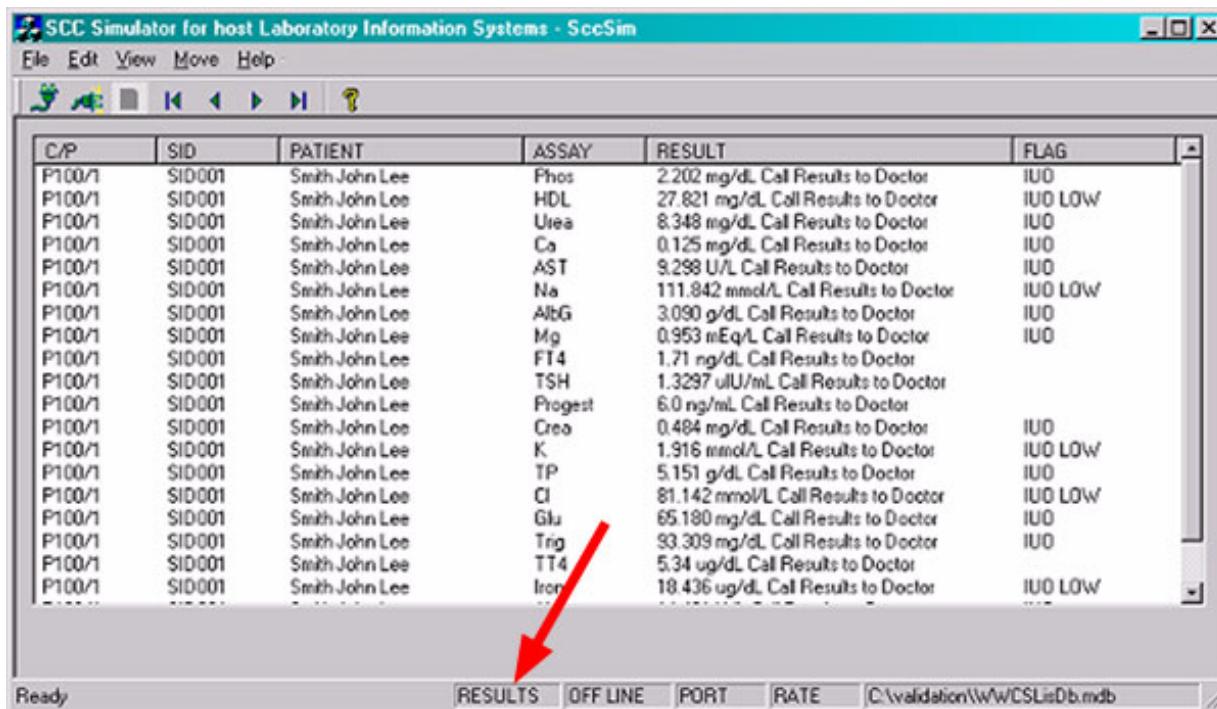
The connection status and simulator database selection of the simulator is displayed for the user in the status window of the application. The fields for the status window are as follows: Current View, Connection Status, Communication Port, Baud Rate, and Selected Database. The database can be selected by using the **Browse for DB** icon on the main application window tool bar (*Figure 8.1*) or by selecting **File, Select Database** (*Figure 8.2*). Navigate to C:\SCCSimulator(LISVendors)\ BlankIcwSimDb.mdb. Once the selection is made, the Current View status bar field displays **RESULTS**, indicating the results view is displayed, and the Selected Database status bar field displays the selected database name (*Figure 8.3*).



**Figure 8.1:** SCC Simulator Database Selection



**Figure 8.2:** SCC Alternate Database Selection



The screenshot shows a Windows application window titled "SCC Simulator for host Laboratory Information Systems - SccSim". The menu bar includes "File", "Edit", "View", "Move", and "Help". The toolbar contains icons for file operations like Open, Save, Print, and Help. Below the toolbar is a table with columns: C/P, SID, PATIENT, ASSAY, RESULT, and FLAG. The table lists 20 rows of patient test results. At the bottom of the window is a toolbar with buttons labeled "Ready", "RESULTS", "OFF LINE", "PORT", "RATE", and a path "C:\validation\w\w\CSLisDb.mdb".

C/P	SID	PATIENT	ASSAY	RESULT	FLAG
P100/1	SID001	Smith John Lee	Phos	2.202 mg/dL Call Results to Doctor	IUD
P100/1	SID001	Smith John Lee	HDL	27.821 mg/dL Call Results to Doctor	IUD LOW
P100/1	SID001	Smith John Lee	Urea	8.348 mg/dL Call Results to Doctor	IUD
P100/1	SID001	Smith John Lee	Ca	0.125 mg/dL Call Results to Doctor	IUD
P100/1	SID001	Smith John Lee	AST	9.298 U/L Call Results to Doctor	IUD
P100/1	SID001	Smith John Lee	Na	111.842 mmol/L Call Results to Doctor	IUD LOW
P100/1	SID001	Smith John Lee	AltG	3.090 g/dL Call Results to Doctor	IUD
P100/1	SID001	Smith John Lee	Mg	0.953 mEq/L Call Results to Doctor	IUD
P100/1	SID001	Smith John Lee	FT4	1.71 ng/dL Call Results to Doctor	
P100/1	SID001	Smith John Lee	TSH	1.3297 uIU/mL Call Results to Doctor	
P100/1	SID001	Smith John Lee	Progesterone	6.0 ng/mL Call Results to Doctor	
P100/1	SID001	Smith John Lee	Crea	0.484 mg/dL Call Results to Doctor	IUD
P100/1	SID001	Smith John Lee	K	1.916 mmol/L Call Results to Doctor	IUD LOW
P100/1	SID001	Smith John Lee	TP	5.151 g/dL Call Results to Doctor	IUD
P100/1	SID001	Smith John Lee	Cl	81.142 mmol/L Call Results to Doctor	IUD LOW
P100/1	SID001	Smith John Lee	Glu	65.180 mg/dL Call Results to Doctor	IUD
P100/1	SID001	Smith John Lee	Trig	93.309 mg/dL Call Results to Doctor	IUD
P100/1	SID001	Smith John Lee	TT4	5.34 ug/dL Call Results to Doctor	
P100/1	SID001	Smith John Lee	Iron	18.436 ug/dL Call Results to Doctor	IUD LOW

**Figure 8.3:** SCC Simulator after Database Selection

### Configuring communication ports

The user can configure a communication port for the SCC Simulator by selecting **Edit, Comm** (*Figure 8.4*). The communication settings window (*Figure 8.5*) displays, allowing the user to configure the following port attributes:

#### Communication ports [1-10]

- Baud rate [1200, 2400, 4800, 9600, 14400, 19200, 28800, 38400, 57600, 115200]
- Data bits [7, 8]
- Parity [even, odd, none]
- Stop bits [1, 2]

The communications settings window (*Figure 8.5*) also has a **Reset To Defaults** button allowing the user to reset the communication settings to the following default port attributes

Communication port	2
Baud rate	9600
Data bits	8
Parity	none
Stop bits	1

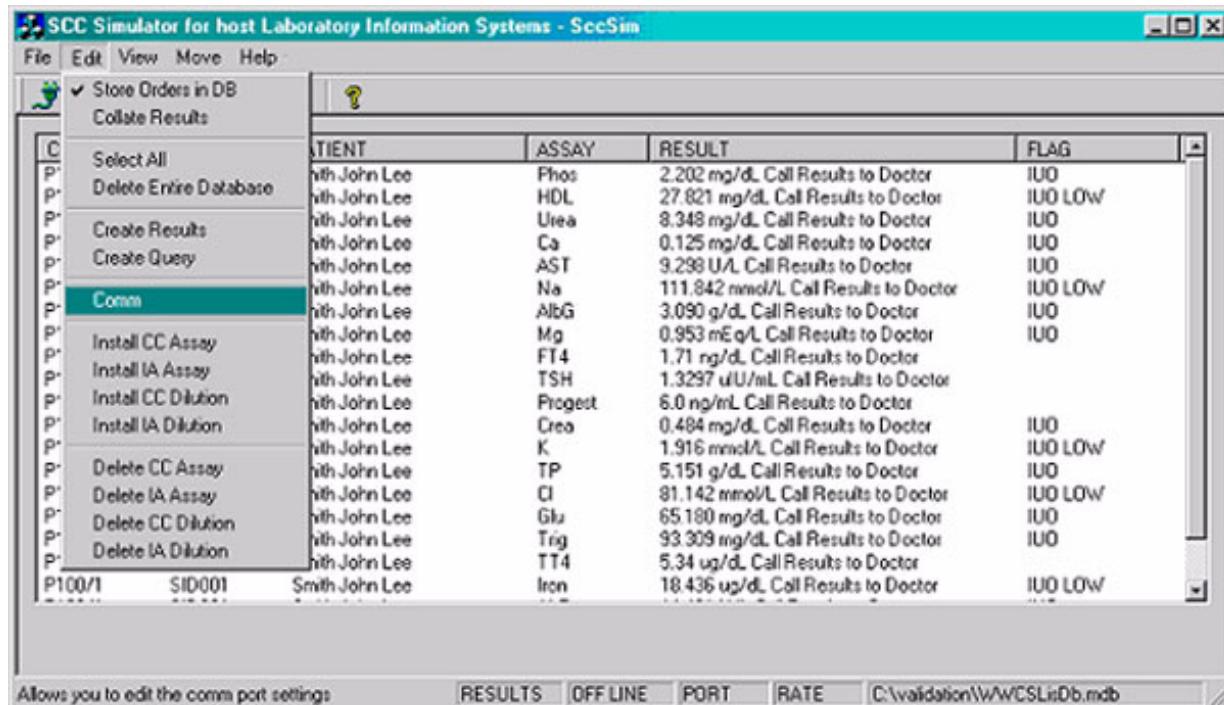


Figure 8.4: Configure Communication Port

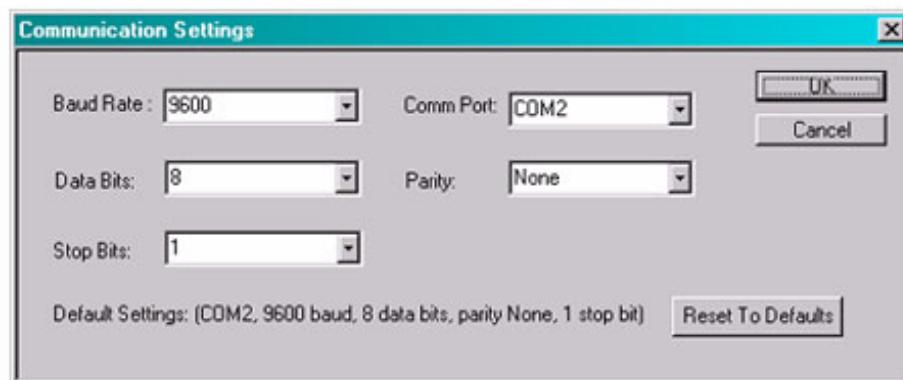
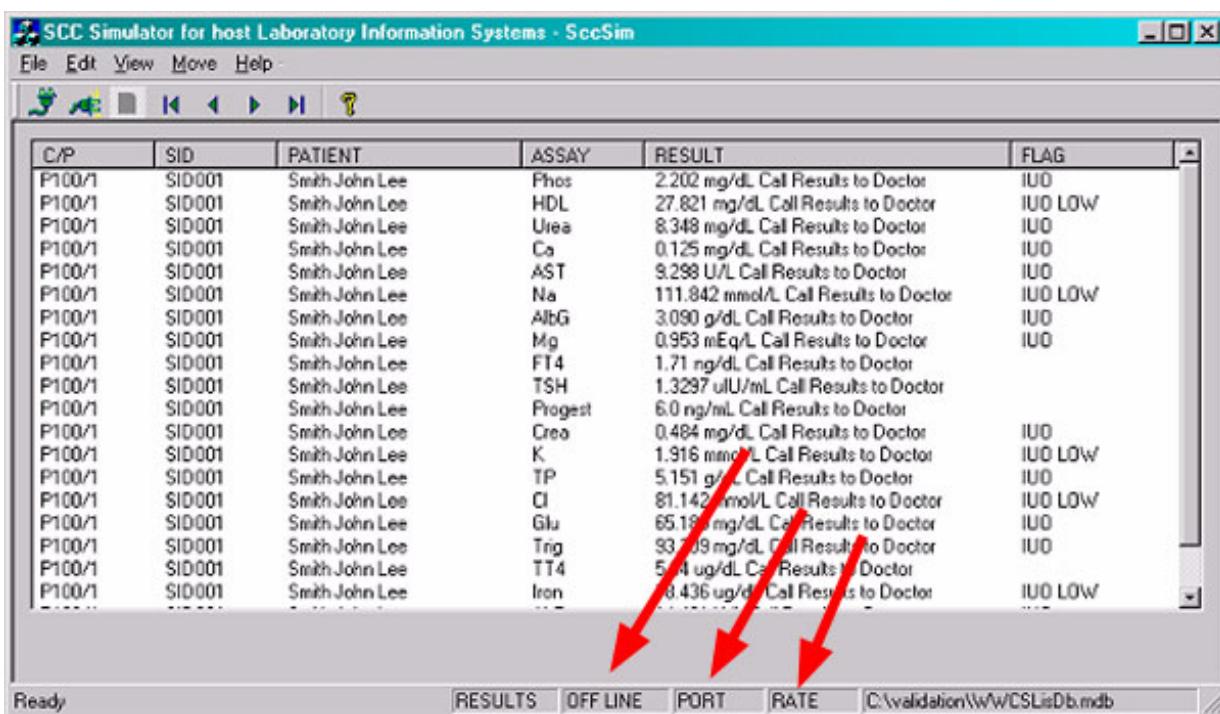


Figure 8.5: Communications Settings window

### Connecting to the communication port

The SCC Simulator main application window status bar provides the connection status of the communication port. Prior to connecting to the communication port, the SCC Simulator connection status field displays OFF LINE, the communication port status field displays PORT, and the baud rate status field displays RATE (Figure 8.6). Once the user selects the communication settings used in the SCC Simulator session, the user can connect to the communication port by pressing the Connect icon on the main application window tool bar.

(Figure 8.7), or by selecting **File, Connect** (Figure 8.8). After the connection is established, the main application status window connection status field displays **ON LINE**, the communication port status field displays **COM#** (# is 1-10), and the baud rate status field displays one of the following baud rate values (1200, 2400, 4800, 9600, 14400, 19200, 28800, 38400, 57600, 115200) (Figure 8.9).



The screenshot shows the SCC Simulator for host Laboratory Information Systems - SccSim application window. The menu bar includes File, Edit, View, Move, Help, and a toolbar with icons for file operations. The main area is a grid table with columns: C/P, SID, PATIENT, ASSAY, RESULT, and FLAG. The data in the grid is as follows:

C/P	SID	PATIENT	ASSAY	RESULT	FLAG
P100/1	SID001	Smith John Lee	Phos	2.202 mg/dL Call Results to Doctor	IUD
P100/1	SID001	Smith John Lee	HDL	27.821 mg/dL Call Results to Doctor	IUD LOW
P100/1	SID001	Smith John Lee	Urea	8.348 mg/dL Call Results to Doctor	IUD
P100/1	SID001	Smith John Lee	Ca	0.125 mg/dL Call Results to Doctor	IUD
P100/1	SID001	Smith John Lee	AST	9.298 U/L Call Results to Doctor	IUD
P100/1	SID001	Smith John Lee	Na	111.842 mmol/L Call Results to Doctor	IUD LOW
P100/1	SID001	Smith John Lee	AltG	3.090 g/dL Call Results to Doctor	IUD
P100/1	SID001	Smith John Lee	Mg	0.953 mEq/L Call Results to Doctor	IUD
P100/1	SID001	Smith John Lee	FT4	1.71 ng/dL Call Results to Doctor	IUD
P100/1	SID001	Smith John Lee	TSH	1.3297 uIU/mL Call Results to Doctor	IUD
P100/1	SID001	Smith John Lee	Progest	6.0 ng/mL Call Results to Doctor	IUD
P100/1	SID001	Smith John Lee	Crea	0.484 mg/dL Call Results to Doctor	IUD
P100/1	SID001	Smith John Lee	K	1.916 mmol/L Call Results to Doctor	IUD LOW
P100/1	SID001	Smith John Lee	TP	5.151 g/dL Call Results to Doctor	IUD
P100/1	SID001	Smith John Lee	Cl	81.142 mmol/L Call Results to Doctor	IUD LOW
P100/1	SID001	Smith John Lee	Glu	65.196 mg/dL Call Results to Doctor	IUD
P100/1	SID001	Smith John Lee	Trig	93.79 mg/dL Call Results to Doctor	IUD
P100/1	SID001	Smith John Lee	TT4	5.4 ug/dL Call Results to Doctor	IUD
P100/1	SID001	Smith John Lee	Iron	8.436 ug/dL Call Results to Doctor	IUD LOW

At the bottom of the window, there are four buttons: RESULTS, OFF LINE, PORT, and RATE. The PORT button is highlighted with a red arrow. The RATE button is also highlighted with a red arrow. The RESULTS button is also highlighted with a red arrow.

**Figure 8.6: Application Window Prior to Connection**

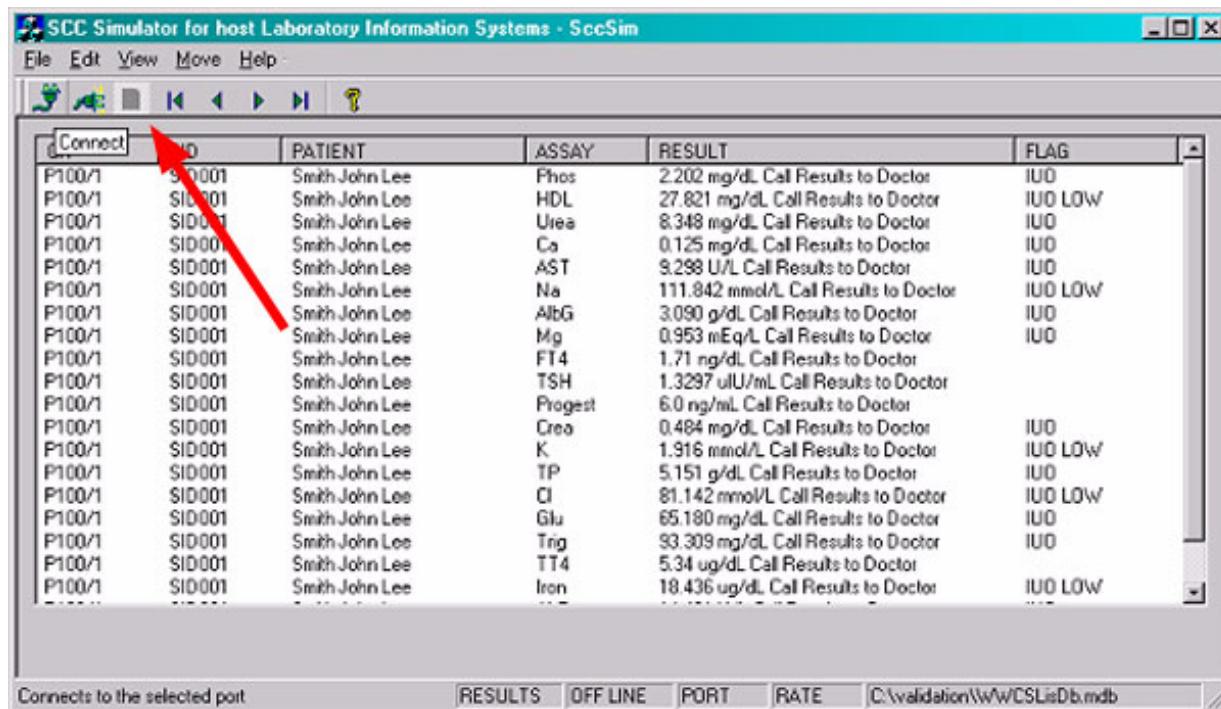


Figure 8.7: Connecting through Tool Bar Icon

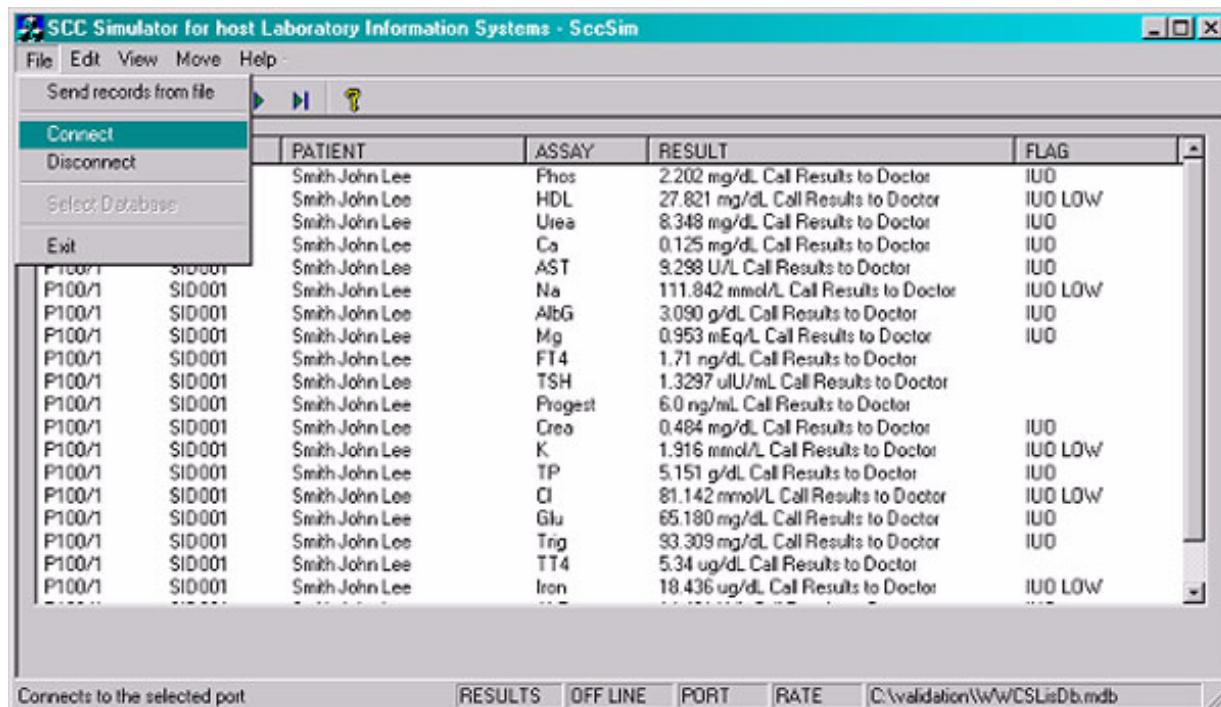
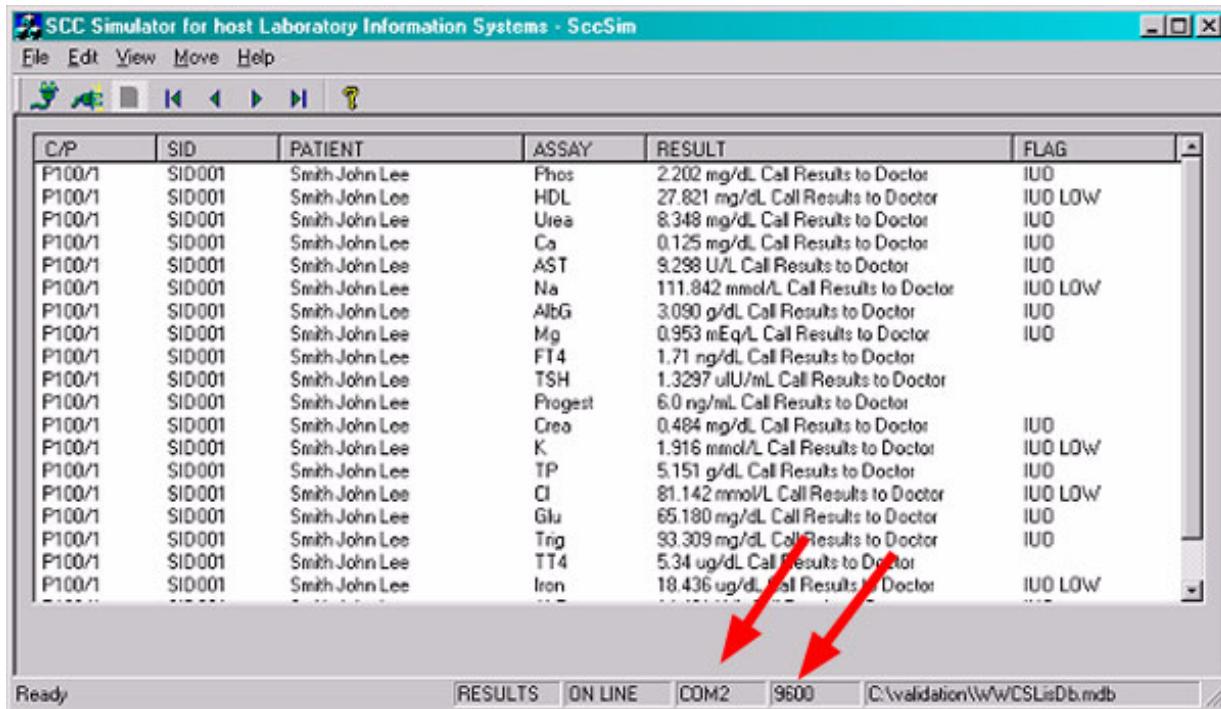


Figure 8.8: Connecting through the Main Menu



C/P	SID	PATIENT	ASSAY	RESULT	FLAG
P100/1	SID001	Smith John Lee	Phos	2.202 mg/dL Call Results to Doctor	IUD
P100/1	SID001	Smith John Lee	HDL	27.821 mg/dL Call Results to Doctor	IUD LOW
P100/1	SID001	Smith John Lee	Urea	8.348 mg/dL Call Results to Doctor	IUD
P100/1	SID001	Smith John Lee	Ca	0.125 mg/dL Call Results to Doctor	IUD
P100/1	SID001	Smith John Lee	AST	9.298 U/L Call Results to Doctor	IUD
P100/1	SID001	Smith John Lee	Na	111.842 mmol/L Call Results to Doctor	IUD LOW
P100/1	SID001	Smith John Lee	AltG	3.090 g/dL Call Results to Doctor	IUD
P100/1	SID001	Smith John Lee	Mg	0.953 mEq/L Call Results to Doctor	IUD
P100/1	SID001	Smith John Lee	FT4	1.71 ng/dL Call Results to Doctor	
P100/1	SID001	Smith John Lee	TSH	1.3287 uIU/mL Call Results to Doctor	
P100/1	SID001	Smith John Lee	Progesterone	6.0 ng/mL Call Results to Doctor	
P100/1	SID001	Smith John Lee	Crea	0.484 mg/dL Call Results to Doctor	IUD
P100/1	SID001	Smith John Lee	K	1.916 mmol/L Call Results to Doctor	IUD LOW
P100/1	SID001	Smith John Lee	TP	5.151 g/dL Call Results to Doctor	IUD
P100/1	SID001	Smith John Lee	Cl	81.142 mmol/L Call Results to Doctor	IUD LOW
P100/1	SID001	Smith John Lee	Glu	65.180 mg/dL Call Results to Doctor	IUD
P100/1	SID001	Smith John Lee	Trig	93.309 mg/dL Call Results to Doctor	IUD
P100/1	SID001	Smith John Lee	TT4	5.34 ug/dL Call Results to Doctor	
P100/1	SID001	Smith John Lee	Iron	18.436 ug/dL Call Results to Doctor	IUD LOW

**Figure 8.9: Application Window after Connection**

### Store received orders

The SCC Simulator provides the ability for the user to store orders or discard them. The SCC Simulator automatically selects storing received orders to the database when the application is started (*Figure 8.10*). If **Store Orders in DB** is checked, orders are stored in the database. The user can change this selection by selecting **Edit, Store Orders in DB** (*Figure 8.11*). Selecting this menu item toggles storing of orders to the database (*Figure 8.12*). In either case, the low-level result records are logged to the SCC Message Log.

The screenshot shows the SCC Simulator interface with the title bar "SCC Simulator for host Laboratory Information Systems - SccSim". The menu bar includes File, Edit, View, Move, Help, and a checked checkbox for "Store Orders in DB". A toolbar below the menu has icons for Store Orders in DB, Collate Results, Select All, Delete Entire Database, Create Results, Create Query, Comm, Install CC Assay, Install IA Assay, Install CC Dilution, Install IA Dilution, Delete CC Assay, Delete IA Assay, Delete CC Dilution, and Delete IA Dilution. The main area displays a table with columns: PATIENT, ASSAY, RESULT, and FLAG. The table contains 20 rows of patient data with various assays and results. At the bottom of the window, there are buttons for RESULTS, ON LINE, COM2, 9600, and the path C:\validation\Ww\CSLisDb.mdb.

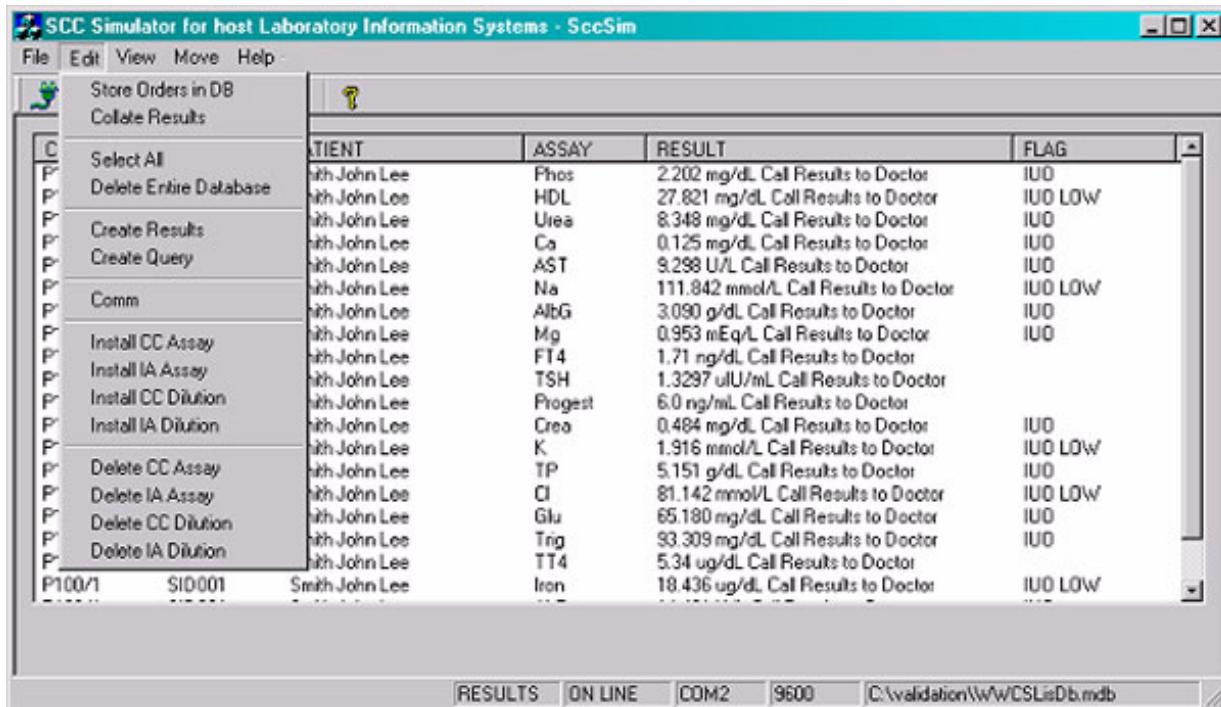
PATIENT	ASSAY	RESULT	FLAG
John Lee	Phos	2.202 mg/dL	Call Results to Doctor
John Lee	HDL	27.821 mg/dL	Call Results to Doctor
John Lee	Urea	8.348 mg/dL	Call Results to Doctor
John Lee	Ca	0.125 mg/dL	Call Results to Doctor
John Lee	AST	9.298 u/L	Call Results to Doctor
John Lee	Na	111.842 mmol/L	Call Results to Doctor
John Lee	Alt/G	3.090 g/dL	Call Results to Doctor
John Lee	Mg	0.953 mEq/L	Call Results to Doctor
John Lee	FT4	1.71 ng/dL	Call Results to Doctor
John Lee	TSH	1.3297 uIU/mL	Call Results to Doctor
John Lee	Progesterone	6.0 ng/mL	Call Results to Doctor
John Lee	Creatinine	0.484 mg/dL	Call Results to Doctor
John Lee	K	1.916 mmol/L	Call Results to Doctor
John Lee	TP	5.151 g/dL	Call Results to Doctor
John Lee	Cl	81.142 mmol/L	Call Results to Doctor
John Lee	Glu	65.180 mg/dL	Call Results to Doctor
John Lee	Triglycerides	93.309 mg/dL	Call Results to Doctor
John Lee	TT4	5.34 ug/dL	Call Results to Doctor
John Lee	Iron	18.436 ug/dL	Call Results to Doctor

Figure 8.10: Storing Orders to the Database

This screenshot is identical to Figure 8.10, showing the SCC Simulator interface with the "Store Orders in DB" checkbox checked. The main difference is at the bottom left of the window, where the status message "Store orders in the database" is displayed, indicating that the feature is active.

PATIENT	ASSAY	RESULT	FLAG
John Lee	Phos	2.202 mg/dL	Call Results to Doctor
John Lee	HDL	27.821 mg/dL	Call Results to Doctor
John Lee	Urea	8.348 mg/dL	Call Results to Doctor
John Lee	Ca	0.125 mg/dL	Call Results to Doctor
John Lee	AST	9.298 u/L	Call Results to Doctor
John Lee	Na	111.842 mmol/L	Call Results to Doctor
John Lee	Alt/G	3.090 g/dL	Call Results to Doctor
John Lee	Mg	0.953 mEq/L	Call Results to Doctor
John Lee	FT4	1.71 ng/dL	Call Results to Doctor
John Lee	TSH	1.3297 uIU/mL	Call Results to Doctor
John Lee	Progesterone	6.0 ng/mL	Call Results to Doctor
John Lee	Creatinine	0.484 mg/dL	Call Results to Doctor
John Lee	K	1.916 mmol/L	Call Results to Doctor
John Lee	TP	5.151 g/dL	Call Results to Doctor
John Lee	Cl	81.142 mmol/L	Call Results to Doctor
John Lee	Glu	65.180 mg/dL	Call Results to Doctor
John Lee	Triglycerides	93.309 mg/dL	Call Results to Doctor
John Lee	TT4	5.34 ug/dL	Call Results to Doctor
John Lee	Iron	18.436 ug/dL	Call Results to Doctor

Figure 8.11: Deselecting Storing Orders to the Database



SCC Simulator for host Laboratory Information Systems - SccSim				
File Edit View Move Help  				
C	PATIENT	ASSAY	RESULT	FLAG
P	Smith John Lee	Phos	2.202 mg/dL Call Results to Doctor	IUD
P	Smith John Lee	HDL	27.821 mg/dL Call Results to Doctor	IUD LOW
P	Smith John Lee	Urea	8.348 mg/dL Call Results to Doctor	IUD
P	Smith John Lee	Cr	0.125 mg/dL Call Results to Doctor	IUD
P	Smith John Lee	AST	9.298 U/L Call Results to Doctor	IUD
P	Smith John Lee	Na	111.842 mmol/L Call Results to Doctor	IUD LOW
P	Smith John Lee	AltG	3.090 g/dL Call Results to Doctor	IUD
P	Smith John Lee	Mg	0.953 mEq/L Call Results to Doctor	IUD
P	Smith John Lee	FT4	1.71 ng/dL Call Results to Doctor	IUD
P	Smith John Lee	TSH	1.3287 uIU/mL Call Results to Doctor	IUD
P	Smith John Lee	Progesterone	6.0 ng/mL Call Results to Doctor	IUD
P	Smith John Lee	Crea	0.484 mg/dL Call Results to Doctor	IUD
P	Smith John Lee	K	1.916 mmol/L Call Results to Doctor	IUD LOW
P	Smith John Lee	TP	5.151 g/dL Call Results to Doctor	IUD
P	Smith John Lee	Cl	81.142 mmol/L Call Results to Doctor	IUD LOW
P	Smith John Lee	Glu	65.180 mg/dL Call Results to Doctor	IUD
P	Smith John Lee	Trig	93.309 mg/dL Call Results to Doctor	IUD
P	Smith John Lee	TT4	5.34 ug/dL Call Results to Doctor	IUD
P	Smith John Lee	Iron	18.436 ug/dL Call Results to Doctor	IUD LOW
P100/1	SI0001	Smith John Lee		

**Figure 8.12:** View after Toggle of Store Orders in DB

## Collate results

The SCC Simulator provides the ability for the user to collate results that are sent to the LIS. The SCC Simulator defaults to not collating results when the application is started (*Figure 8.13*). Results are only collated if **Collate Results** is checked. The user can change this by selecting **Edit, Collate** (*Figure 8.14*). Selecting this menu item toggles the selection of the Collate Results menu item (*Figure 8.15*).

**SCC Simulator for host Laboratory Information Systems - SccSim**

The screenshot shows a Windows application window titled "SCC Simulator for host Laboratory Information Systems - SccSim". The menu bar includes File, Edit, View, Move, Help, and a checked option "Store Orders in DB". Below the menu is a toolbar with icons for Store Orders in DB, Collate Results, Select All, Delete Entire Database, Create Results, Create Query, Comm, Install CC Assay, Install IA Assay, Install CC Dilution, Install IA Dilution, Delete CC Assay, Delete IA Assay, Delete CC Dilution, and Delete IA Dilution. A status bar at the bottom shows RESULTS, ON LINE, COM2, 9600, and the path C:\validation\Ww\CSLisDb.mdb.

PATIENT	ASSAY	RESULT	FLAG
John Lee	Phos	2.202 mg/dL	Call Results to Doctor
John Lee	HDL	27.821 mg/dL	Call Results to Doctor
John Lee	Urea	8.348 mg/dL	Call Results to Doctor
John Lee	Ca	0.125 mg/dL	Call Results to Doctor
John Lee	AST	9.298 U/L	Call Results to Doctor
John Lee	Na	111.842 mmol/L	Call Results to Doctor
John Lee	AltG	3.090 g/dL	Call Results to Doctor
John Lee	Mg	0.953 mEq/L	Call Results to Doctor
John Lee	FT4	1.71 ng/dL	Call Results to Doctor
John Lee	TSH	1.3297 uIU/mL	Call Results to Doctor
John Lee	Progesterone	6.0 ng/mL	Call Results to Doctor
John Lee	Creatinine	0.484 mg/dL	Call Results to Doctor
John Lee	K	1.916 mmol/L	Call Results to Doctor
John Lee	TP	5.151 g/dL	Call Results to Doctor
John Lee	Cl	81.142 mmol/L	Call Results to Doctor
John Lee	Glu	65.180 mg/dL	Call Results to Doctor
John Lee	Triglycerides	93.309 mg/dL	Call Results to Doctor
John Lee	TT4	5.34 ug/dL	Call Results to Doctor
John Lee	Iron	18.436 ug/dL	Call Results to Doctor

Figure 8.13: Collated Results

**SCC Simulator for host Laboratory Information Systems - SccSim**

This screenshot is identical to Figure 8.13, showing the same laboratory results for patient John Lee. The difference is in the menu bar where the "Collate Results" option is now highlighted with a blue selection bar.

PATIENT	ASSAY	RESULT	FLAG
John Lee	Phos	2.202 mg/dL	Call Results to Doctor
John Lee	HDL	27.821 mg/dL	Call Results to Doctor
John Lee	Urea	8.348 mg/dL	Call Results to Doctor
John Lee	Ca	0.125 mg/dL	Call Results to Doctor
John Lee	AST	9.298 U/L	Call Results to Doctor
John Lee	Na	111.842 mmol/L	Call Results to Doctor
John Lee	AltG	3.090 g/dL	Call Results to Doctor
John Lee	Mg	0.953 mEq/L	Call Results to Doctor
John Lee	FT4	1.71 ng/dL	Call Results to Doctor
John Lee	TSH	1.3297 uIU/mL	Call Results to Doctor
John Lee	Progesterone	6.0 ng/mL	Call Results to Doctor
John Lee	Creatinine	0.484 mg/dL	Call Results to Doctor
John Lee	K	1.916 mmol/L	Call Results to Doctor
John Lee	TP	5.151 g/dL	Call Results to Doctor
John Lee	Cl	81.142 mmol/L	Call Results to Doctor
John Lee	Glu	65.180 mg/dL	Call Results to Doctor
John Lee	Triglycerides	93.309 mg/dL	Call Results to Doctor
John Lee	TT4	5.34 ug/dL	Call Results to Doctor
John Lee	Iron	18.436 ug/dL	Call Results to Doctor

Figure 8.14: Selecting Collated Results

C	PATIENT	ASSAY	RESULT	FLAG
P	Smith John Lee	Phos	2.202 mg/dL Call Results to Doctor	IUO
P	Smith John Lee	HDL	27.821 mg/dL Call Results to Doctor	IUO LOW
P	Smith John Lee	Urea	8.348 mg/dL Call Results to Doctor	IUO
P	Smith John Lee	Cr	0.125 mg/dL Call Results to Doctor	IUO
P	Smith John Lee	AST	9.298 U/L Call Results to Doctor	IUO
P	Smith John Lee	Na	111.842 mmol/L Call Results to Doctor	IUO LOW
P	Smith John Lee	AltG	3.090 g/dL Call Results to Doctor	IUO
P	Smith John Lee	Mg	0.953 mEq/L Call Results to Doctor	IUO
P	Smith John Lee	FT4	1.71 ng/dL Call Results to Doctor	IUO
P	Smith John Lee	TSH	1.3287 uIU/mL Call Results to Doctor	IUO
P	Smith John Lee	Progest	6.0 ng/mL Call Results to Doctor	IUO
P	Smith John Lee	Crea	0.484 mg/dL Call Results to Doctor	IUO
P	Smith John Lee	K	1.916 mmol/L Call Results to Doctor	IUO LOW
P	Smith John Lee	TP	5.151 g/dL Call Results to Doctor	IUO
P	Smith John Lee	Cl	81.142 mmol/L Call Results to Doctor	IUO LOW
P	Smith John Lee	Glu	65.180 mg/dL Call Results to Doctor	IUO
P	Smith John Lee	Trig	93.309 mg/dL Call Results to Doctor	IUO
P	Smith John Lee	TT4	5.34 ug/dL Call Results to Doctor	IUO
P	Smith John Lee	Iron	18.436 ug/dL Call Results to Doctor	IUO LOW
P100/1	SI0001	Smith John Lee		

**Figure 8.15:** After Selection of Collate Results

## Selecting views

The SCC Simulator supports multiple views [RESULTS VIEW, QUERIES VIEW, and ORDERS VIEW] that can be displayed based on user input through the user interface. The default view [RESULTS VIEW] is displayed immediately after the user has selected a database (*Figure 8.3*). The user can change the displayed view by selecting **View, Queries** (*Figure 8.16*).

The QUERIES VIEW displays in the main application window (*Figure 8.17*). The user can change to the ORDERS VIEW by selecting **View, Order From DB** (*Figure 8.18*). The ORDERS VIEW displays in the main application window (*Figure 8.19*). The display can be changed back to the RESULTS VIEW by selecting **View, Results**.

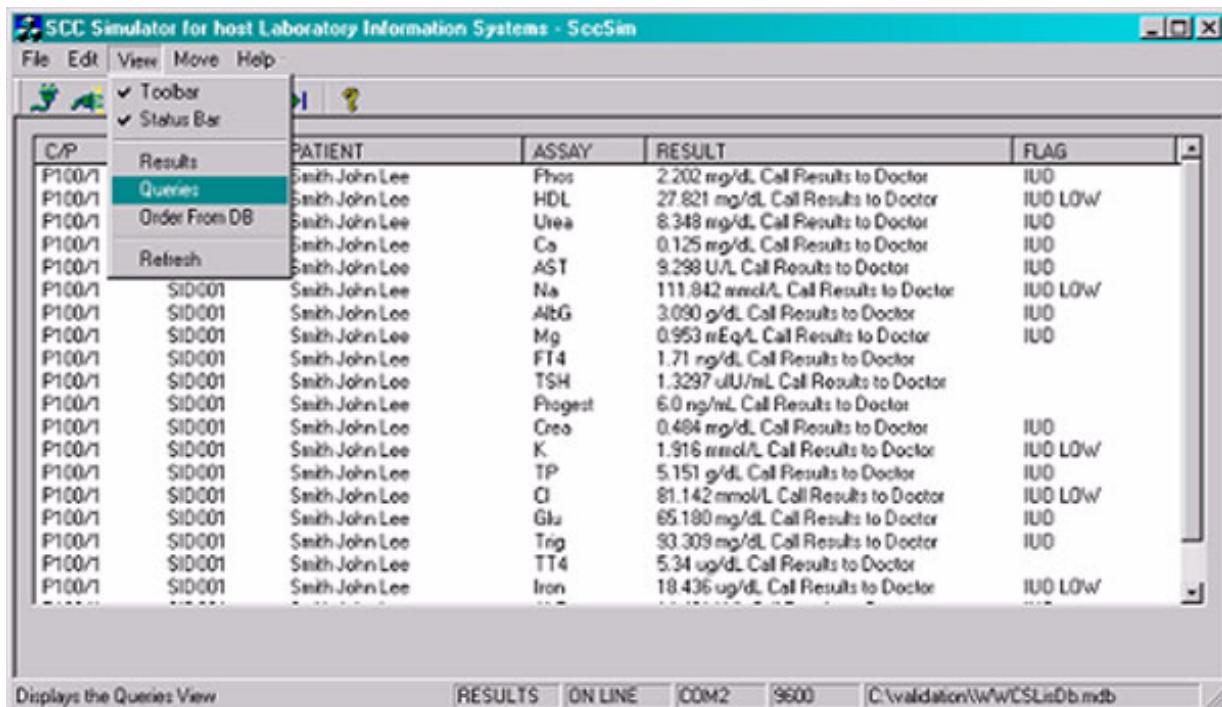


Figure 8.16: Selecting the Queries View

The screenshot shows the same application window as Figure 8.16, but the dropdown menu under "View" has been closed, and the main area now displays a table titled "QUERIES". The table has columns: SID, S/W VERSION, SYS SERIAL N..., and SENDER ID. The data rows show a series of entries for different patient IDs (SID001 to SID019), all with version 2.00, serial number Number1, and sender ID ARCHITECT.

SID	S/W VERSION	SYS SERIAL N...	SENDER ID
SID001	2.00	Number1	ARCHITECT
SID002	2.00	Number1	ARCHITECT
SID003	2.00	Number1	ARCHITECT
SID004	2.00	Number1	ARCHITECT
SID005	2.00	Number1	ARCHITECT
SID006	2.00	Number1	ARCHITECT
SID007	2.00	Number1	ARCHITECT
SID008	2.00	Number1	ARCHITECT
SID009	2.00	Number1	ARCHITECT
SID010	2.00	Number1	ARCHITECT
SID011	2.00	Number1	ARCHITECT
SID012	2.00	Number1	ARCHITECT
SID013	2.00	Number1	ARCHITECT
SID014	2.00	Number1	ARCHITECT
SID015	2.00	Number1	ARCHITECT
SID016	2.00	Number1	ARCHITECT
SID017	2.00	Number1	ARCHITECT
SID018	2.00	Number1	ARCHITECT
SID019	2.00	Number1	ARCHITECT

Figure 8.17: Queries View

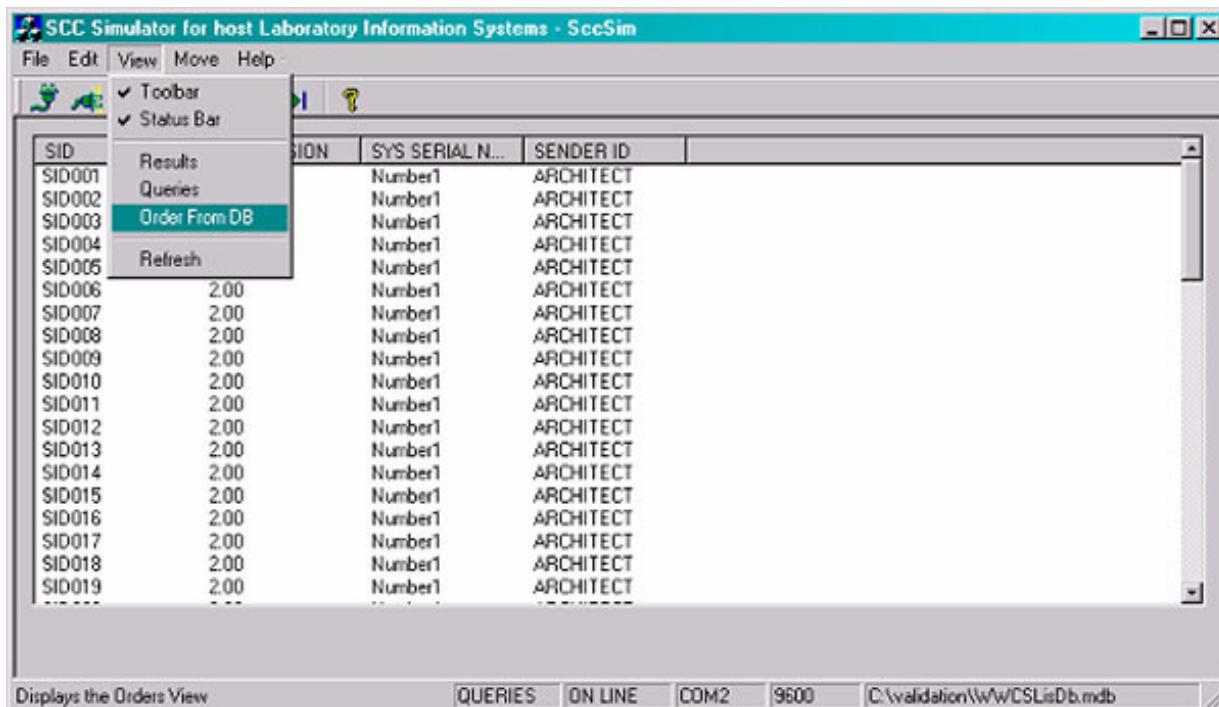


Figure 8.18: Selecting the Orders View

The screenshot shows the SCC Simulator interface with the Orders View selected. The main window displays a table with columns: SID, ORDER TYPE, ASSAY NAME, PATIENT NAME, BIRTHDAY, and GENDER. The data in the table consists of 20 rows, all sharing the same PATIENT NAME ('Smith, John Lee'), BIRTHDAY ('02/14/1950'), and GENDER ('Male'). The ORDER TYPE column lists various medical tests: Na, K, Cl, Urea, Gluc, Crea, Ca, Mg, Phos, TP, FT4, Progest, TSH, TT4, T-Uptake, BhCG, BhCG-Stat, AlbG, and Trig. The ASSAY NAME column provides more detail for each test type. At the bottom of the screen, there is a status bar with tabs for ORDERS, ON LINE, COM2, 9600, and the path C:\validation\w\w\CSLisDb.mdb.

SID	ORDER TYPE	ASSAY NAME	PATIENT NAME	BIRTHDAY	GENDER
SID001	PATIENT ORDER	Na	Smith, John Lee	02/14/1950	Male
SID001	PATIENT ORDER	K	Smith, John Lee	02/14/1950	Male
SID001	PATIENT ORDER	Cl	Smith, John Lee	02/14/1950	Male
SID001	PATIENT ORDER	Urea	Smith, John Lee	02/14/1950	Male
SID001	PATIENT ORDER	Gluc	Smith, John Lee	02/14/1950	Male
SID001	PATIENT ORDER	Crea	Smith, John Lee	02/14/1950	Male
SID001	PATIENT ORDER	Ca	Smith, John Lee	02/14/1950	Male
SID001	PATIENT ORDER	Mg	Smith, John Lee	02/14/1950	Male
SID001	PATIENT ORDER	Phos	Smith, John Lee	02/14/1950	Male
SID001	PATIENT ORDER	TP	Smith, John Lee	02/14/1950	Male
SID001	PATIENT ORDER	FT4	Smith, John Lee	02/14/1950	Male
SID001	PATIENT ORDER	Progesterone	Smith, John Lee	02/14/1950	Male
SID001	PATIENT ORDER	TSH	Smith, John Lee	02/14/1950	Male
SID001	PATIENT ORDER	TT4	Smith, John Lee	02/14/1950	Male
SID001	PATIENT ORDER	T-Uptake	Smith, John Lee	02/14/1950	Male
SID001	PATIENT ORDER	BhCG	Smith, John Lee	02/14/1950	Male
SID001	PATIENT ORDER	BhCG-Stat	Smith, John Lee	02/14/1950	Male
SID001	PATIENT ORDER	AlbG	Smith, John Lee	02/14/1950	Male
SID001	PATIENT ORDER	Trig	Smith, John Lee	02/14/1950	Male

Figure 8.19: Orders View

## Refresh views

The Simulator enables the Refresh icon on the main application toolbar if any orders have been received (*Figure 8.20*). The Simulator also enables the Refresh icon if the user has created any results or queries. The user can refresh the current view by pressing the Refresh icon on the main application window toolbar (*Figure 8.21*) or by selecting **View, Refresh** (*Figure 8.22*). The simulator disables the Refresh icon and updates the current view (*Figure 8.23*). Note the current view is updated, but no new information may show up because the Refresh icon is enabled if any new data has been received (i.e. queries). The user may have to change the view to see the new information. Also, the new data received is placed at the bottom of the database list. Therefore, the user may have to select the last records to view the new data.

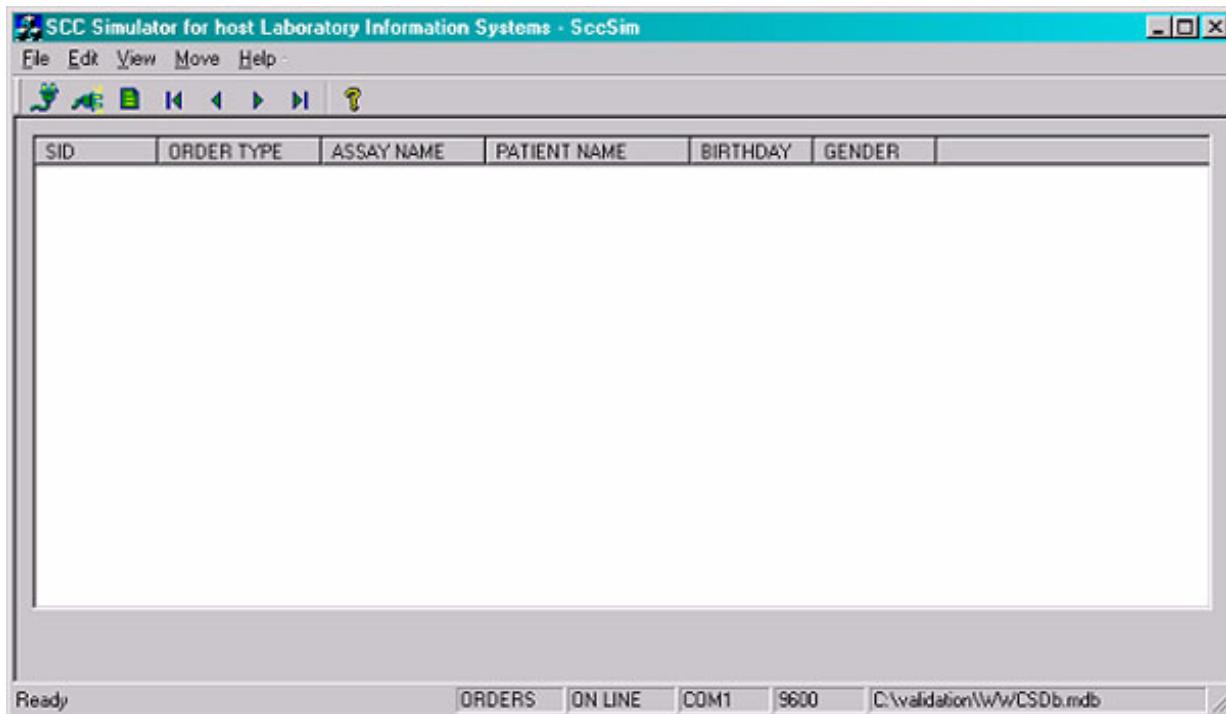


Figure 8.20: Refresh Notification

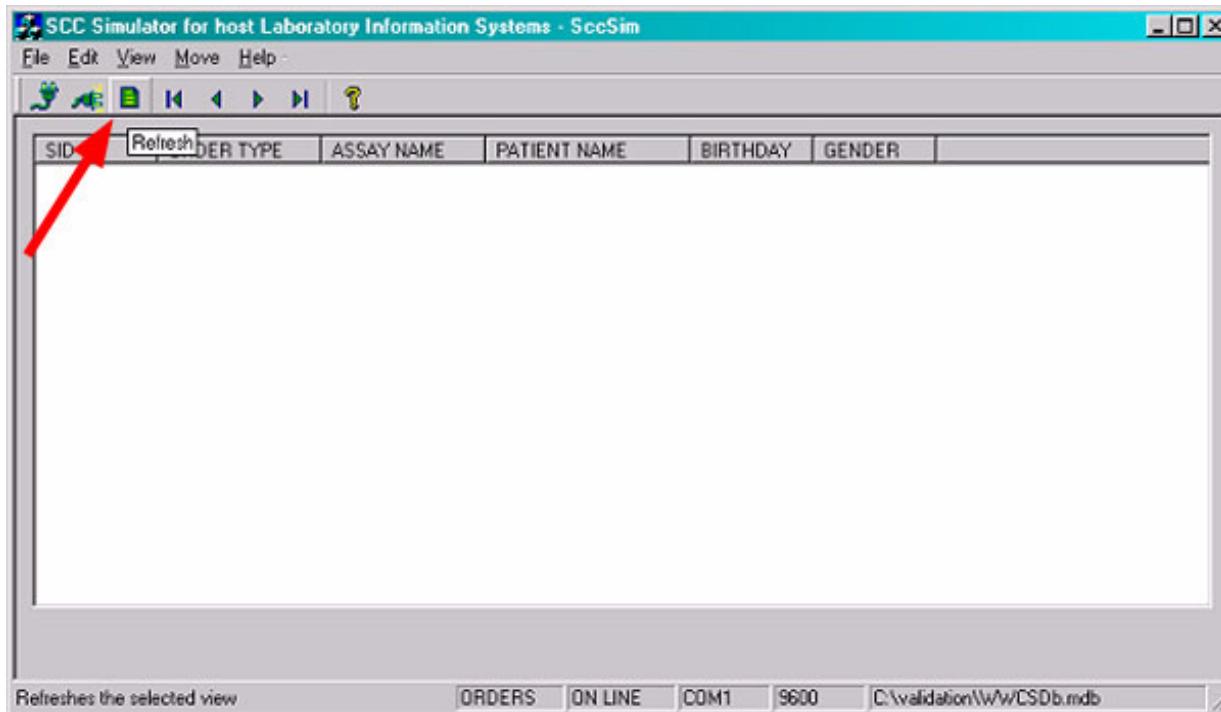


Figure 8.21: Refreshing the View From Toolbar

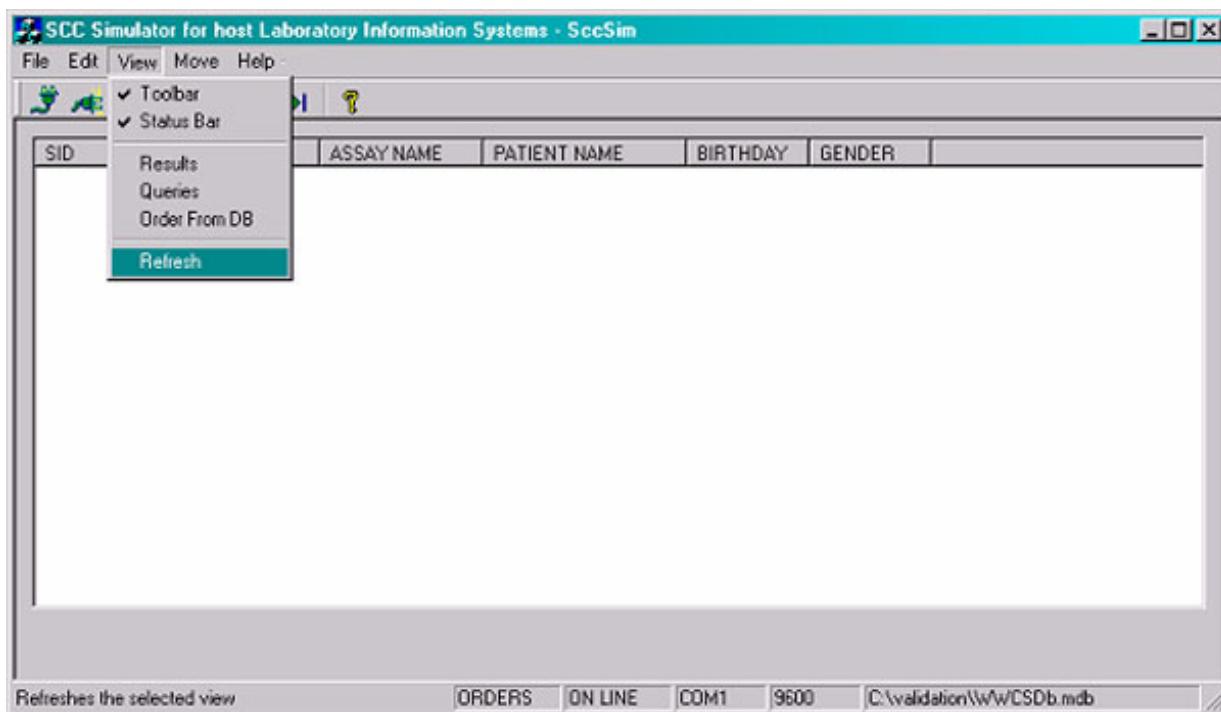


Figure 8.22: Refreshing the View From Menu

The screenshot shows a Windows application window titled "SCC Simulator for host Laboratory Information Systems - SccSim". The menu bar includes File, Edit, View, Move, Help, and a toolbar with icons for search, refresh, and other functions. The main area is a grid-based table with the following columns: SID, ORDER TYPE, ASSAY NAME, PATIENT NAME, BIRTHDAY, and GENDER. The data in the table is as follows:

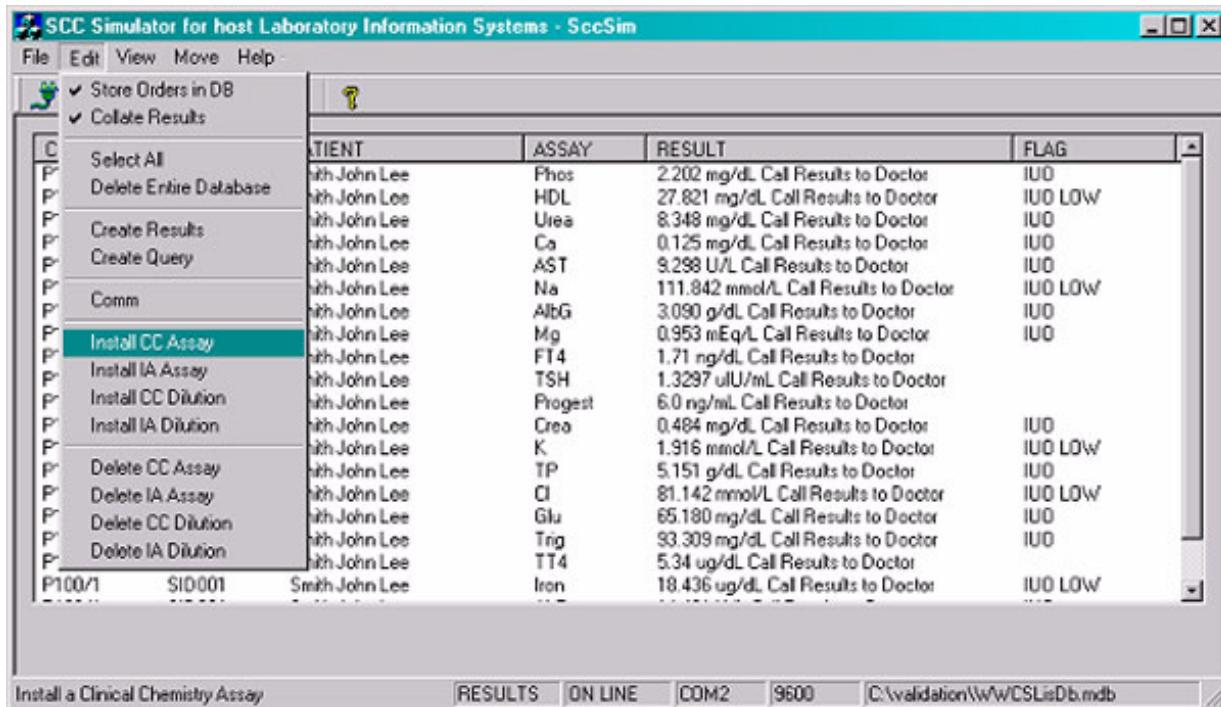
SID	ORDER TYPE	ASSAY NAME	PATIENT NAME	BIRTHDAY	GENDER
SID001	PATIENT ORDER	FT4	Smith, John Lee	02/14/1950	Male
SID001	PATIENT ORDER	TT4	Smith, John Lee	02/14/1950	Male
SID001	PATIENT ORDER	BhCG-Stal	Smith, John Lee	02/14/1950	Male
SID002	PATIENT ORDER	TSH	Jones, Bill W	07/04/1944	Male
SID002	PATIENT ORDER	BhCG	Jones, Bill W	07/04/1944	Male
SID003	PATIENT ORDER	Progesterone	Walker, Mary Sue	06/28/1973	Female

At the bottom of the window, there is a status bar with the text "Ready" and several buttons labeled ORDERS, ON LINE, COM1, 9600, and C:\validation\Ww\CSDb.mdb.

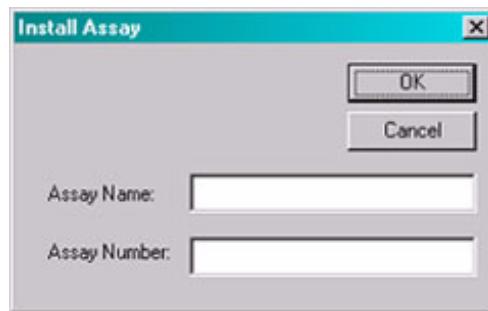
Figure 8.23: Refreshed View

### Installing assays

The SCC Simulator provides a user interface to install Immunoassay and Clinical Chemistry assays in order to create control and patient results. The user can request to install a Clinical Chemistry assay or Immunoassay assay by selecting **Edit, Install CC Assay** or **Edit, Install IA Assay** (*Figure 8.24*). The simulator displays the Install Assay window allowing the user to install an assay name and assay number (*Figure 8.25*). After the user installs the assay, the assay name displays in the Available Assays/Tests list in the Create Results window. For more information, see Creating results, page 8-27.



**Figure 8.24:** Install Assay



**Figure 8.25:** Install Assay Window

### Installing dilution names

The SCC Simulator provides a user interface to install Immunoassay and Clinical Chemistry dilution names in order to create control and patient results. The user can install a Clinical Chemistry dilution name or Immunoassay dilution name by **Edit**, **Install CC Dilution** or **Install IA Dilution** (*Figure 8.26*). The simulator displays the Install Assay Dilution window, allowing installation of a Dilution Name (*Figure 8.27*). After the user installs the dilution name, the dilution name displays in the Dilution Name list in the Create Results window. For more information, see Creating results, page 8-27.

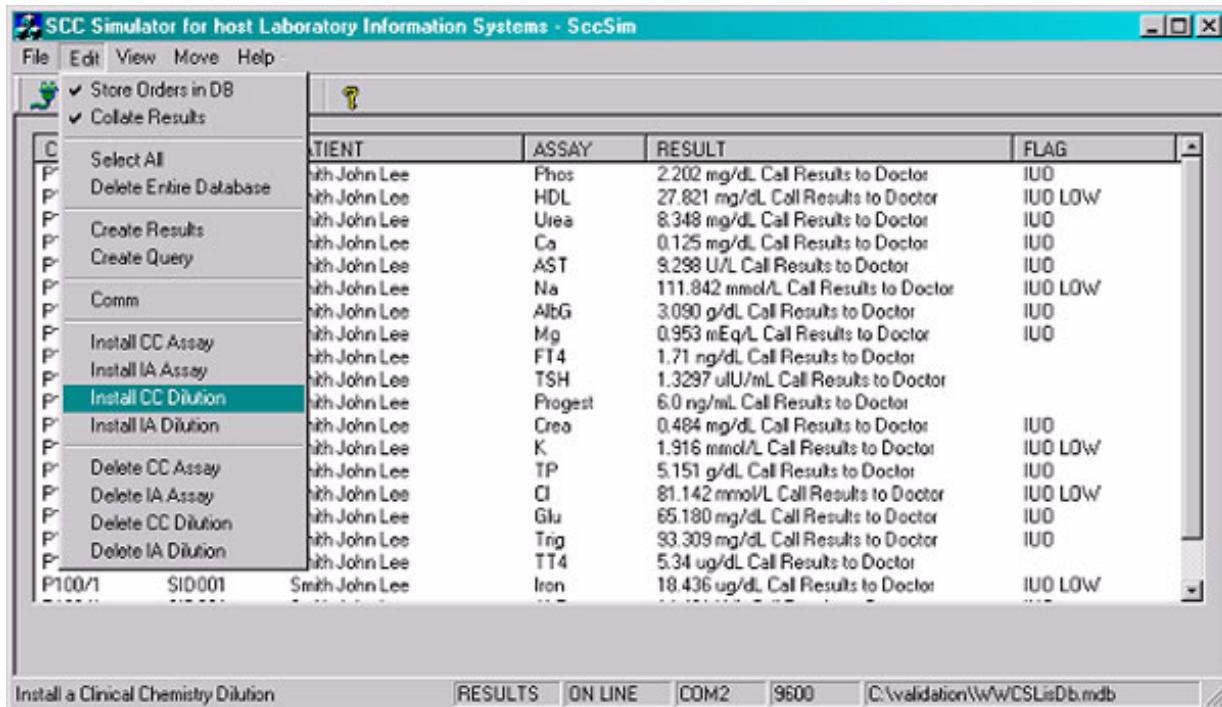


Figure 8.26: Install Dilution

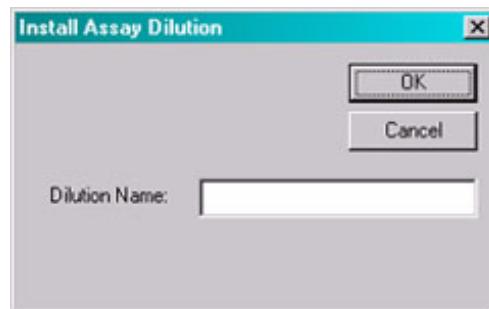
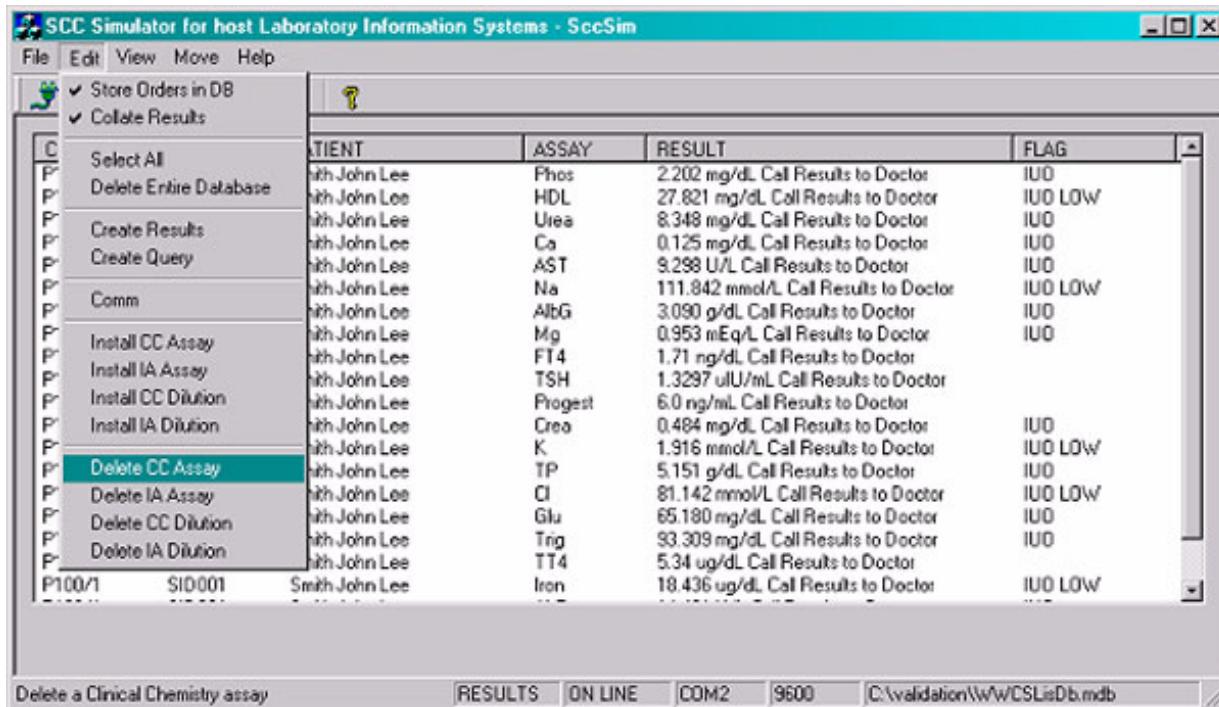


Figure 8.27: Install Assay Dilution Window

### Deleting assays

The SCC Simulator provides a user interface to delete Immunoassay and Clinical Chemistry assays. The user can request to delete a Clinical Chemistry assay or Immunoassay by selecting **Edit**, **Delete CC Assay** or **Delete IA Assay** (Figure 8.28). The simulator displays the **Delete Assay** window and allows the user to delete an **Assay Name** (Figure 8.29). After the user deletes the assay, the assay name no longer displays in the Available Assays/Tests list in the **Create Results** window. For more information, see Creating results, page 8-27.



The screenshot shows a Windows application window titled "SCC Simulator for host Laboratory Information Systems - SccSim". The menu bar includes File, Edit, View, Move, and Help. A toolbar on the left contains icons for various functions like Store Orders in DB, Collate Results, Select All, Delete Entire Database, Create Results, Create Query, Comm, Install CC Assay, Install IA Assay, Install CC Dilution, Install IA Dilution, Delete CC Assay, Delete IA Assay, Delete CC Dilution, and Delete IA Dilution. The main area displays a table with columns: PATIENT, ASSAY, RESULT, and FLAG. The table lists results for patient "Smith John Lee" with various assays and their corresponding values and flags. At the bottom of the window, there is a status bar with buttons for RESULTS, ON LINE, COM2, 9600, and the path C:\validation\W\W\CSLisDb.mdb.

C	PATIENT	ASSAY	RESULT	FLAG
P	Smith John Lee	Phos	2.202 mg/dL Call Results to Doctor	IUD
P	Smith John Lee	HDL	27.821 mg/dL Call Results to Doctor	IUD LOW
P	Smith John Lee	Urea	8.348 mg/dL Call Results to Doctor	IUD
P	Smith John Lee	Ca	0.125 mg/dL Call Results to Doctor	IUD
P	Smith John Lee	AST	9.298 U/L Call Results to Doctor	IUD
P	Smith John Lee	Na	111.842 mmol/L Call Results to Doctor	IUD LOW
P	Smith John Lee	AltG	3.090 g/dL Call Results to Doctor	IUD
P	Smith John Lee	Mg	0.953 mEq/L Call Results to Doctor	IUD
P	Smith John Lee	FT4	1.71 ng/dL Call Results to Doctor	IUD
P	Smith John Lee	TSH	1.3287 uIU/mL Call Results to Doctor	IUD
P	Smith John Lee	Progesterone	6.0 ng/mL Call Results to Doctor	IUD
P	Smith John Lee	Crea	0.484 mg/dL Call Results to Doctor	IUD
P	Smith John Lee	K	1.916 mmol/L Call Results to Doctor	IUD LOW
P	Smith John Lee	TP	5.151 g/dL Call Results to Doctor	IUD
P	Smith John Lee	Cl	81.142 mmol/L Call Results to Doctor	IUD LOW
P	Smith John Lee	Glu	65.180 mg/dL Call Results to Doctor	IUD
P	Smith John Lee	Trig	93.309 mg/dL Call Results to Doctor	IUD
P	Smith John Lee	TT4	5.34 ug/dL Call Results to Doctor	IUD
P	Smith John Lee	Iron	18.436 ug/dL Call Results to Doctor	IUD LOW
P100/1	SI0001	Smith John Lee		

**Figure 8.28:** Delete Assay



**Figure 8.29:** Delete Assay Window

### Deleting dilution names

The SCC Simulator provides a user interface to delete Immunoassay and Clinical Chemistry dilution names. The user can delete a Clinical Chemistry dilution name or Immunoassay dilution name by selecting **Edit, Delete CC Dilution or Delete IA Dilution** (*Figure 8.30*). The simulator displays the Delete Dilution window allowing the user to delete a Dilution Name (*Figure 8.31*). After the user deletes the dilution name, the dilution name no longer displays in the Dilution Name list in the Create Results window. For more information, see Creating results, page 8-27.

Figure 8.30: Delete Dilution Name

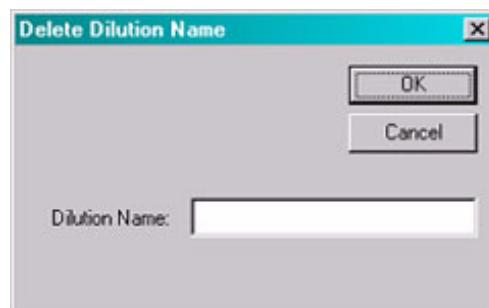
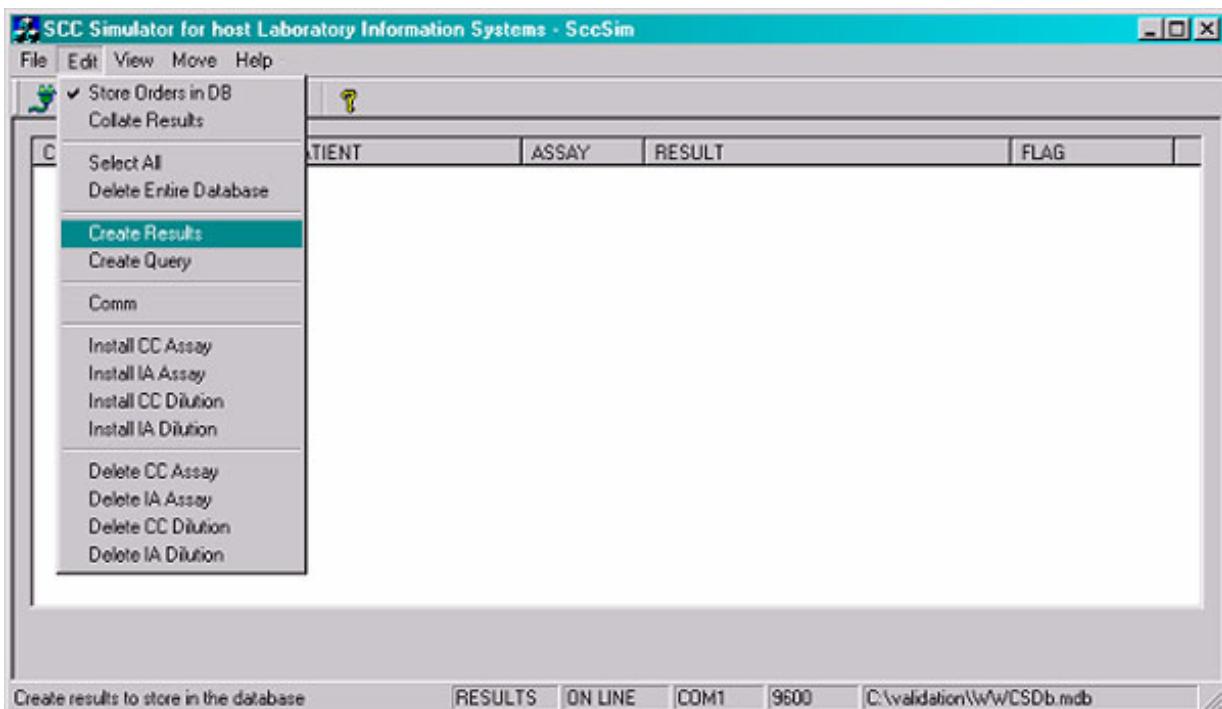


Figure 8.31: Delete Dilution Window

## Creating results

The SCC Simulator provides the user the capability to create control and patient results against installed assays and dilution names and store created results in the user-selected database. The user navigates to the Create Results window through the Edit menu and selecting the Create Results menu item (*Figure 8.32*). Once the Create Results window is displayed (*Figure 8.33*), the user has the ability to create control or patient results against the displayed assays and dilution names. The Create Results window allows the user to create results to be stored in the database (*Figure 8.33*). The form allows the user to specify information for results on a particular instrument and

demographic information related to the patient. Once the information has been specified, the user can select Create Result to add the result or results to the database. The results stored in the database are used to send to the LIS in response to orders that have been received. Note that the results sent to the LIS are not automatically sent in response to an order.



**Figure 8.32:** Selecting the Create Results Window

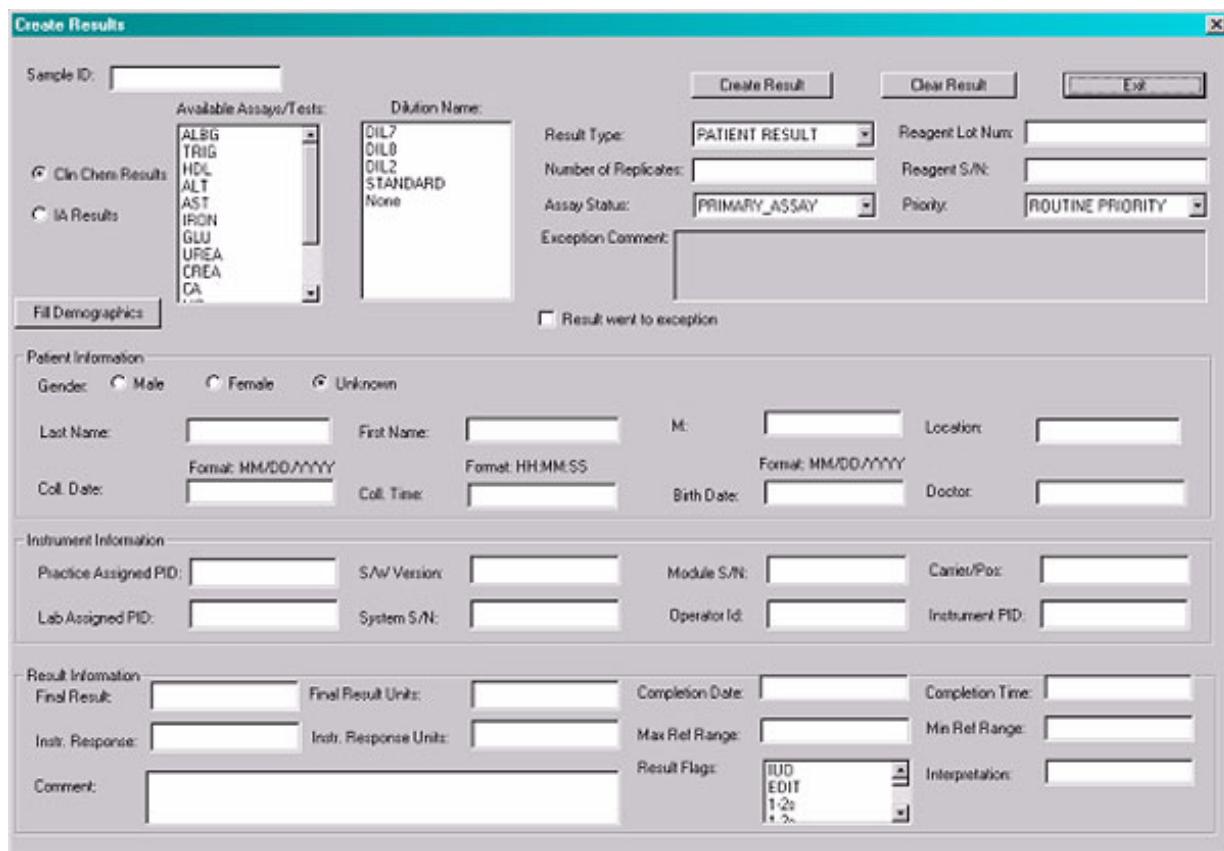


Figure 8.33: Create Results Window

### Creating queries

The SCC Simulator provides the user the capability to create queries to be stored in the user-selected database and sent to the LIS for solicitation of orders against a SID. The user navigates to the Create Query window through the Edit menu and selecting the Create Query menu item (*Figure 8.34*). Once the Create Query window is displayed (*Figure 8.35*), the user has the ability to create a query for a particular SID. The Create Query window allows the user to create a query to be stored in the database (*Figure 8.35*). The form allows the user to specify information for a query on a particular instrument with version information. Once the information has been specified, the user can select Create Query to add the query to the database. The queries stored in the database are used to send to the LIS in order to solicit orders for a particular SID.

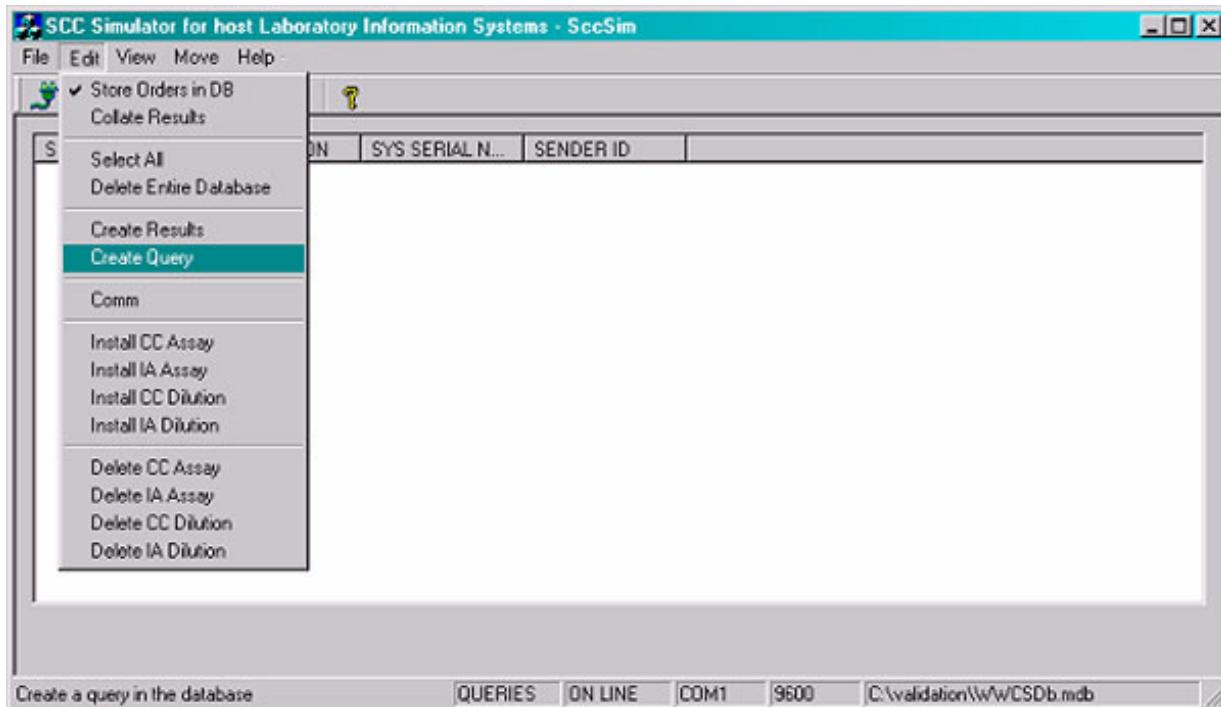


Figure 8.34: Selecting the Create Query Window

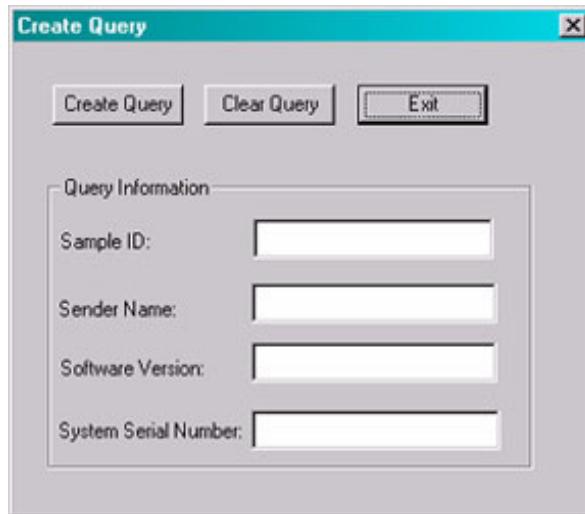


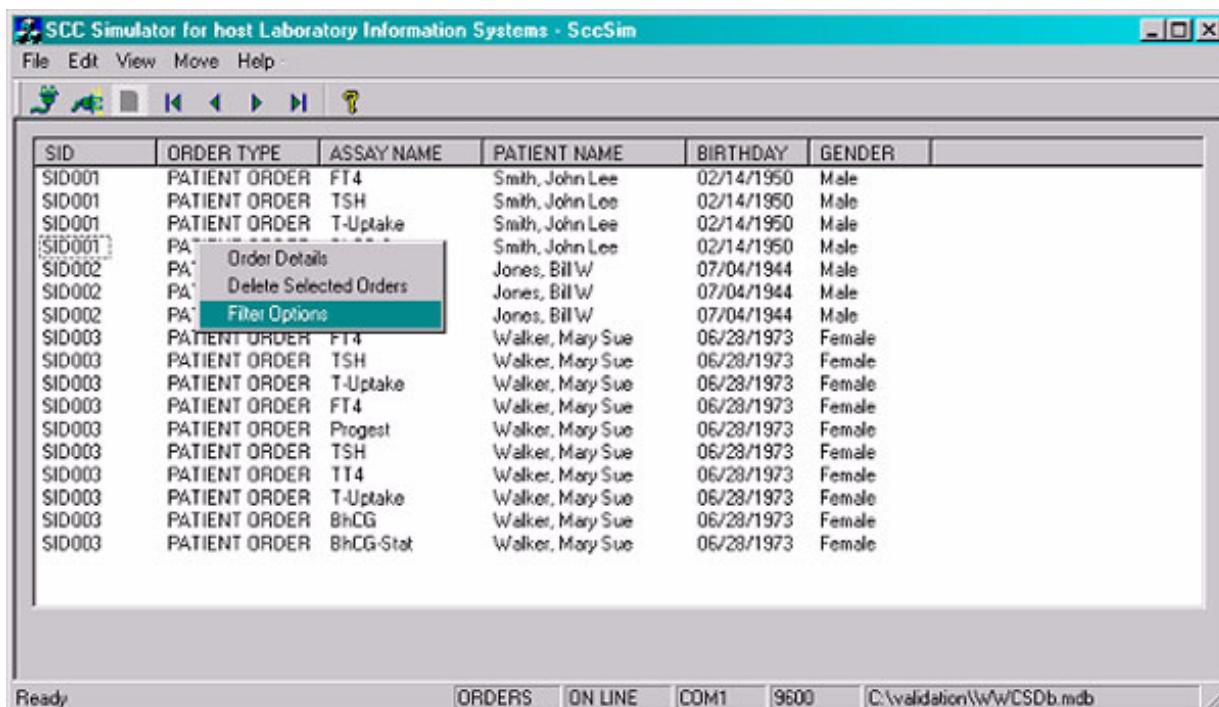
Figure 8.35: Create Query Window

### Order filtering

The SCC Simulator allows the user to select different filter options in the ORDERS view. In order to change filter options, the user needs to navigate to the ORDERS view. For more information, see Selecting views, page 8-18. The filter options allow for easier selection of orders to view. The filter options display with a right mouse click in the

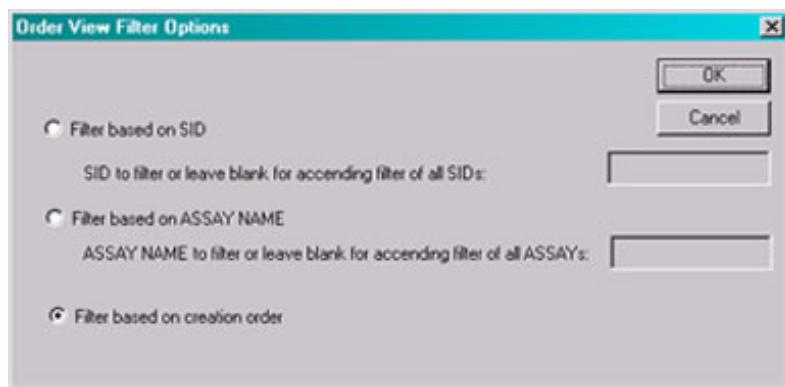
ORDERS view. Select the Filter Options menu item (*Figure 8.36*). This displays the Order View Filter Options Window (*Figure 8.37*). The filter options window allows the user to filter options based on Creation Order (*Figure 8.37*), Assay Name (*Figure 8.39*), or SID (*Figure 8.41*).

*Figure 8.38* shows the Order View with a filter option that is based on Creation Order. *Figure 8.40* shows the Order View with a filter option that is based on Assay Name TT4. *Figure 8.42* shows the Order View with a filter option based on SID002. Note that if a SID is not given with the filter option based on SID, the Order View is sorted alphabetically by SID name (*Figure 8.43*). The same is true for a filter option based on Assay Name and no Assay Name is given. The Order View is sorted alphabetically by Assay Name (*Figure 8.44*). The default filter option on application startup is Creation Order (*Figure 8.38*).



SID	ORDER TYPE	ASSAY NAME	PATIENT NAME	BIRTHDAY	GENDER
SID001	PATIENT ORDER	FT4	Smith, John Lee	02/14/1950	Male
SID001	PATIENT ORDER	TSH	Smith, John Lee	02/14/1950	Male
SID001	PATIENT ORDER	T-Uptake	Smith, John Lee	02/14/1950	Male
SID001	PA	Order Details	Smith, John Lee	02/14/1950	Male
SID002	PA	Delete Selected Orders	Jones, Bill W	07/04/1944	Male
SID002	PA	Filter Options	Jones, Bill W	07/04/1944	Male
SID003	PATIENT ORDER	FT4	Walker, Mary Sue	06/28/1973	Female
SID003	PATIENT ORDER	TSH	Walker, Mary Sue	06/28/1973	Female
SID003	PATIENT ORDER	T-Uptake	Walker, Mary Sue	06/28/1973	Female
SID003	PATIENT ORDER	FT4	Walker, Mary Sue	06/28/1973	Female
SID003	PATIENT ORDER	Progest	Walker, Mary Sue	06/28/1973	Female
SID003	PATIENT ORDER	TSH	Walker, Mary Sue	06/28/1973	Female
SID003	PATIENT ORDER	TT4	Walker, Mary Sue	06/28/1973	Female
SID003	PATIENT ORDER	T-Uptake	Walker, Mary Sue	06/28/1973	Female
SID003	PATIENT ORDER	BhCG	Walker, Mary Sue	06/28/1973	Female
SID003	PATIENT ORDER	BhCG-Stk	Walker, Mary Sue	06/28/1973	Female

Figure 8.36: Selecting Order View Filter Options

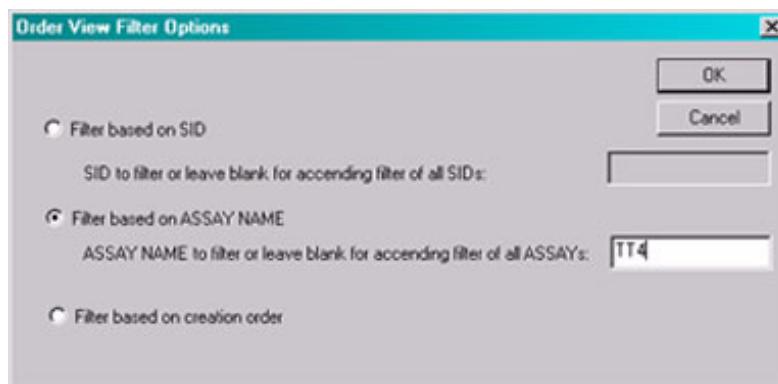


**Figure 8.37: Filter Options Window Creation Order Selected**

A screenshot of the SCC Simulator application window titled "SCC Simulator for host Laboratory Information Systems - SccSim". The menu bar includes File, Edit, View, Move, Help. The toolbar has icons for New, Open, Save, Print, and Help. A table displays patient orders with columns: SID, ORDER TYPE, ASSAY NAME, PATIENT NAME, BIRTHDAY, and GENDER. The data shows multiple entries for patients Smith, John Lee and Walker, Mary Sue across various assay types like FT4, TSH, and T-Uptake. The bottom status bar shows "Ready", "ORDERS", "ON LINE", "COM1", "9600", and the path "C:\validation\www\CSDb.mdb".

SID	ORDER TYPE	ASSAY NAME	PATIENT NAME	BIRTHDAY	GENDER
SID001	PATIENT ORDER	FT4	Smith, John Lee	02/14/1950	Male
SID001	PATIENT ORDER	TSH	Smith, John Lee	02/14/1950	Male
SID001	PATIENT ORDER	T-Uptake	Smith, John Lee	02/14/1950	Male
SID001	PATIENT ORDER	BhCG-Stk	Smith, John Lee	02/14/1950	Male
SID002	PATIENT ORDER	Progesterone	Jones, Bill W	07/04/1944	Male
SID002	PATIENT ORDER	TT4	Jones, Bill W	07/04/1944	Male
SID002	PATIENT ORDER	BhCG	Jones, Bill W	07/04/1944	Male
SID003	PATIENT ORDER	FT4	Walker, Mary Sue	06/28/1973	Female
SID003	PATIENT ORDER	TSH	Walker, Mary Sue	06/28/1973	Female
SID003	PATIENT ORDER	T-Uptake	Walker, Mary Sue	06/28/1973	Female
SID003	PATIENT ORDER	FT4	Walker, Mary Sue	06/28/1973	Female
SID003	PATIENT ORDER	Progesterone	Walker, Mary Sue	06/28/1973	Female
SID003	PATIENT ORDER	TSH	Walker, Mary Sue	06/28/1973	Female
SID003	PATIENT ORDER	TT4	Walker, Mary Sue	06/28/1973	Female
SID003	PATIENT ORDER	T-Uptake	Walker, Mary Sue	06/28/1973	Female
SID003	PATIENT ORDER	BhCG	Walker, Mary Sue	06/28/1973	Female
SID003	PATIENT ORDER	BhCG-Stk	Walker, Mary Sue	06/28/1973	Female

**Figure 8.38: Order View Filtered Based On Creation Order**



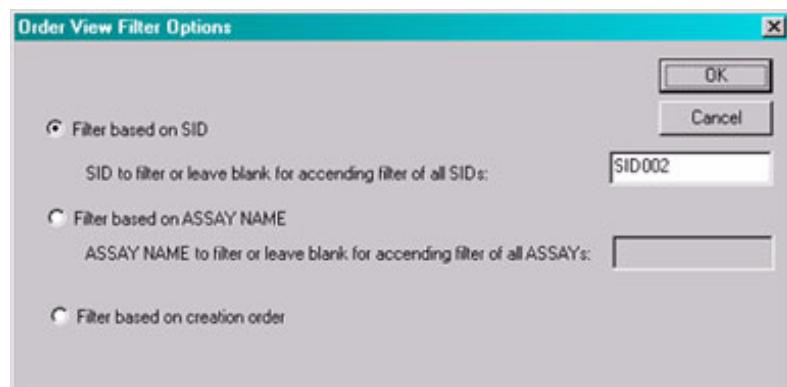
**Figure 8.39:** Filter Options Window with Assay Name Selection

A screenshot of the SCC Simulator application window titled "SCC Simulator for host Laboratory Information Systems - SccSim". The menu bar includes File, Edit, View, Move, Help. The toolbar has icons for New, Open, Save, Print, and Find. The main area displays a table of patient orders. The table has columns: SID, ORDER TYPE, ASSAY NAME, PATIENT NAME, BIRTHDAY, and GENDER. Two rows are visible:  

SID	ORDER TYPE	ASSAY NAME	PATIENT NAME	BIRTHDAY	GENDER
SID002	PATIENT ORDER	TT4	Jones, Bill W	07/04/1944	Male
SID003	PATIENT ORDER	TT4	Walker, Mary Sue	06/28/1973	Female

The status bar at the bottom shows "Ready", "ORDERS", "ON LINE", "COM1", "9600", and the path "C:\validation\Ww\CSDb.mdb".

**Figure 8.40:** Order View with Assay Name as Filter Option



**Figure 8.41:** Filter Options Window with Filtering based on SID

A screenshot of the "SCC Simulator for host Laboratory Information Systems - SccSim" application window. The title bar shows the application name. The menu bar includes File, Edit, View, Move, Help. The toolbar has icons for New, Open, Save, Print, and Help. The main area displays a table of orders. The table has columns: SID, ORDER TYPE, ASSAY NAME, PATIENT NAME, BIRTHDAY, and GENDER. There are three rows of data:

SID	ORDER TYPE	ASSAY NAME	PATIENT NAME	BIRTHDAY	GENDER
SID002	PATIENT ORDER	Progesterone	Jones, Bill W	07/04/1944	Male
SID002	PATIENT ORDER	TT4	Jones, Bill W	07/04/1944	Male
SID002	PATIENT ORDER	BhCG	Jones, Bill W	07/04/1944	Male

The status bar at the bottom shows "Ready", "ORDERS", "ON LINE", "COM1", "9600", and the path "C:\validation\www\CSDb.mdb".

**Figure 8.42:** Order View with SID as Filter Option

**SCC Simulator for host Laboratory Information Systems - SccSim**

SID	ORDER TYPE	ASSAY NAME	PATIENT NAME	BIRTHDAY	GENDER
SID001	PATIENT ORDER	TSH	Smith, John Lee	02/14/1950	Male
SID001	PATIENT ORDER	T-Uptake	Smith, John Lee	02/14/1950	Male
SID001	PATIENT ORDER	BhCG-Stat	Smith, John Lee	02/14/1950	Male
SID001	PATIENT ORDER	FT4	Smith, John Lee	02/14/1950	Male
SID002	PATIENT ORDER	Progesterone	Jones, Bill W	07/04/1944	Male
SID002	PATIENT ORDER	TT4	Jones, Bill W	07/04/1944	Male
SID002	PATIENT ORDER	BhCG	Jones, Bill W	07/04/1944	Male
SID003	PATIENT ORDER	T-Uptake	Walker, Mary Sue	06/28/1973	Female
SID003	PATIENT ORDER	TSH	Walker, Mary Sue	06/28/1973	Female
SID003	PATIENT ORDER	BhCG-Stat	Walker, Mary Sue	06/28/1973	Female
SID003	PATIENT ORDER	FT4	Walker, Mary Sue	06/28/1973	Female
SID003	PATIENT ORDER	Progesterone	Walker, Mary Sue	06/28/1973	Female
SID003	PATIENT ORDER	TSH	Walker, Mary Sue	06/28/1973	Female
SID003	PATIENT ORDER	TT4	Walker, Mary Sue	06/28/1973	Female
SID003	PATIENT ORDER	T-Uptake	Walker, Mary Sue	06/28/1973	Female
SID003	PATIENT ORDER	BhCG	Walker, Mary Sue	06/28/1973	Female
SID003	PATIENT ORDER	FT4	Walker, Mary Sue	06/28/1973	Female

Ready      ORDERS      ON LINE      COM1      9600      C:\validation\WwCSDb.mdb

Figure 8.43: SID is Filter Option with No SID Given

**SCC Simulator for host Laboratory Information Systems - SccSim**

SID	ORDER TYPE	ASSAY NAME	PATIENT NAME	BIRTHDAY	GENDER
SID003	PATIENT ORDER	BhCG	Walker, Mary Sue	06/28/1973	Female
SID002	PATIENT ORDER	BhCG	Jones, Bill W	07/04/1944	Male
SID001	PATIENT ORDER	BhCG-Stat	Smith, John Lee	02/14/1950	Male
SID003	PATIENT ORDER	BhCG-Stat	Walker, Mary Sue	06/28/1973	Female
SID003	PATIENT ORDER	FT4	Walker, Mary Sue	06/28/1973	Female
SID003	PATIENT ORDER	FT4	Walker, Mary Sue	06/28/1973	Female
SID001	PATIENT ORDER	FT4	Smith, John Lee	02/14/1950	Male
SID002	PATIENT ORDER	Progesterone	Jones, Bill W	07/04/1944	Male
SID003	PATIENT ORDER	Progesterone	Walker, Mary Sue	06/28/1973	Female
SID001	PATIENT ORDER	TSH	Smith, John Lee	02/14/1950	Male
SID003	PATIENT ORDER	TSH	Walker, Mary Sue	06/28/1973	Female
SID003	PATIENT ORDER	TSH	Walker, Mary Sue	06/28/1973	Female
SID002	PATIENT ORDER	TT4	Jones, Bill W	07/04/1944	Male
SID003	PATIENT ORDER	TT4	Walker, Mary Sue	06/28/1973	Female
SID001	PATIENT ORDER	T-Uptake	Smith, John Lee	02/14/1950	Male
SID003	PATIENT ORDER	T-Uptake	Walker, Mary Sue	06/28/1973	Female
SID003	PATIENT ORDER	T-Uptake	Walker, Mary Sue	06/28/1973	Female

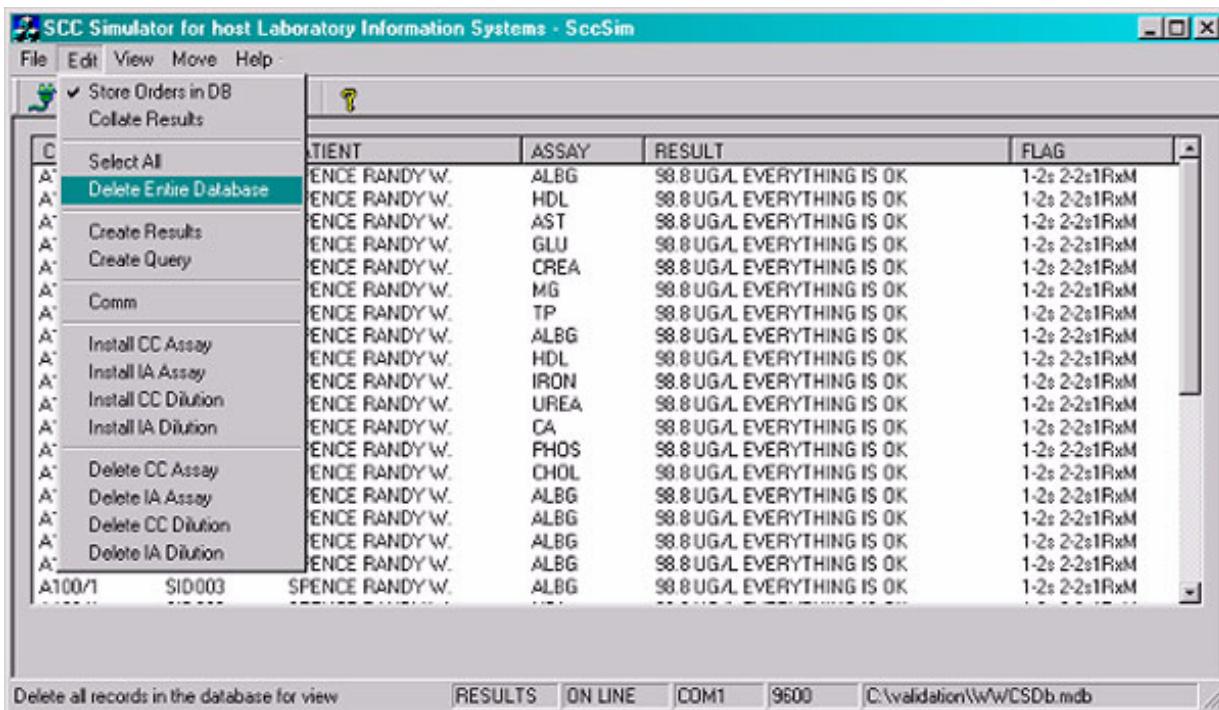
Ready      ORDERS      ON LINE      COM1      9600      C:\validation\WwCSDb.mdb

Figure 8.44: Assay Name is Filter Option with No Assay Name Given

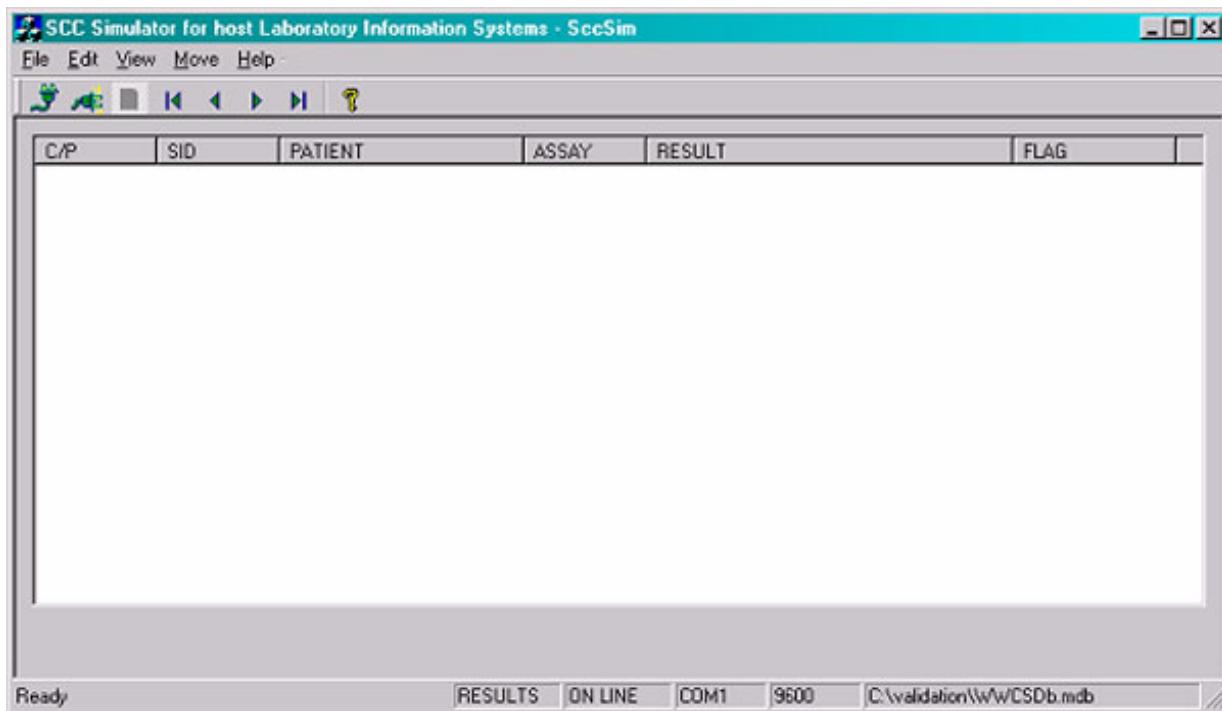
## Deleting items from the database

The SCC Simulator provides the user with the capability to delete items from the user-specified database based on the current view [RESULTS, QUERIES, ORDERS] in one of the following ways:

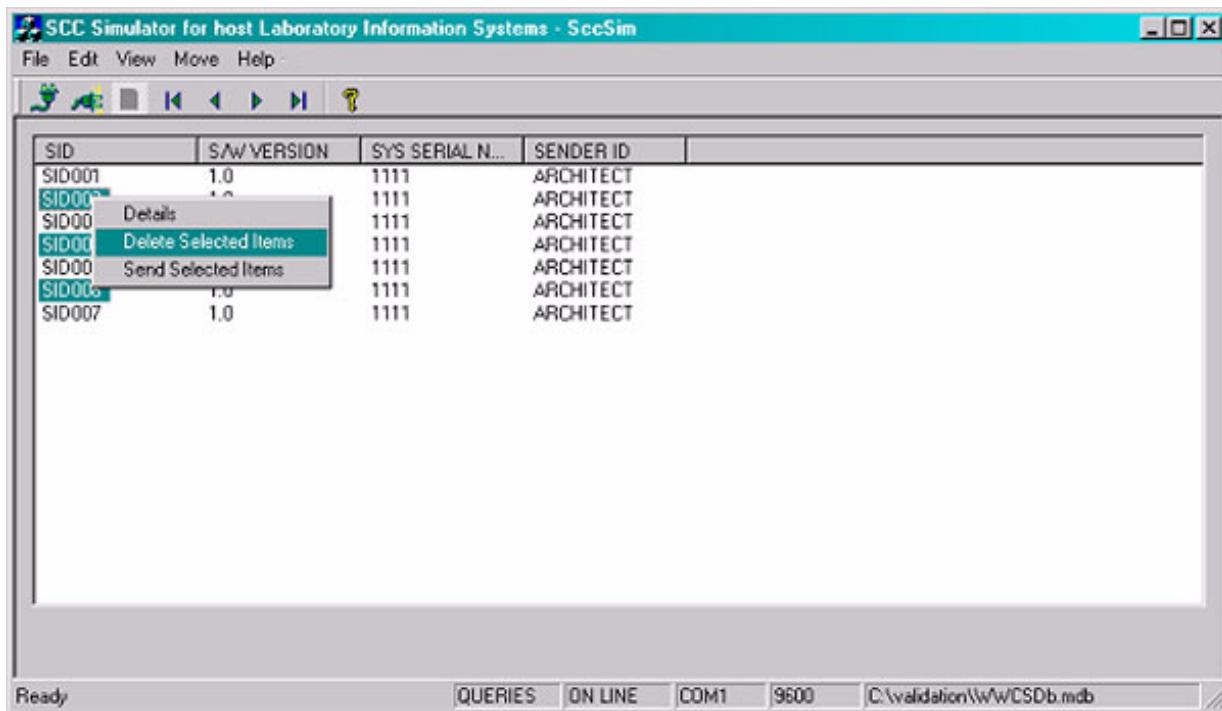
- The user can request the Simulator delete all the records for the currently selected view by selecting **Edit, Delete Entire Database** (*Figure 8.45*). *Figure 8.46* illustrates the view after the deletions have been made.
- The user can select one or multiple items in the currently displayed view [RESULTS, QUERIES, ORDERS] and request the simulator to delete the selected items by a right mouse click on one of the selected items, which displays a popup menu. Select **Delete Selected Items** [RESULTS, QUERIES] (*Figure 8.47 - Figure 8.48*). A similar mechanism is used to delete selected items in the ORDERS VIEW except the **Delete Selected Orders** menu item is selected in the popup menu.



**Figure 8.45: Delete Entire Database for Selected View**



**Figure 8.46:** View after Deletion of Entire Database



**Figure 8.47:** Deletion of Selected Items on a View

The screenshot shows a Windows application window titled "SCC Simulator for host Laboratory Information Systems - SccSim". The menu bar includes "File", "Edit", "View", "Move", and "Help". Below the menu is a toolbar with icons for file operations. The main area contains a table with four columns: SID, S/W VERSION, SYS SERIAL N..., and SENDER ID. The table has 7 rows, with the first row being the header. The data in the table is as follows:

SID	S/W VERSION	SYS SERIAL N...	SENDER ID
SID001	1.0	1111	ARCHITECT
SID003	1.0	1111	ARCHITECT
SID005	1.0	1111	ARCHITECT
SID007	1.0	1111	ARCHITECT

At the bottom of the window, there is a status bar with the text "Ready" and several configuration options: QUERIES, ON LINE, COM1, 9600, and C:\validation\w\w\CSDb.mdb.

Figure 8.48: View after Deletion of Selected Items

### Viewing item details from the database

The SCC Simulator provides the user with the capability to view one or multiple item details from the user-specified database based on the current view [RESULTS, QUERIES, ORDERS]. The user can request the Simulator to select all the records for the currently selected view by selecting **Edit, Select All** (*Figure 8.49*). *Figure 8.50* illustrates the view after the selections have been made. The user can also select one or multiple items in the currently displayed view [RESULTS, QUERIES, ORDERS]. The user can then right click on one of the selected items to display a popup menu. Select **Details** (*Figure 8.51*, *Figure 8.53*) [RESULTS, QUERIES] or **Order Details** (*Figure 8.55*) [ORDERS]. This displays the details form for that view (*Figure 8.52*, *Figure 8.54*, *Figure 8.56*).

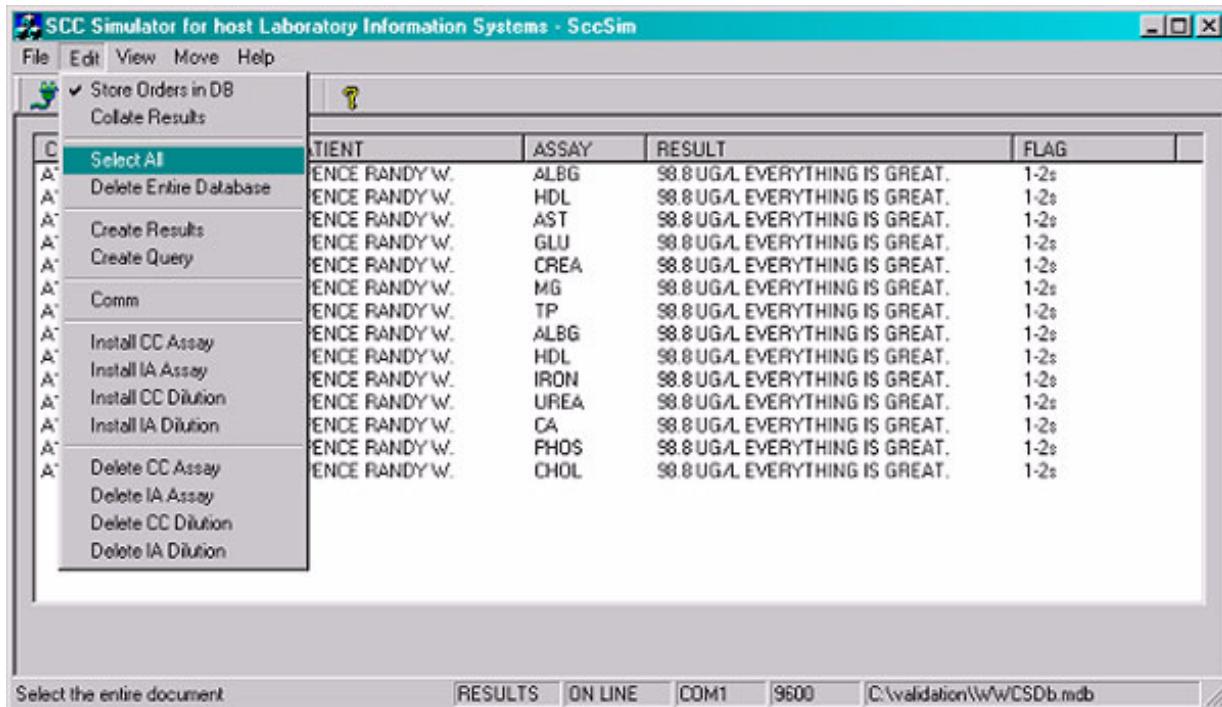
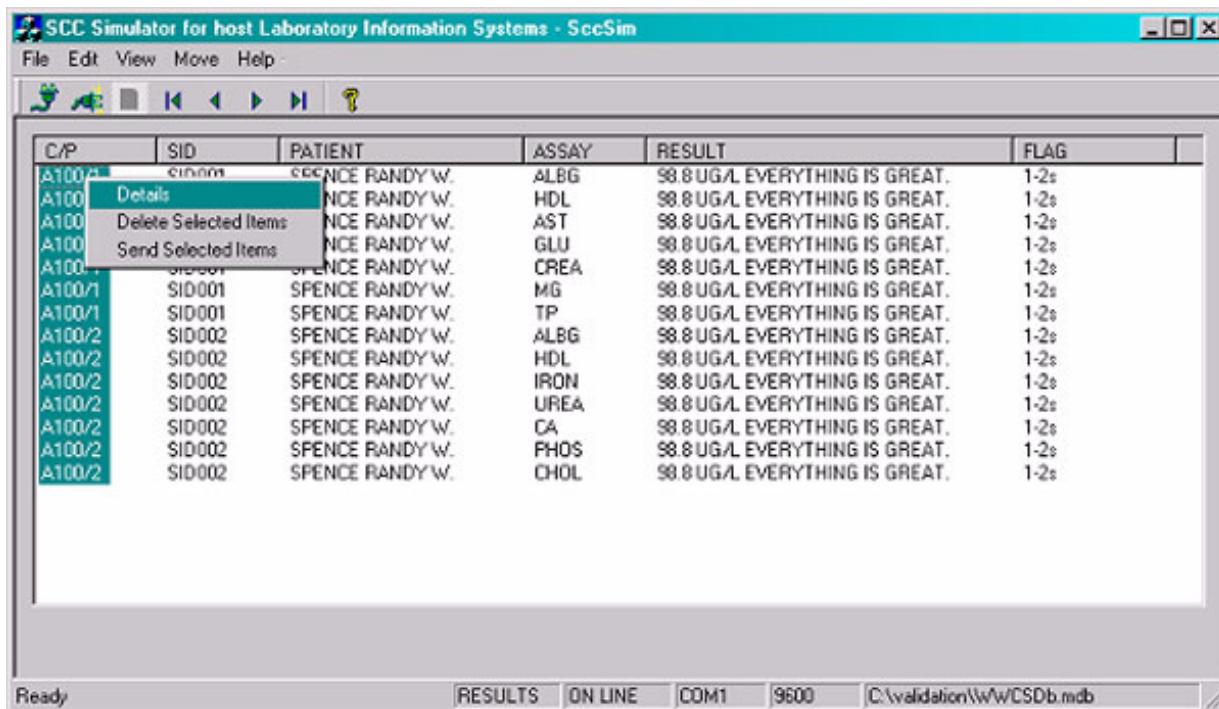


Figure 8.49: Select All Items in a View

The screenshot shows the same SCC Simulator window after performing a "Select All" operation. The main pane now displays a larger set of data rows, indicating that all items in the context menu have been selected. The data in the table is as follows:

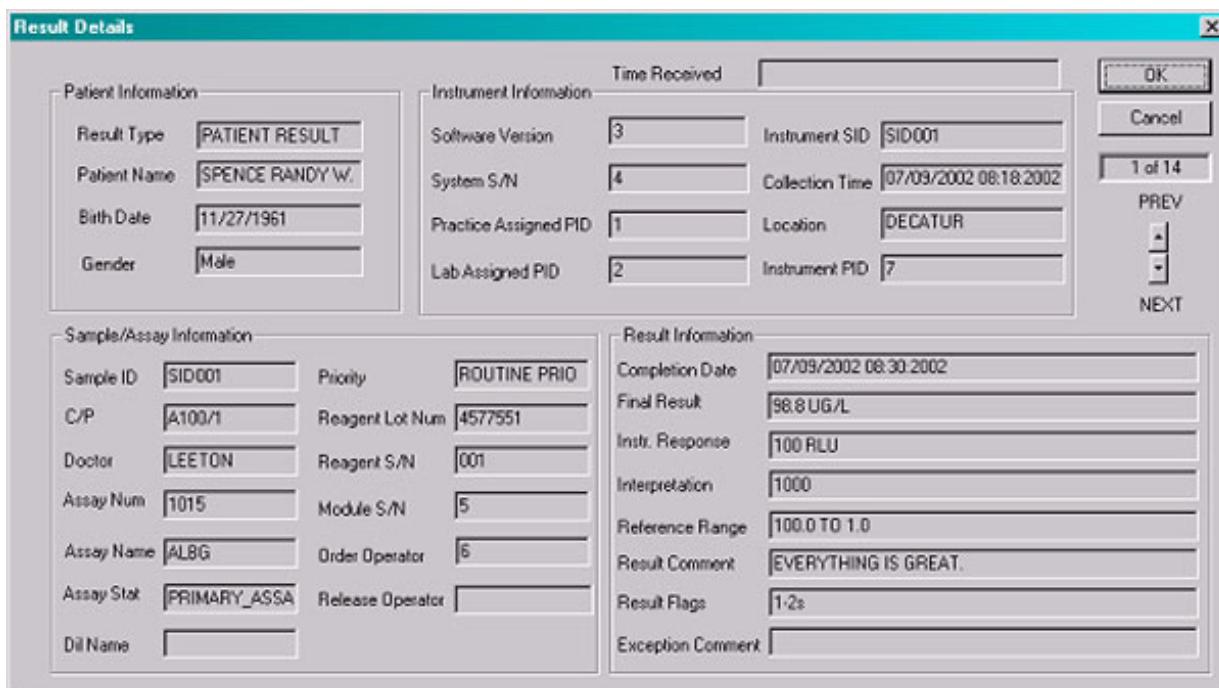
C/P	SID	PATIENT	ASSAY	RESULT	FLAG
A100/1	SID001	SPENCE RANDY W.	ALBG	98.8 UG/L EVERYTHING IS GREAT.	1-2s
A100/1	SID001	SPENCE RANDY W.	HDL	98.8 UG/L EVERYTHING IS GREAT.	1-2s
A100/1	SID001	SPENCE RANDY W.	AST	98.8 UG/L EVERYTHING IS GREAT.	1-2s
A100/1	SID001	SPENCE RANDY W.	GLU	98.8 UG/L EVERYTHING IS GREAT.	1-2s
A100/1	SID001	SPENCE RANDY W.	CREA	98.8 UG/L EVERYTHING IS GREAT.	1-2s
A100/1	SID001	SPENCE RANDY W.	MG	98.8 UG/L EVERYTHING IS GREAT.	1-2s
A100/1	SID001	SPENCE RANDY W.	TP	98.8 UG/L EVERYTHING IS GREAT.	1-2s
A100/2	SID002	SPENCE RANDY W.	ALBG	98.8 UG/L EVERYTHING IS GREAT.	1-2s
A100/2	SID002	SPENCE RANDY W.	HDL	98.8 UG/L EVERYTHING IS GREAT.	1-2s
A100/2	SID002	SPENCE RANDY W.	IRON	98.8 UG/L EVERYTHING IS GREAT.	1-2s
A100/2	SID002	SPENCE RANDY W.	UREA	98.8 UG/L EVERYTHING IS GREAT.	1-2s
A100/2	SID002	SPENCE RANDY W.	CA	98.8 UG/L EVERYTHING IS GREAT.	1-2s
A100/2	SID002	SPENCE RANDY W.	PHOS	98.8 UG/L EVERYTHING IS GREAT.	1-2s
A100/2	SID002	SPENCE RANDY W.	CHOL	98.8 UG/L EVERYTHING IS GREAT.	1-2s

Figure 8.50: View after a Select All



C/P	SID	PATIENT	ASSAY	RESULT	FLAG
A100/1	SID001	SPENCE RANDY W.	ALBG	98.8 UG/L EVERYTHING IS GREAT.	1-2s
A100		SPENCE RANDY W.	HDL	98.8 UG/L EVERYTHING IS GREAT.	1-2s
A100		SPENCE RANDY W.	AST	98.8 UG/L EVERYTHING IS GREAT.	1-2s
A100		SPENCE RANDY W.	GLU	98.8 UG/L EVERYTHING IS GREAT.	1-2s
A100		SPENCE RANDY W.	CREA	98.8 UG/L EVERYTHING IS GREAT.	1-2s
A100/1	SID001	SPENCE RANDY W.	MG	98.8 UG/L EVERYTHING IS GREAT.	1-2s
A100/1	SID001	SPENCE RANDY W.	TP	98.8 UG/L EVERYTHING IS GREAT.	1-2s
A100/2	SID002	SPENCE RANDY W.	ALBG	98.8 UG/L EVERYTHING IS GREAT.	1-2s
A100/2	SID002	SPENCE RANDY W.	HDL	98.8 UG/L EVERYTHING IS GREAT.	1-2s
A100/2	SID002	SPENCE RANDY W.	IRON	98.8 UG/L EVERYTHING IS GREAT.	1-2s
A100/2	SID002	SPENCE RANDY W.	UREA	98.8 UG/L EVERYTHING IS GREAT.	1-2s
A100/2	SID002	SPENCE RANDY W.	CA	98.8 UG/L EVERYTHING IS GREAT.	1-2s
A100/2	SID002	SPENCE RANDY W.	PHOS	98.8 UG/L EVERYTHING IS GREAT.	1-2s
A100/2	SID002	SPENCE RANDY W.	CHOL	98.8 UG/L EVERYTHING IS GREAT.	1-2s

**Figure 8.51: Select Details for View**



Result Type	PATIENT RESULT
Patient Name	SPENCE RANDY W.
Birth Date	11/27/1961
Gender	Male

Software Version	3	Time Received	
System S/N	4	Instrument SID	SID001
Practice Assigned PID	1	Collection Time	07/09/2002 08:18:2002
Lab Assigned PID	2	Location	DECATUR
		Instrument PID	7

Sample ID	SID001	Priority	ROUTINE PRIO
C/P	A100/1	Reagent Lot Num	4577551
Doctor	LEETON	Reagent S/N	001
Assay Num	1015	Module S/N	5
Assay Name	ALBG	Order Operator	6
Assay Stat	PRIMARY_ASSA	Release Operator	
Dil Name			

Completion Date	07/09/2002 08:30:2002
Final Result	98.8 UG/L
Instr. Response	100 RLU
Interpretation	1000
Reference Range	100.0 TO 1.0
Result Comment	EVERYTHING IS GREAT.
Result Flags	1-2s
Exception Comment	

**Figure 8.52: Details Form for Results View**

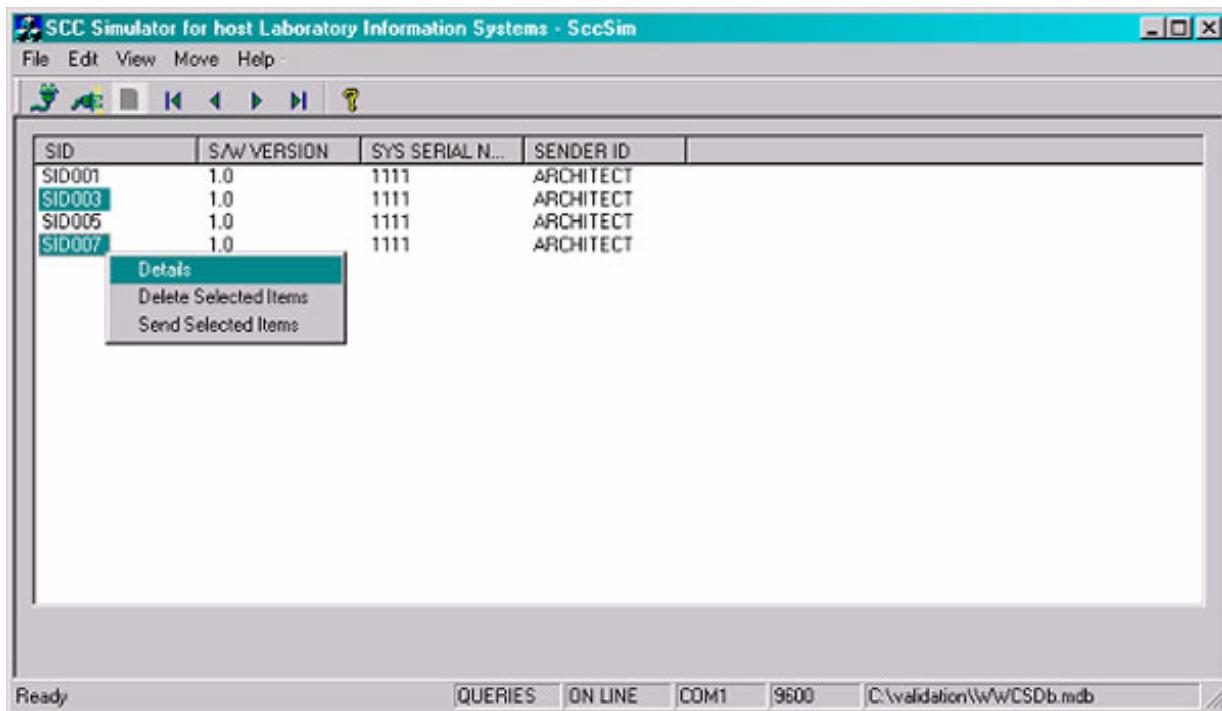


Figure 8.53: Selected Items Details for Queries

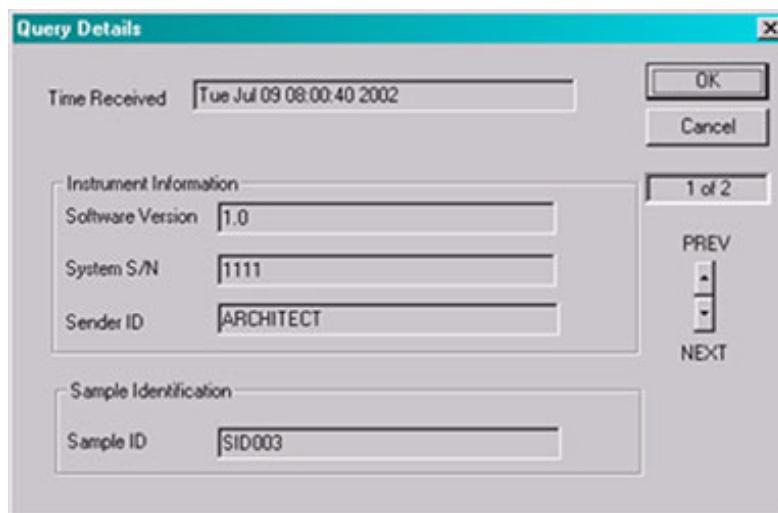
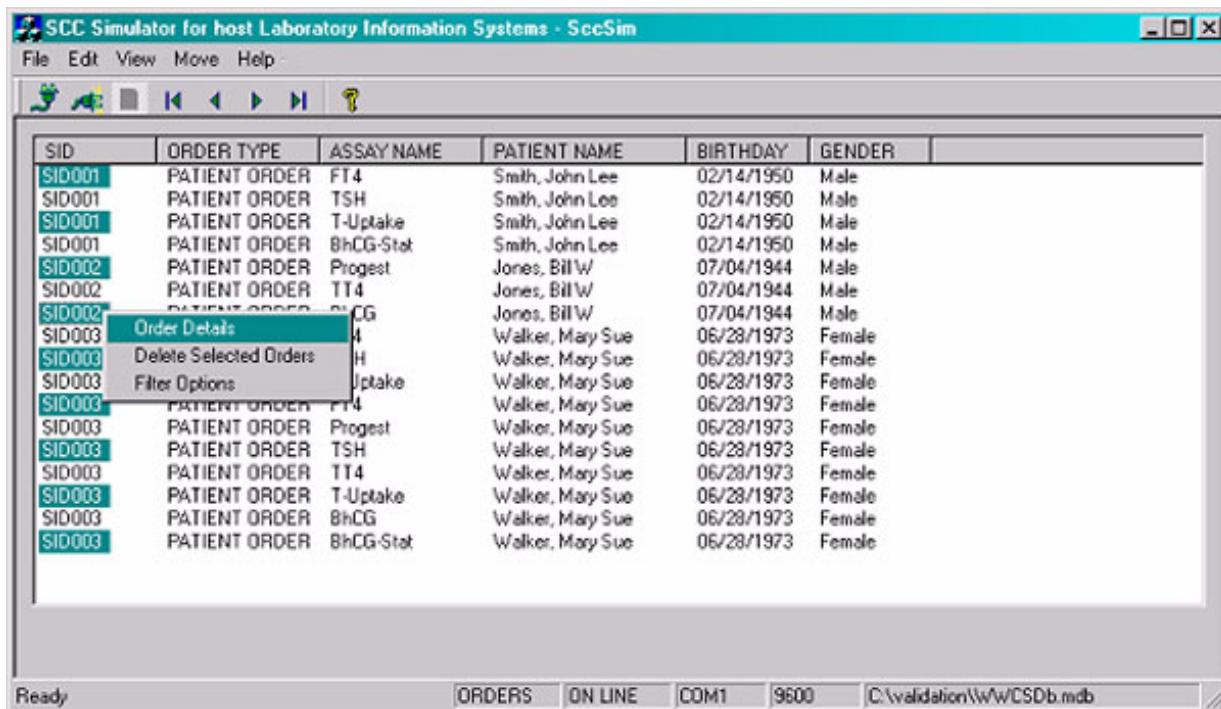


Figure 8.54: Query View Details



The screenshot shows a Windows application window titled "SCC Simulator for host Laboratory Information Systems - SccSim". The menu bar includes "File", "Edit", "View", "Move", and "Help". Below the menu is a toolbar with icons for file operations. The main area is a table with the following columns: SID, ORDER TYPE, ASSAY NAME, PATIENT NAME, BIRTHDAY, and GENDER. The table contains several rows of data. A context menu is open over the row where SID is "SID003". The menu options are: "Order Details", "Delete Selected Orders", and "Filter Options". At the bottom of the window, there is a status bar with the text "Ready" and several status indicators: ORDERS, ON LINE, COM1, 9600, and C:\validation\w\w\CSDb.mdb.

SID	ORDER TYPE	ASSAY NAME	PATIENT NAME	BIRTHDAY	GENDER
SID001	PATIENT ORDER	FT4	Smith, John Lee	02/14/1950	Male
SID001	PATIENT ORDER	TSH	Smith, John Lee	02/14/1950	Male
SID001	PATIENT ORDER	T-Uptake	Smith, John Lee	02/14/1950	Male
SID001	PATIENT ORDER	BhCG-Stk	Smith, John Lee	02/14/1950	Male
SID002	PATIENT ORDER	Progesterone	Jones, Bill W	07/04/1944	Male
SID002	PATIENT ORDER	TT4	Jones, Bill W	07/04/1944	Male
SID002	PATIENT ORDER	BhCG	Jones, Bill W	07/04/1944	Male
SID003	Order Details		Walker, Mary Sue	06/28/1973	Female
SID003	Delete Selected Orders		Walker, Mary Sue	06/28/1973	Female
SID003	Filter Options		Walker, Mary Sue	06/28/1973	Female
SID003	PATIENT ORDER	FT4	Walker, Mary Sue	06/28/1973	Female
SID003	PATIENT ORDER	Progesterone	Walker, Mary Sue	06/28/1973	Female
SID003	PATIENT ORDER	TSH	Walker, Mary Sue	06/28/1973	Female
SID003	PATIENT ORDER	TT4	Walker, Mary Sue	06/28/1973	Female
SID003	PATIENT ORDER	T-Uptake	Walker, Mary Sue	06/28/1973	Female
SID003	PATIENT ORDER	BhCG	Walker, Mary Sue	06/28/1973	Female
SID003	PATIENT ORDER	BhCG-Stk	Walker, Mary Sue	06/28/1973	Female

**Figure 8.55: Selected Item Details for Orders**

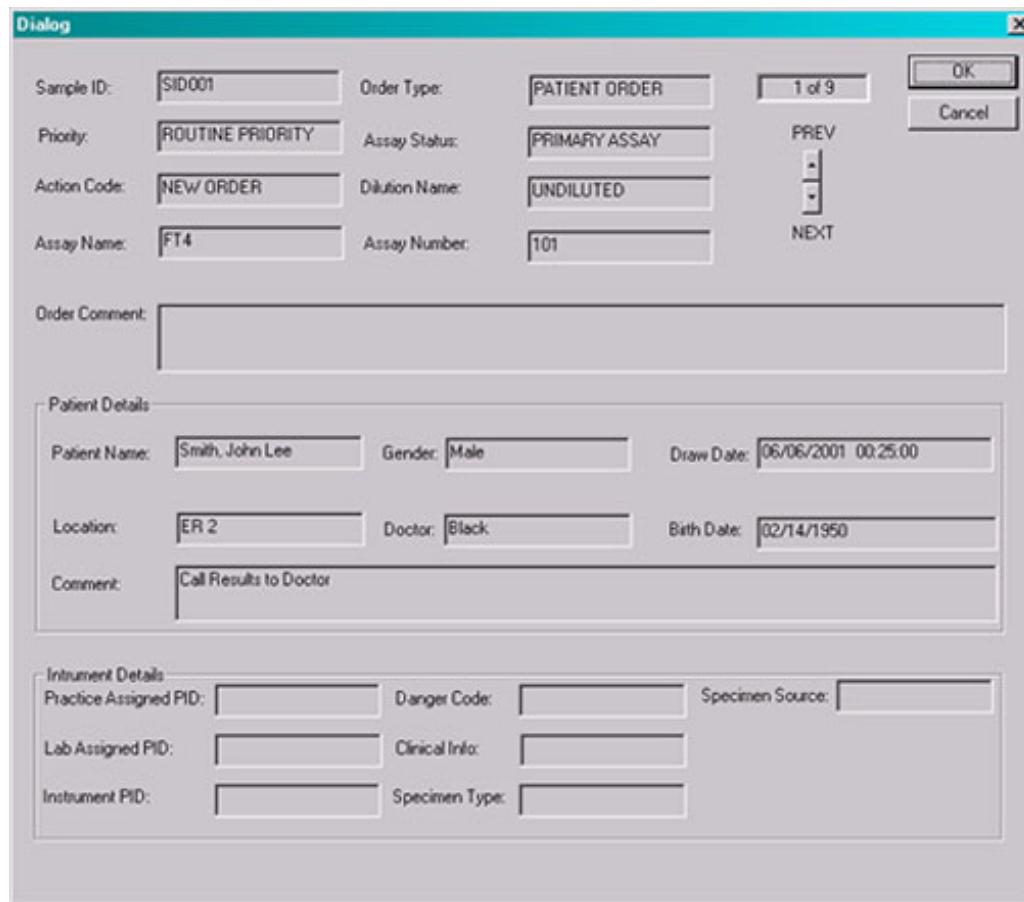


Figure 8.56: Order View Details

### Disconnecting from the communication port

The SCC Simulator main application window status bar provides the connection status of the communication port. Prior to disconnecting from the communication port, the SCC Simulator status window displays **ON LINE**. The user can disconnect from the communication port by pressing the DisConnect icon on the main application window tool bar (*Figure 8.57*), or by selecting **File, Disconnect** (*Figure 8.58*). After the disconnection, the main application status window connection status field changes to **OFF LINE**.

C/P	Disconnect	PATIENT	ASSAY	RESULT	FLAG
A100/1	SID001	SPENCE RANDY W.	ALBG	98.8 UG/L EVERYTHING IS GREAT.	1-2s
A100/1	SID001	SPENCE RANDY W.	HDL	98.8 UG/L EVERYTHING IS GREAT.	1-2s
A100/1	SID001	SPENCE RANDY W.	AST	98.8 UG/L EVERYTHING IS GREAT.	1-2s
A100/1	SID001	SPENCE RANDY W.	GLU	98.8 UG/L EVERYTHING IS GREAT.	1-2s
A100/1	SID001	SPENCE RANDY W.	CREA	98.8 UG/L EVERYTHING IS GREAT.	1-2s
A100/1	SID001	SPENCE RANDY W.	MG	98.8 UG/L EVERYTHING IS GREAT.	1-2s
A100/1	SID001	SPENCE RANDY W.	TP	98.8 UG/L EVERYTHING IS GREAT.	1-2s
A100/2	SID002	SPENCE RANDY W.	ALBG	98.8 UG/L EVERYTHING IS GREAT.	1-2s
A100/2	SID002	SPENCE RANDY W.	HDL	98.8 UG/L EVERYTHING IS GREAT.	1-2s
A100/2	SID002	SPENCE RANDY W.	IRON	98.8 UG/L EVERYTHING IS GREAT.	1-2s
A100/2	SID002	SPENCE RANDY W.	UREA	98.8 UG/L EVERYTHING IS GREAT.	1-2s
A100/2	SID002	SPENCE RANDY W.	CA	98.8 UG/L EVERYTHING IS GREAT.	1-2s
A100/2	SID002	SPENCE RANDY W.	PHOS	98.8 UG/L EVERYTHING IS GREAT.	1-2s
A100/2	SID002	SPENCE RANDY W.	CHOL	98.8 UG/L EVERYTHING IS GREAT.	1-2s

**Figure 8.57:** Prior to Disconnecting from a Communication Port

C/P	Disconnect	PATIENT	ASSAY	RESULT	FLAG
A100/1	SID001	SPENCE RANDY W.	ALBG	98.8 UG/L EVERYTHING IS GREAT.	1-2s
A100/1	SID001	SPENCE RANDY W.	HDL	98.8 UG/L EVERYTHING IS GREAT.	1-2s
A100/1	SID001	SPENCE RANDY W.	AST	98.8 UG/L EVERYTHING IS GREAT.	1-2s
A100/1	SID001	SPENCE RANDY W.	GLU	98.8 UG/L EVERYTHING IS GREAT.	1-2s
A100/1	SID001	SPENCE RANDY W.	CREA	98.8 UG/L EVERYTHING IS GREAT.	1-2s
A100/1	SID001	SPENCE RANDY W.	MG	98.8 UG/L EVERYTHING IS GREAT.	1-2s
A100/1	SID001	SPENCE RANDY W.	TP	98.8 UG/L EVERYTHING IS GREAT.	1-2s
A100/2	SID002	SPENCE RANDY W.	ALBG	98.8 UG/L EVERYTHING IS GREAT.	1-2s
A100/2	SID002	SPENCE RANDY W.	HDL	98.8 UG/L EVERYTHING IS GREAT.	1-2s
A100/2	SID002	SPENCE RANDY W.	IRON	98.8 UG/L EVERYTHING IS GREAT.	1-2s
A100/2	SID002	SPENCE RANDY W.	UREA	98.8 UG/L EVERYTHING IS GREAT.	1-2s
A100/2	SID002	SPENCE RANDY W.	CA	98.8 UG/L EVERYTHING IS GREAT.	1-2s
A100/2	SID002	SPENCE RANDY W.	PHOS	98.8 UG/L EVERYTHING IS GREAT.	1-2s
A100/2	SID002	SPENCE RANDY W.	CHOL	98.8 UG/L EVERYTHING IS GREAT.	1-2s

**Figure 8.58:** Disconnect Through Menu

The screenshot shows a Windows application window titled "SCC Simulator for host Laboratory Information Systems - SccSim". The menu bar includes File, Edit, View, Move, Help, and a toolbar with icons for file operations. The main area displays a table with the following data:

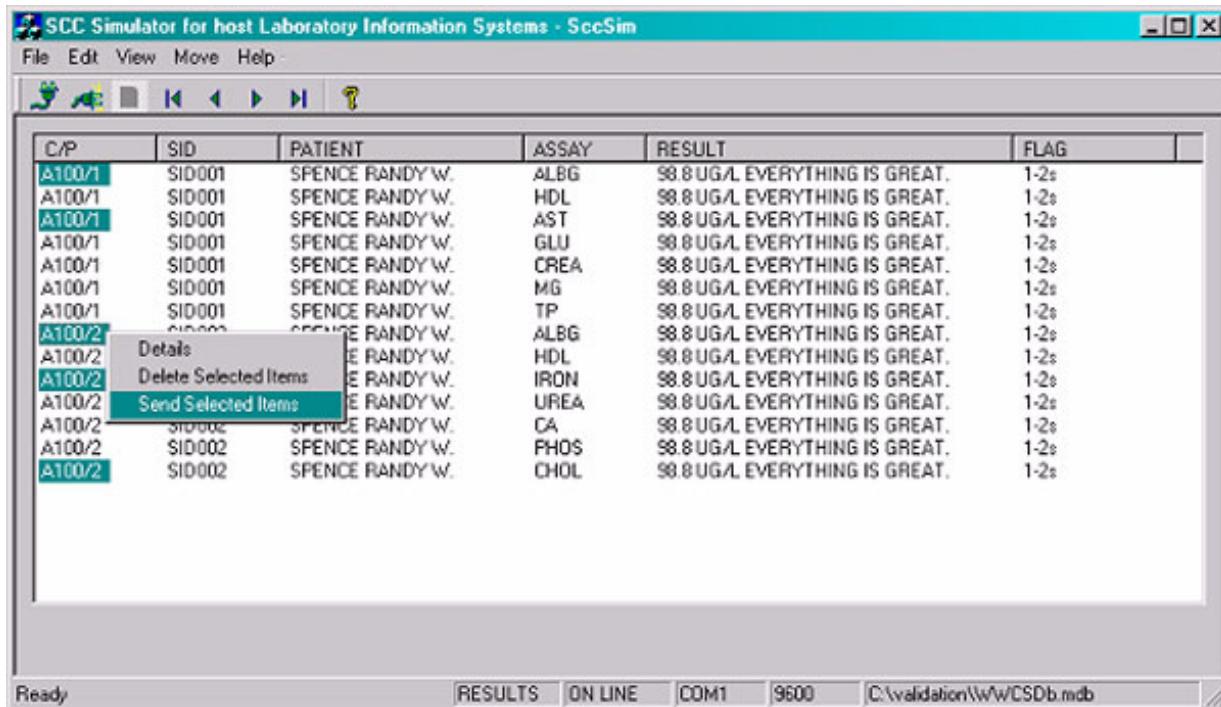
C/P	SID	PATIENT	ASSAY	RESULT	FLAG
A100/1	SID001	SPENCE RANDY W.	ALBG	98.8 UG/L EVERYTHING IS GREAT.	1-2s
A100/1	SID001	SPENCE RANDY W.	HDL	98.8 UG/L EVERYTHING IS GREAT.	1-2s
A100/1	SID001	SPENCE RANDY W.	AST	98.8 UG/L EVERYTHING IS GREAT.	1-2s
A100/1	SID001	SPENCE RANDY W.	GLU	98.8 UG/L EVERYTHING IS GREAT.	1-2s
A100/1	SID001	SPENCE RANDY W.	CREA	98.8 UG/L EVERYTHING IS GREAT.	1-2s
A100/1	SID001	SPENCE RANDY W.	MG	98.8 UG/L EVERYTHING IS GREAT.	1-2s
A100/1	SID001	SPENCE RANDY W.	TP	98.8 UG/L EVERYTHING IS GREAT.	1-2s
A100/2	SID002	SPENCE RANDY W.	ALBG	98.8 UG/L EVERYTHING IS GREAT.	1-2s
A100/2	SID002	SPENCE RANDY W.	HDL	98.8 UG/L EVERYTHING IS GREAT.	1-2s
A100/2	SID002	SPENCE RANDY W.	IRON	98.8 UG/L EVERYTHING IS GREAT.	1-2s
A100/2	SID002	SPENCE RANDY W.	UREA	98.8 UG/L EVERYTHING IS GREAT.	1-2s
A100/2	SID002	SPENCE RANDY W.	CA	98.8 UG/L EVERYTHING IS GREAT.	1-2s
A100/2	SID002	SPENCE RANDY W.	PHOS	98.8 UG/L EVERYTHING IS GREAT.	1-2s
A100/2	SID002	SPENCE RANDY W.	CHOL	98.8 UG/L EVERYTHING IS GREAT.	1-2s

At the bottom, there are buttons for RESULTS, OFF LINE, PORT, RATE, and a path C:\validation\w\w\CSDb.mdb. The status bar shows "Ready".

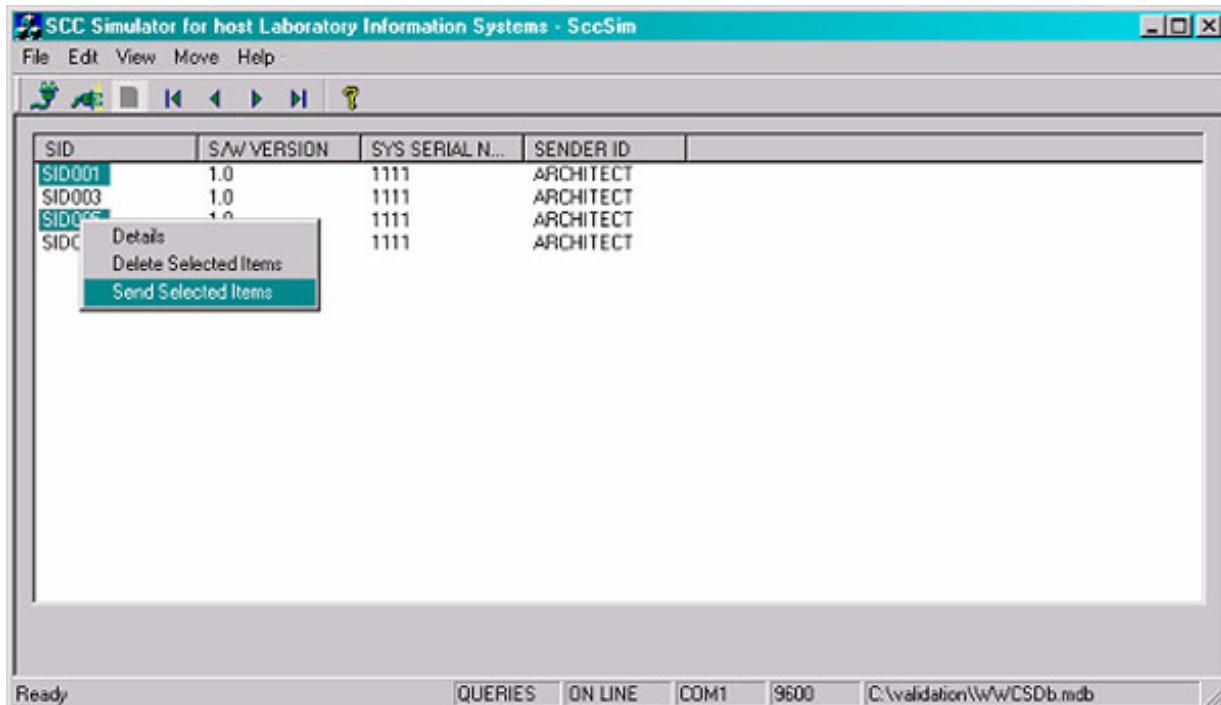
Figure 8.59: After Disconnecting from a Communication Port

### Sending results or queries to a host

The SCC Simulator provides the user the capability to send results or queries to an LIS provided they are in the [RESULTS or QUERIES] view and the simulator is connected to a communication port. The user can select one or multiple items in the currently displayed view [RESULTS or QUERIES]. Once the selections are made, right mouse click on one of the selected items, and select **Send Selected Items** from the popup menu (*Figure 8.60, Figure 8.61*) [RESULTS, QUERIES]. The simulator sends the selected items.



**Figure 8.60:** Send Selected Results



**Figure 8.61:** Send Selected Queries

# Introduction

This section provides a comparison of RS-232 interface specifications between the ARCHITECT System and the AxSYM System including:

- A functional comparison between the two systems.
- A document comparison between the Abbott Standard Interface RS-232 Manuals of the two systems covering *Section 4: System-specific Outgoing Messages* and *Section 5: System-specific Incoming Messages*. This document comparison is based on the:
  - *Abbott Standard Interface RS-232 Manual/ARCHITECT® System Edition (91407-105-March, 2004)*
  - *Abbott Standard Interface RS-232 Manual/AxSYM® Edition (66-6837/R3-February 1996)*

**NOTES**

# Functional Comparison

## Background

As the ARCHITECT System is primarily designed for high volume immunoassay markets, its Host Interface is also designed to enhance the speed and the data communicated with a host system.

The following is a brief description of the major functional differences between the ARCHITECT System and AxSYM System.

## Physical Layer

### Speed

#### AxSYM System

Supported baud rates are:

1200, 2400, 4800, 9600, 19200

#### ARCHITECT System

Supported baud rates are:

1200, 2400, 4800, 9600, 14400, 19200, 28800, 38400, 57600, 115200

### Host Interface Port

#### AxSYM System

The Host Interface Port is one of the eight interface ports located on the back of the AxSYM System.

#### ARCHITECT System

The COM5 Port (Connector P3) is used as the Host Interface Port and is located at the back of the System Control Center (SCC).

## Data Link Layer

### Establishment Phase

#### AxSYM System

During the Establishment Phase, if the AxSYM System has information to transmit, it attempts to establish a connection with an external host every 60 seconds.

**ARCHITECT System**

During the Establishment Phase, if the ARCHITECT System has information to transmit, it attempts to establish a connection with a host every 30 seconds.

If, after ten unsuccessful attempts to establish the connection with the host system (*e.g.*, the host system is down), the ARCHITECT System displays an alert message, and discontinues attempts to establish a connection with the host system.

In the case of discontinuation of attempts, the Host Interface Port is disabled and the user must re-enable Host Communication via the Configure host-release mode dialog window. Refer to Section 5: ARCHITECT System-specific Incoming Messages.

## **Message Content Layer**

### **Canceling of Test Orders**

**AxSYM System**

AxSYM does not currently support the ability for a host to cancel a previously downloaded test order through the use of the Action Code field.

**ARCHITECT System**

ARCHITECT currently supports the ability for a host to cancel a previously down-loaded test order through the use of the Action Code field. Refer to Section 5: ARCHITECT System-specific Incoming Messages, Test Order Records.

### **Transmission Modes**

**AxSYM System**

Has two separate options for transmission as:

- Select Transmit Approved Patient Results to Host:  
ON/OFF
  - If set to ON, the AxSYM System sends patient results to the host computer upon approval.  
Default = OFF.
- Select Accept Order Requests from Host:  
ON/OFF
  - If set to ON, the AxSYM System is enabled to receive orders from a host computer.  
Default = OFF

## **ARCHITECT System**

Provides a single option for both transmission modes as:

- Bi-directional Interface to Host:  
ON/ON WITH QUERY/OFF

If set to ON, the ARCHITECT System is enabled to receive test orders downloaded from the host system and send approved results to the host system.

If set to ON WITH QUERY, the ARCHITECT System is enabled to receive test orders downloaded from the host system or queries and send approved results to the host system.

Default = OFF.

The ARCHITECT System also provides options for transmitting results to the host as described in the following table.

**Table 9.1: Options for transmitting to host computer**

Approved patient results (Default: Collated)	
Collated	<p>Allows for results for multiple orders for a single sample ID to be sent within a message.</p> <p><b>NOTE:</b> Results (both completed results and exceptions) are collated by sample ID. Released Results are held in Pending collation status until all completed results for a sample ID are released and all exceptions for the sample ID have been reported. All test orders for the sample ID must produce an outcome, either a completed result or an exception, before any released results for the sample ID are sent to the host computer.</p>
Single	Allows for a single result for a single patient to be sent within a message.
Approved QC results (Default: Off)	
On	Allows approved QC results and QC exceptions to be released to the host computer.
Off	Approved QC results and QC exceptions are not sent to host computer.
Doctor, Location, and Draw Date/Time (Default: Off)	
On	Doctor, location, and draw date/time are sent to the host computer (if data is available) in result messages.
Off	Doctor, location, and draw date/time are not sent to host computer in result messages (even if data is available).

## Transmission of Multiple Flags

### AxSYM System

Provides an option to configure the Transmission of Multiple Result Flags to the Host (ON/OFF) in the result record type F (final).

If set to OFF, the AxSYM System sends the highest priority result flag to be transmitted to the host.

If set to ON, all result flags (up to 12 characters) are transmitted to the host separated by Component Delimiters (^).

There is no requirement for all component delimiters (^) to be present.

### ARCHITECT System

Automatically sends result related flags in the Result Record Type F. All flags are transmitted to the host separated by Component Delimiters (^).

## Comment Record

### AxSYM System

- **For Outgoing messages:** Allows at least 100 characters maximum in the comment record to be sent to the host system.
- **For Incoming messages:** Not supported.

### ARCHITECT System

- **For Outgoing messages:** Allows at least 260 characters maximum in the comment record to be sent to the host system.
- **For Incoming messages:** Allows 50 characters maximum in the comment record to be sent from the host system. The comment may be associated with and follow either a patient record or a test order record.

## Query Mode

### AxSYM System

If a Query Request is not responded to by either Orders or a Negative Query Response, the AxSYM System discontinues waiting for the response, and no longer issues Query Requests for the remainder of the current run.

## ARCHITECT System

Allows three consecutive Query time-out errors (pre-defined by the system) occurring due to the inability of the host system to reply within the Query time-out period configured via the “Host query timeout” option on the Configure host-release mode dialog window. If this number is reached, the system alerts the user about the encountered error, and disables the host query mode.

## Logical Transmission Error Recovery Requirements

### AxSYM System

- **Incoming messages:** During transmission failure, expects to receive the whole message that was unsuccessfully received.
- **Outgoing messages:** During transmission failure, retransmits the whole message that was unsuccessfully transmitted.

### ARCHITECT System

- **Incoming messages:** stores segments of the message as received, according to the following criteria:
  - At decremental changes in the hierarchical level. Any unsaved data is saved prior to this record.
  - At receipt of a test order. Any unsaved test order record and associated comment record(s) received prior to this record are saved.

According to the hierarchical record level requirements, all logical records necessary to reach the point [record] where transmission failure occurred must be retransmitted.

An example message, showing save points, is provided below at left. A list of which records would need resending in case of transmission failure is shown at right.

Line #	Record Type(Level)	Increment	Action of Host:	Line # where failure occurred	ARCHITECT would require retransmission of:
A	Header	(Level 0)+0		A	A
B	Patient1	(Level 1)+1		B	AB
C	Order 1	(Level 2)+1		C	ABC
D	Order 2	(Level 2)+0 ←	at this	D	ABCD
E	Comment1	(Level 3)+1		E	ABDE
F	Order 3	(Level 2)-1 ←	at this point,	F	ABDEF
G	Comment1	(Level 3)+1		G	ABFG
H	Patient2	(Level 2)-2 ←	at this point,	H	ABFGH
I	Order 1	(Level 2)+1		I	AHI
J	Order 2	(Level 2)+0 ←	at this point,	J	AHJ
K	Comment1	(Level 3)+1		K	AHK
L	Patient3	(Level 1)-2 ←	at this point,	L	AHKL
M	Comment1	(Level 2)+1		M	ALM
N	Order1	(Level 2)+0		N	ALMN
O	Comment1	(Level 3)+1		O	ALMNO
P	Terminator	(Level 0)-3 ←	at this point, (Terminator record is assumed as saved.)	P	ALMNOP

Figure 9.1: Example of Logical Transmission Error Recovery (Incoming)

- **Outgoing messages:** Data is presumed to be saved at the host whenever any decremental change in the hierarchical level is observed.

The example below illustrates the decremental change in the hierarchical level that defines the point where the data is presumed to be saved at the host. At these level changes, all the data received, not including the record at which the decremental change occurred, is saved. In the example below at the left, storage would occur at points E, G, I, M, O, Q, and T.

In order to fulfill hierarchical record level requirements, all logical records necessary to reach the restart record point are sent prior to transmitting the record where line failure originally occurred. A list of which records would be resent in case of a transmission failure is shown at the right.

Line #	Record Type(Level)	Increment	Action of Host:	Line # where failure occurred	ARCHITECT would require retransmission of:
A	Header	(Level 0)+0		A	A
B	Patient1	(Level 1)+1		B	AB
C	Order 1	(Level 2)+1		C	ABC
D	Result1	(Level 3)+1		D	ABCD
E	Order 2	(Level 2)-1 ←	at this	E	ABCDE
F	Comment1	(Level 3)+1		F	ABEF
G	Order 3	(Level 2)-1 ←	at this	G	ABEFG
H	Comment1	(Level 3)+1		H	ABGH
I	Patient2	(Level 2)-2 ←	at this point, saves G thru H	I	ABGHI
J	Order 1	(Level 2)+1		J	AIJ
K	Result1	(Level 3)+1		K	AIJK
L	Comment1	(Level 4)+1		L	AIJKL
M	Result2	(Level 3)-1 ←	at this	M	AIJKLM
N	Result3	(Level 3)+0		N	AIJMN
O	Order2	(Level 2)-1 ←	at this	O	AIJMNO
P	Comment1	(Level 3)+1		P	AIOP
Q	Patient3	(Level 1)-2 ←	at this	Q	AIOPQ
R	Order1	(Level 2)+1		R	AQR
S	Result1	(Level 3)+1		S	AQRS
T	Terminator	(Level 0)-3 ←	at this	T	AQRST
(Terminator record is assumed as saved.)					

**Figure 9.2: Example of Logical Transmission Error Recovery (Outgoing)**

### Other specific field format and content differences

Please refer to Sections 4 and 5 of the respective RS-232 Manuals. A comparison of these sections follows.

**NOTES**

# Document Comparison

## System-Specific Outgoing Messages

The following information provides a comparison between Section 4 of the ARCHITECT System vs. AxSYM System Abbott Standard Interface RS-232 Manuals:

### Overview

The following section outlines the ASTM records and field contents needed to establish communication from the ARCHITECT / AxSYM System to a host computer.

For information on communicating from the host to the ARCHITECT / AxSYM System, refer to Section 5: System-Specific Incoming Messages in the respective Abbott Standard Interface RS-232 Manuals.

### Communication: (ARCHITECT vs. AxSYM) to Host

Transmission of Patient Results, Quality Control Results, and Order Query Requests utilize the high level ASTM records and fields described in this section. Unused fields are not listed.

#### Results Transmission Mode

##### ***Single Results***

Transmission of single results is the same for both systems.

##### ***Collated Results***

ARCHITECT System:

If the user-configurable option “Approved Patient Results” is set to “Collated”, multiple ASTM records are sent within a host session. The record hierarchy is as follows:

**Message Header Record**

**Patient Information Record**

**Test Order Record (Result)**

**Result Record (Final)**

**Comment Record (optional)**

**Result Record (Interpretation - optional)**

**Result Record (Preliminary - optional)**

**Test Order Record (Exception)**

**Comment Record**

**Test Order Record (Result)**

**Result Record (Final)**

**Comment Record (optional)**

**Result Record (Interpretation - optional)**

**Result Record (Preliminary - optional)**

**Message Terminator Record**

The ARCHITECT System collates all the results for a sample and transmits to the host only after the last test for that sample has been completed and released, including reruns. The ARCHITECT System sends one patient information record per session.

**AxSYM System:**

The AxSYM System collates all the results for a sample and transmits to the host only after the last test for that sample has been completed and released. The AxSYM System collates multiple patient information records within one session.

**Order Query Transmission**

Order Query transmission is the same for both systems.

**ASTM Record Formats**

The following sections detail the formats for these ASTM records:

- Message Header Record
- Patient Information Record
- Request Information Record
- Result Record
- Test Order Record
- Comment Record
- Message Terminator Record

ASTM records that are not used:

- Scientific Record
- Manufacturer Information Record

### Message Header Record

The following table details the format of the Message Header Record sent by the ARCHITECT System or AxSYM System to the Host.

**Table 9.2: Message Header: ARCHITECT / AxSYM System to Host**

ASTM Field	Field Name	Maximum Characters	Field Contents	Field Description
7.1.1	Record Type ID (Same for both)	1	H	Header
7.1.2	Delimiter Definition (Same for both)	4		Field delimiter: vertical bar
			\	Repeat delimiter: backslash
			^	Component delimiter: caret
			&	Escape delimiter: ampersand
7.1.5	Sender Name or ID	ARCHITECT: 9	ARCHITECT	Instrument Name
		AxSYM 5	AxSYM	
	Software Version (Same for both)	4	^Version Number (numeric)	Version number in the format 1.23
	Serial Number	ARCHITECT: 25	^Serial Number (alphanumeric)	ARCHITECT: SCC Serial Number
		AxSYM: 10		AxSYM: Instrument Serial Number
	Interface Version (Same for both)	16	^Interface Version (alphanumeric)	Record types the system supports
7.1.12	Processing ID	1	P	ARCHITECT: Production: Treat message as an active message to be completed according to standard processing AxSYM: Patient results
			AxSYM: Q	AxSYM: Quality Control results
7.1.13	Version No. (Same for both)	1	1	Mandatory Field
7.1.14	Date and Time (Same for both)	14	YYYYMMDDHHMMSS	Date and Time of transmission in ASTM format.

# ARCHITECT System and AxSYM Comparison

## Document Comparison

## Section 9

```
H|\^&|||ARCHITECT^1.00^123456789^H1P1O1R1C1Q1L1||||||P|1|19930330133346[CR]
```

Figure 9.3: Example of Message Header Record: ARCHITECT System to Host

```
H|\^&|||AxSYM^1.00^1234567-89^H1P1O1R1C1Q1L1||||||P|1|19930330133346[CR]
```

Figure 9.4: Example of Message Header Record: AxSYM System to Host

### Patient Information Record

The following table details the format of the Patient Information Record sent by the ARCHITECT System or AxSYM System to the Host.

Table 9.3: Patient Information Record: ARCHITECT / AxSYM System to Host

ASTM Field	Field Name	Maximum Characters	Field Contents	Field Description
8.1.1	Record Type	1	P	Patient
8.1.2	Sequence Number	ARCHITECT: 5	ARCHITECT: 1 to 65535	Must be consistent with sequence number rules.
		AxSYM: 1	AxSYM: 1 to n	n represents any number.
8.1.3	Practice-Assigned Patient ID	ARCHITECT: 20	Printable String	Returned unchanged during transmission to the host
		AxSYM: 15	(Any character)	Always returned unchanged to the host.
8.1.4	Laboratory-Assigned Patient ID	ARCHITECT: 20	Printable String	Returned unchanged during transmission to the host
		AxSYM: 15	(Any character)	Always returned unchanged to the host.
8.1.5	Patient ID No. 3	ARCHITECT: 20	Printable String	Optional for Patient test orders
		AxSYM: 15	(Any character)	Instrument PID assigned by operator.

Table 9.3: Patient Information Record: ARCHITECT / AxSYM System to Host (*continued*)

ASTM Field	Field Name	Maximum Characters	Field Contents	Field Description
8.1.6	Patient Name	ARCHITECT: 20	Last (printable string)	<ul style="list-style-type: none"> <li>• Last, first, and middle patient name</li> </ul> <p>ARCHITECT ONLY:</p> <ul style="list-style-type: none"> <li>• Optional for Patient test orders</li> <li>• Empty for Control test orders</li> </ul>
		AxSYM: 15	Last (any character)	
		ARCHITECT: 20	^First (printable string)	
		AxSYM: 20	^First (any character)	
		ARCHITECT: 12	^Middle (printable string)	
		AxSYM: 1	^Middle Initial (any character)	
ARCHITECT: 8.1.8	Birth date	8	YYYYMMDD $\geq 18000101$ date $\leq$ current system date	<ul style="list-style-type: none"> <li>• Patient birth date</li> <li>• Optional for Patient test orders</li> <li>• Empty for Control test orders.</li> </ul>
ARCHITECT: 8.1.9	Patient Gender	1	M, F, U	<ul style="list-style-type: none"> <li>• Patient's gender (Male, Female, or Unknown)</li> <li>• Optional for Patient test orders.</li> <li>• Empty for Control orders</li> <li>• Field is returned unchanged in transmission to the host for patient test orders placed from the host.</li> </ul>
ARCHITECT: 8.1.14	Doctor	20	Printable String	<p>Patient Doctor's name</p> <ul style="list-style-type: none"> <li>• Field contains the data displayed in the optional Doctor attribute on the UI for Patient Test Orders if "Transmit to host: Doctor, location and draw date/time" configuration option is On.</li> <li>• Field is empty for patient test orders if "Transmit to host: Doctor, location and draw date/time" configuration option is Off.</li> <li>• Field is empty for Control test orders</li> </ul>

# ARCHITECT System and AxSYM Comparison

## Document Comparison

## Section 9

Table 9.3: Patient Information Record: ARCHITECT / AxSYM System to Host (*continued*)

ASTM Field	Field Name	Maximum Characters	Field Contents	Field Description
ARCHITECT: 8.1.26	Location	20	Printable String	The general clinic location or nursing unit, or ward or bed or both of the patient. <ul style="list-style-type: none"><li>• Field contains the data displayed in the optional Location attribute on the UI for Patient Test Orders if “Transmit to host: Doctor, location and draw date/time” configuration option is ON.</li><li>• Field is empty for patient test orders if “Transmit to host: Doctor, location and draw date/time” configuration option is Off.</li><li>• Field is empty for Control test orders</li></ul>

```
P|1|||PID13|Patient^Im^A|19320122|F|||||Dr.Amesbury|||||||ParkClinic[CR]
```

Figure 9.5: Example of Patient Information Record:  
ARCHITECT System to Host

```
P|1|||PID13|PATIENT^IM^A[CR]
```

Figure 9.6: Example of Patient Information Record: AxSYM System to Host

## Test Order Record

The following table details the format of the Test Order Record sent by the ARCHITECT System or AxSYM System to the Host.

Table 9.4: Test Order Record: ARCHITECT / AxSYM System to Host

ASTM Field	Field Name	Maximum Characters	Field Contents	Field Description
9.4.1	Record Type	1	O	Order
9.4.2	Sequence Number	ARCHITECT: 5  AxSYM: 1	1 to 65535  1 to n	Must be consistent with sequence number rules.  n represents any number

Table 9.4: Test Order Record: ARCHITECT / AxSYM System to Host (*continued*)

ASTM Field	Field Name	Maximum Characters	Field Contents	Field Description
9.4.3	Specimen ID	ARCHITECT: 20  AxSYM: 15	ARCHITECT: Printable String  AxSYM: any character	Sample ID downloaded from Host, returned unchanged to the host
9.4.4	Instrument specimen ID	20	Printable String	Instrument Specimen ID, Carrier_ID, and Position are returned for all specimens tested, although Instrument Specimen ID may be different than Specimen ID in 9.4.3 if changed by operator or scanned by the instrument
	Carrier ID	4	^alphanumeric	
	Position	2	^numeric	
9.4.4	AxSYM: Instrument specimen ID	15	any character	Instrument Sample ID, segment, and position are returned for all specimens tested, although Instrument Sample ID may be different than Sample ID in 9.4.3 if changed by the operator.
	^location_ID	1	^segment (Alphanumeric)	NOTE: The information in the Segment/Position portion of the field is invalid for Control Orders.
	^position	2	^position (Numeric)	
	Universal Test ID Code	ARCHITECT: 4  AxSYM: 3	^^Assay Number (numeric)	Specific number that identifies the test
	Name	ARCHITECT: 10  AxSYM: 9	^Assay Name (printable string)  ^Assay Name (alphanumeric)	Test name
9.4.5	Assay Protocol	10	ARCHITECT: ^Dilution (printable string)  AxSYM: ^Dilution (Alphanumeric)	Dilution protocol name
	Assay Status	1	^Status (P or C)	Assay status: • P or p if assay is installed as the primary version • C or c if the assay is installed as the correlation version
9.4.6	Priority (Same for both)	1	S or s or R	STAT  ARCHITECT: R or any other character

# ARCHITECT System and AxSYM Comparison

## Document Comparison

## Section 9

Table 9.4: Test Order Record: ARCHITECT / AxSYM System to Host (*continued*)

ASTM Field	Field Name	Maximum Characters	Field Contents	Field Description
ARCHITEC T: 9.4.8	Collection Date and Time	14	YYYYMMDDHHMMSS ≥ 19700101000000 and ≤ current system date	Date and time of sample collection <ul style="list-style-type: none"> <li>• Field contains the data displayed in the optional Draw date/time attribute on the UI for Patient Test Orders if “Transmit to host: Doctor, location and draw date/time” configuration option is ON.</li> <li>• Field is empty for Patient Test Orders if “Transmit to host: Doctor, location and draw date/time” configuration option is OFF.</li> <li>• Field is Empty for Control Test Orders</li> </ul>
9.4.12	Action Code (Same for both)	1	Q	<ul style="list-style-type: none"> <li>• Quality Control Result</li> <li>• Empty for Patient result</li> </ul>
9.4.26	Report Types (Same for both)	1	F or X	Final Result Test could not be performed

```
o|1|SID13|SID3^A123^5|^^^123^Assay1^UNDILUTED^P|R||20010223081223|||||F[CR]
```

Figure 9.7: Example of Test Order Record: ARCHITECT System to Host

```
o|1|SID13|SID13^A^1|^^^16^Assay1^NEAT|R|||||||||F[CR]
```

Figure 9.8: Example of Test Order Record: AxSYM System to Host

## Result Record

The following table details the format of the Result Record sent by the ARCHITECT System or AxSYM System to the Host.

Table 9.5: Result Record: ARCHITECT / AxSYM System to Host

ASTM Field	Field Name	Maximum Characters	Field Contents	Field Description
10.1.1	Record Type (Same for both)	1	R	Result
10.1.2	Sequence Number	ARCHITECT: 5  AxSYM: 1	1 to 65535  1 to n	Must be consistent with sequence number rules.  n represents any number

Table 9.5: Result Record: ARCHITECT / AxSYM System to Host (*continued*)

ASTM Field	Field Name	Maximum Characters	Field Contents	Field Description
10.1.3	Universal Test ID Code	ARCHITECT: 4	^^Assay Number (numeric)	Specific number that identifies the test
		AxSYM: 3		
	Name	ARCHITECT: 10	^Assay Name (printable string)	Test name
		AxSYM: 9	^Assay Name (alphanumeric)	
	Assay Protocol	10	ARCHITECT: ^Dilution (printable string)	Dilution protocol name
			AxSYM: ^Dilution (alphanumeric)	
	ARCHITECT: Assay Status	1	^ Status (P or C)	Assay Status: • P if assay is installed as primary version • C if assay is installed as correlation version
	ARCHITECT: Reagent Lot	15	^ alphanumeric	Reagent Master Lot # (empty for calculated results)
	ARCHITECT: Reagent Serial Number	5	^ alphanumeric	Serial number of reagent kit used to process the test result (empty for calculated results)
	ARCHITECT: Control Lot Number	20	printable string	Lot number of the control material (empty for patient results and calculated results)
	AxSYM: Test_Qualifier		^^	Always null
	Result Type	1	ARCHITECT: ^F	ARCHITECT: • Final result concentration or result value
			AxSYM: F or	AxSYM: • Final result concentration
			P or I	ARCHITECT: • Preliminary instrument result (RLU, mV, Abs) AxSYM: • Preliminary instrument result (rate or mP)
				Interpreted result

# ARCHITECT System and AxSYM Comparison

## Document Comparison

## Section 9

Table 9.5: Result Record: ARCHITECT / AxSYM System to Host (*continued*)

ASTM Field	Field Name	Maximum Characters	Field Contents	Field Description
10.1.4	Data Value	ARCHITECT: 20	ARCHITECT: Printable String	For Result Type F (concentration value if within dynamic range) including < or >
				For Result Type P (numeric response)
		AxSYM: 15	AxSYM: Numeric	For Result Type I (interpretation)
			AxSYM: Numeric Response	For Result Type F
10.1.5	Units	7	AxSYM: Concentration Units <i>or</i> ARCHITECT: RLU or mV or Abs	For Result Type P (Float decimal position or comma for both Result Type F and P.)
			AxSYM: Rate or mP or Percent <i>or</i> Empty	For Result Type I
			ARCHITECT: Result Units (printable string)	Result Type F
			ARCHITECT: RLU or mV or Abs	Result Type P
			Empty	Result Type I
10.1.6	Reference Ranges	ARCHITECT: at least 35	Normal/Therapeutic Ranges ARCHITECT ONLY: (Printable string formatted as minimum value to maximum value) <i>or</i>	For Result Type F for Patient Result
			AxSYM: Control Range	For Result Type F for QC Result
		AxSYM: 25	ARCHITECT ONLY: Control Range (Printable string formatted as minimum value to maximum value) <i>or</i> Empty	For Result Type F for Control Result
			Empty	For Result Type I or P and for Result Type F, if range undefined.

**Table 9.5: Result Record: ARCHITECT / AxSYM System to Host (*continued*)**

<b>ASTM Field</b>	<b>Field Name</b>	<b>Maximum Characters</b>	<b>Field Contents</b>	<b>Field Description</b>
10.1.7	Result Abnormal Flags	ARCHITECT: 25	IUO EDIT 1-2S 1-3S 2-2s1R1M 2-2s1RxM 2-2sxR1M R-4s 4-1s1M 4-1sxM 10-x1M 10-xxM EXP EXPC A#1 A#2 CNTL < or > INDX FLEX LL or HH PSHH LOW or HIGH CORR	For Result Type F: This field can be blank or can contain one or more result flags. Multiple flags are sent separated by component delimiters (which are used as a repeat delimiter).  For Result Type P and I: This field is blank.  The following flags are Westgard analysis flags and only display if the result is a control: 1-2S, 1-3S, 2-2s1R1M, 2-2s1RxM, 2-2sxR1M, R-4s, 4-1s1M, 4-1sxM, 10-x1M, 10-xxM
		AxSYM: 12	EX QC < or > LL or HH L or H	For Result Type F: If configured for multiple result flags, this field can be blank or can contain one or more result flags (separated by a component delimiter).  For Result Type P and I: This field is blank.
10.1.9	Result Status (Same for both)	1	F or R	Final Results  Previously Transmitted Results
10.1.11	Operator Identification	ARCHITECT: 12	Order Operator ID (printable string)  ^Release Operator ID (printable string)	ID of Operator logged into system at time of order  ID of Operator logged in at time of result release
		AxSYM: 6	printable string	
10.1.13	Date/Time Test Complete (Same for both)	14	YYYYMMDDHHMMSS	
10.1.14	Instrument Identification	25	Alphanumeric	Serial # of the module which performed the test.

# ARCHITECT System and AxSYM Comparison

## Document Comparison

## Section 9

```
R|1|^^^16^TSH^DIL1^P^12345AB89^12345^^F|28.275|mIU/mL|30.000TO500.000|EXP^LOW|
|F||OP345^OP346||19930330132949|IA200A345[CR]
```

Figure 9.9: Example of Result Record: ARCHITECT System to Host

```
R|1|^^^16^Assay1^UNDILUTED^^F|28.275|mIU/mL|30.000 TO 500.000|EX^L||F||||19930330132949[CR]
```

Figure 9.10: Example of Result Record: AxSYM System to Host

### ARCHITECT:

The following list of field contents of 10.1.7 (Result Abnormal Flags) are not part of the ASTM standard: EXP, CNTL, CORR, the Westgard Analysis flags (1-2S, 1-3S, 2-2S 1R 1M, 2-2S 1R xM, 2-2S xR 1M, R-4S, 4-1S 1M, 4-1S xM, 10x 1M, 10x xM), IUO, EXPC, A#1, A#2, FLEX, EDIT, and PSHH.

### Comment Record

### AxSYM:

A Comment Record follows a Result Record if information is entered into the comment section of the Results Review screen.

The following table details the format of the Comment Record sent by the ARCHITECT System or AxSYM System to the Host.

Table 9.6: Comment Record: ARCHITECT / AxSYM System to Host

ASTM Field	Field Name	Maximum Characters	Field Contents	Field Description
11.1.1	Record Type (Same for both)	1	C	Comment
11.1.2	Sequence Number	ARCHITECT: 5	1 to 65535	Must be consistent with sequence number rules
		AxSYM: 1	1 to n	n represents any number
11.1.3	Comment Source (Same for both)	1	I	Instrument
11.1.4	Comment Text	ARCHITECT: at least 260	Printable String	Result Comment or Exception String
		AxSYM: 100		

Table 9.6: Comment Record: ARCHITECT / AxSYM System to Host

ASTM Field	Field Name	Maximum Characters	Field Contents	Field Description
11.1.5	Comment Type (Same for both)	1	G or I	Result Comment  Exception String

```
C|1|I|Example Result Comment|G[CR]
```

Figure 9.11: Example of Comment Record: ARCHITECT / AxSYM System to Host

### Request Information Record

The following table details the format of the Request Information Record sent by the ARCHITECT System or AxSYM System to the Host.

#### ARCHITECT

The following table details the exact format of the Request Information Record which shall be sent by the ARCHITECT System to the Host.

Table 9.7: Request Information Record: ARCHITECT / AxSYM System to Host

ASTM Field	Field Name	Maximum Characters	Field Contents	Field Description
12.1.1	Record Type ID (Same for both)	1	Q	
12.1.2	Sequence Number (Same for both)	1	1	Always contains 1
12.1.3	ARCHITECT: ID Number	20	^Specimen ID	Sample ID read from the bar code label on the sample tube
	AxSYM: Starting Range ID Number	15		
12.1.5	Universal Test ID	ARCHITECT: 3  AxSYM: [blank]	^^ALL	System always requests that ALL outstanding orders be sent
12.1.13	Status Code (Same for both)	1	O	System only requests Orders

```
Q|1|^SID12345||^^ALL||||||O[CR]
```

Figure 9.12: Example of Request Information Record: ARCHITECT / AxSYM System to Host

## Message Terminator Record

The following table details the format of the Message Terminator Record sent by the ARCHITECT System or AxSYM System to the Host.

Table 9.8: Message Terminator Record: ARCHITECT / AxSYM System to Host

ASTM Field	Field Name	Maximum Characters	Field Contents	Field Description
13.1.1	Record Type (Same for both)	1	L	Last
13.1.2	Sequence Number (Same for both)	1	1	

L|1[CR]

Figure 9.13: Example of Terminator Record: ARCHITECT / AxSYM System to Host

## System-Specific Incoming Messages

The following information provides a comparison between Section 5 of the ARCHITECT System and AxSYM System Abbott Standard Interface RS-232 Manuals.

### Overview

The following section outlines the ARCHITECT / AxSYM System records and field contents needed to establish communication from a host computer to the ARCHITECT / AxSYM System.

For information on communicating from the ARCHITECT / AxSYM System to a host computer, refer to **Section 4: System-Specific Outgoing Messages** in the respective Abbott Standard Interface RS-232 Manuals.

### Communication: Host to the System (ARCHITECT vs. AxSYM)

Transmission of Patient Demographics, Patient ID, Sample ID, Test Orders, and Query Responses utilize the high level ASTM records and fields described in this section. Unlisted fields are ignored by the ARCHITECT / AxSYM System.

Transmission of patient orders to the ARCHITECT / AxSYM System from the host takes place according to the following logical record hierarchy.

#### ARCHITECT:

Message Header Record

Patient Information Record  
Test Order Record  
Patient Information Record  
Test Order Record  
Test Order Record  
Comment Record (optional)  
Patient Information Record  
Comment Record (optional)  
Test Order Record  
Test Order Record  
Message Terminator Record

**AxSYM:**

Message Header Record  
Patient Information Record  
Test Order Record  
Message Terminator Record

*Both*

Transmission of a negative Query Response (those responses that indicate that the Query Request SID is unknown, or has no outstanding orders) utilize the following logical record hierarchy.

Message Header Record  
Request Information Record  
Message Terminator Record

**NOTE:** In the case of a negative Query Response, the Request Information Record is a copy of the original record sent from ARCHITECT / AxSYM System, with the Status Code field set to X.

**ARCHITECT:**

An error is logged and the remainder of the message—up to the message terminator record—is ignored if the ARCHITECT System receives a record that:

- Is missing a required field as defined in this section
- Is not defined for ARCHITECT System incoming messages
- Has an invalid sequence number

- Has one or more fields or components that do not conform to requirements as defined further in this section

Records that were received prior to this record are accepted and processed further.

## Format Detail

The ARCHITECT / AxSYM System recognizes fields when parsing for the following records:

- Message Header Record
- Patient Information Record
- Request Information Record
- Test Order Record
- Comment Record [ARCHITECT System ONLY]
- Message Terminator Record

### **ARCHITECT:**

The following records are not used by the ARCHITECT System:

- Scientific Record
- Manufacturer Information Record

### **AxSYM:**

All other fields are ignored regardless of content.

The following records are ignored by the AxSYM System:

- Comment Record
- Scientific Record
- Manufacturer Information Record

## Message Header Record

Table 9.9: Message Header: Host to ARCHITECT / AxSYM System

ASTM Field	Field Name	Maximum Characters	Field Contents	Field Description
7.1.1	Record Type (Same for both)	1	H or h	Header
7.1.2	Delimiter Definition	ARCHITECT: 4  AxSYM: [blank]		Bytes 2 and 6 of the record must be the same.

Table 9.9: Message Header: Host to ARCHITECT / AxSYM System (*continued*)

ASTM Field	Field Name	Maximum Characters	Field Contents	Field Description
7.1.12	Processing ID	1	P or p	ARCHITECT: Production: Treat message as an active message to be completed according to standard processing
				AxSYM: Processing ID
7.1.13	Version Number (Same for both)	1	1	Must be 1

```
H|\^&|||||||P|1[CR]
```

Figure 9.14: Example of Message Header Record: Host to ARCHITECT / AxSYM System

Processing ID must be P and Version Number must be 1 or the message "Message Header Record to Terminator Record" is ignored.

ASTM Fields 7.1.1, 7.1.2, 7.1.12, and 7.1.13 of the Message Header Record are all required by the ARCHITECT / AxSYM System.

### Patient Information Record

The following table details the format of the Patient Information Record sent by the Host to the ARCHITECT System or AxSYM System.

Table 9.10: Patient Information Record: Host to ARCHITECT / AxSYM System

ASTM Field	Field Name	Maximum Characters	Field Contents	Field Description
8.1.1	Record Type (Same for both)	1	P or p	Patient
8.1.2	Sequence Number (Same for both)	5	1 to 65535	Must be consistent with sequence number rules
8.1.3	Practice-Assigned Patient ID	ARCHITECT: 20	Printable String	<ul style="list-style-type: none"> <li>Returned unchanged during transmission to the host</li> <li>Optional for Patient test orders</li> <li>Empty for Control test orders</li> </ul>
		AxSYM: 15	Any character	Returned unchanged during transmission to the host.

# ARCHITECT System and AxSYM Comparison

## Document Comparison

## Section 9

Table 9.10: Patient Information Record: Host to ARCHITECT / AxSYM System (*continued*)

ASTM Field	Field Name	Maximum Characters	Field Contents	Field Description
8.1.4	Laboratory-Assigned Patient ID	ARCHITECT: 20	Printable String	<ul style="list-style-type: none"> <li>Returned unchanged during transmission to the host</li> <li>Optional for Patient test orders</li> <li>Empty for Control test orders</li> </ul>
		AxSYM: 15	Any character	Returned unchanged during transmission to the host.
8.1.5	Patient ID No. 3	ARCHITECT: 20	Printable String	<ul style="list-style-type: none"> <li>Optional for Patient test orders</li> <li>Empty for Control test orders</li> </ul>
		AxSYM: 15	Any character	See note below.
8.1.6	Patient Name	ARCHITECT: 20	ARCHITECT: Last (printable string)	<p>ARCHITECT:</p> <ul style="list-style-type: none"> <li>Last, first, and middle patient name for Patient test orders</li> <li>Empty for Control test orders</li> </ul> <p>AxSYM:</p> <ul style="list-style-type: none"> <li>Last, first, and middle initial of the patient name.</li> </ul>
		AxSYM: 15	AxSYM: Last (any character)	
		20	ARCHITECT: ^First (printable string)	
			AxSYM: First (any character)	
		ARCHITECT: 12	ARCHITECT: ^Middle (printable string)	
8.1.8	Birth Date	8	YYYYMMDD ≥18000101 ≤current system date	<ul style="list-style-type: none"> <li>Patient birth date</li> <li>Optional for Patient test orders</li> <li>Empty for Control test orders.</li> </ul>
ARCHITECT: 8.1.9	Patient Sex	1	M, F, U	<ul style="list-style-type: none"> <li>Patient sex (Male, Female, Unknown)</li> <li>Optional for Patient test orders</li> <li>Empty for Control test orders.</li> </ul>

Table 9.10: Patient Information Record: Host to ARCHITECT / AxSYM System (*continued*)

ASTM Field	Field Name	Maximum Characters	Field Contents	Field Description
ARCHITECT: 8.1.14	Doctor	20	Printable String	Patient Doctor's name <ul style="list-style-type: none"> <li>• Field contains the data displayed in the optional Doctor attribute on the UI for Patient Test Orders if "Transmit to host: Doctor, location, and draw date/time" configuration option is On.</li> <li>• Field is empty for patient test orders if "Transmit to host: Doctor, location, and draw date/time" configuration option is Off.</li> <li>• Field is empty for Control test orders.</li> </ul>
ARCHITECT: 8.1.26	Location	20	Printable String	The general clinic location or nursing unit, or ward or bed or both, of the patient. <ul style="list-style-type: none"> <li>• Field contains the data displayed in the optional Location attribute on the UI for Patient Test Orders if "Transmit to host: Doctor, location, and draw date/time" configuration option is On.</li> <li>• Field is empty for patient test orders if "Transmit to host: Doctor, location and draw date/time" configuration option is Off.</li> <li>• Field is empty for Control test orders.</li> </ul>

**Examples:*****Patient Test Order***

```
P|1|Practice PID|Lab PID||Doe^John^Q||19320122|F|||||Dr. Amesbury|||||ParkClinic[CR]
```

Figure 9.15: Example of Patient Information Record: (Patient Test Ordering): Host to ARCHITECT System

```
P|1|Practice PID|Lab PID||Doe^John^Q[CR]
```

Figure 9.16: Example of Patient Information Record: (Patient Test Ordering): Host to AxSYM System

***Control Test Order***

Figure 9.17: Example of Patient Information Record (Control Test Ordering): Host to ARCHITECT System

**NOTE:** The field contents of Practice Assigned Patient ID (8.1.3) shall be copied into the Patient ID No. 3 field upon transmission back to the host (8.1.5) if the field contents of both the Laboratory Assigned Patient ID (8.1.4) and the Patient ID No. 3 (8.1.5) are blank. The field contents of Laboratory Assigned Patient ID (8.1.4) shall be copied into Patient ID No. 3 field upon transmission back to the host (8.1.5), if the field contents of the Patient ID No. 3 (8.1.5) are blank.

**Test Order Record****ARCHITECT:**

The ARCHITECT System Control Center accepts unsolicited Patient and Control test orders from the LIS regardless of whether the host query option is enabled or not.

Replicates for an assay may be ordered using one of the two methods:

- Use of Repeat Delimiter in Universal Test ID (Field 5) of Test Order Record.
- Multiple Order Records containing Action Code A for Patient test orders.

**AxSYM:**

A host-defined panel is not recognized by the AxSYM System. Panels must be converted into individual tests and then regrouped into predefined panels by the host computer.

Replicates for an assay may be ordered using one of two methods:

1. Use of Repeat Delimiter in Universal Test ID (Field 12).
2. Multiple Order Records containing Action Code "A."

**NOTE:** The only field in which the AxSYM System supports the repeat delimiter, within Incoming Messages, is the Universal Test ID of the Test Order Record.

## Section 9

The following table details the format of the Test Order Record sent by the Host to the ARCHITECT System or AxSYM System.

**Table 9.11: Test Order Record: Host to ARCHITECT / AxSYM System**

<b>ASTM Field</b>	<b>Field Name</b>	<b>Maximum Characters</b>	<b>Field Contents</b>	<b>Field Description</b>
9.4.1	Record Type (Same for both)	1	O or o	Order
9.4.2	Sequence Number (Same for both)	5	1 to 65535	Must be consistent with sequence number rules
9.4.3	ARCHITECT: Specimen ID	20	Printable String	Sample ID downloaded from Host
	Carrier ID	4	^alphanumeric	Carrier ID and position are ignored on input
	Position	2	^numeric	
	AxSYM: Specimen ID ^location_ID ^position	15	Specimen	Sample ID downloaded from Host. Location and position are ignored on input.
9.4.4	ARCHITECT: Instrument specimen ID	N/A	N/A	Field ignored on input
	Carrier ID			
	Position			
	AxSYM: Instrument specimen ID ^location_ID ^position			
9.4.5	ARCHITECT: Universal Test ID (The only required component of this field is the assay number)	4	^^^(numeric)	Specific number that identifies the test
		10	^(printable string)	Test name
		10	^(printable string)	Dilution protocol name
		1	^(P, p, C, or c)	Assay status: • P or p if the assay is installed as the primary version • C or c if the assay is installed as the correlation version
		N/A	^^^Assay Number ^Name ^Dilution	Specific number that identifies the test Test Name Dilution Protocol (The only required component of this field is the assay number.)
9.4.6	Priority (Same for both)	1	S	STAT (otherwise blank for Routine)

# ARCHITECT System and AxSYM Comparison

## Document Comparison

## Section 9

Table 9.11: Test Order Record: Host to ARCHITECT / AxSYM System (*continued*)

ASTM Field	Field Name	Maximum Characters	Field Contents	Field Description
ARCHITECT: 9.4.8	Collection Date and Time	14	YYYYMMDDHHMMSS ≥ 19700101000000 and ≤ current system date	Date and time of sample collection <ul style="list-style-type: none"> <li>• Field contains the data displayed in the optional Draw date/time attribute on the UI for Patient Test Orders if “Transmit to host: Doctor, location and draw date/time” configuration option is ON.</li> <li>• Field is empty for Patient Test Orders if “Transmit to host: Doctor, location, and draw date/time” configuration option is OFF.</li> <li>• Field is Empty for Control Test Orders</li> </ul>
9.4.12	Action Code	1	N or A or Q or ARCHITECT ONLY: C	ARCHITECT: New order for a patient sample AxSYM: New Patient or New Order for an existing Sample  ARCHITECT: Unconditional Add order for a patient sample. AxSYM: Add order for Patient  ARCHITECT: Control Sample AxSYM: Quality Control  Cancel or Delete the existing order
9.4.13	Danger Code	15	Printable String	Part of the Test Order Comment Field (optional)
		AxSYM: [blank]	Alphanumeric	Part of the Sample Comment Field
9.4.14	Clinical Information	15	Printable String	Part of the Test Order Comment Field (optional)
		AxSYM: [blank]	Alphanumeric	Part of the Sample Comment Field
9.4.16	ARCHITECT: Specimen Type	5	Printable String	Part of the Test Order Comment Field (optional)
	Specimen Source	15	^Printable String	
	AxSYM: Specimen Descriptor Specimen Type Specimen Source	[blank]	^Alphanumeric ^Alphanumeric ^Alphanumeric	Part of the Sample Comment Field

**Table 9.11: Test Order Record: Host to ARCHITECT / AxSYM System (*continued*)**

<b>ASTM Field</b>	<b>Field Name</b>	<b>Maximum Characters</b>	<b>Field Contents</b>	<b>Field Description</b>
9.4.26	Report Types (Same for both)	1	O or o or Q or q	Order  Order in response to a Query Request.

```
o|1|MCC1||^^^16\^^^606|||20010223081223||||A|Hep|lipemic|serum|||||||Q[CR]
```

**Figure 9.18: Example of Test Order Record: Host to ARCHITECT System**

```
o|1|OMEGA_1||^^^16\^^^606||||||Q|||||||o[CR]
```

**Figure 9.19: Example of Test Order Record: Host to AxSYM System**

#### **AxSYM only:**

ASTM Fields 9.4.1, 9.4.2, 9.4.3, 9.4.5, 9.4.12, and 9.4.26 of the Test Order Record are required by the AxSYM System.

Text in fields 9.4.13, 9.4.14 and two components of field 9.4.16 (Refer to Table 5.3), limited to a maximum of 50 characters in length, is placed sequentially in the Comment field of an AxSYM System order.

If a dilution is specified for supported assays, the dilution is run. If a dilution is not specified, default dilution is ordered for that assay.

If the field content of 9.4.12 (Action Code) is N, the test order is considered a new patient. However, if the sample and test already exists in the host input spool, an error message is generated on the instrument and the test order record is ignored.

If the field content of 9.5.12 (Action Code) is A, the test order is processed as a patient request. If the sample exists, the test requests is added to the sample. If the sample does not exist, a patient request is created.

If the field content of 9.5.12 (Action Code) is Q the sample is created and verified as a control for the requested analytes. If verified, the QC tests is created.

#### **ARCHITECT:**

If a dilution is specified for supported assays, the dilution is run. If a dilution is not specified, default dilution is ordered for that assay.

If the field content of 9.4.12 (Action Code) is N for Patient test orders, the test order is considered a new test. However, if the same test order for this sample ID already exists (Pending, Scheduled, or Running), the system considers this an invalid request and error message is generated.

If the field content of 9.4.12 (Action Code) is A, the test order shall be processed as a mandatory added test order. It shall be added to the test order list regardless of whether or not the same test order exists (Pending, Scheduled, or Running) in the instrument's database.

If the field content of 9.4.12 (Action Code) is C, the test order shall be processed as a request to cancel the specified test order. The instrument shall cancel the first pending test order found, from its pending test order list which has the same SID, Assay Number, Dilution Name, and Assay Status. If no such order is found, the system ignores this request.

If the field content of 9.5.12 (Action Code) is Q, the sample is established and verified as a control for the requested analytes. If verified, the QC tests are created.

## ARCHITECT ONLY:

### Comment Record

The following table details the exact format of the Comment Record which shall be sent by the host to the ARCHITECT System.

**Table 9.12: Comment Record: Host to ARCHITECT System**

ASTM Field	Field Name	Maximum Characters	Field Contents	Field Description
11.1.1	Record Type	1	C or c	Comment
11.1.2	Sequence Number	5	1 to 65535	Must be consistent with sequence number rules
11.1.3	Comment Source	1	L	Computer system
11.1.4	Comment Text	50	Printable characters	Comment text
11.1.5	Comment Type	1	G	Generic comment

```
Q|1|^SID1234||^^^ALL|||||||X[CR]
```

```
C|1|L|Example Comment|G[CR]
```

**Figure 9.20: Example of Comment Record: Host to ARCHITECT System**

When the Comment Record follows a patient record, the comment in 11.1.4 refers to that patient sample and is duplicated in the comment field for each test order for that patient sample.

When the Comment Record follows a test order, it refers only to that test order.

The following comment text—limited to a maximum of 50 characters in length—is placed in the comment field of an ARCHITECT System test order in the following sequence:

1. Text in field 11.1.4 (refer to table 5.9 – Comment Record) of one or more comment records associated with the patient record.  
then
2. Text in fields 9.4.13, 9.4.14 and two components of 9.4.16 (refer to table 5.3 – Test Order Record).  
then
3. Text in field 11.1.4 of one or more comment records associated with the test order.

### **Negative Query Response Record, ARCHITECT**

#### **Request Information Record, AxSYM**

##### **ARCHITECT:**

The system shall accept a Negative Query Response from the Host system. The Negative Query Response is used to indicate that an earlier Query Request from the system resulted in no orders being sent, either due to:

- The sample ID specified in the original Query Request was unknown to the Host system  
**or**
- The sample ID specified had no outstanding orders at the time the Query Request was received.

The following table details the exact format of the Negative Query Response Record which shall be sent by the Host to the system

**Table 9.13: Request Information Record: Host to AxSYM System Negative Query Response Record: Host to ARCHITECT System**

<b>ASTM Field</b>	<b>Field Name</b>	<b>Maximum Characters</b>	<b>Field Contents</b>	<b>Field Description</b>
12.1.1	Record Type ID (Same for both)	1	Q or q	

Table 9.13: Request Information Record: Host to AxSYM System Negative Query Response Record: Host to ARCHITECT System (*continued*)

ASTM Field	Field Name	Maximum Characters	Field Contents	Field Description
12.1.2	Sequence Number (Same for both)	1	1	Always contains 1
12.1.3	ARCHITECT: ID Number	20	^Specimen ID (printable string)	Sample ID that was originally sent by the system
12.1.3	AxSYM: Starting Range ID Number	15	^Specimen ID	
12.1.5	Universal Test ID	ARCHITECT: 3  AxSYM: [blank]	^^ALL	Field contents originally sent by the system
12.1.13	Status Code (Same for both)	1	X	Indicates that either the Sample ID is unknown to the Host, or there are no outstanding orders for the specified Sample ID

ARCHITECT

```
Q|1|^SID1234||^^^ALL|||||||X[CR]
```

Figure 9.21: Example of Negative Query Response Record: Host to ARCHITECT System

AxSYM

```
Q|1|^SID12345||^^^ALL|||||||X[CR]
```

Figure 9.22: Example of Request Information Record: Host to AxSYM System

The system shall discontinue waiting for either Test Orders or a Negative Query Response in response to an earlier issued Query Request, as defined in the user-configurable option “Host timeout”.

After a predefined number of allowed consecutive host time-out errors, the software shall:

- Log an error
- Disable the query mode

**AxSYM:**

The only form of the Request Information Record that is supported by AxSYM as an incoming transmission, is that of the Negative Query Response. The Negative Query Response is used to indicate that an earlier Query Request from the AxSYM System results in no orders being sent. This can be due to (1) the Sample ID specified in the original Query Request was unknown to the Host system, or (2) the Sample ID specified has no outstanding orders at the time the Query Request was received.

The Negative Query Response is essentially a copy of the original Query Request with the Status Code set to X.

**Message Terminator Record**

The following table details the exact format of the Message Terminator Record which shall be sent by the Host to the system.

**Table 9.14: Message Terminator Record: Host to ARCHITECT System**

ASTM Field	Field Name	Maximum Characters	Field Contents	Field Description
13.1.1	Record Type	1	L	Last
13.1.2	Sequence Number	1	1	Must be 1

L|1[CR]

**Figure 9.23: Example of Message Terminator Record: Host to ARCHITECT System**



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## NOTES

**Allowed Data Formats**

All data is represented in ASCII format within the range 0 - 255. Values 0 - 127 are defined by ANSI X3.4-196 Standard. Values 128 - 255 are defined as needed by specific instruments. Values 0 - 31 cannot be used, with the exception of 13 (<CR>). The value 13 is reserved as a record terminator. Values 32 - 255 can be used, with the exception of 127 and 255. Within a data text field, only the ASCII characters 32 - 126 and 128 - 254 are permitted as usable characters. Characters used as delimiters in the transmission are excluded from the above permitted range. The sender is responsible for checking that a data text field does not contain any delimiters. The record identified fields (H, P, O, R, L, C, M, and Q) are always uppercase when output from the Abbott instrument. On input, both upper- and lowercase record identifiers are accepted. Fields and records are variable in length with no restriction placed on the maximum length of a field or record. The high-level protocol depends on the receiver's buffering capability and the low-level communication ability to divide the information into workable lengths for transmission and processing purposes. All Abbott Standard Interface RS-232 manuals provide the maximum allowable length of each field transmitted and received.

**ASI**

Abbott Standard Interface: Abbott's implementation of the American Society for Testing and Materials (ASTM) Standard.  
E 1394-91, A Standard Specification for Transferring Information Between Clinical Instruments and Computer Systems.  
E1381-91, Specification for Low-Level Protocol to Transfer Messages Between Clinical Laboratory Instruments and Computer Systems.

**Assay**

Analysis to determine the presence, absence, or quantity of one or more analytes.

**Assay calibration**

The generation of a calibration curve for use in determining the concentration of an analyte present in samples.

**Assay parameters**

Settings that define specific characteristics or verify the performance of an assay.

**Assay protocols**

Assay processing steps that provide the system with information which allows pipetting, incubation, washing and reading to occur at specific volumes and times throughout the reaction sequence. Protocol types include: One-step, Two-step, and Pre-Treatment.

**Assay settings**

Individual settings within each assay configuration category which you can edit to meet your site-specific requirements.

**ASTM**

American Society for Testing and Materials. Consists of specifications that define the transferring of information between laboratory instruments and computer systems.

**Bulk solutions**

The solutions found in the supply and waste center which are used on the system (Pre-Trigger Solution, Trigger Solution, Wash Buffer).

**Calibration curve**

Created when an operator performs an assay calibration. Used for determining the concentration of analyte in a sample.

**Calibrator**

Material with a known concentration of specific analyte used to create a calibration curve.

**Check boxes**

A user interface input area where you can make one or more selections for an item. A black check mark in the box indicates that it has been selected.

<b>Chemiluminescence</b>	Emission of light produced by a chemical reaction.
<b>CMIA</b>	Chemiluminescent Microparticle Immunoassay; the detection technology the ARCHITECT System uses to perform automated immunoassays.
<b>Configuration</b>	The process by which you can edit System, Assay, and QC-Cal settings that provide the system with information to meet your site-specific requirements.
<b>Consumables</b>	Items that are exhausted in the process of running assays (reagents, calibrators, controls, bulk solutions, septums, replacement caps, sample cups, reaction vessels)
<b>Control</b>	Material with a known concentration of a specific analyte. Controls are run with patient samples and are used to monitor assay and system performance over time.
<b>Dialog windows</b>	Overlay screens that display on top of, or in front of, full-frame screens. They provide additional information, details, or functions. They display after an item or function key has been selected on the primary full-frame screen.
<b>Drop-down menu</b>	List of items that display when an icon is selected that represents each of the screens available for the specific icon.
<b>E1381-91 Frame</b>	A frame is a subdivision of a message and allows transmission of up to 247 characters (240 data characters and 7 control characters). The Abbott instrument transmits one record per frame. Messages more than 247 characters long can be divided into multiple frames, as long as each frame contains only information from one record at a time.
<b>E1381-91 Message</b>	A block of data that is transmitted in a format consistent with the ASTM E 1381-91 Standard. Abbott ASI instruments use an E 1394-91 Record as the E1381-91 Message. Thus, an E1381-91 Message may be transmitted using multiple (one or more) frames, based on the length of the message.
<b>E 1394-91 Message</b>	A block of data that is transmitted in a format consistent with the ASTM E 1394-91 Standard. Data is transmitted in a series of records starting with a Header Record (H) and ending with a Terminator Record (L). When a transmission is lost, the Abbott instrument retransmits or accepts only complete messages.
<b>E 1394-91 Record</b>	An E1394 Record is a string of characters starting with a capital ASCII alphabet character and ending with a carriage return (ASCII 13), as defined by the ASTM E 1394-91 Standard.
<b>Exceptions</b>	Test orders that fail to complete.
<b>Field</b>	A subdivision of a record containing one specific piece of information, such as an address.
<b>Full-frame screen</b>	Screen displayed when a drop-down menu option is selected.
<b>Function key zone</b>	Located at the bottom of the software screens containing function keys associated with a particular screen.
<b>Host</b>	An auxiliary computer system that can communicate back and forth with the ARCHITECT System.
<b>Icon</b>	Symbol providing a graphic and name that represent a category of screens or additional functionality.

## Glossary

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<b>Icon zone</b>	Located at the top of the software screens providing navigational and status indication support. Each icon in the icon zone has a drop-down menu that is displayed when you select the icon.
<b>Immunoassay</b>	Analytical procedure based on reactions between antigens and antibodies.
<b>Information zone</b>	The main area of the software screens containing information pertaining to a particular screen, including screen name.
<b>Multi-module</b>	ARCHITECT System configuration containing more than one (1) i2000 processing module.
<b>Popup windows</b>	Overlay screens that display at the center of a full-frame screen and in front of the currently displayed window. All interaction with the user interface is suspended until you acknowledge the popup by selecting one of the buttons in the window.
<b>Process path</b>	A covered temperature controlled circular track that moves RVs; provides liquid aspiration, and wash points as necessary for the assay.
<b>Processing center</b>	Area in which assay processing activities take place. Contains the process path.
<b>Processing module</b>	Light sealed area where sample processing takes place. Functions that occur here include mixing and delivering of reagents, solutions, and samples, incubations, all optical reads and disposal of used RVs.
<b>Processing module graphic</b>	Located in the center of the Snapshot screen, and contains key information specific to the processing module, as well as navigational hot spots for accessing related screens.
<b>Processing module status</b>	Information regarding the operational mode of the processing module. Status types include: Offline, Stopped, Warming, Ready, Scheduled Pause, Running, Initializing, and Scanning.
<b>Query Request</b>	A message sent to the LIS requesting test orders for a specific sample ID.
<b>Query Response</b>	A message sent to the ARCHITECT System containing orders for the sample ID specified in the prior Query Request. A Query Response may also indicate that no orders are required at the time the Query Request was made.
<b>Radio buttons</b>	A user interface input area where you can only make one selection from multiple options. A black-filled circle indicates that it has been selected.
<b>Reaction Vessel (RV)</b>	A disposable that carries a specified volume of sample, reagent, and solution through the processing center path.
<b>Reagent carousels</b>	Carousels located in the refrigerated compartment of the processing center where reagent bottles are loaded.
<b>Record</b>	Related information which forms a subdivision of a complete ASTM message.
<b>Repeat field</b>	A single data element which expresses a duplication of the field definition it represents. It is used for demographics, requests, orders and the like, where each element of a repeat field is to be treated as having equal priority to associated repeat fields.
<b>Reserved Characters</b>	The following characters have special uses and should not be used for data: Vertical Bar ( ) Backslash (\) Ampersand (&) Carriage Return (<CR>) Caret (^)

<b>Sample double load / Unload queues</b>	Configured on multi-module systems to provide two load queue lanes with a capacity of up to 125 samples each (25 sample carriers) for a total capacity of 250 samples (50 sample carriers).
<b>Sample handler</b>	Module that transports samples from the load queue to the Processing Center queue and then to the unload queue.
<b>Sample handler keypad</b>	Used to provide extended system control center functionality at the sample handling center.
<b>Sample handler status</b>	Information regarding the operational mode of the sample handler. Status types include: Offline, Stopped, Ready, Running, and Load queue paused.
<b>Sample load queue</b>	Track on the left side of the processing module where sample carriers are loaded.
<b>Sample load queue bar code reader</b>	Used to scan carrier ID bar codes, carrier position bar codes, and primary tube bar codes to identify the sample.
<b>Sample processing queue</b>	Track in front of the processing module where sample carriers are transported from the load queue to the sample aspiration position and then down the track to the unload queue.
<b>Sample syringe (SS)</b>	Aspirates and dispenses sample by moving the piston in the syringe body.
<b>Sample unload queue</b>	Track on the right side of the processing module where sample carriers are unloaded
<b>Serial port</b>	A connection point between the ARCHITECT System and an external device.
<b>Snapshot screen</b>	The Main Menu screen of the ARCHITECT System. Monitors key system and processing module information. Also provides quick access to related screens through the use of icons and drop-down menus.
<b>System control center</b>	Computer workstation that provides a centralized interface by which the operator can control one or more processing modules.
<b>System software</b>	Software that controls operation of the ARCHITECT System.
<b>System status</b>	Information regarding the operational modes of the system. The processing module and the sample handler each have separate statuses.
<b>Unicode</b>	Character encoding scheme that supports internationalization of textual information. The encoding scheme uses 16 data bits to represent each character which provides for definition of 65536 unique characters.
<b>User interface</b>	Graphical screens that an operator uses to control and navigate through the ARCHITECT System software. Navigate by using a mouse, touch-screen monitor, and/or keyboard.

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## Revision history

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# Revision history

The revision history table provides a high level summary of content that has changed in this document since the last revision (LN 06F71-04).

Section	Description
<b>Section 4</b> ARCHITECT System-specific Outgoing Messages	Table 4.4: Result Record: ARCHITECT System to Host ASTM Field 10.1.4 Data Value
<b>Section 9</b> ARCHITECT System and AxSYM Comparison	Table 9.5: Result Record: ARCHTECT / AxSYM System to Host ASTM Field 10.1.4 Data Value

**NOTES**