CHEM.ARCH.7.0   ACCELERATOR APS LINE OPERATING PROCEDURE

PRINCIPLE

The ACCELERATOR APS workcell is a modular system designed to automate sample handling and processing in the clinical laboratory. The system allows consolidation of multiple clinical chemistry and immunoassay analytical instruments into a unified workstation.

PURPOSE

The ACCELERATOR APS (Automated Processing Systems) workcell is a modular system designed to automate pre-analytical processing, sample handling, and processing in the clinical laboratory.

DOCUMENT OWNER

Supervisor, Chemistry and Special Chemistry

INTRODUCTION

The system consolidates multiple analytical instruments into a unified workstation by employing a common sample processing capability. The workcell software provides for workload management, sample order management, and instrument operational status monitoring. This is accomplished through communication connections between the workcell, analyzers, and LIS (laboratory information systems) or middleware.

The 7 major components of the APS workcell include the Input/Output module, the Track module, one or two Centrifuge modules, the Decapper module, the Resealer module, the Storage and Retrieval Module, and the Analyzer Interface Module.

A.   Input/Output Module:
        The Input/Output module provides a single point of sample tube input and output, barcode tube identification and tracking, and operator interface.

        The Input/Output module holds up to 15 48-position routine racks in numbered lanes, which can be designated for specific purposes, such as input lane, output lane, sorting lane and Priority output lane. In addition, there are two lanes for 12-position Priority input racks and three lanes for 12-position Priority output racks. Lanes can also be designated for specific tubes, such as capped or uncapped, pre-spun or unspun, etc.

        The Input/Output module is equipped with a two-color LED indicator for each rack lane. The following bullets describe the different LED indicator conditions.
            • **Red** indicator: rack is locked into a lane and needs to be processed.
            • **Green** indicator: rack is locked and processing is completed.

• **Off** indicator: rack is unlocked or no rack is loaded.

The Touch Screen monitor and mouse allows users to interface with the workcell. Users can select onscreen options by selecting function and navigation buttons, menu items, and text areas. In addition, the Input/Output module stores the computer and UPS for the workcell.

Figure 1.2: Input/Output module
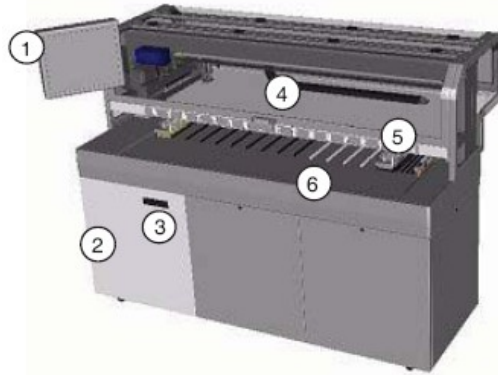
1. Touch Screen monitor	2. Input/Output module front-left door
3. Door Handle	4. Input/Output module robot
5. LED bar	6. Worktable

B.   Resealer Module:

The Resealer module allows automatic sealing of plastic sample tubes after analytical processing. At the Resealer module, tube grippers hold the sample tube while it is sealed with aluminum foil from the Resealer coil. Individual foil seals are cut for each sample tube and heat-sealed to the plastic sample tube.

Figure 1.11: Resealer module
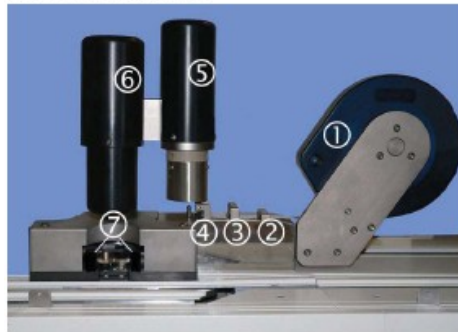
1. Resealer coil	2. Locker
3. Puller and Gripper	4. Cutter
5. Heater	6. Crimper
7. Tube Gripper	

C.   Storage and Retrieval Module:

The Storage and Retrieval module stores sample tubes from the workcell in a temperature-controlled and protected environment. The Storage and Retrieval module consists of the storage worktable and automatic refrigerator. The automatic refrigerator consists of 20 floors, with each

floor holding 16 48-position routine racks, for a total of 15,360 sample tubes. After a pre-defined, configurable time interval, the sample tubes are discarded into the storage waste.

Figure 1.12: Storage and Retrieval module

| 1. Automatic refrigerator	2. Storage worktable
3. Storage waste	
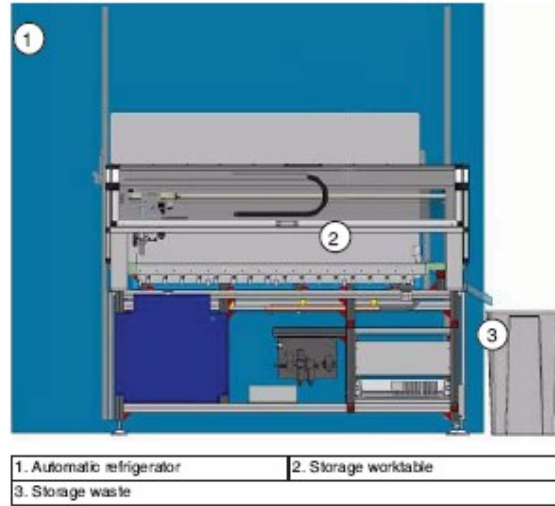
D.   Analyzer Interface Module:
The analyzer Interface module provides the path required to move sample tubes to the analyzer. If a sample tube has test requests for an analyzer, the tube carrier is moved to the analyzer for sample aspiration and processing. After sample aspiration, the sample tube is returned to the main lane of the workcell. The following are different types of analyzer interface modules designed for the following instrument types:

1.   ARCHITECT c Systems

Figure 1.13: ARCHITECT c System Interface module
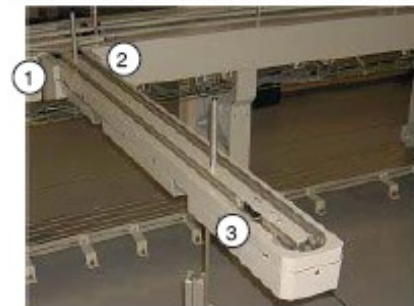
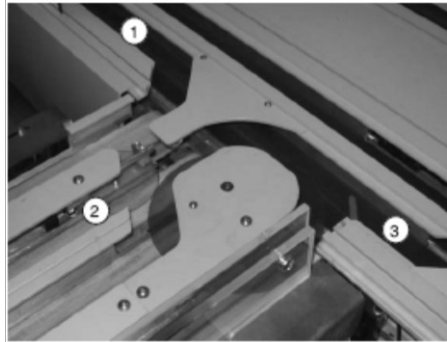| 1. Instrument gate	2. Return gate
3. Sample gate	

2.   ARCHITECT i 2000

Figure 1.12 ARCHITECT i 2000 Interface module

1. Instrument gate	2. Sample/Return gate

3. ARCHITECT i 2000SR (see Section -- for further Information)

Figure 1.14: ARCHITECT i 2000sr Interface module gates

1. Entry queue	2. Exit gate
3. Exit queue	

4. Non-Abbott instruments section (see specific instrument section for further information)

Figure 1.15: Non-Abbott Interface module

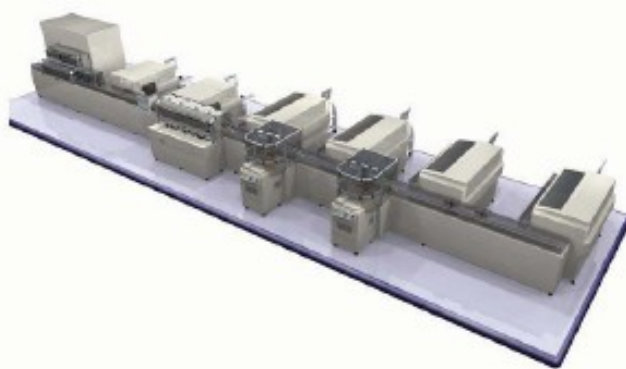| 1. Instrument gate	2. Sample/Return gate

E. Track Module:
The Track module provides the path required to move sample tubes from the Input/Output module to the Centrifuge, Decapper, Resealer and Storage and Retrieval modules, and the analytical instruments.
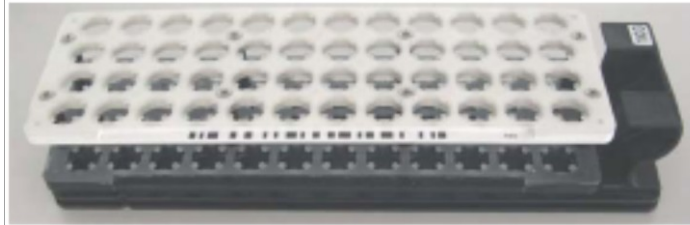
Figure 1.16: Track module

The Track Module consists of the following 5 parts for samples to be processed:

1. Routine Racks:
   Routine racks are four-column, 48-position racks used for routine samples and for Priority output samples, e.g., samples with automation errors or those requested by the operator. The routine racks have a handle and rack ID.

Figure 1.17: Routine rack

2. Priority Racks:
   Priority racks are one-column, 12-position racks used for STAT samples in the two Priority input lanes and for Priority output samples in the three Priority output lanes. The priority racks have a handle.

Figure 1.18: Priority rack

3. Storage Racks:
   Storage racks are four-column, 48-position racks used to store sealed sample tubes in the Storage and Retrieval module. This rack does not have a handle.

Figure 1.19: Storage rack
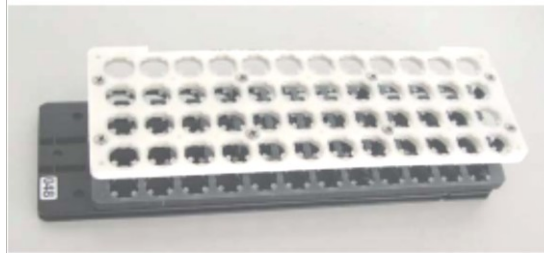
4.   Tube Carriers:
Tube carriers are used to transport tubes on the Track module. The tube carriers have a unique Radio-Frequency ID (RF ID) tag used to identify and locate sample tube positions along the Track module.

Figure 1.20: Tube carrier

5.   Reselaer Coil:
Resealer coil is the aluminum foil used by the Resealer module to seal plastic sample tubes.

Figure 1.21: Resealer coil

SCOPE
The scope of this procedure encompasses laboratory personnel who are directly involved in the receipt and processing of blood specimens. This procedure should be used as a knowledge resource.

SAFETY

A.   Bloodborne Pathogen Risk: HIGH

The exposure to a Bloodborne Pathogen is relatively high considering the state of some specimens which may be tainted with blood due to the conditions of collection prior to laboratory receiving.

B.   Chemical Risk: LOW

There is no known Chemical Risk associated with the Accelerator APS Line workcell other than pathogenic risk of the specimens it processes

C.   PPE required: LAB COATS, GLOVES, GOGGLES, FACE SHIELDS, AND COUNTER-MOUNTED SHIELDS.

Follow all PPE precautions when working in a laboratory setting as stated in the OSHA regulation found in the Safety Laboratory Manual.

- Refer to Task Assessment Log, Chemical Inventory Log and Chemical Registry for further information.

SPECIMEN REQUIREMENTS

A.   Sample Tube Specifications:

Sample tubes must meet the following specifications.

See Table 4.1.1 and Figures 4.1 thru 4.3 for detail.

Table 4.1.1: Sample tube specifications

	Nominal Diameter (mm) Min - Max	Nominal Height (mm) Min - Max
Uncapped Tube	13 to 16	75 to 100
Capped Tube	13 to 17.8	75 to 108.3
Sealed sample Tube	13 to 16	75 to 100

Figure 4.1: 16mm Tube Specification

16mm Tall Tube Specification

Tube Height = 100mm

Max Capped Width = 17.81 mm

Min Capped Height = 6 mm

Min Capped Width = 17.24 mm

Max Uncapped Tube Height = 102 mm

Max Total Tube Height = 110 mm

Min Uncapped Tube Height = 82 mm

Min Total Tube Height = 88 mm

Min Interior Diameter of Tube = 12.95 mm

16mm Short Tube Specification

Tube Height = 75mm

Max Capped Width = 17.81 mm

Min Capped Height = 6 mm

Min Capped Width = 17.24 mm

Max Uncapped Tube Height = 80 mm

Max Total Capped Tube Height = 86 mm

Min Uncapped Tube Height = 70mm

Min Total Capped Tube Height = 77 mm

Min Interior Diameter of Tube = 12.95 mm

Figure 4.2: 13mm Tube Specification

13mm Tall Tube Specification

Tube Height = 100 mm

Max Capped Width = 16.30 mm

Min Capped Height = 6 mm

Min Capped Width = 14.60 mm

Max Uncapped Tube Height = 102 mm

Max Total Tube Height = 110 mm

Min Uncapped Tube Height = 82 mm

Min Total Tube Height = 90 mm

Min Interior Diameter of Tube = 10.25 mm

13mm Short Tube Specification

Tube Height = 75 mm

Max Capped Width = 16.30 mm

Min Capped Height = 6 mm

Min Capped Width = 14.60 mm

Max Uncapped Tube Height = 80 mm

Max Total Capped Tube Height = 86 mm

Min Uncapped Tube Height = 70 mm

Min Total Capped Tube Height = 77 mm

Min Interior Diameter of Tube = 10.25 mm

Figure 4.3: Tube Specification with different cap shape

Max Capped Height = 24.4 mm

Min Capped Height = 6 mm

Max Capped Width = 17.81 mm

Min Capped Width = 17.24 mm

Max Uncapped Tube Height = 102 mm

Max Total Capped Tube Height = 120 mm

Min Uncapped Tube Height = 82 mm

Min Total Capped Tube Height = 88 mm

Min Interior Diameter of Tube = 12.96 mm

13mm Tall Tube Specification: different cap shape

Max Capped Height = 24.4 mm

Min Capped Height = 6 mm

Max Capped Width = 16.30 mm

Min Capped Width = 14.60 mm

Max Uncapped Tube Height = 102 mm

Max Total Capped Tube Height = 120 mm

Min Uncapped Tube Height = 82 mm

Min Total Capped Tube Height = 88 mm

Min Interior Diameter of Tube = 10.25 mm

B.   Acceptable Sample Tubes:

The ACCELERATOR APS workcell will only process **PLASTIC** sample tubes with a removable closure on the open end.

VERY IMPORTANT: Never use glass tubes if the Resealer module is installed and in the on line status. Glass tubes cannot be sealed properly. If there are glass tubes that require processing, verify the Resealer module is off-line.

IMPORTANT: Follow the reagent manufacturer's assay-specific documentation (e.g., a package insert or reagent application sheet) for detailed, assay-specific information about specimen collection, preparation, and storage.

Failure to follow tube and assay manufacturer's recommendations for sample tube type and handling could result in erroneous and misleading results.

1.   Use only sample tubes with screwed and pressure plastic closures.
2.   The tube surface must be smooth and free of any ridges or collars that could interfere with removal of the tube cap or closure.
3.   Use only plastic sample tubes when the Resealer module is installed and in the on-line status. The type of plastic tubes that can be sealed using the Resealer module are limited to:

a.   PET (Polyethylene terephthalate)
b.   PS (Polystyrene)
c.   PP (Polypropylene)

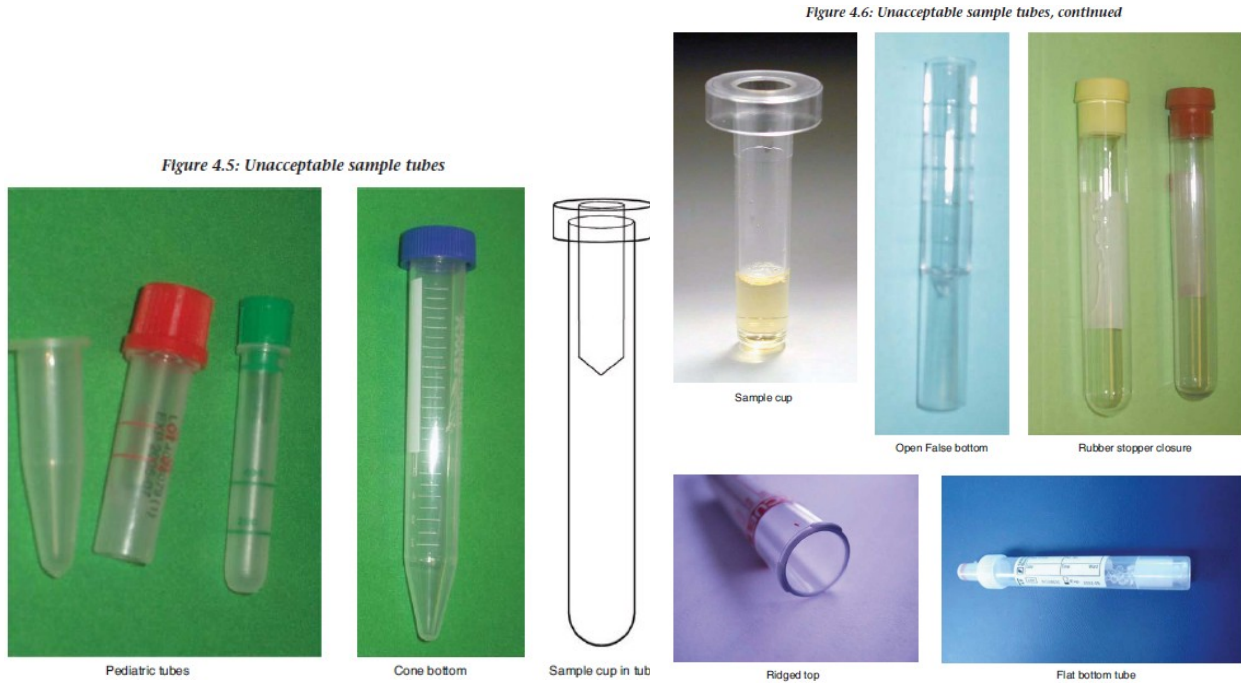Examples of acceptable tubes for processing on the ACCELERATOR APS are shown below. See figures 4.4.

NOTE: Refer to previous section for acceptable specimen tubes for the ARCHITECT i 2000SR.

Figure 4.4: Acceptable sample tubes

Pressure closure   Screw cap

C.   Unacceptable Sample Tubes:

The following are examples of unacceptable sample tube types.

Figure 4.6: Unacceptable sample tubes, continued

Sample cup

Open False bottom   Rubber stopper closure

Figure 4.5: Unacceptable sample tubes

Pediatric tubes   Cone bottom   Sample cup in tub   Ridged top   Flat bottom tube

1.   Description of Unacceptable Sample Tubes:

    a.   Pediatric tubes: These include Red and Green tops along with STATfuge conical tubes used in separation of lipemic specimens.

    b.   Cone bottoms tubes: These include those used as aliquots for urine drug screen specimens.

    c.   Sample Cup: These were used to accommodate short specimens for sampling on the Architect prior to the APS Line.

    d.   Open False Bottom: No longer used in the laboratory.

    e.   Rubber Stopper Closure: UA tubes and 10mL red tops are unacceptable

    f.   Ridged Tops: Do not carry in the lab.

    g.   Flat Bottom Tube: Similar to send out tubes

D.   Barcode Label Requirements:

Depending on the type of barcode label, requirements include information about guidelines, format, sample ID length, label length, and placement.

1.   Sample Barcode Symbology:

The barcode readers support the following barcode symbologies:

    a.   Code 128

    b.   Code 39 with and without check digit

    c.   Interleaved 2 of 5 with and without check digit

    d.   USS Codabar

> **NOTE:** When the check digit is enabled, it is enabled for all symbologies that allow for check digit configuration (Code 39 and Interleave 2 of 5).

2. Sample ID Identification Length:
   The following factors affect the number of characters that can fit on a sample barcode label.
   a. Sample barcode label length
   b. Sample barcode label placement
   c. Symbology used
   d. Density
   e. Ratio
   f. Quiet zone
   For the ARCHITECT System, the maximum number of characters allowed on the sample barcode label is 20 characters. This value may be less for some symbologies, due to overall label length, narrow bar width, and ratio.

3. Sample Barcode Length:
   Generally, a 50 mm label fits a 75 mm sample tube, and a 75 mm label fits a 100 mm sample tube.

   To ensure the entire label is visible to the barcode reader when the tube is loaded into the tube carrier, do not place the barcode label lower than approximately 20 mm from the bottom of the sample tube. Place barcode labels on tubes vertically as straight as possible.

   The presence of an external plastic cap on a sample tube will decrease the available space for applying the barcode label. The size of an external plastic cap may range from 15 to 20 mm.

   The following are maximum sample barcode label lengths acceptable for 75 mm and 100 mm sample tubes, with and without external caps.

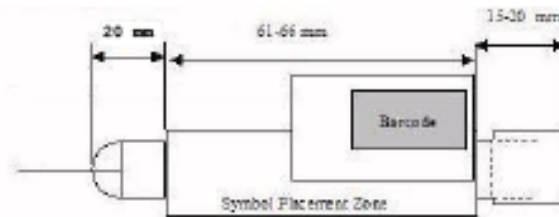Figure 4.8: 100 mm tube with external plastic cap

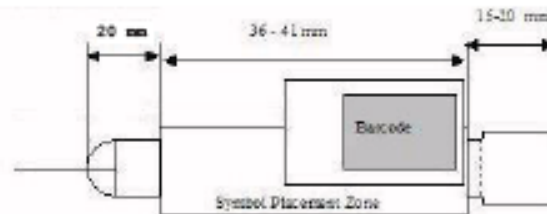Figure 4.9: 75 mm tube with external plastic cap

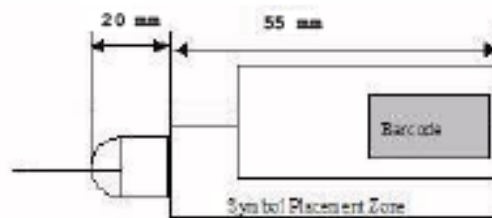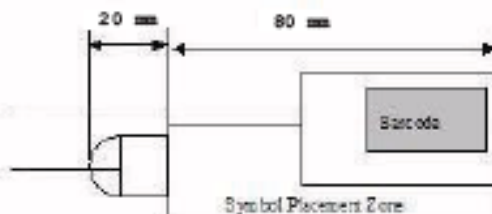Figure 4.11: 75 mm tube without external plastic cap

Figure 4.10: 100 mm tube without external plastic cap

4. Sample Barcode Label Placement:
The barcode label should be affixed to the sample tube in a "ladder" orientation, where the printed bars are horizontal. The correctly labeled tube in Figure 4.12 illustrates an example of correct label placement.

Position the barcode label on the sample tube so that:
a. Label is oriented along the length of the tube. Do not wrap the label horizontally around the tube.
b. Label does not overlap the top or bottom of the tube.
c. Label is vertically as straight as possible.
d. Label does not touch the tube closure.
e. Label should be free of excess moisture.
f. Label should be placed at the top of the sample tube to ensure the barcode label does not extend beyond the top of the tube carrier.
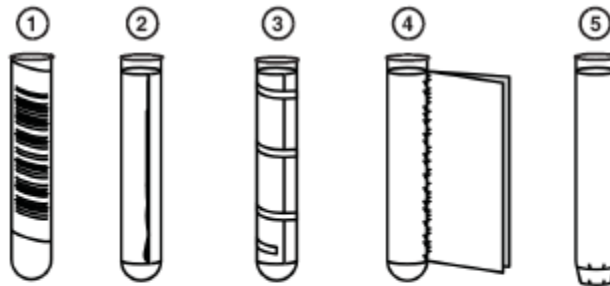
NOTE: The operator is responsible for placing the correct barcode label on the sample tube to ensure proper sample identification.

IMPORTANT: When a new barcode label is added to a sample tube, ensure the original barcode label is covered entirely by the new barcode label.

Figure 4.12: Correctly labeled sample tube

Figure 4.13: Incorrectly labeled sample tubes

1. Angled placement	2. Edges peeled loose
3. Clear tape over label	4. Flap extends from label
5. Label extends beyond bottom of tube	

5. Sample ID Allowable Characters:
   The allowable character set for sample barcode IDs consists of all printable ASCII characters, except the characters listed below.
   a. The following printable ASCII characters cannot be used in a sample ID.
      1) **&** (ASCII 26 hex - decimal 038)
      2) **** (ASCII 5C hex - decimal 092)
      3) **^** (ASCII 5E hex - decimal 094)
      4) **|** (ASCII 7C hex - decimal 124)
      5) **~** (ASCII 7E hex - decimal 126)
   b. The following printable ASCII characters cannot be used as the first digit of a sample ID.
      1) (ASCII 2A hex - decimal 042)
      2) **?** (ASCII 3F hex - decimal 063)
   c. Examples of valid sample IDs include:
      1) 001040
      2) 001040A

      3)   001040-B

      4)   001040/C1

      5)   001040?D

      6)   001040*

      7)   ABCDEFG/10H

d.   Examples of invalid sample IDs include:

      1)   001040\A

      2)   001040^B

      3)   ?001040

      4)   *001040

NOTE: Sample tubes with an invalid sample ID are automatically sorted to a priority output rack without processing.

NOTE: Use of allowable non-alphanumeric character may cause the SID to be improperly displayed in some screens. This is a display issue only, the samples will be processed as expected.

e.   The effected ACSII codes are:

      1)   ASCII 20 hex - decimal 32 to ASCII 2E hex - decimal 46

      2)   Characters **<space>** to **/**

      3)   ASCII 3A hex - decimal 58 to ASCII 40 hex - decimal 64

      4)   Characters : to **&**

      5)   ASCII 5B hex - decimal 91 to ASCII 60 hex - decimal 96

      6)   Characters **[** to `` ` ``

      7)   ASCII 7B hex - decimal 123 to ASCII 7E hex - decimal 126

      8)   Characters **{** to **~**

NOTE: The APS will not process samples with duplicate sample IDs until the original sample has been removed from the system. For workcells with a Storage and Retrieval Module, do not re-use sample IDs until the Storage-Rack Disposal Timeout has expired. Refer to Storage and Retrieval Module – Configuration.

SUPPLIES AND EQUIPMENT

The following List Numbers are unique identifiers that are used when ordering products. These numbers are provided for guidance only and are subject to change. Contact your local Abbott representative for the most current List Numbers.

A.   ACCELERATOR APS Accessory and Consumable List Numbers:

      Accessories and consumables are used during routine processing and component replacement. Contact your Abbott representative to order the following supplies.

Item	Quantity	List Number
ACCELERATOR APS I/O Module Routine Rack	1	07L10
ACCELERATOR APS Priority/Exception Rack	1	07L11
ACCELERATOR APS Resealing Aluminum Coil	1	07L12
ACCELERATOR APS Tube Carriers	10	07L15
ACCELERATOR APS Computer Air Filter	1	07L22
ACCELERATOR APS Hex Tool Set	1	07L24
ACCELERATOR APS Tube Storage Rack	1	07L37
ACCELERATOR APS Balance Rack Silicone Insert	1	07L43
ACCELERATOR APS i 2000SR Tube Carriers	4	07L47

B.   Manual List Numbers
        Support documentation is available in printed format. Contact your Abbott representative to order the following manual.

Item	Quantity	List Number
ACCELERATOR APS Operations Manual	1	07L19

MAINTENANCE

Proper service and maintenance of the ACCELERATOR APS workcell is one of the most important aspects of a complete quality assurance program. A thorough service and maintenance program will:

- Minimize down time
- Maintain records for inspection and accreditation
- Maintain optimal workcell operation to provide optimal performance
- Refer to **Section 9** of the **APS Operational Manual** for more information.

Performance of a maintenance procedure should be documented in the **Maintenance Log** under the appropriate maintenance section. Refer to ACCELERATOR APS Maintenance Log,

A.   MAINTENANCE SCHEDULE

FREQUENCY	PROCEDURE
BASED ON WORKLOAD	▪ Workload based shutdown
WEEKLY	▪ Clean touch screen
	▪ Clean input/output module
	▪ Empty desealer waste
	▪ Shut down
	▪ Empty storage

MONTHLY
- Clean resealer module
- Clean computer air filter – storage retrieval module
- Clean input/output module robot gripper
- Clean desealer module
- Clean storage and retrieval module robot gripper
- Clean computer air filter – input/output module
- Clean UPS – input/output
- Clean UPS – storage retrieval module

AS NEEDED
- Check storage and retrieval module temperature
- Clean racks
- Replace resealer coil
- Record storage retrieval module rack errors

B. GENERAL ROUTINE CARE AND CLEANING
Some maintenance procedures are performed routinely.

WARNING: Potential Biohazard. Only trained operators should perform the following maintenance procedures. Follow your laboratory standard operating procedures and guidelines for biohazardous materials handling.

IMPORTANT: Do not allow bleach or soapy water to spill through the workcell cover, or set any bleach solution or soapy water containers on the workcell surface. This could lead to contamination of samples, possibly causing erroneous patient results.

C. BLEACH PREPARATION SOLUTION FOR ROUTINE CLEANING
Decontamination procedures may require use of diluted sodium hypochlorite. Use the following formula to calculate the volume of water required to mix with manufacturer-supplied sodium hypochlorite.

$$X = (B - A)/A$$

Where:

A=   % of sodium hypochlorite solution desired

B=   % of sodium hypochlorite (active or available chlorine) in manufacturer-supplied solution

C=   Number of parts of water required to mix with one part of manufacturer-supplied sodium hypochlorite (active or available chlorine) solution

NOTE: Stability of the Bleach solution is 30 days after preparation.

D.   LOGGING IN/OUT FOR ROUTINE MAINTENANCE
       Log in with the appropriate user access level as necessary to perform the following maintenance
       procedures.
       1.   To log in:
              a.   Press the **System** navigation button.
              b.   Press the **Configuration** option button.
              c.   Press the **Login** function button. Enter the User ID using the pop-up screen then
                     press the **Confirm** button.
       2.   To log out after completing a procedure:
              a.   Press the **System** navigation button.
              b.   Press the **Configuration** option button.
              c.   Press the **Login** function button. Enter **000** on the pop-up screen then press the
                     Confirm button.

              The Supervisor login password is needed for many of the maintenance procedures.
              Refer to the Login section for additional information on user logins.

E.   MAINTENANCE BASED ON WORKLOAD
       Perform the following maintenance procedure whenever interface communication slows down.
       1.   Workload Based Shutdown/Powercycle
       2.   Weekly Maintenance
              Perform the following procedures weekly:
              a.   Clean the Touch Screen
              b.   Clean the Input/Output Module
              c.   Clean and Lubricate the Centrifuge(s) and Inspect Centrifuge(s) Buckets for
                     Cracks
                            NOTE: For other Centrifuge maintenance procedures, refer to the
                            manufacturer's literature.
       3.   MONTHLY MAINTENANCE
              Perform the following maintenance procedures monthly:
              a.   Clean the Centrifuge Module(s) Robot Gripper.
              b.   Clean the Decapper Module
              c.   Clean the Input/Output Module Robot Gripper
              d.   Clean the Resealer Module
              e.   Clean the Storage and Retrieval Module Robot Gripper
              f.   Clean the Computer Air Filter(s)
              g.   Clean the UPS
       4.   AS NEEDED MAINTENANCE
              Perform the following maintenance procedures As Needed:
              a.   Check the Storage and Retrieval Module Temperature
              b.   Clean the Racks
              c.   Replace the Resealer Coil
              d.   Replace the Silicone Insert of the Balance Rack

PROCEDURE

The ACCELERATOR APS is flexible and accommodates many laboratory environments and work flows. Before attempting to operate the workcell, it is important to be familiar with the hardware components of your workcell and the fundamental principles of the software user interface. Refer to the PRINCIPLE section on page 1 for additional information.

A.   Workcell Shutdown and Startup:
         The operator may need to shut down or start up the workcell and its components to:
                    −   Perform routine maintenance
                    −   Perform troubleshooting diagnostic procedures
                    −   Perform unexpected or emergency shutdown

   1.   Power Shutdowns
            There are three procedures to remove power from the ACCELERATOR APS workcell:
            a.   Emergency Power Shutdown
            b.   Slow or non-responsive software
            c.   Controlled Power Shutdown
                         NOTE: Incompleted request for sample tubes to be retreived from the Storage module at the time of system shutdown, will be delivered to the I/O module after powering on the workcell and selecting **Run**.
            d.   Shutdown Prodecures

Shutdown	Description
Emergency	Removes power from all areas of the workcell. Shutdown is accomplished by pressing the UPS OFF button(s) and removing the power cords from their receptacles. No data backup is performed before power loss, and the files could become corrupted.
Software	If a shutdown cannot be requested via the software, the computer(s) must be shut down. This may occur when software is slow to respond or non-responsive.

Shutdown	Description
Controlled	Shutdown is requested via the software. Before the instrument shuts down, a data backup is performed. The UPS OFF button(s) is(are) pressed after the workcell shuts down. Controlled shutdown is used when power must be removed for routine maintenance. **NOTE**: To completely remove the power, unplug the workcell and storage and retrieval module power cord and the centrifuge(s) power cord from their receptacles. The workcell and storage retrieval module share the same power cord.

2.   Important Power Safety Information
The power shutdown procedures must be performed in the prescribed order for the following reasons:

a.   Turning OFF the computer power switch activates a signal that prevents the UPS from providing power to workcell components when the workcell power cord is disconnected from the receptacle.

b.   If the computer power switch is ON, the UPS power button must be pressed to turn the UPS OFF, even if the workcell power cord was removed from the receptacle.

> **WARNING: Electrical shock hazard.** If the UPS OFF button is not pressed, full power is provided to the instrument for approximately 10 minutes, even if the workcell power cord is unplugged. To completely remove power from the workcell, the UPS must be turned OFF and the main power cords unplugged.

3.   Emergency Shutdown
Performing an Emergency Shutdown

IMPORTANT: Sample integrity could be compromised if samples are left on the system or the Storage and Retrieval module when power is shut down. Refer to your laboratory guidelines or the reagent manufacturer's assay-specific documentation (e.g., a package insert or reagent application sheet) for detailed specimen collection, preparation, and storage information.

NOTE: This procedure does not power down the analyzers. Refer to the specific analyzer operations manual for additional information.

NOTE: Use this procedure if the ACCELERATOR APS workcell must be shut down in an emergency situation when a controlled shutdown is not possible.

a. Unplug the main power cord from its power receptacle.

   WARNING: Electrical shock hazard. To remove power completely, the workcell must be unplugged from its power receptacle even if the UPS is switched off and no power is being supplied to the workcell.

b. Power down the Input/Output module.

Figure 5.1: Input/Output module computer/UPS storage center

1. Input/Output module front-left door	2. Computer
3. UPS	

   1) Open the Input/Output module door, with the handle.
   2) Press the UPS OFF button (#2, below) for approximately **three seconds**. The self-test "✓" indicator turns off when shutdown is complete.

   WARNING: Electrical shock hazard. If the UPS OFF button is not pressed, full power is provided to the instrument for approximately 10 minutes, even if the instrument power cord is unplugged. To completely remove power from the workcell, the UPS must be turned OFF and the main power cords unplugged.

Figure 5.2: Input/Output module UPS
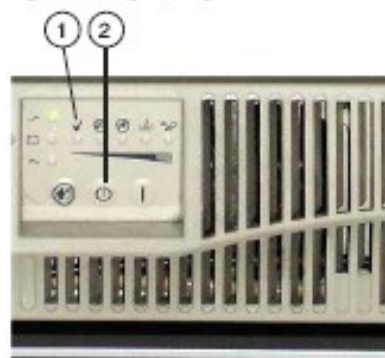
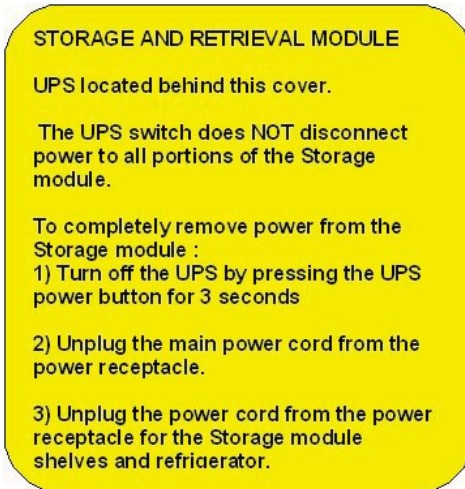| 1. Self-test "✓" indicator	2. UPS OFF button

c. Power down the Storage and Retrieval module (if available).
   1) To access the Storage and Retrieval module UPS/CPU, pull the panel forward and remove it.

> **WARNING: Pinch Hazard.** Use caution when removing or replacing the cover panel. Fingers can be pinched.

The panel is identified by following label.

> STORAGE AND RETRIEVAL MODULE
>
> UPS located behind this cover.
>
> The UPS switch does NOT disconnect power to all portions of the Storage module.
>
> To completely remove power from the Storage module :
> 1) Turn off the UPS by pressing the UPS power button for 3 seconds
>
> 2) Unplug the main power cord from the power receptacle.
>
> 3) Unplug the power cord from the power receptacle for the Storage module shelves and refrigerator.

2) Press the Storage and Retrieval module UPS OFF button for approximately three seconds. The self-test "✓" indicator LED turns off when shutdown is complete.

> **NOTE:** The workcell and Storage and Retrieval module share the same power cord.

3) Unplug the power cord of the Storage and Retrieval module shelves and refrigerator from its receptacle or any laboratory-supplied UPS/generator.

> **NOTE:** When the Storage and Retrieval module UPS OFF button is selected, power is disconnected to the sample robot, rack robot, shutter, and computer. Power for the Storage and Retrieval module storage shelves and refrigerator must be disconnected by unplugging the shelves and refrigerator power cord.

d. Power down each ARCHITECT i 2000SR Interface module (i 2000SR IM), if available.

1) Our power switch is type 2, turn to the "APS/OFF" position.

Figure 5.6: i 2000sr IM power switch type 2

4. Restoring Power after an Emergency Shutdown

IMPORTANT: Sample integrity could be compromised if samples are left on the workcell or storage table when power is shut down. Refer to your laboratory guidelines or the reagent manufacturer's assay-specific documentation (e.g., a package insert or reagent application sheet) for detailed specimen collection, preparation, and storage information.

NOTE: This procedure does not restore power to the analyzers. Refer to the specific analyzer operations manual for additional information.

a. Power on each ARCHITECT® i 2000SR IM i 2000SR, if available.
f the power switch is type 2, make sure i 2000SR IM power switch is in the "APS/OFF" position. The ARCHITECT i 2000SR IM will be automatically turned on when the APS UPS is switched on.

b. Power on the Input/Output module.

1) Plug the workcell power cable cord into its receptacle.
> **NOTE:** The workcell and Storage and Retrieval module share the same power cord.

2) Open the Input/Output module door, with the handle.

Figure 5.7: Input/Output module computer/UPS storage center

1. Input/Output module front-left door	2. Computer
3. UPS	

3) Press the UPS ON button. When the self-test " " indicator LED turns green, proceed to the next step.

Figure 5.8: Input/Output module UPS
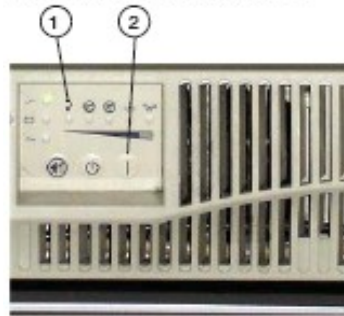
1. Self-test "✓" indicator	2. UPS ON button

4) If the green Power indicator is on, go to next step. Otherwise, push the computer power switch up and hold approximately three seconds, then release.

Figure 5.9: Input/Output module computer

1. Power switch

5) Close the Input/Output module front-left door.

c. Power on the Storage and Retrieval module (if available).

1) Empty the Storage and Retrieval module waste container.

2) Remove the Storage and Retrieval module UPS/CPU access panel (if necessary) to access the UPS.

> **WARNING: Pinch Hazard.** Use caution when removing or replacing the cover panel. Fingers can be pinched.

3) Press the UPS ON button. When the self-test "✓ " indicator LED turns green, proceed to the next step.

4) If the green Power indicator is on, go to next step. Otherwise, push the computer power switch up and hold approximately three seconds, then release.

5) Replace the Storage and Retrieval module UPS/CPU access panel.

> **WARNING: Pinch Hazard.** Use caution when removing or replacing the cover panel. Fingers can be pinched.

6) Plug the power cord of the Storage and Retrieval module shelves and refrigerator into its receptacle.

d. After the ACCELERATOR APS software is launched, the workcell powers up and the Snapshot screen displays. The workcell is in Pause mode. Press the Run navigation button to unpause the workcell.

> **NOTE:** After restoring power, all modules initialize when the **Run** navigation button is pressed. Wait for initialization to complete before processing sample tubes.

e.   When the message "Make sure that the Workcell is free of tubes" displays, check for the presence of sample tubes.

   1)   Any sample tubes present on the workcell are read at the Input/Output module barcode reader and processed if included in the Expected or Incomplete worklist.

   > **WARNING: Potential Biohazard.** Biohazardous material could be present on workcell surfaces. Take appropriate precautions when performing this procedure. Follow laboratory standard operating procedures and guidelines when performing this procedure.

f.   Confirm the prompt by pressing the "✓" button.

g.   Remove all filled racks from the Input/Output module.

   > **IMPORTANT:** Review the middleware/LIS host to determine which samples have pending tests. Ensure sample tubes requiring reruns or additional testing are unloaded from the Storage and Retrieval module. If a sample tube has not been retrieved, a manual delivery of the sample tube may be required.

5.   Performing a Software Shutdown
   Use this procedure if the ACCELERATOR APS workcell must be shut down when a controlled shutdown is not possible due to the software not being responsive to the Shutdown command.

   > **IMPORTANT:** Sample integrity could be compromised if samples are left on the system or the Storage and Retrieval module when power is shut down. Refer to your laboratory guidelines or the reagent manufacturer's assay-specific documentation (e.g., a package insert or reagent application sheet) for detailed specimen collection, preparation, and storage information.

   > **NOTE:** This procedure does not power down the analyzers. Refer to the specific analyzer operations manual for additional information.

a.   Open the Input/Output module (IOM) door with the handle.

b.   Push the IOM computer's main power switch (#1) up until the green power light goes out, and then release the switch.

Figure 5.12: Input/Output module computer power switch

c.   Press the IOM UPS OFF button (#2, below) for approximately three seconds. The self-test "✓" indicator (#1) turns off when UPS power is completely off.

Figure 5.13: Input/Output module UPS
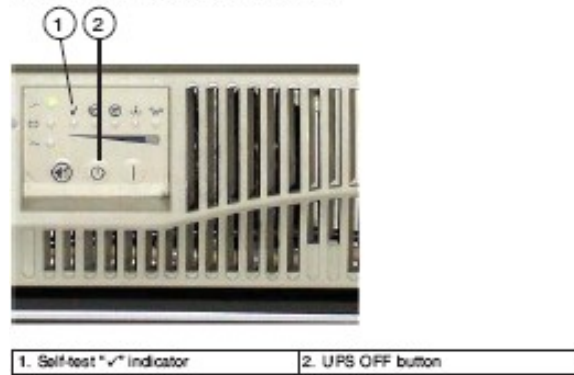
1. Self-test "✓" indicator	2. UPS OFF button

WARNING: Electrical shock hazard. If the UPS OFF button is not pressed, full power is provided to the instrument for approximately 10 minutes, even if the instrument power cord is unplugged. To completely remove power from the workcell, the UPS must be turned OFF and the main power cords unplugged.

d.   To access the Storage and Retrieval module (SRM) UPS/CPU, pull the panel forward and remove it. The panel is identified by following label.

STORAGE AND RETRIEVAL MODULE

UPS located behind this cover.

The UPS switch does NOT disconnect power to all portions of the Storage module.

To completely remove power from the Storage module :
1) Turn off the UPS by pressing the UPS power button for 3 seconds

2) Unplug the main power cord from the power receptacle.

3) Unplug the power cord from the power receptacle for the Storage module shelves and refrigerator.

> **WARNING: Pinch Hazard.** Use caution when removing or replacing the cover panel. Fingers can be pinched.

e. Push the SRM computer's main power switch (#1) up until the green power light goes out, and then release the switch.

f. Press the SRM UPS OFF button for approximately three seconds. The self-test "✓" indicator turns off when UPS power is completely off.

> **NOTE:** When the Storage and Retrieval module UPS OFF button is selected, power is disconnected to the sample robot, rack robot, shutter, and computer.

6. Restoring Power after a Software Shutdown

> **IMPORTANT:** Sample integrity could be compromised if samples are left on the workcell or storage table when power is shut down. Refer to your laboratory guidelines or the reagent manufacturer's assay-specific documentation (e.g., a package insert or reagent application sheet) for detailed specimen collection, preparation, and storage information.

> **NOTE:** This procedure does not restore power to the analyzers. Refer to the specific analyzer operations manual for additional information.
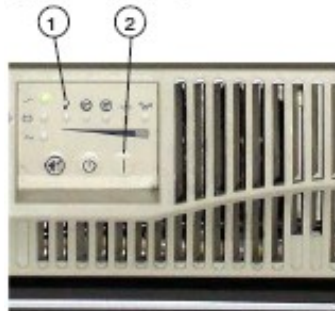
a. Open the Input/Output module (IOM) with the handle.

b. Press the IOM UPS ON button (see #2 below). When the self-test "✓" indicator LED turns green (#1), proceed to the next step.

Figure 5.16: Input/Output module computer/UPS storage center

1. Input/Output module door	2. Computer
3. UPS	

Figure 5.17: Input/Output module UPS

1. Self-test "✓" indicator	2. UPS ON button

c.   If the green Power indicator is on, go to next step. Otherwise, push the computer power switch up and hold approximately three seconds, then release.

d.   Close the Input/Output module door.

e.   Power on the Storage and Retrieval module (SRM).

Figure 5.18: Input/Output module computer

1. Power switch

1)   Empty the Storage and Retrieval module waste container.

2)   Press the SRM UPS ON button (#2). When the self-test " " indicator LED turns green (#1), proceed to the next step.

3)   Push the SRM computer power switch (#1) up and hold approximately **three seconds**, then release. The green power light will illuminate.

f.   Replace the Storage and Retrieval module panel.

> **WARNING: Pinch Hazard.** Use caution when removing or replacing the cover panel. Fingers can be pinched.

g.   After the ACCELERATOR APS software is launched, the workcell powers up and the Snapshot screen displays. The workcell is in Pause mode. Press the Run navigation button to unpause the workcell.

> **NOTE:** After restoring power, all modules initialize when the **Run** navigation button is pressed. The IOM will also read the RFID of all tube carriers on the workcell. Wait for the steps to complete before processing sample tubes.

h.   When the message "Make sure that the Workcell is free of tubes" displays, check for the presence of sample tubes.

1) Any sample tubes present on the workcell are read at the Input/Output module barcode reader and processed if included in the Expected or Incomplete worklist.

> **WARNING: Potential Biohazard.** Biohazardous material could be present on workcell surfaces. Take appropriate precautions when performing this procedure. Follow laboratory standard operating procedures and guidelines when performing this procedure.

2) If sample tubes are present in the Centrifuge module, perform the following steps.

   a) Turn the locking knob of the Centrifuge counterclockwise to unlock.

   b) Use the hex tool (3 mm) to remove the two screws holding the safety shield to the Centrifuge. Set aside the screws.

   c) Lift the Centrifuge safety shield and open the Centrifuge lid.

   > **CAUTION:** Use caution when opening the lid to ensure it is fully open. For Centrifuge modules with the locking mechanism installed, ensure the safety shield is opened completely to engage the locking mechanism.

   > **NOTE:** If the sliding door of the Centrifuge is open, it is not possible to turn the locking knob. In this case, remove sample tubes through the sliding door.

   d) Open the Centrifuge lid to access the rotor buckets and remove all sample tubes loaded in rotor buckets.

   e) Close the Centrifuge lid.

   f) Remove all sample tubes from bucket inserts in the Centrifuge loading and unloading areas.

   g) Close the Centrifuge safety shield and tighten the screws. When closing the Centrifuge module safety shield with a locking mechanism, pull out the lock and lower the safety shield.

   > **WARNING: Pinch Hazard.** Use caution when pulling the lock for the locking mechanism. Fingers can be pinched.

   h) Turn the locking knob of the Centrifuge clockwise to lock.

   i) If two Centrifuge modules are installed, repeat the above steps for the second Centrifuge module.

i. Confirm the prompt by pressing the "✓" button.

j. Remove all filled racks from the Input/Output module.

> **IMPORTANT:** Review the middleware/LIS host to determine which samples have pending tests. Ensure sample tubes requiring reruns or additional testing is unloaded from the Storage and Retrieval module. If

a sample tube has not been retrieved, a manual delivery of the sample tube may be required.

7. Performing a Controlled Power Shutdown

> **NOTE:** This procedure does not shut down the analyzers. Refer to the specific analyzer operations manual for additional information.
>
> **WARNING: Potential Biohazard.** Sample tubes are potentially biohazardous. Follow your laboratory standard operating procedures and guidelines when handling and disposing of tubes.
>
> **IMPORTANT:** Sample integrity could be compromised if samples are left on the system or the Storage and Retrieval module when power is shut down. Refer to your laboratory guidelines or the reagent manufacturer's assay-specific documentation (e.g., a package insert or reagent application sheet) for detailed specimen collection, preparation, and storage information.

a. Remove all samples from the workcell before performing this procedure. If necessary, perform the Purging Samples procedure.
   1) Press the **System** navigation button.
   2) Press the **Configuration** option button.
   3) Press the **Purge** function button at the bottom of the screen.
   4) Press "✓" to confirm the **Purge** procedure.
   5) Allow the purge to complete. Verify all samples were purged by checking the on-line samples on the Worklist screen.
b. Remove all racks from the Input/Output module.
c. Press the Pause navigation button to pause the workcell. Ensure the Run/Pause indicator symbol displays.
d. Ensure all Centrifuges are on-line.
   1) Press the **System** navigation button.
   2) Press the **Configuration** option button.
   3) Press the **System** function button at the bottom of the screen.
   4) Highlight the Centrifuge module(s).
   5) If off-line, press the **Selection** button to change to on-line.
e. Shut down the workcell.
   1) Press the **System** navigation button.
   2) Press the **Configuration** option button.
   3) Press the **Shutdown** function button at the bottom of the screen.
   4) Confirm the message "Are you sure you want to shut down?" on the pop-up screen by pressing the "✓" button.
f. Power off the Input/Output module.
   1) Open the Input/Output module door, with the handle.

Figure 5.23: Input/Output module

Front-left door

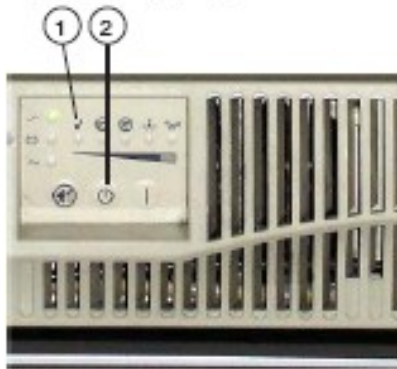Figure 5.24: Input/Output module computer/UPS storage center

1. Input/Output module front-left door	2. Computer
3. UPS	

2)   If necessary, push the computer power switch up, then release. The green power indicator will turn off. Some computers will automatically power off, depending on the software.

WARNING: Electrical shock hazard. The remaining steps must be performed to remove power from all areas of the workcell.

3)   Press the UPS OFF button for approximately three seconds. The self-test "✓" indicator turns off when shutdown is complete.

Figure 5.26: Input/Output module UPS

1. Self-test "✓" indicator	2. UPS OFF button

4)   Close the Input/Output module front-left door.

g.   Power off the Storage and Retrieval module (if available).

1)   To access the Storage and Retrieval module UPS/CPU, pull the panel forward and remove it.

> **WARNING: Pinch Hazard.** Use caution when removing or replacing the cover panel. Fingers can be pinched.

2) If necessary, push the Storage and Retrieval module computer power switch up, then release. The green power indicator will turn off. Some computers will automatically power off, depending on the software.

Figure 5.28: Storage and Retrieval module computer
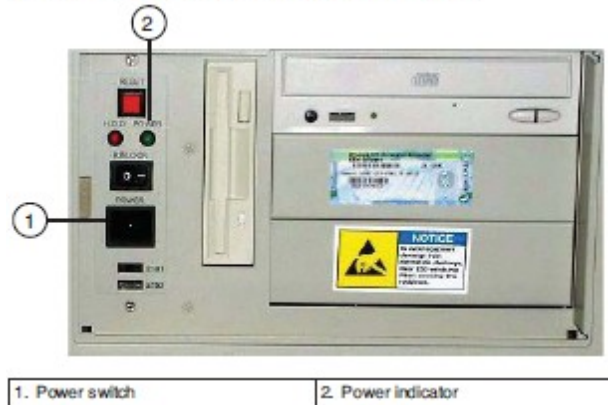
1. Power switch	2. Power indicator

3) Press the Storage and Retrieval module UPS OFF button for approximately **three seconds**. The self-test "✓" indicator turns off when shutdown is complete.

4) Replace the Storage and Retrieval module UPS/CPU access panel.

> **WARNING: Pinch Hazard.** Use caution when removing or replacing the cover panel. Fingers can be pinched.

h. Power down each ARCHITECT i 2000SR Interface module, if available.

1) If the power switch is type 1, turn to the i 2000SR IM power switch from the "APS" position to the "0" position.

2) If the power switch is type 2, make sure the i 2000SR IM power switch is in the "APS/OFF" position. The ARCHITECT i 2000SR IM will be automatically turned off when the APS UPS is switched off.

3) If it is necessary to completely remove power, unplug the workcell and Storage and Retrieval module power cord, and the Centrifuge(s) power cord from their receptacles. The workcell and the Storage and Retrieval module share the same power cord.

8. Restoring Power after a Controlled Shutdown

> **NOTE:** This procedure does not restore power to the analyzers. Refer to the specific analyzer operations manual for additional information.

a. If necessary, plug the workcell and Storage and Retrieval module power cord into its receptacle.

> **NOTE:** The workcell and Storage and Retrieval module share the same power cord.

b. Power on each ARCHITECT i 2000SR IM i 2000SR, if available.

1) If the power switch is type 1, turn to the i 2000SR IM power switch from the "0" position to the "APS" position.

2) If the power switch is type 2, make sure the i 2000SR IM power switch is in the "APS/OFF" position. The ARCHITECT i 2000SR IM will be automatically turned on when the APS UPS is switched on.

c. Power on the Input/Output module.
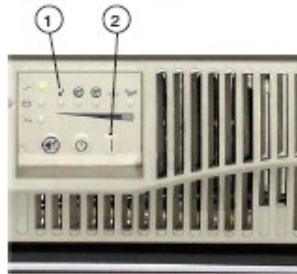
1) Open the Input/Output module front-left door.

Figure 5.30: Input/Output module computer/UPS storage center

1. Input/Output module front-left door	2. Computer
3. UPS	

2) Press the UPS ON button. When the self-test "✓" indicator turns green, proceed to the next step.

Figure 5.31: Input/Output module UPS

1. Self-test "✓" indicator	2. UPS ON button

3) If the green Power indicator is on, go to next step. Otherwise, push the computer power switch up and hold approximately three seconds, then release.

Figure 5.32: Input/Output module computer

1. Power switch

4) Close the Input/Output module front-left door.

d. Power on the Storage and Retrieval module (if available).

1) Empty the Storage and Retrieval module waste container.

2) Remove the Storage and Retrieval module UPS/CPU access panel (if necessary) to access the computer and UPS.

WARNING: Pinch Hazard. Use caution when removing or replacing the cover panel. Fingers can be pinched.

3) Press the Storage and Retrieval module UPS ON button. When the self-test "✓" indicator turns green, proceed to the next step.

Figure 5.33: Storage and Retrieval module UPS
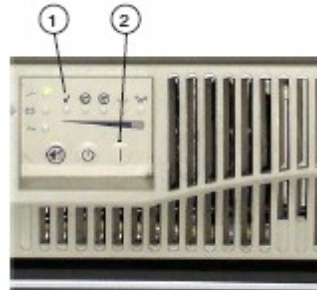
| 1. Self-test "✓" indicator | 2. UPS ON button |

4) Push the Storage and Retrieval module computer main power switch up and hold approximately three seconds, then release.

Figure 5.34: Storage and Retrieval module computer

| 1. Power switch |

5) Replace the Storage and Retrieval module UPS/CPU access panel.

WARNING: Pinch Hazard. Use caution when removing or replacing the cover panel. Fingers can be pinched.

e. Plug the Centrifuge(s) power cords into the receptacles.

f. Power on the Centrifuge module(s).

NOTE: Toggle the Centrifuge power switch to the right to turn on the Centrifuge module. Repeat for the second Centrifuge module, if necessary.

g. After the ACCELERATOR APS software is launched, the workcell powers up and the Snapshot screen displays. The workcell is in Pause mode. Press the Run navigation button to unpause the workcell.

NOTE: When power is restored, all modules initialize when the **Run** navigation button is pressed. The Centrifuge module weighs all balance tubes and bucket inserts during initialization. Wait for initialization to

complete and the Resealer module to reach operating temperature before processing sample tubes.

h.   When the message "Make sure that the workcell is free of tubes" displays, check for the presence of sample tubes.

> **NOTE:** This pop-up appears only if sample tubes were left inside the Centrifuge module or in racks locked in lanes during Shutdown.

1)   If a Purging Samples procedure was not completed before shutdown, then any sample tubes present on the workcell are read at the Input/Output module barcode reader and processed if included in the Expected or Incomplete worklist.

2)   If sample tubes present in the Centrifuge module were not purged, perform the following steps.

a)   Turn the locking knob of the Centrifuge counterclockwise to unlock.

b)   Use the hex tool (3 mm) to remove the two screws holding the safety shield to the Centrifuge. Set aside the screws.

c)   Lift the Centrifuge safety shield and open the Centrifuge lid.

> **CAUTION:** Use caution when opening the lid to ensure it is fully open. For Centrifuge modules with the locking mechanism installed, ensure the safety shield is opened completely to engage the locking mechanism.

> **NOTE:** If the sliding door of the Centrifuge is open, it is not possible to turn the locking knob. In this case, remove sample tubes through the sliding door.

d)   Remove all sample tubes loaded in rotor buckets.

e)   Close the Centrifuge lid.

f)   Remove all sample tubes from bucket inserts in the Centrifuge loading and unloading areas.

g)   Close the Centrifuge safety shield and tighten the screws. When closing the Centrifuge module safety shield with a locking mechanism, pull out the lock and lower the safety shield.

> **WARNING: Pinch Hazard.** Use caution when pulling the lock for the locking mechanism. Fingers can be pinched.

h)   Turn the locking knob of the Centrifuge clockwise to lock.

i)   If two Centrifuge modules are installed, repeat the above steps for the second Centrifuge module.

i.   Confirm the prompt by pressing the " " button.

j.   Remove all filled racks from the Input/Output module.

> **IMPORTANT:** Review the middleware/LIS host to determine which samples have pending tests. Sample tubes for which orders were sent for reruns or additional testing may not be unloaded from the Storage

and Retrieval module. A manual delivery of the sample tube may be required. Refer to Delivery of a Sample to a Priority Output Rack.

B.   Removing Tubes from Workcell if unable to Power-up
Sample tubes should be removed manually from the workcell if all of the following conditions occur:

- Workcell power went off unexpectedly
- There are sample tubes on the workcell
- Power to the workcell is going to be off for an extended period of time such that the integrity of the sample will be compromised.

CAUTION: Do not remove tubes manually unless ALL three of the above conditions are met. Positive identification of samples could be compromised if tubes are manually removed from the workcell when the power is on.

If sample tubes need to be removed manually, use the following procedure.

1.   Manual removal of sample tubes from the workcell
   a.   Ensure power is off to the APS workcell
   b.   Put all Abbott analyzers in a **Ready** or **Stopped** status, or equivalent status for non-Abbott analyzers.
   c.   Open the safety shields or covers for the following modules:
      1)   I/O module
      2)   Centrifuge module(s)
      3)   Decapper module
      4)   Resealer module
      5)   Storage and Retrieval module
      6)   All analyzers

   d.   Manually remove all accessible sample tubes from tube carriers.
                 NOTE: Place all samples in a sample rack. They may need to be removed from the On-line worklist later in this procedure

                 NOTE: All sample tubes located in lanes 1 and 2 of the i 2000SR IM will have to be removed by the local Abbott representative. See Figure E.5 i 2000SR IM Lanes, page E-6
   e.   Close all the safety shields and replace covers.
   f.   If there are sample tubes in the Centrifuge Module perform the following steps:
                 NOTE: If the sliding door of the Centrifuge is open, it is not possible to turn the locking knob. In this case, remove sample tubes through the sliding door.
      1)   Turn the locking knob of the Centrifuge counterclockwise to unlock.
      2)   Use the hex tool (3 mm) to remove the two screws holding the safety shield to the Centrifuge. Set aside the screws.

3) Lift the Centrifuge safety shield and open the Centrifuge lid.
4) Remove all sample tubes loaded in rotor buckets. Place them in the rack noted in Step 4.
5) Close the Centrifuge lid.
6) Remove all sample tubes from bucket inserts in the Centrifuge. Place them in the rack noted in Step 4.
7) Place the buckets and the balancing tubes in their initial position. See Polar Centrifuge module components, page 1-8 and Cartesian Centrifuge module components, page 1-8.
8) Close the Centrifuge safety shield and tighten the screws.
9) Turn the locking knob of the Centrifuge clockwise to lock.
10) If two Centrifuge modules are installed, repeat the above steps for the second Centrifuge module.

g. If there are sample tubes that are still on the workcell that were not accessible before, the track covers must be removed to have access to those sample tubes:

1) Locate the sample tubes and determine which track cover needs to be removed.
2) Remove the clear plastic tape that covers the gap between the ends of the track covers.
3) Use a screwdriver to remove the two screws from the track covers. Set the screws aside.
4) Lift straight up on the track cover to remove it and set the cover aside.
5) Remove the sample tubes. Place them in the rack noted in Step 4.
6) Replace the track cover. Ensure that the cover is seated in the grooves on the track.
7) Replace the track cover screws to secure the cover to the track.
8) Replace the clear plastic tape that covers the gap between the ends of the track covers.
9) Repeat steps from a through h for all sample tubes remaining on the track.

h. At the next start up all sample tubes that were manually removed may need to be deleted from the On-Line worklist. These tubes should all be in the rack referenced in step 4, step 6d, step 6f and step 7e. Perform procedure Remove a Sample Tube from the On-line Worklist, page 10-108

C. Sample Management
Sample management consists of the activities associated with preparing and loading samples, initiating processing, and unloading samples.

1. Sample Requirements
It is important to follow the reagent manufacturer's assay-specific documentation (e.g., a package insert or reagent application sheet) for detailed, assay-specific information about specimen collection, preparation, and storage.

NOTE: The ACCELERATOR APS does not assess integrity of a specimen for testing after centrifugation and before running on an analyzer. It is the laboratory's

responsibility to determine an acceptable process for specimen preparation and assessment of integrity. Hemolysis, icterus, and lipemia can be semi-quantitatively measured on some chemistry analyzers. Samples requiring operator inspection can be routed to a Sorting lane. This can be done via the host LIS or middleware by ordering an off-track inspection test. Contact your local Abbott representative for additional details.

a.   Sample Tube Requirements

A sample tube should be plastic with a removable closure on the open end. The tube surface must be smooth and free of any ridges or collars that could interfere with the removal of the tube cap or closure. Sample tubes must be filled and handled according to laboratory guidelines and procedures. Follow all usual precautions for collecting blood by venipuncture to avoid specimen hemolysis. Refer to Acceptable Sample Tubes for additional tube type information for the ACCELERATOR APS.

IMPORTANT: Use only sample tubes in Acceptable Sample Tubes, section 4-2, pg 12. Sample tubes must meet these specifications.

IMPORTANT: Do not use Glass tubes. Glass tubes cannot be sealed properly. Refer to System (On-line/Off-line), page 2-7 for additional information.

IMPORTANT: Do not use rubber stopped (conventional closure) sample tubes in Dynamic or Input spun lanes. The rubber stoppers must be removed manually due to the rubber causing damage to the Decapper module. Refer to Acceptable Sample Tubes, page 4-16.

IMPORTANT: Follow the reagent manufacturer's assay-specific documentation (e.g., a package insert or reagent application sheet) for detailed, assay-specific information about specimen collection, preparation, and storage. Failure to follow tube and assay manufacturer's recommendations for sample tube handling and type could result in erroneous and misleading results.

IMPORTANT: If adequate sample volume is not used, reliability of assay results cannot be guaranteed. Ensure there is sufficient sample volume to run the ordered tests. Due to the workcell's enclosed, automatic processing of sample tubes, sample volume cannot be inspected visually after centrifugation and before sampling. It is the laboratory's responsibility to determine an acceptable process to assess sample volume. It may be necessary to centrifuge some samples off-track due to inadequate sample volume. Refer to the specific

analyzer operations manual and reagent manufacturer's assay-specific documentation (e.g., a package insert or reagent application sheet) for information regarding sample volume.

b.   Special Handling

1)   Always review the analyzer and specific reagent manufacturer's assay-specific documentation (e.g., a package insert or reagent application sheet) before selecting test methods to be processed on the ACCELERATOR APS workcell. Some methods may have specific instructions that are not appropriate for workcell processing (e.g., methods requiring preprocessing, pretreatment, or special handling).

2)   Sample carryover requirements for some clinical chemistryanalyzers may be less stringent than for immunoassay analyzers. The possibility of sample carryover should be considered when samples are processed on multiple analyzers. The ACCELERATOR APS workcell routes sample tubes to maximize throughput and sample carryover cannot be controlled by configuring the sample routing order on the APS. It is the laboratory's responsibility to verify sample carryover is acceptable among all analyzers.

2.   Sample Processing

Each laboratory should determine their acceptable sample processing times for priority samples. If this time is not being met by loading priority samples in the Priority Input lanes of the Input/Output Module, centrifuge the sample tubes off-track and manually remove caps. Load the sample tubes manually on the analyzer (for example, the instrument sample carousel or the interface module). Using this procedure eliminates any increase in sample processing time.

NOTE: When a Routine sample is loaded into Priority Input lanes the priority of the sample is upgraded to STAT and the workcell sends an upgrade status notification to the Host, if this function has been enabled by the local Abbott representative.

NOTE: When handling uncapped sample tubes, avoid splashing sample outside of the sample tubes.

WARNING: Potential Biohazard. Sample tubes are potentially biohazardous. Follow your laboratory standard operating procedures and guidelines when handling and disposing of tubes.

To load samples for priority processing, perform the following steps.

a.   Determine the lane assignment of the lanes. Refer to Table 5.6 Loading racks, to determine what type of tubes can be placed in racks based on the following:

1)   Lane assignment for the lane to be used.

2)   On-line/off-line status of the Centrifuge and Decapper.

> **IMPORTANT:** Verify the rack is loaded correctly with sample tubes, according to instructions described in Loading Sample onto Racks, page 5-47.

b.   Verify there is not a rack in the lane.

c.   Grasp the one-column, 12-position Priority rack by the handle and position the rack so the handle is facing you.

d.   Load the rack into either the Priority I-1 or I-2 lane, performing the following steps.

1)   Place the rack flat on the worktable.

2)   Align the edge of the rack with the guides on the worktable.

3)   Slide the rack into the lane.

4)   Push firmly until the rack clicks into position and the indicator light turns red.

> **IMPORTANT:** Before processing sample tubes, always verify the rack is properly locked into the lane and detected by the workcell. The LED indicator should be red

Figure 5.38: Rack latch

> **WARNING: Pinch Hazard.** Never reach under the LED bar to load or unload tubes. You could be injured if your hand enters the Input/Output robot area. Remove the racks from the Input/Output module before loading and unloading sample tubes. Always use the rack handles to insert or remove a rack.

> **IMPORTANT:** Do not use routine or Priority racks if the silicone tube supports are broken or missing. The tubes should be upright and centered when added to the rack. If a rack is damaged, set it aside and contact your local Abbott representative.

IMPORTANT: Always load empty Priority racks into Priority output lanes (Lanes O-1, O-2, O-3) before sample processing. If an error occurs, the sample tube will be returned to the Priority output rack.

It is possible to load an empty routine rack into a routine lane configured as Priority output. If an error occurs, the sample tube will be returned to this rack in case of unavailability of racks in standard Priority output Lanes ((0-1, 0-2, 0-3).

NOTE: When a Routine sample is loaded into Priority Input lanes the priority of the sample is upgraded to STAT and the workcell sends an upgrade status notification to the Host, if this parameter has been enabled by the FSE.

NOTE: When loading samples manually on the c System analyzers, it is recommended to set the analyzers to Off-line on the APS screen prior to opening the cover on the sample carousel. If workcell sample tubes are in the analyzer queue, use Transitioning To Off-line to allow the samples to complete aspiration.

3. Loading Racks and Patient Samples

WARNING: Electrical shock hazard. Sample tubes are potentially biohazardous. Follow your laboratory standard operating procedures and guidelines when handling and disposing of tubes.

a. When loading samples on the ACCELERATOR APS workcell, ensure the following conditions are met.

1) Inspect sample tubes and verify they are not cracked or leaking before insertion in the sample racks. Damaged or leaking sample tubes could result in workcell contamination and/or sample carryover.

2) Sample tubes must be barcode labeled.
    a) Ensure barcode label alignment is correct and meets recommended specifications. Refer to Acceptable Sample Tubes, section 4-2 starting on pg 12 for additional information.
    b) Ensure the label does not extend below the top of the tube carrier. Refer to Sample Barcode Label Length, page 14.
    c) Do not load duplicate sample IDs on the APS workcell.

3) Verify the sample tube size meets the specifications listed in Table 4.9, Sample tube specifications, section 4-2 page 12.

4) Ensure there is sufficient sample volume to run the ordered tests.
    NOTE: Due to the workcell's enclosed, automated processing of sample tubes, sample volume cannot be inspected visually after centrifugation and before sampling. It is the laboratory's

responsibility to determine an acceptable process to assess sample volume. It may be necessary to centrifuge some samples off-track due to inadequate sample volume. Refer to the specific analyzer operations manual and reagent manufacturer's assay-specific documentation (e.g., a package insert or reagent application sheet) for information regarding sample volume.

5) Follow the reagent manufacturer's assay-specific documentation (e.g., a package insert or reagent application sheet) for detailed, assay-specific information about specimen collection, preparation, and storage.

6) Ensure complete clot formation in serum specimens has taken place. Some specimens, especially those from patients receiving anticoagulants or thrombolytic therapy, may exhibit increased clotting times. If the specimen is centrifuged before a complete clot forms, the presence of fibrin may cause erroneous results.

7) Refer to Sample Requirements, page 4-13 for additional information.

IMPORTANT: Do not run sample tubes if these conditions are not met. Patient results could be affected.

b. Loading samples onto racks

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	I-1	I-2	O-1	O-2	O-3
Routine Samples Priority Output															Priority Input Samples		Priority Output Samples		

There are three different types of lanes on the Input/Output module.

- Routine
- Priority Input
- Priority Output

The table below explains their function:

Table 5.2: Input/Output module lanes

Type Lane	Description
Routine	• Lanes 1 through 15 • Holds the four-column, 48-position routine racks • Used for routine samples • Can be used as Priority Output
Priority Input	• First two narrow lanes, I-1 and I-2 • Holds the one-column, 12-position Priority racks • Used for processing STAT samples
Priority Output	• Last three narrow lanes, O-1, O-2, and O-3 • Holds the one-column, 12-position Priority racks • Used for sample tubes under the following conditions: – Sample tubes with automation errors. Refer to *Appendix B, Troubleshooting Error Codes* for additional information. – Sample tubes requested by the operator to be "delivered" to the Input/Output module. Refer to *Delivery of a Sample to a Priority Output Rack*, page 5-94.

Figure 5.35: Input/Output module lanes
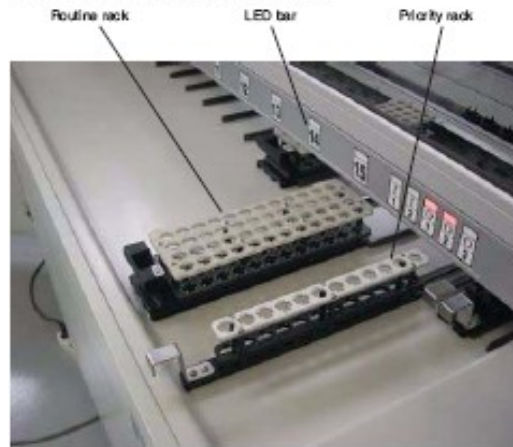
The racks use silicone rubber guides on two levels to hold the tubes upright and centered so they can be gripped securely by the Input/Output robot.

Figure 5.36: Routine/Priority racks
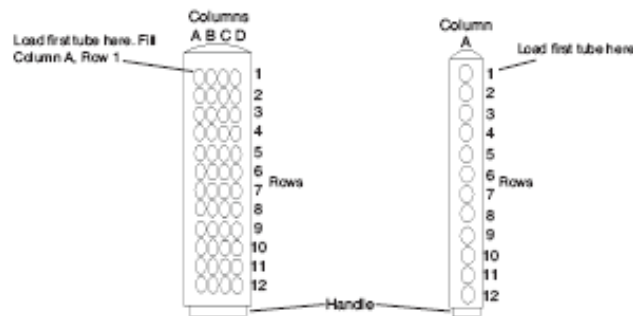
To load a tube, insert it straight into a rack position, ensuring it is seated firmly against the bottom of the rack and not tilted. Place the first tube in Column A, Row 1.

Continue to fill that column by placing each subsequent sample in the next row of the same column. Continue with the next column, filling each column before inserting a tube in the next. This method of filling racks ensures the most efficient robot access. If the robot encounters an empty position, it does not check for tubes in subsequent positions in that column. This could result in unrecognized sample tubes existing in an output or sorting rack.

WARNING: Failure to load tubes as described could result in sample tube damage, loss of sample, and sample contamination due to placement of tubes into occupied positions.

WARNING: Pinch Hazard. Never reach under the LED bar to load or unload tubes. You could be injured if your hand enters the Input/Output robot area. Remove the racks from the Input/Output module before loading and unloading sample tubes. Always use the rack handles to insert or remove a rack.

Samples can be loaded onto routine and Priority racks at or away from the Input/Output module worktable.

The operator can determine the order of sample processing by loading racks in specific designated positions. Sample tubes that are loaded in the Priority racks in positions I-1 and I-2 are processed before sample tubes loaded in the routine racks in Lanes 1 through 15. Routine racks are processed in the order in which they are loaded into the workcell. For example: if an Input rack is loaded in Lane 10, then another Input rack is loaded in Lane 5, the rack in Lane 10 is processed first followed by the rack in Lane 5.

NOTE: Lanes configured as Input/Dynamic/Spun/Uncapped have a higher priority than a Sealed lane. Sealed lanes have the lowest priority, however, once the I/O robot has started picking up tubes from a rack in a Sealed lane, it will continue to load all the tubes from that rack until it is empty.

NOTE: Priority Output lanes (O-1, O-2, O-3) are used before the routine lane(s) that has been configured as PO.

The workcell accepts capped, uncapped, spun, unspun, and sealed sample tubes, provided they are loaded correctly on the workcell. The routine and Priority racks can be used to group sample tubes. For example, uncapped tubes must be loaded in a separate rack from capped tubes. Uncapped sample tubes must not be centrifuged.

Similarly, spun sample tubes should be placed in a separate rack from unspun sample tubes. Sealed sample tubes can be loaded on a separate rack for routing to the Storage and Retrieval module. Each type of sample tube must be loaded into separate racks and identified appropriately for the workcell. A single rack can hold different acceptable tube sizes.

NOTE: It is very important to place racks in the correct lanes. Always check lane assignments before placing the racks on the Input/Output module.
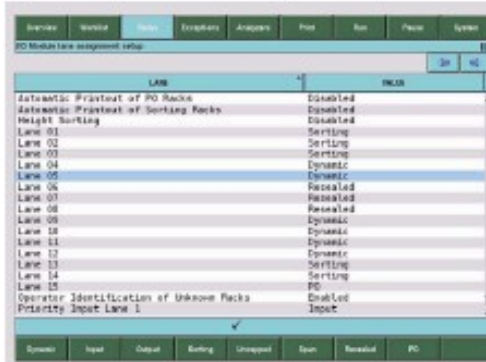
To check lane assignments, perform the following steps.

1)   Press the **Racks** navigation button in the upper part of the screen.

Figure 5.37: I/O Module lane assignment setup screen

2)   Press the Lane Setup function button to determine the current lane configuration.

Refer to Checking Status of Racks and Lanes for additional information on lane status.

Refer to I/O Module Lane Assignment Setup for additional information on lane setup.

IMPORTANT: Uncapped tubes must be placed on a separate rack and in a lane specifically assigned for uncapped tubes. Serious damage could result if these sample tubes do not bypass the Centrifuge and, Decapper modules.

IMPORTANT: Placing capped whole blood (unspun) tubes in a lane configured for uncapped or spun tubes could lead to erroneous and misleading results.

IMPORTANT: Sealed tubes already processed that need to be sent directly to the Storage and Retrieval module must be placed in a lane specifically assigned for sealed tubes. Serious damage could result if a sealed tube is transported directly to the Decapper module or analyzers.

IMPORTANT: Before loading a sealed tube for retest, manually remove the foil from the top of the tube. Serious damage could result if a sealed tube is transported to the Decapper module or analyzers.

IMPORTANT: Never use glass tubes if the Resealer module is installed and in on-line status. Glass tubes cannot be sealed properly. Turn the Resealer module off-line when glass tube processing is needed.

c.   Lane Status

The LED bar is positioned over the Input/Output module worktop. Each LED indicator light illuminates as indicated below.

Table 5.3: LED indicators

LED Indicator	Description
Green	Indicates all tubes in the rack have been processed and the rack can be unlocked.
Red	Indicates the tubes in the rack are being processed and the racks are not available.
Off	Indicates: • The rack has been unlocked and tubes have been processed. • The rack needs to be locked and processed.

The following table describes all possible lane statuses depending on lane setup and LED indicators.

Table 5.4: Lane status

Lane Setup		LED Indicator	Latch	Rack Status
Routine Input	Input, Uncapped, or Spun	Red	Locked	Sample tubes in this rack are being processed.
		Off	Unlocked	Sample tubes have been processed and this rack can be removed.
	Sealed	Red	Locked	Sample tubes in this rack are being sent to storage.
		Off	Unlocked	Sample tubes have been sent to storage and this rack can be removed.
	Dynamic	Red	Locked	Sample tubes in this rack are being processed.
Routine Output	Dynamic	Red	Locked	Sample tubes are being placed in this rack.
		Green	Locked	Sample tubes have been placed in this rack and this rack can be unlocked.
		Off	Unlocked	Sample tubes have been placed in this rack and this rack can be removed.
	Output or Sorting	Red	Locked	Sample tubes are being placed in this rack.
		Green	Locked	Sample tubes have been placed in this rack and this rack can be unlocked.
		Off	Unlocked	Sample tubes have been placed in this rack and this rack can be removed.
	Priority Output	Red	Locked	Sample tubes in error condition or requested by user are being placed in this rack.
		Green	Locked	Sample tubes have been placed in this rack and this rack can be unlocked.
		Off	Unlocked	Sample tubes have been placed in this rack and this rack can be removed.
Priority Input	Input, Uncapped, or Spun	Red	Locked	Sample tubes in this rack are being processed.
		Off	Unlocked	Sample tubes have been processed and this rack can be removed.
Priority Output	Output	Red	Locked	Sample tubes in this rack are being placed in this rack.
		Off	Unlocked	Sample tubes have been placed in this rack and this rack can be removed.

Review the Worklist screen for more information about sample tubes contained in the racks.

WARNING: Pinch Hazard. Never reach under the LED bar to load or unload tubes. You could be injured if your hand enters the Input/Output robot area. Remove the racks from the Input/Output module before loading and unloading sample tubes. Always use the rack handles to insert or remove a rack.

d. Loading Racks into the Input/Output Module
Before processing, ensure the input racks are in lanes assigned for their appropriate tube types, and empty racks are loaded in both the Priority and routine output lanes.

3) Loading Output Racks
Before processing, ensure output racks have been loaded in the Input/Output module. Use the following table to determine where to load output racks in the Input/Output module.

Table 5.5: Output racks

Lanes	Lane assignment	Status of samples placed in the rack...
O1, O2, O3	Priority output	I (Incomplete) samples due to an error, or C (Complete) samples that have been retrieved, or Purged samples regardless of their status
1-15	Output	C (Complete)
1-15	Sorting	I (Incomplete) the assay is unavailable or analyzer is off-line
1-15	Dynamic	C (Complete) or I (Incomplete)
1-15	Priority output	I (Incomplete) samples due to an error, or C (Complete) samples that have been retrieved, or Purged samples regardless of their status

NOTE: If a rack unlatches unexpectedly, do not reinsert the rack into the lane. Check status of all samples located in the rack and take appropriate action. Perform the following procedures to load output racks into the Input/Output module.

WARNING: Potential Biohazard. Sample tubes are potentially biohazardous. Follow your laboratory standard operating procedures and guidelines when handling and disposing of tubes.

To load output racks in Priority output lanes, perform the following steps.

a)   Verify there is not a rack in the lane.
b)   Grasp an empty one-column, 12-position Priority rack by the handle and position the rack so the handle is facing you.
c)   Load the rack into the Priority O-1, O-2, or O-3 lane, performing the following steps.
    i.   Place the rack flat on the worktable.
    ii.   Align the edge of the rack with the guides on the worktable.
    iii.   Slide the rack into the lane.
    iv.   Push firmly until the rack clicks into position and the indicator light turns red.

To load output and sorting racks in routine lanes:

a)   Verify there is not a rack in the lane.
b)   Grasp an empty four-column 48-position routine rack by the handle and position the rack so the handle is facing you.
c)   Load the rack into the appropriate routine lane (Lanes 1 through 15), performing the following steps.
    i.   Place the rack flat on the worktable.
    ii.   Align the edge of the rack with the guides on the worktable.
    iii.   Slide the rack into the lane.
    iv.   Push firmly until the rack clicks into position and the indicator light turns red.

4)   Loading Input Racks for Priority Processing
Perform this procedure to load Priority input racks into the Input/Output module. Samples loaded in the Priority input lanes are processed before samples loaded in routine lanes.

a)   Loading Input Racks for Routine Processing
Perform this procedure to load routine input racks into the Input/Output module.

NOTE: When handling uncapped sample tubes, avoid splashing sample outside of the sample rack.
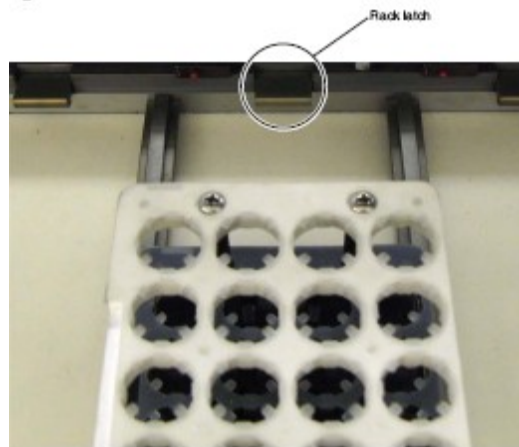
WARNING: Potential Biohazard. Sample tubes are potentially biohazardous. Follow your laboratory standard operating procedures and guidelines when handling and disposing of tubes.

To load samples for routine processing, perform the following steps.

i. Determine the type of tubes which can be placed in the racks, based on the following:
    –   Lane assignment for the lane to be used.
    –   On-line/off-line status of the Centrifuge and Decapper.
    –   Refer to Table 5.6 Loading racks.
        IMPORTANT: Verify the rack is loaded correctly with sample tubes, according to instructions described in Loading Samples onto Racks.

ii. Verify there is not a rack in the lane.

iii. Grasp the four-column 48-position routine rack by the handle and position the rack so the handle is facing you.

iv. Load the rack into a routine lane (1-15), performing the following steps
    –   Place the rack flat on the worktable.
    –   Align the edge of the rack with the guides on the worktable.
    –   Slide the rack into the lane.
    –   Push firmly until the rack clicks into position and the indicator light turns red.

Figure 5.39: Rack latch

WARNING: Pinch Hazard. Never reach under the LED bar to load or unload tubes. You could be injured if your

hand enters the Input/Output robot area. Remove the racks from the Input/Output module before loading and unloading sample tubes. Always use the rack handles to insert or remove a rack.

IMPORTANT: Do not use routine or Priority racks if the silicone tube supports are broken or missing. The tubes should be upright and centered when added to the rack. If a rack is damaged, set it aside and contact your local Abbott representative.

IMPORTANT: Always load empty Priority racks into Priority output lanes (Lanes O-1, O-2, O-3) before sample processing. If an error occurs, the sample tube will be loaded into the Priority output rack.

5) Loading Racks into Appropriate Lanes
Use the following table to load racks into the appropriate lane. For information regarding changing a lane assignment, refer to I/O Module Lane Assignment Setup.

6) Initiate or Resume Sample Processing
To initiate or resume processing samples from Pause mode on the ACCELERATOR APS workcell, perform the following steps.

    a) If the **Exceptions** navigation button is yellow or red, check for errors or warnings.
        i. Press the **Exceptions** navigation button.
        ii. View any errors or warnings that occurred in a workcell module or instrument.
        iii. Take action as needed. Refer to Section 10, Troubleshooting for additional information.
        NOTE: If a rerun is requested and the APS is in Paused mode, APS will not consider the request until the APS is put into Run. When the APS is then put into Run, if the sample is not found on track or in the Input/Output module, a Rerun Exception is generated.

    b) Press the Run button to place the workcell in Run mode. The Symbol " ▶ " displays when the Run button is selected. When the workcell is in Run mode, the Input/Output module is ready to begin processing sample tubes.
        NOTE: After 10 minutes of inactivity, the workcell Track and motor stop, but the workcell remains in Run mode.

> To resume running, load a rack into the Input/Output module.

7) Pause Sample Processing

To pause sample processing from Run mode on the ACCELERATOR APS workcell, perform this procedure. Press the **Pause** button to place the workcell in Pause mode. This pauses all workcell components. The symbol " **II** " displays when **Pause** is selected. The workcell continues communication with all modules, analyzers, and host LIS or middleware while in Pause mode.

a) Pause

When the **Pause** navigation button is selected, the following actions take place before the module pauses.

Table 5.10: Pause

Module	Description
Analyzer Interface	Completes all aspirations for the sample tube currently located in the Sample gate.
Centrifuge	Completes centrifugation of sample tubes currently loaded in the Centrifuge.
Centrifuge robot	If a sample tube or bucket insert is in the Centrifuge module gripper, the robot completes the command to move the sample tube or bucket insert to the destination location.
Input/Output robot	If a sample tube is in the Input/Output module robot gripper, the robot completes the command to move the sample tube to the destination location.
Decapper	Completes decapping of the sample tube currently located at the Decapper module, and releases the cap into the waste tube.
Resealer	Completes sealing of the sample tube currently located at the Resealer module and a following one, if present, for which the aluminium foil has been prepared.
Storage and Retrieval module	If shelves are moving or a rack is being moved, the Storage module completes the command to move the rack to the destination position, and closes the shutter. If a sample tube is in the Storage module robot gripper, the robot completes the command to move the sample tube to the destination location.
Track	The belts move but the tube carriers remain at the gates.

4. Checking Status of Racks and Lanes

To check the lane configuration and status of racks loaded on the workcell, perform the following steps.

a. Press the **Racks** navigation button in the upper part of the screen.

Figure 5.40: Racks screen

b.   A set of function buttons displays at the bottom of the screen.

Table 5.11: Racks function buttons

Button	Function
On-line	Displays all racks currently on the workcell. Refer to *Checking Details of Samples*, page 5-71. NOTE: Select the **On-line** button again to update the screen.
Lane Setup	Displays the list of lanes and their configuration. For information to change a lane, refer to *I/O Module Lane Assignment Setup*, page 2-2.
Priority Out	Displays the list of samples in the Priority output lane or in routine lanes configured as Priority output. NOTE: The **Unlock** button is not available.
Off-line	Displays the list of racks already processed. NOTE: The **Unlock** button is not available.
Output	Displays the list of racks assigned to Complete samples.

Button	Function
Sorting	Displays the list of racks assigned to Incomplete samples.
Search	Displays the keyboard to type the rack ID for a search.
Unlock	Unlocks a selected rack.

c.   To view information about samples contained in a rack, highlight the rack then press the Selection button. Sample information can also be viewed by pressing the Worklist navigation button. Refer to Checking Details of Samples, page 5-71.

5.   Racks – On-line Status

To view the status of racks loaded on the workcell, perform the following steps.

a.   Press the **Racks** navigation button.

b.   Press the **On-line** function button.

The following table describes on-line rack status, depending on lane setup.

Table 5.12: On-line rack status

Description of Lane Type		Status	Description
Routine Input	Dynamic	Input – Queued	Routine input rack with unprocessed samples. Waiting for sample tubes to be picked up by the Input/Output module robot and loaded onto the workcell.
		Input – Active	Routine input rack with unprocessed sample tubes. Input/Output module robot in process of loading sample tubes from this rack onto the workcell.
		Empty	Last sample tube from routine input rack loaded onto the workcell. Will transition to output rack.
	Input	Input – Queued	Routine input rack with unprocessed samples. Waiting for sample tubes to be picked up by the Input/Output module robot and loaded onto the workcell.
		Input – Active	Routine input rack with unprocessed sample tubes. Input/Output module robot in process of loading sample tubes from this rack onto the workcell.
	Uncapped	Input – Queued	Routine uncapped rack with unprocessed, spun sample tubes. Waiting for sample tubes to be picked up by the Input/Output module robot and loaded onto the workcell.
		Input – Active	Routine uncapped rack with unprocessed, spun sample tubes. Input/Output module robot in process of loading sample tubes from this rack onto the workcell.
	Spun	Input – Queued	Routine spun rack with unprocessed sample tubes. Waiting for sample tubes to be picked up by the Input/Output module robot and loaded onto the workcell.
		Input – Active	Routine spun rack with unprocessed sample tubes. Input/Output module robot in process of loading sample tubes from this rack onto the workcell.
	Sealed	Sealed – Queued	Routine rack with sealed sample tubes. Waiting for Input/Output module robot to load sample tubes from this rack onto the workcell.
		Sealed – Active	Routine rack with sealed sample tubes. Input/Output module robot in process of loading sealed sample tubes onto the workcell to be transported to the Storage and Retrieval module.

Table 5.12: On-line rack status (Continued)

Description of Lane Type		Status	Description
Routine Output	Dynamic	Sorted – Empty	Routine output rack waiting for Incomplete sample tubes to be loaded from the workcell into this rack.
		Sorted – Active	Routine output rack. Input/Output module robot in process of loading Incomplete sample tubes from the workcell into this rack.
		Output – Empty	Routine output rack waiting for sample tubes to be loaded from the workcell into this rack.
		Output – Active	Routine output rack. Sample robot in process of loading sample tubes from the workcell into this rack.
	Output	Output – Empty	Routine output rack waiting for sample tubes to be loaded from the workcell into this rack.
		Output – Active	Routine output rack. Input/Output module robot in process of loading sample tubes from the workcell into this rack.
	Sorting	Sorted – Empty	Output rack waiting for sample tubes from the workcell. These sample tubes will be sorted by instrument type and/or tests.
		Sorted – Active	Sorted output rack. Input/Output module robot in process of loading sample tubes from the workcell. These sample tubes are being sorted by instrument type and/or tests.
	PO	Output – Active	Routine racks configured as Priority output with sample tubes from the workcell, due to errors or operator request.
Priority Input	STAT	Input – Active	Priority input rack with unprocessed STAT sample tubes. Input/Output module robot in process of loading sample tubes from this rack onto the workcell.
Priority Output	Error	Output – Active	Priority output racks with sample tubes from the workcell, due to errors or operator request.

6.   Checking the Status of Samples

Perform this procedure to view sample information. Requests sent from the LIS or middleware and acknowledged by the workcell are included in the Worklist screens.

a.   Press the **Worklist** navigation button.

b.   Select the **On-line** function button. A list of all samples currently on the workcell displays.

Figure 5.41: Worklist screen

Table 5.13: Worklist screen

Column header	Information
ID	Displays the sample ID
NAME	Displays the sample name
PRIORITY	Displays Priority codes of the sample: **S** STAT **A** ASAP (As Soon as Possible) **R** Routine

Table 5.13: Worklist screen (Continued)

Column header	Information
STATUS	Displays Status codes: **E** Expected: samples with test requests received and acknowledged by the workcell, but the sample barcode label has not been read by the workcell **I** Incomplete: sampling not completed **C** Complete: sampling completed **O** Overdue: an expected sample has exceeded sample time-out. Refer to *LIS Record Management*, page 2-27 for information to configure Overdue Sample Timeout. **U** Unknown: a sample tube can be in the unknown status for the following reasons: • The workcell cannot read the barcode of the sample tube. • The workcell unloads the tube into a PO rack because the barcode is a duplicate • The sample has been archived (refer to *LIS Record Management*, page 2-27). **NOTE:** When an Unknown tube is placed into a sorting or output rack following an error recovery, this tube is then automatically moved to a PO rack.
LOCATION	Displays the sample tube location on the workcell. Refer to *Table 5.14, Sample locations* for additional information. **NOTE:** If the sample is unloaded in the priority output rack and the rack was unlocked, the sample location is included in parenthesis or has an R preceeding the location code.

NOTE: For actual sample locations, refer to Figures 5.42 through 5.59.

Table 5.14: Sample locations

Location code	Location	Position	Example
Lane 01-15 (Input/Output module)	R-Rack ID	Column A, B, C, or D/ Position 01-12	15-R101-A12 **NOTE:** If the sample rack has been removed, the lane does not display and the location code is in parentheses: (R101-A12)
PI - Priority Input Lanes (Input/Output module)	I-1 or I-2	Rack position 01-12	PI2-12
PO - Priority Output Lanes (Input/Output module)	O-1, O-2, or O-3	Rack position 01-12	PO3-12 **NOTE:** If the sample rack has been removed, the location code is in parentheses: (PO3-12)
CM(2)I - Centrifuge (2) Module Input	R01 - R04	Bucket insert position 01-20*	CM2I-R01-06
CM(2)O - Centrifuge (2) Module Output	R05 - R08	Bucket insert position 01-20*	CM2O-R08-06
CM(2)R - Centrifuge (2) Module Run (inside Centrifuge)	R09 - R12	Bucket insert position 01-20*	CM2R-R09-06

Table 5.14: Sample locations (Continued)

Location code	Location	Position	Example
Gate location Displays location of the tube carrier at the current gate or location of the gate where the tube carrier will arrive next.		Gate name: • Centrifuge (2) Gate A, B, or C • Decapper Divert Gate • Decapper Gate • Desealer Divert** • Desealer Gate** • Instrument (# of the connected analyzer) • IOM Divert Gate • IOM Gate A, B, or C • Resealer Divert Gate • Resealer Gate • Return Gate (# of the connected analyzer) • Sampling Gate (# of the connected analyzer) • Storage Gate A, B, C, or D	
S - Storage and Retrieval Module	Floor 01-20/ Rack 01-16	Column A, B, C, or D/Position 01-12/Rack ID	S20-16-A12-(142)

* Bucket insert positions are oriented differently on the Polar and Cartesian Centrifuge modules. Refer to *Figure 5.47: Polar Bucket insert positions*, page 5-78 and/or *Figure 5.50: Cartesian Bucket insert positions*, page 5-79, as applicable.
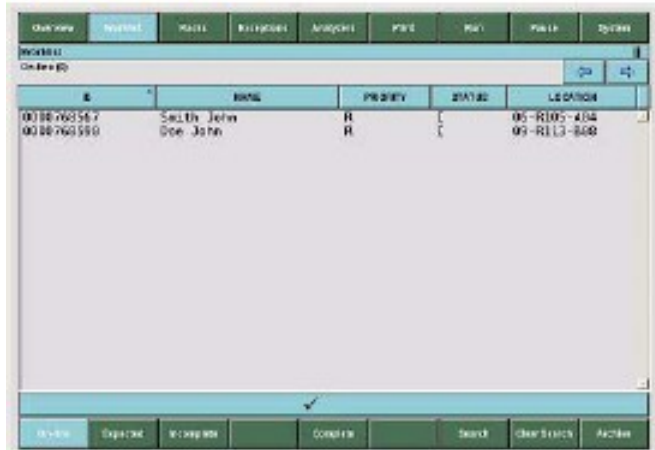
** Possible device for optional upgrade

c.   How to Check Sample Status on Worklists
        Perform this procedure to view sample information from the different Worklist screens.

1)   Press the **Worklist** navigation button.

Figure 5.60: Worklist screen

2)   Press a function button to display a list of specific samples.

Table 5.15: Worklist function buttons

Button	Function
On-line	Displays all samples currently on the workcell [Complete (C) and Incomplete (I) sample status]. NOTE: Select the **On-line** button again to update the screen
Expected	Displays samples with test requests received and acknowledged by the workcell, but the sample has not been loaded into the workcell [Expected (E) and Overdue (O) sample status]. NOTE: Select the **Expected** button again to update the screen
Incomplete	Displays samples partially processed but not yet sampled on all requested analyzers. These samples have an Incomplete (I) sample status. NOTE: Select the **Incomplete** button again to update the screen

Table 5.15: Worklist function buttons (Continued)

Button	Function
Complete	Displays samples completed on all requested analyzers. These samples have a Complete (C) sample status. NOTE: Select the **Complete** button again to update the screen
Search	Displays a search for a sample by entering the sample ID or patient name. A search can also be performed by entering a partial sample ID or patient name.
Clear Search	After the result of the search is reviewed or printed, press the **Clear Search** button. Otherwise, the data will be added to your next set of search results NOTE: Before every search of archived samples press the **Clear Search** button. Otherwise, the displayed results may be not complete.
Archive	Displays samples processed on previous dates. Enter the desired day of the month on the pop-up keypad to view all samples for that day (range values are 1 to 31). NOTE: Before every search of archived samples press the **Clear Search** button. Otherwise, the displayed results may be not complete.

NOTE: During normal operation, the selected list must be refreshed to view the current status of samples. Press the function button again to refresh the desired sample list.

NOTE: The screen displays the samples list by pages of 3,000 samples. Highlight **Next Page** at the top or at the bottom of the screen content area then press the **Selection** button to display the next 3,000 samples. To return to the previous page highlight **Previous Page** at the top or at the bottom of the screen content area then press the **Selection** button.

NOTE: If a worklist screen (Expected, Incomplete or Complete) contains more than 32,768 samples, the list of samples is not displayed. A pop-up displays, refer to Pop-up Message Table, page B-28 to troubleshoot the error condition.

a) Highlight a sample to view specific information for that sample.
b) Press the **Selection** button.
See sample screen on the next page…

Figure 5.61: Sample screen

Table 5.16: Sample screen

Column Header	Information
TEST	Short name of test.
DESCRIPTION	Long name of test.
STATUS	Displays current status of the test: • **[blank]**—Sample for the test has not been delivered to the analyzer. • **# Sampled**—Displays the ID# of the instrument that completed sampling of the displayed test. • **Sorted**—Sample was sorted in a sorting rack by that test. • **UNDONE**—Sample was not processed on an analyzer connected to the workcell for the displayed test. **IMPORTANT:** Review the middleware/LIS host for additional sample information.

The following set of function buttons displays in the Sample screen.

Table 5.17: Sample screen function buttons

Button	Function
Previous	Displays details about the previous sample in the list.
Next	Displays details about the next sample in the list.
Rerun*	Displays a set of buttons with all programmed tests for the selected sample. One or more of these tests can be rerun, but only if the analyzer has already programmed the rerun.
Complete	Changes a sample's status to Complete, whether or not all tests for that sample were completed on all requested analyzers. **NOTE:** The same operation can be done by the Host/LIS, which sends a message to APS to change a sample status to Complete. This is possible only if this ability is configured on both the workcell and the host system by the local Abbott and Host representatives. Refer to your Host documentation for further information.
Deliver	Delivers an on-line or a stored sample to a Priority output rack. Refer to *Delivery of a Sample to a Priority Output Rack*, page 5-94.
Priority	Changes the displayed priority of the selected sample. **NOTE:** When the priority of Routine samples is upgraded to STAT, the workcell sends an upgrade status notification to the Host if this function has been enabled by the local Abbott representative. This may affect how the sample is run.
Add Test*	Adds a test request to the selected sample ("add-on" test). One or more new tests can be added only if the new tests have already been ordered on the analyzer(s).
More...	Displays other information about the selected sample, used primarily for troubleshooting.

* It is recommended that these functions be performed at the host LIS or middleware.

From the **More...** function button, the following specific sample information may display, depending on information available.

Table 5.18: Sample information

Item	Description
Action Code	**N** New request **A** Add test or rerun **C** Cancel
Birth Date	Patient's date of birth
Cap	Yes—Cap is present No—Sample tube cap was either removed manually before loading on the workcell or removed by the Decapper module
Centrifuged	Yes—Sample tube was centrifuged either off-track before loading on the workcell or centrifuged by the Centrifuge module No—Sample tube was not centrifuged
Dilution	Manual dilution
Error code	Error code as reported by instrument
Instrument Type	Instrument to be performing the test
Location	Location associated with the patient
More Information	APS error message generated during sample handling
Patient First Name	Patient's first name
Patient ID	Identification assigned to the patient
Patient Last Name	Patient's last name
Patient Middle Name	Patient's middle name
Patient Sex	**M** Male **F** Female **U** Unknown
Physician First Name	Physician's first name
Physician Last Name	Physician's last name
Physician Middle Name	Physician's middle name
Priority	Displays Priority codes of the sample: **S** STAT **A** ASAP (As Soon As Possible) **R** Routine
Resealed	Yes—Sample tube was sealed by the Resealer module No—Sample tube was not sealed by the Resealer module
Sample Location	Location of the sample in the workcell

Table 5.18: Sample information (Continued)

Item	Description
Sample Collection	Date and time of sample collection
Specimen ID	Barcode number or ID assigned to the sample
Specimen Source	QC1 (1st Level QC) QC2 (2nd Level QC) QC3 (3rd Level QC) QC4 (4th Level QC) QC5 (5th Level QC)
Specimen Type	S Serum C CSF U Urine W Whole blood A Amniotic fluid O Other
Test Code	Short name of the test
Total Tests for Sample	Total number of tests ordered for a sample (includes all tests for all instrument types)
Tube Diameter (mm)	Sample tube diameter measured by the Decapper module gripper
Tube Height (mm)	Sample tube height measured by the tube presence sensor at the Input/Output module
Units	Units of measure as reported
Weight	Sample tube weight measured by the Centrifuge module balance

7. Unloading Racks and Samples

To maintain continuous processing, samples and racks should be unloaded on a routine basis. In addition, it may be necessary to deliver a sample from the workcell or the Storage and Retrieval module to the Priority output lanes.

> **WARNING: Potential Biohazard.** When handling uncapped sample tubes, avoid splashing sample outside of the sample tubes.
>
> Sample tubes are potentially biohazardous. Follow your laboratory standard operating procedures and guidelines when handling and disposing of tubes.

To maintain continuous processing, racks should be unloaded on a routine basis.

If the LED indicator is off, proceed to step 5. If it is red or green, begin procedure at step 1.

> **NOTE:** If the LED indicator is red and the sample robot is processing tubes on that lane, a pop-up message displays. Wait for the sample robot to complete processing then the rack can be unlocked.

> **NOTE:** The Priority output rack holds samples with automation errors and those samples requested by the operator to be delivered. Before removal of this rack, an operator may review and/or print the Priority Output screen for a list of sample tubes, their rack location, and the associated error code.

a.   Press the **Pause** navigation button to pause the workcell. Ensure the Run/Pause indicator symbol " **II** " displays.

b.   Press the **Racks** navigation button.

c.   Press the **On-line** function button.

d.   Highlight the lane of the rack then press the **Unlock** function button, Refer to Checking Status of Racks and Lanes, page 5-66 for additional information.

Figure 5.62: Racks screen

e.   Grasp the handle and slide the rack out of its lane.

f.   Ensure the rack is completely clear of the guides, and both ends are supported when it is removed from the workcell.

> **WARNING: Pinch Hazard.** Never reach under the LED bar to load or unload tubes. You could be injured if your hand enters the Input/Output robot area. Remove the rack from the Input/Output module before loading and unloading sample tubes. Always use the rack handles to insert or remove a rack.

3)   Unloading Samples
Perform this procedure to remove a sample tube from the Input/Output module.

> **WARNING: Potential Biohazard.** When handling uncapped sample tubes, avoid splashing sample outside of the sample tubes.

Sample tubes are potentially biohazardous. Follow your laboratory standard operating procedures and guidelines when handling and disposing of tubes.

a) Before unloading samples, determine if any sample tubes require additional sample processing by performing one of the following:

Figure 5.63: Exceptions screen

i. Review the Exceptions screen from the ACCELERATOR APS screen. Refer to the Troubleshooting Section page 10-6 of the Procedure Manual for additional information.

ii. Review the middleware/LIS host to determine if any samples have pending tests for this analyzer.

iii. The operator must use laboratory operating procedures to ensure all samples have been processed, and all tests have been completed.

b) Store sample tubes according to laboratory guidelines.

8. Delivery of a Sample to a Priority Output Rack

Use this procedure to return a sample from the workcell or the Storage and Retrieval module to the Input/Output module. The sample tube is delivered to the Priority output rack with no further processing performed.

NOTE: If Delivery is requested for a sample tube that is in the Centrifuge module, but has not yet started spinning, all samples will be removed from the centrifuge module without being spun. The requested tube is placed in a priority output rack; the remaining tubes are unloaded to the track and rerouted to the centrifuge module.

| Module status	Run/Pause
User access level	Supervisor
Supplies	None

a.   Press the **Worklist** navigation button.
1)   If the sample is currently on the workcell, press the **On-line** function button. A list of samples currently on the workcell displays.
2)   If the sample tube has been stored in the Storage and Retrieval module, perform the following steps.
a)   Press the **Search** function button to locate the sample.
b)   Enter the sample ID in the pop-up keyboard then press the **Confirm** button.

Figure 5.64: Worklist screen
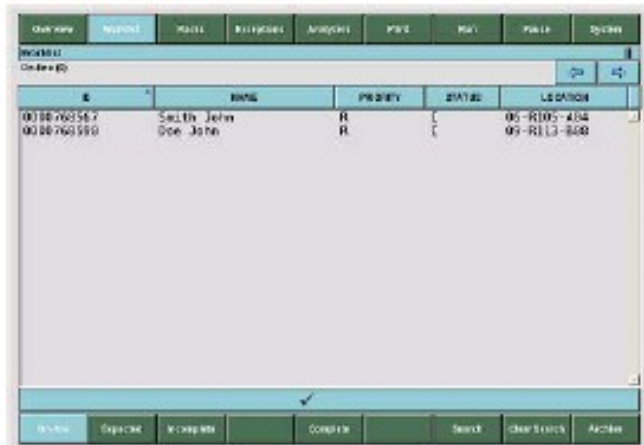
c)   Highlight the sample to be accessed from the Worklist screen.
d)   Press the Selection button.
e)   Select the Deliver function button.
f)   Confirm the pop-up "Are you sure?" by pressing the "✓" button to accept.
g)   The sample tube is delivered to the Priority output lane.

Figure 5.65: Sample screen
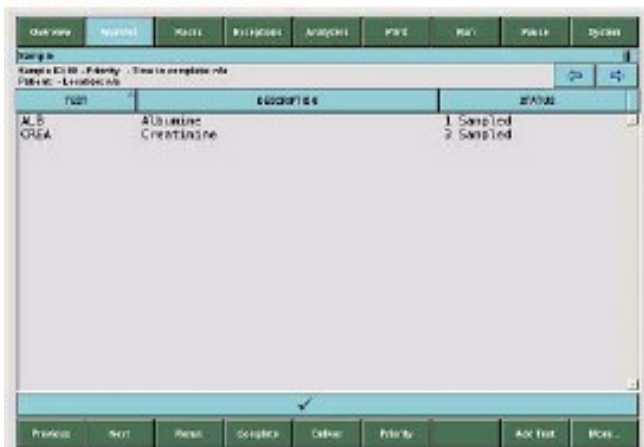
NOTE: It is possible to configure a routine lane as Priority Output. Priority Output lanes (O-1, O-2, O-3) are used before the routine lane(s) that has been configured as PO.

9. Purging Samples

Samples may need to be purged from the workcell if the workcell must be paused or powered down for an extended period of time, e.g., when maintenance will be performed. Purged samples are returned to Priority Output lanes.

NOTE: During the Purging Samples procedure, samples in the Centrifuge are returned to the Priority output lane when centrifugation is complete.

IMPORTANT: Sample integrity could be compromised if samples are left on the workcell when power is shut down. Refer to your laboratory specific guidelines or the reagent manufacturer's assay-specific documentation (e.g., a package insert or reagent application sheet) for detailed specimen collection, preparation, and storage information.

NOTE: This Purge procedure does not purge tube carriers from the ARCHITECT i 2000SR Interface module (i 2000SR IM) or the ARCHITECT i 2000SR Entry gate. Perform Purging Samples from i 2000SR IM, page E-148 for each ARCHITECT i 2000SR connected to the APS workcell.

a. Perform the following steps to display the LOCATION column of the Worklist screen.

1) Press the **Worklist** navigation button.
2) Press the **On-line** function button.

Figure 5.66: Worklist screen

3) If sample tubes display in the LOCATION column, it is necessary to perform the Purging Samples procedure to remove these sample tubes from the workcell. If no sample tubes remain on the workcell, no further action is needed.
4) Remove racks from Lanes 1 through 15. Refer to Unloading Racks from the Input/Output Module, page 5-91.
   a) Press the **Racks** navigation button.

b) Press the **On-line** function button.
c) Highlight the lane of the rack then press the **Unlock** function button, if necessary.

5) Verify all installed Centrifuge modules are on-line.

a) Press the **System** navigation button.
b) Press the **Configuration** option button.
c) Press the **System** function button at the bottom of the screen.
d) Highlight the necessary module to turn on-line.

> **IMPORTANT:** If the Centrifuges are off-line, samples cannot be purged from the Centrifuge area. Refer to System (On-line/Off-line), page 2-7.

Figure 5.67: System screen
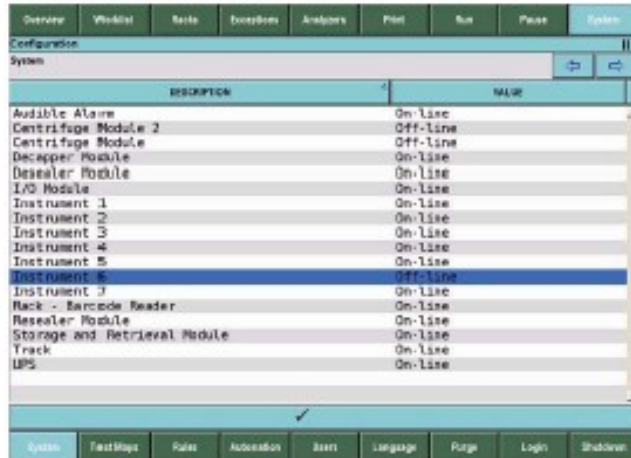
Select "✓" to accept or "✗" to cancel.

e) Allow any sample tubes loaded in tube carriers at the Input/Output module to be scanned by the barcode reader before proceeding.
f) Perform the following steps to start the Purge procedure.

i. Press the **System** navigation button.
ii. Press the **Configuration** option button.
iii. Press the **Purge** function button at the bottom of the screen.
iv. The pop-up message "Purge all samples from System" displays.

Figure 5.68: "Purge all samples from system" pop-up

v. Select the confirmation button by pressing "✓" to confirm the Purge procedure.

g)   Load empty Priority output racks and replace until all samples have been removed from the Track module.

> **NOTE:** It is possible to configure a routine lane as Priority output. If a routine lane is configured as Priority output, it is used to unload purged samples if the standard Priority output racks are unavailable.

h)   The Purge procedure continues until all samples are unloaded from the workcell.

> **NOTE:** Sample tubes in the Centrifuge must complete centrifugation before delivery to the Priority output lane.

i)   To verify the Purge procedure is running:

   i.   Press the **System** navigation button.
   ii.   Press the **Diagnostics** option button.
   iii. Press the **Automation** function button.
   iv.   Press the **I/O Module** function button.
   v.   Locate the line **Purge all samples from system** to determine procedure status.

Figure 5.69: Automation screen

Value	Status	Description
Green	Normal	Purge procedure is complete or stopped
Yellow	Warning	APS is currently purging samples

j)   Verify all samples were purged by checking for on-line samples on the Worklist screen.

   i.   Press the **Worklist** navigation button.
   ii.   Press the **On-line** function button.
   iii. There will not be any on-line samples when the Purge procedure has completed.

      k)   When sample tubes are located only on the workcell Track, the Purge procedure must be ended manually. Refer to Checking Details of Samples, page 5-71.

          i.   Press the **Purge** function button at the bottom of the Configuration screen.

          ii.   The pop-up message "Quit purging samples" displays.

          iii.   Select the confirmation button by pressing "✓" to confirm the Quit Purging procedure.