AU680 Chemistry Analyzer In-Lab Training Manual

WARNINGS AND PRECAUTIONS

Read all product manuals and consult with Beckman Coulter-trained personnel before attempting to operate the instrument.

Beckman Coulter, Inc. urges its customers and employees to comply with all national health and safety standards such as the use of barrier protection. This may include, but is not limited to, protective eyewear, gloves, suitable laboratory attire when operating or maintaining this or any other automated laboratory equipment.

INTENTION FOR USE

This document is not intended to replace the information in your Instructions for Use or Reference Manual. Information in the Instructions for Use and Reference Manual supersedes information in any other manual.

REVISION STATUS

Version 2.0 (September 2016)

Based on:

- AU680 Chemistry Analyzer Software version 4.0
- AU680 Chemistry Analyzer Instructions for Use B04779AB
- AU680 Chemistry Analyzer Reference Manual B63158AA

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AU680 Chemistry Analyzer
In-Lab Training Manual

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Chapter 1

Analyzer Overview

Introduction

The AU680 is an automated chemistry analyzer that measures analytes in samples, in combination with appropriate reagents, calibrators, quality control (QC) material, and other accessories. The system is for in vitro diagnostic use only. The AU680 performs automated analysis of serum, urine, other fluids, and whole blood.

This chapter will cover the following:

- Analyzer and ISE hardware components
- Photometric sample processing overview
- ISE sample processing overview

Understanding the function of hardware components in the processing of samples on the analyzer can assist in efficiently operating the system, as well as with performing maintenance and troubleshooting.

Note: The ISE module is an optional module of the analyzer. You can skip any ISE-related information and procedures in the In-Lab Training Manual if your lab does not have the ISE module.

Practice

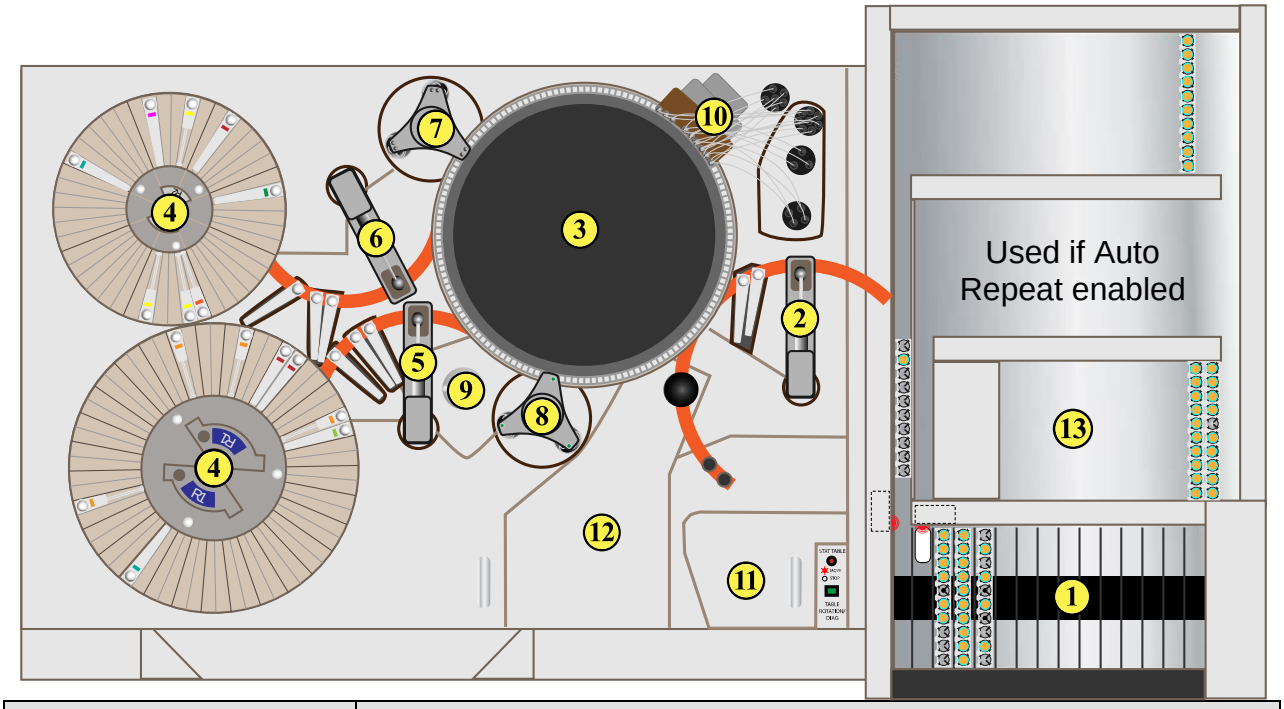
- Use the information presented in the following pages to identify the hardware components on the analyzer

- Review the sample processing overviews for tests processed in cuvettes (photometric) and the ISE module

- Animations for the reaction process can be found on the Beckman Coulter website. Use the following pathway to access the e-learning modules:

  www.beckmancoulter.com > SUPPORT > Training & Education > Diagnostics/Chemistry > AU680 > select **On Demand** tab**:**
  - **AU680 Overview E-learning**: Provides a hardware and software overview of the AU680 with reaction process animation
  - **AU680 ISE Overview E-learning**: Provides a hardware overview of the ISE module with reaction process animation

AU680 Hardware

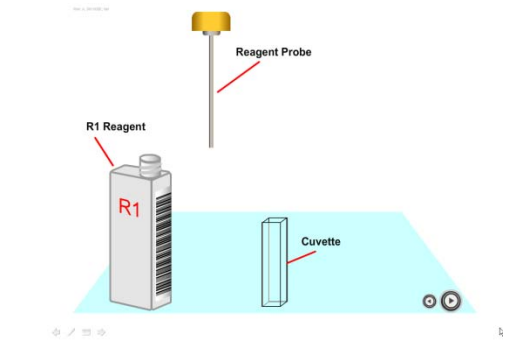
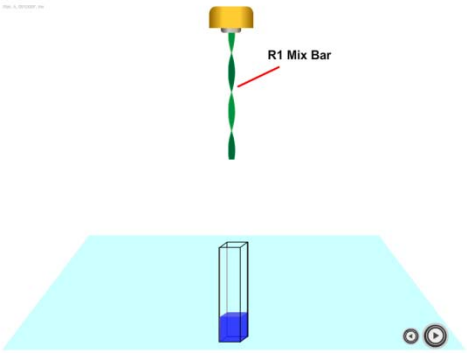
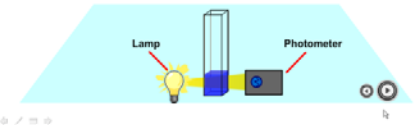
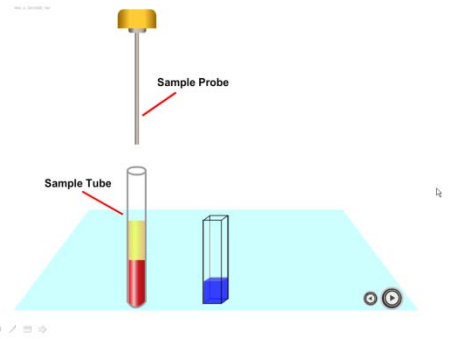


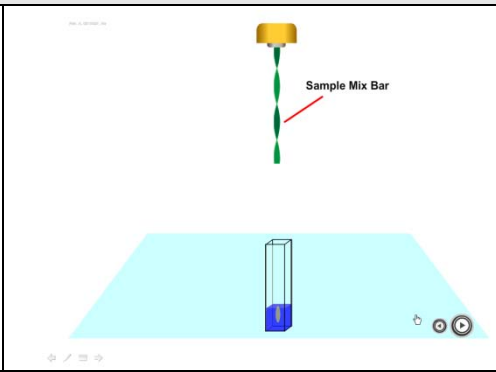
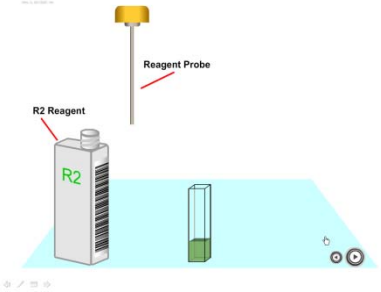
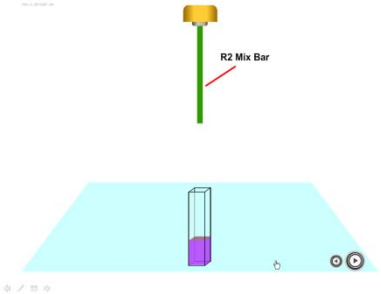
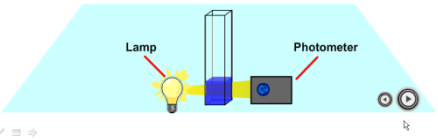
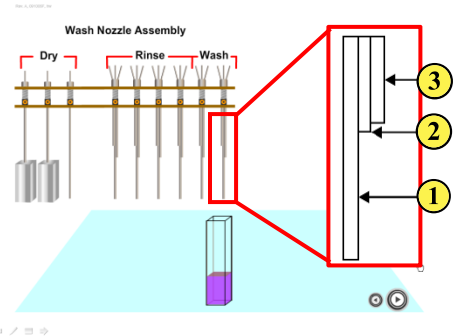
Component		Function
1	**Rack Feeder Module**	Holds racks waiting to process and feeds the racks through the analyzer for sampling
2	**Sample Probe**	Aspirates sample (in conjunction with the sample syringe) from a sample container and dispenses into a cuvette or the ISE sample pot
3	**Cuvette Wheel**	Houses 165 glass cuvettes where reactions occur and absorbance readings are taken
4	**R1/R2 Reagent Refrigerators**	Two refrigerated compartments that house R1 (60 positions) and R2 (48 positions) reagents
5	**R1 Reagent Probe**	Aspirates and dispenses R1 reagent (in conjunction with the R1 reagent syringe) into glass cuvettes located in the cuvette wheel
6	**R2 Reagent Probe**	Aspirates and dispenses R2 reagent (in conjunction with the R2 reagent syringe) into glass cuvettes located in the cuvette wheel
7	**R1/S Mix Bar Component**	Spiral-shaped mix bars on the component mix the contents of the cuvette after R1 reagent and sample are dispensed
8	**R2 Mix Bar Component**	L-shaped mix bars on the component mix the contents of the cuvette after R2 reagent is dispensed
9	**Photometer Lamp**	Component of the photometry system that is used to measure reactions
10	**Wash Nozzle Component**	Cleans, rinses, and dries cuvettes before and after analysis
11	**STAT Table**	Use to process STAT samples and for ISE calibration and ISE maintenance
12	**ISE Module**	Measures sodium (NA), potassium (K), and chloride (CL) ions by the indirect (diluted) ion-selective electrode (ISE) method
13	**Rack Collection Area**	Collects racks the system no longer needs for operator removal

AU680 Hardware (Continued)

Component		Function
1	**Tank Storage Area**	Houses the DI water tank, wash solution tank, and diluted wash solution tank; used to clean cuvettes and mix bars and rinse components
2	**R2 Syringe**	Aspirates and dispenses specified volume of R2 reagent
3	**R1 Syringe**	Aspirates and dispenses specified volume of R1 reagent
4	**ISE Buffer Syringe**	Aspirates and dispenses ISE Buffer reagent
5	**ISE Reagents**	Bulk reagents required for electrolyte analysis (ISE Reference, ISE MID Standard, ISE Buffer)
6	**Sample Syringe**	Aspirates and dispenses the specified sample volume
7	**Wash Syringe**	Aspirates and dispenses DI water for sample probe cleaning
8	**Operation Buttons**	• **ON** (green): Turns on the analyzer and computer • **EM STOP** (orange): Emergency stop turns off all power to the analyzer immediately. Ctrl+Alt+Del is required to turn off the computer • **RESET** (white): Use following an EM STOP or power failure before pressing the ON button

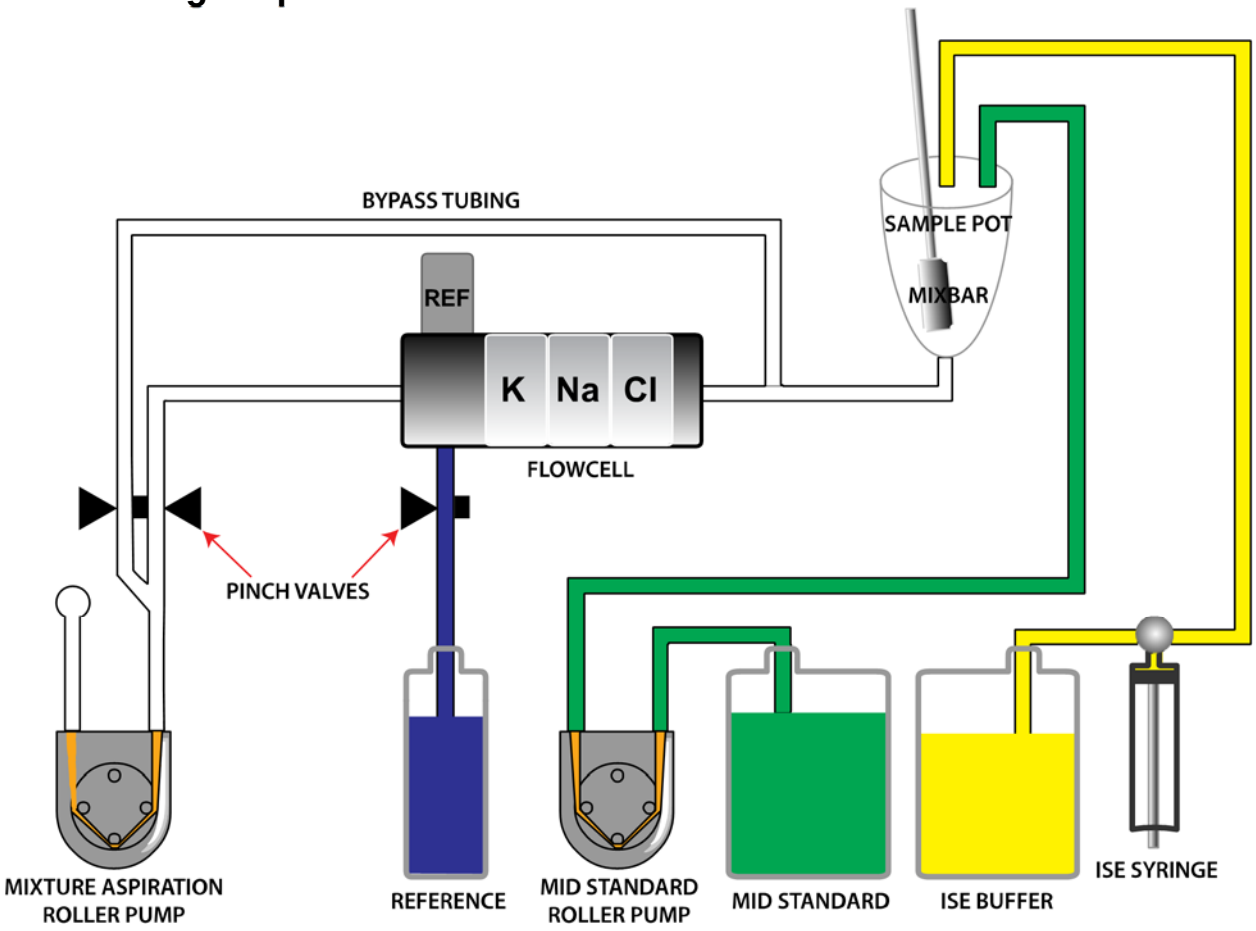
Sample Processing Overview

Step	Action	
1	A sample rack is placed on the rack feeder module by the operator	
2	The operator presses Start	
3	The rack is moved to the bar code reader where sample programming is identified	
4	The rack is moved to the sample aspiration position	
5	The reagent probe, working with the reagent syringe, delivers R1 reagent (concentrated) and diluent into a cuvette	
6	An R1 mix bar mixes the diluted reagent in the cuvette	
7	The photometer starts taking readings	
8	The sample probe, working with the sample syringe, aspirates and dispenses sample into the cuvette in the cuvette wheel	

Step	Action	
9	A sample mix bar mixes the sample and the reagent. The photometer continues to take readings	
10	If required, the reagent probe, working with the reagent syringe, delivers the R2 reagent (concentrated) and diluent into the cuvette	
11	An R2 mix bar mixes the reaction mixture	
12	The photometer continues to take reaction readings	
13	The cuvette is washed, rinsed and dried by the wash nozzle probes using diluted wash solution and DI water Note: Each wash nozzle is a 3-way nozzle used to clean the cuvettes: ① Longest aspirates liquid ② Middle dispenses liquid ③ Shortest aspirates overflow liquid	
14	When the sample is no longer needed the rack is moved to the rack collection area	

Note: A priority sample may be processed using the STAT table at any time during routine sample processing. This allows the priority sample to be processed before samples loaded through the rack feeder module.

ISE Testing Sequence



Step	Action
1	The mixture aspiration roller pump pulls ISE Reference Solution from the bottle and past the REF electrode where measurements are taken and the solution is sent to waste.
2	ISE Buffer Solution is delivered to the sample pot by the ISE Buffer syringe.
3	Sample is aspirated by the sample probe and dispensed into the sample pot where the sample and ISE Buffer Solution are mixed by the mix bar.
4	The mixture aspiration roller pump draws the diluted sample through the flowcell where measurements are taken. Excess diluted sample in the sample pot is pulled through the bypass tubing by the mixture aspiration roller pump and sent to waste.
5	After a urine sample is processed, ISE Buffer Solution is delivered to the sample pot by the ISE Buffer syringe and pulled through the flowcell by the mixture aspiration roller pump to rinse the flowcell.
6	After each sample is processed, the MID Standard roller pump pulls ISE MID Standard Solution from the bottle and delivers it to the sample pot. The mixture aspiration roller pump draws the ISE MID Standard Solution through the flowcell to condition the electrodes and take measurements and the solution is sent to waste.

Chapter 2

Software Overview

Introduction

The software is used by the operator to interact with the analyzer and perform system operations.

This chapter will cover the following:

- Common software screen areas
- Home menu of the AU680
- Software screen structure
- Accessing the Help menu

Being familiar with the software can assist in understanding and efficiently operating the system. Three software navigation methods are available for interacting with the software:

- Touch screen
- Mouse
- Keyboard

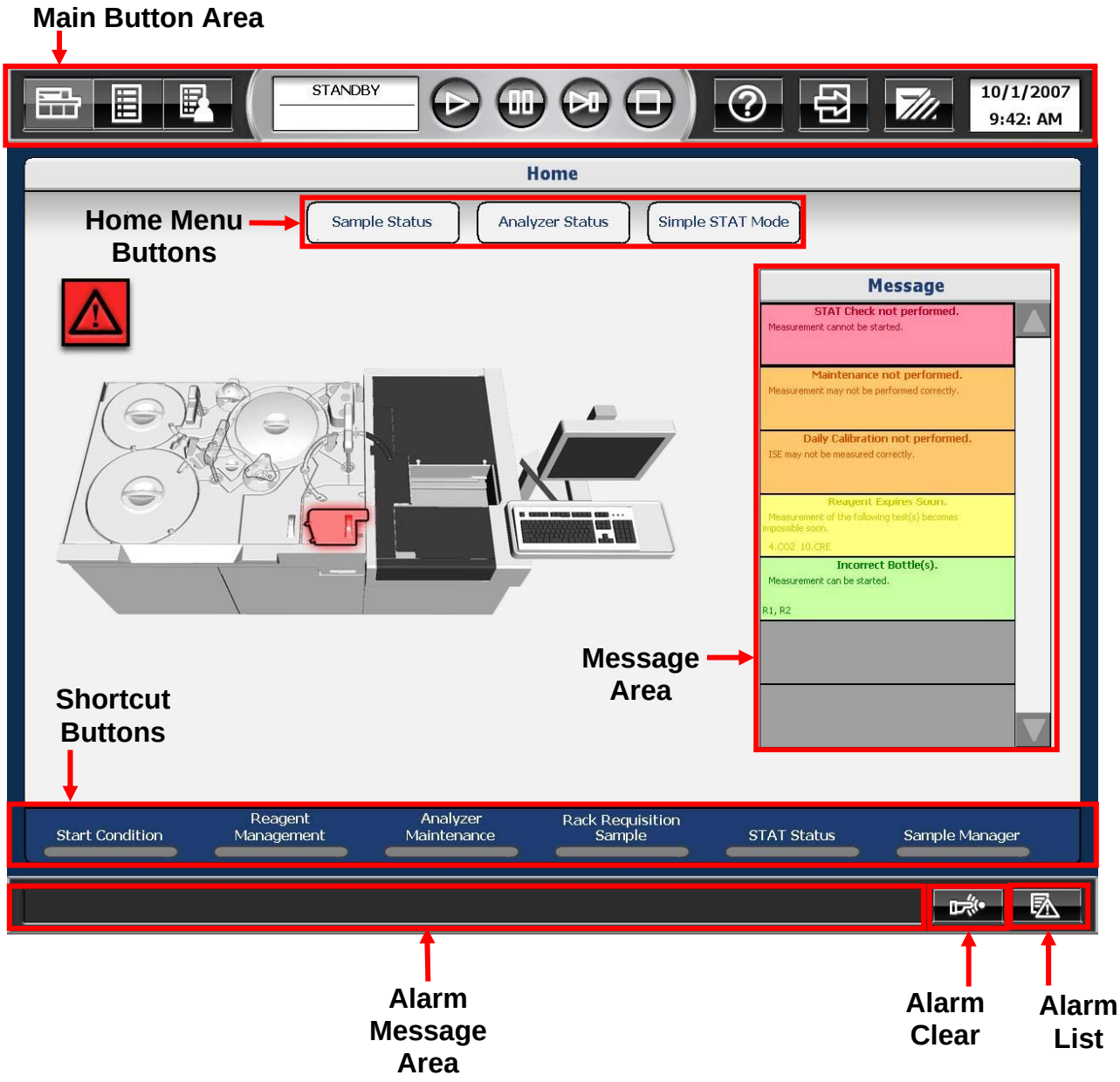
Practice

- Use the information on the following pages to identify the common software areas and the Home menu

- Access the **Help** button to identify the information available on the system. Help is not accessible when the analyzer is in *Measure* mode

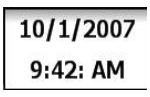
- The Main Button area buttons are not labeled on the software. Place the pointer of the mouse over a button to identify the name of the button

AU680 Home Menu



Main Button Area

The Main Button Area is viewable from all software screens.

Button	Description
 **Home**	Displays the Home screen
 **Menu List**	Displays the Menu List screen
 **User Menu**	Displays the User Menu screen (operator-defined shortcut buttons)
 **Mode Display area**	Displays the current mode. Displays the time remaining for certain maintenance operations
 **Start**	Starts analysis
 **Pause**	Pauses analysis. The system pauses at the first test for which no reagent was dispensed
 **Feeder Stop**	Stops the rack supply component. The analysis of samples in racks that are loaded continues
 **Stop / Standby**	Stops analysis. All data in process will be lost. In *Stop* mode, select this button to return the system to *Standby* mode
 **Help**	The system displays a menu for accessing the operator documentation and maintenance video directory. This button is not available when the system is in *Measure* mode
 **Logout**	Logs out an operator
 **End**	Shuts down the system (End Process). Shutting down the system turns off the auxiliary power supply, including the lamp and computer
 **Time Display area**	Displays the current date and time

.

Home Menu Area

Home Menu Button	Description
	**Sample Status**: Displays the sample status under analysis, estimated time of completion, and results
	**Analyzer Status**: Displays the analyzer status and temperatures
	**Simple STAT Mode**: Processes STAT samples one at a time with minimal operator actions required. Samples cannot be processed in the normal analyzer operation modes when using Simple STAT Mode

Message Area	Description
	• Displays messages regarding system conditions that can affect analysis results • Colors indicate the severity level of the message: **Red** — You cannot start analysis until you address red messages **Orange** — You can start analysis. Review the message carefully and take corrective actions **Yellow** — You can start analysis. Review the message carefully and take corrective actions. Yellow messages will shift to orange (more severe) if they are not addressed **Green** — A notification of system status. The system has no operational problems • A symbol displays  in the upper left of the screen according to the most severe message color • When a message is selected from the message area: – A system displays a dialog with information and corrective actions for the message – Highlights the affected area on the analyzer diagram

Home Screen Shortcut Buttons

Shortcut buttons provide direct menu access to the most frequently used menus to simplify software navigation.

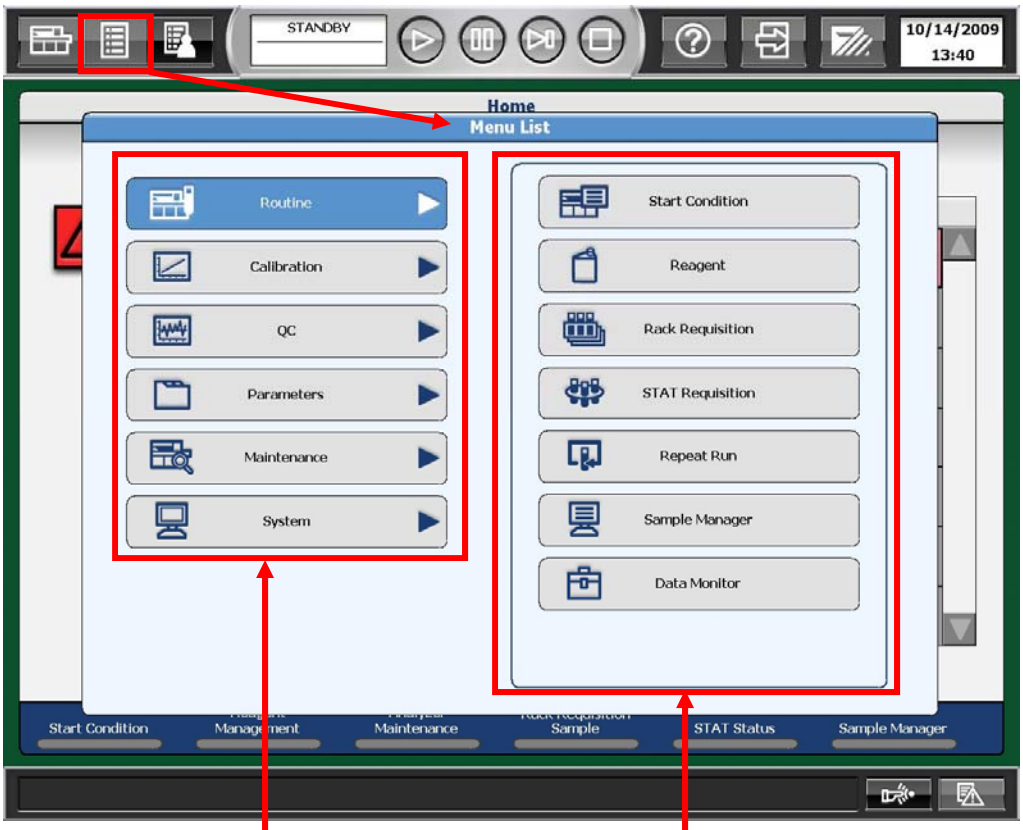
Button	Description
Start Condition	Set a new data index, the group of tests in use, the operator name, and start sample numbers
Reagent Management	Displays the reagent status and cleaning solution status
Analyzer Maintenance	Displays the analyzer and ISE maintenance schedules. Use to start some maintenance procedures
Rack Requisition Sample	Displays sample information and manually order (requisition) tests for patient samples, calibration, and QC
STAT Status	Start and monitor priority STAT samples for analysis from the STAT table; manually order (requisition) STAT samples
Sample Manager	View and print reagent blank, calibration, QC, and patient data, and batch transfer data to the laboratory information system (LIS)

Alarm Area

Displays alarm messages generated during system operation.

Button	Description
 **Alarm Clear**	Select to stop the audible alarm. Select a second time to clear the alarm message from the screen
 **Alarm List**	Select to display the Alarm List. The system can store and display a maximum of 999 alarms

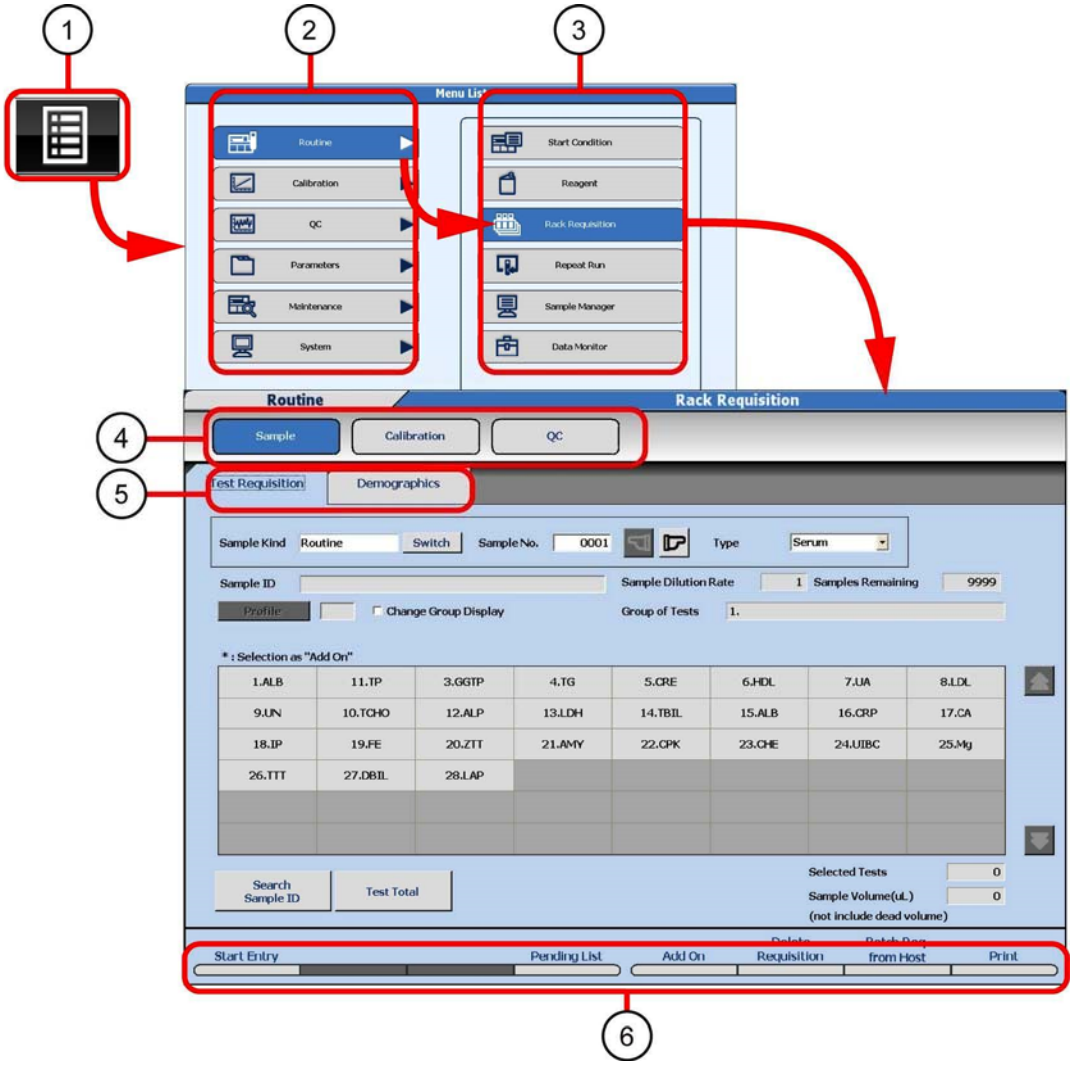
Menu List



This column displays the software menus. The selected menu is highlighted in blue.	This column displays the submenus for the selected menu.

Menu	Description
Routine	Perform various basic operational procedures: set start conditions, manage reagents, order samples/calibrations/QC, view/print results, review reaction data
Calibration	View history of calibration information and perform calibration verification
QC	View and manage QC data and charts
Parameters	Program information for all tests, including calibration and QC parameters
Maintenance	Monitor and perform maintenance, review a detailed alarm log, and perform diagnostic functions
System	Program online conditions, list formats, comments, bar code options, system settings, and data management

Software Menu Path



1 Menu List

2 Menus

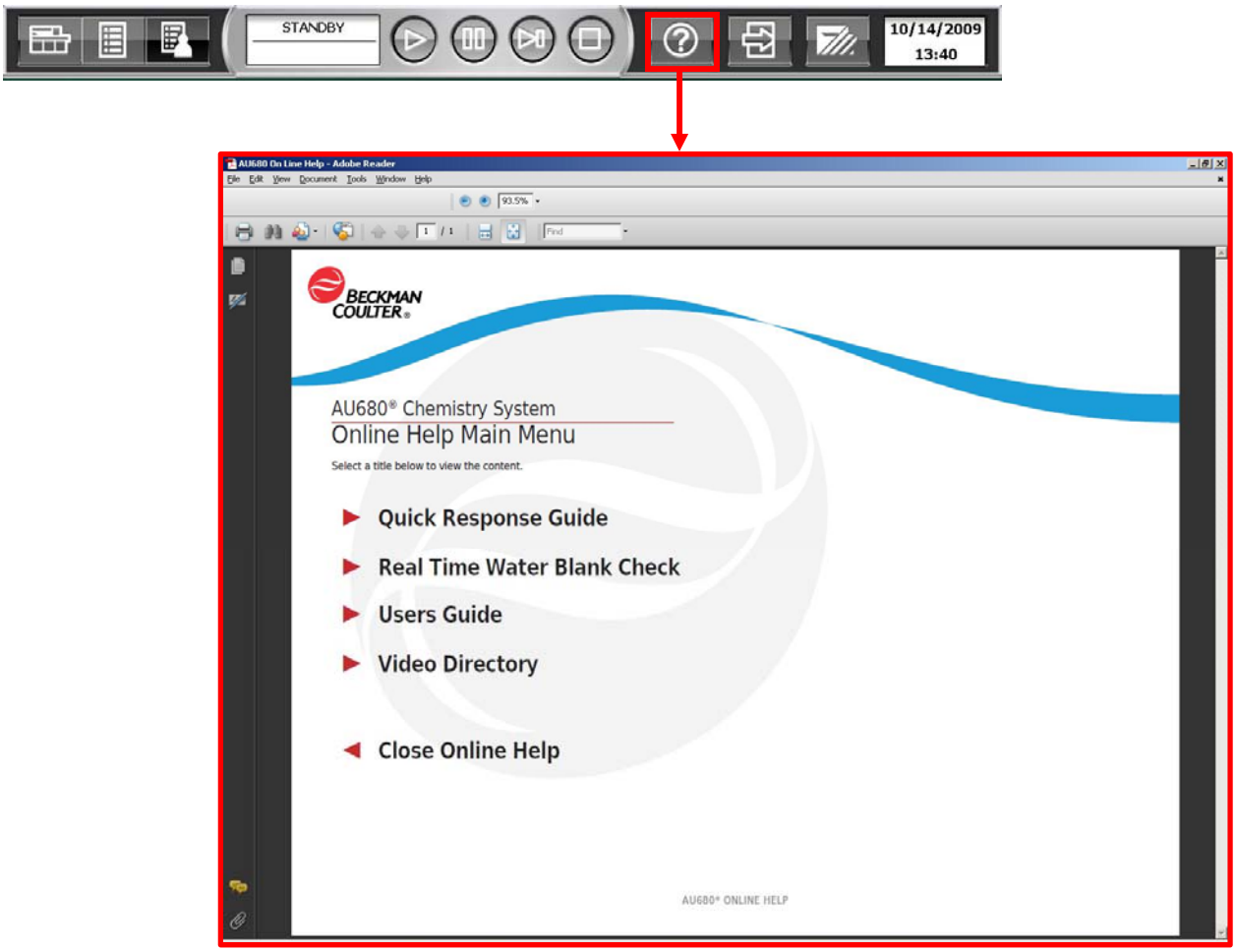
3 Submenus

4 Screens

5 Tabs

6 Buttons for corresponding function keys (F1 – F8 on the keyboard)

Online Help



- Select the **Help** button from the Main Button area to access the AU680 Chemistry Analyzer Online Help Main Menu

- Online Help includes:
  - PDF versions of Instructions for Use and Reference Manual
  - Video Directory with videos of select maintenance procedures

- Tips for using Online Help:
  - Accessible only when system is not in *Measure* mode
  - PDF documents can be printed – be sure to enter a page range before printing if only printing a specific section or procedure
  - Blue text within the PDF document can be selected as a link to other procedures
  - Exiting and returning to the Online Help window takes you back to the Main Menu – it does not recall the last page you were on

Chapter 3

Daily Startup

Introduction

A daily startup should be performed daily on the AU680 prior to processing patient samples. The following procedures are required for a daily startup:

- Set the start conditions
- Perform daily analyzer maintenance
- Check the analyzer status
- Check and replenish reagents
- Perform an ISE startup
- Perform analyzer calibration
- Process quality control (QC)

These procedures are presented in this chapter in an efficient order. However, you may identify an order that may be more efficient based on your lab policies and processes.

Flowchart Information

Flowcharts are provided for each daily startup procedure in this chapter. These flowcharts are available as a quick reference for the daily startup procedures.

Review the Instructions for Use for Warnings, Cautions, Important, Note, and Tip alerts as well as step-by-step instructions. For complete instructions to the daily startup procedures, refer to:

Reference: AU680 Chemistry Analyzer Instructions for Use
↳ Chapter 2: Daily Startup

Practice

- Use the information and flowcharts on the following pages to practice the daily startup procedures and determine an efficient order based on your laboratory workflow

Set the Start Conditions

The Start Condition menu is used to create a data index, select a group of tests, and enter the operator name.

An index is a data file identified by the date and time. Create a new index daily, each shift, or as needed. There are two options available when creating a new index:

- **Option 1**: Create a new index from the New Index window that displays when the analyzer is turned on from an End Process (system shutdown). This option is available only for labs that shut down the analyzer at the end of the day
- **Option 2**: Create a new index from the Start Condition menu. This option is available for continuously operating labs or if there is a need to create another index in the same day

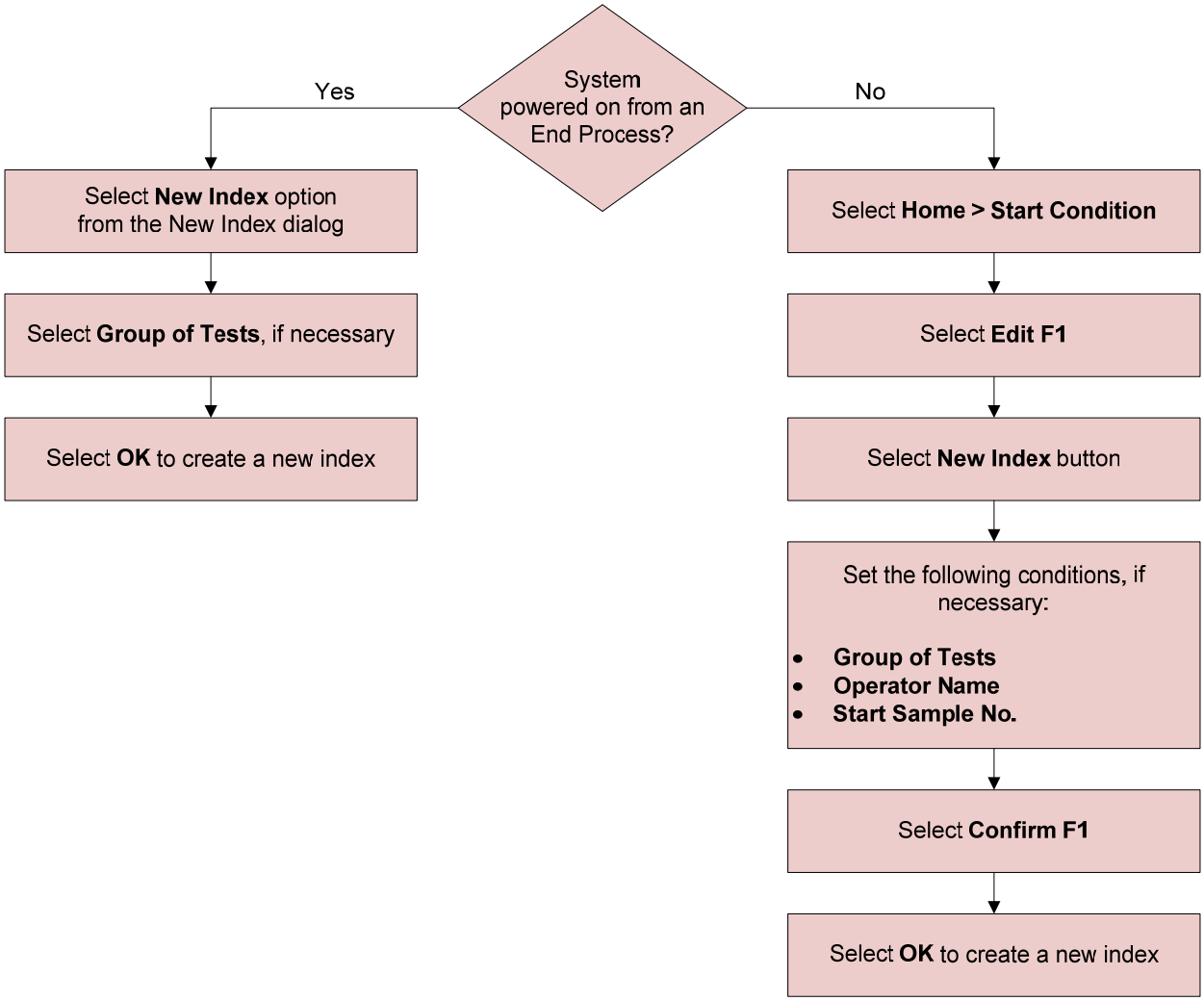
The group of tests determines the onboard tests to be performed in the index. Up to three different groups can be defined on the system. A group of tests can be changed without changing the index.

Practice

- Use the flowchart on the next page to practice creating a new index. To practice creating an index following option 1 (turning the system on from an End Process), you will need to first shut down and then turn the analyzer back on. Refer to Chapter 7 As-Needed Tasks → Perform an End Process (System Shutdown) of this manual for instructions on performing an end process

- Determine if your lab will have multiple "Group of Tests" defined. If so, identify when you would need to change the group of tests

Set the Start Conditions



Daily Analyzer Maintenance

Maintenance should be performed on the analyzer to ensure system performance and safety. Daily analyzer maintenance involves a series of inspections and the replenishment of solutions.

A Maintenance Schedule List is available for you to document the completion of maintenance procedures on the AU680.

For a copy of the Maintenance Schedule List, refer to:

Reference: AU680 Chemistry Analyzer Instructions for Use
↳ Chapter 8: Maintenance
↳ 8.1 Using the Routine Maintenance Schedule
↳ 8.1.1 Maintenance Schedule List

Practice

- Use the flowcharts on the following pages to practice the daily maintenance procedures. Procedures are presented in an efficient order in the flowchart but do not need to be performed in the order listed

- Identify where to find spare parts in the lab for components that require replacement following inspections: syringes, roller pump tubing, mix bars, probes

- Identify the solutions that need to be replenished for the bottle positions on the outside of the reagent refrigerators and sample probe:
  - Diluent
  - Det.-1, Det.-2
  - CLN-1, CLN-2 (lab dependent contamination parameters; check with your Applications Specialist for the appropriate solutions)

- Based on your laboratory workflow, which shift will be in charge of daily maintenance?

Daily Analyzer Maintenance

Inspect the Syringes for Leaks

- Confirm the system is in *Warm Up* or *Standby* mode
- Open the front right door of the analyzer

For each syringe:
- Visually inspect the case head for any cracks or leaks/condensation
- Use a lint-free cloth to check the top and bottom connections of the syringe case head and the bottom fixing screw for leaks
- Confirm the fixing nut and piston fixing screw are tight

- Close the front right door of the analyzer

Inspect the Wash Solution Roller Pump for Leaks

- Confirm the system is in *Warm Up* or *Standby* mode
- Open the front left door of the analyzer

For the wash solution roller pump tubing:
- Visually inspect for cracks; use a clean dry cloth to check for any leaks
- Confirm the connectors are tight; turn connector clockwise to tighten

Inspect the Wash Solution and Replenish As Needed

- Confirm the system is in *Warm Up* or *Standby* mode

Inspect the wash solution level:
- Confirm there is a sufficient quantity of wash solution for typical daily use; the system uses approximately 0.5 L per day for 4,000 tests per day

To replenish the wash solution:
- Disconnect the wash solution tank level sensor connector 869
- Remove the wash solution roller pump tubing from the roller pump
- Pull the wash solution tank forward and unscrew the cap to remove the cap and level sensor from the tank
- Replace the tank with a new wash solution tank, or add wash solution to the tank
- Insert the level sensor in the tank, tighten the cap and place the wash solution tank in the analyzer
- Reconnect the level sensor connector 869
- Mount the wash solution roller pump tubing on the roller pump

- Close the front left door of the analyzer

Inspect the Printer and Paper

- Confirm the printer is on
- Confirm that there is enough paper in the printer

Inspect the Stability of the Upper Cover

- Confirm that the cover is stable and remains in the upright position when raised

Daily Maintenance procedures continued on the next page

Daily Analyzer Maintenance, continued

Daily Maintenance procedures continued from the previous page

Inspect, Clean, and Prime the Sample Probe, Reagent Probes, and Mix Bars

- Confirm the system is in *Warm Up* or *Standby* mode
- Open the main cover of the analyzer

For the sample and reagent probes:
- Visually inspect that they are not bent or damaged
- Inspect for contaminants or crystallization; wipe outside with 70% isopropyl alcohol, if needed

For each mix bar:
- Inspect for deformities (bent, scratches, or chips in the fluororesin coating)
- Inspect for contaminants or crystallization; wipe outside with 70% isopropyl alcohol, if needed

Confirm proper operation of the probes and mix bars:
- Select **Home > Analyzer Maintenance**
- Place a check mark in the box next to the **Analyzer Maintenance** option
- Select **Prime Washing-line**
- Select **OK** in the Start dialog; leave default number in **Times** field
- Press the green **TABLE ROTATION/DIAG** button on the analyzer to start the prime cycle
- Confirm a thin straight stream of water is dispensed from each probe and that water is present in the wash wells
- Confirm proper operation of each mix bar component and wash nozzle component
- When priming is complete (green button lights up), deselect the check box next to the **Analyzer Maintenance** option to exit the *Maintenance* mode

Replace the DI Water in the Pre-dilution Bottle

- Discard the water in the pre-dilution bottle (located outside of the R1 reagent compartment in position labeled 61. Diluent/W2)
- Rinse the bottle twice with DI water
- Fill the bottle with DI water and replace it on the analyzer

Prepare the Sample Probe Wash Solutions

- Confirm there is approximately 50 mL of 2% wash solution in the two sample probe wash solution bottles (60 mL bottles located by the sample probe in positions labeled 64. Det.-1/W2 and 65. Det.-2)

Contamination Parameters

- If you have contamination parameters defined on your system, confirm you have sufficient volume of the appropriate cleaning solution in each bottle (60 mL bottles located by the R1 and R2 reagent probes in positions labeled 49. CLN-1, 50. CLN-2, 62. CLN-1, and 63. CLN-2)

Document completion of analyzer Daily Maintenance tasks on the paper Maintenance Schedule

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Check the Analyzer Status

The Analyzer Status menu displays a color-coded overview of the system and the temperatures of the incubator and refrigerated R1/R2 compartments. The following colors indicate the status of the components:

- **Blue**: No errors
- **Yellow**: Non-fatal error. The analyzer can be started
- **Red**. Fatal error. The analyzer cannot be started

The STAT table, DI water tank, wash solution tanks, waste tanks, printer, and LIS communication are also monitored. The ISE module and reagents are monitored when the ISE module is installed.

Note: Analyzer Status also displays the location of in-process racks on the rack feeder module.

For a description of the display color status for each component, refer to:

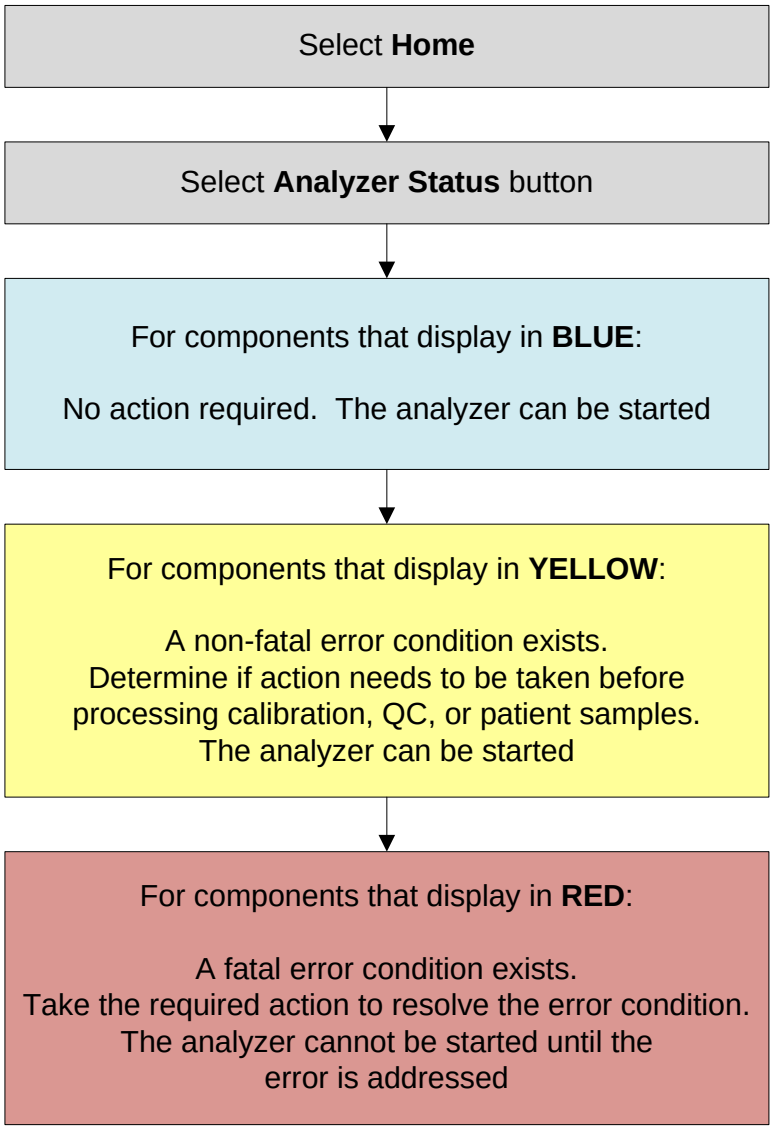
Reference: AU680 Chemistry Analyzer Instructions for Use
↳ Chapter 5: System Monitoring and Results
↳ Monitoring Analysis
↳ Inspect the Analyzer Status

Practice

- Use the flowchart on the following page to review the Analyzer Status menu.
  To cause the display color to change for different components, you can:
  - Open the covers of the refrigerators, ISE module, STAT table, or rack feeder
  - Remove an ISE reagent from its tray behind the front right door

- Locate the **Bath Temp** and **Coolant Temp** displays. Determine if your lab requires daily documentation of the temperature readings on a separate log

Check the Analyzer Status



Check and Replenish Reagents

A reagent check should be performed during a daily startup to determine the number of tests onboard and to update the status of the reagents.

Reagent volume and status can be viewed from tabs in Reagent Management:

- **Main** tab: Provides volume and status of reagents by sample type. The display color for each reagent indicates the following:
  - **Orange**: Reagent is missing, expired, or empty
  - **Yellow**: Reagent volume is short (low)
  - **Green**: The remaining volume is less than the necessary volume determined by Reagent Inventory calculations
  - **Light Blue**: Required reagents are set (present)
  - **Gray**: The reagent is not used for the displayed sample type
- **Details** tab: Provides detailed information for each onboard reagent. Use the **Shots**, **Onboard Remaining**, and **Expiration** columns to identify reagents that need to be replaced

Reagent Check: The analyzer requires a reagent check any time the reagent refrigerator covers are opened or when selecting the Edit function in the Parameters menu. The following options are available when performing a reagent check:

- **Check all positions**: Checks the remaining volume of reagents at all positions, including the bottle positions outside of the R1/R2 compartments and sample probe
- **Check specified positions**: Checks the remaining volume of reagents at specified positions selected by the operator
- **Check changed positions**: Checks the remaining reagent for any reagent ID (bar code) that is new or has been moved since the previous reagent check
- **Reset Only**: The reagent volume check and bar code reading is not performed. Select this option when a reagent cover is opened without changing any reagent, or a Parameters screen is entered, but no changes are made

Note: A reagent check resets any manual calibration or QC orders back to automatic order requirements (based on calibration status and default QC profile).

Practice

- Use the flowchart on the following page to practice loading reagents and performing a reagent check
- Review the Details tab to identify the additional information that displays for onboard reagents
- Based on your test volume, at what number of shots (tests) will you decide to replace or add reagent bottles?
- Perform each reagent check option to identify the differences between them
  Note: The **Checked changed positions** option will require the moving or addition of a bar coded reagent to see the reagent probes perform a volume check.

Check and Replenish Reagents

Select **Home > Reagent Management**

- Select the **Main** and **Details** tabs to identify the following reagent quantity and status information:

Note: If reagent information is not available (all reagents gray in the Main tab), perform a reagent check of all positions first.

Reagent Management **Main** tab

- Reagents in Orange are missing, expired, or empty
- Reagents in Yellow are short (low)
- Reagents in Green are less than the necessary volume determined by Reagent Inventory calculations
- Reagents in Light Blue are onboard and sufficient in quantity
- Reagents in Gray are used for a different sample type
- Select sample type from the **Type** drop-down list to view quantity and status of reagents for each sample type

Reagent Management **Details** tab

*Note: Missing reagents are not displayed in the **Details** tab.*

- Confirm "Shots" (number of tests) are sufficient for the run
- Confirm "Onboard Remaining" time is sufficient for the run (H = Hours, D = Days)
- Confirm "Expiration" of the reagent lot is within date
- Select sample type from the **Type** drop-down list to view quantity and status of reagents for each sample type

Load required reagents:

- Lift and remove the R1 and/or R2 reagent refrigerator covers
- Remove reagent bottles to be replaced (identified from the **Details** tab)
- Confirm appropriate adapters and partitions are set in desired reagent tray positions
- Place R1 bottles in the R1 refrigerator
- Place R2 bottles in the R2 refrigerator
  *Note: Bar coded reagents can be placed in any available position. Place fixed reagents (non-bar coded) in the positions assigned in the **Details** tab*
- Replace the R1 and/or R2 reagent refrigerator covers

Perform a reagent check:

- Select **Reagent Check F5**
- Select appropriate reagent check option
- Select **Start**. The system performs the selected reagent check option
- Review the **Main** and **Details** tab to confirm loaded reagents

  *Note: Perform **Check all positions** as a part of the daily startup to also check volumes after replenishing the pre-dilution (DIL), sample probe wash solution (DET-1, DET-2), and contamination parameter (CLN-1, CLN-2) bottles.*

ISE Startup – Check the ISE Reagents

The ISE Module uses three reagents:

- ISE Buffer Solution
- ISE MID Standard Solution
- ISE Reference Solution

Check the ISE reagents daily for onboard stability and volume:

- All three ISE reagents have a 90-day onboard stability that needs to be tracked by the operator. The analyzer does not track ISE reagent onboard stability. It is recommended to write the onboard expiration on the bottle when loading an ISE reagent
- The system generates an "ISE Reagent Short" alarm when the reagent volume is low (5.2 cm above the bottom of the bottle). The approximate number of samples that can be processed for each reagent when the alarm is generated is:
  - Buffer: 240 samples
  - MID Standard: 180 samples
  - Reference: 600 samples

When loading ISE reagents:

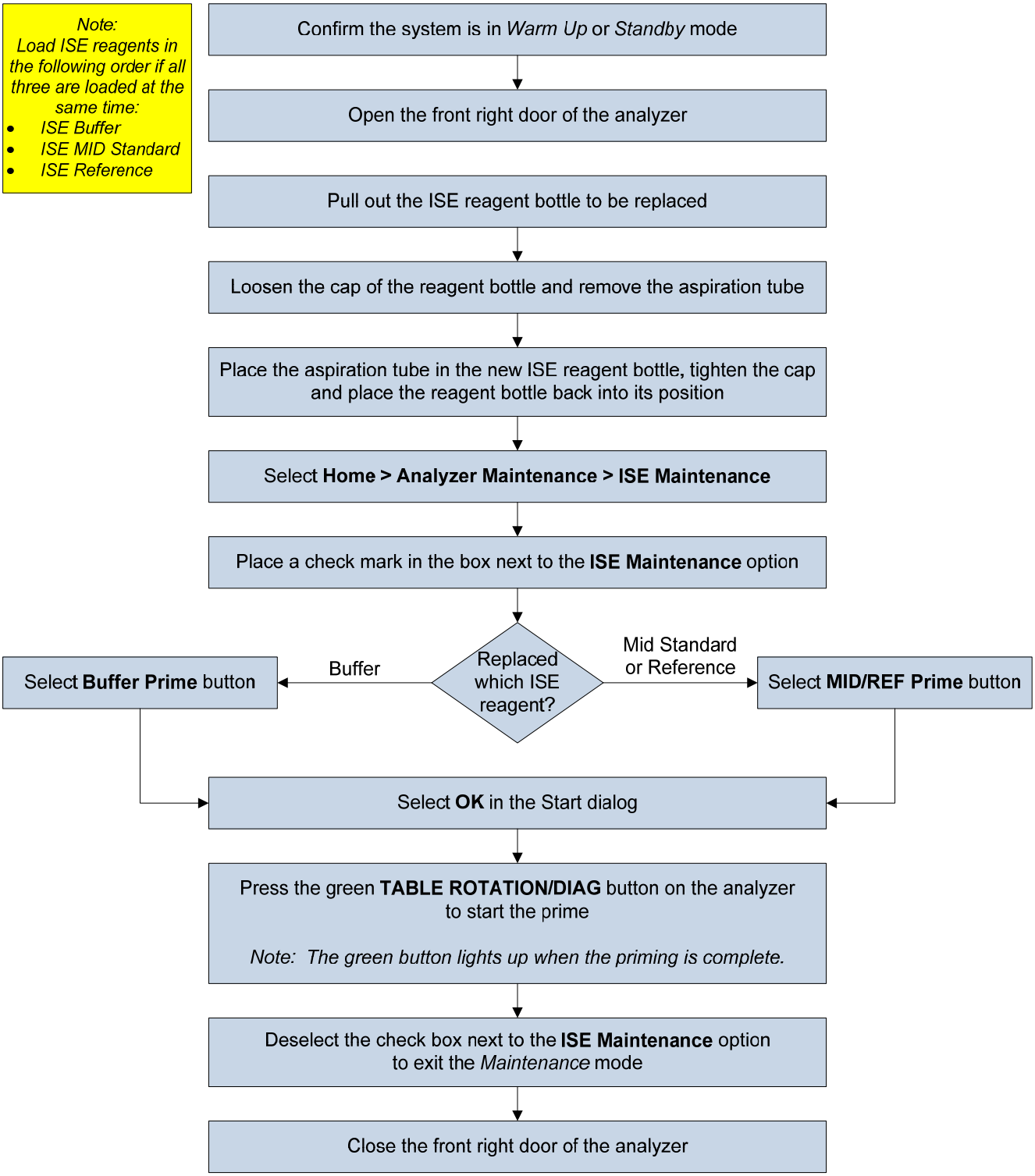
- ISE reagents cannot be loaded and primed in *Measure* mode. Verify there is sufficient reagent volume on board before starting analysis
- DO NOT mix old and new reagent
- It is recommended to perform calibration when a new bottle is loaded even if the 24-hour ISE calibration period is not due

Practice

- Use the flowchart on the following page to practice loading an ISE reagent

- Determine the volume at which your lab will replace an ISE reagent:
  - Based on your daily sample volume, can you wait until the alarm is generated?
  - Will you have each shift check the volume prior to processing samples?

Load ISE Reagents



ISE Startup – ISE Daily Maintenance

ISE Daily Maintenance includes:

ISE Cleaning

- Perform daily to clean the ISE sample pot and electrode lines. Contamination or inaccurate results may occur if the cleaning is not performed
- For labs that will perform an End Process (system shutdown) each day, it is recommended to perform the cleaning just prior to shutting down the analyzer to remove any build up before the ISE is not in use for a period of time
- Procedure takes approximately 4 minutes to complete

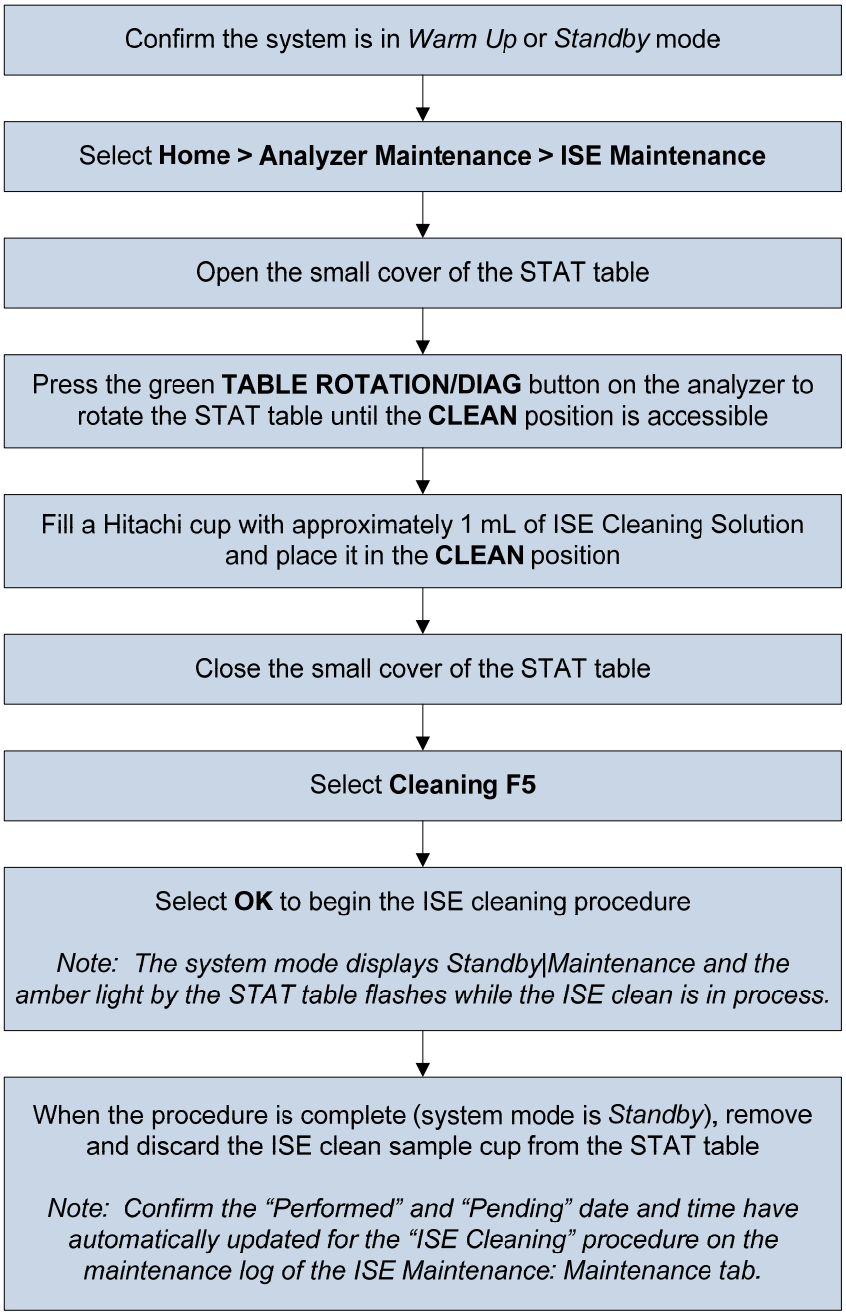
ISE Calibration

- Perform once every 24 hours, following specific maintenance procedures, and when replacing ISE reagents
- If the ISE calibration is performed immediately after the ISE cleaning, perform a total prime before calibrating
- The ISE Serum and Urine Standards have an open-bottle stability of 90 days
- Calibrating serum only or urine only takes approximately 4 minutes. Calibrating serum and urine takes approximately 7 minutes
- Use the **Slope** tab to review the slope results in graphical format for consistency across calibrations

Practice

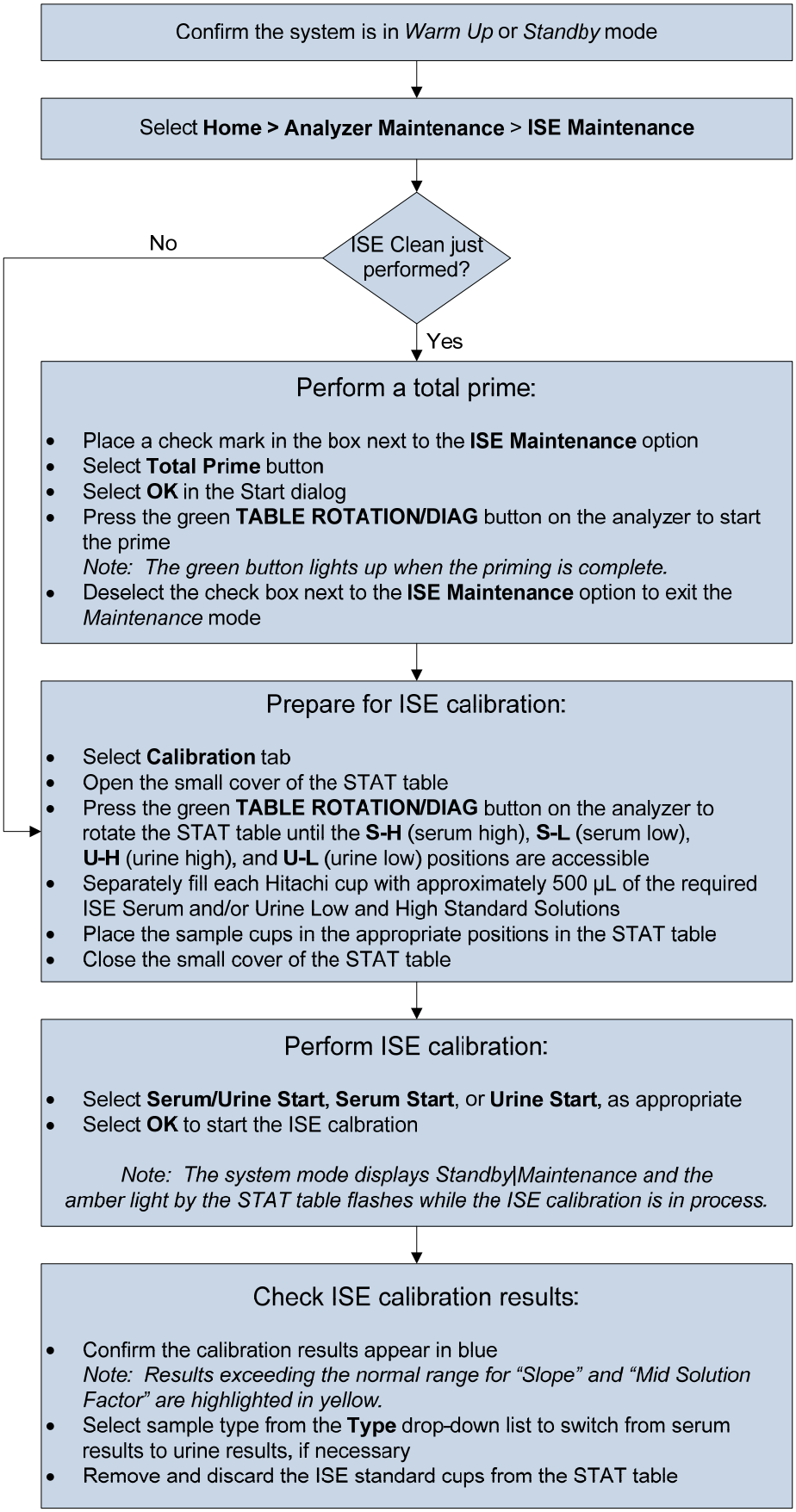
- Use the flowcharts on the following pages to perform the ISE Daily Maintenance procedures
- Determine when you will perform the ISE cleaning and ISE calibration based on your laboratory operating hours
- Identify if your lab will calibrate serum only, urine only, or both
- Review the Slope chart
- The system automatically updates the ISE Cleaning and ISE Calibration procedures when they are completed in the ISE Maintenance screen. Confirm that the system has the correct “Performed” date and time after the procedures are complete

ISE Cleaning



CAUTION: Pressing the green button during the clean will STOP the procedure.

ISE Calibration



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Analyzer Calibration

During a reagent check, the system automatically orders (requisitions) reagent blank (RB) and calibration (CAL) for all tests with:

- Reagent blank or calibration expired
- Reagent blank or calibration expires soon*
- New bottle or lot number for the reagent
- Reagent blank or calibration failed

* Your Beckman Coulter Applications Specialist can define “expires soon” to a time period that meets your laboratory workflow.

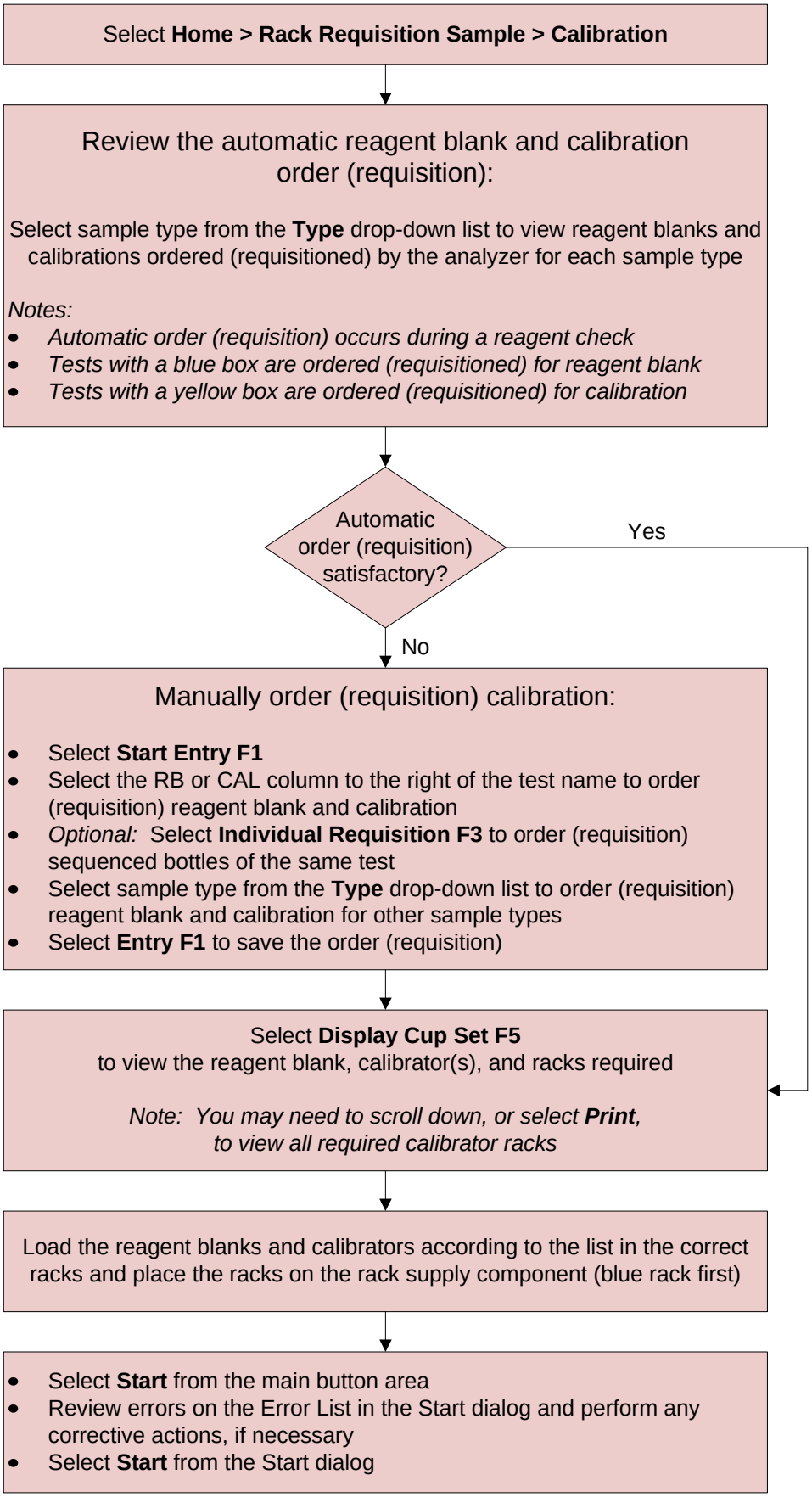
You can always edit the automatic order by adding or removing tests for reagent blank and calibration.

The reagent blank and calibration status (RB/CAL Stability Remaining) for a test can be found in the Reagent Management: Details tab.

Practice

- Use the flowchart on the following page to review the tests automatically ordered for calibration and the calibrators required
- Identify the “expires soon” time set for your analyzer
- Identify where to see the RB Stability and CAL Stability Remaining times from the Reagent Management: Details screen. The system displays remaining times in days (D) and hours (H)
- Use the flowchart to practice manually ordering tests for calibration

Analyzer Calibration



Process Quality Control (QC)

Quality control analysis is used to confirm system performance. QC should be performed prior to processing patient samples, following calibration, following maintenance procedures, and according to laboratory policy. Each laboratory should establish its own control frequency.

QC can be processed on the system by:

- Using a default QC profile
- Manually ordering QC tests

When a default QC profile is defined on the system, all tests defined in the profile will be automatically ordered (requisitioned) when a reagent check is performed. The default QC profile is usually setup by the Applications Specialist during installation.

The default QC profile is automatically ordered only for the first bottle (sequence 1) of each reagent onboard the system. If multiple bottles of the same reagents are on the system, you will need to manually order QC for the additional bottles (individual requisition) if your lab policy requires QC to be processed on the additional bottles. Up to 5 sequence bottles can be loaded on the analyzer for a reagent.

If a default QC profile is not defined, then the operator is required to manually order (requisition) QC each time it needs to be processed on the analyzer.

Note: The following flowcharts do not apply if your lab uses the LIS to generate QC requests and monitor QC results.

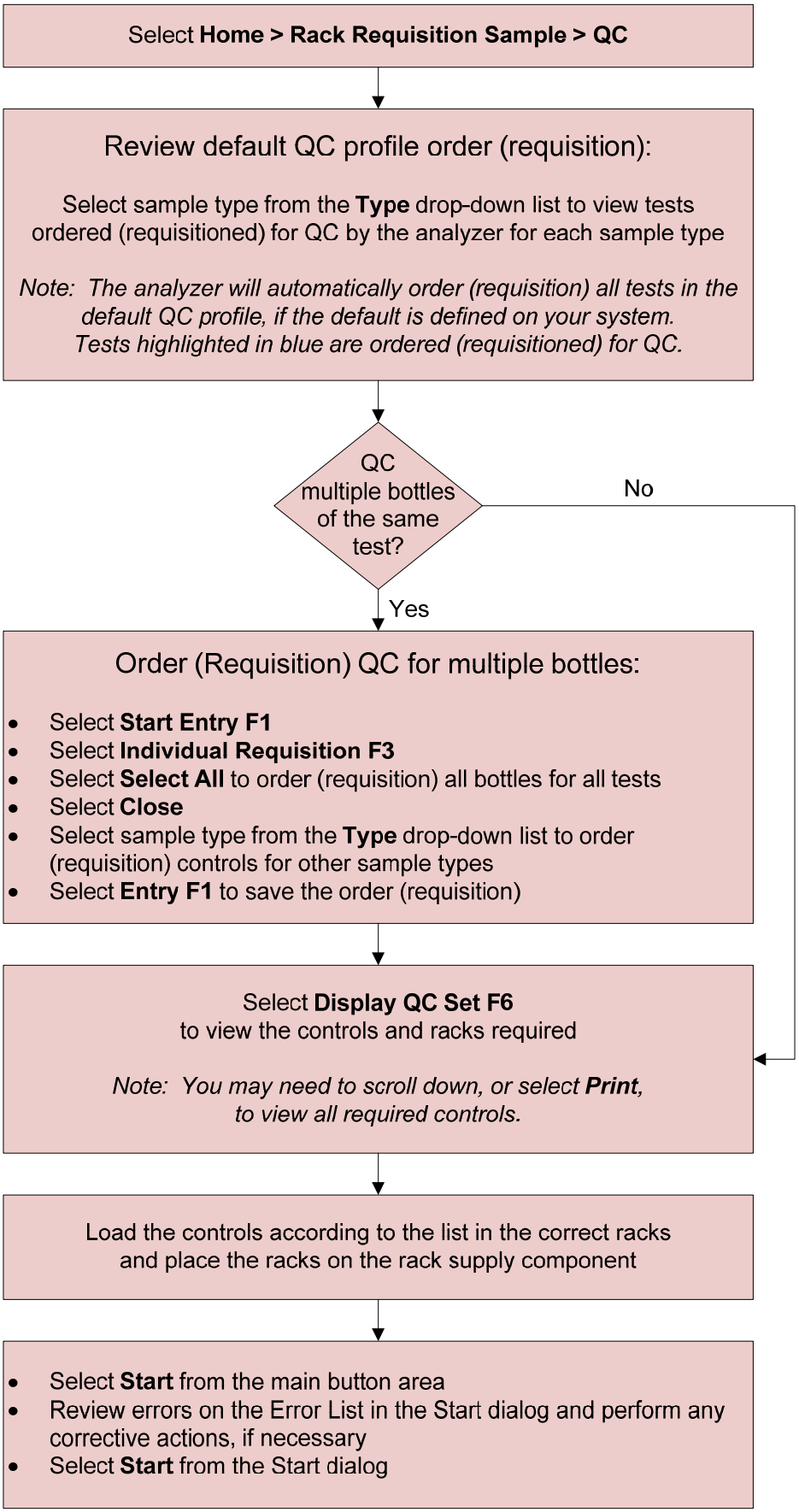
Practice

- Use the flowcharts on the following pages to practice processing QC:
  - Use the “Process Quality Control (QC) Using a Default QC Profile” flowchart if you have a default QC profile defined on your system
  - Use the “Manually Order (Requisition) Quality Control (QC)” flowchart if you do not have a default QC profile defined

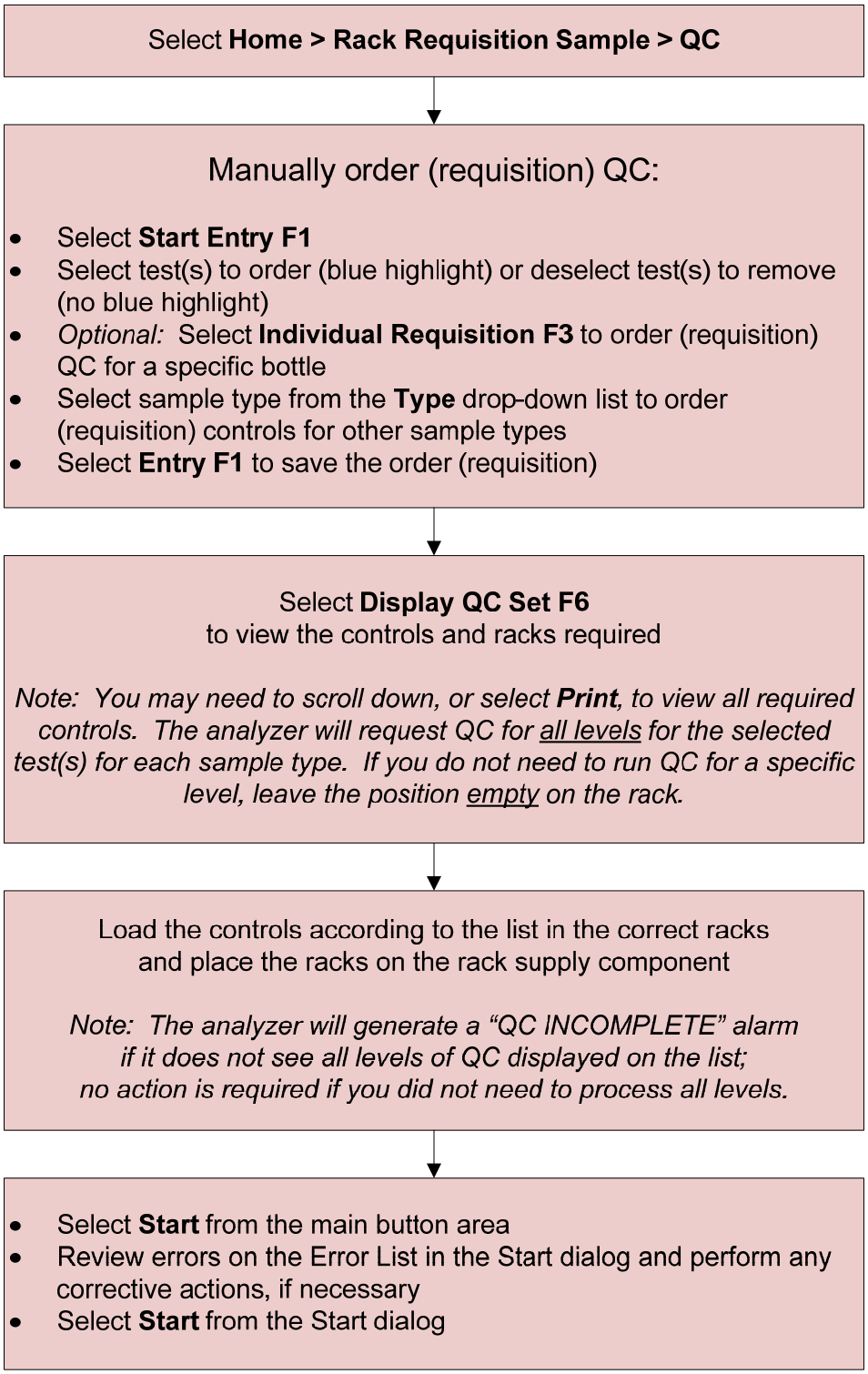
- Based on your test volume, will you require multiple bottles of reagents on the analyzer? You can identify the multiple bottles in the “Seq.” column of the Reagent Management: Details tab

- Use the “Manually Order Quality Control (QC)” flowchart when you need to rerun or order QC for specific tests

Process Quality Control (QC) Using a Default QC Profile



Manually Order (Requisition) Quality Control (QC)



Chapter 4

Sample Processing and Programming

Introduction

In this chapter you will identify the racks and validated sample containers that are available on the AU680. The racks and containers that you use in your lab are setup by your Applications Specialist and Service Engineer during installation.

It is important to reduce the risk of system errors and to provide accurate test results by using the appropriate racks and validated containers when processing samples on the analyzer.

This chapter will also include information on:

- Sample data prefixes
- Processing samples with bar codes and LIS programming
- Processing and programming samples without LIS programming
- Ordering an add on or rerun test at the analyzer
- Batch programming samples on the analyzer

Sample Racks

The system identifies the rack type from the combination of magnets set into the bottom of the rack. The color of the rack is for the operator to easily identify the rack type.

The system identifies the sample type for the rack from the rack ID bar code label. The rack ID bar code range for sample type is configured in the AU680 software. The following sample types are available on the AU680: **Serum, Urine, Other-1, Other-2, Whole Blood**. Place samples in the correct rack for the sample type.

Any validated container can be used to process reagent blank, calibrators, QC, or patient samples in the appropriate rack type. The available validated containers for the AU680 will be addressed later in this chapter.

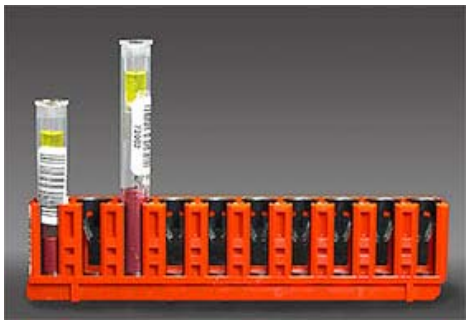
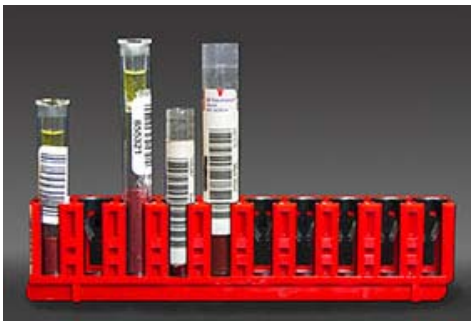
Blue Rack	
	• Use to process reagent blanks • Use any validated container to place DI water in position 1 • One rack is used for all sample types
Yellow Rack	
	• Use to process calibrators • Multiple racks may be required depending on number of calibrators and sample types used • Racks may be configured for rack ID and position or bar code operation
Green Rack	
	• Use to process QC material • Multiple racks may be required depending on number of controls and sample types used • Racks may be configured for rack ID and position or bar code operation

Patient Sample Rack Types

- **Barcode analysis**: Bar coded samples may be placed in any position in the rack programmed for the correct sample type
- **Sequential analysis**: Samples without bar codes must be placed in numeric order by their sample number order. Do not leave empty spaces between samples
  Note: Barcode analysis is recommended because sequential analysis does not allow for positive patient identification.

Rack Adapters

Rack adapters are necessary to hold smaller diameter tubes (11.5 to 13.5 mm) firmly in position in the racks. Larger diameter tubes (13.6 to 16 mm) do not require adapters.

White Rack	
	• Use for routine patient samples • Use for Automatic Repeat samples (repeat is automatically ordered and processed by the analyzer in the same rack)
Orange Rack	
	• Use for Manual Repeat samples (repeat is automatically ordered by the analyzer, but only processed when placed into an orange rack) • Samples that require repeat are identified from the Repeat Run Pending List **(Menu List > Routine > Repeat Run > Pending List F4)**
Red Rack	
	• Can be used to designate a different sample category • Defined as Emergency rack in the software, but samples placed in a red rack do not process with higher priority • Can also be used for Automatic Repeat samples

Sample Data Prefix

The system displays the sample data prefix in front of the sample number. The sample data prefix can help you identify the following information about a sample processed on the analyzer:

- If the sample data is for a reagent blank, calibration, QC, or patient sample
- If the sample was processed in a routine (white) rack, an emergency (red) rack, a manual repeat (orange) rack, or on the STAT table
- If the patient sample result is from the original run or the repeat run of the sample

Type		Normal Run	Repeat Run
Routine Sample	Serum	(None)	H
	Urine	U	HU
	Other-1	X	HX
	Other-2	Y	HY
	Whole Blood	W	HW
Emergency Sample	Serum	E	HE
	Urine	UE	HUE
	Other-1	XE	HXE
	Other-2	YE	HYE
	Whole Blood	WE	HWE
STAT Sample (Priority)	Serum	P	HP
	Urine	UP	HUP
	Other-1	XP	HXP
	Other-2	YP	HYP
QC		Q	
CAL		A	
RB		R	

AU680 Validated Sample Containers

Note: BD indicates a Becton Dickinson part number. The BD tube or its equivalent can be used.

Placement	Container Type	Description	Part Number	Dead Volume (µL)	Example
Rack / STAT Table	Primary Tube	Serum Separator Tube 13x100 mm	BD 367986	4 mm above the non-sample (cells or gel) layer	
		Serum Separator Tube 16x100 mm	BD 367988		
		Lithium heparin with gel separator (light green top) 13x75 mm	BD 367960		
		Lithium heparin with gel separator (light green top) 13x100 mm	BD 367962		
		Lithium heparin (green top) 13x75 mm	BD 367884		
		Lithium heparin (green top) 13x100 mm	BD 367886		
		Primary tube (red top) 13x75	BD 366668	140	
		Primary tube (red top) 13x100	BD 367815		
	Aliquot Tube	Auto Aliquot Tube 13 mm	2910034	80	
	Sample Cup	Hitachi Cup 2.0 mL	MU853200	50	

AU680 Validated Sample Containers

Placement	Tube Part Number	Nested / Insert Cup		Dead Volume (µL)	Example
		Description	Part Number		
Rack: **Cup Nested (Inserted) in Tube**	13x75 mm BD 367960 BD 367884 BD 366668	Access 2 Cup 1.0 mL	81915	140	
	13x100 mm BD 367962 BD 367886 BD 367815				
	13x75 mm BD 367960 BD 367884 BD 366668	EZ Nest Cup	1270013000	50	
	13x100 mm BD 367962 BD 367886 BD 367815				
	16x75 mm BD 364976	EZ Nest Cup	1270016000	50	
	16x100 mm BD 367988				
	SST 16x100 mm BD 367988	Hitachi Cup 2.0 mL	MU853200	50	
	DxC Transfer Tube 979272	DxC Cup 2.0 mL	652730	50	
		Access 2 Cup 2.0 mL	81902		

AU680 Validated Sample Containers

Placement	Tube Part Number	Nested / Insert Cup		Dead Volume (µL)	Example
		Description	Part Number		
WARNING: The analyzer has only one sensor to detect the cup or tube on the STAT table, therefore only one maximum probe downward stroke can be programmed. The maximum probe downward stroke must be programmed for the cup or tube with the lowest bottom position. If primary tubes and tubes with nested cups are both being used on the STAT table, the nested cup must contain sufficient sample to avoid a probe crash into the nested cup.					
STAT Table: **Cup Nested (Inserted) in Tube**	13x75 mm BD 367960 BD 367884 BD 366668	Access 2 Cup 1.0 mL	81915	140	
	13x75 mm BD 367960 BD 367884 BD 366668	EZ Nest Cup	1270013000	50	
	16x75 mm BD 364976	EZ Nest Cup	1270016000	50	
	DxC Transfer Tube 979272	DxC Cup 2.0 mL	652730	50	
		Access 2 Cup 2.0 mL	81902		

Sample Processing

When processing samples on the analyzer:

- Determine if samples have sufficient volume to process in the primary tubes. Transfer any samples with insufficient volume into validated low volume containers. Use of non-validated containers may result in sampling errors
  CAUTION: A field service engineer sets the sample probe descent and alignment for optimal sampling during your system installation. Do not change the type of containers used on a rack without consulting Beckman Coulter technical support.
- Remove all caps
- Barcode analysis: Samples can be placed in any position in the rack, but a bar code is required. Bar code labels should be placed at least 7 mm from the bottom of the container
- Place each sample in the correct rack for:
  - Sample type: In Barcode analysis, if a sample is placed in the incorrect rack for sample type, the system will generate an alarm and will not process the sample
  - Tube size: Confirm a tube fits correctly in a rack by placing the tube into a rack with and without an adapter and determine which holds the tube most securely
- Ensure the sample bar codes are aligned in the center of the open slots in the rack
- Load racks on the rack supply component with position 1 of the rack (rack ID bar code end) facing the back of the analyzer
- Do not leave spaces between racks when loading. The rack feeder stops advancing when a space is left between racks
- Use the STAT table to process samples with higher priority
  - The system will process samples loaded in the STAT table before samples loaded on a rack, regardless of the priority assigned to the sample in the LIS request

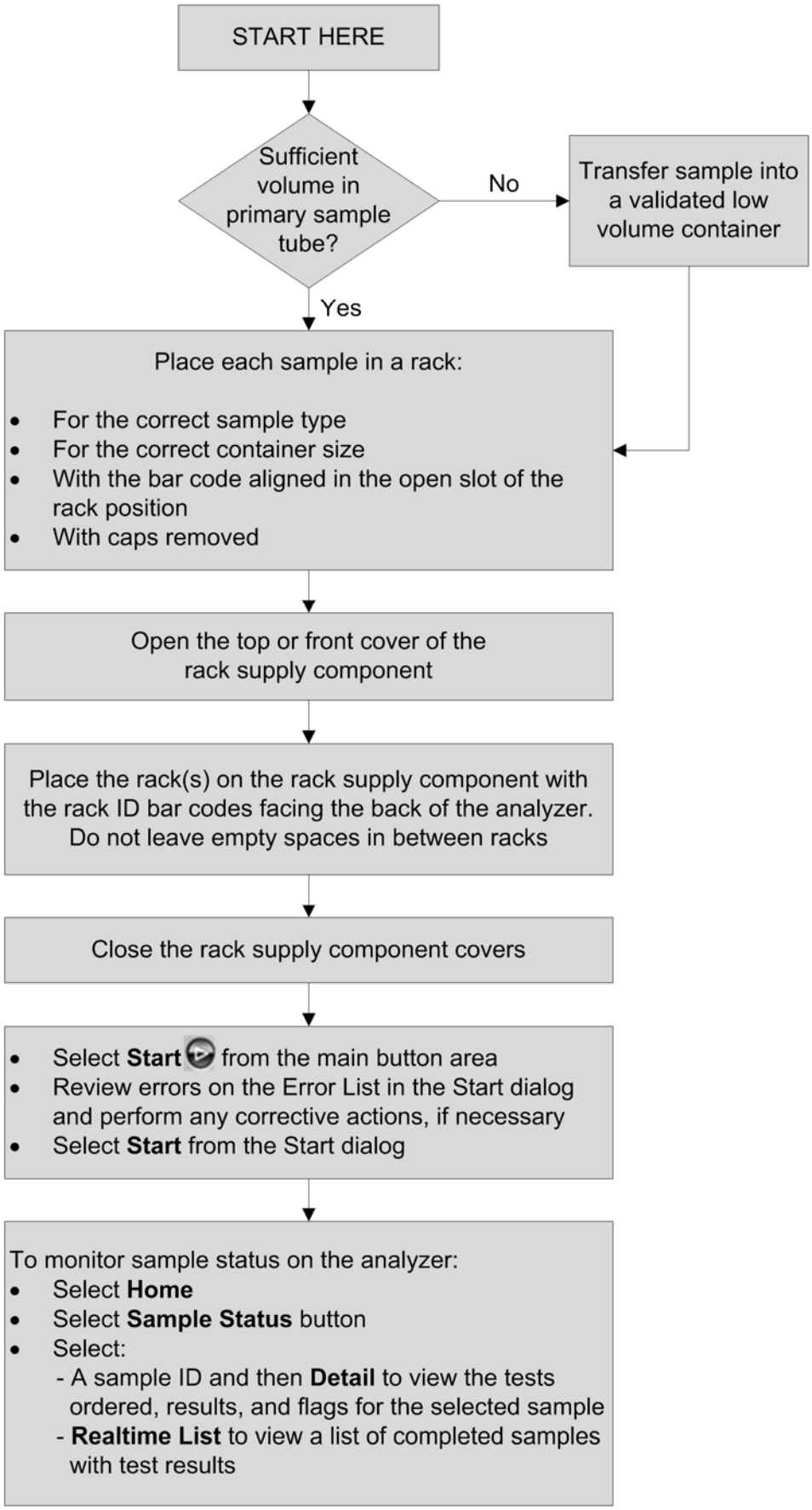
Practice

- Use the flowcharts on the following pages to process samples on racks or the STAT table. The flowcharts apply for systems setup for **Barcode analysis**

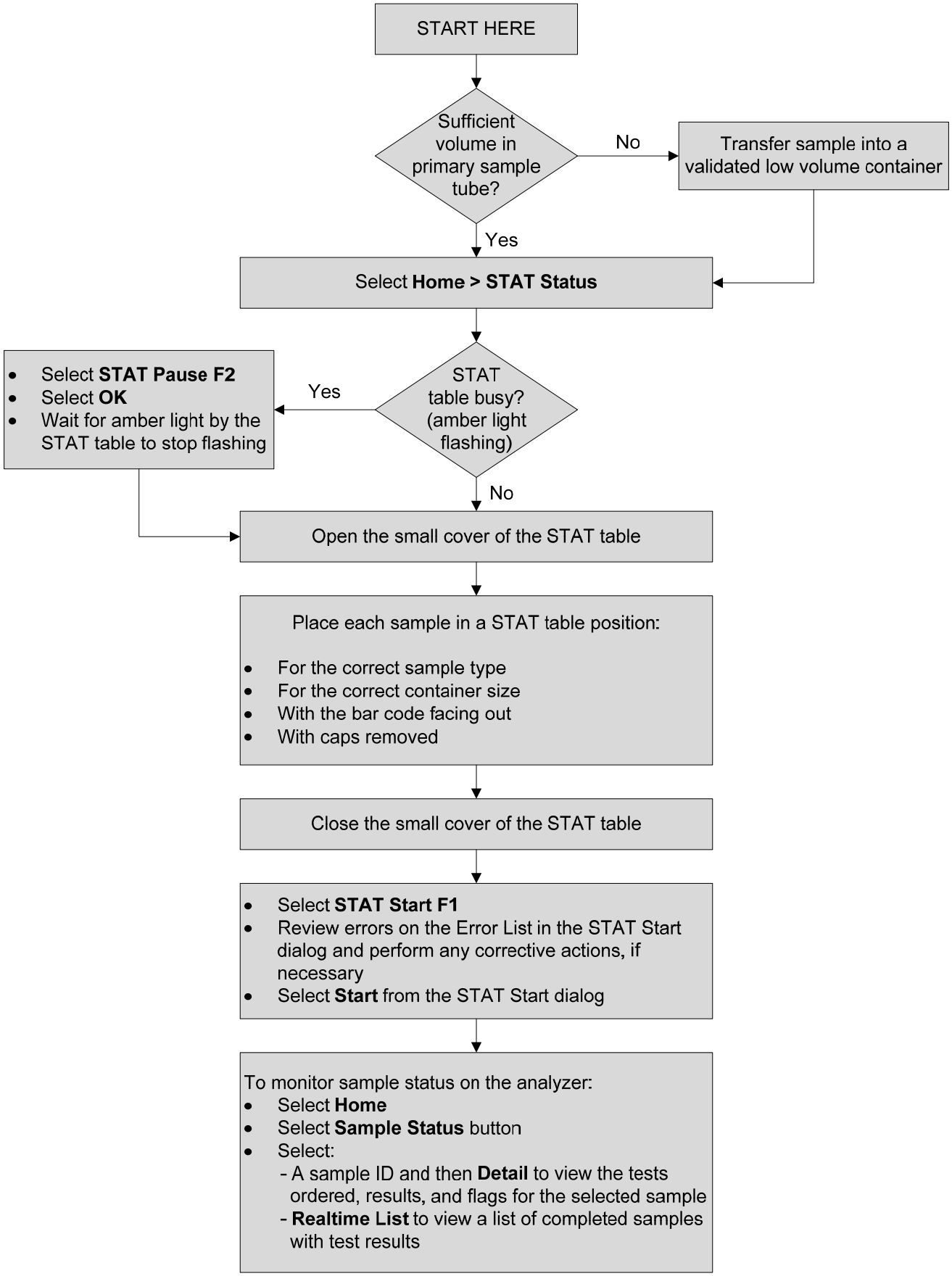
- Based on your laboratory workflow, how will you manage priority samples? Placing a sample in an Emergency (red) rack does not indicate STAT priority on the analyzer

- Identify if you will require racks for different sample types and tube sizes. How will operators be able to differentiate racks for sample type?

Sample Processing on Racks



Sample Processing on the STAT Table



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Manual Programming

Samples can be manually programmed and processed on the AU680 when the LIS is down or if the sample does not have an LIS-generated request. Samples can be manually programmed for processing on racks or the STAT table.

When the system is setup with racks for **Barcode analysis**, manually programmed samples require a bar code. A roll of alternate bar codes is provided with your analyzer during installation for you to use when manually programming. You may also have "downtime" bar codes in your lab that you can use for manual programming.

When the system is setup with racks for **Sequential analysis**, you will need to manually program all samples processed in the sequential racks, but they do not require a bar code on the sample. Samples processed in sequential racks must be placed in the rack and onto the analyzer in the order they are manually programmed on the system.
Note: Barcode analysis is recommended because sequential analysis does not allow for positive patient identification.

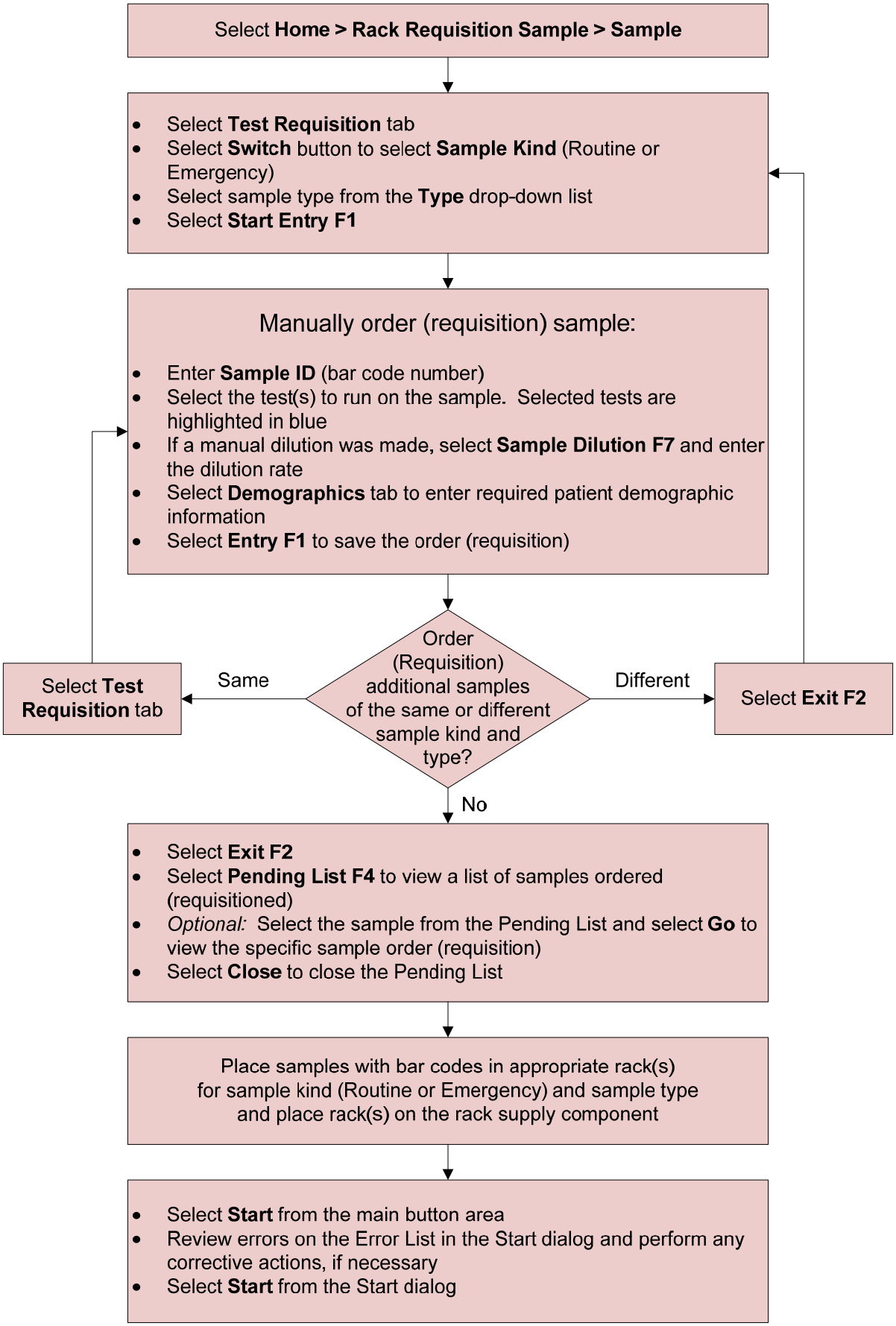
To identify the Analysis mode for racks on your system, use the following pathway on the software:

Menu List > System > System Condition > Analysis mode > [Test Requisition]

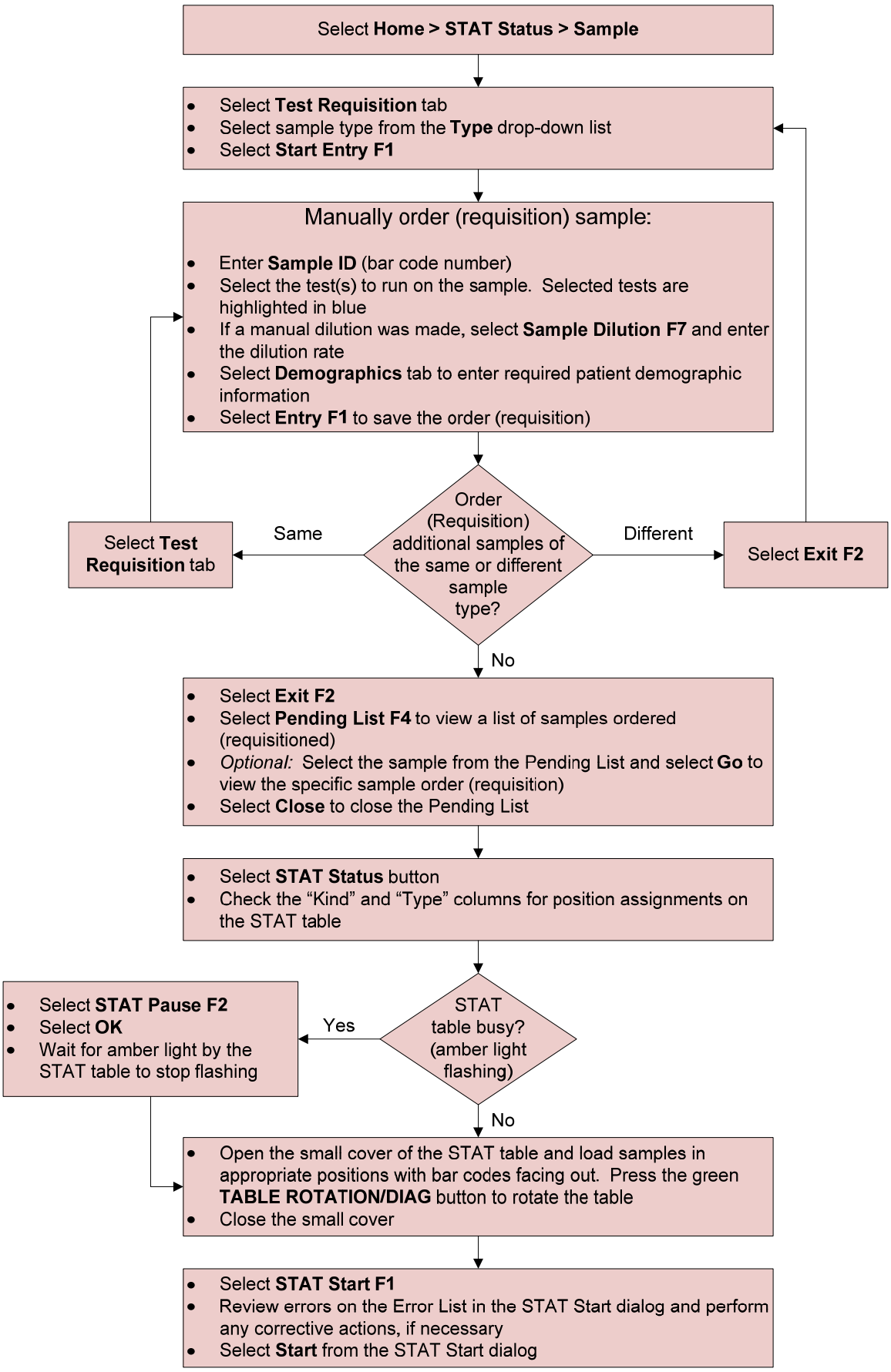
Practice

- Use the flowcharts in the following pages to practice manually programming samples for processing on racks and the STAT table
- Which bar codes will be used in your lab when a sample without a bar code is manually programmed?
- Routine (white) and Emergency (red) racks can be set up separately for Barcode or Sequential analysis. Will you have racks setup for sequential analysis? If so, how will you manage processing samples on these racks?

Manual Programming for Samples on Racks



Manual Programming for Samples on the STAT Table



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Additional Sample Programming Features

The Rack Requisition Sample screen provides additional features for manually programming samples at the analyzer:

- Add on or rerun tests
- Batch programming

The system allows for manual ordering of add on and rerun tests for samples previously processed in the same index. Use the **Add On** button when:

- The order is required to be manually ordered at the analyzer (not from data management system or LIS)
- The order will be on samples that were processed in the current index
- The order requires the use of the original sample ID (bar code) from the first run of the sample
- The order will be processed using the same Sample Kind (Routine rack, Emergency rack, STAT table) as the first run of the sample

If any of these conditions do not apply to the request, then the add on or rerun can be manually ordered as a “new” sample.

Batch programming allows for the ordering of the same tests on a number of samples without having to order each sample individually.

Practice

- Use the flowcharts on the following pages to practice ordering add on/rerun tests or batch programming
  Note: The add on/rerun procedure can only be performed on a sample that has been processed in the current index.

- When will you need to manually order an add on or rerun test at the analyzer?

- When will you need to batch order at the analyzer?

Add On and Rerun Tests on Racks

Note: This procedure applies only for samples that require an add on or rerun test to be processed ***using the same sample ID, rack type, and index as the original sample.***

The information listed below is required to order (requisition) an add on or rerun. This information can be found on the **Sample Status** screen or on the printed report.

- Sample Number (e.g. S. No. 0003)
- Sample Kind (Routine or Emergency)
- Sample Type

- Select **Home > Rack Requisition Sample > Sample**
- Select **Test Requisition** tab

Order (Requisition) an add on or rerun test:

- Select **Add On F5**
- Confirm the correct **Sample Kind** rack (Routine or Emergency) in which the sample was initially processed is displayed. Select the **Switch** button if you need to change the sample kind
- Select sample type from the **Type** drop-down list
- Enter the sample number in both of the **Sample No.** fields
  Note: Enter a range of sample numbers if an add on or rerun is required on multiple samples for the same tests.
- Select the **Select Tests to be Repeated** option
- Select the test(s) to add on or rerun
- Select **OK**

Place samples with bar codes in appropriate rack(s) for sample kind (Routine or Emergency) and sample type and place rack(s) on the rack supply component

- Select **Start** from the main button area
- Review errors on the Error List in the Start dialog and perform any corrective actions, if necessary
- Select **Start** from the Start dialog

The analyzer may generate a “MEASURE COMPLETED FOR THE READ SAMPLE ID” alarm when the sample bar code is read. Confirm the sample is in process from the **Sample Status** screen

Add On or Rerun Tests on STAT Table

Note: This procedure applies only for STAT samples that require an add on or rerun test to be processed on the STAT table ***using the same sample ID and index as the original sample****.*

The information listed below is required to order (requisition) an add on or rerun. This information can be found on the **Sample Status** screen or on the printed report.

- Sample Number (e.g. S. No. P0003)
- Sample Type

- Select **Home > STAT Status > Sample**
- Select **Test Requisition** tab

Order (Requisition) an add on or rerun test:

- Select **Add On F5**
- Select sample type from the **Type** drop-down list
- Enter the sample number in both of the **Sample No.** fields
  Note: Enter a range of sample numbers if an add on or rerun is required on multiple samples for the same tests.
- Select the **Select Tests to be Repeated** option
- Select the test(s) to add on or rerun
- Select **OK**

- Select **Sample Status** button
- Check the "Kind" and "Type" columns for position assignments on the STAT table

STAT table busy? (amber light flashing)

Yes

- Select **STAT Pause F2**
- Select **OK**
- Wait for amber light by the STAT table to stop flashing

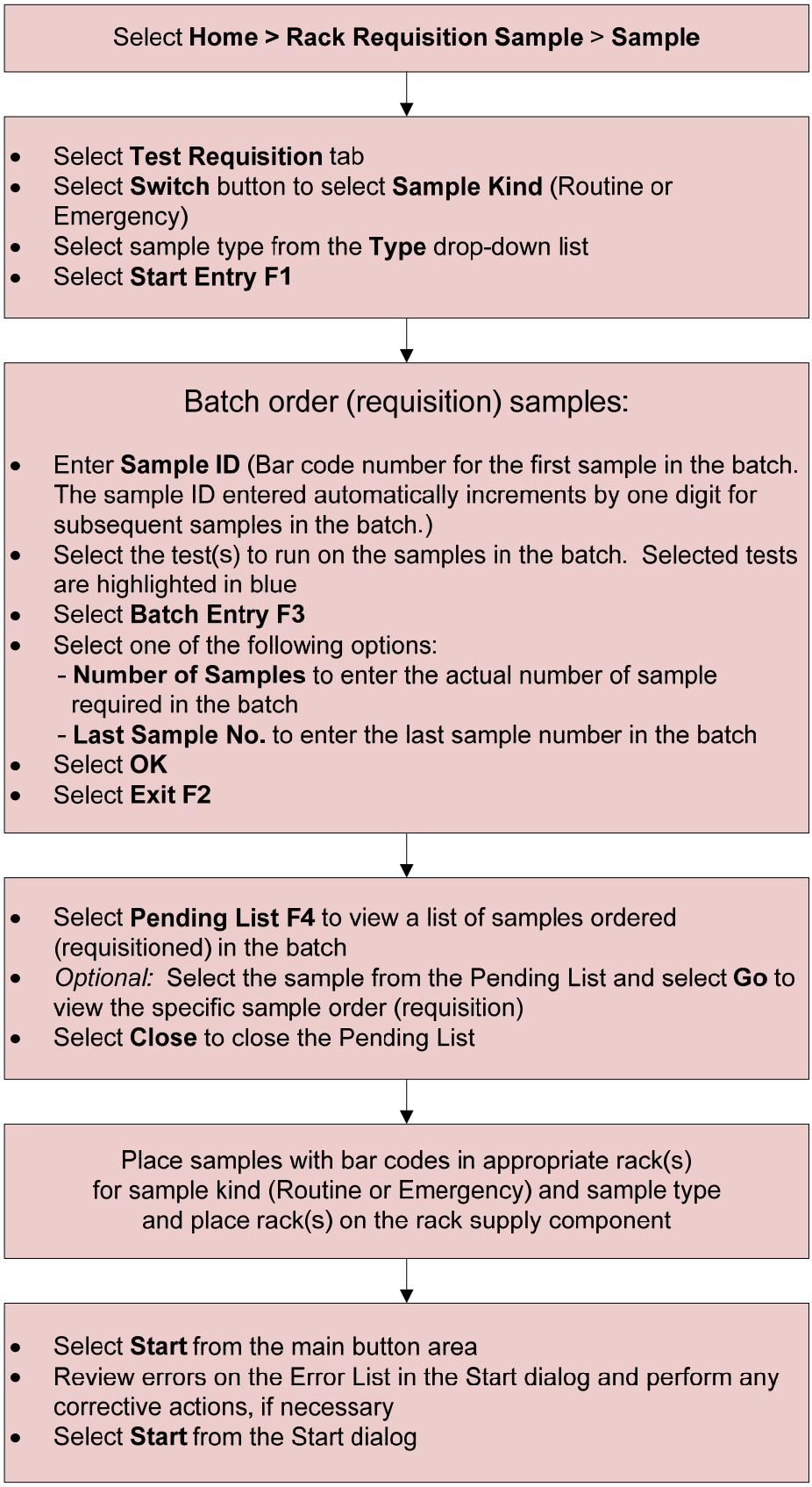
No

- Open the small cover of the STAT table and load samples in appropriate positions with bar codes facing out. Press the green **TABLE ROTATION/DIAG** button to rotate the table
- Close the small cover

- Select **STAT Start F1**
- Review errors on the Error List in the STAT Start dialog and perform any corrective actions, if necessary
- Select **Start** from the STAT Start dialog

The analyzer may generate a "MEASURE COMPLETED FOR THE READ SAMPLE ID" alarm when the sample bar code is read. Confirm the sample is in process from the **Sample Status** screen

Batch Order (Requisition)



Chapter 5

Monitor and Review Results

Introduction

It is important to review the results for reagent blank, calibration, and QC before processing samples. Patient samples should be reviewed for any flags before releasing results.

This chapter will cover the following:

- Reviewing calibration status from the Calibration Monitor
- Reviewing QC charts
- Managing QC data
- Reviewing patient results

The system can be setup to automatically print reagent blank, calibration, QC, and patient results. You can also reprint reports when needed.

Print RB/CAL/QC Results

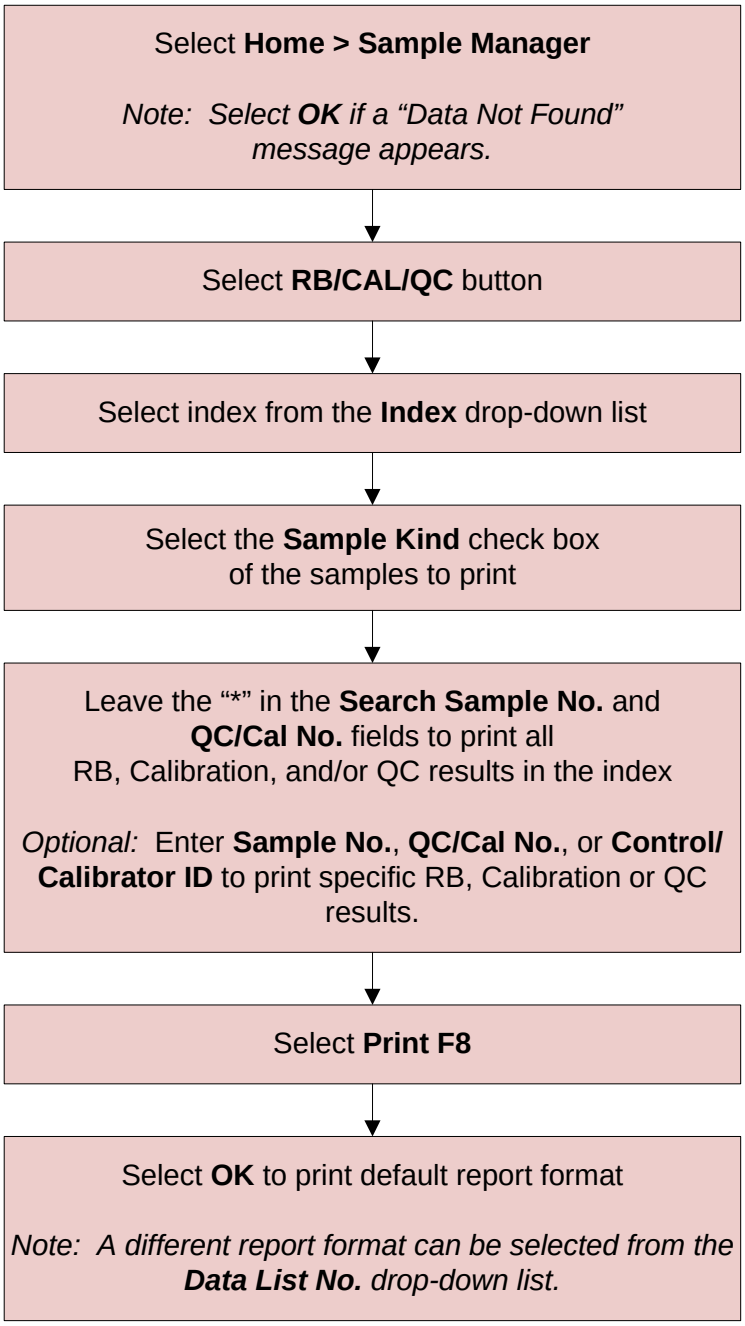
Reagent blank, calibration, and QC results should be reviewed for flags. These results can be reviewed from the printed reports or from the **Realtime Display** screen in Sample Status.

The analyzer is usually set to automatically print reagent blank, calibration, and QC results when they are complete. These reports can be reprinted from Sample Manager when needed.

Practice

- Use the flowchart on the following page to print reagent blank, calibration, and QC results from Sample Manager
- When might you need to reprint a reagent blank, calibration, or QC report?

Print RB/CAL/QC Results



Calibration Monitor

Use the Calibration Monitor to:

- Review the reagent blank and calibration status for a test
- Review the reagent blank and calibration history for a test
- Review the reagent blank and calibration details for a test

The **Status** tab provides a color-coded status of reagent blank and calibration for each test by sample type. The display color indicates the following for RB and CAL:

- **Orange**: Bottles without calibration data, with failed calibration data, or with expired calibration data exist
- **Yellow**: Bottles with calibration data that expires soon exist
- **Light Blue**: No errors (current calibration passed)
- **White**: Status cannot be determined until a reagent check is performed

The **RB History** and **Calibration History** tabs provide a graph of the reagent blank and calibration data for a test. The system saves a maximum of 100 points of data per sample type per test. The graphs can be used to check for consistency of reagent blank and calibration data.

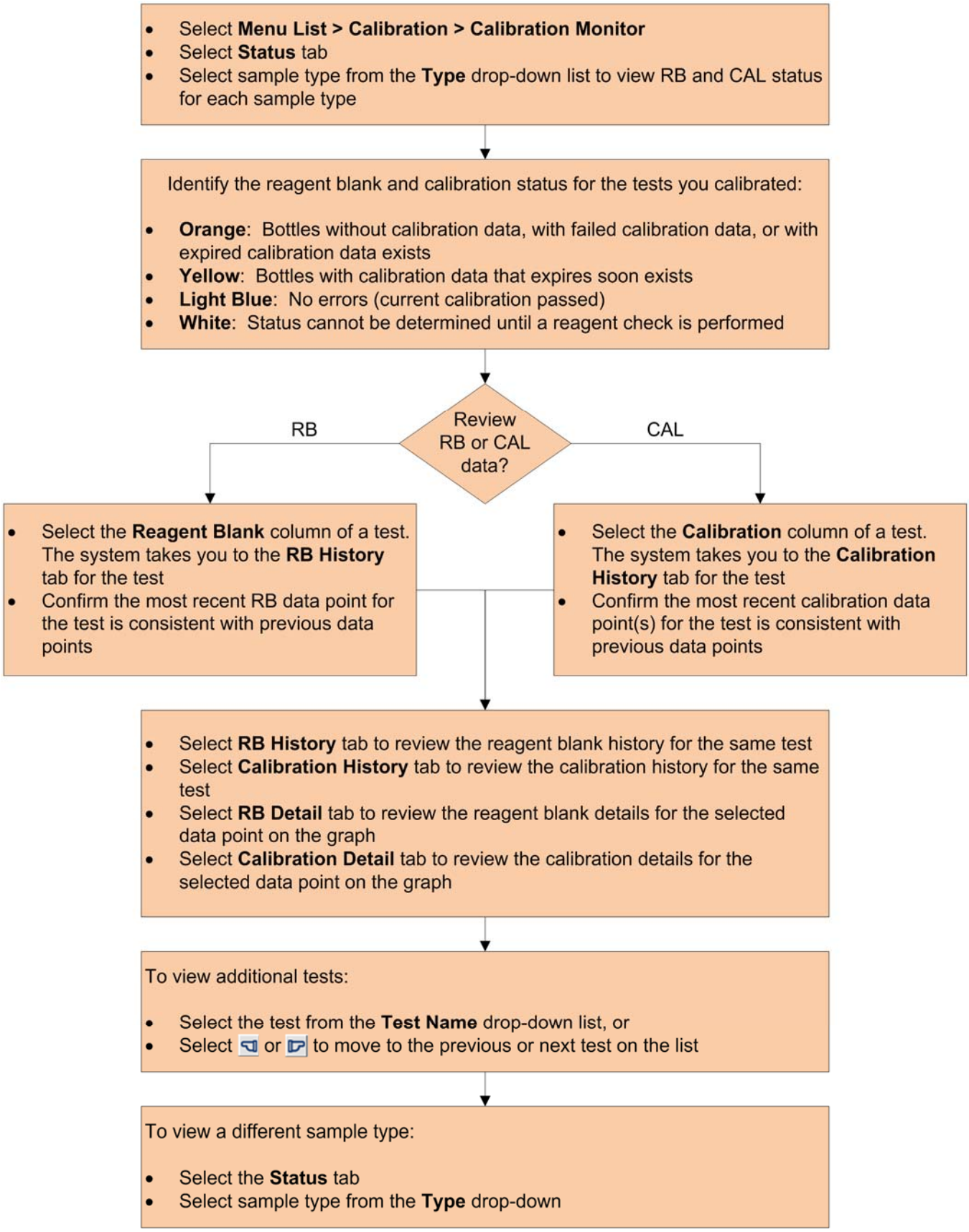
The **RB Detail** and **Calibration Detail** tabs provide the detailed data for the selected test.

Practice

- Use the flowchart on the following page to review the reagent blank and calibration status, history, and details for tests from the Calibration Monitor

- Calibration status for a test can also be viewed from the Comment column of the Reagent Management: Details tab. What is the benefit of using the Calibration Monitor to view calibration status?

Calibration Monitor



QC Monitor and QC Data Review

Use the QC Monitor to:

- Review QC data review status
- Review and print QC charts
- Review QC statistics

The QC Monitor displays the QC data review status for the QC levels processed for each test in the current index. The color for each QC level processed for a test indicates the status:

- **Green**: Normal data (results in range)
- **Yellow**: Data outside the range programmed in QC Parameters
- **Orange**: Abnormal data (not included in QC statistics)

Use QC Data Review to:

- Delete QC data
- Enter comments for QC results

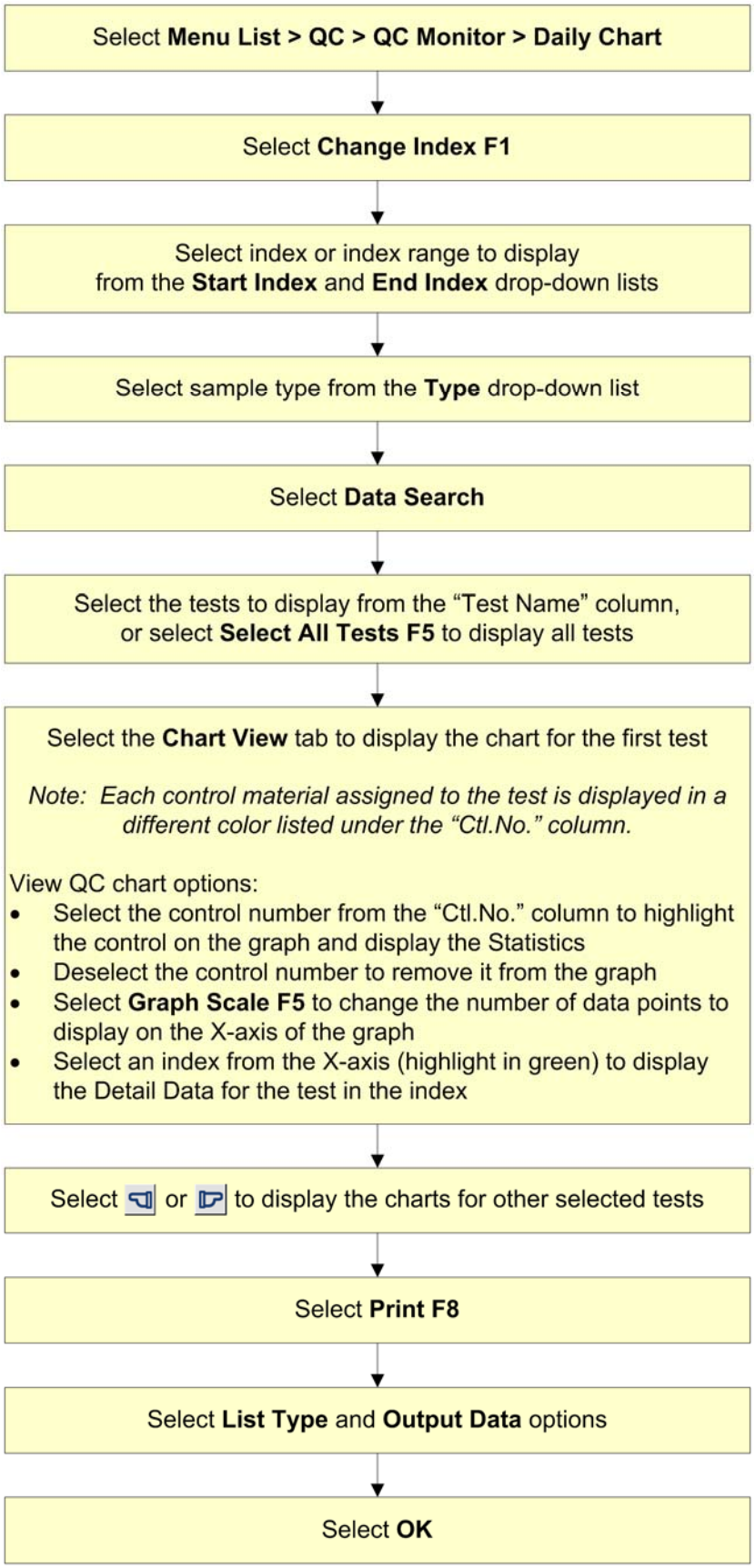
If you are using the analyzer to generate QC statistics you may need to manage QC data if it is processed incorrectly (levels switched, wrong QC used) to not include the data in the statistics calculation.

Practice

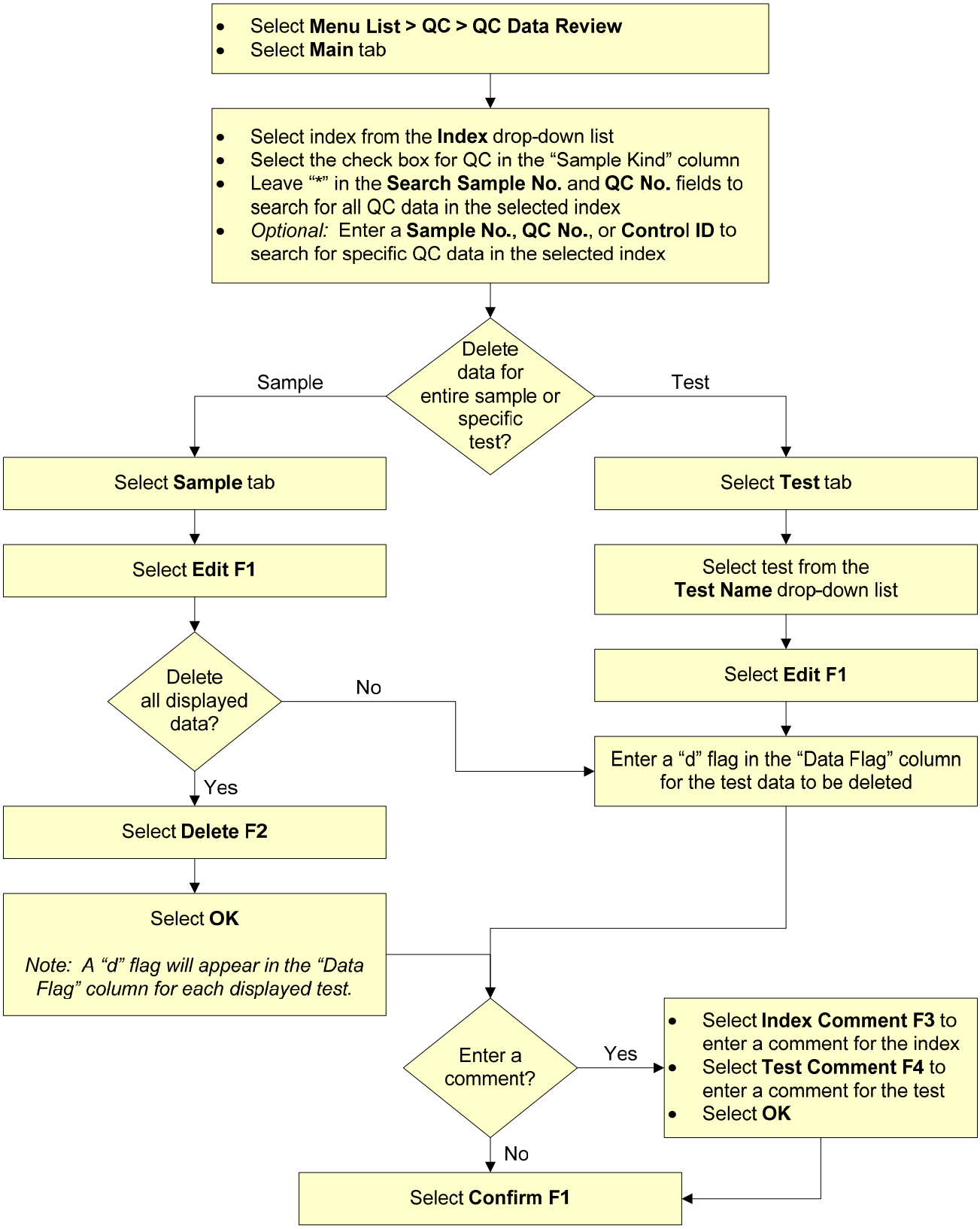
- Use the flowcharts on the following pages to review and manage QC results

- Will you use the analyzer to review and manage QC results, or will this be done using another QC program (on a data management system or LIS)?

Review and Print QC Daily Chart



Delete QC Data and Enter Comments



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Review Patient Results

Patient results can be reviewed from the software or on the printed reports.

In progress and completed samples can be viewed from the Sample Status screen of the Home menu. Completed samples can be reviewed and printed from the Sample Manager screen.

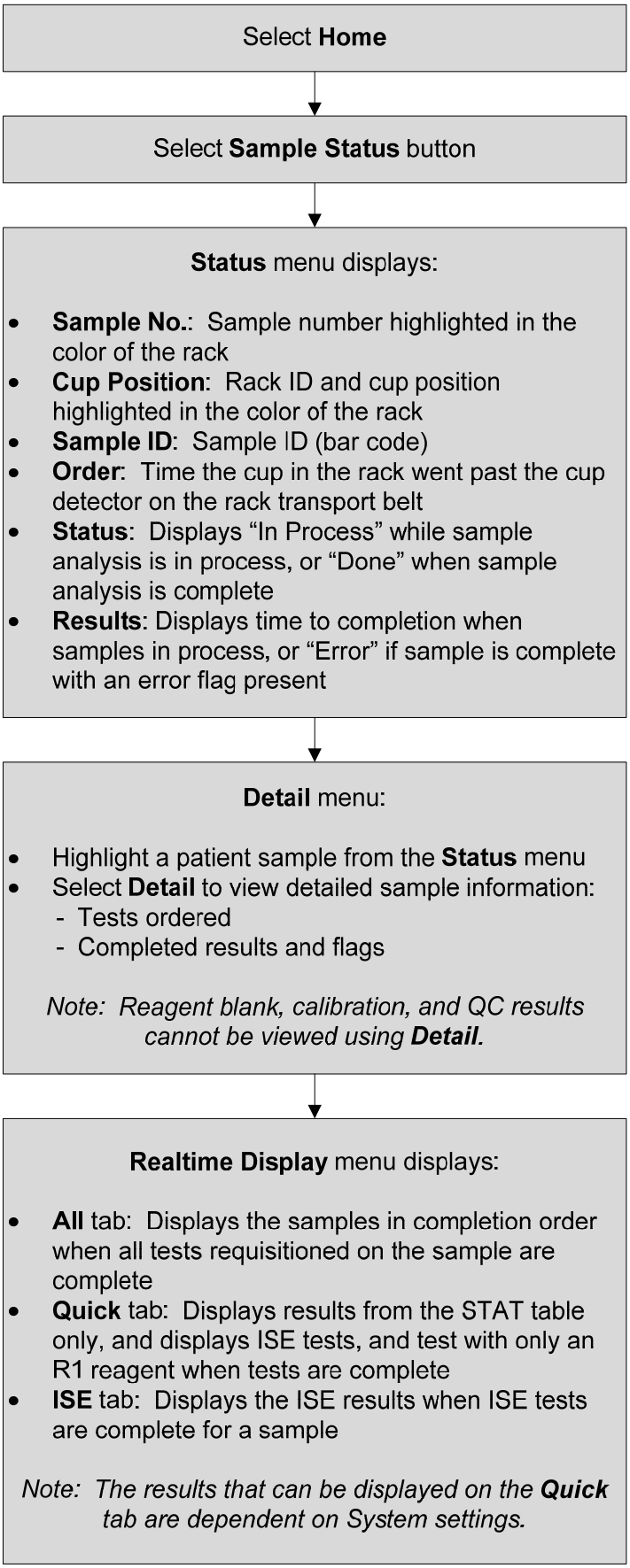
Patient results should be reviewed for flags. Error flags are generated by the system when it encounters a condition that can affect the result. This condition can range from minor warnings to severe errors that require immediate attention. No result should be reported with an unresolved or unexpected flag. When in doubt, always consider repeating the sample analysis.

Flags are displayed to the right of the patient result. They are displayed in red when results are reviewed on the Sample Status screen. They are also displayed in red on printed reports if the analyzer is connected to a color printer.

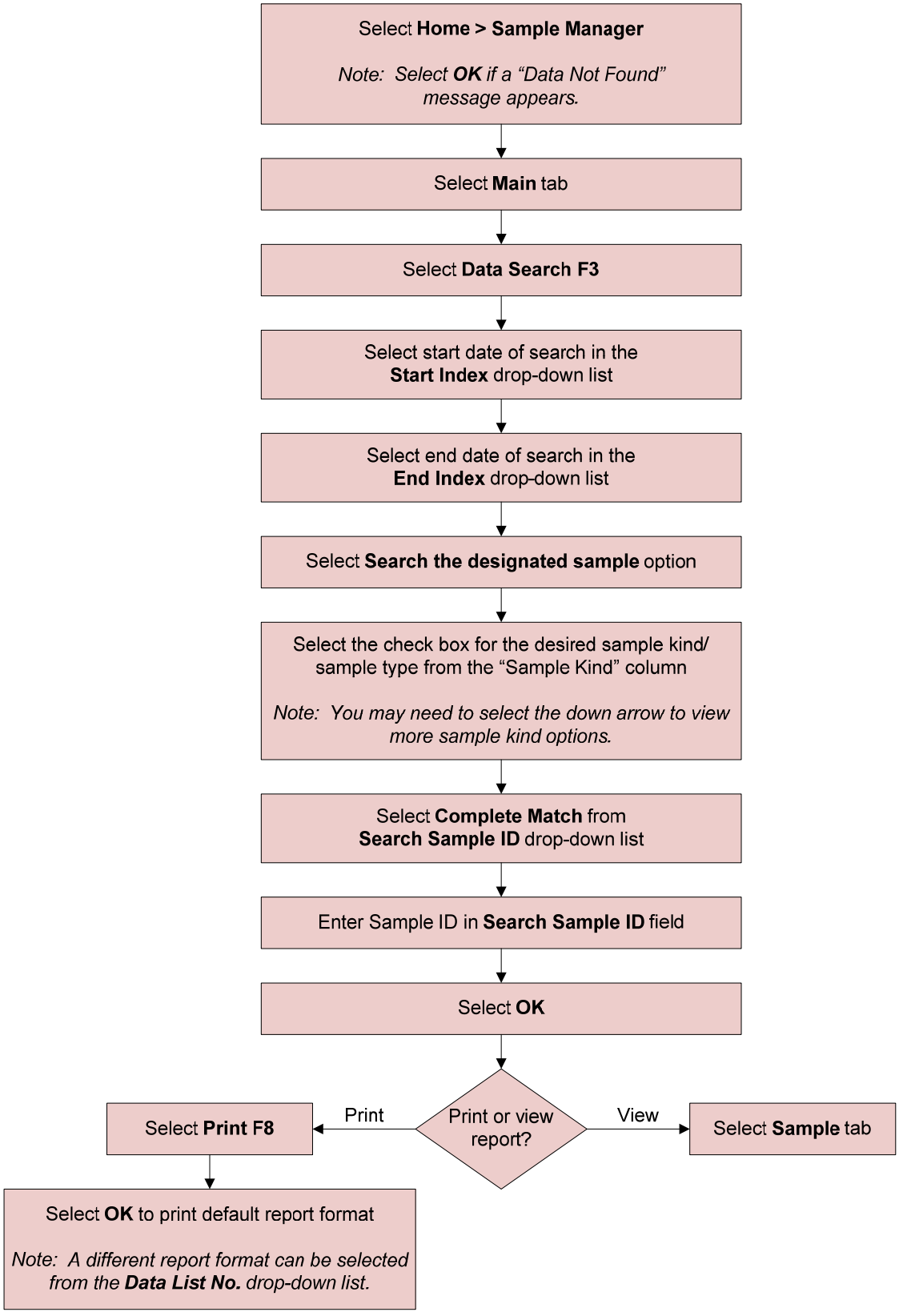
Practice

- Use the flowcharts on the following pages to review patient results on the software and print patient results
- Will patient results be reviewed from printed reports or at the analyzer? Or will they be reviewed on a data management system or at the LIS?
- When might you need to print a patient report? Review the different report formats available on your system for printing patient reports

Review Patient Results from Sample Status



Review and Print Patient Results from Sample Manager



Chapter 6

Maintenance

Introduction

Maintenance should be performed on the analyzer to ensure system performance and safety.

A Maintenance Schedule List is available for you to document the completion of maintenance procedures on the AU680.

For a copy of the Maintenance Schedule List, refer to:

Reference: AU680 Chemistry Analyzer Instructions for Use
↳ Chapter 6: Maintenance
  ↳ Maintenance Schedule

This chapter will cover the following maintenance intervals:

- Weekly Maintenance
- Every Other Week Maintenance
- Monthly Maintenance

Flowcharts are provided for weekly, every other week, and monthly procedures in this chapter. These flowcharts are available as a quick reference for the procedures.

Review the Instructions for Use for Warnings, Cautions, Important, Note, and Tip alerts as well as step-by-step instructions.

For information on maintenance intervals beyond Monthly (Every Other Month, Quarterly, 6-Month, Yearly, As Needed), refer to the AU680 Chemistry Analyzer Instructions for Use, Chapter 6: Maintenance.

Maintenance Resources

Multiple resources are available to assist in performing maintenance on the analyzer:

- **Instructions for Use**
  - Includes step-by-step instructions with pictures and drawings for all maintenance procedures that can be performed by the operator
  - Includes Warnings, Cautions, Important, Note, and Tip alerts
  - Includes a list of supplies required for each procedure as well as the part number of analyzer components that need to be replaced

- **Maintenance Videos**
  - Available in the Online Help Video Directory of the analyzer
  - Includes videos for the following maintenance procedures:
    - Clean the Wash Nozzle Component and Inspect the Tube Mounting Joints
    - Replace the Photometer Lamp
    - Clean or Replace Individual Cuvettes
    - Replace Syringes or Syringe Case Heads
    - Enhanced ISE Cleaning (Manual)

- **Maintenance Job Aids**
  - Available on the Beckman Coulter website (see *Chapter 9: Resources* in this manual)
  - Shortened versions of maintenance procedures found in the Instructions for Use
  - Available for the following maintenance intervals
    - Weekly and Every Other Week
    - Monthly
  - Two versions of job aids, one for procedures performed on their own, one for efficiency (combines procedures and presented in efficient order)

Weekly and Every Other Week Maintenance

Weekly Maintenance includes the following procedures:

- Clean the Sample Probe and Mix Bars
- Perform a W2
- Perform a Photocal
- Clean the Pre-dilution Bottle
- (ISE Option only) Selectivity Check for the Na and K Electrodes
- (ISE Option only) Enhanced Cleaning of Electrode Line

(ISE Option only) Every Other Week or Every 3,000 Samples Maintenance includes the following procedure:

- Manually Clean the ISE Mix Bar, Liquid Level Sensors, Sample Pot, and Sample Pot Tubing

For Weekly Maintenance, the W2, Photocal, and Enhanced Cleaning of the Electrode Line procedures can be combined for efficiency. The flowchart in this chapter combines the three procedures. These procedures can also be performed separately when needed.

Practice

- Use the flowcharts on the following pages as a quick reference for performing Weekly and Every Other Week maintenance procedures

- The W2, Photocal, and Enhanced ISE Cleaning procedures take approximately an hour to complete when performed together. Based on your laboratory workflow, when will these procedures be performed?

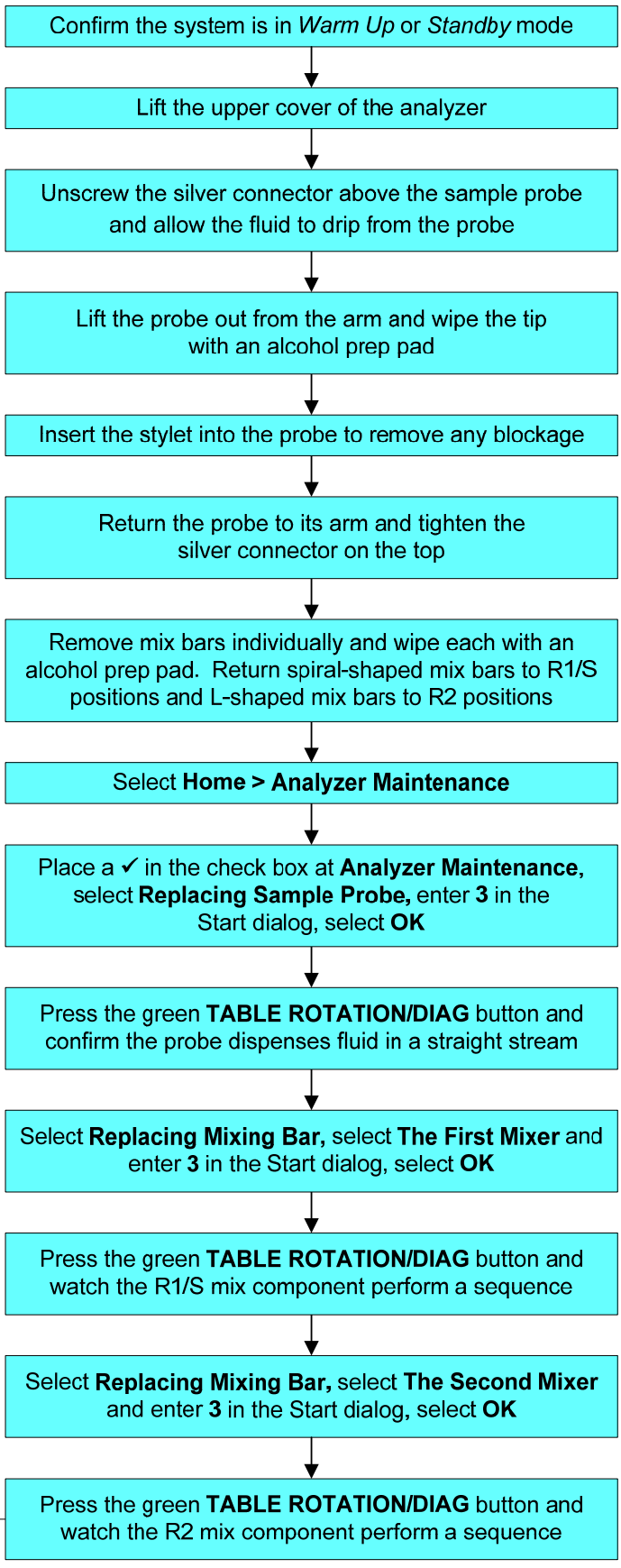
- Every Other Week maintenance requires sonication of the sample pot and tubing for 10 minutes. Will your lab order a spare sample pot and tubing set to minimize analyzer downtime?

- Identify the solutions that you will need for maintenance. Some of these solutions need to be made up prior to performing the maintenance procedures

Clean the Sample Probe and Mix Bars

Supplies Required:

- Alcohol prep pad (70% Isopropyl alcohol)
- Stylet 0.2 φ diameter (included in the startup kit)



Replace the probe if it appears bent, damaged or does not dispense a straight stream of fluid

Replace mix bars if they appear bent, scratched or make unusual noise during sequence

Document you completed the procedure on the paper maintenance log

Selectivity Check for the Na and K Electrodes

Supplies Required:

- ISE Na and K Selectivity Check Solutions
- 2 Hitachi cups

Confirm the system is in *Warm Up* or *Standby* mode

↓

Fill the Hitachi cups with at least 500 µL of Na and K Selectivity Check Solutions

↓

Open the STAT table cover and place the cups in the **SEL-Na**, and **SEL-K** positions (use the green **TABLE ROTATION/DIAG** button as required to rotate the STAT table). Close the STAT table cover

↓

Select **Home > Analyzer Maintenance > ISE Maintenance**

↓

Select **Selectivity Check** tab, select **Check Start,** select **OK**

↓

When the procedure completes, check the results

Failures will be displayed in yellow. Replace the electrode that failed.

↓

Select the **Maintenance** tab, place a ✓ in the **ISE Maintenance** box, select the **MID/REF Prime** button, select **OK**

↓

Press the green **TABLE ROTATION/DIAG** button to prime. Repeat 3 times (a prime is complete when green light turns on)

↓

Document you completed the procedure on the paper maintenance log

W2, Photocal and Enhanced Cleaning of Electrode Line (ISE option)

Supplies Required:

- Three 60 mL bottles
- Cleaning Solutions: 1 N HCL **or** 0.5% sodium hypochlorite solution (5% Sodium Hypochlorite Solution diluted 1:10)

ISE option supplies:

- ISE Cleaning Solution
- 1 Hitachi cup

Confirm the system is in *Standby* mode

↓

Fill the 60 mL bottles (do not fill in the neck of the bottle) with cleaning solutions (1 N HCL or diluted sodium hypochlorite solution. Never combine cleaning solutions and alternate the cleaning solutions each week)

↓

Lift the upper cover of the analyzer and place the bottles in the appropriately labeled W2 positions on the analyzer. Close the upper cover

↓

(ISE option only)
Fill the Hitachi cup with at least 1.5 mL of ISE Cleaning Solution. Open the STAT table cover and place the cup in the **CLEAN** position (press the green **TABLE ROTATION/DIAG** button as required to rotate the STAT table). Close the STAT table cover

↓

Select **Home > Analyzer Maintenance**

↓

Select **W2 F6** and select the check boxes for:

- **After W2 ends, perform the photocal**
- **ISE Cleaning (Enhanced)** (ISE option only)

↓

Select **Start.**
The system performs the W2 and the ISE Cleaning (Enhanced) (if selected) simultaneously and automatically performs the Photocal procedure at the completion of the W2. Allow approximately 30 minutes for each procedure (total of 60 minutes for all three selections). The mode display will countdown the maintenance time left

↓

When the system returns to the *Standby* mode, remove all maintenance materials and return routine materials as required

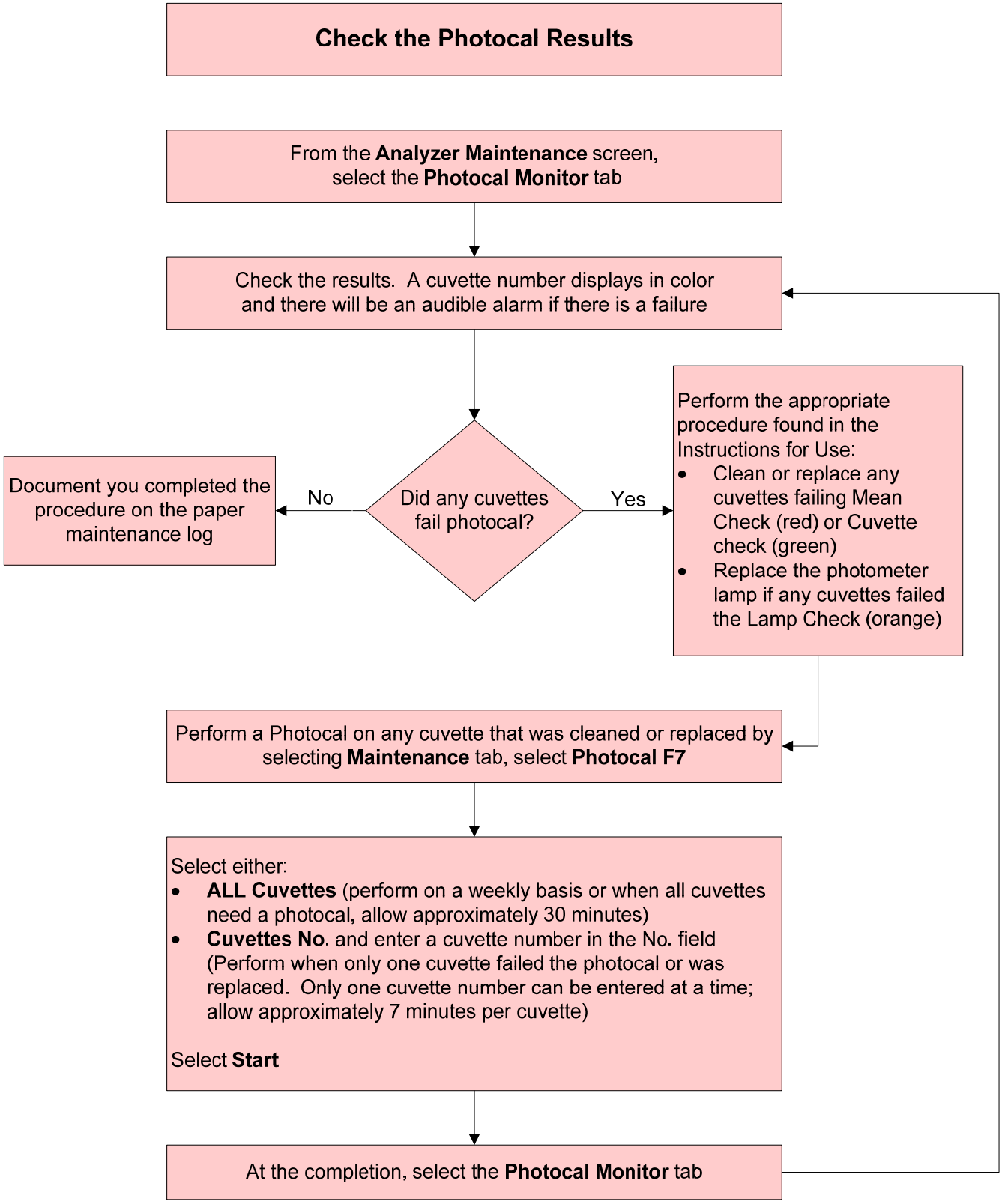
↓

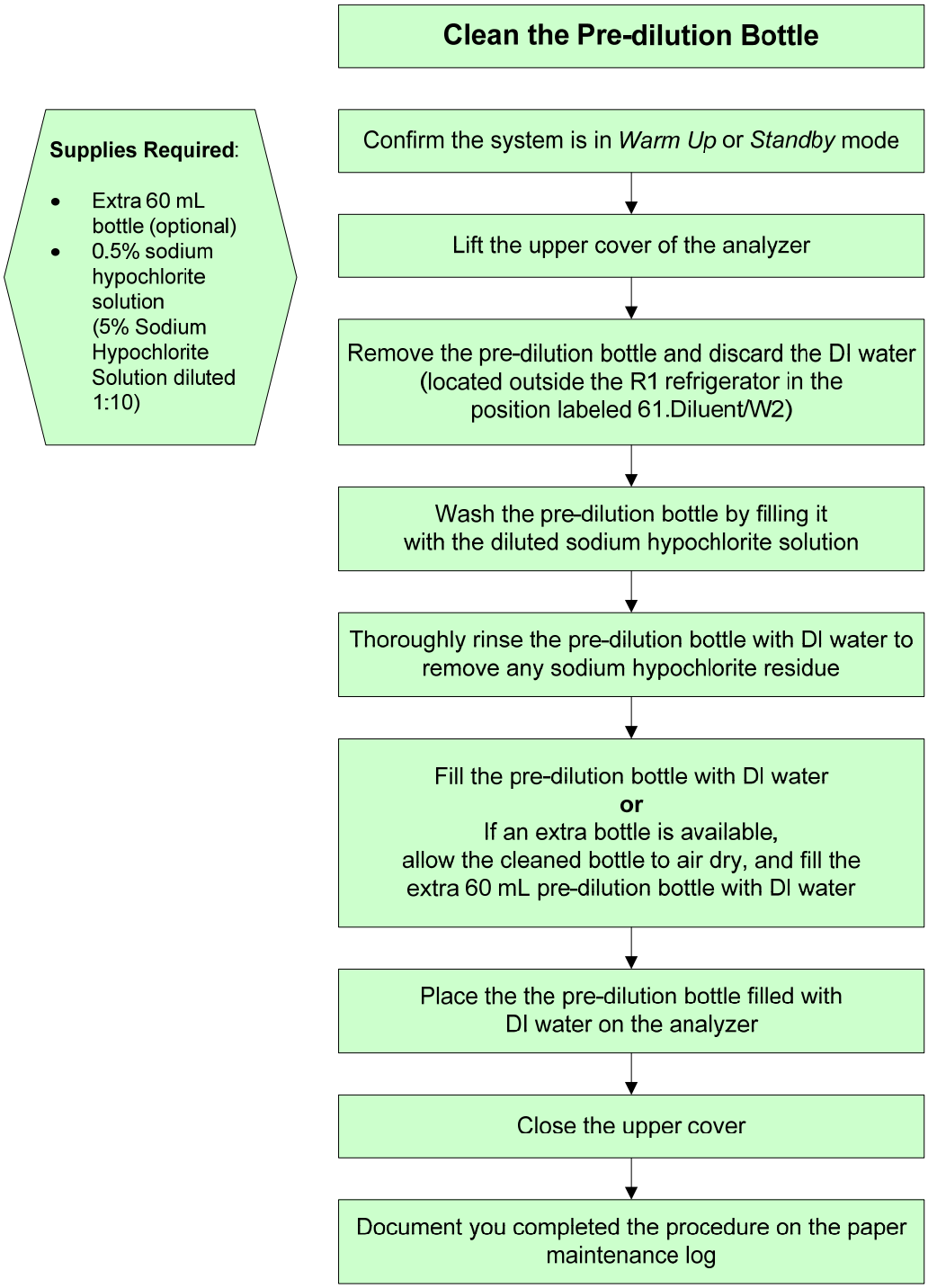
Document you completed the W2 and ISE Cleaning (Enhanced) procedures on the paper maintenance log

↓

Proceed to the “Check the Photocal Results” flowchart

Check the Photocal Results




Clean the Pre-dilution Bottle
Supplies Required:
Extra 60 mL bottle (optional)
0.5% sodium hypochlorite solution (5% Sodium Hypochlorite Solution diluted 1:10)
Confirm the system is in Warm Up or Standby mode
Lift the upper cover of the analyzer
Remove the pre-dilution bottle and discard the DI water (located outside the R1 refrigerator in the position labeled 61.Diluent/W2)
Wash the pre-dilution bottle by filling it with the diluted sodium hypochlorite solution
Thoroughly rinse the pre-dilution bottle with DI water to remove any sodium hypochlorite residue
Fill the pre-dilution bottle with DI water
or
If an extra bottle is available, allow the cleaned bottle to air dry, and fill the extra 60 mL pre-dilution bottle with DI water
Place the the pre-dilution bottle filled with DI water on the analyzer
Close the upper cover
Document you completed the procedure on the paper maintenance log

Manually Clean the ISE Mix Bar, Liquid Level Sensors, Sample Pot and Sample Pot Tubing

Supplies Required:

- Alcohol prep pads (70% isopropyl alcohol)
- Clean, dry, lint-free absorbent tissue
- Freshly prepared 1% Wash solution (1 part Wash solution added to 99 parts DI water)
- Sonicator
- Beaker
- Disposable pipette tip attached to a squeeze bottle or syringe

Confirm the system is in *Warm Up* or *Standby* mode

↓

Select **Home > Analyzer Maintenance > ISE Maintenance**

↓

Place a ✓ in the **ISE Maintenance** check box

↓

Select the **Drain Flowcell** button, select **OK**

↓

Press the green **TABLE ROTATION/DIAG** button to drain the flowcell

↓

Lift the upper cover of the analyzer, then open the ISE cover

↓

Disconnect the liquid level sensor connector 714 and mixing motor connector 706 of the mixing component

↓

Loosen the knob securing the mixing component and gently lift to unseat it

↓

Use an alcohol prep pad to wipe the two nozzles, two liquid level sensors, and the mix bar

↓

Place the mixing component on the mixing component holder

↓

Loosen the retaining knob securing the sample pot and lift the pot off the peg

↓

Hold the sample pot in one hand and remove:

- Sample pot tubing from the inlet of the flow cell
- Bypass tubing labeled 5 from the pinch valve
- Bypass tubing labeled 5 at the Y-connector near the mixture aspiration roller pump

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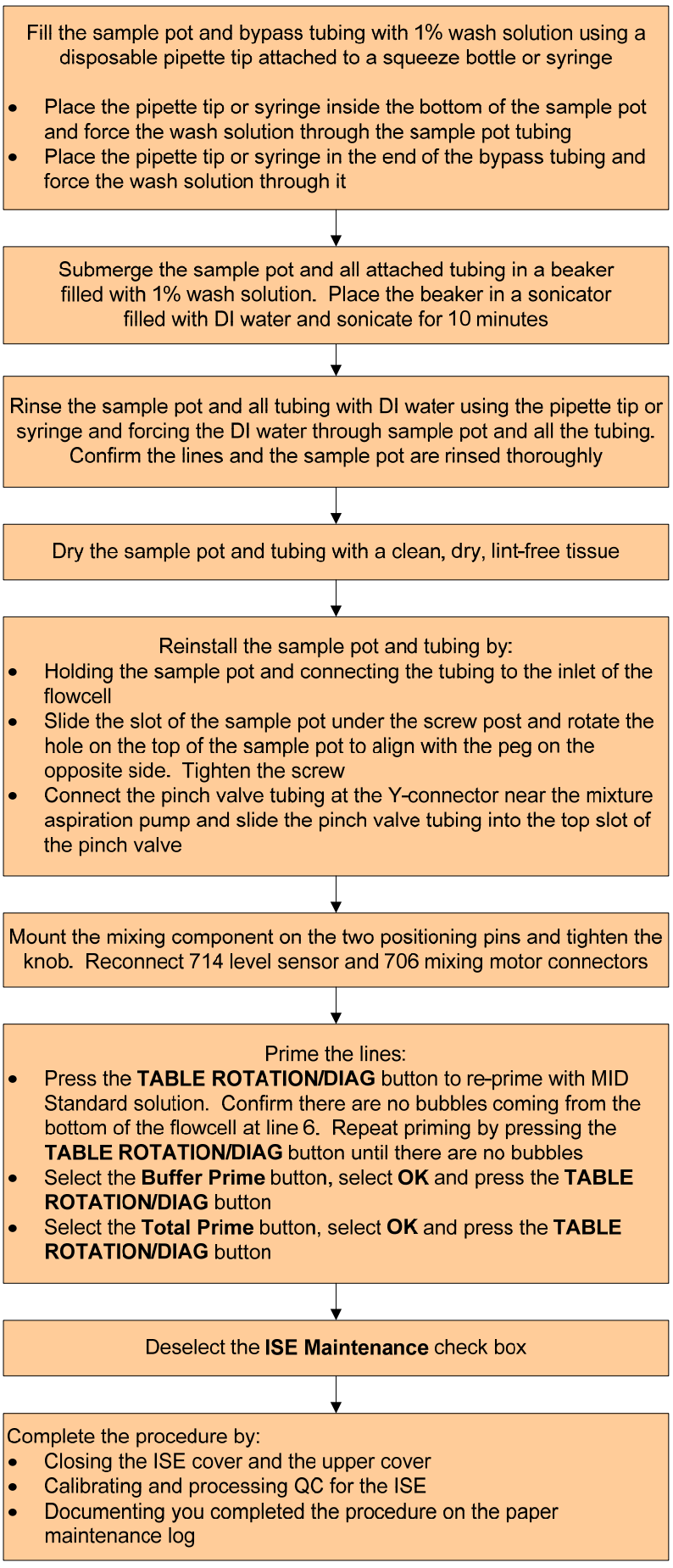

Fill the sample pot and bypass tubing with 1% wash solution using a disposable pipette tip attached to a squeeze bottle or syringe
• Place the pipette tip or syringe inside the bottom of the sample pot and force the wash solution through the sample pot tubing
• Place the pipette tip or syringe in the end of the bypass tubing and force the wash solution through it
Submerge the sample pot and all attached tubing in a beaker filled with 1% wash solution. Place the beaker in a sonicator filled with DI water and sonicate for 10 minutes
Rinse the sample pot and all tubing with DI water using the pipette tip or syringe and forcing the DI water through sample pot and all the tubing. Confirm the lines and the sample pot are rinsed thoroughly
Dry the sample pot and tubing with a clean, dry, lint-free tissue
Reinstall the sample pot and tubing by:
• Holding the sample pot and connecting the tubing to the inlet of the flowcell
• Slide the slot of the sample pot under the screw post and rotate the hole on the top of the sample pot to align with the peg on the opposite side. Tighten the screw
• Connect the pinch valve tubing at the Y-connector near the mixture aspiration pump and slide the pinch valve tubing into the top slot of the pinch valve
Mount the mixing component on the two positioning pins and tighten the knob. Reconnect 714 level sensor and 706 mixing motor connectors
Prime the lines:
• Press the TABLE ROTATION/DIAG button to re-prime with MID Standard solution. Confirm there are no bubbles coming from the bottom of the flowcell at line 6. Repeat priming by pressing the TABLE ROTATION/DIAG button until there are no bubbles
• Select the Buffer Prime button, select OK and press the TABLE ROTATION/DIAG button
• Select the Total Prime button, select OK and press the TABLE ROTATION/DIAG button
Deselect the ISE Maintenance check box
Complete the procedure by:
• Closing the ISE cover and the upper cover
• Calibrating and processing QC for the ISE
• Documenting you completed the procedure on the paper maintenance log

Monthly Maintenance

Monthly Maintenance includes the following procedures:

- Clean the Sample Probe, Reagent Probe, and HbA1c Wash Wells
- Clean the Mix Bar Wash Wells
- Clean the Wash Nozzle Component and Inspect the Tube Mounting Joints
- Clean the Deionized Water Tank, Deionized Water Filter, and Sample Probe Filter

Practice

- Use the flowcharts on the following pages as a quick reference for performing Monthly maintenance procedures

- The AU680 Online Help has a maintenance video for the “Clean the Wash Nozzle Component and Inspect the Tube Mounting Joints” procedure. Watch the video for a demonstration on performing the procedure

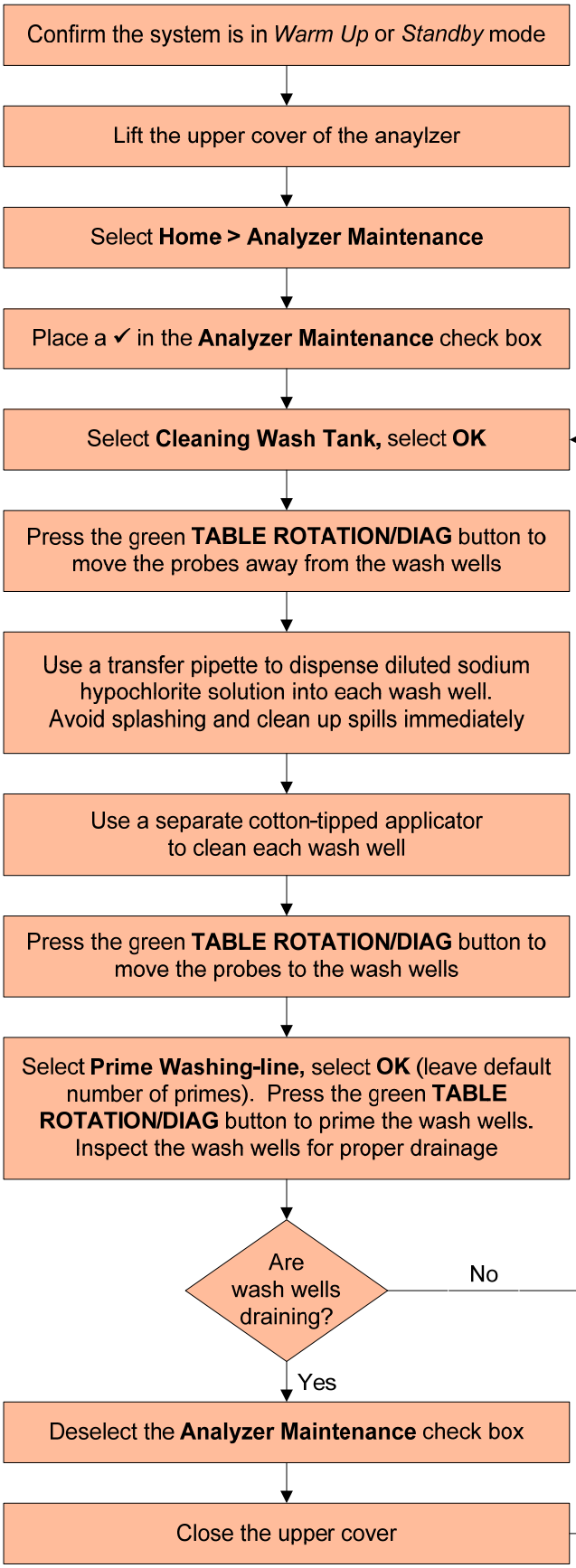
- The “Clean the Deionized Water Tank, Deionized Water Filter, and Sample Probe Filter” procedure requires the sonication of DI water filters for 10 minutes. Will your lab order spare DI water filters to minimize analyzer downtime?

- Identify the solutions that you will need for maintenance. Some of these solutions need to be made up prior to performing the maintenance procedure

Clean the Sample Probe, Reagent Probe, and HbA1c Wash Wells

Supplies Required:

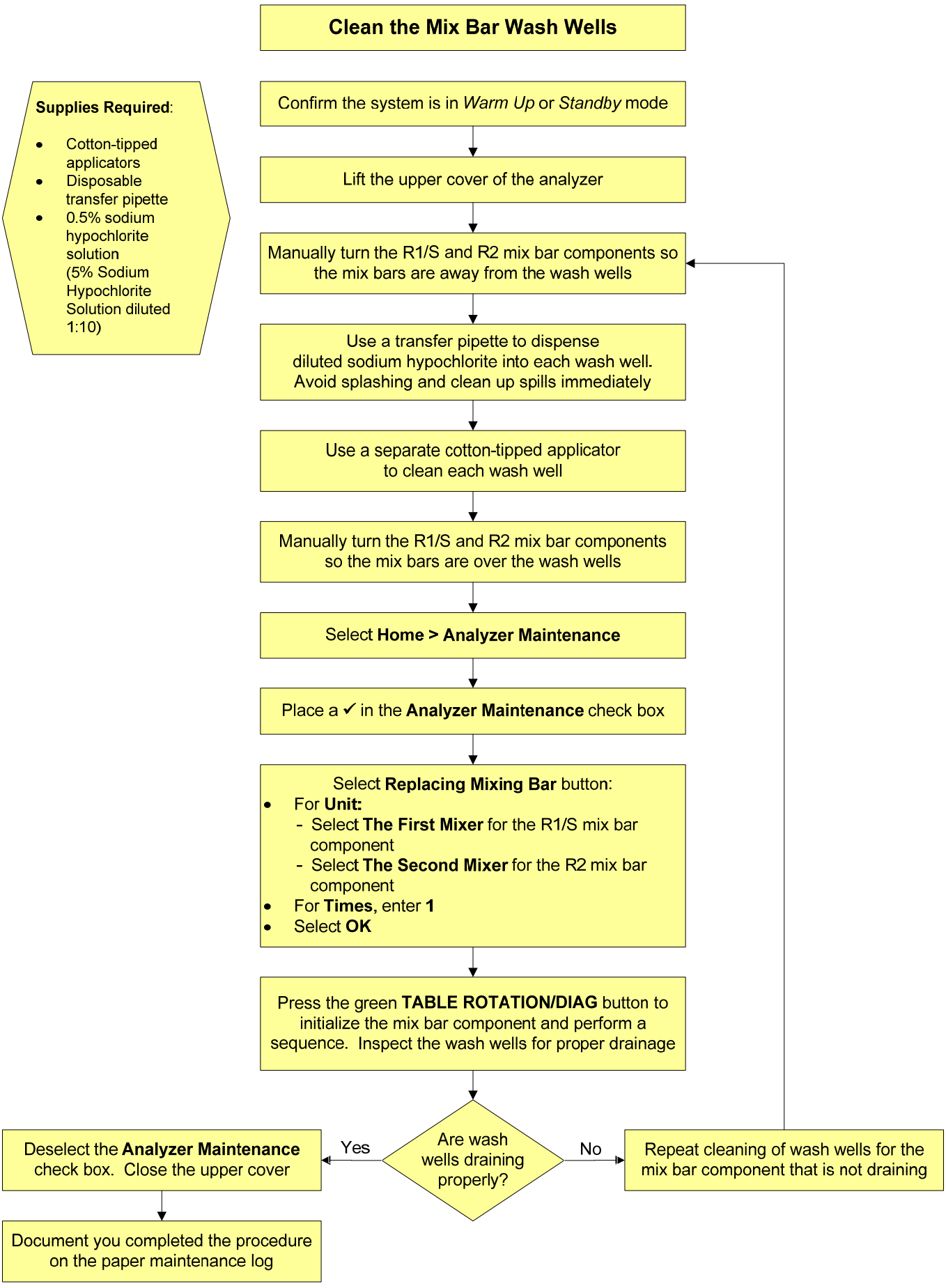
- Cotton-tipped applicators
- Disposable transfer pipette
- 0.5% sodium hypochlorite solution (5% Sodium Hypochlorite Solution diluted 1:10)



Clean the Mix Bar Wash Wells

Supplies Required:

- Cotton-tipped applicators
- Disposable transfer pipette
- 0.5% sodium hypochlorite solution (5% Sodium Hypochlorite Solution diluted 1:10)



Clean the Wash Nozzle Component and Inspect the Tube Mounting Joints

Supplies Required:

- Clean, dry, lint-free absorbent tissuel
- Sonicator filled with DI water

Confirm the system is in *Warm Up* or *Standby* mode

Lift the upper cover of the analyzer

Select **Home > Analyzer Maintenance**

Place a ✓ in the **Analyzer Maintenance** check box

Select **Replacing Wash Nozzle**, select **OK**

Press the green **TABLE ROTATION/DIAG** button to drain the liquid from the tubing

Always drain the fluid from the wash nozzle before removing the tubing to avoid spills in the cuvette wheel

Open the rear cover

Loosen the 4 gray manifolds and remove them from their mounting positions

Perform the following inspections :

- Inspect the 6 O-rings in the water supply manifold and confirm all O-rings are present, not worn (over stretched), or torn and that the area is free of dust or detergent crystals. Clean or replace O-rings. if necessary
- Inspect the packing (thin black ring) inside each manifold of the three tube mounting joints. If damaged, replace the packing

Loosen the silver knob holding the wash nozzle component and lift the wash nozzle component up over the positioning screws

Remove the wash nozzle component along with tubing and inspect the joints (flexible tubing joining the metal nozzle to the tubing) for cracks. Replace any joints, if necessary

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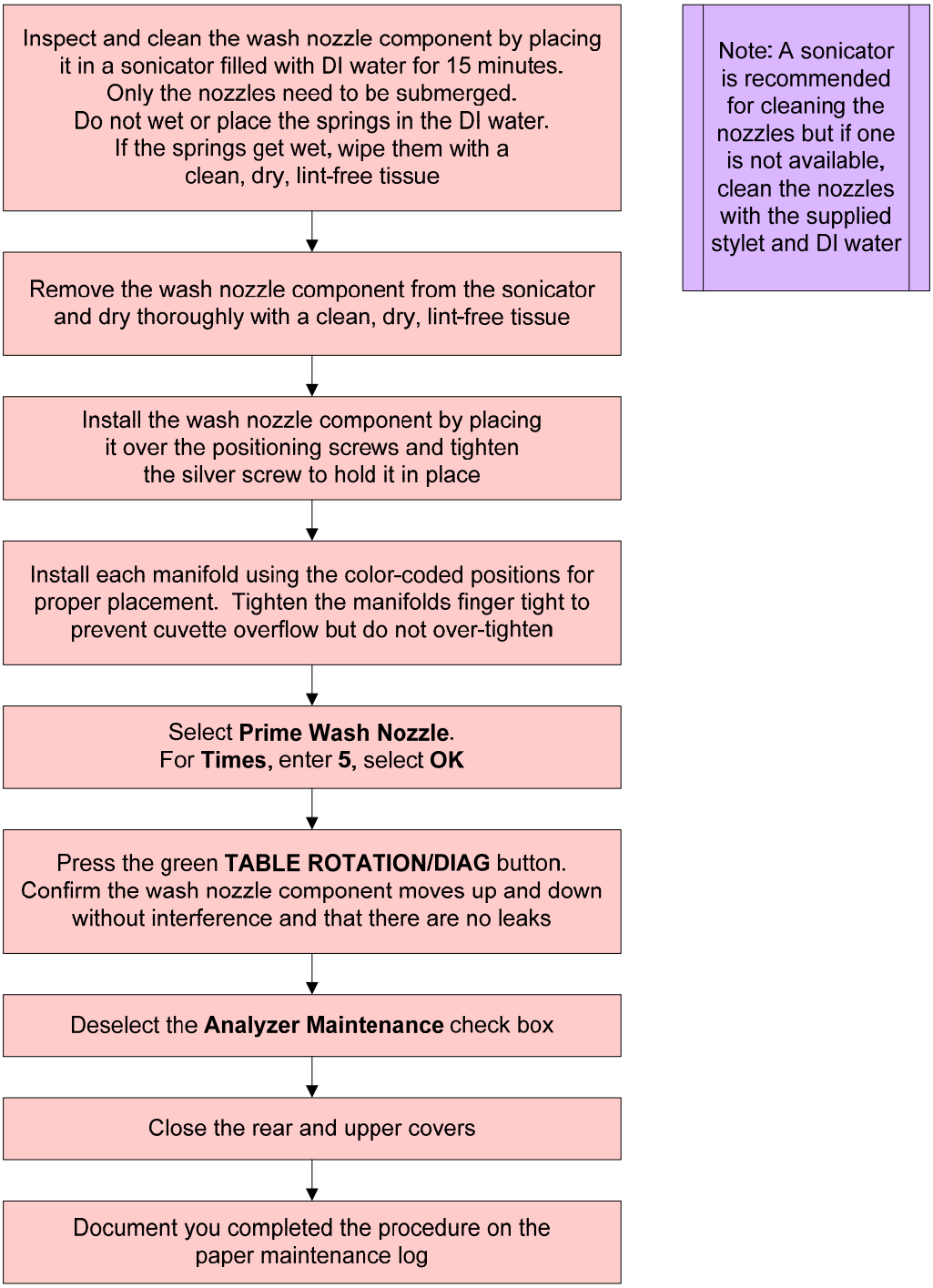

Inspect and clean the wash nozzle component by placing it in a sonicator filled with DI water for 15 minutes. Only the nozzles need to be submerged. Do not wet or place the springs in the DI water. If the springs get wet, wipe them with a clean, dry, lint-free tissue
Note: A sonicator is recommended for cleaning the nozzles but if one is not available, clean the nozzles with the supplied stylet and DI water
Remove the wash nozzle component from the sonicator and dry thoroughly with a clean, dry, lint-free tissue
Install the wash nozzle component by placing it over the positioning screws and tighten the silver screw to hold it in place
Install each manifold using the color-coded positions for proper placement. Tighten the manifolds finger tight to prevent cuvette overflow but do not over-tighten
Select **Prime Wash Nozzle**. For **Times**, enter **5**, select **OK**
Press the green **TABLE ROTATION/DIAG** button. Confirm the wash nozzle component moves up and down without interference and that there are no leaks
Deselect the **Analyzer Maintenance** check box
Close the rear and upper covers
Document you completed the procedure on the paper maintenance log

Clean the Deionized Water Tank, Deionized Filter, and Sample Probe Filter

Supplies Required:

- Clean, dry, lint-free absorbent tissue
- Basin
- 1.0% sodium hypochlorite solution (5% Sodium Hypochlorite Solution diluted 1:5)
- Extra DI water tank filled with 5 L of DI water
- Sonicator filled with DI water

Confirm the system is in *Warm Up* or *Standby* mode

From **Home,** select the **End** button  to shut down the system

Open the front left door on the analyzer

Place a basin on the floor in front of the DI water tank to catch spilled water

Disconnect the float sensor connector 868

Be sure to remove the float sensor connector to prevent water from pouring out of the DI water tubing

Press the gray quick disconnect joints on the front of the tank and remove the tubes

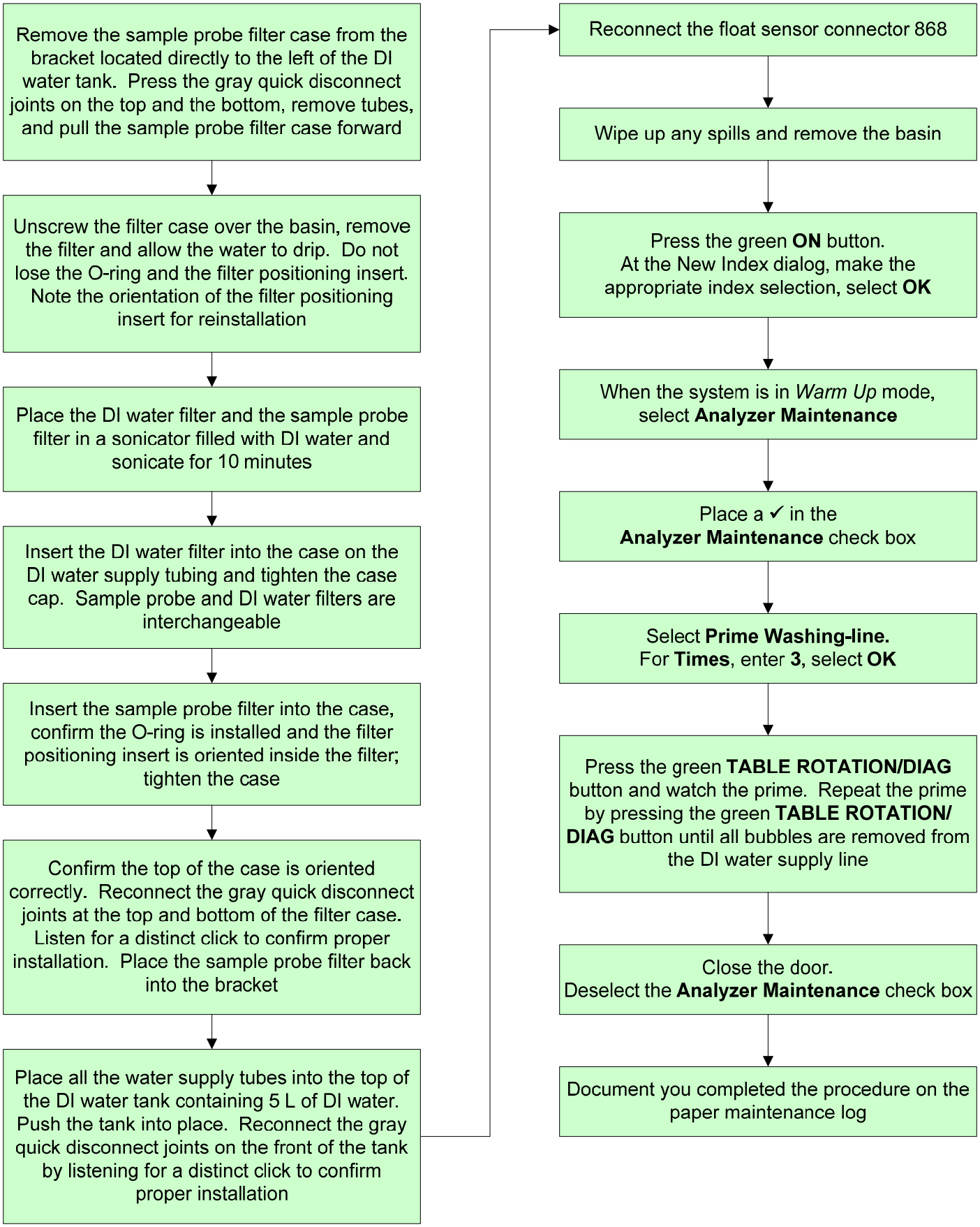
Pull the DI water tank forward and pull out the tubes from the top of the tank.
Wrap the tubes with a clean absorbent tissue (one tube has the DI water filter attached)

Pull the DI water tank out of the analyzer.
Unscrew and remove the float sensor from the DI water tank, wipe the float sensor with DI water, then wipe the float sensor dry with a clean, dry lint-free tissue.
Install the float sensor in the spare DI water tank containing 5 L of DI water

Discard the DI water from the tank you removed from the analyzer and rinse the tank with the diluted sodium hypochlorite solution. Rinse the tank thoroughly with DI water and allow to dry

Locate the filter on the DI water supply tubing removed from the tank. Position the tubing over the basin and unscrew the filter case, remove the filter and allow the water to drip

Continue on the next page


Remove the sample probe filter case from the bracket located directly to the left of the DI water tank. Press the gray quick disconnect joints on the top and the bottom, remove tubes, and pull the sample probe filter case forward
Unscrew the filter case over the basin, remove the filter and allow the water to drip. Do not lose the O-ring and the filter positioning insert. Note the orientation of the filter positioning insert for reinstallation
Place the DI water filter and the sample probe filter in a sonicator filled with DI water and sonicate for 10 minutes
Insert the DI water filter into the case on the DI water supply tubing and tighten the case cap. Sample probe and DI water filters are interchangeable
Insert the sample probe filter into the case, confirm the O-ring is installed and the filter positioning insert is oriented inside the filter; tighten the case
Confirm the top of the case is oriented correctly. Reconnect the gray quick disconnect joints at the top and bottom of the filter case. Listen for a distinct click to confirm proper installation. Place the sample probe filter back into the bracket
Place all the water supply tubes into the top of the DI water tank containing 5 L of DI water. Push the tank into place. Reconnect the gray quick disconnect joints on the front of the tank by listening for a distinct click to confirm proper installation
Reconnect the float sensor connector 868
Wipe up any spills and remove the basin
Press the green **ON** button.
At the New Index dialog, make the appropriate index selection, select **OK**
When the system is in *Warm Up* mode, select **Analyzer Maintenance**
Place a ✓ in the **Analyzer Maintenance** check box
Select **Prime Washing-line.**
For **Times**, enter **3**, select **OK**
Press the green **TABLE ROTATION/DIAG** button and watch the prime. Repeat the prime by pressing the green **TABLE ROTATION/ DIAG** button until all bubbles are removed from the DI water supply line
Close the door.
Deselect the **Analyzer Maintenance** check box
Document you completed the procedure on the paper maintenance log

Chapter 7

As-Needed Tasks

Introduction

This chapter provides information on tasks that are performed on an as-needed basis. The procedures include:

- Fix (assign) a reagent position
- Set calibrator lot concentrations
- Configure a new QC lot
- Define a user menu
- Save or load system parameters
- Save data to external media
- Perform an end process
- Perform and recover from an emergency stop
- Disable a test
- Transfer data to the host

These tasks may not be required for all operators of the AU680. Determine which tasks apply to you based on your role and responsibilities in the lab.

Fix (Assign) a Reagent Position

If your lab will be using non-bar coded reagents (user-defined or from a third party vendor) on the AU680, you will need to assign these reagents to fixed positions. The analyzer does not read bar codes on reagents in fixed positions. Fixed positions in the reagent refrigerators can be identified by an asterisk (*) to the left of the "Pos." column in the Reagent Management: Details screen.

When reagents in fixed positions need to be replaced or replenished you do not need to fix them again unless you are placing them into new positions. You can edit the information for a fixed reagent position as-needed.

The **Initialize Onboard Stability** button can be used to reset the "Onboard Remaining" time when a fixed reagent is replaced or replenished. For this feature to work, the fixed reagent needs to have:

- An Onboard Stability time set for the test in Specific Test Parameters
- A lot number and bottle number (SN) entered for the reagent bottle

You can also assign bar coded reagents to fixed positions if the bar code is damaged or unreadable. When fixing bar coded reagents that have R1 and R2 bottles, both bottles need to be assigned to fixed positions, even if only one of them have bar code read issues. The Reagent Management: Details tab will display a Mismatch error if the information entered for fixed R1 and R2 reagents do not match.

Do not leave positions fixed if they are no longer needed. Be sure to switch the position back to Reagent ID so the system will read bar codes for reagents placed in the position on the reagent refrigerator.

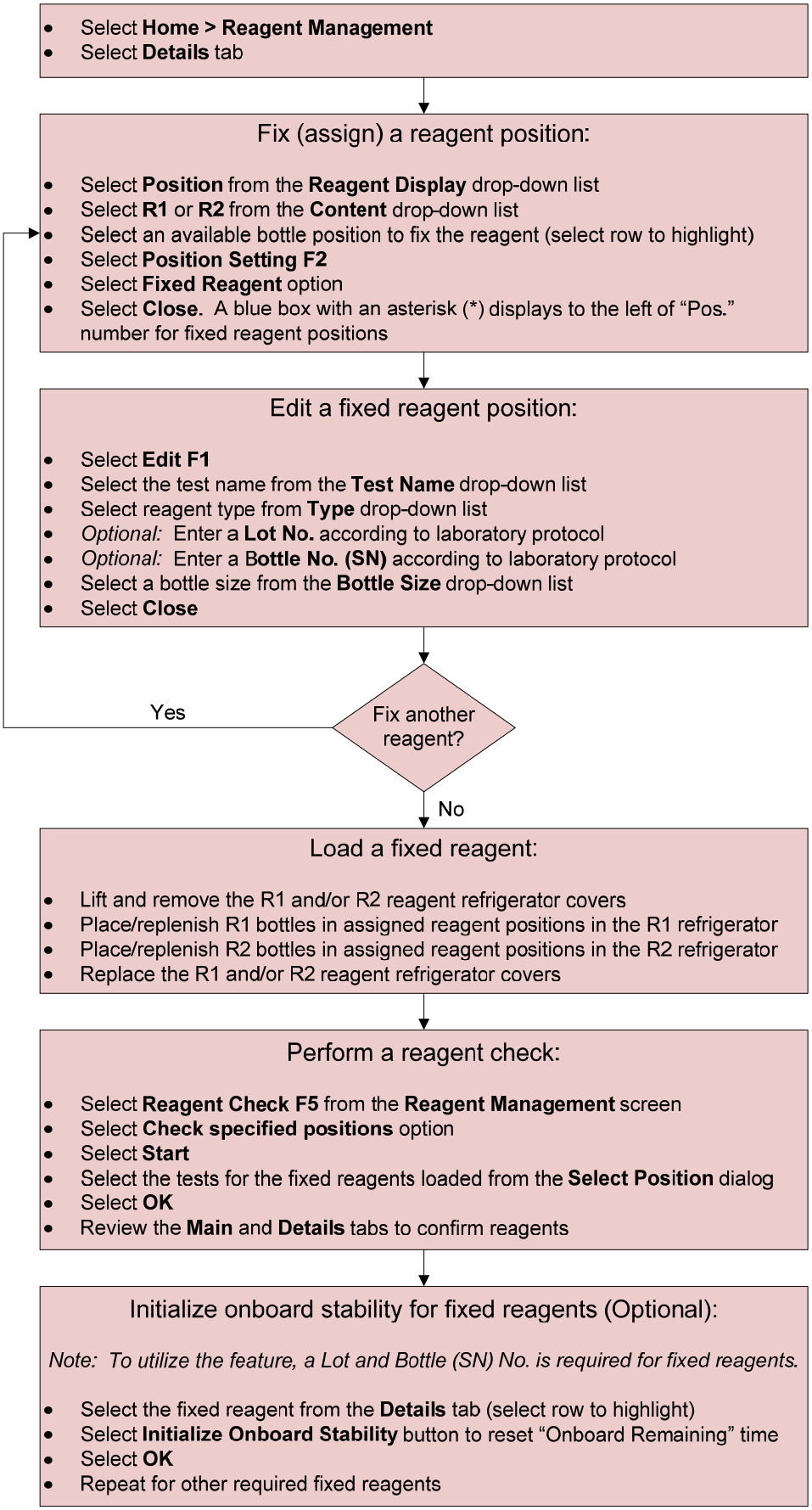
Practice

- Use the flowchart on the following page to identify how to fix a position, assign a reagent to the fixed position, and load the reagent

- Will you have fixed reagent positions on your system? Identify which tests will be fixed on your analyzer

- Will your lab policy require the entering of lot and bottle number (SN) for fixed reagents? This is required to update onboard stability for fixed reagents

Fix (Assign) a Reagent Position



Set Calibrator Lot Concentrations

When you receive a new lot of a calibrator in the lab you will need to enter the new information (lot number, expiration, concentrations) into the system.

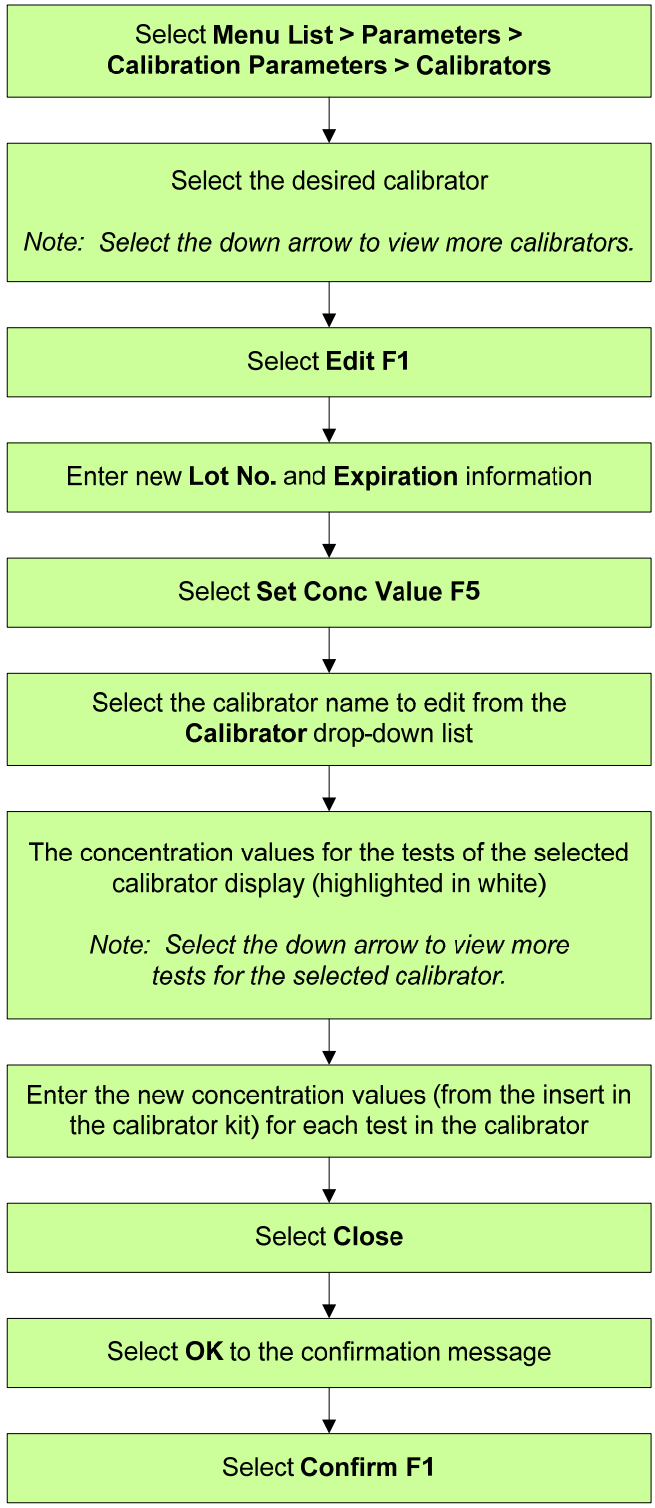
The calibrator kit includes an insert with the updated concentrations for tests in the calibrator. Confirm the concentrations are entered correctly before processing calibrations.

Practice

- Use the flowchart on the following page to practice updating a calibrator with new lot information
- Will all operators be required to know how to enter new calibrator lot information on the analyzer?
- How will you confirm that the correct calibrator lots are in use?

Set Calibrator Lot Concentrations

Note:
This procedure applies only for calibrators that are already defined on the analyzer.



Configure New QC Lot

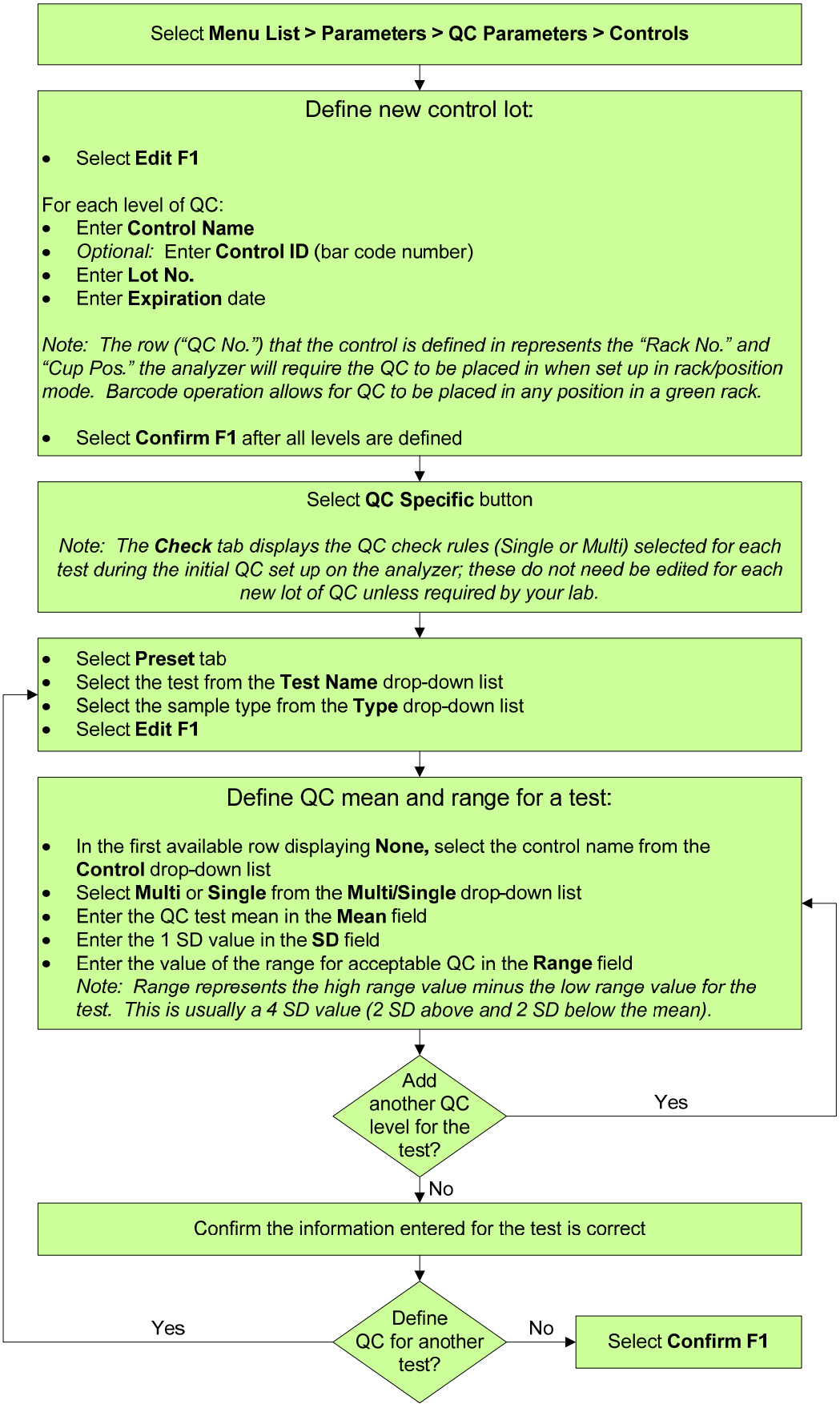
When you receive a new lot of a QC in the lab you will need to enter in the new information (lot number, expiration, mean, SD, range) on the system.

If your lab policy requires parallel lot testing for new QC lots you will need to configure the new QC separately from the current QC. This will allow both lots of QC to be ordered as a part of the automatic QC requisition.

Practice

- Use the flowchart on the following page to practice defining a new lot of QC
- Will all operators be required to know how to enter new QC lots on the analyzer?
- Will you use the QC Parameters to define new lots of QC on the analyzer, or will this be managed on a different QC program (on a data management system or LIS)?

Configure a New QC Lot



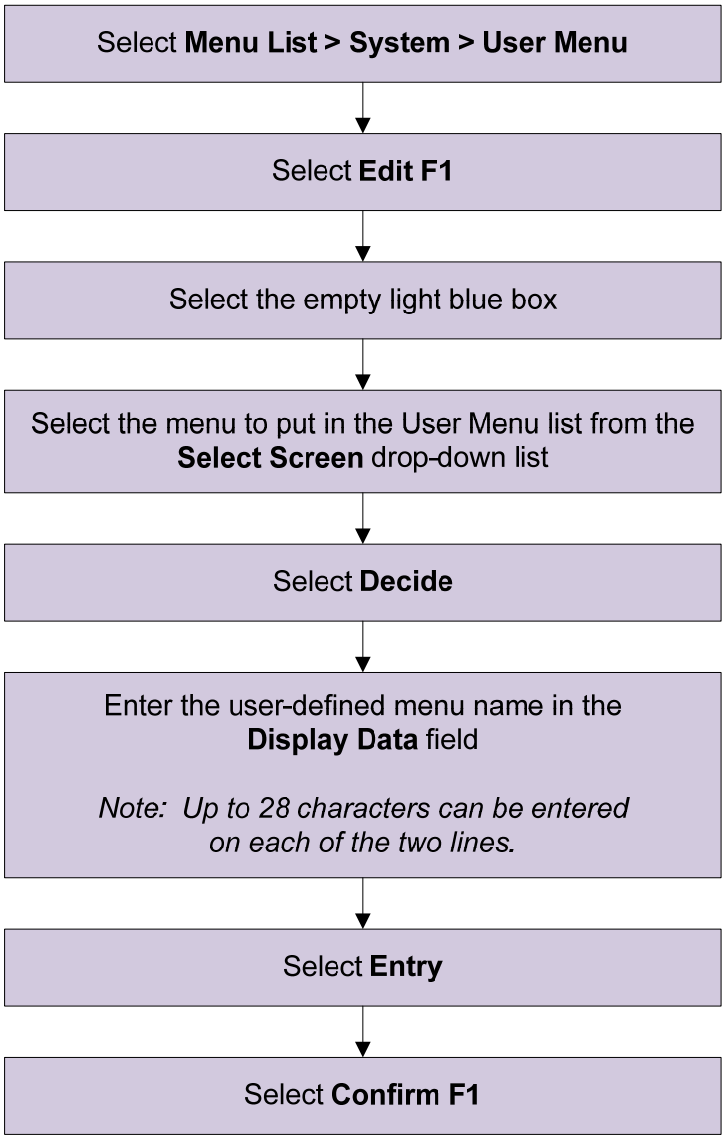
Define a User Menu

The User Menu allows for the customization of up to 16 menus (with operator-defined names) frequently used in your lab. Selecting a menu from the User Menu can save time for the operator by decreasing the number of steps required to reach specific software screens.

Practice

- Use the flowchart on the following page to practice creating a user menu entry
- Does your analyzer already have some User Menu entries defined? Your Applications Specialist may have defined some during installation
- Will you define User Menu entries on your system to access screens for routine operations? Or will you define entries for less frequently accessed screens?
- Think of how you can name a User Menu entry to make software navigation easier for operators

Define a User Menu



Save or Load System Parameters

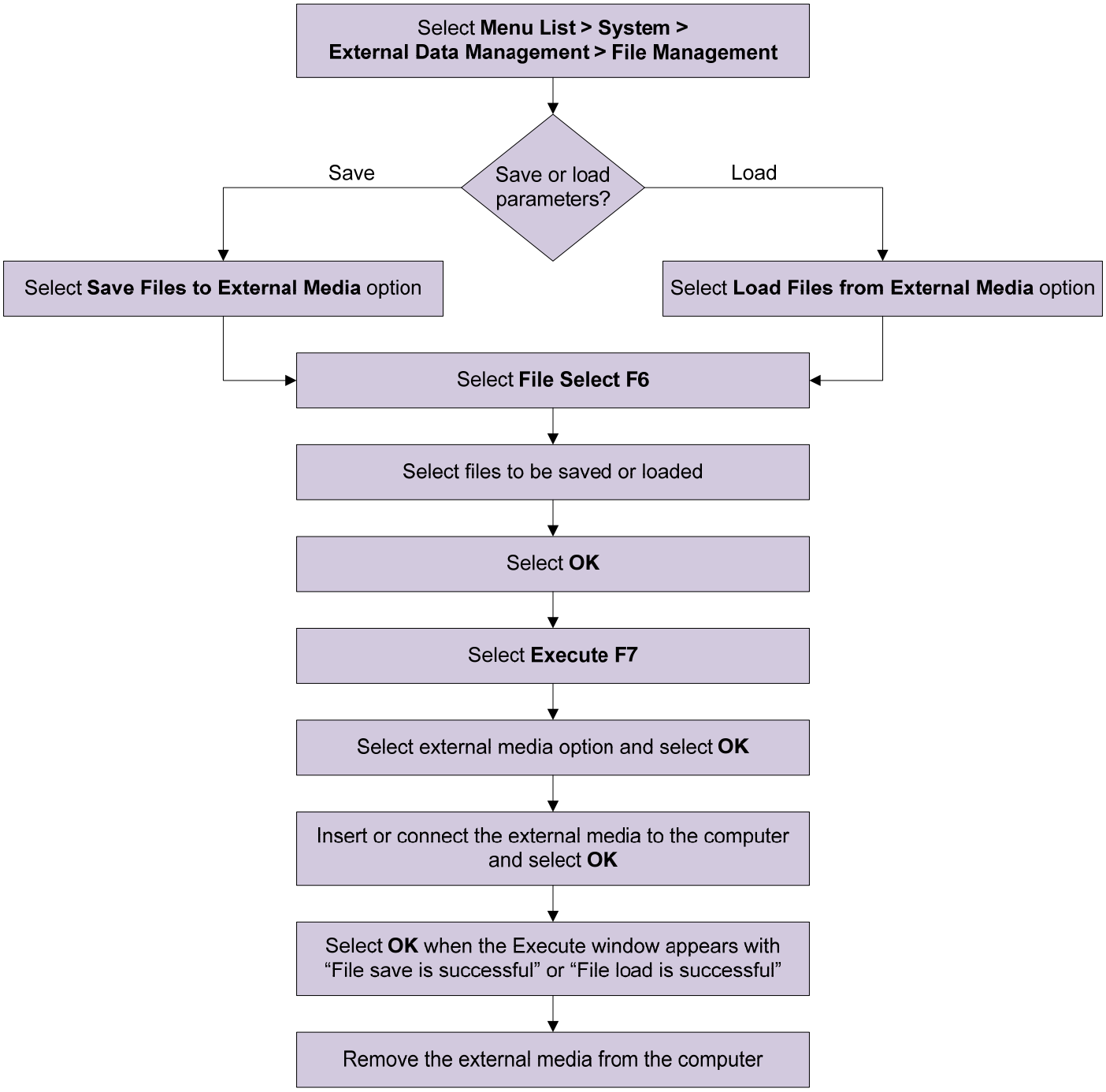
The system can save or load parameters to a backup folder on the hard drive or external media. Beckman Coulter recommends saving parameters to external media when programming changes are made to the Parameters or System menus, or following laboratory policy. If your lab needs to add, remove, or edit any tests following the initial install of your system, it is important to save the updated test parameters to external media to ensure that a current backup copy is available.

Having a system parameters backup can be useful in the event that you have a system issue that requires the replacement of the computer. The saved parameters can be quickly loaded onto the new computer. This would save a significant amount of analyzer downtime that would be required if a backup was not available and the information needed to be reentered.

Practice

- Use the flowchart on the following page to practice saving system parameters
- Will your lab have a policy to perform a system parameter backup on a routine schedule? Who will be required to know how to save system parameters?
- What external media will you use for backup (flash drive, CD, floppy disk)?

Save or Load System Parameters



Save Data to External Media

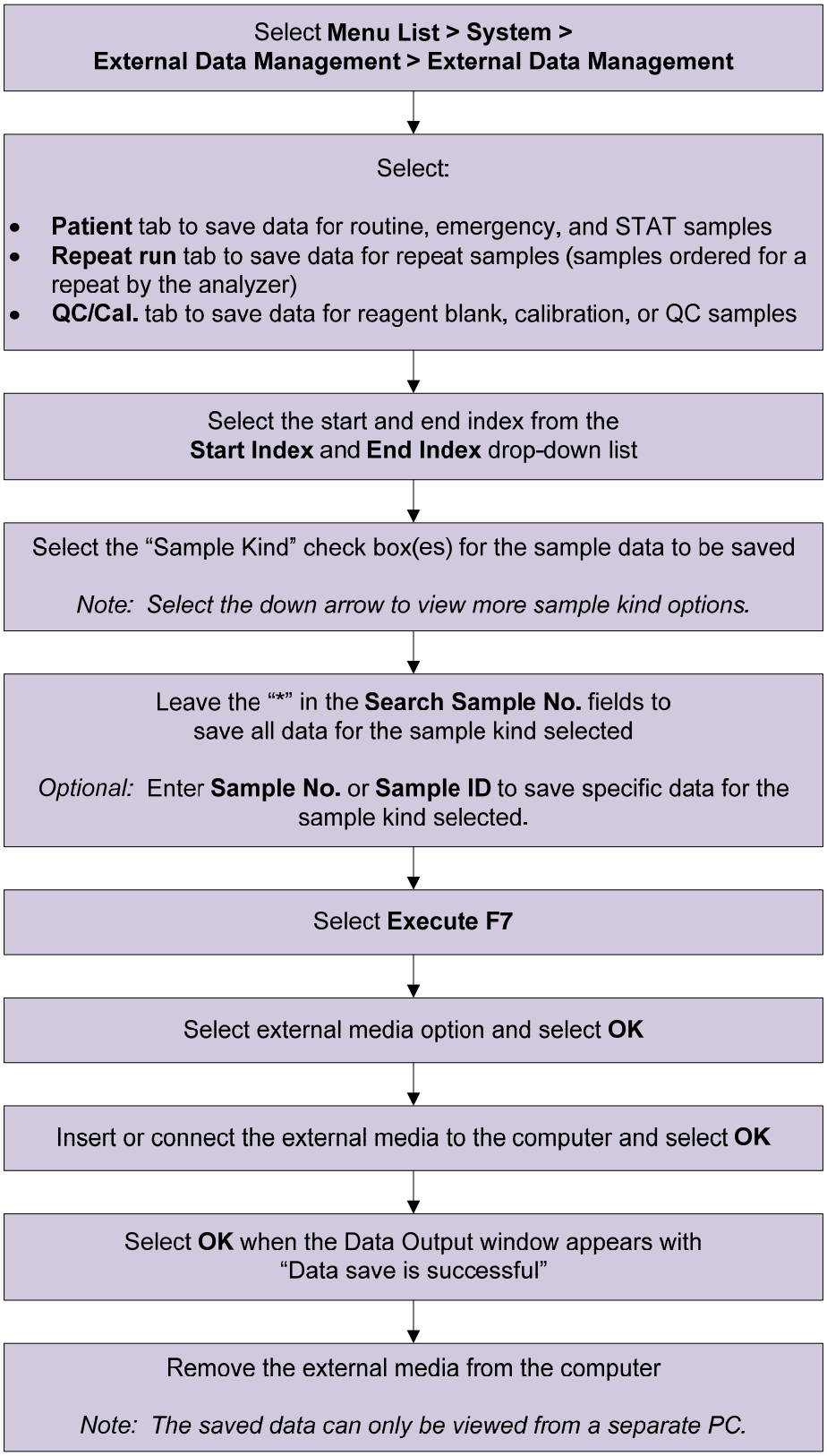
Save data to external media for a backup of data, or to transfer the data to another computer. Data is saved to an “AU Data” folder. The data files are identified by the index.

Sample data, reagent blank, calibration, and QC data can be saved to external media.

Practice

- Use the flowchart on the following page to practice saving data to external media
- Does your lab require data to be saved electronically? If so, how frequently will the data backup be performed?

Save Data to External Media



Perform an End Process (System Shutdown)

An End Process turns off the analyzer lamp and the computer. The reagent refrigerators, incubator, and STAT table compartment temperatures are maintained. The ISE module performs an automatic prime with ISE MID Standard Solution every hour to keep the electrodes conditioned while the system is shutdown.

An End Process can be initiated after a W2 and/or Photocal is started. In this case, the system shuts down after the W2 and/or Photocal is completed.

An End Process (system shutdown) is recommended for labs that do not operate 24 hours a day, 7 days a week, to save lamp life.

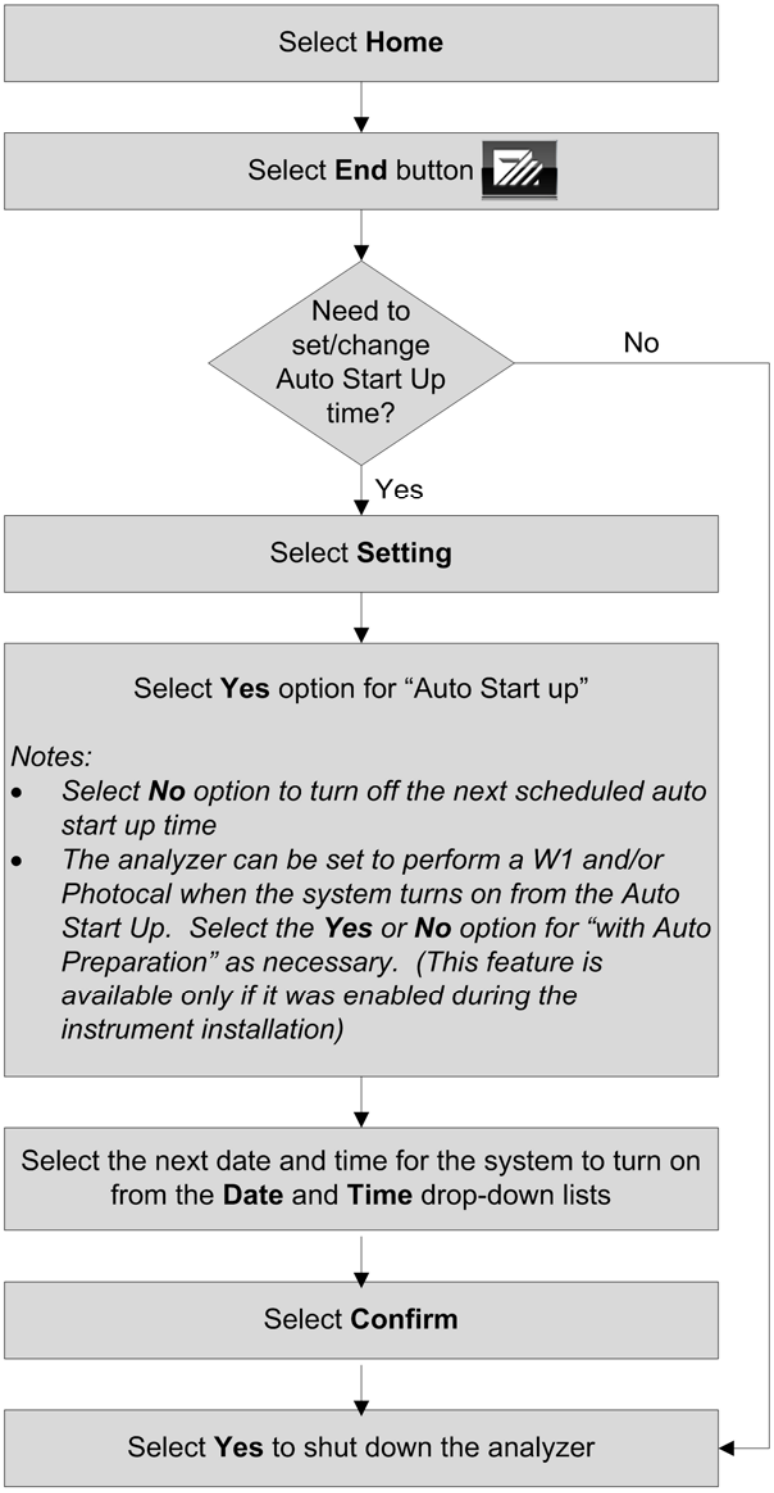
An automatic startup time can be set for the system to automatically turn on at a specified time each day of the week. This feature allows the system to warm up before you arrive in the lab in the morning.

Practice

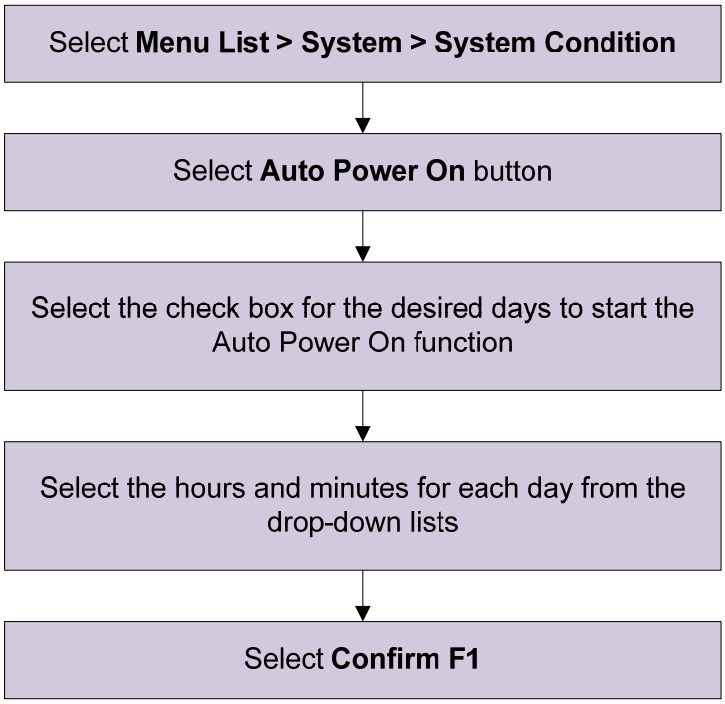
- Use the flowchart on the following page to practice performing an End Process and setting a daily automatic startup time

- Will you be performing an End Process daily in your lab? If so, you can set an automatic startup time so that the analyzer will turn on at a specified time each day of the week

Perform an End Process (System Shutdown)



Program Automatic Startup Function



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Perform and Recover from an Emergency Stop

Pressing the EM STOP button on the analyzer immediately turns off power to the analyzer and ISE module. All analysis immediately stops and any data that is not complete is lost and must be repeated.

Reagents remain in the cuvettes after performing an emergency stop of the analyzer. A W1 should be performed following an emergency stop to clean the cuvettes before performing an End Process or resuming analysis.

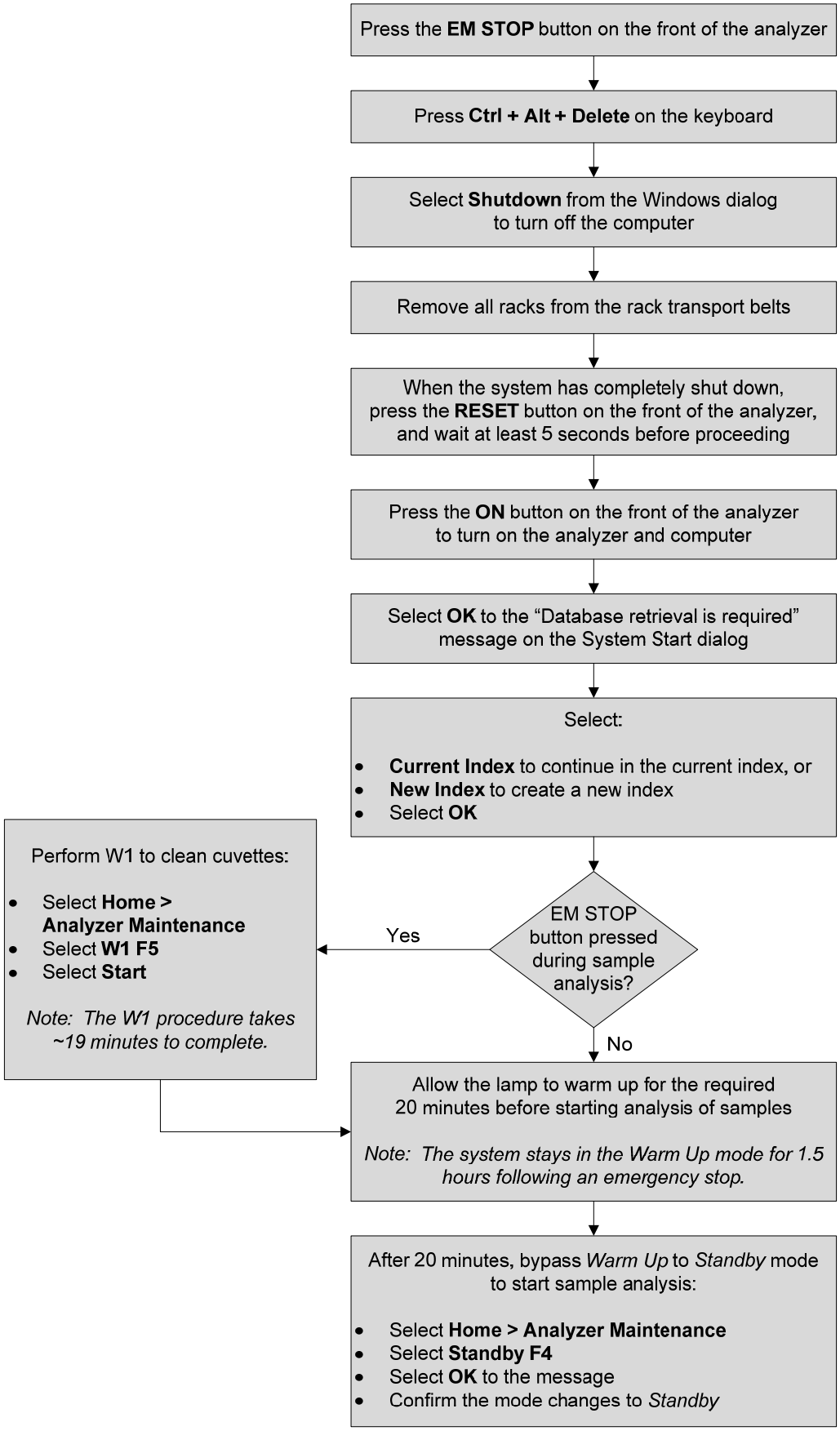
The same steps used to recover from an emergency stop also apply to recovering from a loss of power to the analyzer.

When the analyzer turns on following an emergency stop the system mode remains in *Warm up* for 1.5 hours. The system requires a 20 minute warm up time for the lamp. After the 20 minute warm up time you can bypass warm up to standby.

Practice

- Use the flowchart on the following page to practice performing an emergency stop
- When an emergency stop is performed on the analyzer the refrigerator temperature is no longer maintained. Consider how to manage reagents in the refrigerators if the system is not immediately turned back on

Perform and Recover from an Emergency Stop



Disable a Test

Specific tests can be selected to stop analysis (disable) even when the test has an order. It may be useful to disable a test if the calibration failed for that test, or QC fails and samples are in process.

- A test can be disabled or enabled during *Measure* mode. Analysis of the test(s) will stop or re-start after selection in the Disable dialog
- Reagent blank, calibration, and QC samples can still be processed for disabled tests
- Tests that are disabled display and print with a **/** flag, indicating the test was ordered but not performed
- Selections in the Disable dialog are in effect until a new index is created, an End Process is performed, or the test is re-enabled

Practice

- Use the flowchart on the following page to practice disabling a test

- Navigate to the Home menu to identify how an operator can see that a test is disabled

- The test is re-enabled when a new index is created or following an End Process. You can also re-enable the test from the Start Condition screen. Re-enable the test you disabled

Disable a Test

Note: A test can be disabled or enabled during Measure mode.

Select **Home > Start Condition**

↓

Select **Disable F7**
A list of tests to disable is displayed

↓

Select the test(s) to be disabled.
Tests that are disabled are highlighted in orange

↓

Select **OK**

Note: Tests remain disabled until:

- *They are re-enabled*
- *A new index is made, or*
- *An End Process is performed*

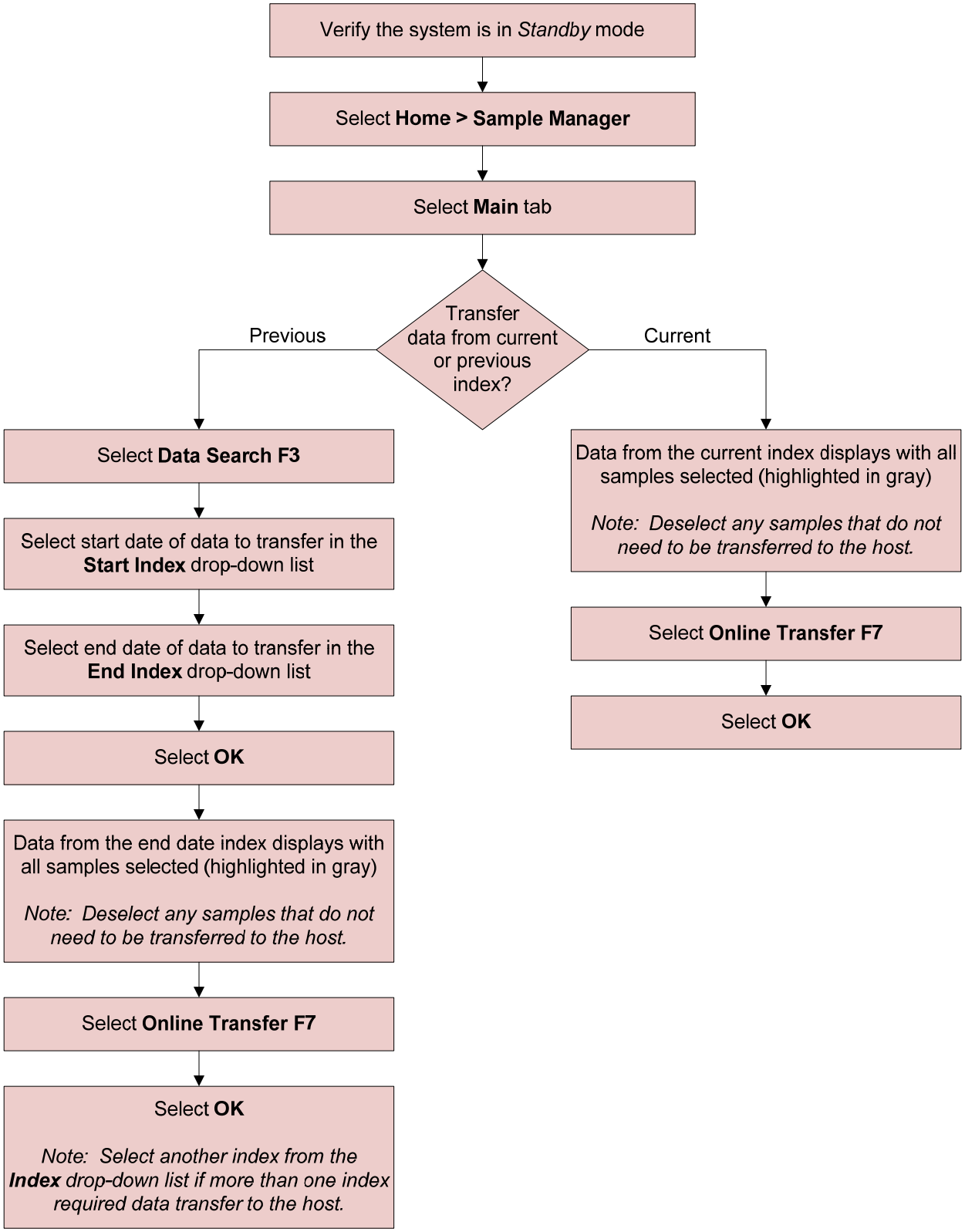
Transfer to Host

The system is generally set up to automatically transfer results to the host. If the communication between the analyzer and host becomes unavailable, you may need to resend the results to the host once the communication is reestablished.

Practice

- Use the flowchart on the following page to practice sending results to the host
- What scenarios might arise in your lab that will require you to resend results to the host?

Transfer to Host



Chapter 8

Troubleshooting

Introduction

This chapter introduces you to the resources available for troubleshooting on the AU680. The following will be covered in this chapter:

- Alarm list
- Error flags
- Troubleshooting reagent blank, calibration, and QC failures
- Troubleshooting tips for common issues

Practice

- Use the information in the following pages to:
  - Review information in the Alarm List and Alarm Help
  - Identify flags
  - Review tools available for troubleshooting reagent blank, calibration, and QC failures

Alarms

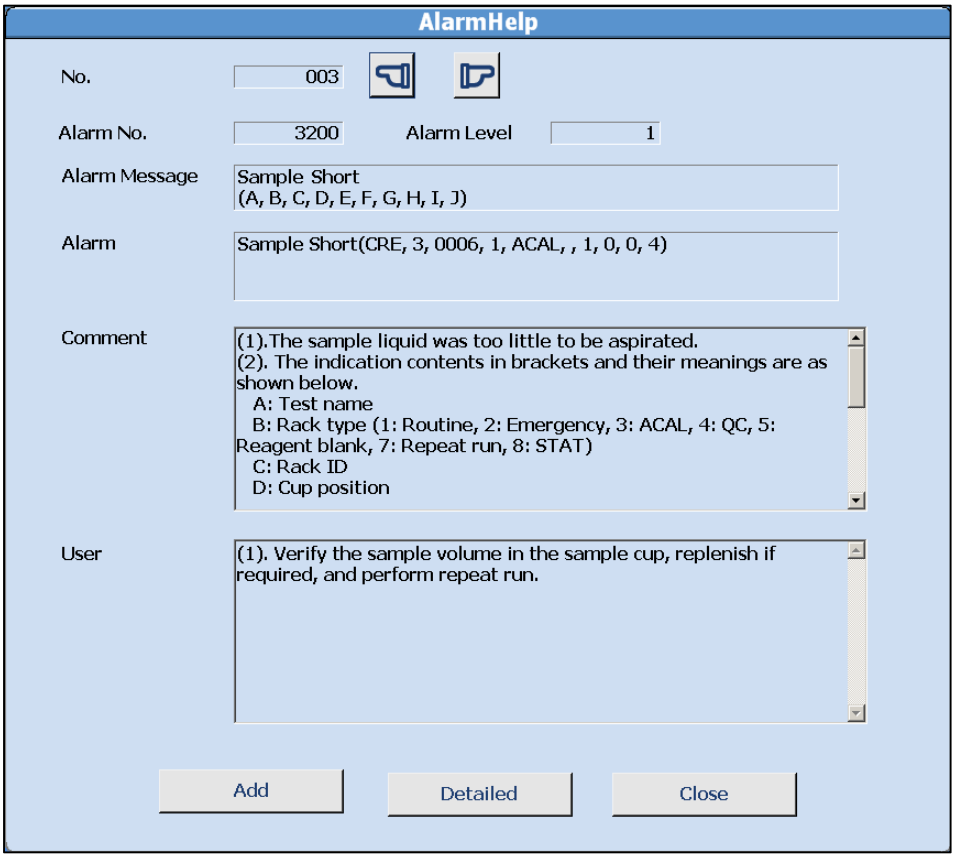
- Alarm messages display on the bottom of the software screen with an audible alert
  - Select **Alarm Clear**  once to silence the audible alert
  - Select **Alarm Clear**  a second time to clear the message from the bottom of the software screen

- There are three alarm levels. A different sound can be set for each alarm level:

Level	Description
1	Warning: A fatal system abnormality exists
2	Caution: An abnormality influencing the data exists
3	Informational: No system abnormality and the system displays the operation log

- System can store and display a maximum of 999 alarms on the **Alarm List** 

- To access detailed information about the alarm and possible corrective actions:
  - Select **Alarm List**  . The system displays the Alarm List dialog with the most recent alarm at the top
  - Select the alarm you are investigating, and then select **Help**. The system displays the Alarm Help dialog for the selected alarm
  - Select **Print Screen** on the keyboard to print a copy of the alarm
  - Review the information in the **User** section for possible corrective actions to take
  - Contact Beckman Coulter Technical Support if the issue is not resolved using the available resources



Alarm Message	The **Alarm Message** and **Alarm** sections display the general and specific content in the parentheses and brackets for a selected alarm. The following example is for a "Sample Short" alarm: Sample Short (A, B, C, D, E, F, G, H, I, J)
Alarm	Sample Short (CRE, 3, 0006, 1, ACAL, , 1, 0, 0, 4)
Comment*	Displays more information about the alarm, including a key to the content in the parentheses and brackets. The following example is the key for the alarm message above: **A:** Test Name **B:** Rack type (1: Routine, 2: Emergency, 3: ACAL, 4: QC, 5: Reagent blank, 7: Repeat run, 8: STAT) **C:** Rack ID **D:** Cup position **E:** Sample No. **F:** Sample ID **G:** Error information **H:** Error information **I:** Error information **J:** Error information
User	Corrective action to be taken by the operator. If there is no information in the User section, determine if Beckman Coulter Technical Support should be contacted to help resolve the issue.

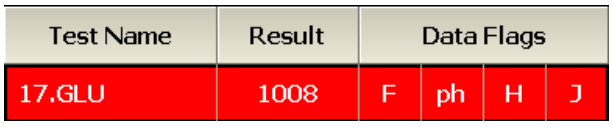
*Note: Select the **Detailed** button if the **Comment** section does not provide enough information to interpret the contents of the alarm.

Flags

- The system generates flags when the system encounters a condition that can affect the result. This condition can range from minor warnings to severe errors that require immediate attention
- Up to four flags may be attached to a result according to priority. The four flags with the highest priorities are displayed in red when viewing results from the Sample Status: Detail screen or on the printed reports
- Review each flag and identify the root cause, and perform the corrective action
- Do not report any result with an unresolved or unexpected flag
- For a list of flag definitions, possible causes, and corrective actions, refer to:

  Reference: AU680 Chemistry Analyzer Instructions for Use
  ↳ Chapter 7: Flags
  ↳ Flags
  ↳ Flag Details

- Examples of how flags are displayed on different software screens and on a printed report:

Sample Status: Detail	
Sample Status: Realtime Display	
Sample Manager: Sample tab	
Data Log Report (Printed report)	

Troubleshooting Reagent Blank, Calibration, and QC Failures

Reagent Blank (RB) Issues

- The system generates “RB DATA ERROR” alarms if the reagent blank fails for a test
- Review the printout for flags:
  - Flags **u** or **y** display if the RB data of the first read point of the test fails
  - Flags **U** or **Y** display if the RB data of the second read point of the test fails
- Review the RB history data graph in the **Calibration Monitor: RB History**
  - OD readings should be consistent with previous reagent blank data
- **If RB fails for only one test**, inspect what is UNIQUE to the failed test:
  - Reagent
    - Reagent expiration date
    - Reagent on-board expiration date
    - Confirm correct reagent preparation
    - Confirm fixed reagents are in the correct position
    - Confirm a bar code labeled reagent is not in a position fixed for a different test
- **If RB fails for multiple tests**, inspect what is COMMON to the failed tests:
  - Reagent Probes
  - Reagent Syringes
  - RB sample (DI water)
- Take action based on your investigation, and perform a reagent blank and calibration

Calibration (CAL) Issues

- The system generates “CALIBRATION FACTOR RANGE OVER/UNDER” and “CALIBRATION ERROR” alarms if the calibration fails for a test

- Review the printout for flags
  Note: A failed calibration does not always generate a flag for the test on the calibration data report.

- Review the calibration history data graph in the **Calibration Monitor: Calibration History**
  - OD readings should be consistent with previous calibration data
  - Look for separation between calibrator levels for a multi-point calibration
  - Look at the RB History of the test to determine if you see the same trend (OD readings increase/decrease) as the failed calibration. If so, use the RB Issues section to troubleshoot the reagent before continuing with troubleshooting the calibrator or sampling system

- **If CAL fails for only one test**, and the RB history OD readings for the test are consistent, inspect what is UNIQUE to the failed test:
  - Calibrator
    - Confirm the correct calibrator was poured
    - Confirm the integrity of the calibrator material (expiration date, open bottle stability, time at room temperature, contamination)
    - Confirm correct calibrator is placed in the correct position
    - Confirm the correct lot number is in use and concentration set points entered correctly

- **If CAL fails for multiple tests**, inspect what is COMMON to the failed tests:
  - Calibrator
  - Sample Probe
  - Sample Syringe
  - Wash Syringe

- Take action based on your investigation, and perform a reagent blank and calibration

QC Issues

- Perform QC on the system to validate the calibration
- If the **QC Mode** on the system is set for **Preset** or **Cumulative**, the system generates “QC DATA RANGE OVER/UNDER” alarms if the results exceed the QC range
- Review the printout for flags
  - QC data that exceeds Single Check Level generates **1Q** flag
  - QC data that does not meet Multi Check Level selection generates **1Q** to **7Q** flags
- **If QC fails, review the following for the failed tests:**
  - Reagent blank issues
  - Calibration issues
- If the RB History and Calibration History OD data are consistent for the tests that failed QC, troubleshoot the QC material:
  - QC Sample:
    - Confirm the correct QC material was poured
    - Confirm the integrity of the QC material (expiration date, open bottle stability, time at room temperature, contamination)
    - Confirm correct QC material is placed in the correct position
    - Confirm the correct QC lot number is in use and range is entered correctly
- Take action based on your investigation:
  - Perform a reagent blank and calibration, if needed
  - Process QC for the failed tests

Other Consider-ations

- DI water
- Waste
- Power
- Temperature
- Humidity
- Mixing
- Cuvette overflow
- Incorrect wash dilution

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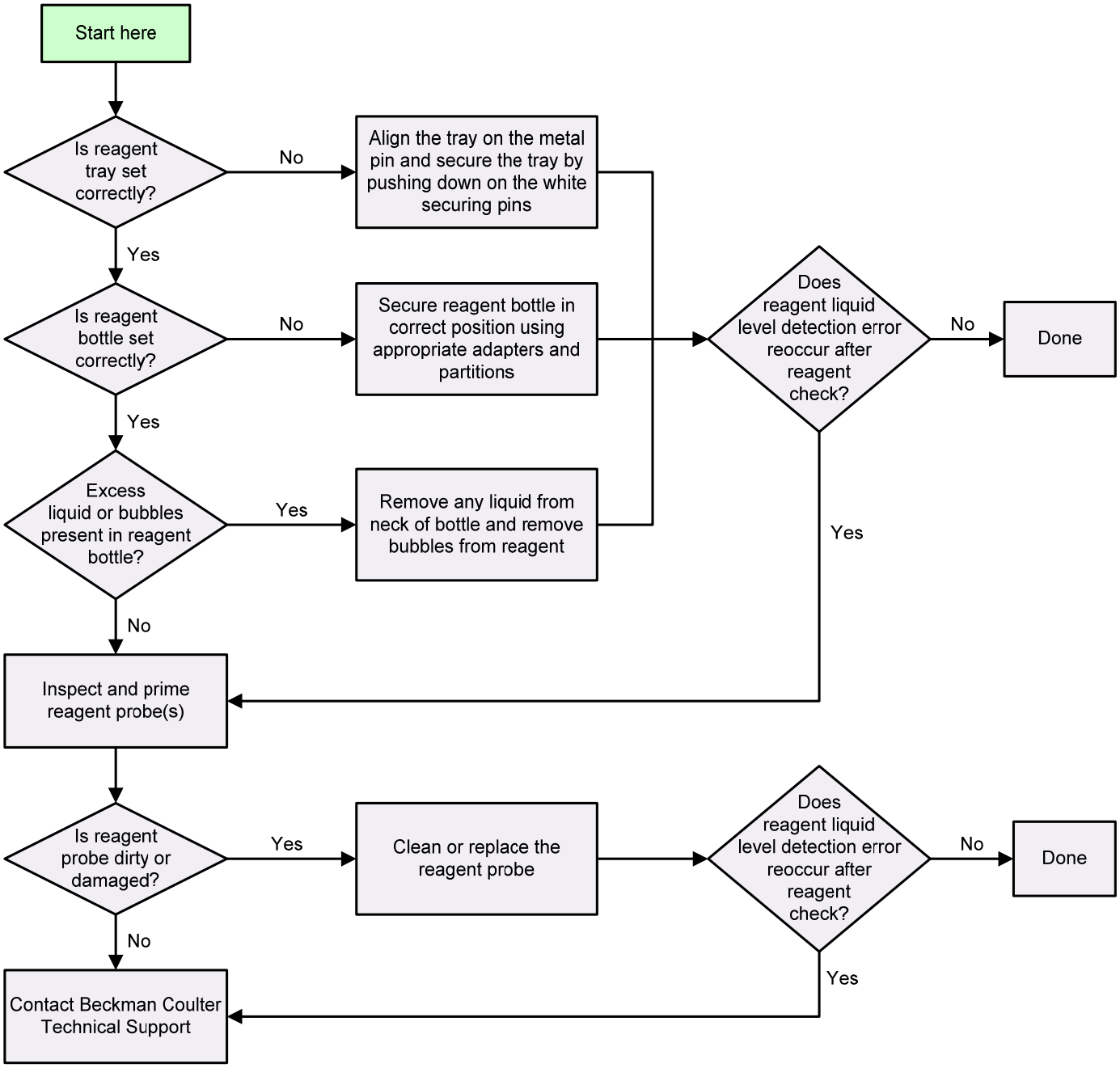
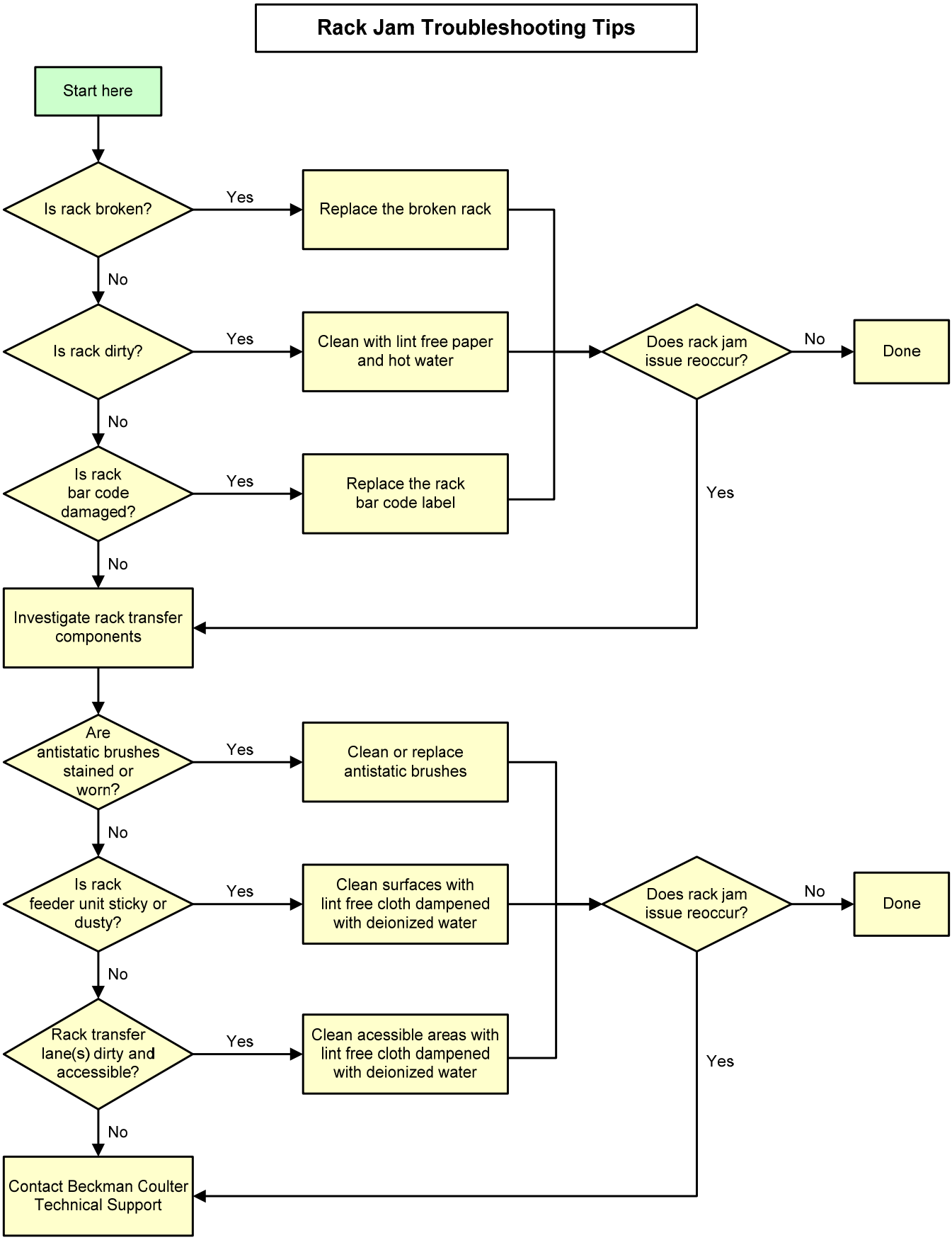
Troubleshooting Tips

The following pages include flowcharts for troubleshooting common issues that may arise when operating the analyzer. The flowcharts included are:

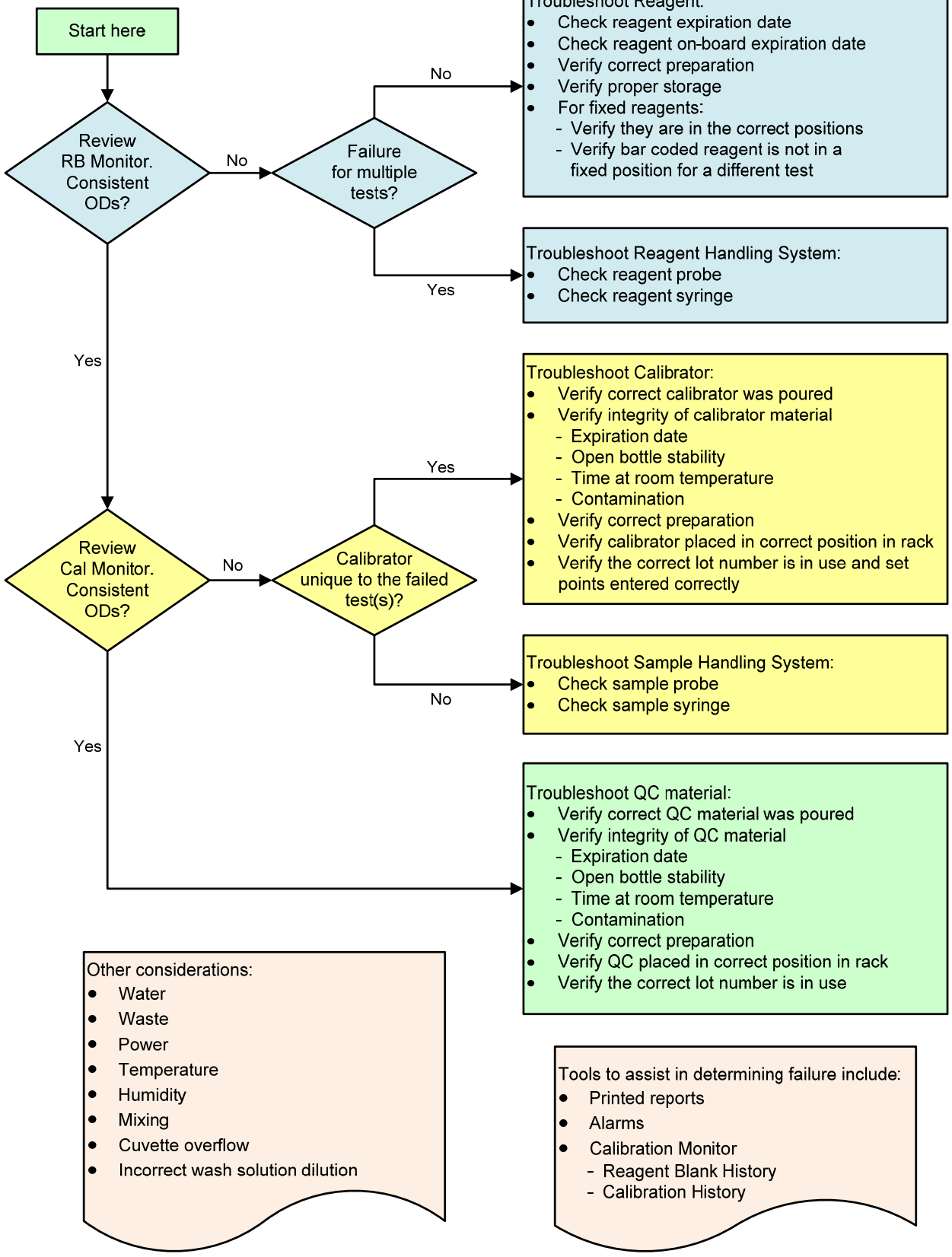
- Reagent Liquid Level Detection Error Troubleshooting Tips
- Rack Jam Troubleshooting Tips
- Failed Reagent Blank (RB), Calibration (CAL), or Quality Control (QC) Troubleshooting Tips
- ISE Calibration Failure Troubleshooting Tips

Reagent Liquid Level Detection Error Troubleshooting Tips




Rack Jam Troubleshooting Tips
Start here
Is rack broken?
Yes
Replace the broken rack
No
Is rack dirty?
Yes
Clean with lint free paper and hot water
No
Is rack bar code damaged?
Yes
Replace the rack bar code label
No
Does rack jam issue reoccur?
No
Done
Yes
Investigate rack transfer components
Are antistatic brushes stained or worn?
Yes
Clean or replace antistatic brushes
No
Is rack feeder unit sticky or dusty?
Yes
Clean surfaces with lint free cloth dampened with deionized water
No
Rack transfer lane(s) dirty and accessible?
Yes
Clean acessible areas with lint free cloth dampened with deionized water
No
Does rack jam issue reoccur?
No
Done
Yes
Contact Beckman Coulter Technical Support

Failed Reagent Blank (RB), Calibration (CAL), or Quality Control (QC) Troubleshooting Tips



ISE Calibration Failure Troubleshooting Tips

Check ISE Reagents

- Sufficient volume of reagents (Buffer, MID Standard, Reference)
- Verify MID Standard and Buffer are in the correct positions
- Expiration date
- Open bottle stability (90 days)
- Contamination (Never combine old and new reagents)

Check ISE Standards

- Verify sufficient volume of standard solutions in cups
- Verify ISE standards poured and placed in correct position
- Verify integrity of ISE standards
  - Expiration date
  - Open bottle stability (90 days)
  - Contamination

Prime Reagents (Buffer, MID/REF)

- Verify dispense of Buffer and MID Standard in sample pot
- Verify there are no bubbles in the tubing at the bottom of the flowcell during MID/REF Prime

Perform Scheduled and As-needed Maintenance

- Critical procedures:
  - ISE daily clean
  - Manually clean mix bar, liquid level sensor, sample pot, and sample pot tubing
  - Enhanced ISE cleaning (Manual)

Check ISE Components (replace if required)

- Roller pump tubing
- Pinch valve tubing
- Sample pot seated correctly and tubing not kinked
- Sample pot mix bar installed and operating properly
- Electrodes installed correctly:
  - Electrode stack aligned
  - Wires connected to correct electrode
  - O-rings present on each electrode and top of flowcell
- ISE Buffer syringe installed correctly without leaks and condensation
- REF electrode seated correctly and internal reference solution at correct level

NOTE: The REF electrode should only be replaced after performing all other troubleshooting options.

Chapter 9

Resources

Introduction

This chapter identifies and describes resources available to assist you with your AU680 chemistry analyzer.

Beckman Coulter Support Personnel

Technical Support (Hotline):
- Provides 24 hour phone support
- Contact at 1-800-854-3633
  - Know your System ID _____
- www.beckman.com/help → Support Request

Applications Specialist:
- Provides installation support
- Your applications specialist is _____
  (Name)

Field Service Engineer:
- Installs the system
- Repairs and assists in maintaining your system
- Your Field Service Engineer is _____
  (Name)

References

Beckman Coulter website at www.beckmancoulter.com:

- Sign up for "My Technical Documents" to receive updates on documents pertaining to your analyzer. Access the My Technical Documents User Guide link from the website at SUPPORT → Technical Documents for instructions on how to sign up

- **AU680 Instructions for Use and Reference Manual** can be found using the following pathway from the website:
  - SUPPORT → Technical Documents → make the following selections from the *Search By Product* drop-down lists:
    - Market Segment: Diagnostics
    - Product Line: Chemistry
    - Product Series: AU Systems
    - Product: AU680
    - Document Category: Instrument IFU/Manual

- **AU680 Reagent Instructions for Use and Chemistry Setting Sheets** can be found using the following pathway from the website:
  - SUPPORT → Technical Documents → make the following selections from the *Search By Product* drop-down lists:
    - Market Segment: Diagnostics
    - Product Line: Chemistry
    - Product Series: AU Systems
    - Product: AU Test Menu
    - Document Category: Consumable IFU/CIS/Setting Sheet
  - To search for documents for a specific test, use the *Search by Reagents/Calibrators/Controls* or *Search By Item/REF/Document Number* options

- **AU680 Safety Data Sheets (SDS/MSDS)** can be found using the following pathway from the website:
  - SUPPORT → Technical Documents → Safety Data Sheets (SDS/MSDS) tab → enter *Search By* and *Search For* criteria

- **AU680 Tools, Job Aids, and E-learning** can be found using the following pathway from the website:
  - SUPPORT → Training & Education → Diagnostics → Chemistry → AU680:
    - Tools & Aids
      - Job Aids (Daily Startup, Maintenance, System Operations)
      - Competency Checklist
      - Troubleshooting Tips
    - On Demand
      - AU680 E-learning modules

Chapter 10

In-Lab Training Competency Exercise

The competency exercise should be completed by the end of the in-lab training session. All materials supplied with the AU680 or used during training may be used to complete this exercise. The exercise is a combination of performing learned skills and knowledge review.

Analyzer Overview

1. Identify how many of each component listed below is on the analyzer:

Component	Number on Analyzer
Sample Probes	
Reagent Probes	
R1/S Mix Bars	
R2 Mix Bars	
Syringes	
Electrodes	
Cuvettes	

2. Place a number next to each step in the order they occur in the sample processing of a photometric test on the analyzer (1 = first, 2 = second, etc.):

Order	Step
	The cuvette is washed, rinsed, and dried by the wash nozzle component
	The sample probe delivers sample into the cuvette
	The rack is moved to the sample aspiration position
	The R2 mix bar mixes the R2 reagent, sample, and R1 reagent. The photometer continues to take readings
	The reagent probe delivers R1 reagent (concentrated) and diluent into the cuvette
	The sample mix bar mixes the sample and R1 reagent. The photometer continues to take readings
	The rack is moved to the bar code reader where sample programming is identified
	If necessary, the reagent probe delivers R2 reagent (concentrated) and diluent into the cuvette
	The R1 mix bar mixes the diluted R1 reagent. The photometer starts taking readings

Software Overview

3. Identify the name of each Main Button Area button.

   Hint: When you hold the mouse pointer over the button on the software screen, a pop-up message will indicate the name of the button.

Button	Name	Button	Name
			
			
			
			
			

4. Which button can you select to access the Instructions for Use to look up how to perform a maintenance procedure? _____

5. Your analyzer is in a *Stop* mode. Which button do you select to bring the analyzer back to *Standby*? _____

6. Which menu should you be in to access the **Sample Status** button to view the status of samples processing? _____

7. The lamp needs to be replaced on the analyzer. Which button should you select to shut down the analyzer? _____

8. Racks have been placed on the rack feeder while the analyzer is in *Standby*. Which button should you select to place the system into *Measure*? _____

Daily Startup

9. Identify the solution used in the bottles listed below and the probe that utilizes that solution. The bottles are located near the sample and reagent probes on the analyzer.

   Hint: You may need to look on the analyzer to identify which probe is used for each solution.

Bottle	Solution	Sample Probe or Reagent Probe?
61. Diluent/W2		
62. CLN-1		
63. CLN-2		
64. Det.-1/W2		
65. Det.-2		

10. Where should you go to view the system temperatures? Circle the correct answer.

    a. Start Condition

    b. Analyzer Status

    c. Analyzer Maintenance

    d. Sample Status

11. (ISE Labs only) Identify the reagents used by the ISE module:

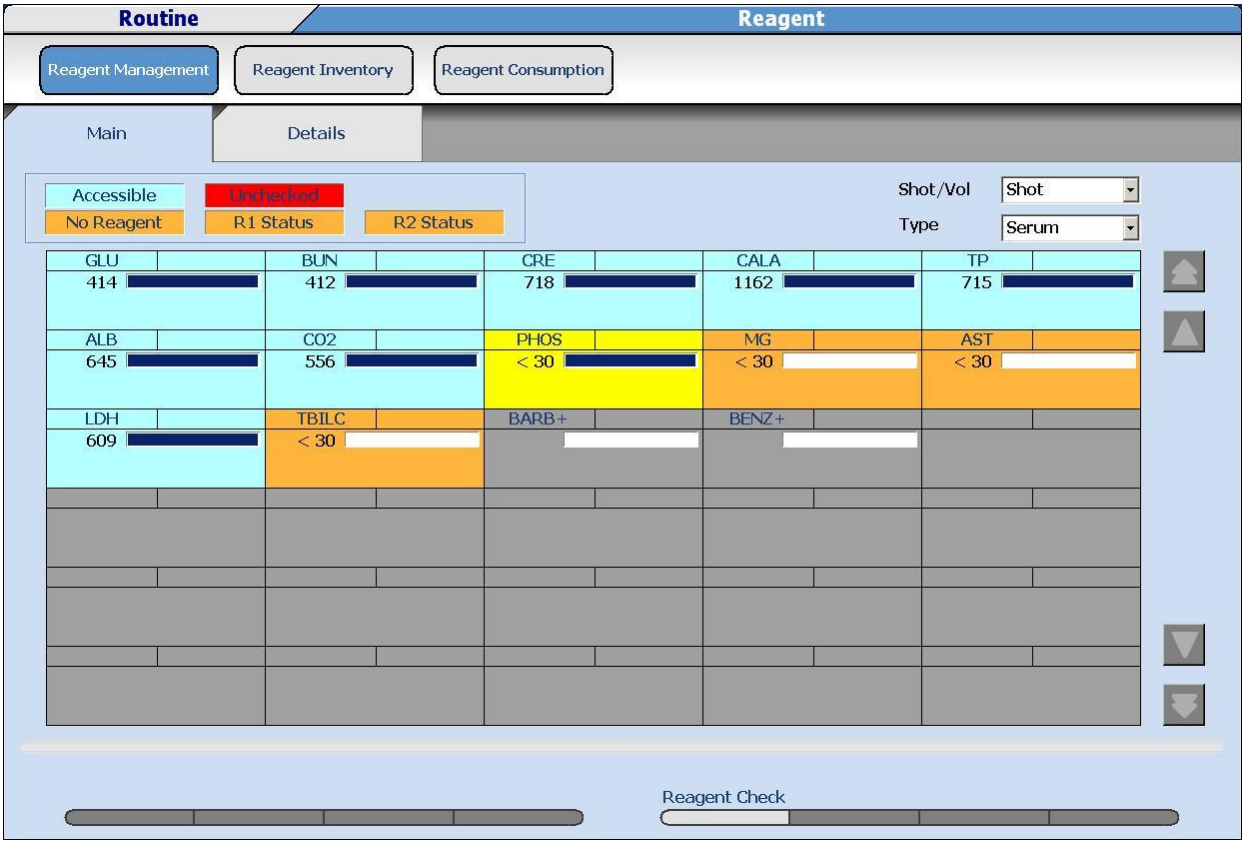
    - _____
    - _____
    - _____

12. (ISE Labs only) TRUE or FALSE?

    You need to press the green **TABLE ROTATION/DIAG** button on the analyzer to start the ISE Cleaning procedure.

13. (ISE Labs only) Where is ISE calibration processed? _____

Daily Startup, continued



Refer to the Reagent Management screen above to answer the following questions:

14. TRUE or FALSE? A reagent check is required on the analyzer.

15. How many shots are available for Total Protein (TP)? _____

16. Which reagent(s) has a reagent short status? _____

17. Which reagent(s) is missing, expired, or empty? _____

18. What should you select to identify the Onboard Stability of reagents?

    _____

19. Why are BARB+ and BENZ+ highlighted in gray?

    _____

    What should you select to view the status of BARB+ and BENZ+? _____

Daily Startup, continued

20. Identify the four options available when performing a reagent check:

- _____
- _____
- _____
- _____

Circle the option(s) that can be used to check the volume of the bottles on the outside of the reagent refrigerators (Diluent, Det.-1, Det.-2, CLN-1, CLN-2)

21. During a reagent check, the system automatically orders reagent blank (RB) and calibration (CAL) for all tests with: Check all that apply

- ☐ Reagent blank or calibration expired
- ☐ Reagent blank or calibration expires soon (time determined by lab)
- ☐ New bottle or lot number for reagent
- ☐ Reagent blank or calibration failed
- ☐ QC failed

22. You can load multiple bottles of the same reagent on the analyzer. The AU identifies each bottle as a sequence. Up to how many bottle sequences of the same reagent can be on the analyzer at one time? Circle the correct answer.

a. 4

b. 5

c. 6

d. There is no limit

23. The system does not automatically process QC on multiple bottles of a reagent. Which software pathway should you take when you need to order QC on multiple bottles of the same reagent? Circle the correct answer.

a. QC > Rack Requisition Sample > Start Entry > Individual Requisition

b. Rack Requisition Sample > QC > Start Entry > Individual Requisition

c. Rack Requisition Sample > QC > Individual Requisition > Start Entry

d. Rack Requisition Sample > Individual Requisition > QC > Start Entry

24. Perform a Daily Startup on your AU680 analyzer.

25. Review the items that you have covered in *Chapter 3: Daily Startup*. Place a check next to items you feel comfortable performing. Meet with your trainer to review or answer any questions you may still have on unchecked items.

Daily Startup Review Checklist

- ☐ Set a new index
- ☐ Perform daily analyzer maintenance
  - ☐ Inspect syringes for leaks
  - ☐ Inspect wash solution roller pump for leaks
  - ☐ Inspect the wash solution and replenish, as needed
  - ☐ Inspect the printer and paper
  - ☐ Inspect the stability of the upper cover
  - ☐ Inspect, clean, and prime the sample probe, reagent probes, and mix bars
  - ☐ Replace the DI water in the pre-dilution bottle
  - ☐ Prepare the sample probe wash solutions (2% wash)
  - ☐ Replenish contamination parameter solutions, as needed
- ☐ Check the analyzer status
- ☐ Check and replenish reagents
- ☐ Perform an ISE startup
  - ☐ Check and load ISE reagents, as needed
  - ☐ Perform ISE cleaning
  - ☐ Perform ISE calibration
- ☐ Perform analyzer calibration
- ☐ Process quality control (QC)

26. Use the Calibration Monitor and QC Monitor to review the status of calibration and QC from the daily startup.

27. Review the items for monitoring calibration and QC status and results in *Chapter 5: Monitor and Review Results.* Place a check next to items you feel comfortable performing. Meet with your trainer to review or answer any questions you may still have on unchecked items.

Monitor and Review Results Checklist – RB/CAL/QC

- ☐ Print RB/CAL/QC results
- ☐ Review calibration using Calibration Monitor
- ☐ Review QC using QC Monitor and QC Data Review

Sample Processing and Programming

28. Place the letter representing the rack color next to the sample kind the rack is used for:

Letter / Rack Color
A: White
B: Yellow
C: Green
D: Orange
E: Red
F: Blue

Letter	Sample Kind
	Reagent Blanks
	QC Samples
	Emergency Samples
	Calibrator Samples
	Manual Repeats
	Routine Patient and Automatic repeats

29. Circle the statement that is false when loading racks in the rack feeder:

    a. Caps should be removed from all sample containers

    b. The rack should be placed in the rack feeder with the rack bar code facing the back of the analyzer

    c. 13x75, 13x100, and 16x100 tubes can be placed in the same rack if they for the same sample type

    d. When calibrating, always place the yellow racks in front of the blue rack

    e. Manually programmed samples require a bar code if the analyzer is set for Barcode analysis

30. TRUE or FALSE?

    Samples placed in an Emergency (red) rack will have higher processing priority than samples placed in a Routine (white) rack.

31. Identify the software pathway to start sample processing on the STAT Table:

    Home → _____ → _____

32. Which software screens can you use to view **patient results**? Check all that apply.

- ☐ Sample Status > Status
- ☐ Sample Status > Detail
- ☐ Sample Status > Realtime Display
- ☐ STAT Status > Sample
- ☐ Sample Manager > Main tab
- ☐ Sample Manager > Sample tab

33. Practice the following sample-related tasks, as appropriate, based on your analyzer setup and lab processes:
    - Manually program and process samples on routine racks for the sample types used in your lab
    - Manually program and process samples on the STAT table for the sample types used in your lab
    - Recall and reprint a patient report

34. Review the items that you have covered in the *Chapter 4: Sample Processing and Programming* and *Chapter 5: Monitor and Review Results*. Place a check next to items you feel comfortable performing. Meet with your trainer to review or answer any questions you may still have on unchecked items.

Sample Processing and Programming Checklist

- ☐ Identify sample rack usage
- ☐ Identify validated sample containers
- ☐ Process bar coded samples with LIS-programming in racks
- ☐ Process bar coded samples with LIS-programming in the STAT table
- ☐ Manually program and process samples in racks
- ☐ Manually program and process samples in the STAT table

Monitor and Review Results Checklist – Patient Samples

- ☐ Monitor patient results from Sample Status
- ☐ Review and reprint patient results from Sample Manager

35. Practice and review any additional tasks from the In-Lab Training Manual required of your role and responsibilities in your lab.

36. You have completed the competency check. Have your trainer compare the answers of your completed competency check with the Reference Key and review any questions you might have.

CONGRATULATIONS!

Congratulations

_____

has successfully completed the
In-Lab Training Course on the operation of the

AU680 Chemistry Analyzer

_____ _____

Beckman Coulter Representative Date

In-Lab Training Competency Exercise Reference Key

Analyzer Overview

1. Identify how many of each component listed below is on the analyzer:

Component	Number on Analyzer
Sample Probes	**1**
Reagent Probes	**2**
R1/S Mix Bars	**6 (3 of each)**
R2 Mix Bars	**3**
Syringes	**5 (4 if no ISE)**
Electrodes	**3**
Cuvettes	**165**

2. Place a number next to each step in the order they occur in the sample processing of a photometric test on the analyzer (1 = first, 2 = second, etc.):

Order	Step
9	The cuvette is washed, rinsed, and dried by the wash nozzle component
5	The sample probe delivers sample into the cuvette
2	The rack is moved to the sample aspiration position
8	The R2 mix bar mixes the R2 reagent, sample, and R1 reagent. The photometer continues to take readings
3	The reagent probe delivers R1 reagent (concentrated) and diluent into the cuvette
6	The sample mix bar mixes the sample and R1 reagent. The photometer continues to take readings
1	The rack is moved to the bar code reader where sample programming is identified
7	If necessary, the reagent probe delivers R2 reagent (concentrated) and diluent into the cuvette
4	The R1 mix bar mixes the diluted R1 reagent. The photometer starts taking readings

Software Overview

3. Identify the name of each Main Button Area button.

   Hint: When you hold the mouse pointer over the button on the software screen, a pop-up message will indicate the name of the button.

Button	Name	Button	Name
	**Home**		**Menu List**
	**User Menu**		**Start**
	**Pause**		**Feeder Stop**
	**Stop/Standby**		**Help**
	**Logout**		**End**

4. Which button can you select to access the Instructions for Use to look up how to perform a maintenance procedure? **Help button**

5. Your analyzer is in a *Stop* mode. Which button do you select to bring the analyzer back to *Standby*? **Stop/Standby button**

6. Which menu should you be in to access the **Sample Status** button to view the status of samples processing? **Home**

7. The lamp needs to be replaced on the analyzer. Which button should you select to shut down the analyzer? **End button**

8. Racks have been placed on the rack feeder while the analyzer is in *Standby*. Which button should you select to place the system into *Measure*? **Start button**

Daily Startup

9. Identify the solution used in the bottles listed below and the probe that utilizes that solution. The bottles are located near the sample and reagent probes on the analyzer.

   Hint: You may need to look on the analyzer to identify which probe is used for each solution.

Bottle	Solution	Sample Probe or Reagent Probe?
61. Diluent/W2	**DI water**	**Reagent**
62. CLN-1	**Lab dependent**	**Reagent**
63. CLN-2	**Lab dependent**	**Reagent**
64. Det.-1/W2	**2% wash solution**	**Sample**
65. Det.-2	**2% wash solution***	**Sample**

10. Where should you go to view the system temperatures? Circle the correct answer.

    a. Start Condition

    b. Analyzer Status

    c. Analyzer Maintenance

    d. Sample Status

11. (ISE Labs only) Identify the reagents used by the ISE module:

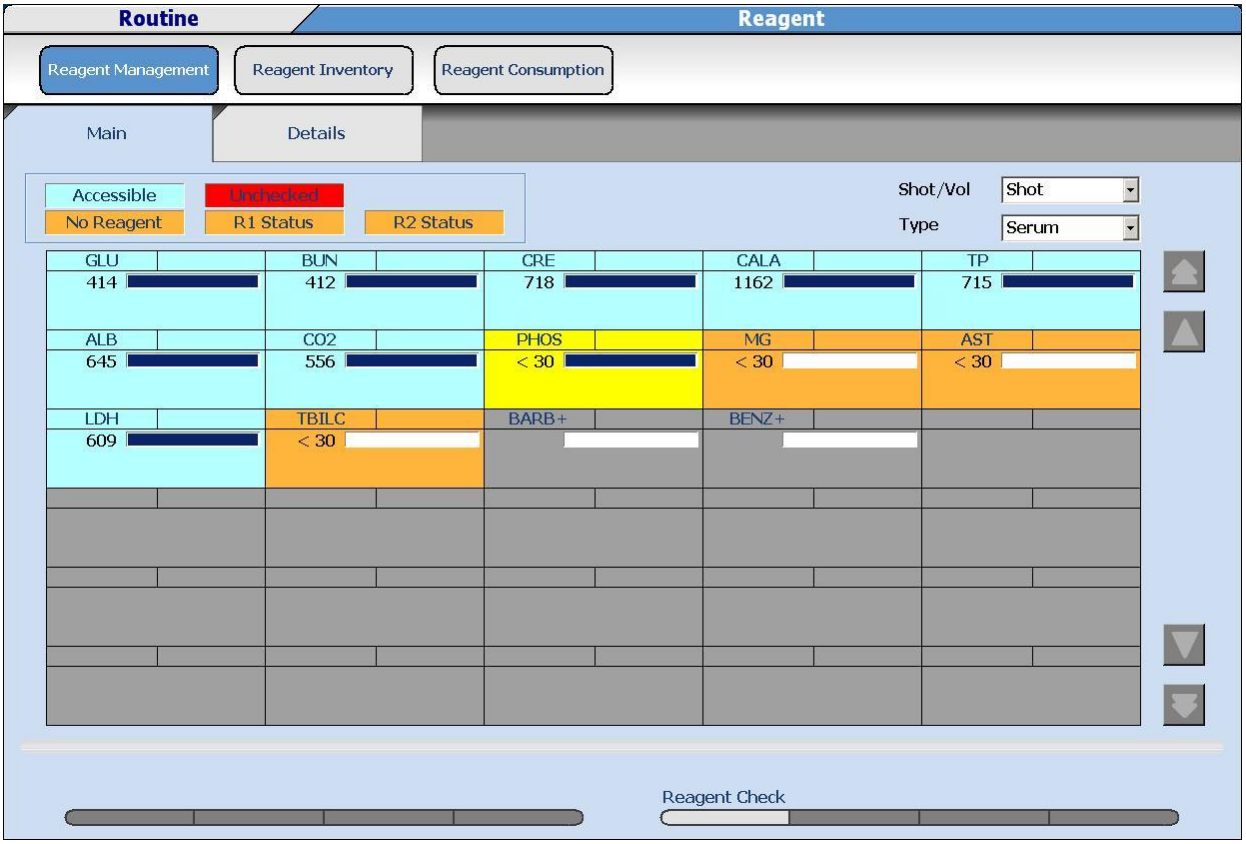
    - **ISE Buffer Solution**
    - **ISE MID Standard Solution**
    - **ISE Reference Solution**

12. (ISE Labs only) TRUE or FALSE?

    You need to press the green **TABLE ROTATION/DIAG** button on the analyzer to start the ISE Cleaning procedure.

13. (ISE Labs only) Where is ISE calibration processed? **STAT Table**

Daily Startup, continued



Refer to the Reagent Management screen above to answer the following questions:

14. TRUE or FALSE? A reagent check is required on the analyzer.

15. How many shots are available for Total Protein (TP)? **715 shots**

16. Which reagent(s) has a reagent short status? **PHOS**

17. Which reagent(s) is missing, expired, or empty? **MG, AST, TBILC**

18. What should you select to identify the Onboard Stability of reagents?

    Details tab

19. Why are BARB+ and BENZ+ highlighted in gray?

    They are not used for the displayed sample type (Serum) on the Main tab

    What should you select to view the status of BARB+ and BENZ+? **Type drop-down**

Daily Startup, continued

20. Identify the four options available when performing a reagent check:

- **Check all positions**
- **Check specified positions**
- **Check changed positions**
- **Reset Only**

Circle the option(s) that can be used to check the volume of the bottles on the outside of the reagent refrigerators (Diluent, Det.-1, Det.-2, CLN-1, CLN-2)

21. During a reagent check, the system automatically orders reagent blank (RB) and calibration (CAL) for all tests with: Check all that apply

- ✓ Reagent blank or calibration expired
- ✓ Reagent blank or calibration expires soon (time determined by lab)
- ✓ New bottle or lot number for reagent
- ✓ Reagent blank or calibration failed
- ☐ QC failed

22. You can load multiple bottles of the same reagent on the analyzer. The analyzer identifies each bottle as a sequence. Up to how many bottle sequences of the same reagent can be on the analyzer at one time? Circle the correct answer.

a. 4

b. 5

c. 6

d. There is no limit

23. The system does not automatically process QC on multiple bottles of a reagent. Which software pathway should you take when you need to order QC on multiple bottles of the same reagent? Circle the correct answer.

a. QC > Rack Requisition Sample > Start Entry > Individual Requisition

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c. Rack Requisition Sample > QC > Individual Requisition > Start Entry

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  - ☐ Replace the DI water in the pre-dilution bottle
  - ☐ Prepare the sample probe wash solutions (2% wash)
  - ☐ Replenish contamination parameter solutions, as needed
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- ☐ Check and replenish reagents
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Letter	Sample Kind
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C	QC Samples
E	Emergency Samples
B	Calibrator Samples
D	Manual Repeats
A	Routine Patient and Automatic repeats

29. Circle the statement that is false when loading racks in the rack feeder:

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    e. Manually programmed samples require a bar code if the analyzer is set for Barcode analysis

30. TRUE or FALSE?

    Samples placed in an Emergency (red) rack will have higher processing priority than samples placed in a Routine (white) rack.

31. Identify the software pathway to start sample processing on the STAT Table:

    Home → **STAT Status** → **STAT Start**

32. Which software screens can you use to view **patient results**? Check all that apply.

- ☐ Sample Status > Status
- ✓ Sample Status > Detail
- ✓ Sample Status > Realtime Display
- ☐ STAT Status > Sample
- ☐ Sample Manager > Main tab
- ✓ Sample Manager > Sample tab

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