Quantiferon

LIS Guideline for LIS-Link

For LIS-Link V2.0.3 and higher/QFT Plus

Revision B

CONTENT

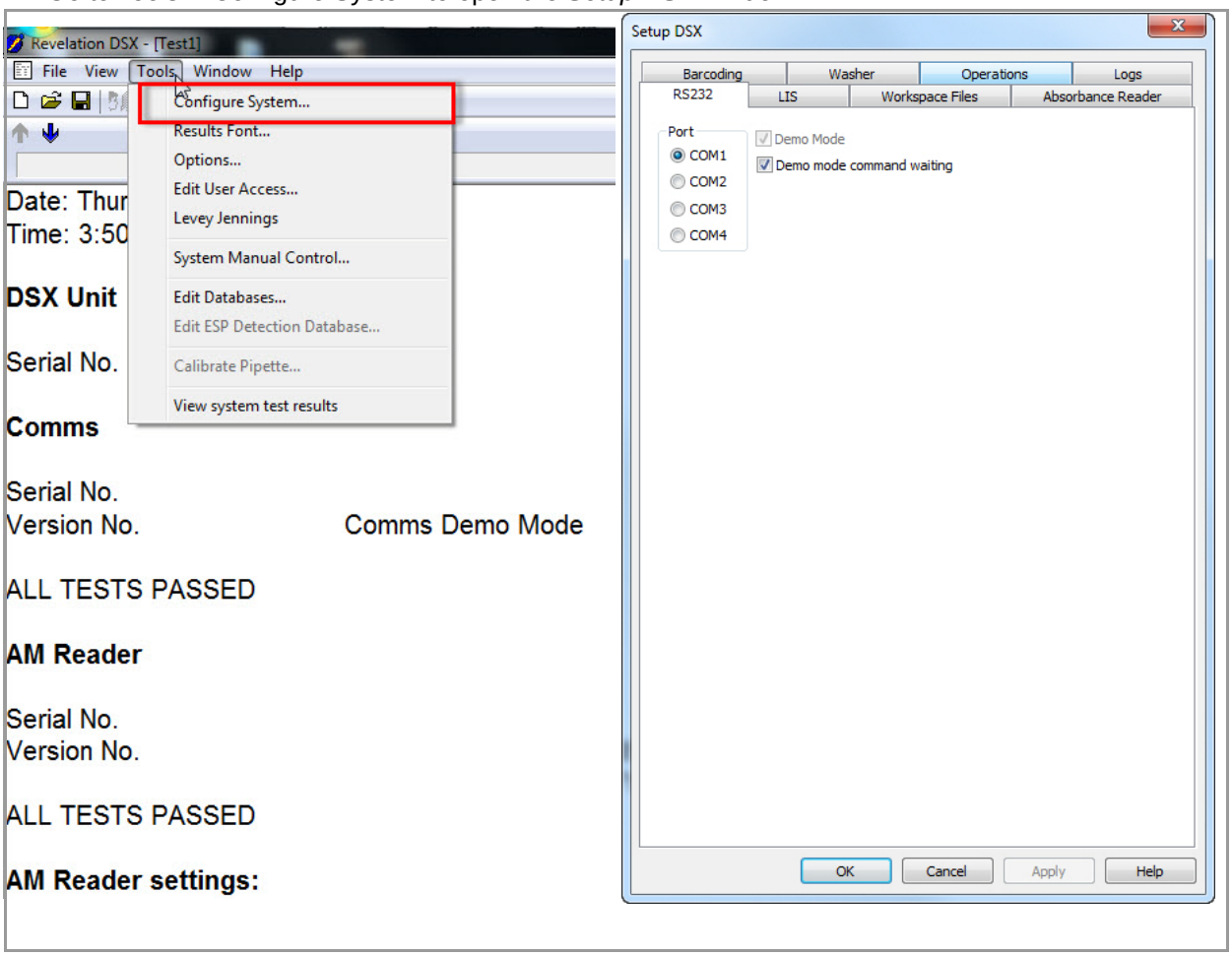
1.0 Introduction

This document is a consolidated guideline for setting up LIS-Link for the DS2 and DSX Dynex systems.

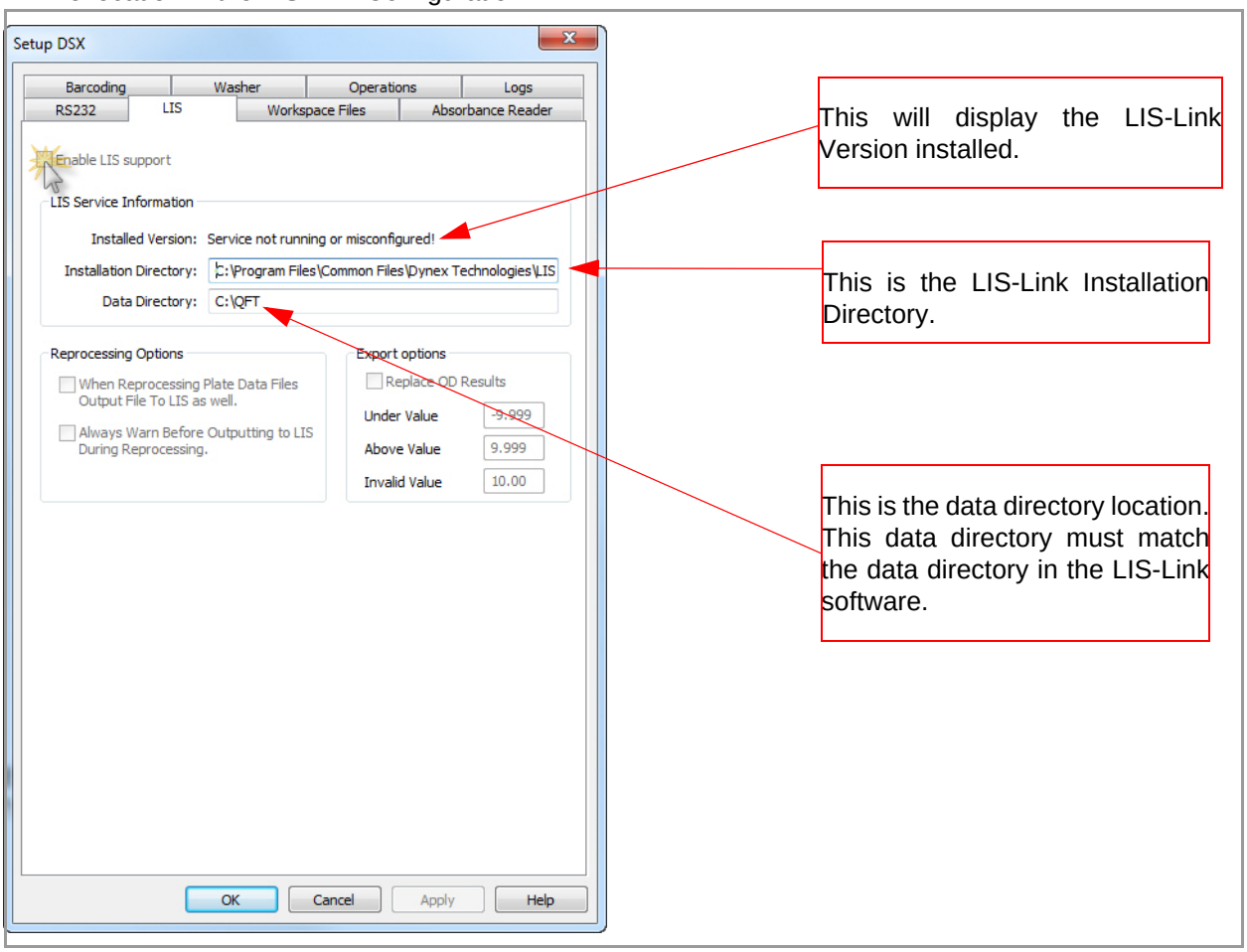
This document does not replace the information found in the LIS-Link Guideline from Dynex.

2.0 DSX Setup

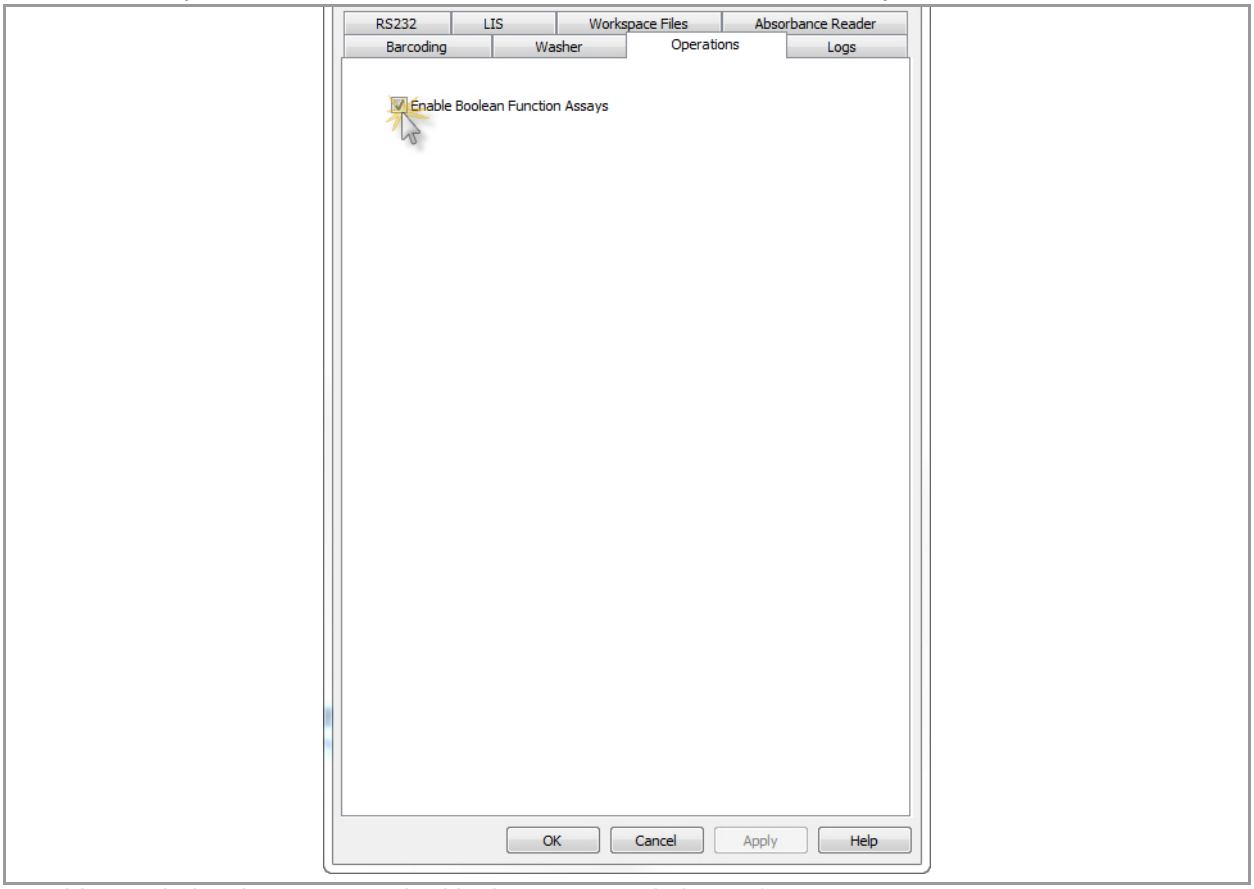
1. Open the Revelation DSX Software.
2. Go to Tools-->Configure System to open the *Setup DSX* window.



3. Go to the *LIS* tab and check the *Enable LIS support* check-box.
4. Check the Data Directory on the *LIS* tab. The data directory file location must match the data directory file location in the LIS-Link Configuration.



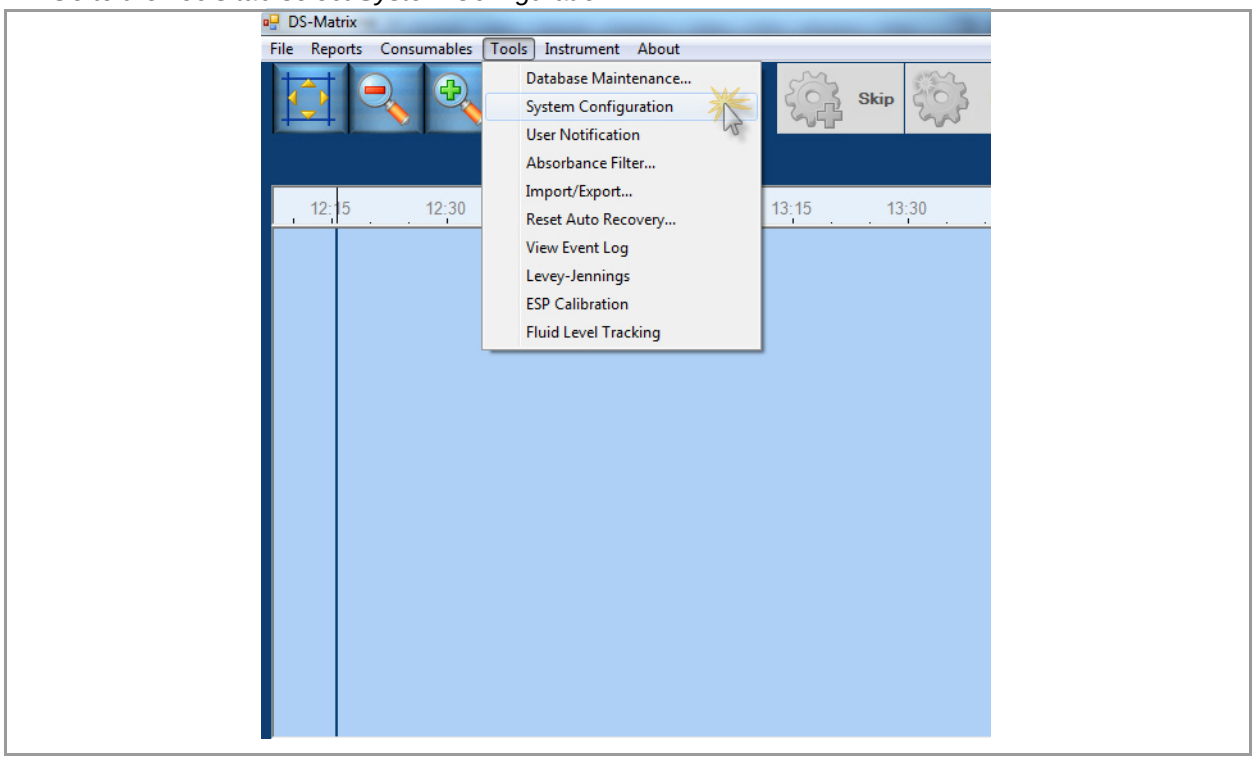
5. Go to the *Operations* tab and check the *Enable Boolean Function Assays* check-box.



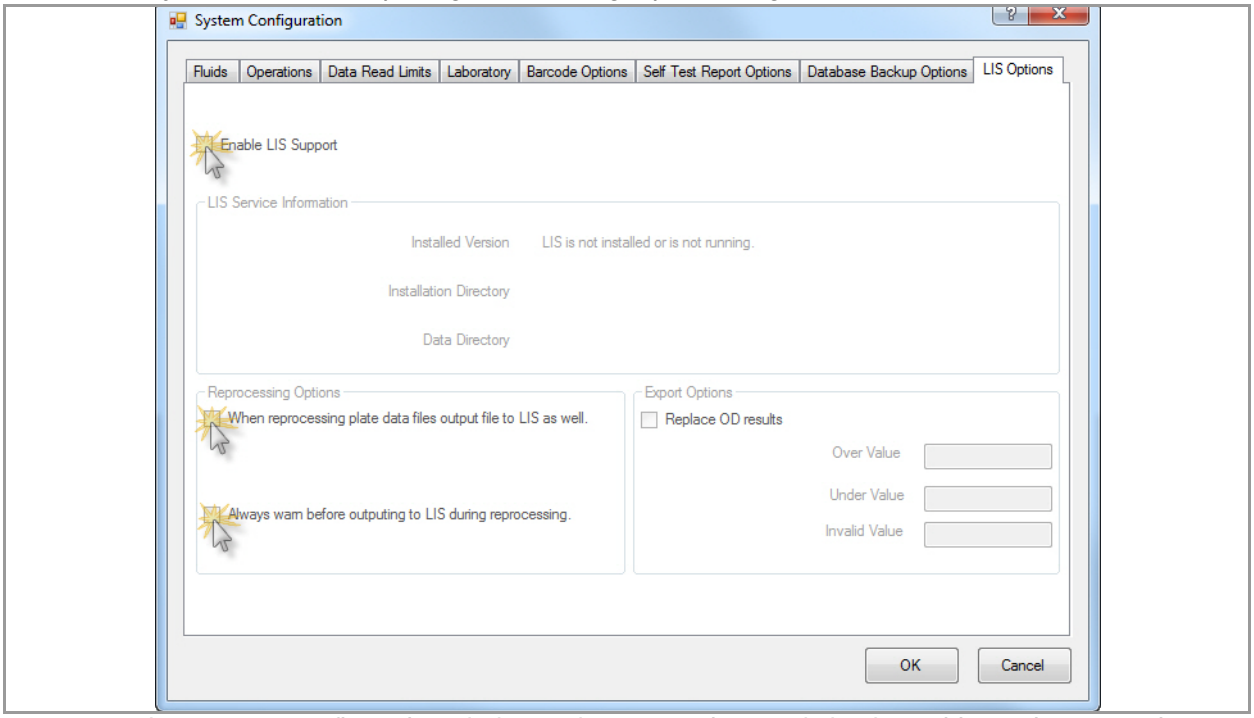
6. This concludes the setup required in the DSX Revelation Software.

3.0 DS2 Setup

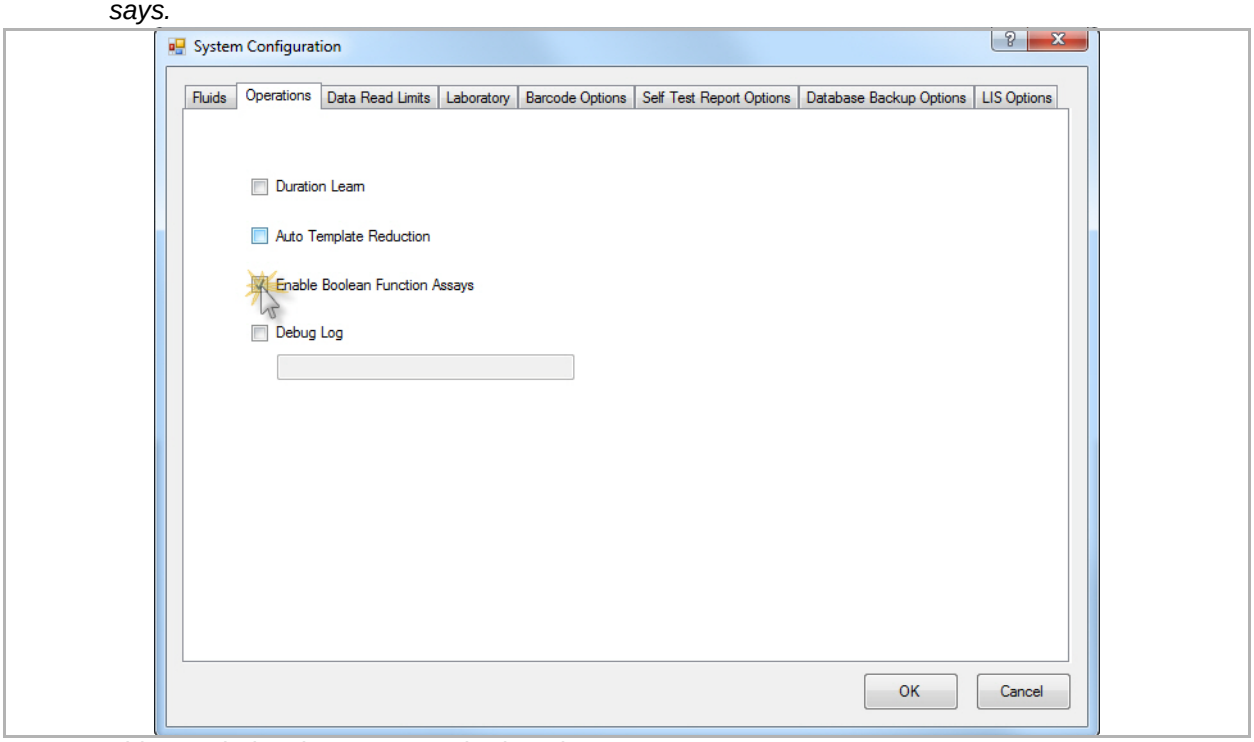
1. Open the DS2 Matrix Software.
2. Go to the *Tools tab* select *System Configuration.*



3. At the *System Configuration* window, select *LIS Options* and check the following boxes:
   3.1 *Enable LIS Support*
   3.2 When reprocessing plate data files output file to LIS as well.
   3.3 *Always warn before outputting to LIS during reprocessing.*



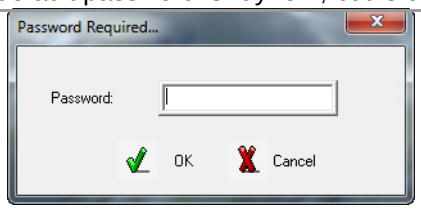
3.4 At the *System Configuration* window, select *Operations* and check *Enable Boolean Function Assays.*



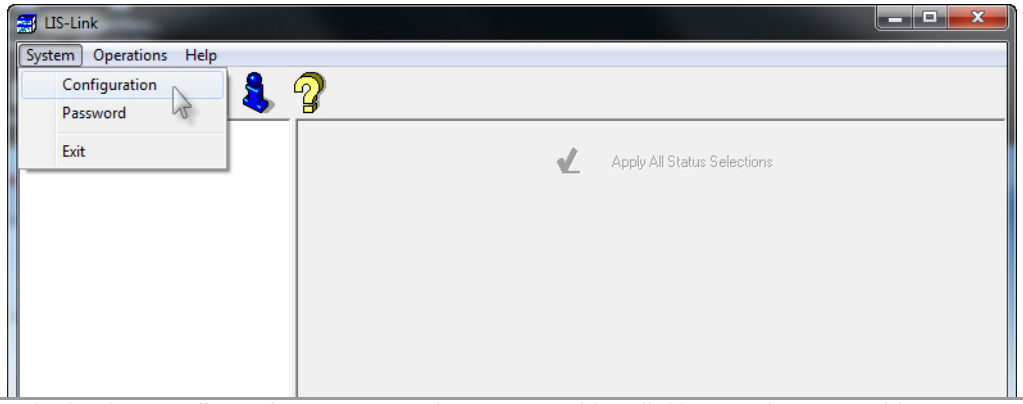
3.5 This concludes the setup required on the DS2.

4.0 LIS-Link Setup

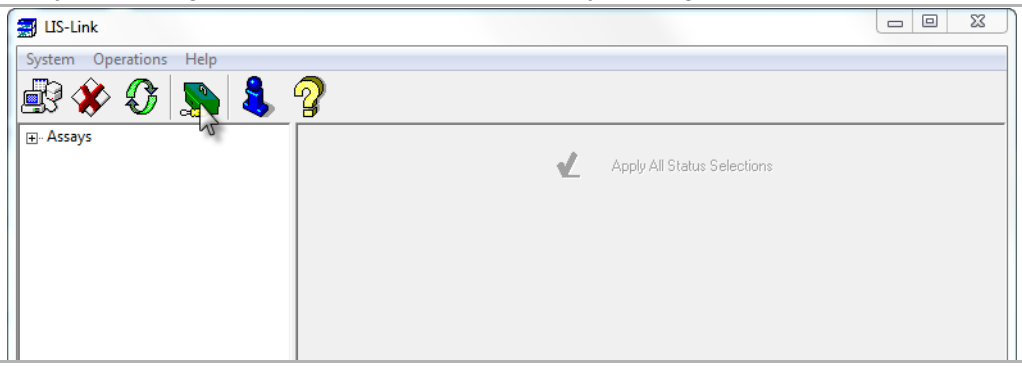
1. Open LIS-Link (Start -->Programs-->Dynex Technologies-->LIS-Link)
2. Enter the initial password. The default password is “dynex”, but is configurable by the user.



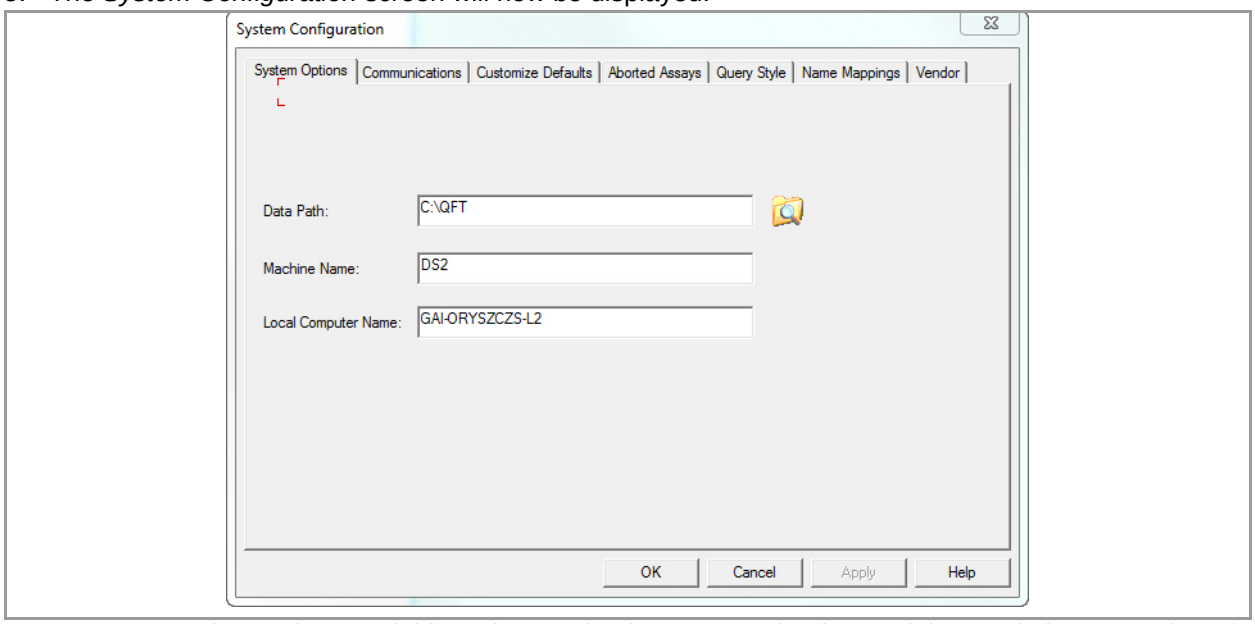
3. The main LIS-Link window will now be open. From the *System* menu, select *Configuration.*



4. Alternatively, the *Configuration* menu can be accessed by clicking on the screwdriver.



5. The *System Configuration* screen will now be displayed.

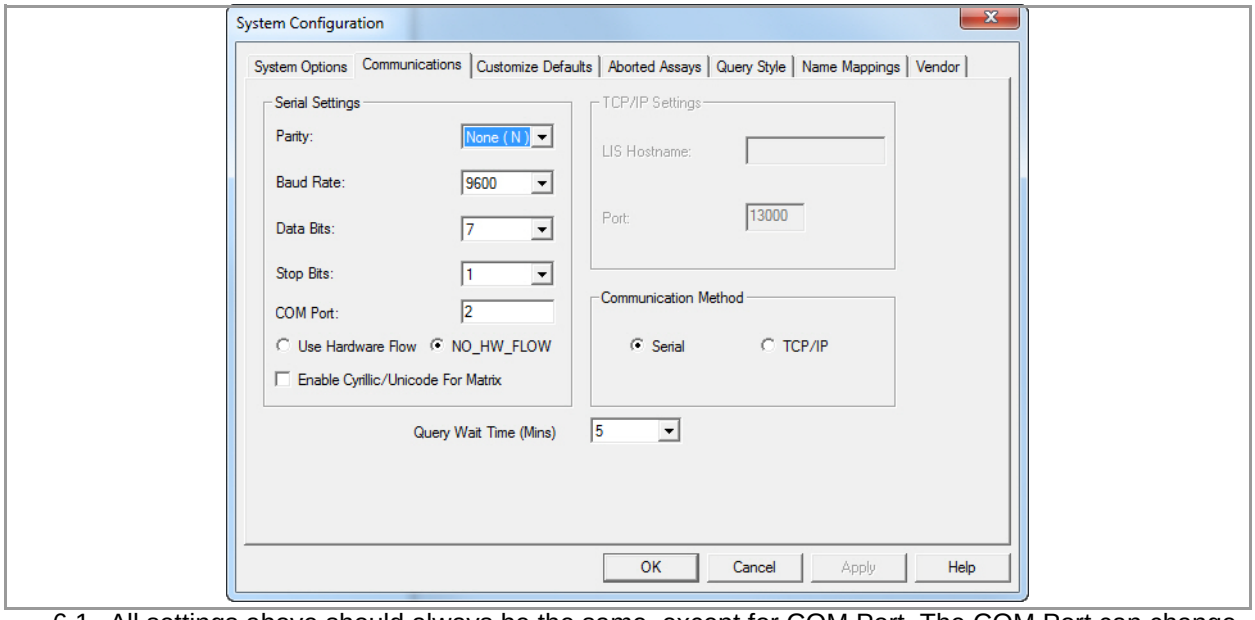


5.1 Data Path: Can be any viable path. Must be the same as the data path in Revelation or Matrix Software.

5.2 *Machine Name*: Can be any name, the recommendation is to use the Instrument Serial Number.

5.3 *Local Computer Name*: Enter the name of the system computer

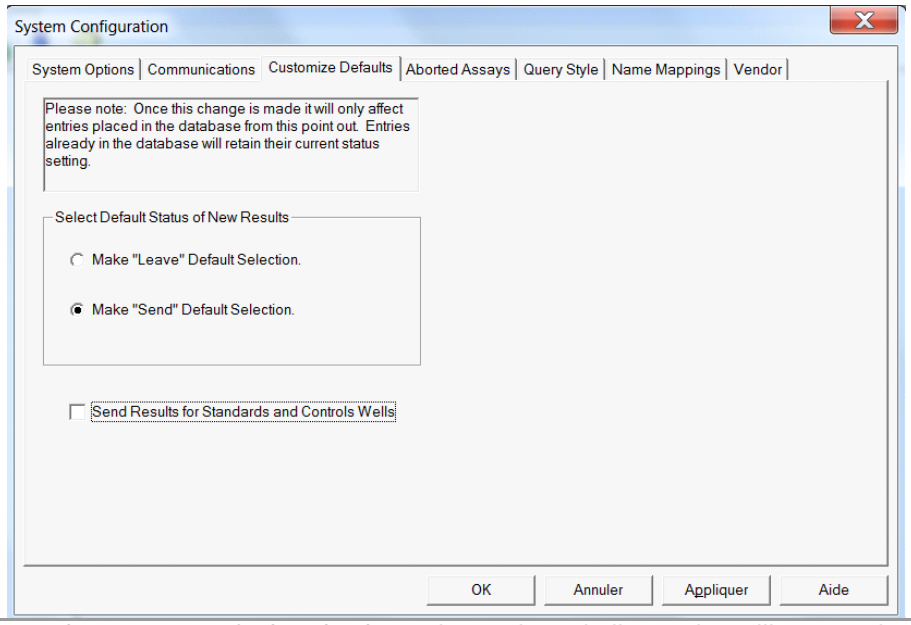
6. *Communications* Tab



6.1 All settings above should always be the same, except for COM Port. The COM Port can change based on the customers configuration. Ensure the LIMS server matches these settings.

6.2 Ensure the communication method is set to *Serial*. TCP/IP communication does not work with LIS-Link.

7. *Customize Defaults* Tab

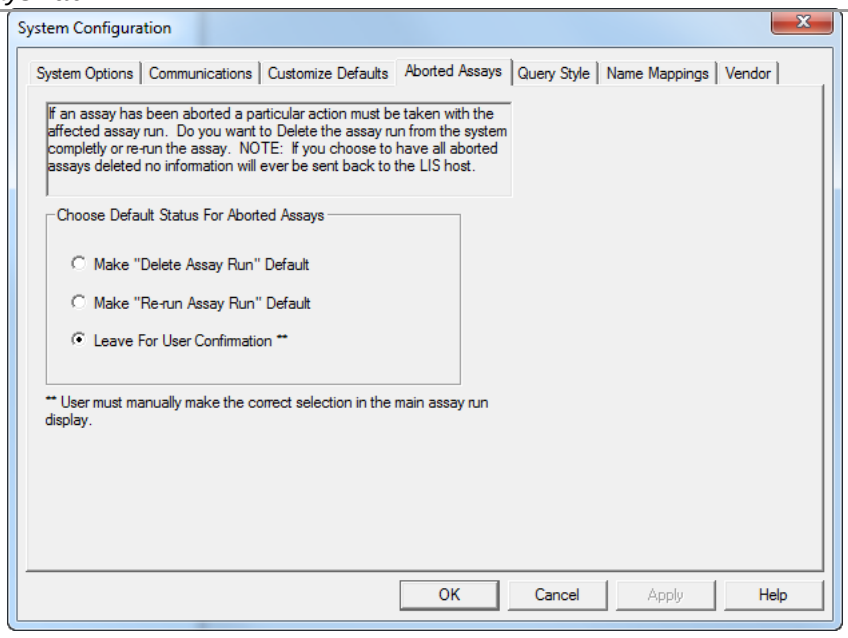


7.1 *Make "Leave" Default Selection*: When selected all samples will automatically be set to leave by default

7.2 *Make "Send" Default Selection*: When selected all samples will automatically be set to send by default. This is the typical setting.

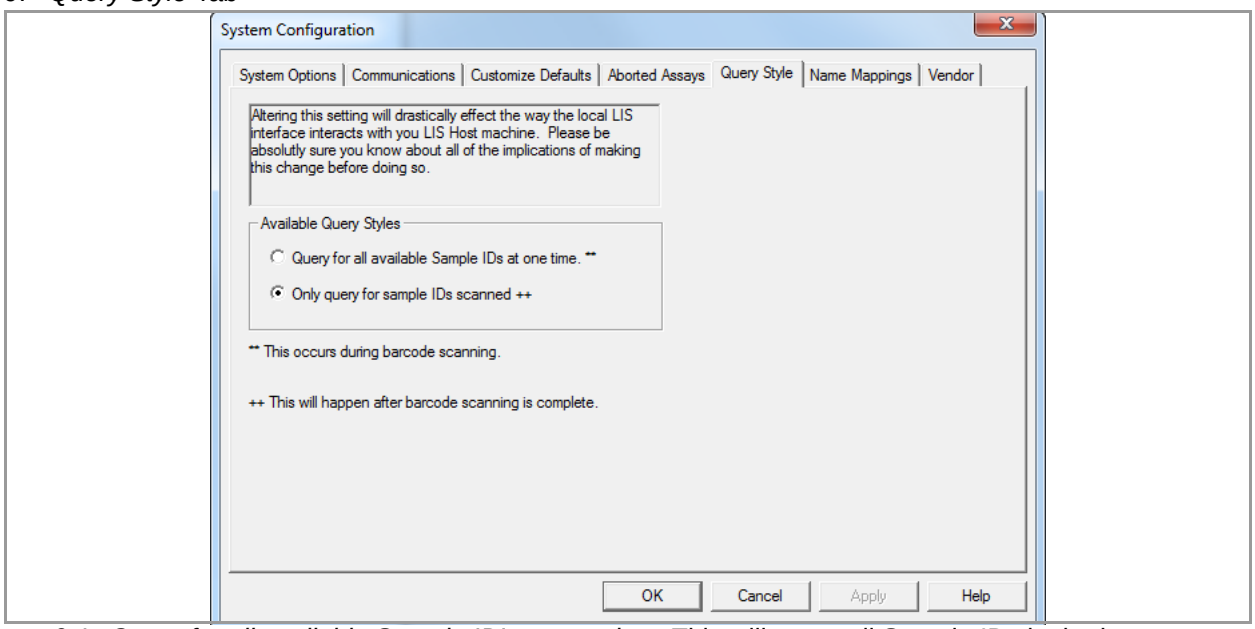
7.3 *Send Results for Standards and Control Wells*: When selected the standards and controls will be sent. Uncheck this box if the LIMS is not expecting to receive standards and controls.

8. *Aborted Assays* Tab



8.1 This defines the system behavior on aborted assays. We typically leave this at: *Leave for User Confirmation*'.

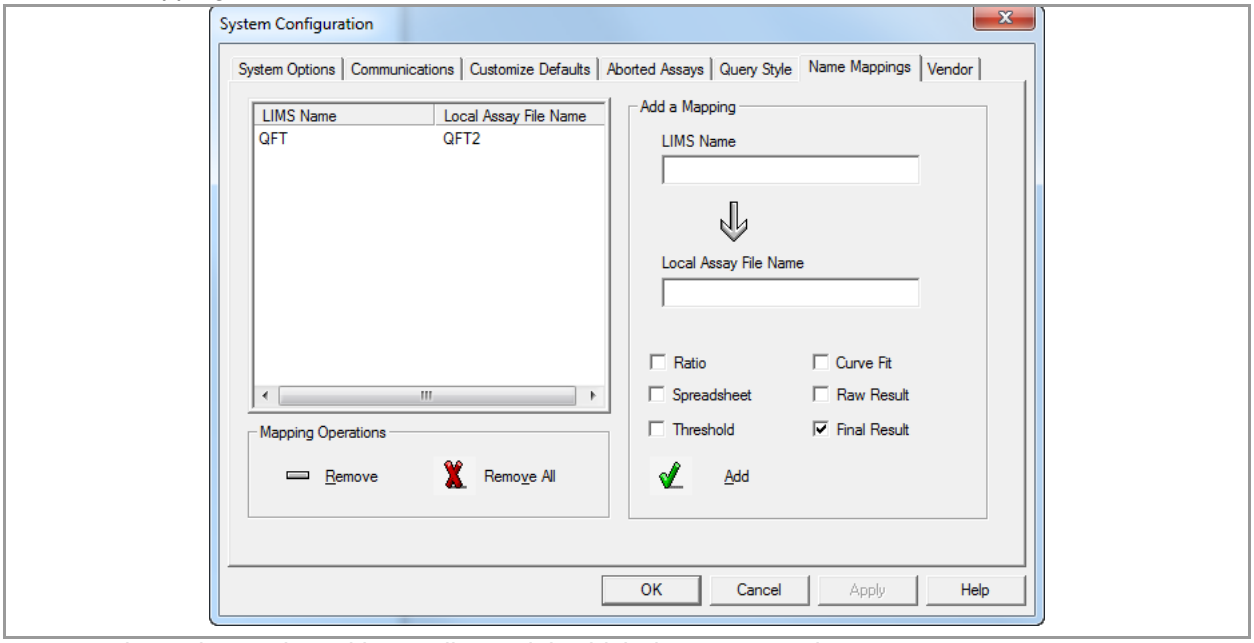
9. *Query Style* Tab



9.1 Query for all available Sample ID's at one time: This will query all Sample IDs in the host system.

9.2 *Only query for sample IDs scanned:* This is the typical setting.

10. *Name Mappings* Tab



10.1 The options selected here tell LIS-Link which data to transmit.

10.2 *LMS Name*: This can be anything the lab wants. Typically people are using QFT.

Critical: The name the LIS Host uses for the test must exactly match the LMS Name here.

10.3 *Local Assay File Name:* This must be the exact name of the assay used. Including spaces and periods.

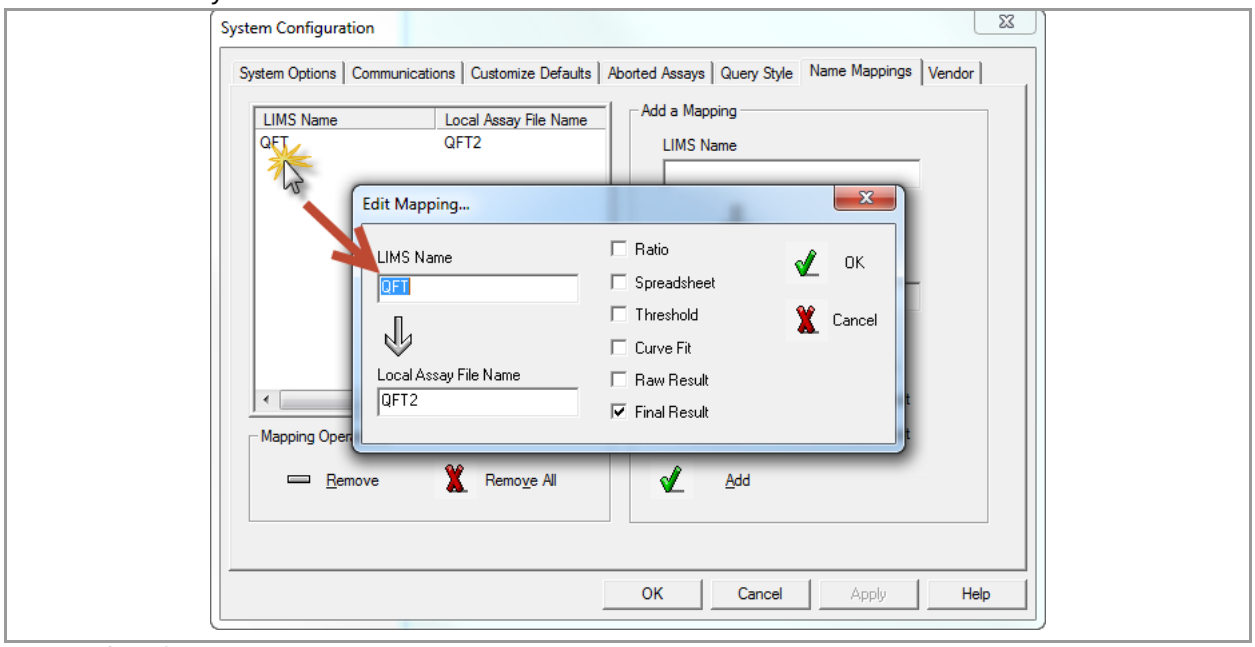
Critical: The Local Assay File name must be typed in exactly.

10.4 Check Boxes (Ratio, Curve Fit, Spreadsheet, Raw Result, Threshold, Final Result)

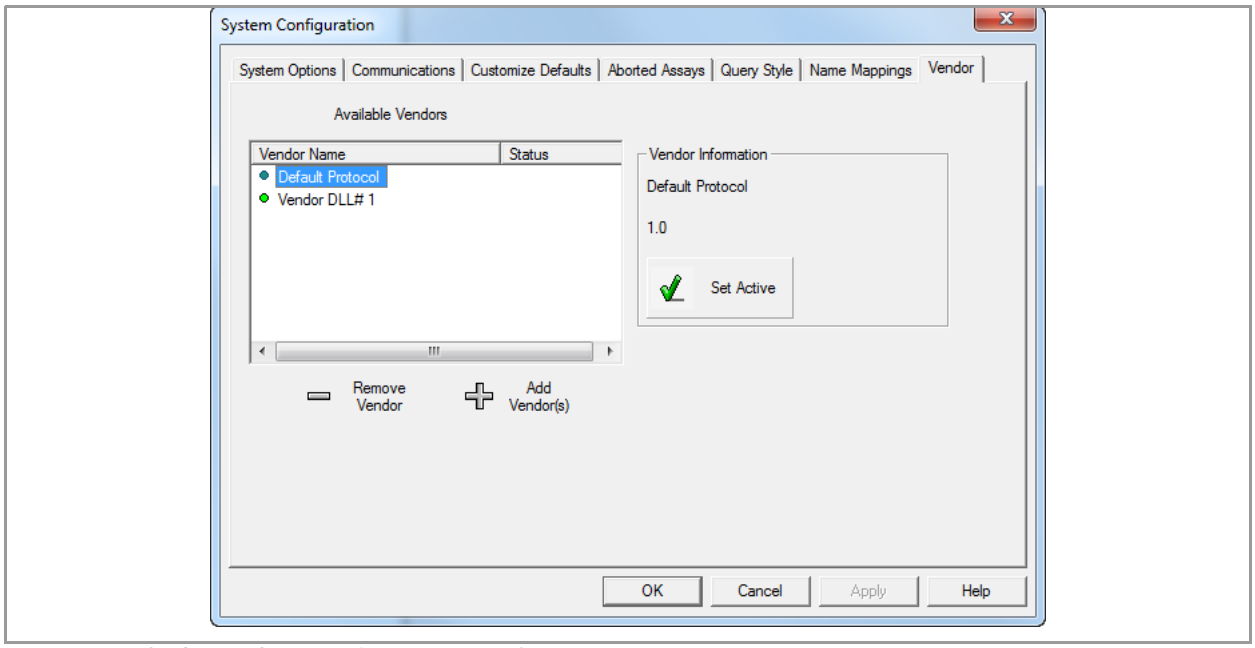
If I check	I will receive
Ratio	Nothing. QFT does not use ratios.
Curve Fit	TB Tubes Concentration Value Mitogen Tube Concentration Value Nil Tube Concentration Value
Spreadsheet	TB-Nil value (Difference Data) Mitogen-Nil Value (Difference Data) Nil Tube Concentration Value
Raw Result	OD values for all three/four tubes.
Threshold	Nothing. QFT does not use Threshold.
Final Result	The actual result. PO=Positive, ne=Negative, IN=Indeterminate

10.5 Most clients choose ***Spreadsheet* and *Final Result.***

10.6 After a Test is set up, the Name Mapping for that test can be edited by double clicking the name of the assay on the left side of this tab.



11. *Vendor* tab



11.1 *Default Vendor*: Use for every vendor except Sunquest.

11.2 *Vendor DLL #1:* Use for Sunquest.

12. This concludes the LIS-Link setup.

5.0 LIS-Link Versions

Dynex has three main LIS-Link Releases currently used by clients: 1.08, 2.01, and 2.03.

Differences between 1.08 and 2.01
According to Dynex, the main difference between the versions is the transmission of controls/standards. The main reason for a client to upgrade to 2.01 is if they want to see the control/standard information.

With LIS-Link 1.08 you will not see the results in the “logdebugactions.txt” file.
With LIS-Link 2.01 you will see the results in the “logdebugactions.txt” file.

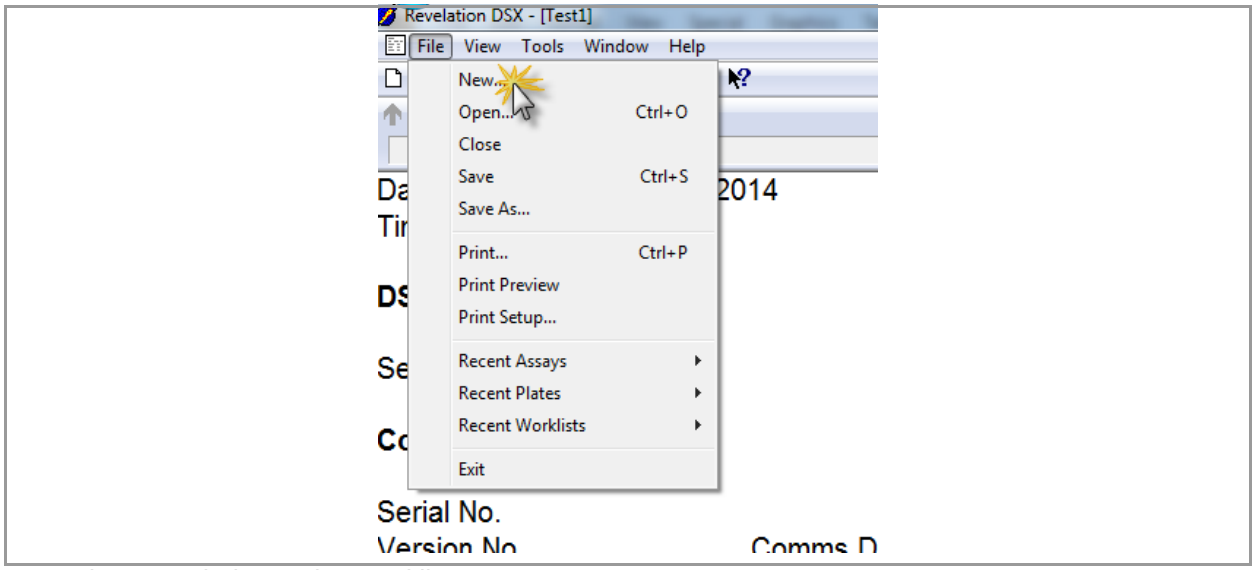
Version 2.03 must be used for QFN Plus.

1. Version 2.03 is intended for and validated against DS2-Matrix version 1.34.2 and Revelation DSX version 6.26.
2. Version 2.03 is intended for future Agility use, Agility version to be determined.
3. Version 2.03 adds support for 4 tubes/sample Boolean assays. It retains support for 3 tubes/sample Boolean assays and for 1 tube/sample non Boolean assays.
4. Version 2.03 adds a user switch to turn off transmission of results for standard and control fluids. Default is "send results".
5. Version 2.03 improves diagnostic error logging.
6. Version 2.03 fixes a problem with embedded parentheses in the LIMS assay name.
7. Version 2.03 detects query status mismatches between Lis-Link and the machine. If Lis-Link expects Query All but machine uses Query by Sample ID, Lis-Link uses the Query by Sample ID protocol. Lis-Link rejects machine use of Query All if Lis-Link expects Query by Sample ID.

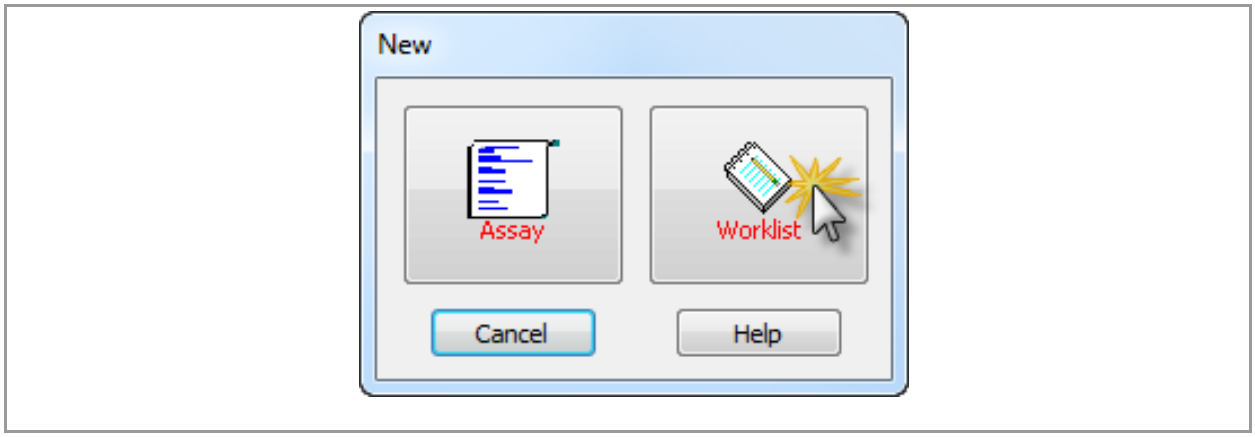
6.0 DSX Workflow

This chapter will show a typical DSX Workflow for a customer using and LIS.

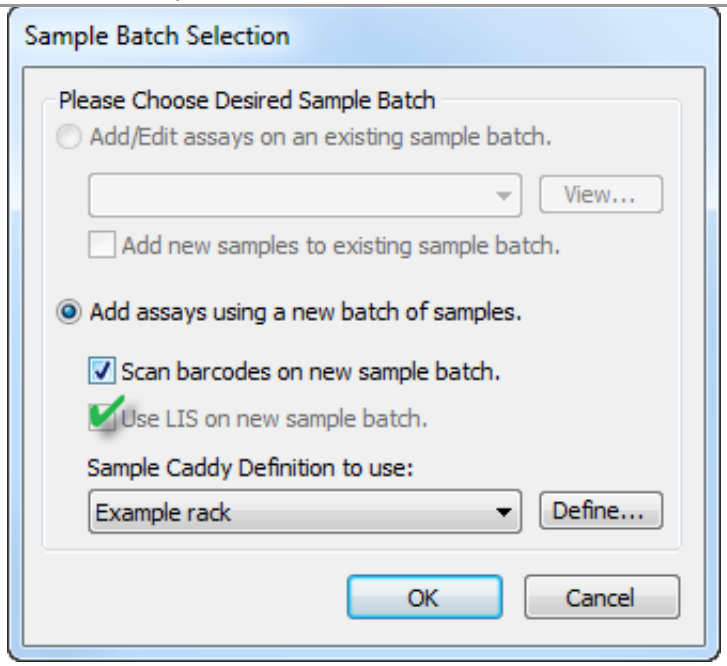
1. Initiate a worklist from the Revelation software. File-->New-->Worklist.



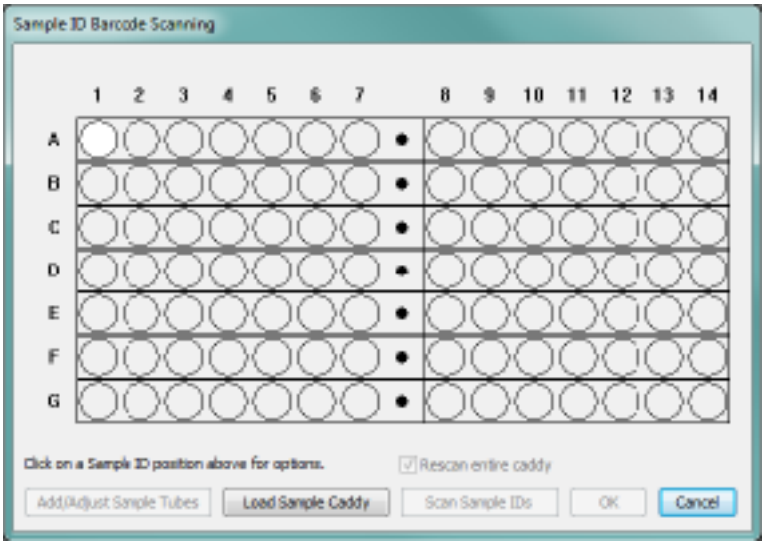
2. At the next window, select worklist.



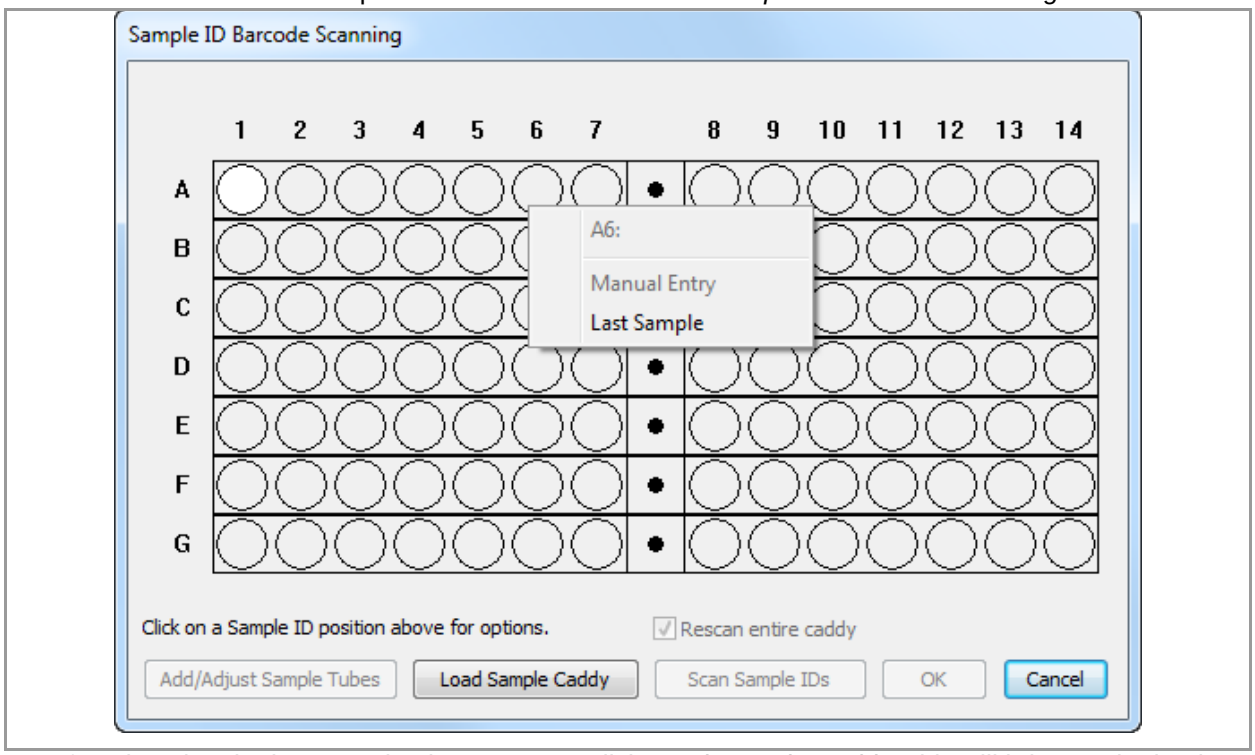
3. At the next window, ensure that *Add assays using a new batch of samples"* is selected and both option boxes are checked. Press *OK* to proceed.



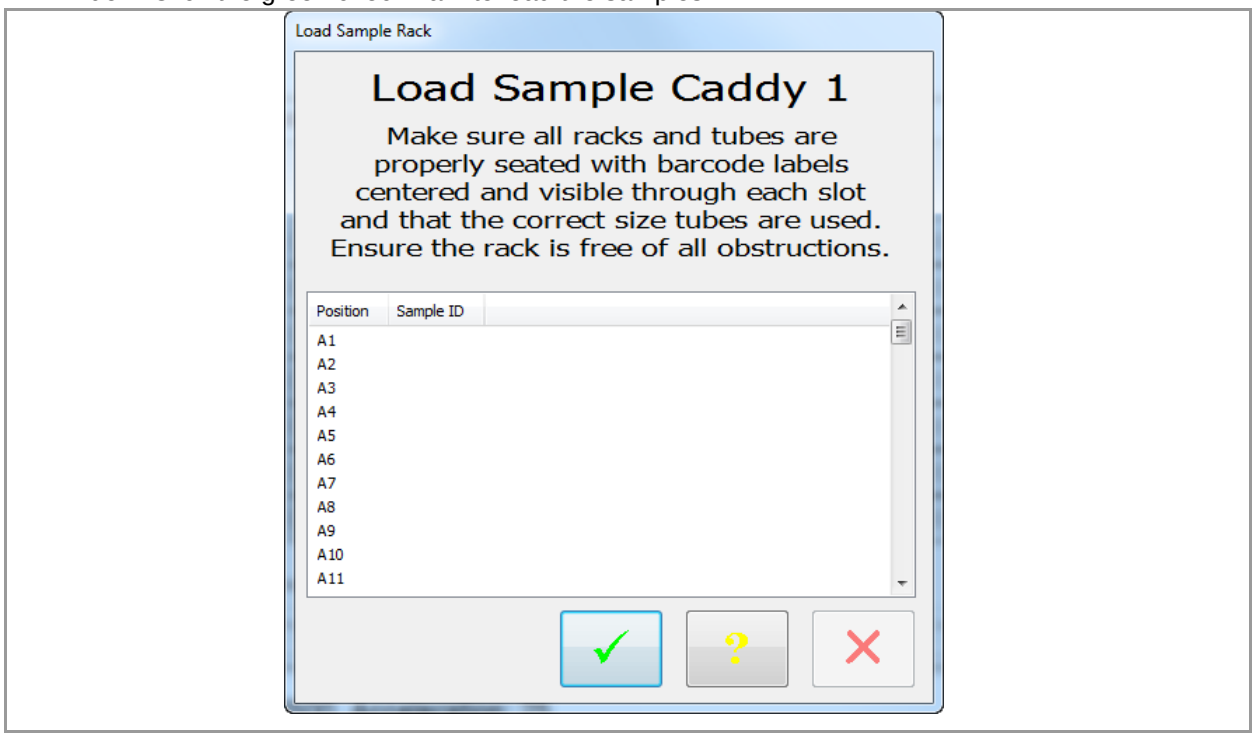
4. The Sample ID Barcode Scanning Window will open.



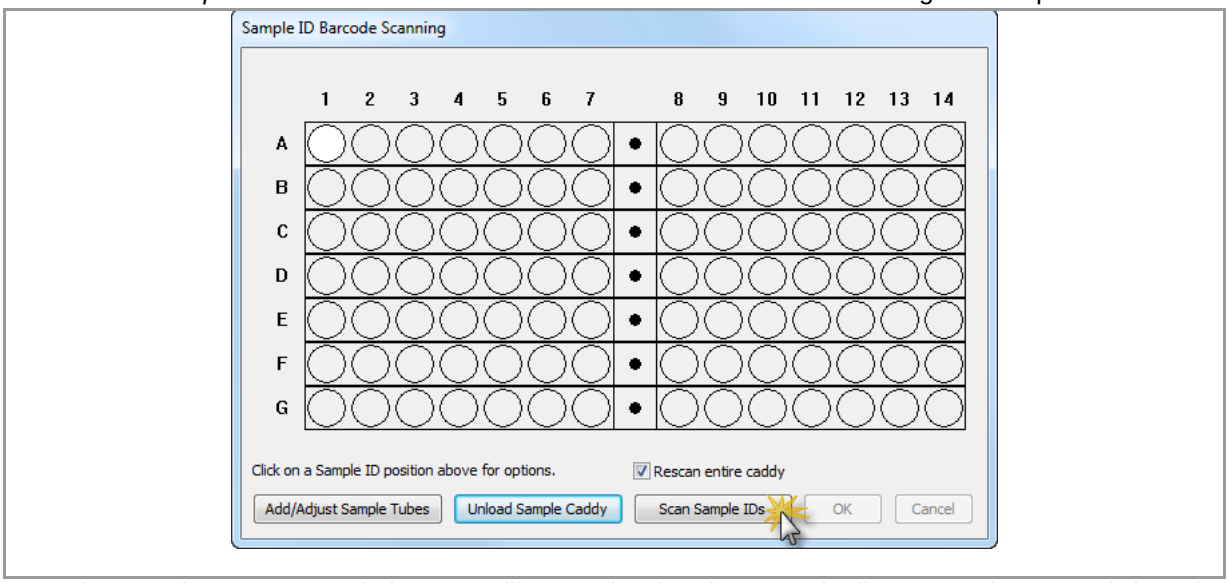
5. Quantiferon assays must ***always*** be run in sets of 3, with no other assays run within the batch. The user must left click the *last* sample tube to be scanned in the *Sample ID Barcode Scanning Window.*



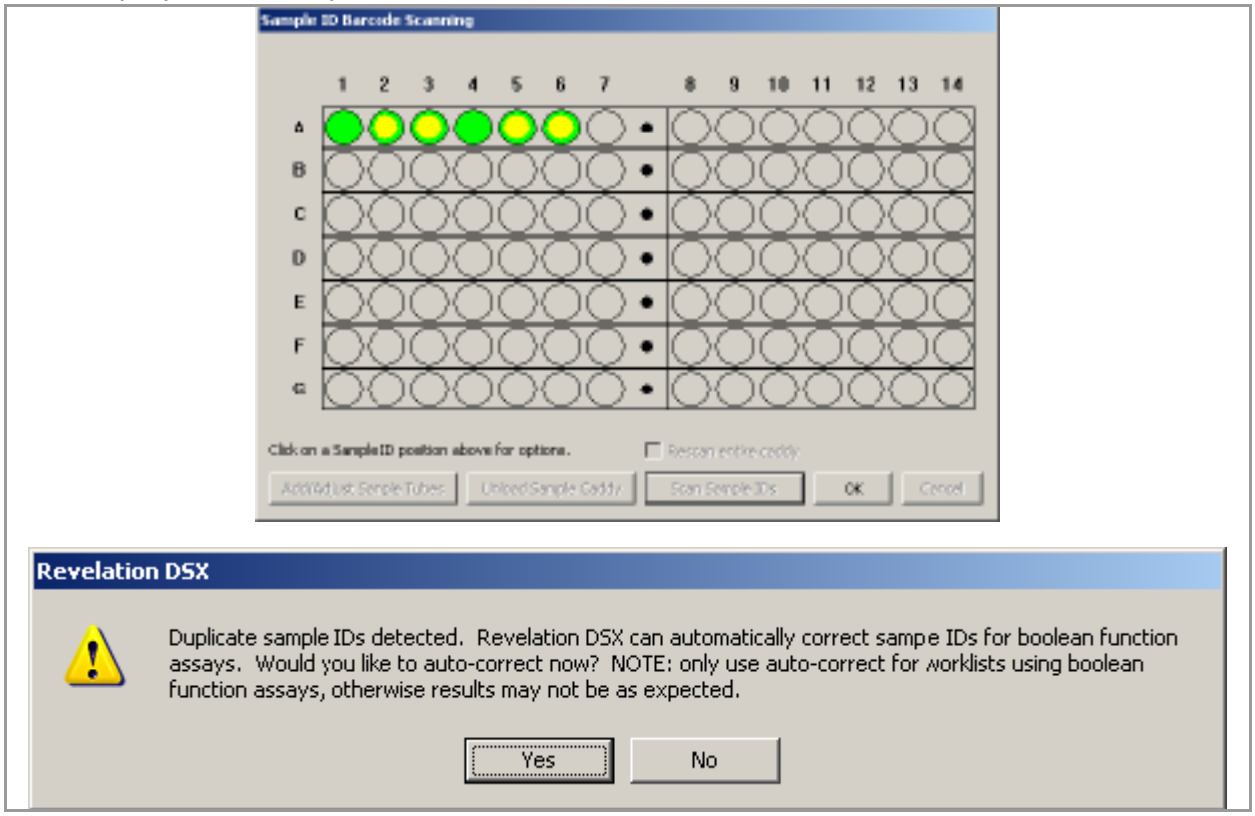
6. After choosing the last sample, the user must click *Load Sample Caddy.* This will bring up the load window. Click the green checkmark to load the samples.



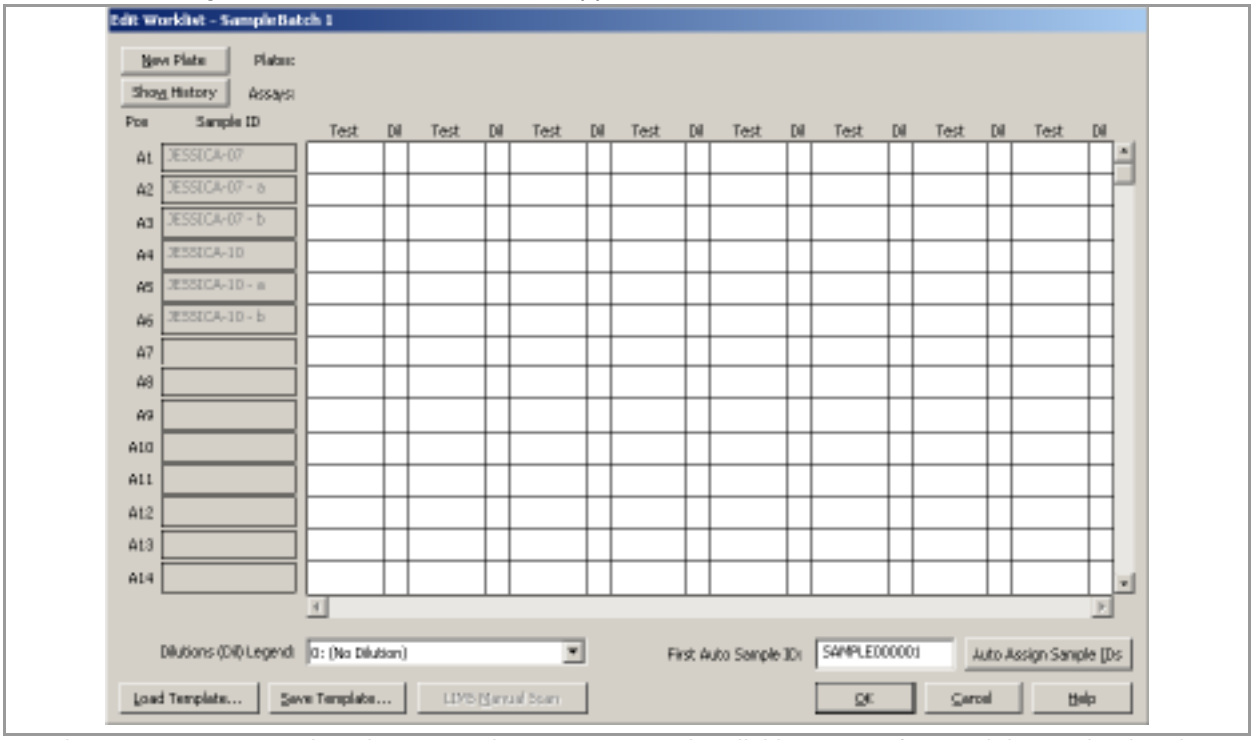
7. The *Sample ID Barcode Scanning* window will come back, but with additional button active. Primarily, the *Scan Sample IDs* button is now active. Click this button to start scanning the samples



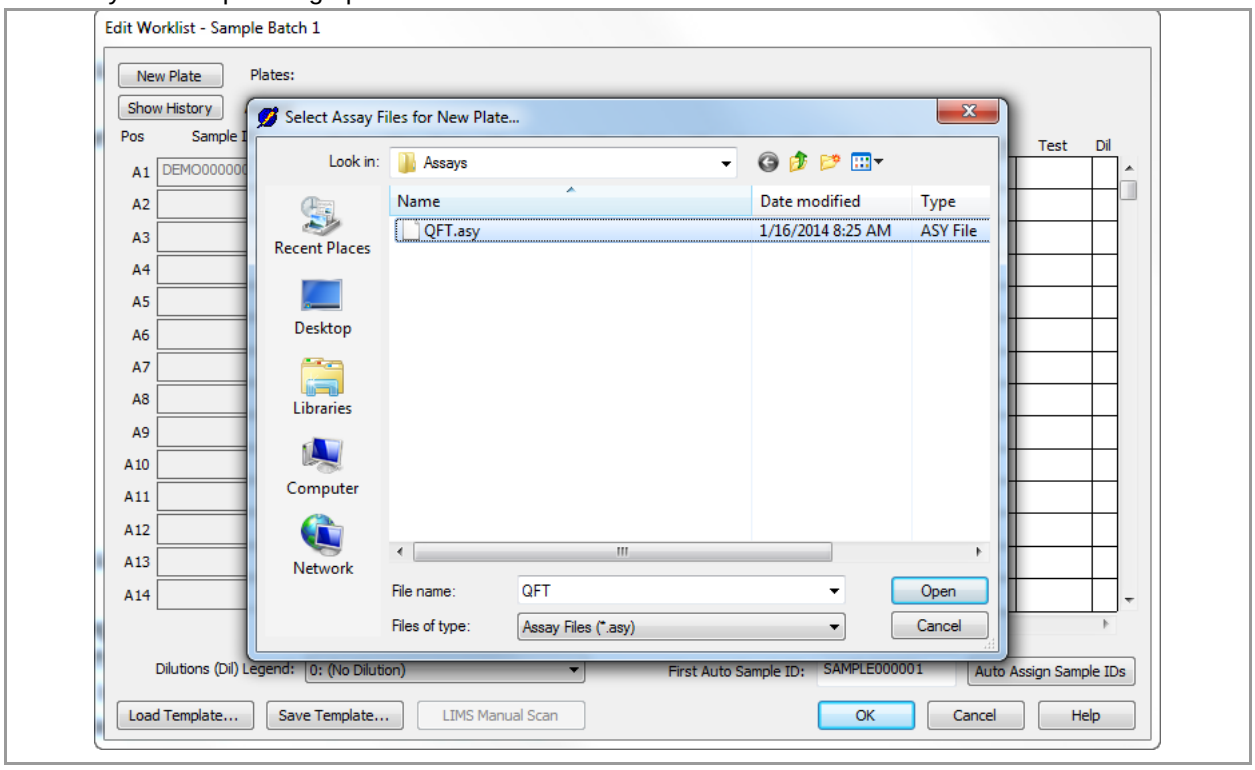
8. As the samples are scanned, the DSX will recognize that there are duplicate sample ID's and show that graphically by displaying yellow circles inside green circles. The Revelation Software has been programmed to automatically correct this for the Quantiferon Assay.
   8.1 Revelation will append a *"-a" and a "-b"* to the duplicate samples.
   8.2 After pressing *Yes* to accept the auto-correction of the sample IDs, LIS-Link will transmit the test query to the host system.



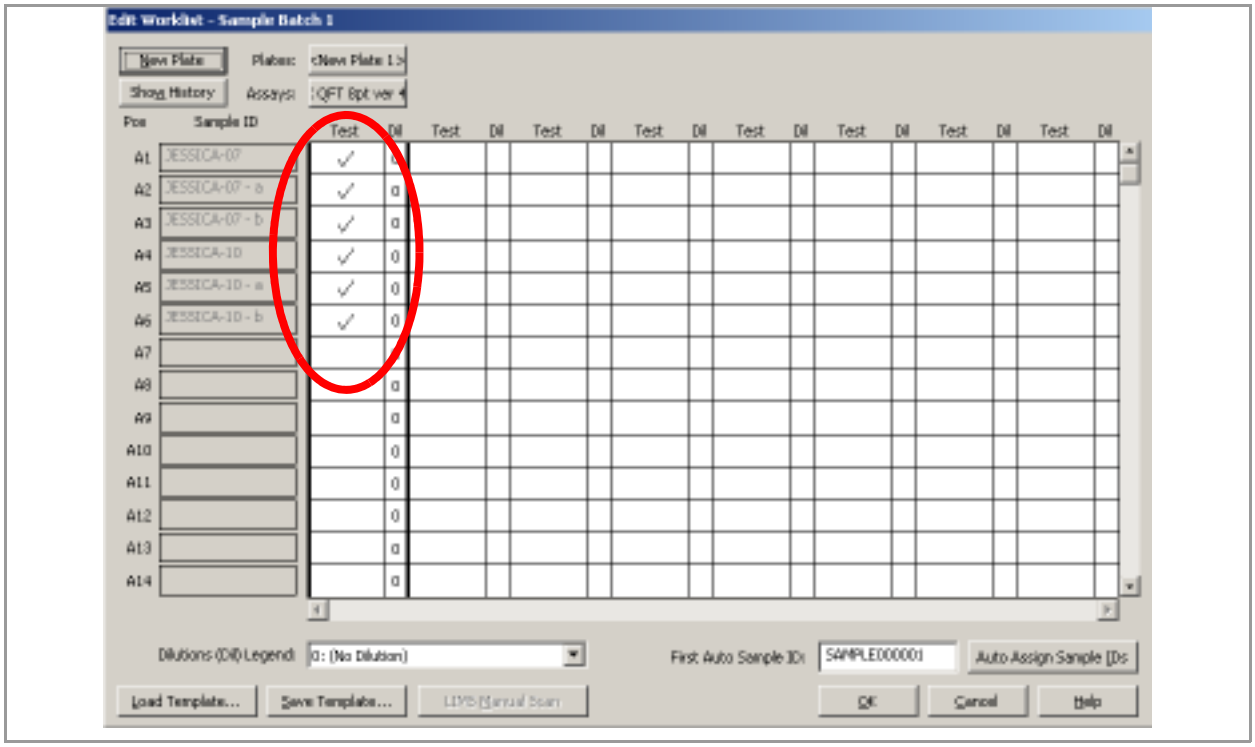
9. After scanning, the *Edit Worklist* screen will appear.



10. The user must now select the Assay they want to run, by clicking *New Plate* and then selecting the Assay file and pressing open.



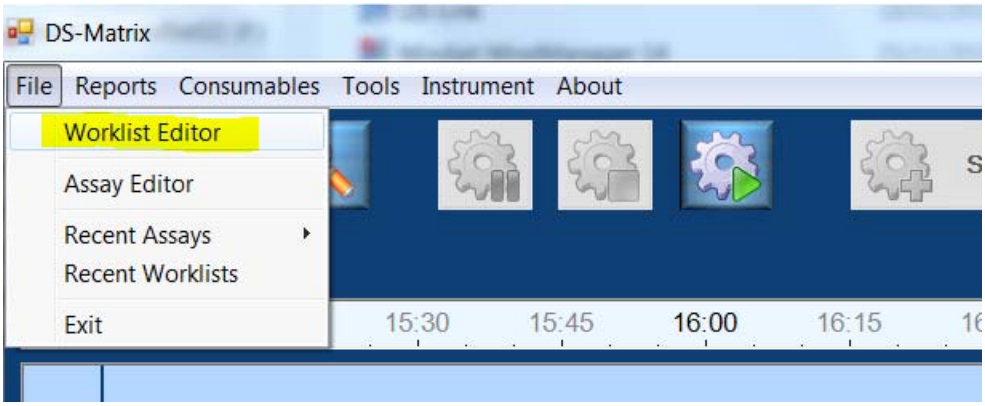
11. This is one of the most **critical steps.** After selecting the assay, the *Test c*olumn should automatically populate with checkmarks. That indicates that LIS-Link has received the test orders from the LIS-Host system. If the checkmarks **don't** automatically populate, LIS-Link did not receive test orders from the LIS-Host and **no** results will be transmitted after the run
    11.1 After confirming the presence of the auto-populated checkmarks, the user presses *OK* to start their run.



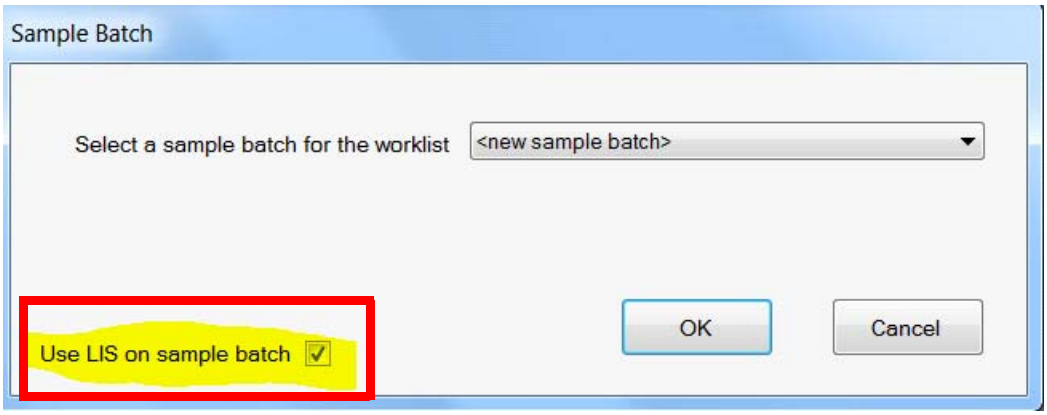
7.0 DS2 Workflow

This section will detail a typical DS-Matrix workflow for a client using LIS.

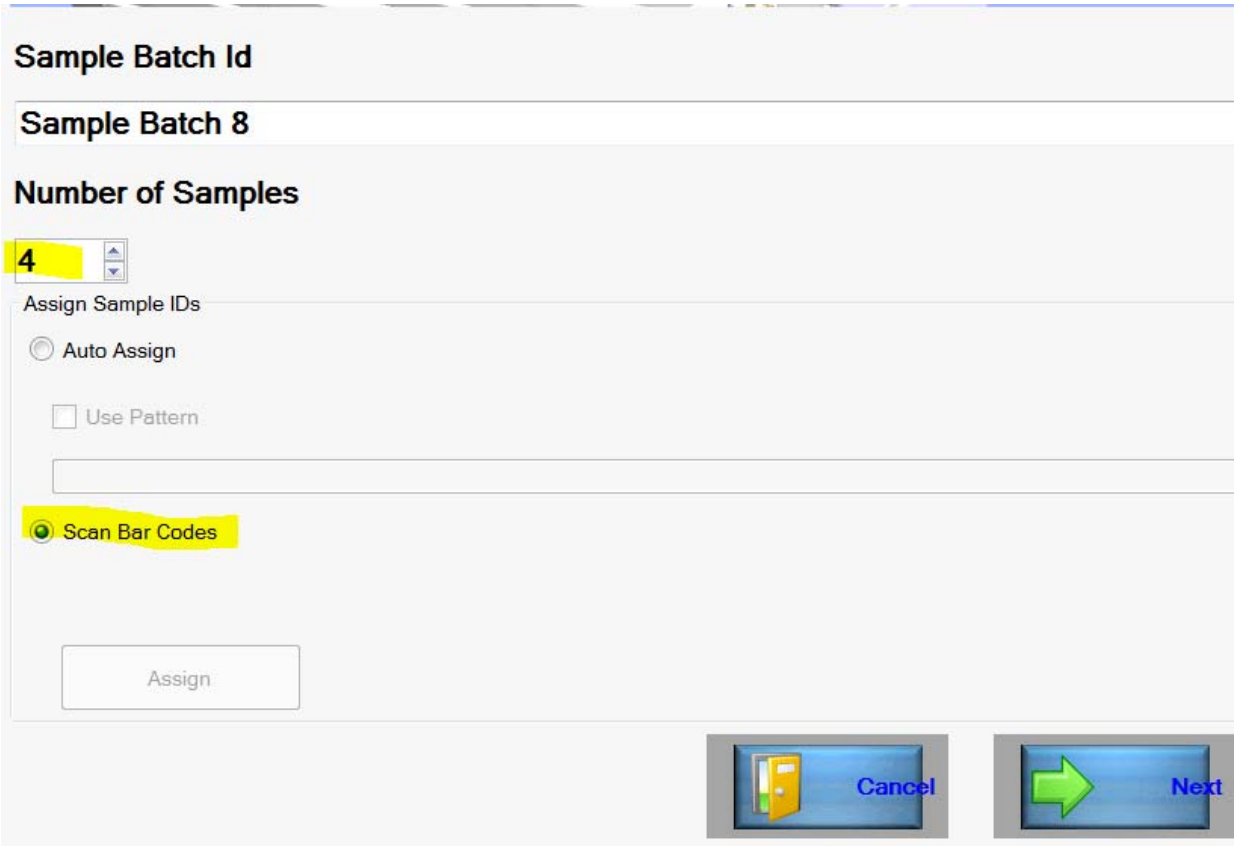
1. Initiate a worklist by pressing *File-->Worklist Editor.*



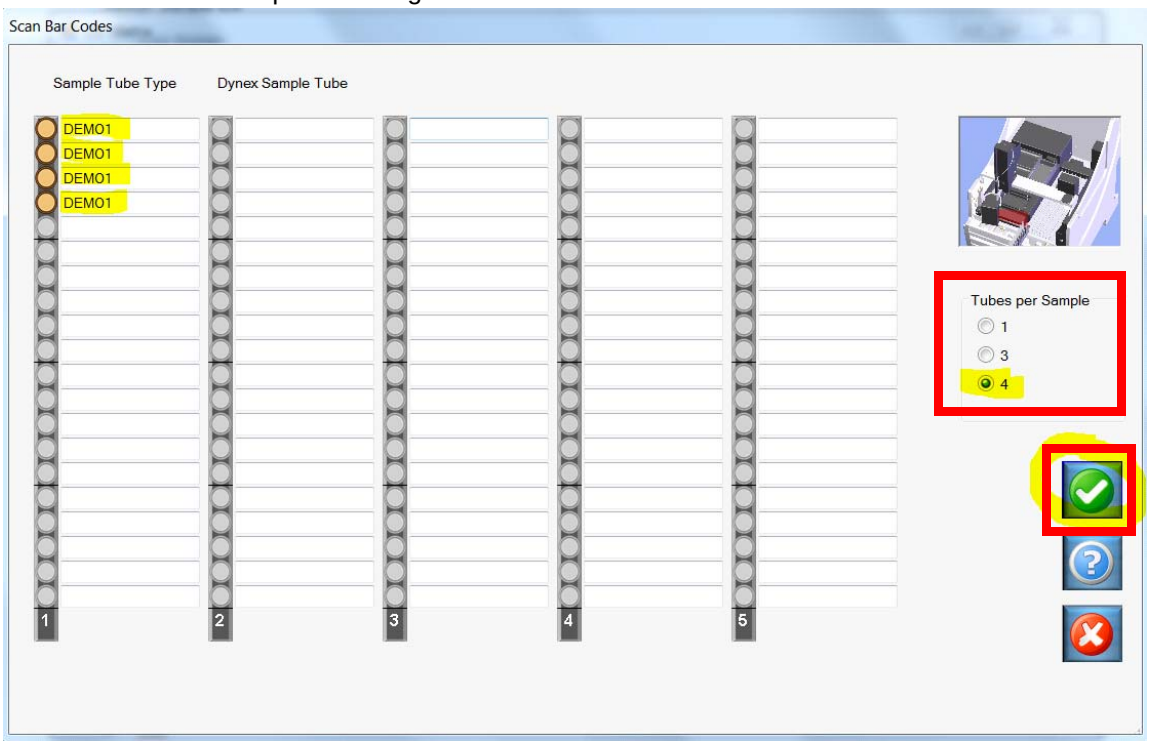
2. Ensure *Use LIS on sample batch* is selected and press *OK.*



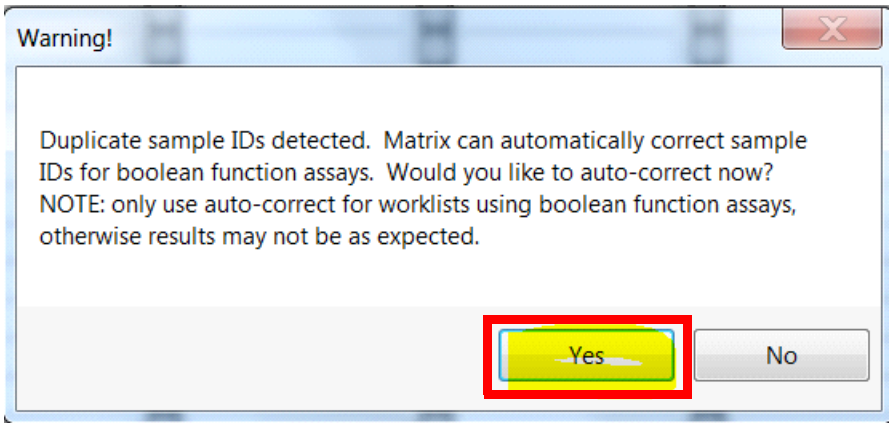
3. Select the number of samples to be run. QFN+ requires samples in multiples of 4. QFT requires samples in multiples of 3. Also check the *Scan Bar Codes* radio button, then press *Next.*



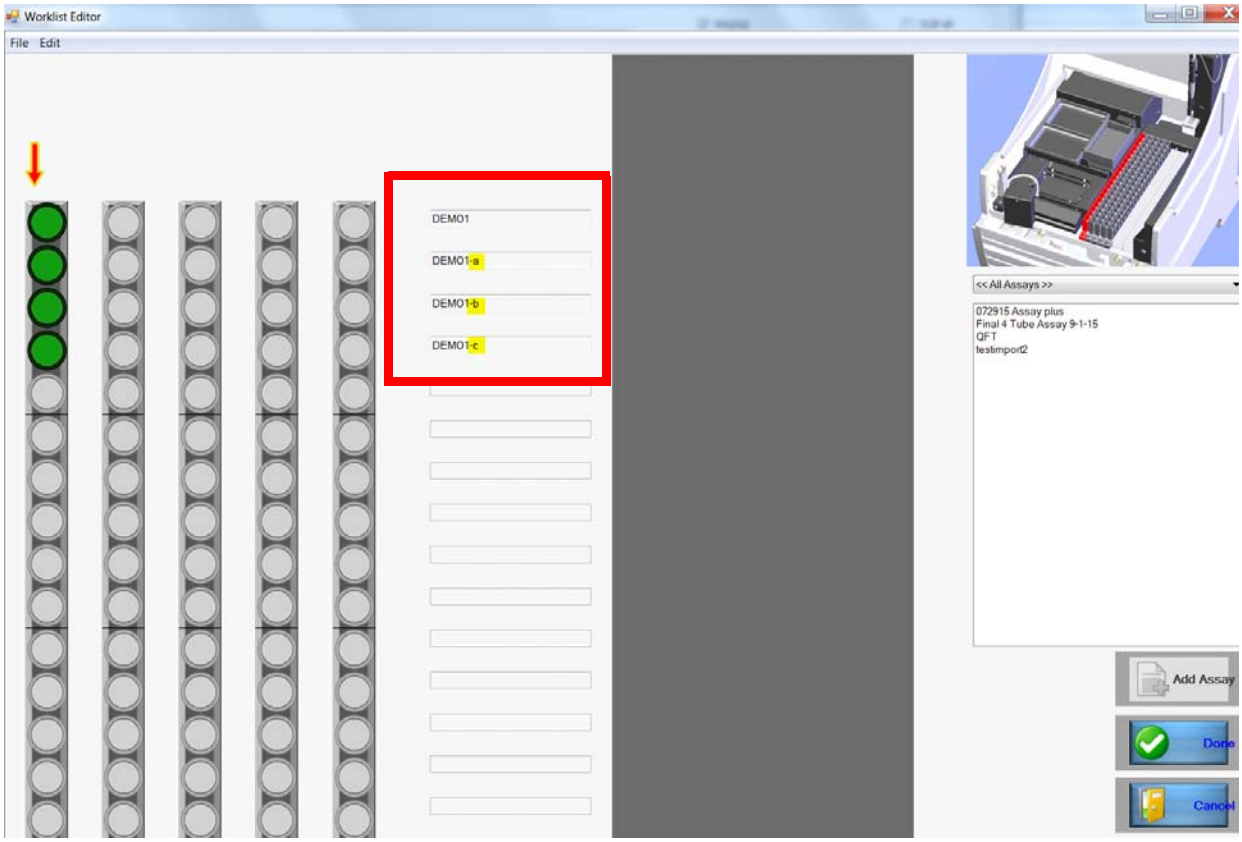
4. Choose 3 or 4 *Tubes per Sample*, depending on if you are running QFN(3) or QFN+(4). Press the green check box to start sample scanning.



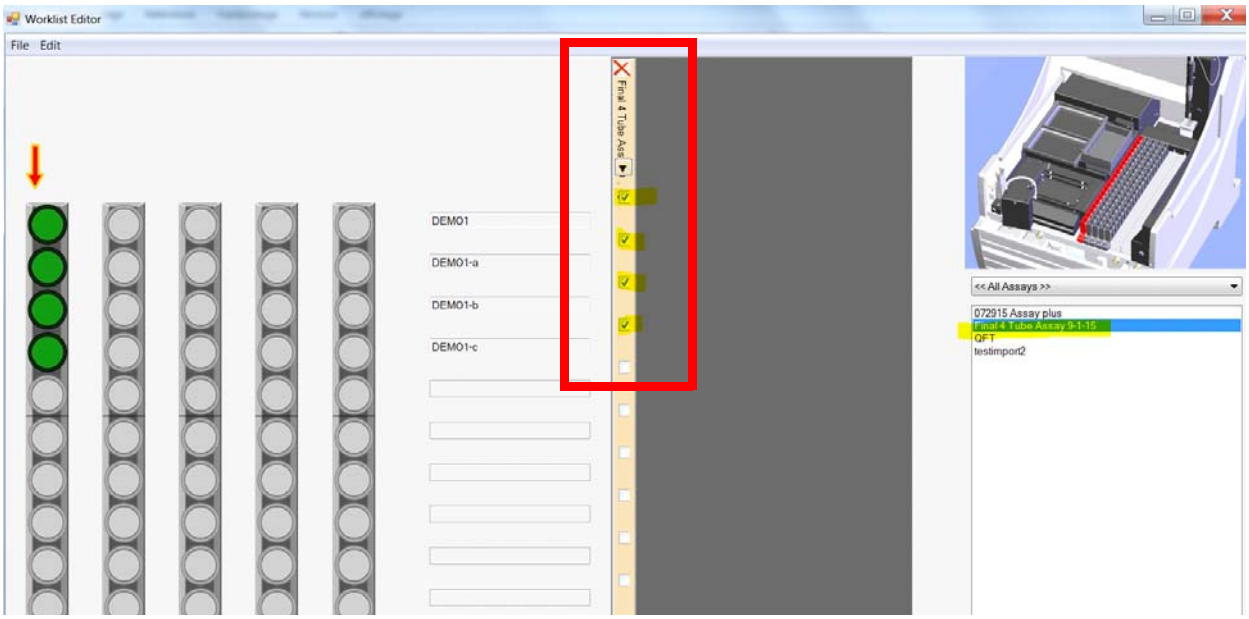
5. The software will pop up a warning about duplicate sample ID's. This is normal, choose *Yes.*



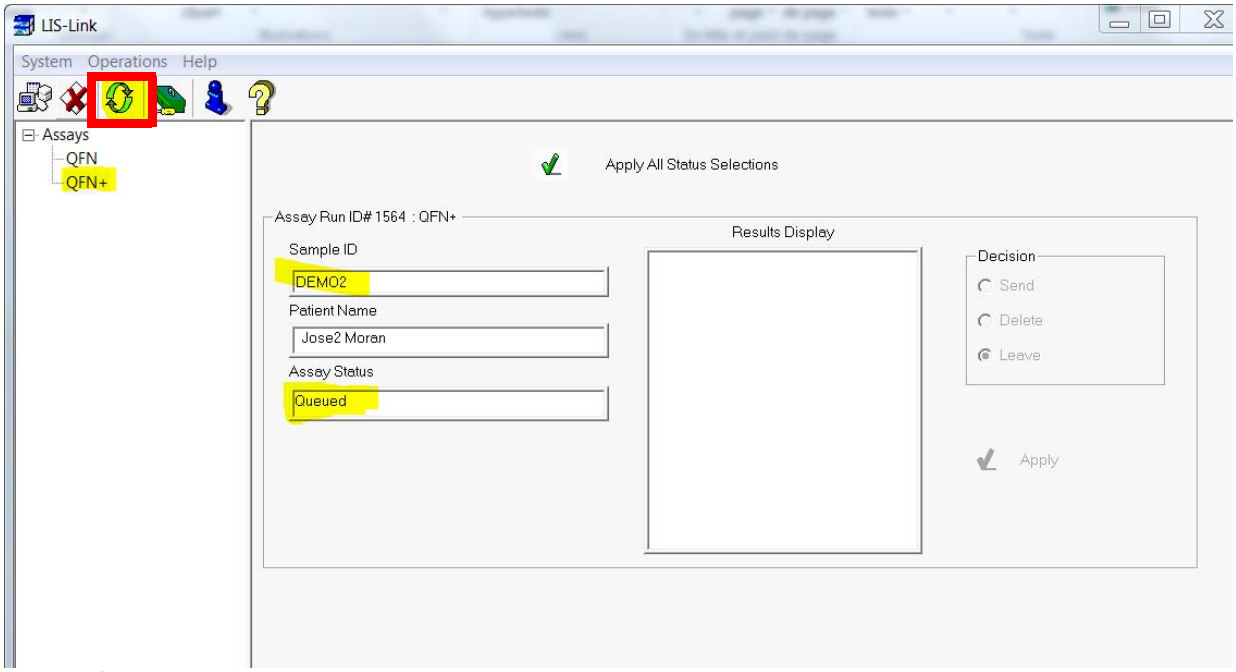
6. After pressing Yes, a query is sent to the LIS host, and the duplicate sample ID's will appended with -a, -b, and -c.



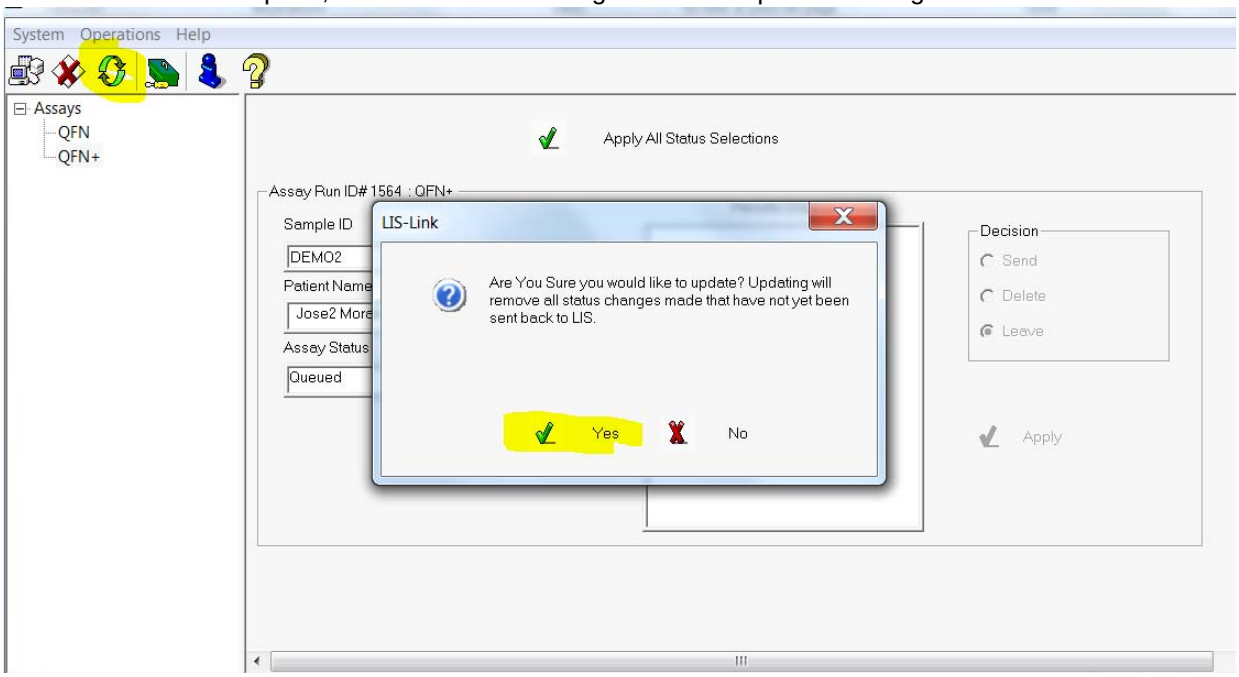
7. If the LIMS query was successful, the assay will automatically be assigned to the samples. If this does not happen, no results will be transmitted at the end of the run.



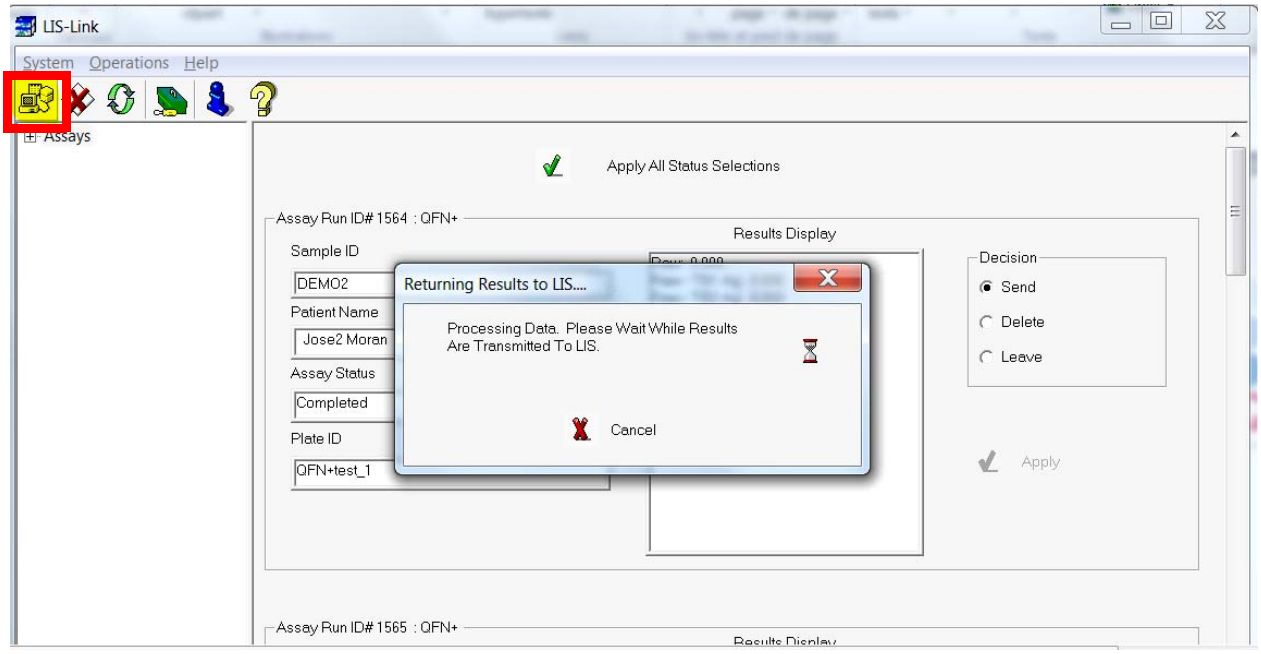
8. LIS-Link should not contain the samples from your run in a Queued state. You may have to manually press the refresh button.



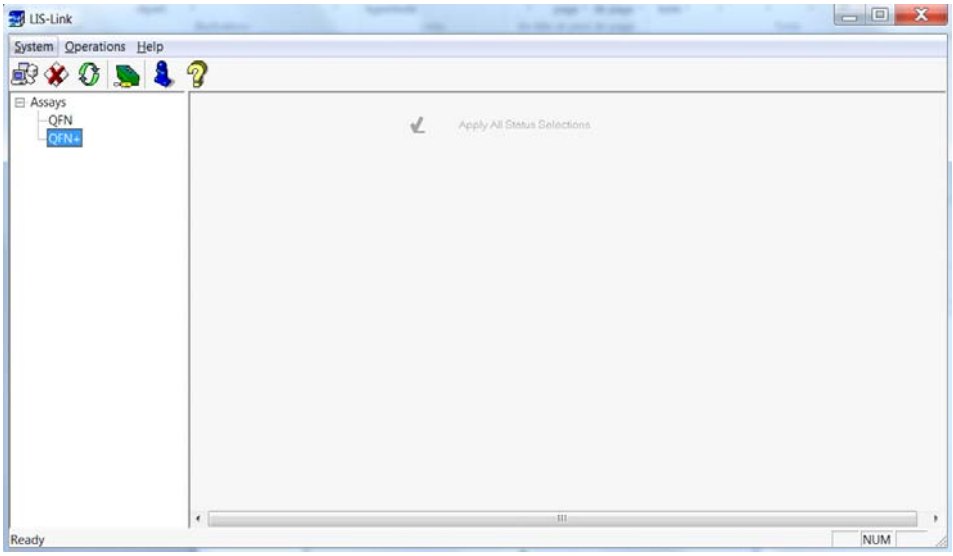
9. Start the run.
10. After the run is complete, refresh the LIS-Link again and accept the warning.



11. The samples from the run will be updated with a *complete* status. After reviewing, you can press the computer icon to send all sample data to the LIS.



12. The results will be transmitted. At this point you can confirm transmission to the LIS host. The samples should also be removed from the pending assay list.



8.0 Data Transmission

8.1 LIS-Link Queries LIS-Host for Test

1. The first step in data transmission is LIS-Link polling the LIS-Host for sample IDs. This happens during the setup of runs. LIS-Link always sends a query for all three Quantiferon Tubes. The message is an *outgoing* message. That means LIS-Link is sending data to the LIS-Host.

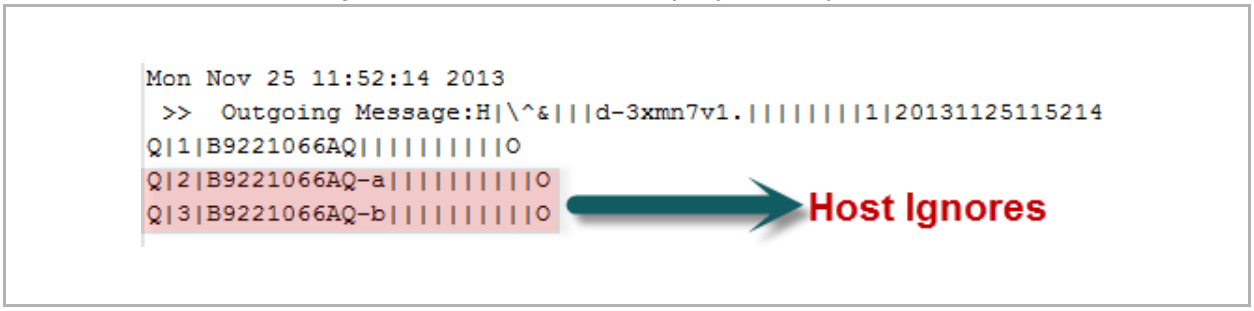
```
Mon Nov 25 11:52:14 2013
 >>  Outgoing Message:H|\^&|||d-3xmn7v1.||||||||1|20131125115214
Q|1|B9221066AQ||||||||||O
Q|2|B9221066AQ-a||||||||||O
Q|3|B9221066AQ-b||||||||||O
```

2. You will see the above transmission whether or not LIS-Link is connected to an LIS-Host.
3. All transmissions are stored in a file called *logdebugaction.txt*
   3.1 The *logdebugactions.txt* file is overwritten whenever LIS-Link is restarted.
   3.2 The *logdebugactions.txt* file is located here:

c:\program files\common files\Dynex…\LIS Link\logdebugaction.txt

INFORMATION	The LIS Host **MUST** ignore the second and third query for each Quantiferon sample.

   3.3 The LIS host must ignore the second and third query for sample.



8.2 LIS-Host Sends Test Orders to LIS-Link

1. If the LIS-host is properly connected to the LIS-Link computer and the sample ID has a test in the LIS-Host system, the LIS-Host system will respond to LIS-Link with an incoming message, ordering the Quantiferon test.

```
Wed Oct 30 16:08:08 2013
 >>  Incoming Message:H|\^&|||LabDAQ||||||||1|20131030160817
P|1||A0038719||LastName^FirstName
O|1|A0038719||^^^QFT
```

   1.1 P|1| indicates patient #1
   1.2 O|1| indicates order #1
2. Each Quantiferon patient (3 or 4 tubes) should only receive one test order.

8.3 LIS-Link Sends Results to LIS-Host

1. After the run/batch is complete, if everything ran correctly, the results will be in LIS-Link, waiting to be sent to the LIS-Host. The results always have to be released from LIS-Link to the LIS-Host.
2. The results can be released two ways.
   2.1 Go to the *Operations --> Commit Operations --> Send Data to LIS Host*
   2.2 From the sample view window, press the green checkmark.

8.4 Data Interpretation

1. The data transmitted depends on the name mapping options set by the user. Additionally, in LIS-Link 2.01, standards and controls are sent by default (with no possibility to suppress)

2. The overall results will look similar to this if *Final Result, Spreadsheet,* and *Curve Fit* are selected:

```
P|2|| Scott2345
O|1| Scott2345||^^^QFT|R|20110531153848
R|1|^^^QFT|*****|||DF||F||||20110531154452|MName
R|2|^^^QFT^TB-Nil|*****|||DF||F||||20110531154452|MName
R|3|^^^QFT^Mitogen-Nil|*****|||DF||F||||20110531154452|MName
R|4|^^^QFT|*****|0||CF||F||||20110531154452|MName
R|5|^^^QFT^TB-Nil|*****|0||CF||F||||20110531154452|MName
R|6|^^^QFT^Mitogen-Nil|*****|0||CF||F||||20110531154452|MName
R|7|^^^QFT|*****|||FR||F||||20110531154452|MName
```

Difference Data

Curve Fit Data

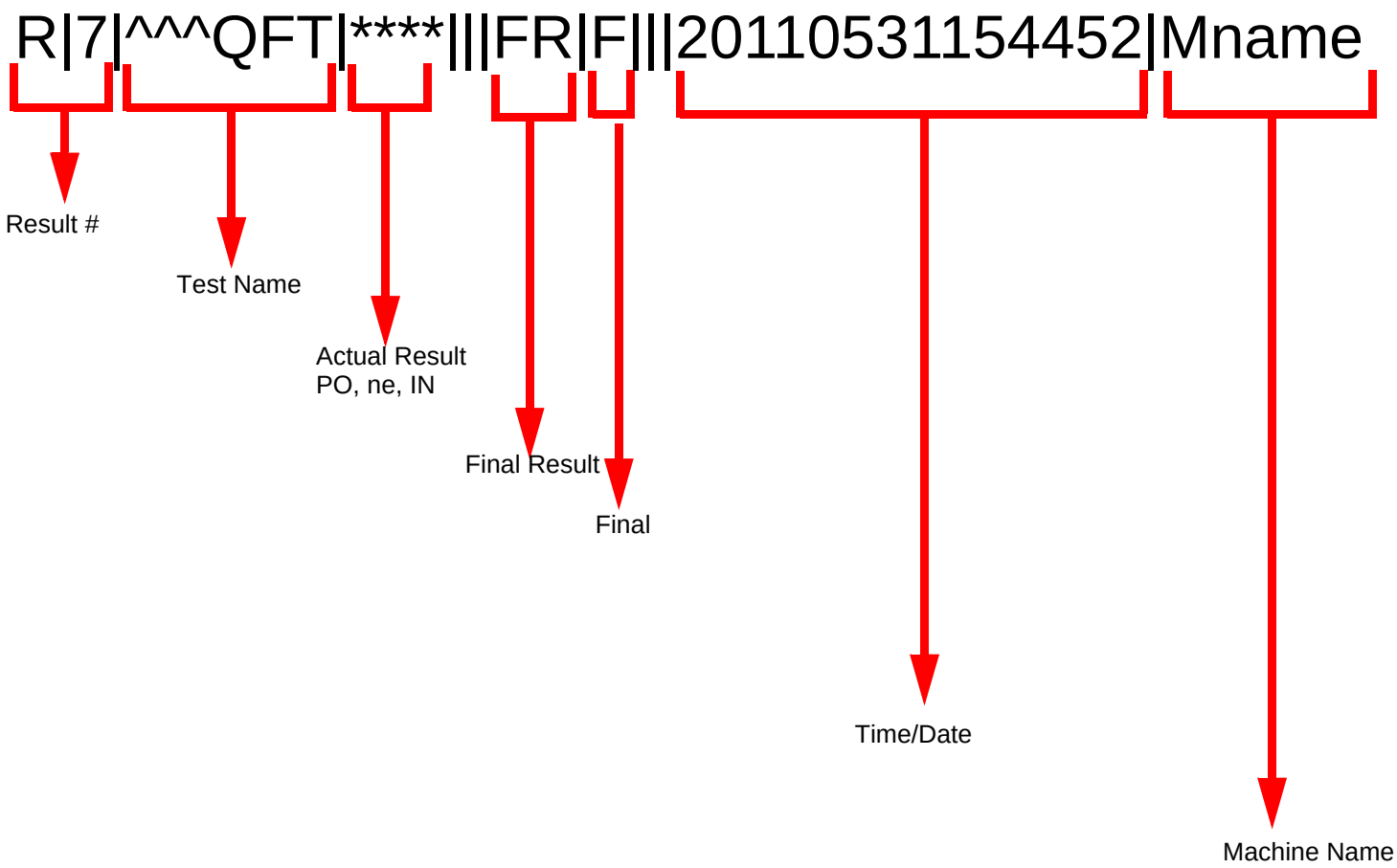
Final Result

INFORMATION	The results do NOT always come through in the same order. The LIS Host must not depend on the order of the results.

3. The first two lines are the patient information and order information.
4. All lines that start with '*R|x|*" are results.

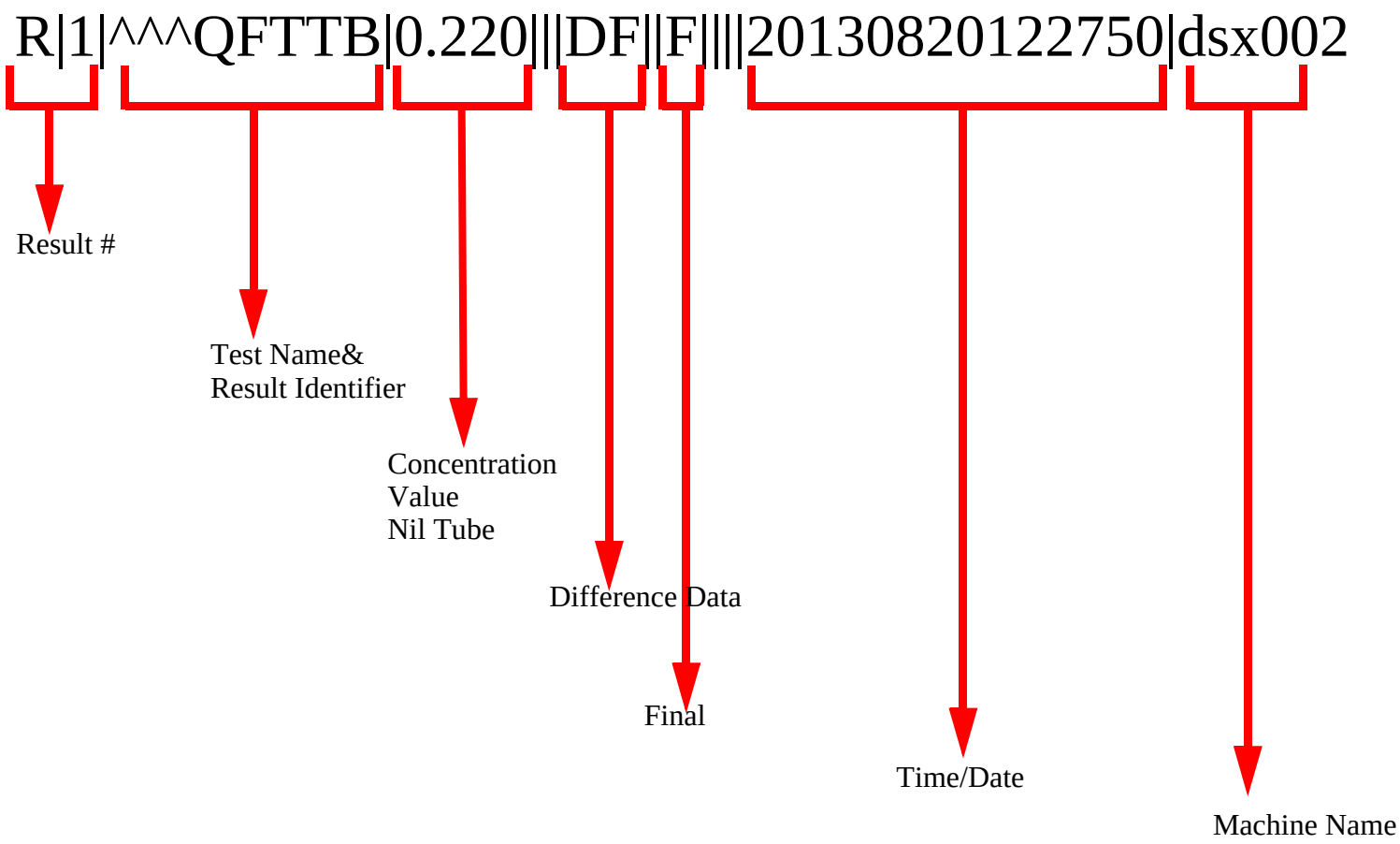
8.4.1 Final Result

1. The final result data will be transmitted like this:
   1.1 R|x|^^^TESTNAME|RESULT|||FR|F|||TIME/DATE|Machine Name
   1.2 From above:

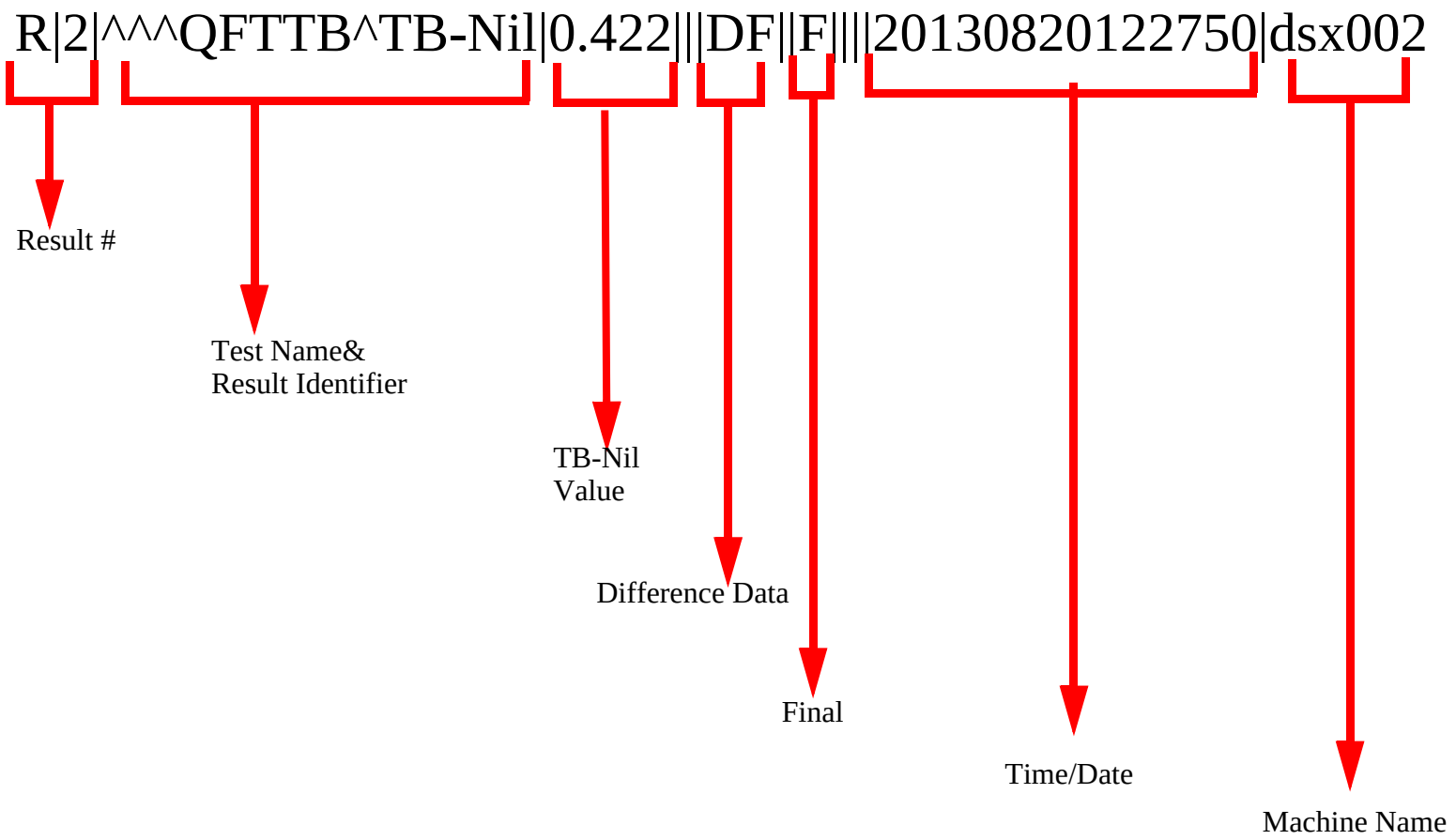


2. The combination of these elements allow the LIS Host to uniquely identify each result, regardless of the transmission order.
   2.1 The final result can be identified by these three elements: ^^^QFT/FR/F (^^QFT will change depending on what the customer is calling their test)
   2.2 If those three elements are present in a result line, then it is the Final Result.

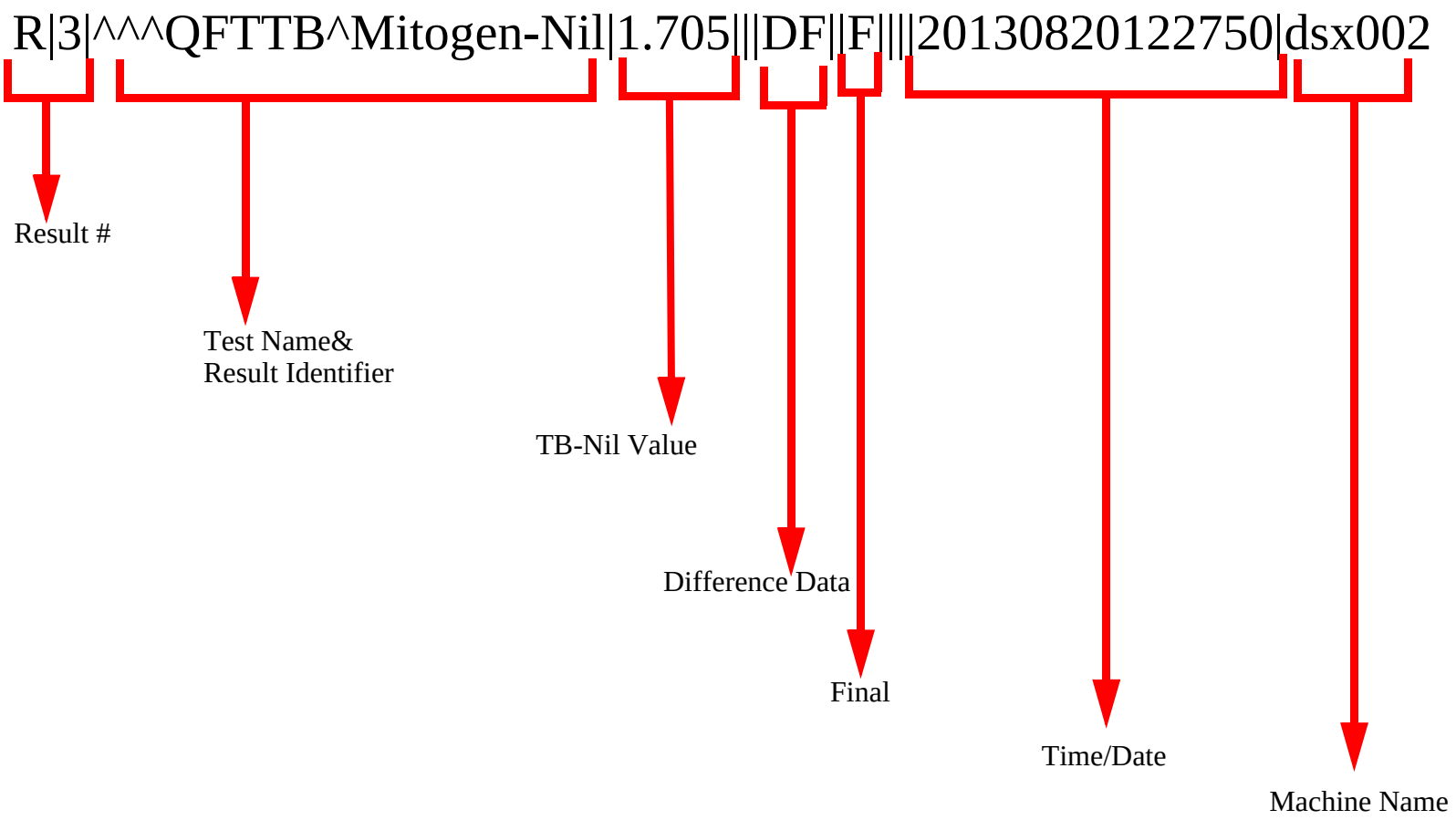
8.4.2 Spreadsheet Results (Difference Data)



1. This is the concentration value for the nil tube
2. This result can be uniquely identified by the following three elements: ^^^QFTTB/DF/F (^^QFT will change depending on what the customer is calling their test)
3. If those three elements are present in a result line, then it is the Nil Tube concentration value.

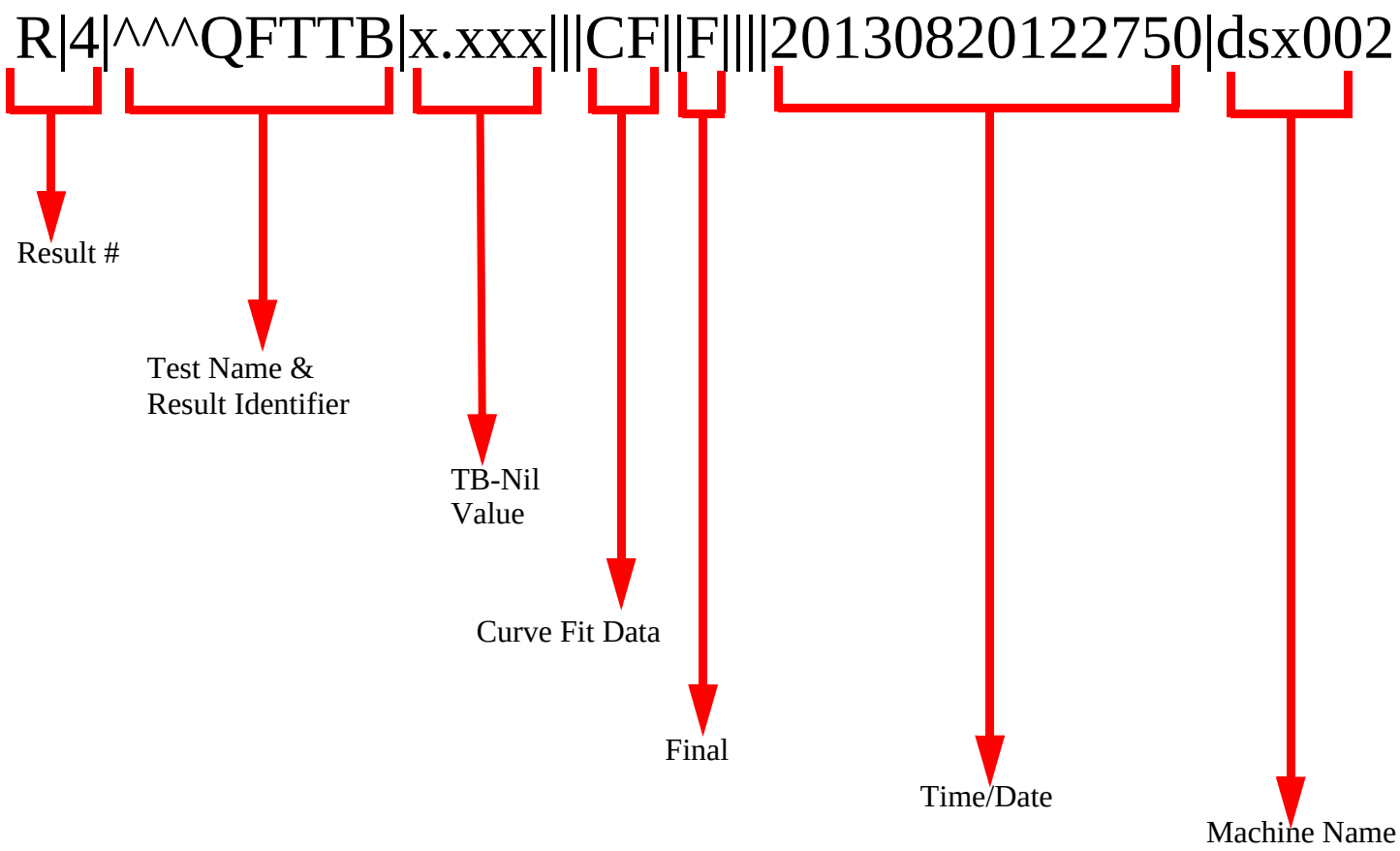


1. This is the difference data for TB-Nil.
2. This result can be uniquely identified by the following three elements: ^^^QFTTB^TB-Nil/DF/F (^^QFT will change depending on what the customer is calling their test)
3. If those three elements are present in a result line, then it is the TB-Nil concentration value.

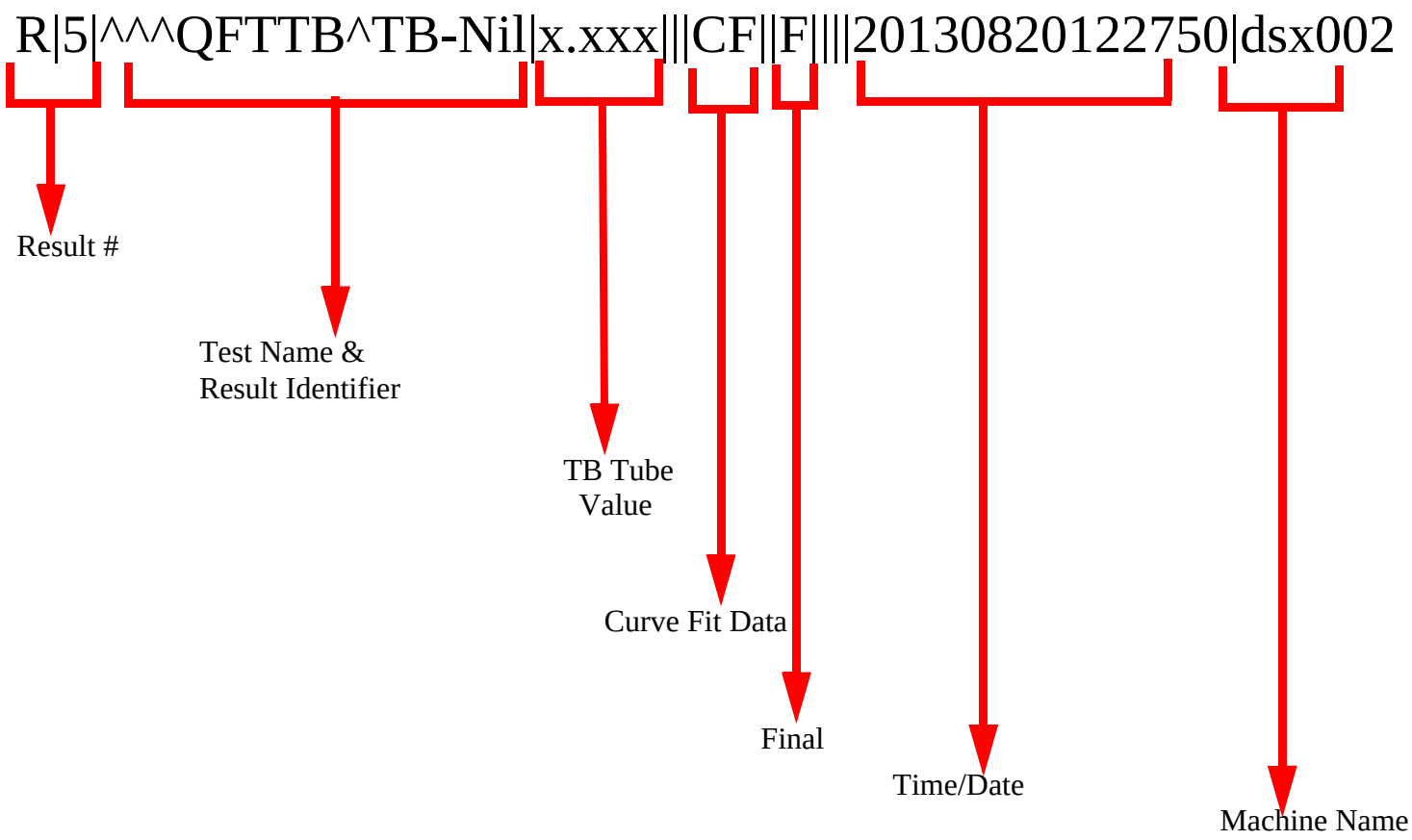


1. This is the difference data for TB-Nil.
2. This result can be uniquely identified by the following three elements: ^^^QFTTB^TB-Nil/DF/F (^^QFT will change depending on what the customer is calling their test)
3. If those three elements are present in a result line, then it is the TB-Nil concentration value.

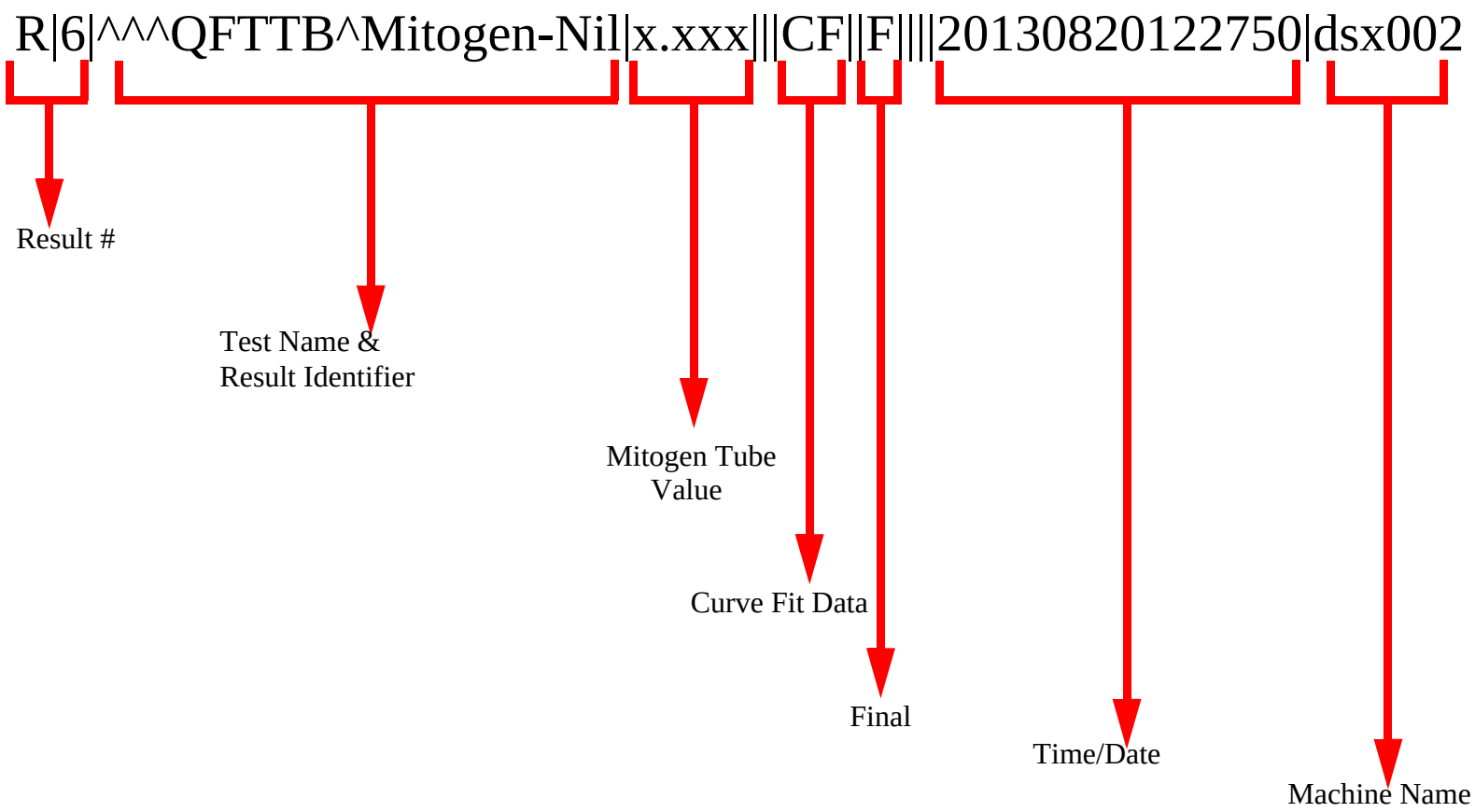
8.4.3 Curve Fit Results



1. This is the curve fit data for the Nil Tube. This is the exact same data that is sent for the Nil Tube with the Spreadsheet data. This is the concentration value for the Nil Tube.
2. This result can be uniquely identified by the following three elements: ^^^QFTTB/CF/F (^^QFT will change depending on what the customer is calling their test)
3. If those three elements are present in a result line, then it is the Nil Tube concentration value.



1. This is the curve fit data for the TB Tube. This is the concentration value for the TB Tube.
2. This result can be uniquely identified by the following three elements: ^^^QFTTB^TB-Nil/CF/F (^^QFT will change depending on what the customer is calling their test)
3. If those three elements are present in a result line, then it is the TB Tube concentration value.



1. This is the curve fit data for the Mitogen Tube. This is the concentration value for the Mitogen Tube.
2. This result can be uniquely identified by the following three elements: ^^^QFTTB^Mitogen-Nil/CF/F (^^QFT will change depending on what the customer is calling their test)
3. If those three elements are present in a result line, then it is the Mitogen Tube concentration value.

9.0 Terms

9.1 LIS-Host

1. The backend LIS system deployed at the customer site. The LIS-Host could be one of the larger LIS Providers or an in-house solution.
2. Common LIS Hosts Include
   - 2.1 Lab-Daq
   - 2.2 Cerner
   - 2.3 Soft
   - 2.4 Apollo LIMS
   - 2.5 Orchard
   - 2.6 SunQuest
   - 2.7 GLIMS
   - 2.8 Data Innovation
   - 2.9 other providers or in house solution

9.2 Logdebugaction.txt File

1. The “logdebugaction.txt” file contains transmissions to and from LIS-Link.

INFORMATION 	With LIS-Link V1.08, the result data is not logged in the logdebugactions.txt file. With LIS-Link V2.01, the result data is logged in the logdebugactions.txt file. With LIS-Link V2.03, the result data is logged in the logdebugactions.txt file.

2. This file is overwritten every time the LIS-Link program is shut down and restarted.
3. This file is located at the following location on customers computers:
   - 3.1 c:\program files\common files\Dynex…\LIS Link\logdebugaction.txt
4. We always need this file to effectively troubleshoot LIS issues.

9.3 Host Trace File

1. The host trace file is a complementary file to the “logdebugaction.txt” file.
2. The host trace file shows all transmissions sent and received by the host.
3. If we have both the “logdebugaction.txt” file and the host trace file, we will have a complete picture of the communication.
4. It is very nice to have this file in addition to the “logdebugaction.txt” file for troubleshooting purposes.

10.0 Troubleshooting

The number of items that can be wrong on the LIS-Link/Dynex side of things is minimal. Most issues come from the LIS-Host side. In many cases our role in troubleshooting is to be the mediator between the client and the LIS-Host representative.

Effectively, the only output that we are responsible for is ensuring that the data is properly transmitted to the LIS-Host via LIS-Link. If we can confirm that the data is being properly transmitted via a “logdebugaction.txt” file or a “host trace file”, we have done our job.

However, due the Quantiferon test and its unique result reporting, the LIS-Host can have many problems interpreting the data and getting their interface programmed correctly. We can assist the LIS-Host by providing the proper documentation and giving guidance.

This section will outline the main troubleshooting topics that come up, but is not meant to be comprehensive:

10.1 Documentation

The LIS-Link Guide from Dynex is very good and that is the first document that I send to clients who need LIS support. Most questions are answered in there, if it is read.

10.2 Test Reply from host

1. Since QFT is unique with three or four tubes per test, this creates new situations for the client and for LIS-Hosts.
2. QFT always need to be run is sets of 3 or 4, with no other test being run in the same batch.
3. The LIS-Host **must** ignore the samples named with -a, -b, or -c query from LIS-Link for a test. We can not stress this point enough.

INFORMATION	The LIS-Host must ignore the 2nd and 3rd and/or 4th order query.

4. Proper reply from host for one sample.

```
Wed Oct 30 16:08:08 2013
 >>  Incoming Message:H|\^&|||LabDAQ|||||||1|20131030160817
P|1||A0038719||LastName^FirstName
O|1|A0038719||^^^QFT
```

10.3 Automatic Sample Check Off

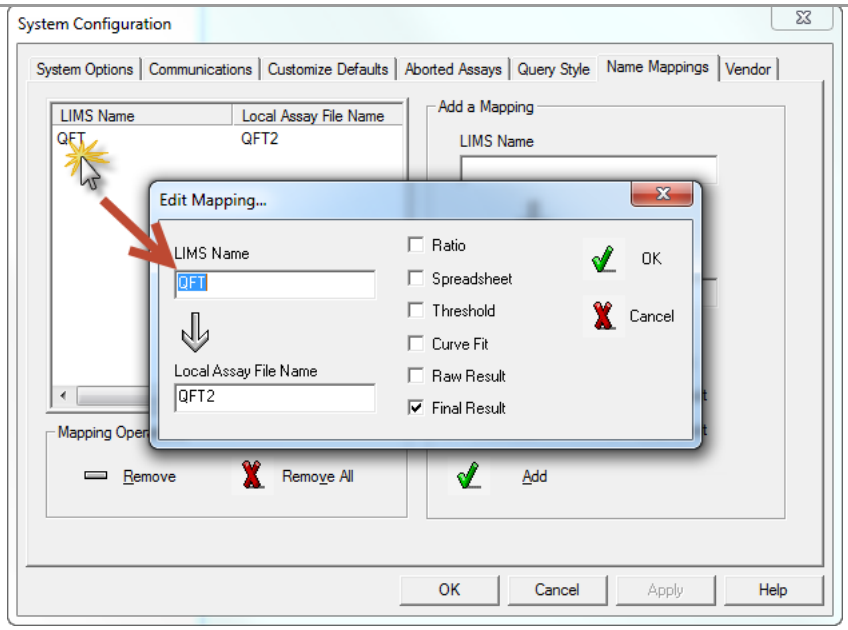
When setting up their runs, the samples must automatically “check off” after communication with the LIS-Host. If the samples do not automatically check off, no results will be transmitted to the LIS-Host after the run has completed. In other words, LIS-Link has a strict bi-directional query mode LIMS interaction.

10.4 Serial -vs- TCP/IP connection

1. LIS-Link does not work with a TCP/IP (ethernet) connection. The client must use a serial connection from the instrument computer to their LIS server.
2. The client needs to ensure that they are using the correct serial port. We have had cases where the wrong serial port was being used. The serial port selection can be changed in the LIS-Link settings.

10.5 LMS Name (Test Name) & Local Assay File Name

1. The Test Name set up in the LIS-Link name mapping must be the same test name used by the LIS-Host. In LIS-Link the Test Name is the LIMS name.



2. The *Local Assay File Name* must be typed in exactly as it is written. This is a typical error point with LIS-Link Setups.

3. The exact name is the Assay Name as show in the assay list in the worklist editor
4. DSX Assay File Names
   4.1 DSX QFT 4pt ver 6.00.asy (the client must include the spaces for this assay file name and must include the .asy at the end)
   4.2 DSX QFT 4pt ver 6.25.asy
   4.3 DSX QFT 8pt ver 6.00.asy
   4.4 DSX QFT 8pt ver 6.25.asy
5. DS2 Assay File Names
   5.1 DS2 QFT 4pt v6.00 (the client must include the spaces for this assay file name, however there is no file extension needed at the end)
   5.2 DS2 QFT 8pt v6.25
   5.3 DS2 QFT 4pt V6.00
   5.4 DS2 QFT 8pt V6.25

10.6 Unique Result Identification

1. We get many questions about uniquely identifying results. Use the guidance in this document to show clients how results are uniquely identified.

INFORMATION 	Clients should not rely on the *order* of the results, but must identify results by their unique identifiers. We have seen cases where the results come through in a different order.

10.7 LIS Providers

1. LIS-Link does use LIS LIS01-A2 / LIS2-A2 (ex ASTM E1394-97 E1381). These protocols are designed for transferring Information between Clinical Laboratory Instruments and Information Systems. As this LIS-LINK permit exchange with any clinical LIS/LIMS. The exchange is defined as a bidirectional query mode interface.
2. QFT has been successfully integrated with various LIS Providers. I will list the contacts I have worked with at the various providers below.

LIS Provider	Contact Name	Contact Information
CompuGroup Medical	Gerald Perry	gerald.perry@cgm.com 800-259-0911 (option 1) (ext. 1102)
SCC Soft	Jamal Abou-Assali	jamala@softcomputer.com 727-789-0100 Ex 4101
Cerner	none	no contact, but we can interface with cerner
Sunquest	none	no contact, but we can interface with sunquest
MIPS	none	GLIMS software

3. Below is an example of a full LIMS interaction for a QFN+ assay, including ASTM low level entries.
4.

Connected
LIMS received HEx :05

LIMS received ENQ (enquery)

ACK sent

LIMS received HEx
:0231487C5C5E267C7C7C6775696775697C7C7C7C7C7C7C317C32303136303331383131353731310D517C317C313530333
230313620337C7C7C7C7C7C7C7C7C7C4F0D517C327C31353033323031362033 2D617C7C7C7C7C7C7C7C7C7C4F0D517C33
7C31353033323031362033 2D627C7C7C7C7C7C7C7C7C7C4F0D517C347C31353033323031362033 2D637C7C7C7C7C7C7C7
C7C7C4F0D517C357C31353033323031362034 7C7C7C7C7C7C7C7C7C4F0D517C367C31353033323031362034 2D617C7C7
C7C7C7C7C7C7C7C4F0D517C377C31353033323031362034 2D627C7C7C7C7C7C7C7C7C7C4F0D517C387C31353033321741
430D0A

got message:
_1H|\^&|||guigui|||||||1|20160318115711
Q|1|15032016 3|||||||||O
Q|2|15032016 3-a|||||||||O
Q|3|15032016 3-b|||||||||O
Q|4|15032016 3-c|||||||||O
Q|5|15032016 4|||||||||O
Q|6|15032016 4-a|||||||||O
Q|7|15032016 4-b|||||||||O
Q|8|15032

receved Querry send ACK as answer

LIMS received HEx
:023230313620342D637C7C7C7C7C7C7C7C7C4F0D517C397C31353033230313620357C7C7C7C7C7C7C7C7C4F0D517
C31307C31353033323031362035 2D617C7C7C7C7C7C7C7C7C4F0D517C31317C31353033323031362035 2D627C7C7C7C7
C7C7C7C7C7C4F0D517C31327C31353033323031362035 2D637C7C7C7C7C7C7C7C7C4F0D517C31337C313530333230313
620367C7C7C7C7C7C7C7C7C4F0D517C31347C31353033323031362036 2D617C7C7C7C7C7C7C7C7C4F0D517C31357
C31353033323031362036 2D627C7C7C7C7C7C7C7C7C4F0D517C31367C31353033323031362036 2D637C7C7C7C7C7C173
1460D0A

got message:
_2016 4-c|||||||||O
Q|9|15032016 5|||||||||O
Q|10|15032016 5-a|||||||||O
Q|11|15032016 5-b|||||||||O
Q|12|15032016 5-c|||||||||O
Q|13|15032016 6|||||||||O
Q|14|15032016 6-a|||||||||O
Q|15|15032016 6-b|||||||||O
Q|16|15032016 6-c||||||

receved Querry send ACK as answer

LIMS received HEx :02337C7C7C7C4F0D4C7C317C4E0D0335320D0A

message Checksum true

got message:
3||||O
L|1|N
_52
receved Querry send ACK as answer

LIMS received HEx :04

got EOT (end of transmission)

LIMS send ENQ to send order
LIMS received HEx :06

Got ack I send message as answer:

send: _1H|\^&|||FAKELIMS|||||||1|20160315154522|
P|1||15032016 3||Jose Moran
O|1|15032016 3||^^^QFN|R||||||^M
P|2||15032016 4||Alfonse Brown
O|1|15032016 4||^^^QFN|R||||||^M
P|3||15032016 5||Tommy Jess
O|1|15032016 5||^^^QFN|R||||||^M
P|4||15032016 6||John Doe
O|1|15032016 6||^^^QFN|R||||||^M
L|1|F_F4

0231487C5C5E267C7C7C46414B454C494D537C7C7C7C7C7C7C7C317C32303136303331353135343532327C0D507C317C7C
313530333230313620337C7C4A6F7365204D6F72616E0D4F7C317C313530333230313620337C7C5E5E5E51464E7C527C7C7C
7C7C7C5E4D0D507C327C7C313530333230313620347C7C416C666F6E73652042726F776E0D4F7C317C313530333230313620
347C7C5E5E5E51464E7C527C7C7C7C7C7C5E4D0D507C337C7C313530333230313620357C7C546F6D6D79204A6573730D4F
7C317C313530333230313620357C7C5E5E5E51464E7C527C7C7C7C7C7C5E4D0D507C347C7C313530333230313620367C7C
4A6F686E20446F650D4F7C317C313530333230313620367C7C5E5E5E51464E7C527C7C7C7C7C7C5E4D0D4C7C317C460346
340D0A
LIMS received HEx :06

Got ack I send message as answer:

Got ack but no more message to send I send EOT

At this step order is sent on waiting Dynex system samples end processing.

LIMS received HEx :05

got ENQ

ACK sent

LIMS received HEx
:0231487C5C5E267C7C7C6775696775697C7C7C7C7C7C7C317C32303136303331383132303630350D507C317C7C3135303
33230313620330D4F7C317C313530333230313620337C7C5E5E5E51464E7C527C32303136303331383131353732320D527C31

7C5E5E5E51464E7C302E3032307C7C7C52577C7C467C7C7C7C32303136303331383132303630357C746573740D527C327C5
E5E5E51464E5E5442312D4E696C7C302E3031377C7C7C52577C7C467C7C7C7C32303136303331383132303630357C746573
740D527C337C5E5E5E51464E5E5442322D4E696C7C302E3031397C7C7C52577C7C467C7C7C7C32303136301734300D0A

got message:
_1H|\^&|||guigui|||||||1|20160318120605
P|1||15032016 3
O|1|15032016 3||^^^QFN|R|20160318115722
R|1|^^^QFN|0.020|||RW||F||||20160318120605|test
R|2|^^^QFN^TB1-Nil|0.017|||RW||F||||20160318120605|test
R|3|^^^QFN^TB2-Nil|0.019|||RW||F||||20160

send ACK as answer of non query message

LIMS received HEx
:023233313831323036303357C746573740D527C347C5E5E5E51464E5E4D69746F67656E2D4E696C7C302E3839347C7C7C525
77C7C467C7C7C7C32303136303331383132303630357C746573740D527C357C5E5E5E51464E7C302E3034307C7C7C44467C
7C467C7C7C7C32303136303331383132303630357C746573740D527C367C5E5E5E51464E5E5442312D4E696C7C302E303030
7C7C7C44467C7C467C7C7C7C32303136303331383132303630357C746573740D527C377C5E5E5E51464E5E5442322D4E696
C7C302E3030307C7C7C44467C7C467C7C7C7C32303136303331383132303630357C746573740D527C387C5E1736320D0A

got message:
_2318120605|test
R|4|^^^QFN^Mitogen-Nil|0.894|||RW||F||||20160318120605|test
R|5|^^^QFN|0.040|||DF||F||||20160318120605|test
R|6|^^^QFN^TB1-Nil|0.000|||DF||F||||20160318120605|test
R|7|^^^QFN^TB2-Nil|0.000|||DF||F||||20160318120605|test
R|8|^

send ACK as answer of non query message

LIMS received HEx
:02335E5E51464E5E4D69746F67656E2D4E696C7C322E3635307C7C7C44467C7C467C7C7C7C32303136303331383132303630
0357C746573740D527C397C5E5E5E51464E7C302E3034307C7C7C43467C7C467C7C7C7C32303136303331383132303630357
C746573740D527C31307C5E5E5E51464E5E5442312D4E696C7C302E3034307C7C7C43467C7C467C7C7C7C32303136303331
383132303630357C746573740D527C31317C5E5E5E51464E5E5442322D4E696C7C302E3034307C7C7C43467C7C467C7C7C7
C32303136303331383132303630357C746573740D527C31327C5E5E5E51464E5E4D69746F67656E2D4E696C1746390D0A

got message:
_3^^QFN^Mitogen-Nil|2.650|||DF||F||||20160318120605|test
R|9|^^^QFN|0.040|||CF||F||||20160318120605|test
R|10|^^^QFN^TB1-Nil|0.040|||CF||F||||20160318120605|test
R|11|^^^QFN^TB2-Nil|0.040|||CF||F||||20160318120605|test
R|12|^^^QFN^Mitogen-Nil

send ACK as answer of non query message

LIMS received HEx
:02347C322E3639307C7C7C43467C7C467C7C7C7C32303136303331383132303630357C746573740D527C31337C5E5E5E514
64E7C6E657C7C7C46527C7C467C7C7C7C32303136303331383132303630357C746573740D507C327C7C31353033323031362
0340D4F7C317C31353033323031362047C7C5E5E5E51464E7C527C32303136303331383131353732320D527C317C5E5E5E5
1464E7C302E3031397C7C7C52577C7C467C7C7C7C32303136303331383132303630357C746573740D527C327C5E5E5E51464
E5E5442312D4E696C7C302E3031377C7C7C52577C7C467C7C7C7C32303136303331383132303630357C741734300D0A

got message:

_4|2.690|||CF||F||||20160318120605|test
R|13|^^^QFN|ne|||FR||F||||20160318120605|test
P|2||15032016 4
O|1|15032016 4||^^^QFN|R|20160318115722
R|1|^^^QFN|0.019|||RW||F||||20160318120605|test
R|2|^^^QFN^TB1-Nil|0.017|||RW||F||||20160318120605|t

send ACK as answer of non query message

LIMS received HEx
:02356573740D527C337C5E5E5E51464E5E5442322D4E696C7C302E3031377C7C7C52577C7C467C7C7C7C32303136303331
383132303630357C746573740D527C347C5E5E5E51464E5E4D69746F67656E2D4E696C7C302E3031377C7C7C52577C7C467
C7C7C7C32303136303331383132303630357C746573740D527C357C5E5E5E51464E7C302E3034307C7C7C44467C7C467C7C
7C7C32303136303331383132303630357C746573740D527C367C5E5E5E51464E5E5442312D4E696C7C302E3030307C7C7C44
467C7C467C7C7C7C32303136303331383132303630357C746573740D527C377C5E5E5E51464E5E5442322D4E1730320D0A

got message:
_5est
R|3|^^^QFN^TB2-Nil|0.017|||RW||F||||20160318120605|test
R|4|^^^QFN^Mitogen-Nil|0.017|||RW||F||||20160318120605|test
R|5|^^^QFN|0.040|||DF||F||||20160318120605|test
R|6|^^^QFN^TB1-Nil|0.000|||DF||F||||20160318120605|test
R|7|^^^QFN^TB2-N

send ACK as answer of non query message

LIMS received HEx
:0236696C7C302E3030307C7C7C44467C7C467C7C7C7C32303136303331383132303630357C746573740D527C387C5E5E5E5
1464E5E4D69746F67656E2D4E696C7C302E3030307C7C7C44467C7C467C7C7C7C32303136303331383132303630357C7465
73740D527C397C5E5E5E51464E7C302E3034307C7C7C43467C7C467C7C7C7C32303136303331383132303630357C74657374
0D527C31307C5E5E5E51464E5E5442312D4E696C7C302E3034307C7C7C43467C7C467C7C7C7C32303136303331383132303
630357C746573740D527C31317C5E5E5E51464E5E5442322D4E696C7C302E3034307C7C7C43467C7C467C7C1731350D0A

got message:
_6il|0.000|||DF||F||||20160318120605|test
R|8|^^^QFN^Mitogen-Nil|0.000|||DF||F||||20160318120605|test
R|9|^^^QFN|0.040|||CF||F||||20160318120605|test
R|10|^^^QFN^TB1-Nil|0.040|||CF||F||||20160318120605|test
R|11|^^^QFN^TB2-Nil|0.040|||CF||F||

send ACK as answer of non query message

LIMS received HEx
:02377C7C32303136303331383132303630357C746573740D527C31327C5E5E5E51464E5E4D69746F67656E2D4E696C7C302E
3034307C7C7C43467C7C467C7C7C7C32303136303331383132303630357C746573740D527C31337C5E5E5E51464E7C494E7
C7C7C46527C7C467C7C7C7C32303136303331383132303630357C746573740D507C337C7C3135303332303136203 50D4F7C3
17C3135303332303136203 57C7C5E5E5E51464E7C527C32303136303331383131353732320D527C317C5E5E5E51464E7C302
E3031387C7C7C52577C7C467C7C7C7C32303136303331383132303630357C746573740D527C327C5E5E5E1736330D0A

got message:
_7||20160318120605|test
R|12|^^^QFN^Mitogen-Nil|0.040|||CF||F||||20160318120605|test
R|13|^^^QFN|IN|||FR||F||||20160318120605|test
P|3||15032016 5
O|1|15032016 5||^^^QFN|R|20160318115722

R|1|^^^QFN|0.018|||RW||F||||20160318120605|test
R|2|^^^

send ACK as answer of non query message

LIMS received HEx
:023051464E5E5442312D4E696C7C312E3031377C7C7C52577C7C467C7C7C7C32303136303331383132303630357C746573740D527C337C5E5E5E51464E5E5442322D4E696C7C302E3837347C7C7C52577C7C467C7C7C7C32303136303331383132303630357C746573740D527C347C5E5E5E51464E5E4D69746F67656E2D4E696C7C302E3037367C7C7C52577C7C467C7C7C7C32303136303331383132303630357C746573740D527C357C5E5E5E51464E7C302E3034307C7C7C44467C7C467C7C7C7C32303136303331383132303630357C746573740D527C367C5E5E5E51464E5E5442312D4E696C7C332E3036307C7C7C1746430D0A

got message:
_0QFN^TB1-Nil|1.017|||RW||F||||20160318120605|test
R|3|^^^QFN^TB2-Nil|0.874|||RW||F||||20160318120605|test
R|4|^^^QFN^Mitogen-Nil|0.076|||RW||F||||20160318120605|test
R|5|^^^QFN|0.040|||DF||F||||20160318120605|test
R|6|^^^QFN^TB1-Nil|3.060|||

send ACK as answer of non query message

LIMS received HEx
:023144467C7C467C7C7C7C32303136303331383132303630357C746573740D527C377C5E5E5E51464E5E5442322D4E696C7C322E3538307C7C7C44467C7C467C7C7C7C32303136303331383132303630357C746573740D527C387C5E5E5E51464E5E4D69746F67656E2D4E696C7C302E3134307C7C7C44467C7C467C7C7C7C32303136303331383132303630357C746573740D527C397C5E5E5E51464E7C302E3034307C7C7C43467C7C467C7C7C7C32303136303331383132303630357C746573740D527C31307C5E5E5E51464E5E5442312D4E696C7C332E3130307C7C7C43467C7C467C7C7C7C32303136303331383132303630357C746573740D527C31307C5E5E5E51464E5E5442312D4E696C7C332E3130307C7C7C43467C7C467C7C7C7C32303136303331383132303630357C746573740D527C3130

got message:
_1DF||F||||20160318120605|test
R|7|^^^QFN^TB2-Nil|2.580|||DF||F||||20160318120605|test
R|8|^^^QFN^Mitogen-Nil|0.140|||DF||F||||20160318120605|test
R|9|^^^QFN|0.040|||CF||F||||20160318120605|test
R|10|^^^QFN^TB1-Nil|3.100|||CF||F||||2016031812

send ACK as answer of non query message

LIMS received HEx
:0232303630357C746573740D527C31317C5E5E5E51464E5E5442322D4E696C7C322E3632307C7C7C43467C7C467C7C7C7C32303136303331383132303630357C746573740D527C31327C5E5E5E51464E5E4D69746F67656E2D4E696C7C302E3138307C7C7C43467C7C467C7C7C7C32303136303331383132303630357C746573740D527C31337C5E5E5E51464E7C504F7C7C7C46527C7C467C7C7C7C32303136303331383132303630357C746573740D507C347C7C3135303332303136203 60D4F7C317C3135303332303136203 67C7C5E5E5E51464E7C527C32303136303331383131353732320D527C317C5E5E5E51464E1745410D0A

got message:
_20605|test
R|11|^^^QFN^TB2-Nil|2.620|||CF||F||||20160318120605|test
R|12|^^^QFN^Mitogen-Nil|0.180|||CF||F||||20160318120605|test
R|13|^^^QFN|PO|||FR||F||||20160318120605|test
P|4||15032016 6
O|1|15032016 6||^^^QFN|R|20160318115722
R|1|^^^QFN

send ACK as answer of non query message

LIMS received HEx
:02337C302E3031397C7C7C52577C7C467C7C7C7C32303136303331383132303630357C746573740D527C327C5E5E5E51464
E5E5442312D4E696C7C302E3031387C7C7C52577C7C467C7C7C7C32303136303331383132303630357C746573740D527C33
7C5E5E5E51464E5E5442322D4E696C7C302E3432307C7C7C52577C7C467C7C7C7C32303136303331383132303630357C746
573740D527C347C5E5E5E51464E5E4D69746F67656E2D4E696C7C302E3838347C7C7C52577C7C467C7C7C7C32303136303
331383132303630357C746573740D527C357C5E5E5E51464E7C302E3034307C7C7C44467C7C467C7C7C7C32301744350D0A

got message:
_3|0.019|||RW||F||||20160318120605|test
R|2|^^^QFN^TB1-Nil|0.018|||RW||F||||20160318120605|test
R|3|^^^QFN^TB2-Nil|0.420|||RW||F||||20160318120605|test
R|4|^^^QFN^Mitogen-Nil|0.884|||RW||F||||20160318120605|test
R|5|^^^QFN|0.040|||DF||F||||20

send ACK as answer of non query message

LIMS received HEx
:023431363033313831323036303357C746573740D527C367C5E5E5E51464E5E5442312D4E696C7C302E3030307C7C7C44467C
7C467C7C7C7C32303136303331383132303630357C746573740D527C377C5E5E5E51464E5E5442322D4E696C7C312E313430
7C7C7C44467C7C467C7C7C7C32303136303331383132303630357C746573740D527C387C5E5E5E51464E5E4D69746F67656
E2D4E696C7C322E3632307C7C7C44467C7C467C7C7C7C32303136303331383132303630357C746573740D527C397C5E5E5E
51464E7C302E3034307C7C7C43467C7C467C7C7C7C32303136303331383132303630357C746573740D527C1743430D0A

got message:
_4160318120605|test
R|6|^^^QFN^TB1-Nil|0.000|||DF||F||||20160318120605|test
R|7|^^^QFN^TB2-Nil|1.140|||DF||F||||20160318120605|test
R|8|^^^QFN^Mitogen-Nil|2.620|||DF||F||||20160318120605|test
R|9|^^^QFN|0.040|||CF||F||||20160318120605|test
R|

send ACK as answer of non query message

LIMS received HEx
:023531307C5E5E5E51464E5E5442312D4E696C7C302E3034307C7C7C43467C7C467C7C7C7C32303136303331383132303630363
0357C746573740D527C31317C5E5E5E51464E5E5442322D4E696C7C312E3138307C7C7C43467C7C467C7C7C7C3230313630
333138313230363035 7C746573740D527C31327C5E5E5E51464E5E4D69746F67656E2D4E696C7C322E3636307C7C7C43467
C7C467C7C7C7C32303136303331383132303630357C746573740D527C31337C5E5E5E51464E7C504F7C7C7C46527C7C467C
7C7C7C32303136303331383132303630357C746573740D4C7C317C4E0D0342340D0A

message Checksum true

got message:
510|^^^QFN^TB1-Nil|0.040|||CF||F||||20160318120605|test
R|11|^^^QFN^TB2-Nil|1.180|||CF||F||||20160318120605|test
R|12|^^^QFN^Mitogen-Nil|2.660|||CF||F||||20160318120605|test
R|13|^^^QFN|PO|||FR||F||||20160318120605|test
L|1|N
_B4
send ACK as answer of non query message

LIMS received HEx :04

got EOT

get non query EOT

Full messages correspond to results with all results options activated . :

H|\^&|||guigui|||||||1|20160318120605
P|1||15032016 3
O|1|15032016 3||^^^QFN|R|20160318115722
R|1|^^^QFN|0.020|||RW||F||||20160318120605|test
R|2|^^^QFN^TB1-Nil|0.017|||RW||F||||20160318120605|test
R|3|^^^QFN^TB2-Nil|0.019|||RW||F||||20160318120605|test
R|4|^^^QFN^Mitogen-Nil|0.894|||RW||F||||20160318120605|test
R|5|^^^QFN|0.040|||DF||F||||20160318120605|test
R|6|^^^QFN^TB1-Nil|0.000|||DF||F||||20160318120605|test
R|7|^^^QFN^TB2-Nil|0.000|||DF||F||||20160318120605|test
R|8|^^^QFN^Mitogen-Nil|2.650|||DF||F||||20160318120605|test
R|9|^^^QFN|0.040|||CF||F||||20160318120605|test
R|10|^^^QFN^TB1-Nil|0.040|||CF||F||||20160318120605|test
R|11|^^^QFN^TB2-Nil|0.040|||CF||F||||20160318120605|test
R|12|^^^QFN^Mitogen-Nil|2.690|||CF||F||||20160318120605|test
R|13|^^^QFN|ne|||FR||F||||20160318120605|test
P|2||15032016 4
O|1|15032016 4||^^^QFN|R|20160318115722
R|1|^^^QFN|0.019|||RW||F||||20160318120605|test
R|2|^^^QFN^TB1-Nil|0.017|||RW||F||||20160318120605|test
R|3|^^^QFN^TB2-Nil|0.017|||RW||F||||20160318120605|test
R|4|^^^QFN^Mitogen-Nil|0.017|||RW||F||||20160318120605|test
R|5|^^^QFN|0.040|||DF||F||||20160318120605|test
R|6|^^^QFN^TB1-Nil|0.000|||DF||F||||20160318120605|test
R|7|^^^QFN^TB2-Nil|0.000|||DF||F||||20160318120605|test
R|8|^^^QFN^Mitogen-Nil|0.000|||DF||F||||20160318120605|test
R|9|^^^QFN|0.040|||CF||F||||20160318120605|test
R|10|^^^QFN^TB1-Nil|0.040|||CF||F||||20160318120605|test
R|11|^^^QFN^TB2-Nil|0.040|||CF||F||||20160318120605|test
R|12|^^^QFN^Mitogen-Nil|0.040|||CF||F||||20160318120605|test
R|13|^^^QFN|IN|||FR||F||||20160318120605|test
P|3||15032016 5
O|1|15032016 5||^^^QFN|R|20160318115722
R|1|^^^QFN|0.018|||RW||F||||20160318120605|test
R|2|^^^QFN^TB1-Nil|1.017|||RW||F||||20160318120605|test
R|3|^^^QFN^TB2-Nil|0.874|||RW||F||||20160318120605|test
R|4|^^^QFN^Mitogen-Nil|0.076|||RW||F||||20160318120605|test
R|5|^^^QFN|0.040|||DF||F||||20160318120605|test
R|6|^^^QFN^TB1-Nil|3.060|||DF||F||||20160318120605|test
R|7|^^^QFN^TB2-Nil|2.580|||DF||F||||20160318120605|test
R|8|^^^QFN^Mitogen-Nil|0.140|||DF||F||||20160318120605|test
R|9|^^^QFN|0.040|||CF||F||||20160318120605|test
R|10|^^^QFN^TB1-Nil|3.100|||CF||F||||20160318120605|test
R|11|^^^QFN^TB2-Nil|2.620|||CF||F||||20160318120605|test
R|12|^^^QFN^Mitogen-Nil|0.180|||CF||F||||20160318120605|test
R|13|^^^QFN|PO|||FR||F||||20160318120605|test
P|4||15032016 6
O|1|15032016 6||^^^QFN|R|20160318115722
R|1|^^^QFN|0.019|||RW||F||||20160318120605|test
R|2|^^^QFN^TB1-Nil|0.018|||RW||F||||20160318120605|test

R|3|^^^QFN^TB2-Nil|0.420|||RW||F||||20160318120605|test
R|4|^^^QFN^Mitogen-Nil|0.884|||RW||F||||20160318120605|test
R|5|^^^QFN|0.040|||DF||F||||20160318120605|test
R|6|^^^QFN^TB1-Nil|0.000|||DF||F||||20160318120605|test
R|7|^^^QFN^TB2-Nil|1.140|||DF||F||||20160318120605|test
R|8|^^^QFN^Mitogen-Nil|2.620|||DF||F||||20160318120605|test
R|9|^^^QFN|0.040|||CF||F||||20160318120605|test
R|10|^^^QFN^TB1-Nil|0.040|||CF||F||||20160318120605|test
R|11|^^^QFN^TB2-Nil|1.180|||CF||F||||20160318120605|test
R|12|^^^QFN^Mitogen-Nil|2.660|||CF||F||||20160318120605|test
R|13|^^^QFN|PO|||FR||F||||20160318120605|test
L|1|N