

The logo for Titian, featuring the word "titian" in a lowercase, sans-serif font, enclosed within a white, stylized shape that resembles a teardrop or a drop with a tail.

{ APPLICATION NOTE }

Integrating an Automated Store to your Mosaic System using Titian's Automated Stores (AMS) Module

Tim Stroud, Titian Software Ltd

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Mosaic Sample Management is Titian Software's comprehensive, customisable, modular software product to control and monitor all aspects of sample storage, preparation and delivery. From small biotech to global pharma, Mosaic helps to provide a seamless, error-free sample supply chain and audit trail.

Mosaic Sample Management is a tailored solution for all sample management requirements, configured through expert consulting services.

Mosaic SampleBank and Mosaic FreezerManagement are Mosaic packages, optimised and pre-configured for rapid deployment:

- FreezerManagement keeps track of samples in freezers and provides a comprehensive audit trail as samples are accessed and aliquoted.
- SampleBank provides full inventory tracking capabilities coupled with sample ordering and workflow management in a simple package. It offers seamless start-up and ongoing performance for busy sample managers.

Mosaic's modular approach means that it is simple to upgrade or extend the software's functionality whenever it is needed.

Introduction

Manual methods of storing and retrieving samples are slow and inefficient in comparison to automated ones, so it is a natural step to consider adding automated storage systems to the sample management workflow as a company grows. The ability to easily and efficiently integrate the chosen store into your workflow management has been shown to provide multiple benefits and efficiencies.

Titian's Automated Stores (AMS) module is a feature integrated into Mosaic's web application, and forms part of Titian's overall Mosaic sample management product suite. It provides a seamless automated link between Mosaic and an automated store to enable efficient placing/picking of labware items. As inventory known to Mosaic is placed into the store the database is updated automatically to record that the items now reside within the store. To pick items from the store users will initiate picking from Mosaic's web interface to instruct the store to retrieve labware items required for a particular order. The store can also be operated in an ad hoc mode to retrieve labware items as needed to meet self-service requests.

Compatible Automated Stores

The Mosaic AMS module integrates with and drives a wide variety of automated stores from market leading manufacturers such as:

- Hamilton Storage
- TTP Labtech
- Brooks
- TAP
- Nexus
- Matrical



Benefits of Using an Automated Store

Using an automated store in conjunction with Mosaic helps to make storing and retrieving your samples a much more efficient process. The store takes on the task of deciding where items should reside making best use of its storage capacity. Operators simply feed containers into the store and, at the press of a button, they are put away. Retrieving items is also achieved in just a few clicks from the Mosaic web pages. Because freezer doors do not have to be opened for prolonged periods of time, temperature fluctuations are greatly reduced. This has the added benefit of reducing energy consumption as well as prolonging the life of your freezers, as they do not have to repeatedly be brought back down to the correct temperature. Mosaic constantly monitors the store for activity, which means items cannot be removed without Mosaic knowing about it. This robust method of tracking gives you the confidence of always knowing where your samples are.

Supported Operations

Placing Labware Items

Operators place items into the store using the store's own software interface. Mosaic will read the store's log files and update its database to record that these items reside within the store.

Picking Labware Items

Operators are able to specify picking events in response to specific order requirements. Alternatively, operators can request items on an ad hoc basis to meet self-service requirements. Operators can also define the layout by which tubes will be placed into delivery racks.

The following use cases outline these operations:

Use Case 1: Placing Labware Items into a Store

Placing items into an automated store could not be simpler. An operator places the items that require storage onto the store's I/O interface and presses a button to instruct the store to put them away. Mosaic constantly monitors the store's log files for activity and as items are placed into the store, Mosaic updates its database to reflect that. The example below outlines placing a tube into a TTP Labtech arctic® store.

Tube AB0019

Details

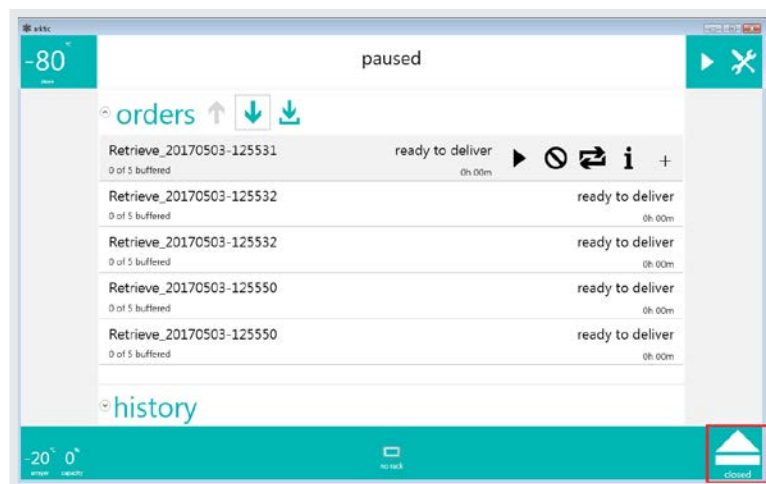
Barcode:	AB0019
Labware Type:	2D Mini Tube (1.4 mL)
Creation Date:	31/03/2017 15:51:04
Expiry Date:	
Last Picked Date:	05/12/2017 13:23:03
Thaw Count:	0
Comment:	
Requires Secure Storage:	No
Despatched:	No

Location

Location Type:	Mini Tube Rack
Location Path:	\\Home\Newcastle\Lab_01
Name/Barcode:	RCK4143
Position:	A01

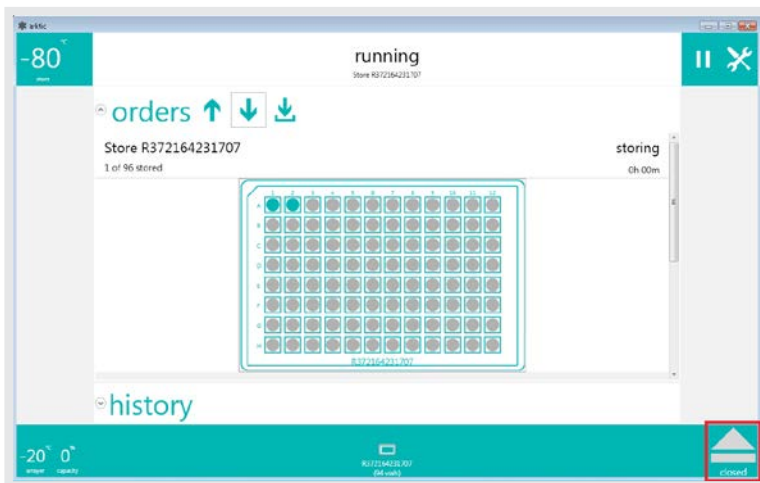
View Audit Trail
Create Tubes
Add to Pick List
Pick
Add to Place List
Dispose
Edit

- 1) To begin, we have a tube that is in a rack outside of the store which we would like to place into the store

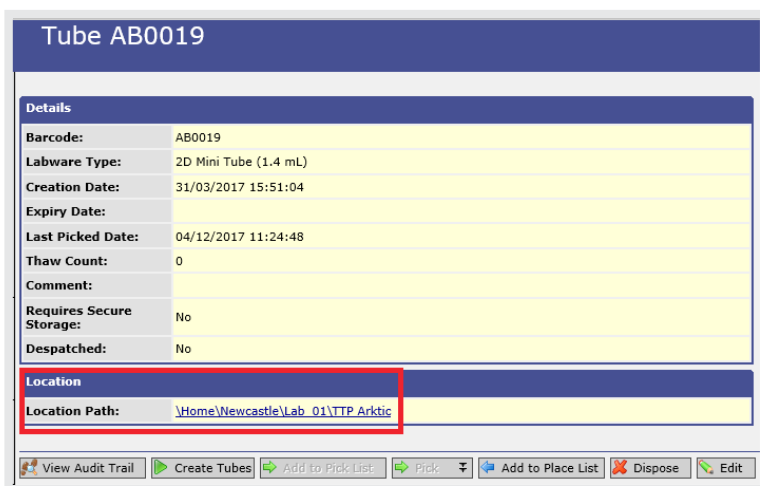


The screenshot shows the Mosaic interface with a 'paused' status. A list of orders is displayed, each with a 'ready to deliver' status and a '0h:00m' timer. The interface includes a 'history' section at the bottom and a 'closed' button in the bottom right corner.

- 2) The operator opens the store's I/O drawer by clicking on the open/close arrow



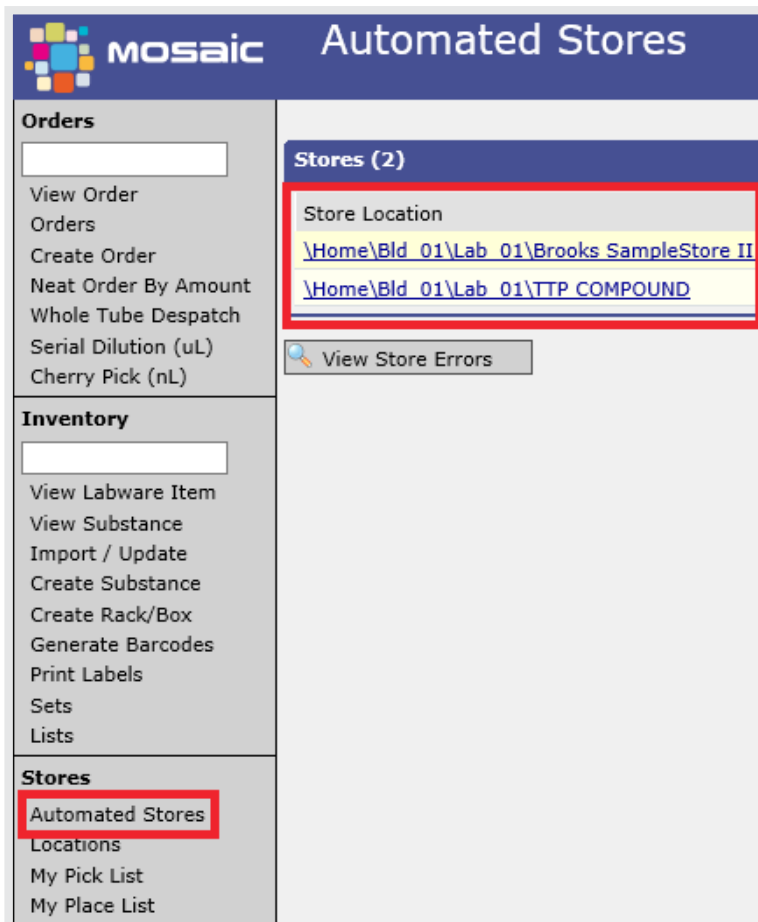
3) The tube rack is then placed onto the I/O drawer and the operator clicks on the open/close arrow to place the tube into the store



4) Mosaic reads the store's log files and updates its database to reflect that the tube is now within the store

Use Case 2: Picking Labware Items for an Order

From the Mosaic web application, you can instruct an automated store to pick items for a specific order in a few simple clicks as outlined below.



Mosaic Automated Stores

Orders

View Order
Orders
Create Order
Neat Order By Amount
Whole Tube Despatch
Serial Dilution (uL)
Cherry Pick (nL)

Inventory

View Labware Item
View Substance
Import / Update
Create Substance
Create Rack/Box
Generate Barcodes
Print Labels
Sets
Lists

Stores

Automated Stores
Locations
My Pick List
My Place List

Stores (2)

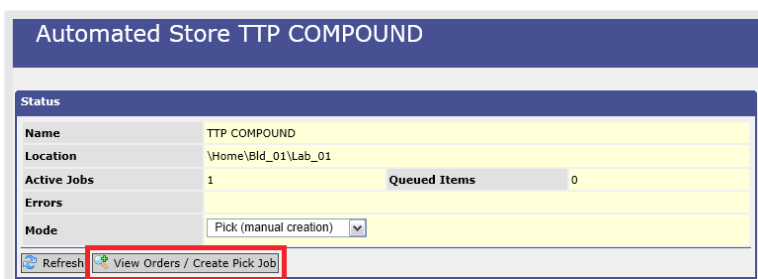
Store Location

[\\Home\Bld_01\Lab_01\Brooks SampleStore II](#)

[\\Home\Bld_01\Lab_01\TTP COMPOUND](#)

View Store Errors

- 1) Click on the "Automated Stores" menu link and then select the store where your labware item(s) reside



Automated Store TTP COMPOUND

Status

Name	TTP COMPOUND		
Location	\\Home\Bld_01\Lab_01		
Active Jobs	1	Queued Items	0
Errors			
Mode	Pick (manual creation) ▼		

Refresh View Orders / Create Pick Job

- 2) On the next screen, click on the "View Orders/ Create Pick" Job button

Orders for TTP COMPOUND

Order	Order Type	Next Operations	Priority	Pick in sequence	Comment	Required By	Labware Items	Item Type
58	From Solution Tubes (by 5 Cherry Pick)	Normal				06/06/2017	4	1.4 ml tube
52	From Solution Tubes (by 5 Cherry Pick)	Normal				06/06/2017	4	1.4 ml tube
53	From Solution Tubes (by 5 Cherry Pick)	Normal				17/05/2017	4	1.4 ml tube
12	From Solution Tubes (by 8 Manual)	Normal				07/04/2017	4	1.4 ml tube

Number of Items: 2 / 2
 Layout: All 90 (Col)
 Priority: Normal
 Required by: 05/12/2017
 Comment:
 Create Pick Job Refresh
 Create Pick Job Cancel

3) Then select the order you want to process, define the layout for the tubes in the rack and click on the "Create Pick Job" button

Pick Job 1
TTP COMPOUND

Details

Store	\Home\Bld_01\Lab_01\TTP COMPOUND		
Job Type	Pick	Total Job Items	2
Orders	4		
Priority	Normal	Required By	04/12/2017
Comment			
Failure Text			
Status	In progress	Pending Items	2
Complete Items	0	Failed Items	0

Job Items (2)

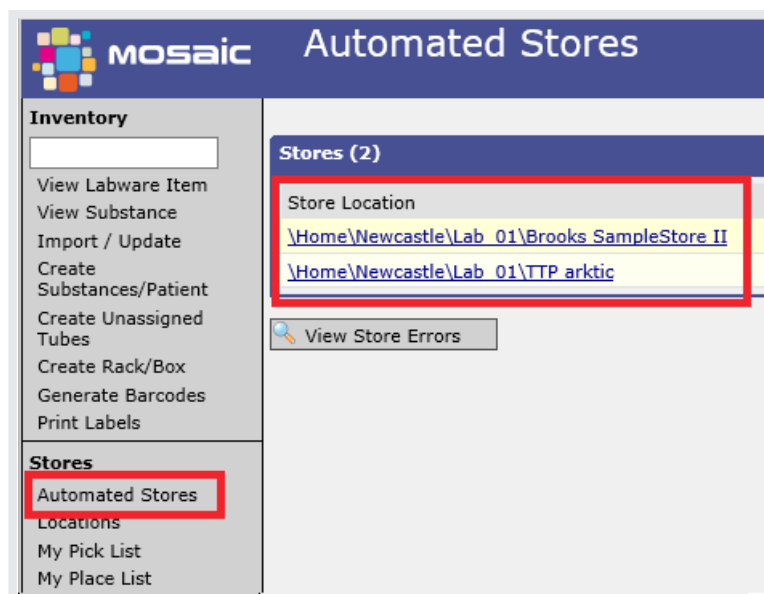
Barcode	Order	Status	Failure Text
TJS3103173	4	Pending	
TJS3103174	4	Pending	

View Store

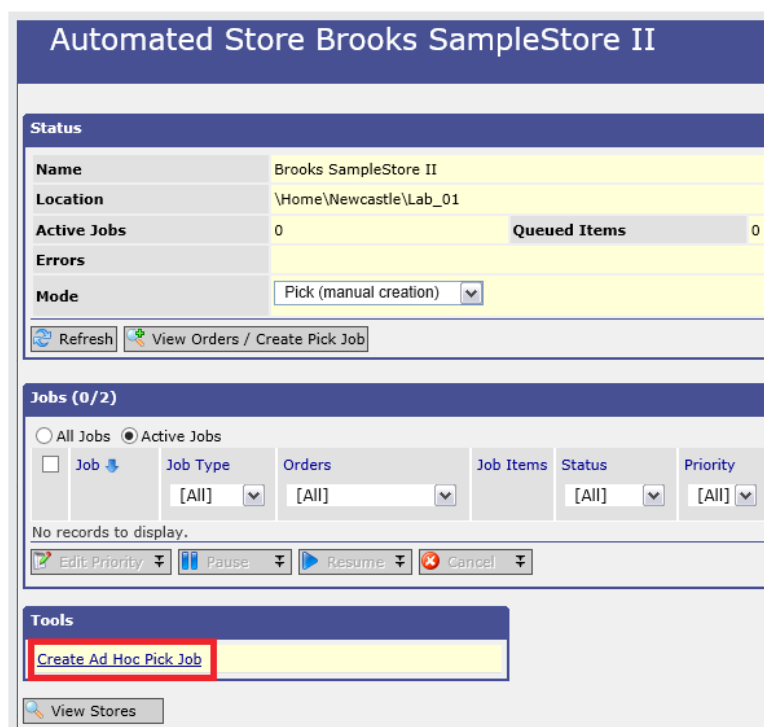
4) Mosaic then creates a pick job and instructs the store to retrieve the tubes for the selected order

Use Case 3: Ad Hoc / Self-Service Picking

Items can also be picked from an automated store on an ad hoc basis to meet self-service requirements. The user builds a list of items that require picking and submits the list to the store for processing.



- 1) Click on the “Automated Stores” menu link and then select the store where your labware item(s) reside



- 2) On the next screen, click on the “Create Ad Hoc Pick Job” link

Create Ad Hoc Pick Job

\Home\Newcastle\Lab_01\Brooks SampleStore II

Job Details

Labware Class * Tube

Layout * All 96 (Col)

Priority * 0

Required By * 05/12/2017

Comment

Specify Items

Specify items by:
 Barcode Canned Query

Barcodes:
 AB0041
 AB0043
 AB0046
 (3 items entered.)

+ Create Pick Job View Store

- 3) Then build up a list of the labware items you require to be picked from the store, define the layout for the tubes in the rack and click the "Create Pick Job" button

Pick Job 3

Brooks SampleStore II

Details

Store	\Home\Newcastle\Lab_01\Brooks SampleStore II		
Job Type	Pick	Total Job Items	3
Orders			
Priority	0	Required By	05/12/2017
Comment			
Failure Text			
Status	New	Pending Items	3
Complete Items	0	Failed Items	0

Edit Priority Pause Resume Cancel

Job Items (3)

Barcode	Order	Status	Failure Text
	[All]	[All]	
AB0041		Pending	
AB0043		Pending	
AB0046		Pending	

View Store

- 4) Mosaic then creates a pick job and instructs the store to retrieve the tubes

Summary



Titian's AMS module seamlessly integrates your Mosaic system with an automated store. Mosaic will monitor the store's activity and automatically update its database as inventory known to Mosaic is placed into the store. Operators can initiate picking jobs using Mosaic in response to an order or on an ad hoc basis to meet self-service requirements.

This seamless integration between Mosaic and an automated store makes the best use of your storage capacity, optimises processing, reduces energy consumption and provides a full audit trail.

About Titian Software

Titian is the industry leader in providing sample management software for the Life Sciences. Using our Mosaic software, our customers see significant benefits in terms of throughput, response times, error rate reduction, sample conservation and cost savings due to markedly reducing the labour associated with managing sample collections. We also use our experience of integrating laboratory instrumentation and robotics into our systems to ensure that our clients make best use of their investment in research and development technologies.

At Titian, our development efforts never stop as we continue to advance Mosaic toward higher levels of efficiency and practicality for the user. The ongoing collaborative relationship between Titian and hardware vendors continues to ensure that new applications are made available on a timely basis to fulfill our customer's research goals. We pride ourselves on taking into account customer feedback for all of our Mosaic modules to drive our product to be the best it can be. It's all part of Titian's commitment to providing innovative solutions that make life easier for sample management professionals.

About the author

Tim Stroud

After 15 years as a scientist at Pfizer, Tim Stroud moved to MedImmune for 3 years to specialise in managing laboratory automation. He joined Titian Software in 2014 as a business application consultant.

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Titian Software Ltd

2 Newhams Row,
London SE1 3UZ
UK

Tel: +44 20 7367 6869
Fax: +44 20 7367 6868

1500 West Park Drive,
Westborough MA 01581
USA

Tel: +1 508 366 2234
Fax: +1 508 366 2744

info@titian.co.uk
www.titian.co.uk