Thermo Scientific™ VisionMate™ HSX
2D Barcode Reader User Manual

Version 01
User Manual • May 2022

Thermo Fisher
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1 - VisionMate HSX overview

Your Thermo Scientific™ VisionMate™ Barcode Reader rapidly decodes 2D barcoded storage tubes with full rack reading capabilities. The compact, user-friendly readers provide exceptional flexibility with data export formats, tube type readability and tube layout options.

Speed and Versatility.

Controlled via the on-screen VisionMate Suite software interface provided, or remotely via TCP/IP connection, the VisionMate HSX scans one 2D barcoded storage rack in as little as 1 second or less.

Data File Flexibility

Easily integrated into LIMS, existing databases or tracking systems, by choosing the data format for export. User-defined code types and code lengths indicate incorrect codes and password-protected accounts ensure security and limited access by user profile. Optimized software ensures that the least amount of memory is being used while the program is idle.

Knowledgeable Support

Our team has a strong reputation for supporting both equipment and consumables and can demonstrate how the VisionMate HSX barcode reader streamlines sample management in your laboratory.

2 - Package contents VisionMate HSX

Your Thermo Scientific VisionMate Scanner package should contain the following items:

1. One VisionMate HSX
2. USB 2 AB-1860 1D reader
3. USB flash drive containing software and User Manual

1. VisionMate HSX

2. USB 2 AB-1860v4
1D magnetic reader attachment

3. USB FLASH DRIVE

Note: Please contact your Thermo Fisher Scientific representative if any package contents are missing.

3 - Installation requirements VisionMate HSX

The recommended operating system to use the Thermo Scientific VisionMate 2D Reader is Microsoft Windows 10.

The minimum requirements for a personal computer running the VisionMate software at a satisfactory level are listed below:

Computer/ Processor	2 GHz 32-bit x86 or 64-bit x64 or higher processor
Memory	RAM requirements depend on the operating system used Windows 10: 4GB RAM
Hard drive space	300 MB of available hard disk space
Operating System	Microsoft Windows 10
Drive	USB Flash drive
Display	Super VGA 800x600 or higher resolution monitor with 256 colors
Peripherals	Mouse or compatible pointing device
USB	1x VisionMate HSX USB 2 port recommended
Power	One main power socket

NOTE: If performance is noticeably slow, increasing RAM to 8GB or above and/or increasing processor speed will normally help.

NOTE: The scanner should NOT be connected via an external USB hub or USB extension cable.

4 - Installing the VisionMate HSX software onto the PC

Locate the setup file on the USB flash drive or from the Thermo Fisher Scientific download link and double click to run.

NOTE: DO NOT plug in the VisionMate hardware at this point; run through the software installer first to allow all the drivers to be installed.

Thermo Scientific VisionMate HSX Setup

When the setup starts click "Next" for the setup to check what prerequisites the operating system requires to be installed.

Once complete a list will be generated which will automatically select the required prerequisite. Click "Next" and allow the installer to complete.
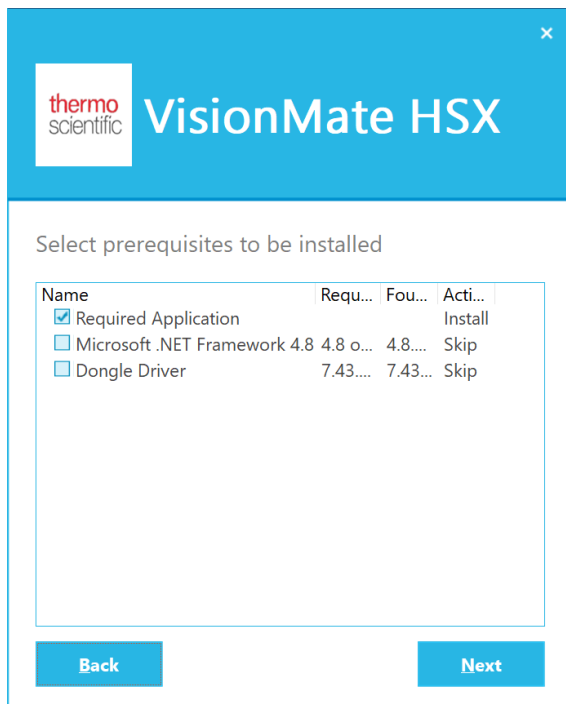
You may be prompted to agree and run a few of the installation packages during the installation. Please watch for required installs and follow the associated setup instructions

Once complete, choose the install location then click "I agree", then INSTALL. Allow the installer to complete before closing or running any other application.

Once complete you will see this screen. The icons and shortcut menus will have been created. Click "Finish".
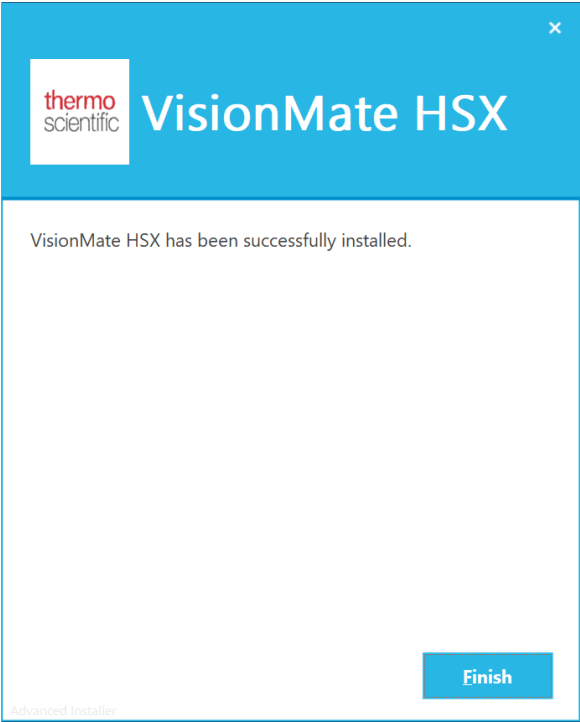
At this point, plug the VisionMate hardware into a free USB port and allow the hardware wizard to complete.
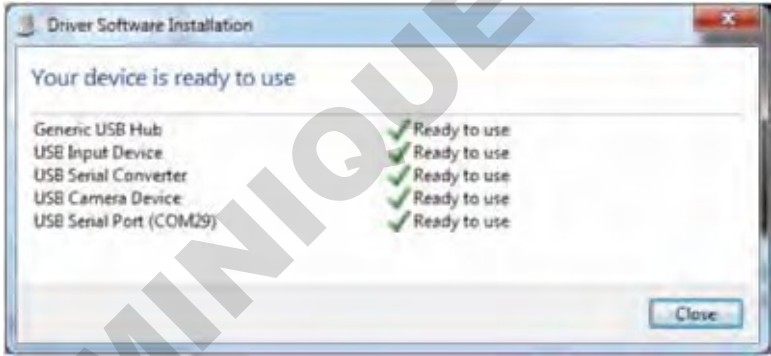
Once the system has installed the hardware you are ready to start the software. Click on the desktop icon or menu shortcut.
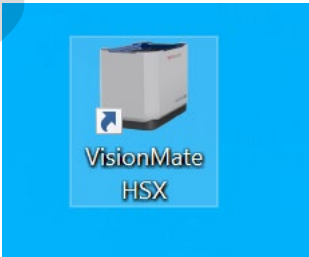
5 - VisionMate Suite software

Your Thermo Scientific™ VisionMate™ Barcode Reader uses an intuitive software package named the VisionMate Suite.

The VisionMate Suite controls multiple hardware products in a single software package. Now that you have setup the VisionMate hardware please make sure your VisionMate scanner is plugged in with all relevant accessories.

Double click on the VisionMate Icon which would have been created on your desktop.
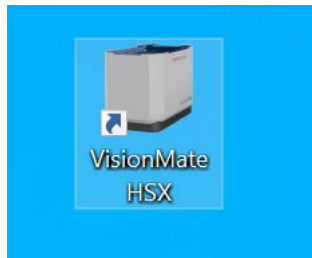
6 - Hardware Setup

The VisionMate HSX base reader does not require any assembly after unboxing. The base reader should be positioned on a stable, level surface in your laboratory. Do not position the base reader or other equipment in your laboratory in such a way that will make it difficult to disconnect the reader from your computer. Allow space at the back of the base reader where the USB cable exits the housing to prevent any damage to the protective covering on the cable. Additional space will be needed when using the 1D linear barcode reader in conjunction with the base reader. Excess cabling for the base reader and 1D reader should be tied up to prevent cable damage and eliminate hazards that may arise from tangling or unintended contact.

The 1D linear barcode reader accessory is fully magnetic and can be manually positioned on the body of the base reader. Position the 1D reader as needed to align with the barcode on storage tube rack in use.

Connect the USB cable on the base reader to an available USB port (2.0 or higher) on your computer. Repeat this step for the 1D linear barcode reader USB cable if needed. In order to prevent issues with reader performance, both cables should be connected directly to your computer. Avoid connections to an external USB Hub.

After the base reader and 1D linear barcode reader have been connected to your computer, launch the VisionMate Suite software to begin use.

Running the VisionMate HSX for the first time

When opening the software the first time, it will immediately prompt that no users are found. Specify your preferred User name and Password and click "Create".
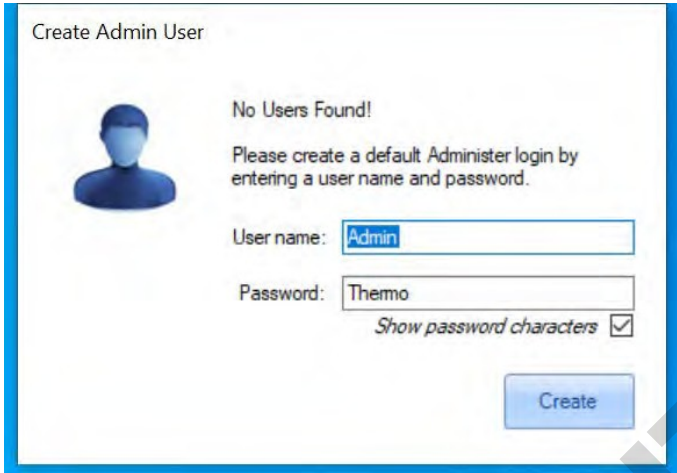
Choose how you prefer to log into the VisionMate Suite each time it loads. Do so by selecting one of the three choices and click "Ok".
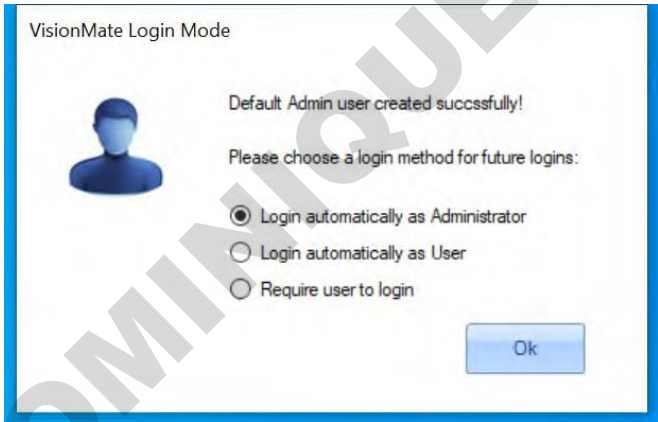
NOTE: The default user name is Admin and the password is Thermo (capitalized first letters).

7 - Scanning your first rack

Now that you have setup a User and log in method you are ready to start scanning barcoded racks.

For a basic test with a full rack.

Place a fully populated rack onto the scanner, the scanner will detect it has been placed and read the tubes in the rack.

Now that you have scanned your first rack, please read on to learn more about the VisionMate Suite`s features and how to export data.

8 - Overview of the main screen

View of the main VisionMate HSX software

Rack Formats
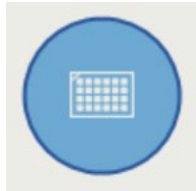
This contains rack default types discussed in section 11, as well as RAD (Rack Auto Detect) profiles set up by the user. It also contains ST (single tube) mode, as well as the Auto mode for scanning full racks.
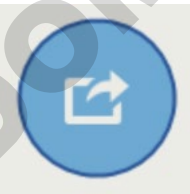
Export Options

Export Options are TCP/Server, CSV, Html, Image, ODBC, VMCV, Xls, and XML.

Rack ID and Magnetic 1D Reader Attachment Options
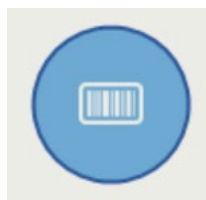
Options that define how the system should handle / request Rack ID. Includes Before Scan, Date, After Scan, Ignore, Rack Code, 1D reader attachment (if plugged into the computer).

Rack Auto Detection and Sensor settings
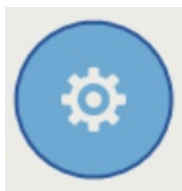
Choices include RAD, Options, Quick Decode, Sensor settings.

RAD - Rack Auto Detection will be described in further detail in section 24-1.

Options – Different settings related to the naming and handling of data by the VisionMate.

Quick Decode VS Normal Decode.
Normal decode mode is selected by default. If Quick Decode is selected (with a check mark displaying), then that will be running. It is only recommended with scanning racks with less than 8 tubes or one row. This will then allow for faster scanning of the racks.

Exit / User Config settings

Options for Exit/LogOut/Minimal/Users

9 - Tube search feature
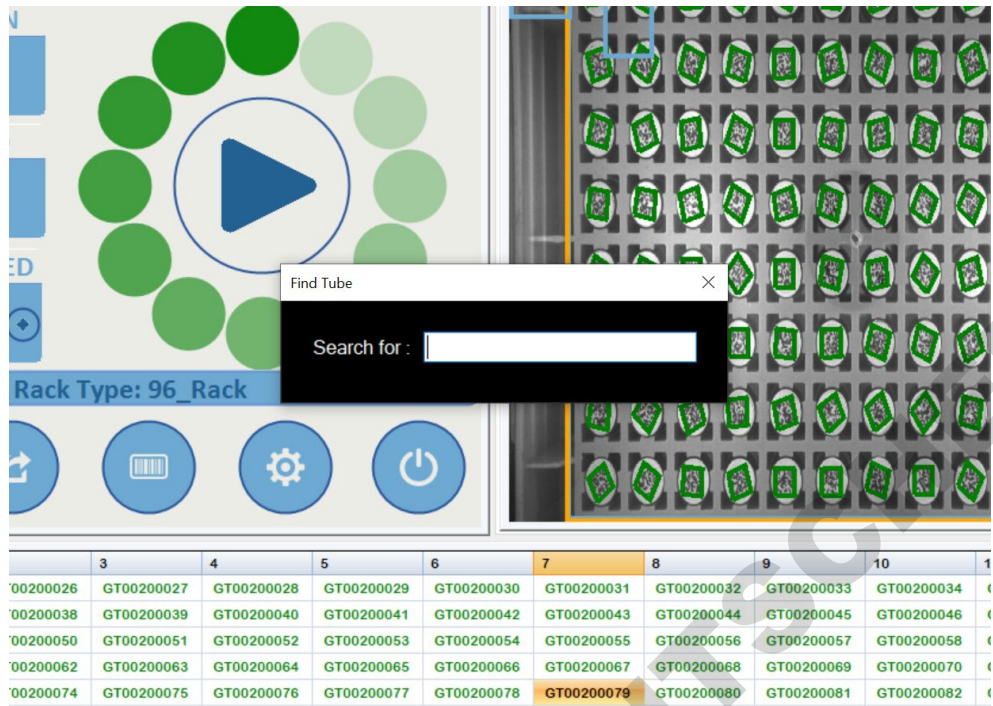
After a rack scan has been completed `right click` anywhere in the results list area.
A `Search for:` box will appear.

This allows you to type in the desired number you wish to find and it will be highlighted as in the example below.

10 - Using the menus

The menu is accessed via hovering the mouse over the blue bar.
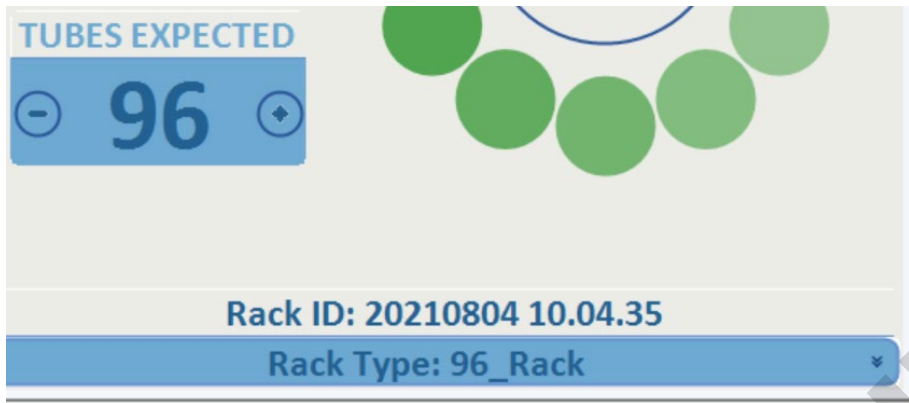
The menu system has three parts to it, which include Select, Expand, and Back/Exit. When you click on a menu button you will be presented with the circular expanded selection menu.
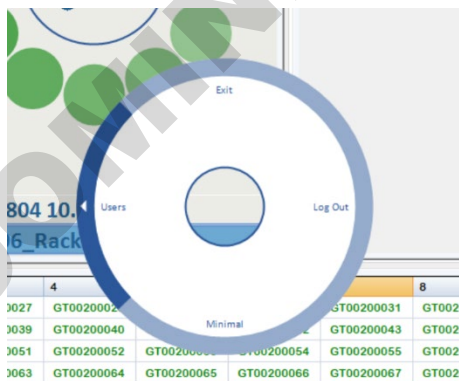
Use the mouse cursor to highlight the area you wish to navigate to.
Move the cursor to the outer part of the menu and click once to expand to view more options.

Use the mouse cursor to highlight the area you wish to open. Select the item by hovering the cursor over the outer border of the menu and click one time to expand additional options.

Below is an example of the export options with CSV selected. This was done by clicking on the word CSV.

In this example, the first time you select an option, it will take you to more detailed settings for that export option. These detailed options will be discussed further in the manual. The same detailed information can be accessed by clicking on the Expand (outer border) portion of the menu system

To return to the main screen, click the middle section, which is the Back/Exit option.

Workflow Menu Tab

To access the menu click the Settings wheel > Options > WorkFlow tab
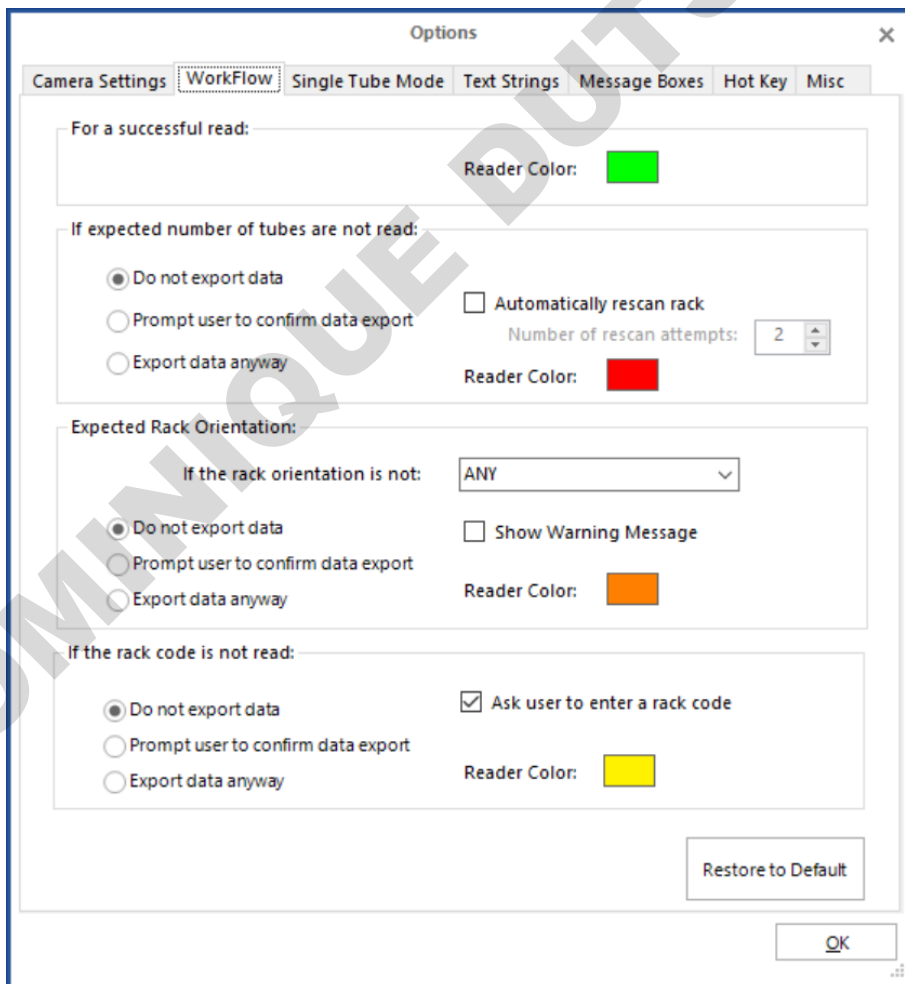
The workflow menu tab allows you to customize the LED color for different scan circumstances.

Click on the color square to choose your setting.

- For a successful read - when the read is complete without issues
- If expected number of tubes are not read
- Expected Rack Orientation - customisable by selecting a variable from the drop down menu.
- If the rack code is not read - this is the Rack ID barcode, normally located in the corner of the rack.

Customizing these settings could be useful of you wanted to control the data from been exported depending on the rack read status or to create a visual workflow method based on LED status color when manually scanning populated racks.

Option to Restore to Default

11 - Setting the rack type

The scanner will decode any of the Thermo Scientific family of 2D coded tube racks by default. These rack types include 24, 48, 48 nunc, 96, and 384 formats and are pre-set under the rack type menu.

Note 96 Rack is set by default
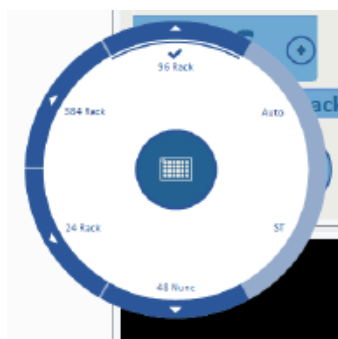
Place the rack of tubes onto the scanner. The software will determine the rack type automatically if the scanner is in AUTO MODE and the rack is FULLY populated with tubes.

To add a new rack type(s), place a full rack onto the scanner, click on the appropriate menu button, and select RAD. For the High Speed, RAD may need to be selected twice. Afterwards, follow the on screen instructions.

If one clicks on RAD, it begins to scan. The rack should be placed on the scanner first, then RAD selected.

To view and select the desired rack type, click on this menu and either choose your RAD created racks, or the options of AUTO, or ST.
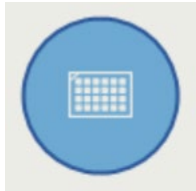
12 - Decoding a rack

The scanner is ready to decode a rack once the correct rack type is loaded and the start button is blue.

1. Place a rack on the scanner.

2. After a small delay to enable placing of the rack, the scan will start and the decode results will be displayed. You will notice the swirl working during the scanning process.

NOTE: The HSX scanner has two optical sensors located in two corners of the metal lid which automatically sense the presence of a rack.

These sensors also determine the orientation of the rack by looking for the small mouse-hole shaped notch in the rack; this allows the software to correctly display the decoded results.

It is good practice to check the sensors for dust and particle buildup as part of cleaning the unit in relation to A1 vs. H12 on the rack.

In order to use automatic rack sensing, the "Enable AutoScan Function" menu item under the Config menu must be checked. This feature is enabled by default.

13 - Starting a scan manually

Place a rack on the scanner and select "Auto" if the rack is full, or select the appropriate rack type being used.

Starting a scan using a hotkey

The hotkey will start a scan when it is pressed. Hotkey scanning is configured using the 'Hot Key' tab in the options page.
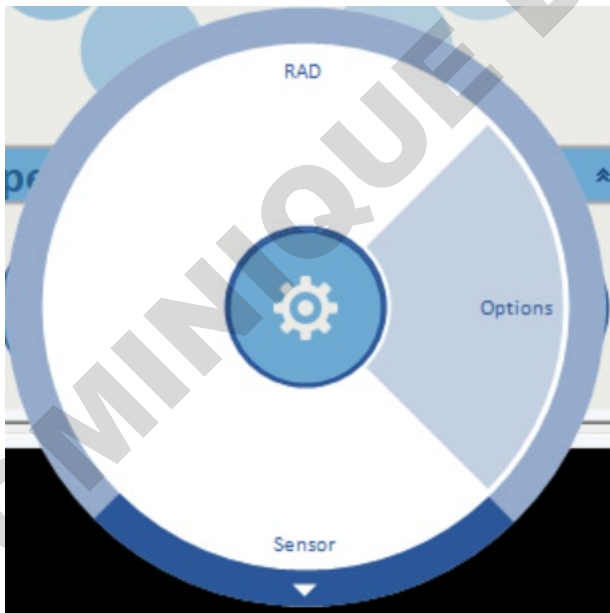
1. Select a key to use as a hot key from the dropdown list and check the enable box.
2. The hotkey will now start a scan if it is pressed when the VisionMate application is the current desktop application.
3. To allow the hotkey to work even when the VisionMate application is minimized or another application is selected, make the hotkey global by checking the box.

Options   ✕

| Camera Settings | WorkFlow | Single Tube Mode | Text Strings | Message Boxes | Hot Key | Misc |

Select a key from the list: None   ▾

☐ Enable Hot Key

☐ Hot Key is Global

The hot key will start a scan when it is pressed.

OK
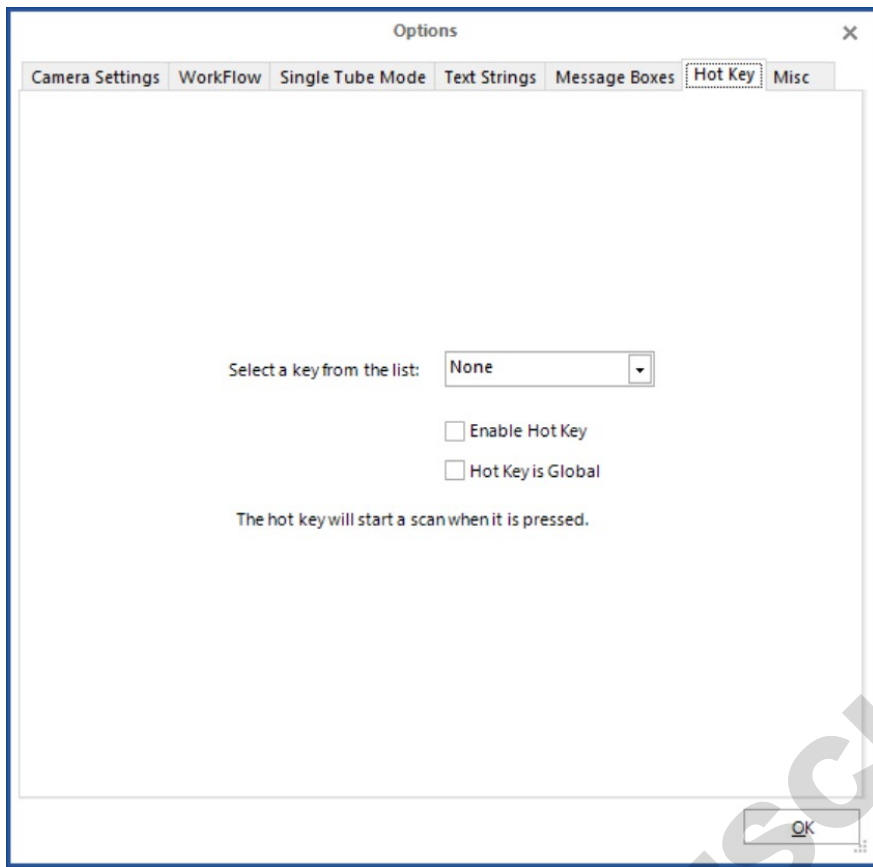
14 - Setting the expected number of tubes

The expected number of tubes function is useful when you are scanning a rack that is not completely full.

This function speeds up the decoding time on partial racks. This is because the software does not spend time trying to decode empty rack locations.
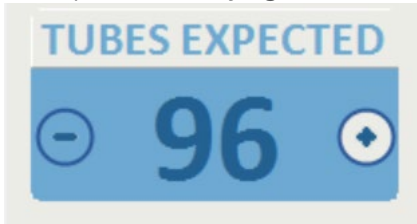
To set the expected number of tubes:
Click the UP/DOWN arrow to choose the number of tubes.

This function should be used with default rack formats and racks which have been added using the Rack Auto Detect feature.

Configuration options can be found in the "WorkFlow" please refer to section 10.3
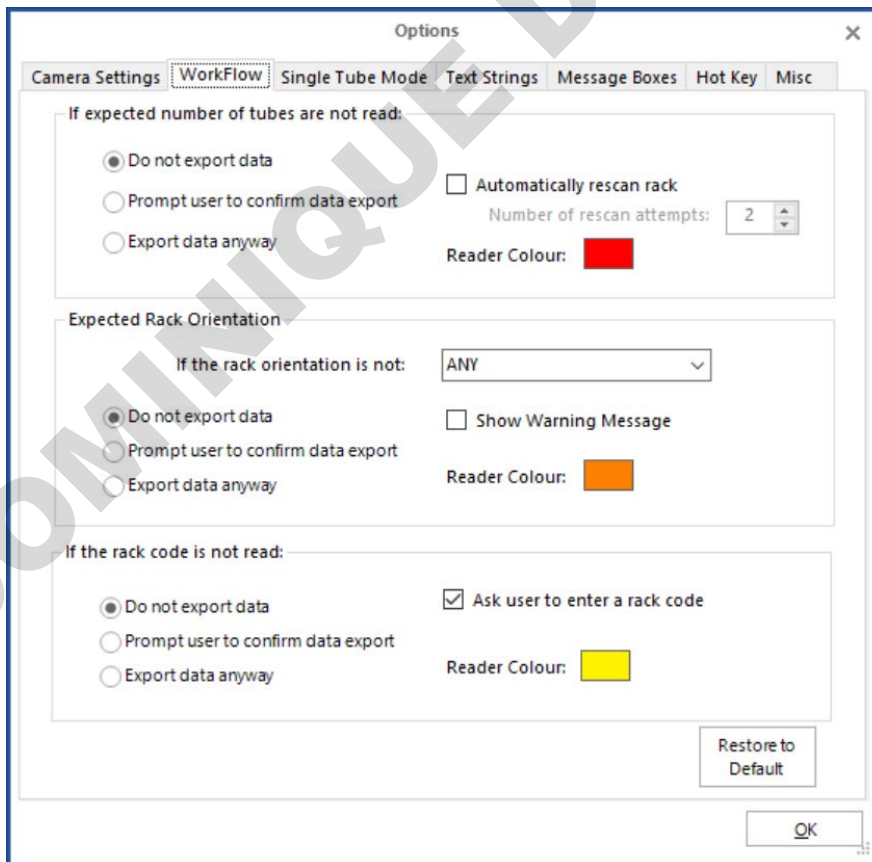
15 - Adding a user

Once logged in as an Admin level user, click the "Exit/User Config Setting" menu.
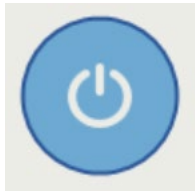
Expand the "Users" option.
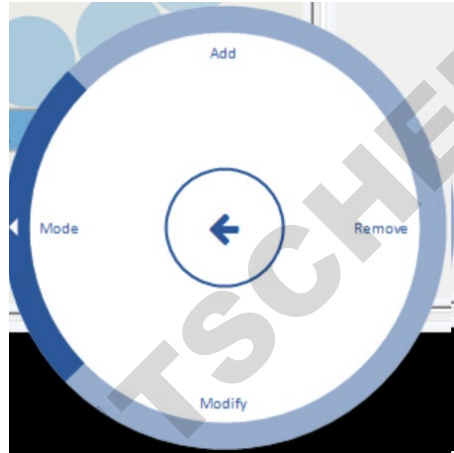
In order to add a new user:

Click the 'Add' section.

Enter a user name in the dialog box.
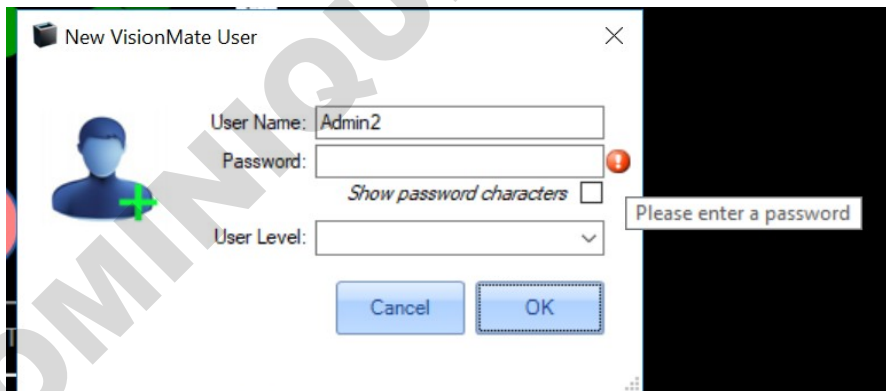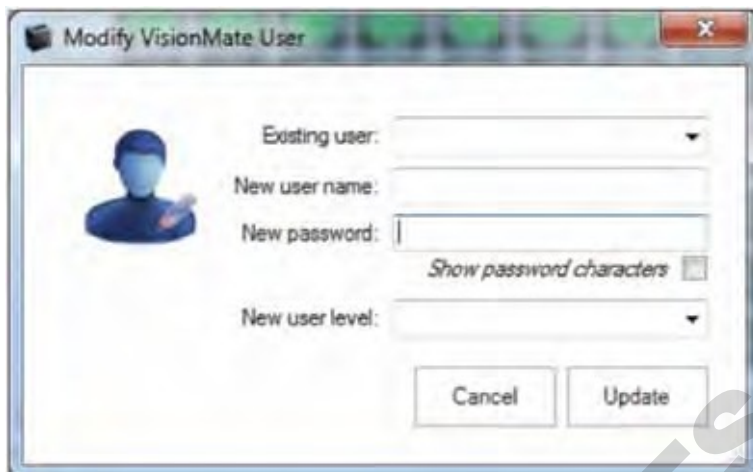
Enter user details and password for the new user.
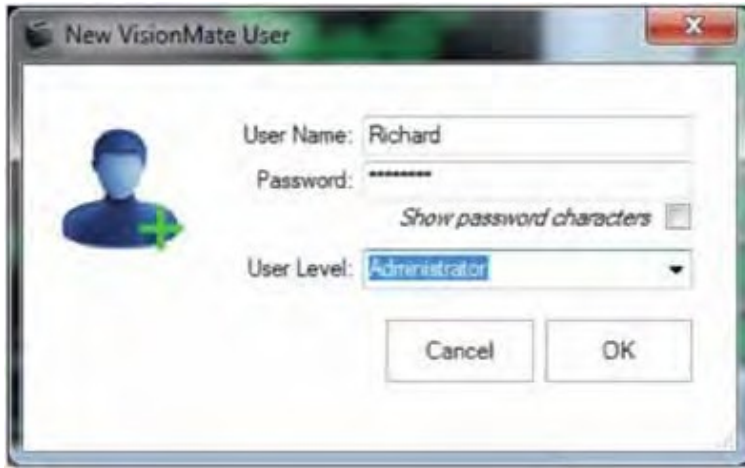
To modify existing users click the modify section in the menu button.

NOTE: In order to modify users, one must be logged into the software as an admin. Otherwise, the Exit/User Config menu option looks completely different.

Your newly-added and existing users will now appear in the drop-down box. Selecting your user will show their user level by highlighting the user level option for their level, and allow you to modify the details.

16 - Removing a user

It is possible to remove a user by clicking on the "Exit/User Config Setting" menu.

Click Users

All other users may be removed as long as you are logged in as an Admin level user.

Click the 'Remove' button.

Select the user you wish to remove from the drop down bar and select remove.

17 - Running in minimal mode

Setup Minimal Mode

There is an option to run the GUI (Graphical user interface) in a minimal mode. This could be useful if you wish to organize your desktop to allow more programs to be visible at one time.

First click on the Power button.

Then select and click Minimal.
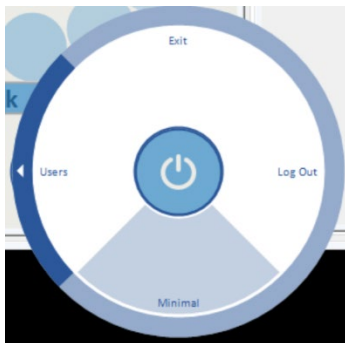
The main screen will now scale down and you will get a movable window with the main menu options visible. This will, by default, be set in the bottom right hand side of the screen.

The scanner is still fully operational in this mode.

Minimal overview
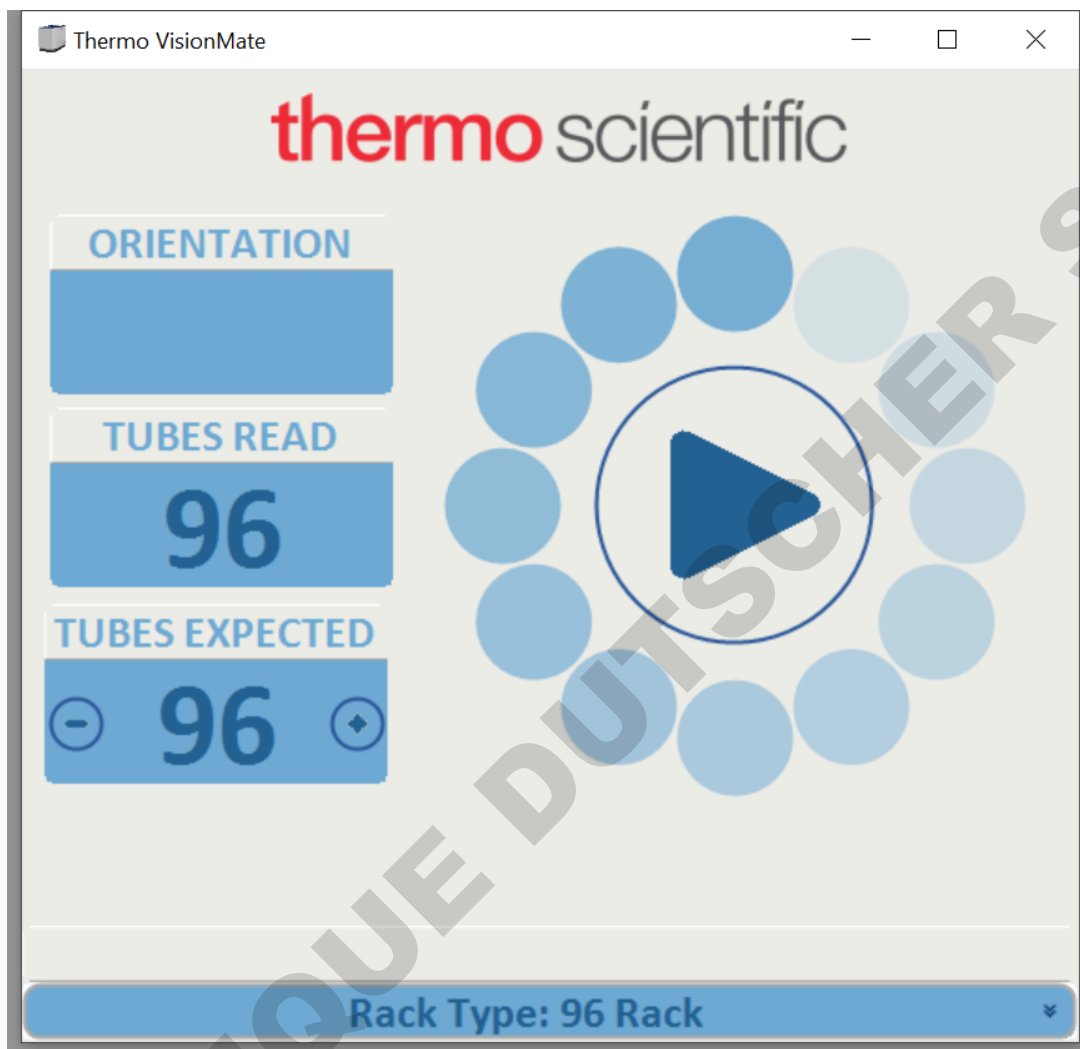
Camera View Window
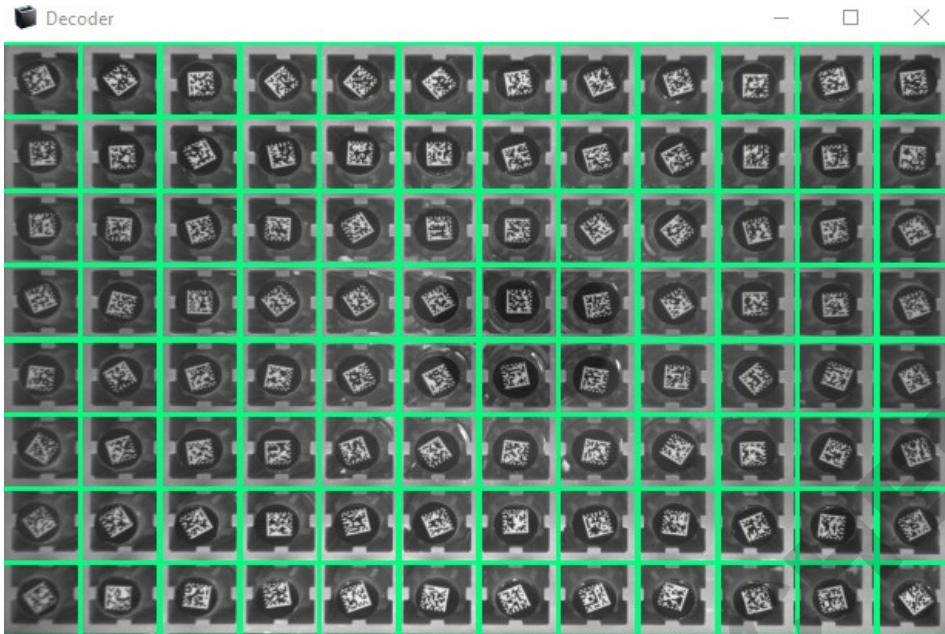
Results View Window

	1	2	3	4	5	6	7	8	9	10	11	12
A	0188190623	0188190622	0188190621	0188190620	0188190619	0188190618	0188190617	0188190616	0188190615	0188190614	0188190613	0188190612
B	0188190600	0188190601	0188190602	0188190603	0188190604	0188190605	0188190606	0188190607	0188190608	0188190609	0188190610	0188190611
C	0188190599	0188190598	0188190597	0188190596	0188190595	0188190594	0188190593	0188190592	0188190591	0188190590	0188190589	0188190588
D	0188190576	0188190577	0188190578	0188190579	0188190580	0188190581	0188190582	0188190583	0188190584	0188190585	0188190586	0188190587
E	0188190575	0188190574	0188190573	0188190572	0188190571	0188190570	0188190569	0188190568	0188190567	0188190566	0188190565	0188190564
F	0188190552	0188190553	0188190554	0188190555	0188190556	0188190557	0188190558	0188190559	0188190560	0188190561	0188190562	0188190563
G	0188190551	0188190550	0188190549	0188190548	0188190547	0188190546	0188190545	0188190544	0188190543	0188190542	0188190541	0188190540
H	0188190529	0188190528	0188190530	0188190531	0188190532	0188190533	0188190534	0188190535	0188190536	0188190537	0188190538	0188190539

Results View Window
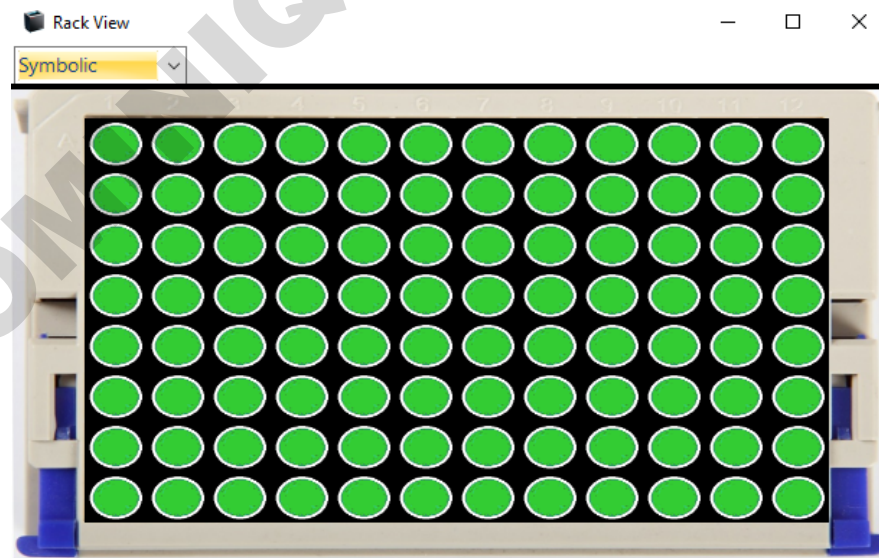
18 - Rack AutoDetect and sensor settings
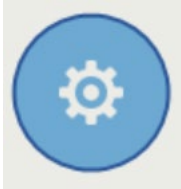
The gear icon allows for Rack Auto Detection (RAD), options to be set, Sensor modifications to be made and also the enabling of Quick Decode.

If you have a new rack profile you wish to add and save as a standard format you can place the rack on the scanner and perform a RAD. This will scan and detect the format of the rack and give you the option to save the rack format. Ensure you use a FULLY populated rack.
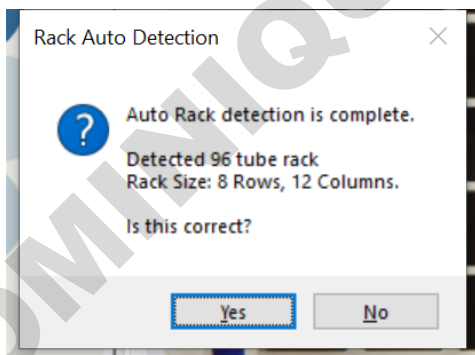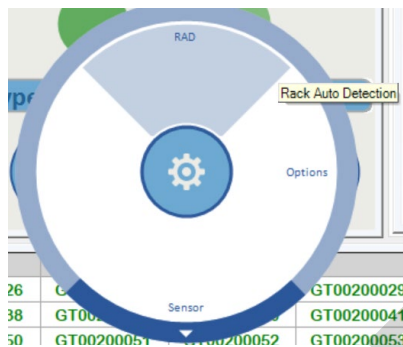
All custom racks have a sub-menu indicated by the arrow around the edge of the Radio Dial. The sub-menu allows the user to remove or rename that rack.
The "ST" and "Auto" rack options do not offer this functionality.
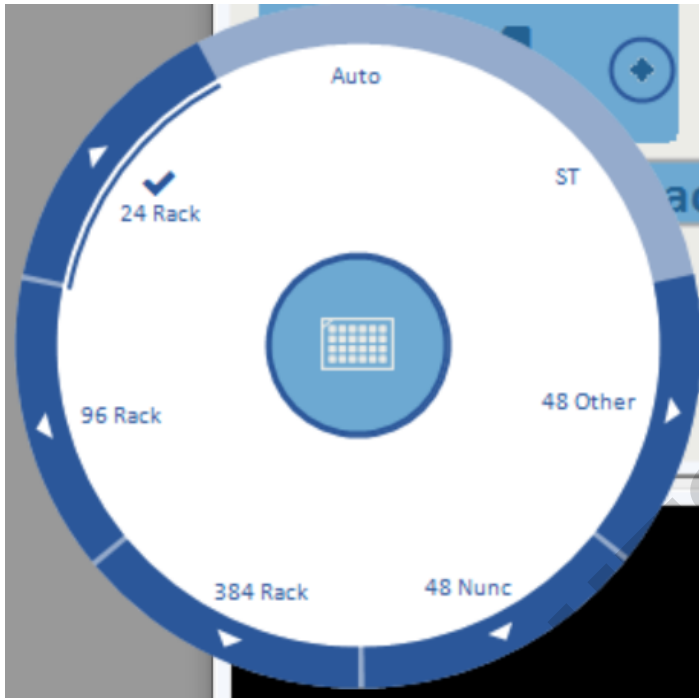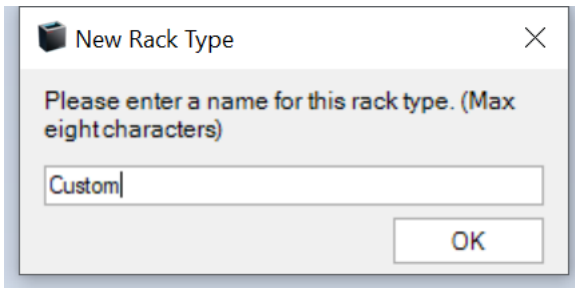
To remove a custom rack, select the "Remove" option and then select "Yes" in the Delete Rack confirmation window.
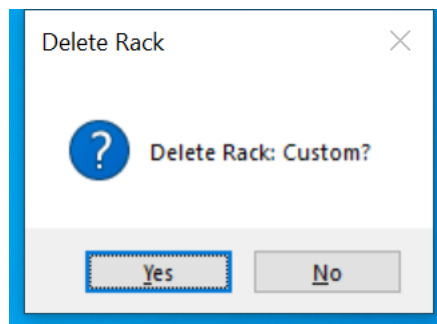
To rename a rack, select the Rename option then enter the new rack name in the Rename Rack window and select "OK".
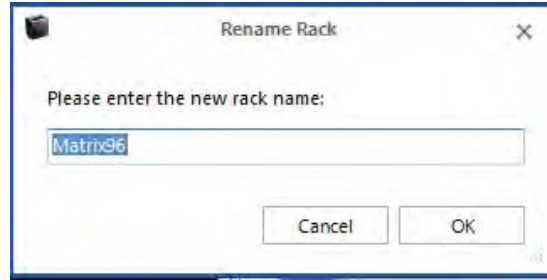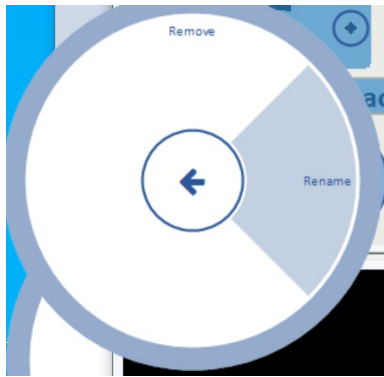
The Sensor menu allows you to access the following options:

Auto Scan

Automatically starts the scan when a rack is placed on the scanner.

Orientation
Orientation is automatically enabled by default. It is detected using the sensors on the scanner in conjunction with the mouse holes on the racks.

19 - Rack ID Options and 1D reader settings
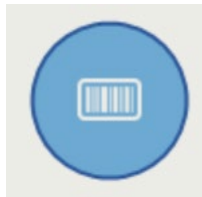
This menu allows you to set the Rack ID details. If you have the 1D reader "AB-1860" attachment plugged in you will be presented with 6 options.

Before Scan
If this option is selected when a rack is placed on the scanner in "Auto mode" or "Start scan manually" you will be presented with a popup box for the user to enter a RACK ID before the rack is read.

Date
This will use the current Date / Time as the rack ID; this will be done automatically.

After Scan
If this option is selected when a rack is placed on the scanner in Auto mode or Start scan manually, you will be presented with a pop up box for the user to enter a RACK ID after the scan.

AB-1860
This is the option when using the 1D reader accessory. If this option is visible then the hardware is plugged in and ready to run. If this is not visible, close the software and plug in the accessory. After the driver wizard has installed the hardware, start the software and the option will now be visible.

When you expand the AB-1860 menu you will be presented with Test and Config.
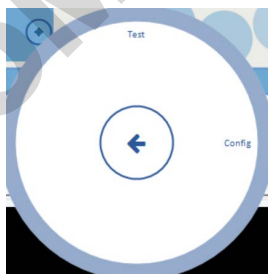
If you click on "Test" the 1D scanner will activate continually until you turn off "Test". This will allow you to move the 1D scanner into position for consistent reads.

Once you have done this turn the Test function off.
The Config menu presents you with the following screen.

AB1860 1D Reader
Enable Code Length Check — False
Exptd Code Length — 12

Enable Code Length Check
Enable 1D Code Length Check
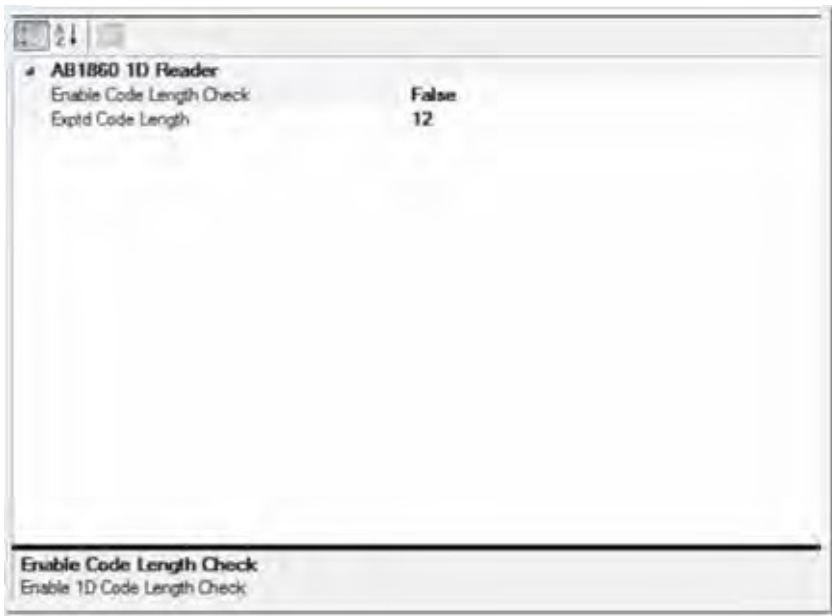
This enables the user to add a code length check, if you require this feature please enable and choose your desired code length.

Which code symbologies are supported?
The AB-1860 is preprogrammed to read the following 1D code types out of the box:

1.   Code 128
2.   Code 39
3.   Codabar
4.   Interleaved 2 of 5
5.   EAN 13/UPC
6.   EAN 8
7.   UPC-E

To Enable or Disable symbology types please put the scanner in "Test" under the Config Menu and scan the barcode below. You will need to click "Test" after every scan you make on this page as it programs the 1D reader.
It is recommended you disable code types you do not use to stop partial reads.

DISABLE ALL CODE

ENABLE

DISABLE

CODE 39

CODE 39

CODE 128

CODE 128

EAN-8

EAN-8

EAN-13

EAN-13

INDUSTRIAL 2 OF 5

INDUSTRIAL 2 OF 5

CODABAR

CODABAR

UK PLESSEY CODE

UK PLESSEY CODE

Rack Code

You can enable this option if you are using the latest Thermo Scientific barcoded latch rack products along with the HSX.

You can identify these as they have the Rack ID in human readable format, 1D barcode and 2D barcode marked on three sides of the rack. They also have a 2D barcode on the underside of the rack.

In this mode the rack must be placed in A1 position of the rack in the top left corner of VisionMate scanner. The reader will read and set the rack ID during the normal scan.
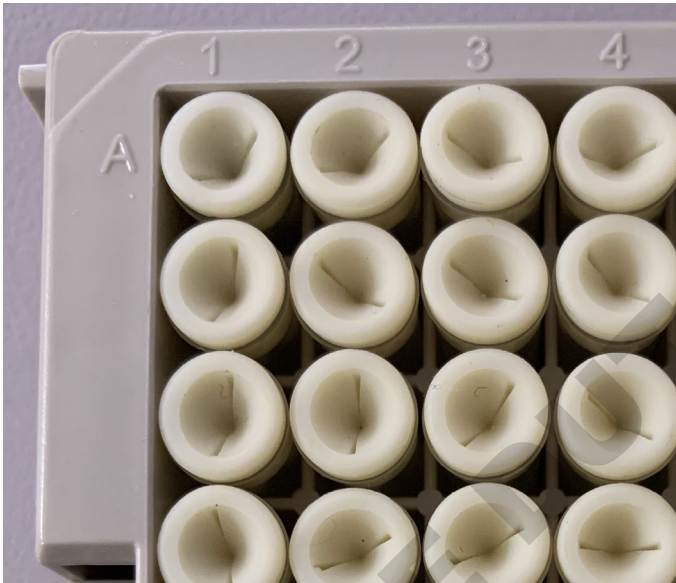
A1 position of rack

Rack ID barcode locations

TS65000011

20 - Export options

Data Export can be configured by clicking on the Data Export button.
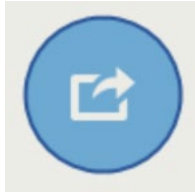
Data Export options:

CSV –   Comma-separated values
ODBC –   Open Database Connectivity
TCP/IP –   Transmission Control Protocol/Internet Protocol
HTML –   HyperText Markup Language
XLS –   MS Excel file extension
IMAGE –   PNG, JPEG,TIFF, GIFF, BMP
VMCSV –   VisionMate compatible CSV file
XML –   Extensible Markup Language

When using data export, it is important to remember the option needs to be correctly selected.

You can have multiple export options selected; they work simultaneously with each other.

This is the export options menu with CSV File export option selected. If selected there is a check mark and the inner bar. This needs to be selected for the export to be turned ON. You can click on the menu again to turn it OFF.
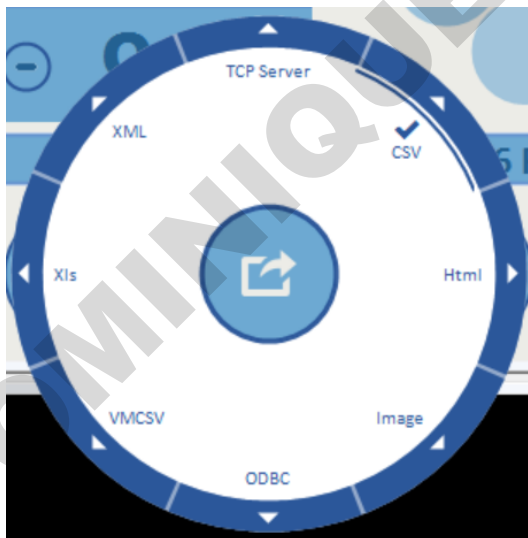
When you go to the Config section of any export option you will be presented with a generic set of Properties. Options will be grayed out if not available in the selected export option.

Here is a breakdown and details of the settings.

Data Format	
Add Delimiter Character at End of Line	This option allows the user to include or not include the delimiter character at the end of each line in the output file.
Date Format	A dropdown box allows the selection of a date format to use when exporting the date to the output file. (y = year; M = month; d = day; MMM = month abbreviation; MMMM = month full name)
Delimiter Character	A drop down box allows the selection of the delimiter character.
Show Column Headers	Set this to True or False
Time Format	A dropdown box allows the selection of a time format to use when exporting the date to the output file. (h = hour; m = minute; s = second; t = PM/AM)
Data Structure	
Data Field Prefix	Add a user defined text or number prefix
Data Field Suffix	Add a user defined text or number suffix
Order Results By	Select Row or Column
File Location	
Target Folder	Use the browse button to select a folder in which the output files are to be created.
File Name Format	
Filename Extension	This property allows you to select the filename extension for the output file. The available options are *.csv (comma-delimited file); *.txt (text file) and *.log (log text file). The *.csv file will normally open automatically in MS Excel where available. The *.txt file will normally open automatically in MS Notepad. The *.log file is not normally associated with any program.
Filename Prefix	It is possible to add a text prefix for the filename here. E.g. if the file naming method is 'Use Date and Time' and a 'Filename Prefix' of "Test Rack" is used, then the output file would be named e.g. "TestRack01012008.csv" instead of just "01012008.csv" (**see www.asciitable.com**).
Filename Suffix	It is possible to add a text suffix for the filename here. E.g. if the file naming method is 'Use Date and Time' and a 'Filename Suffix' of "Test Rack" is used, then the output file would be named e.g. "01012008TestRack.csv" instead of just "01012008.csv" (**see www.asciitable.com**).

Data Format	
File Naming Method	There are three options for naming the csv file: Use Date and Time. This option uses the date and time at the point of file creation to name the file. The date format is as specified in the "Date Format" property. Use Rack Name: This option uses the rack name which was given to the rack during the scan and is probably the most useful option. Use Fixed Filename: This option always names the file with the filename specified in the "Fixed Filename" property. If the file exists, it is overwritten.
Fixed File Name	If you select the 'File Naming Method' of 'Fixed Filename' then you should enter the fixed filename here. E.g. "Test_Rack".

Data Fields

The data fields page is a drag and drop format configuration. It allows you to quickly drag and drop the extra details you wish to have available in the exported data file.

The idea is you drag and drop from the left hand column to the right hand column and this will update your output file in real time. You can drag the items back to the left hand side to remove.

To see the "real time results, a rack must have already been scanned.
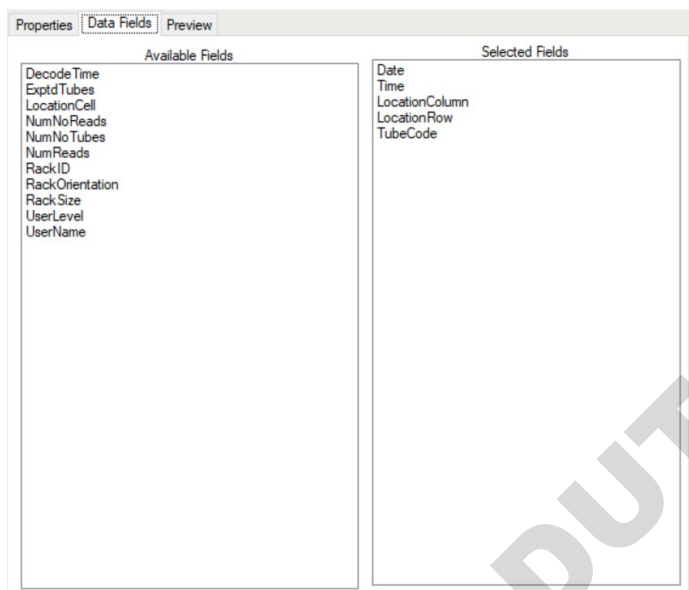
Data Fields	Description / meaning
Exptd Tubes	Display the expected number of tubes in the output file
LocationCell	Display the location cell in the output file e.g. A1 / A2 / A3
LocationColumn	Display the location column in the output file e.g. 1 / 2 / 3 / 4
LocationRow	Display the location row in the output file e.g. A / B / C / D
NumNoReads	Display the number of no reads in the output file
NumNoTubes	Display the number of no tubes in the output file
NumReads	Display the number of reads in the output file
RackID	Display the rack ID in the output file
RackOrientation	Display the rack orientation in the output file e.g. A1 / H12
RackSize	Display the rack size in the output file e.g. 24 / 96 / 384
Time	Display the time in the output file
TubeCode	Display the tube code data in the output file
UserLevel	Display the user level in the output file e.g. Admin

You can use the Preview tab to see the file changing live as you configure the export options you wish to use. This is an example of a CSV file format.
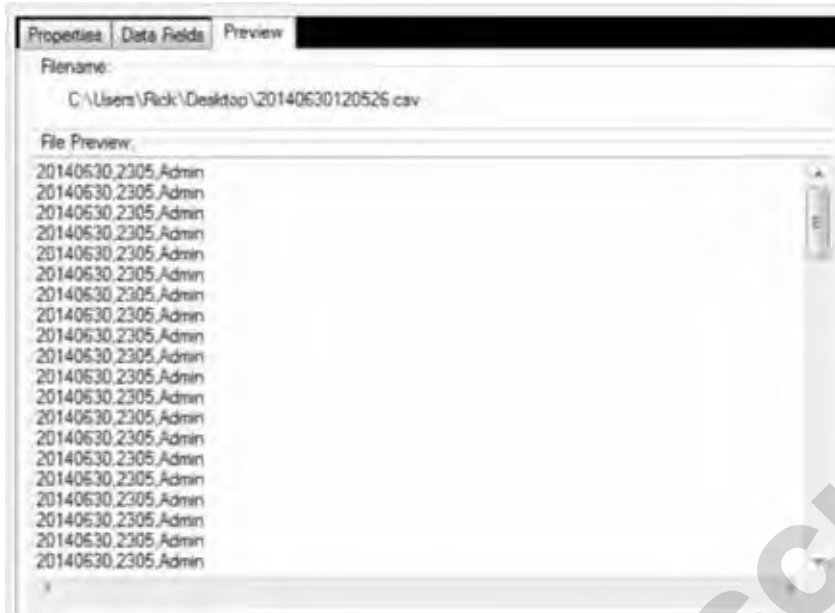
This is an example of a PDF formatted with no Data Fields.
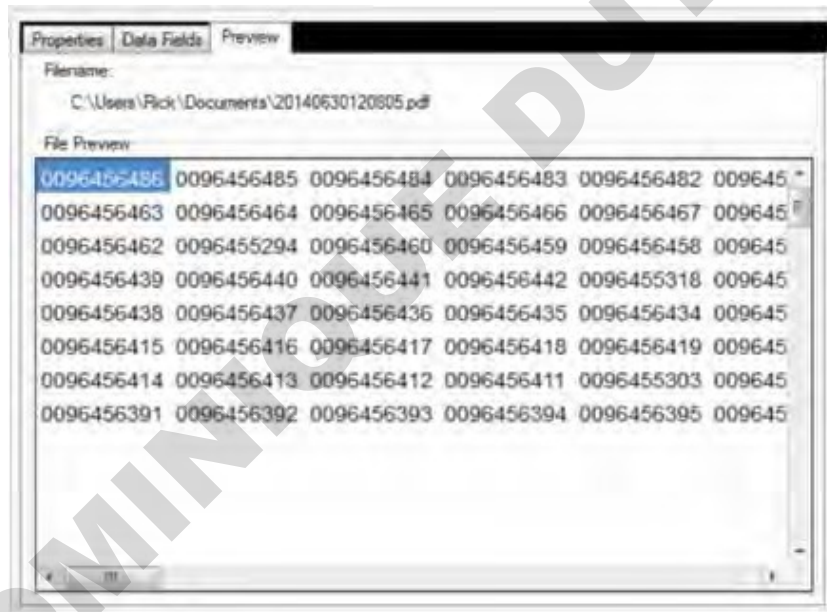
This is an example of an XML file format
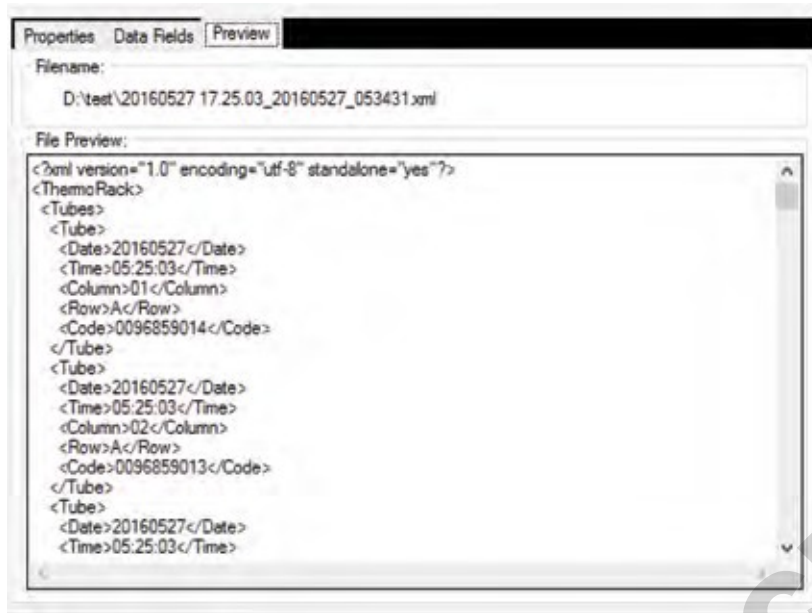
To modify how No Tube / No Read results are displayed the default "No Read" and "No Tube" text strings can be replaced with alternative text by modifying the values in the "Text Strings" tab of the options page. The modified text will be used both in the application and in all exported results.
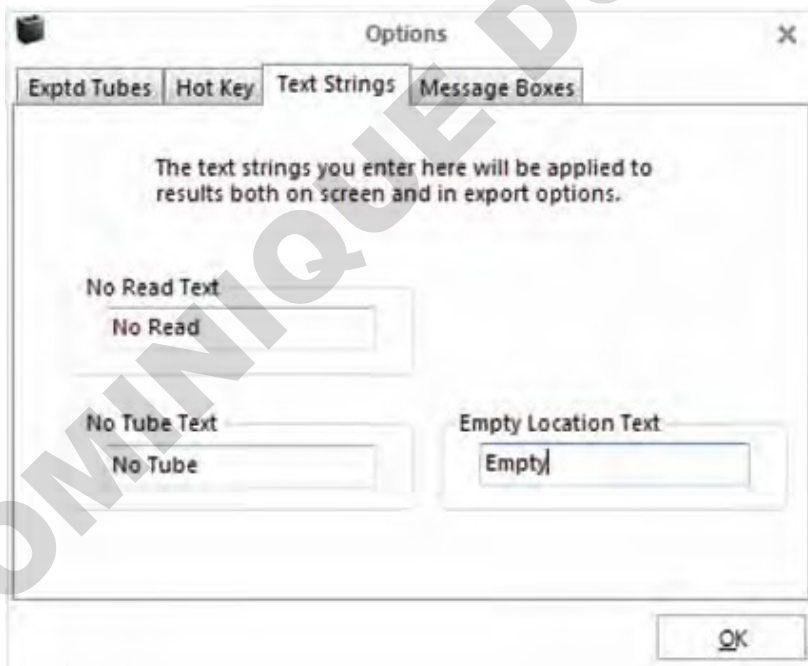
21 - TCP/IP

Configuration and usage instructions

1. Background

- The current version of the TCP Server is implemented to be fully compatible with this previous versions (AB-1850, 312800 V4) so existing system interfaces should not be broken when using the VisionMate HSX version.

- Note that by default the Server does not prefix or suffix its responses with any start or end of message characters. If this is required, that the user should set them in the 'Data Structure' properties specified in section 8.

The TCP Server export function is intended to provide a simple method of interfacing between the reader and a third-party control application so that the third-party application may completely control the reader and receive data.

The TCP Server receives TCP/IP client connection requests to a configurable specified IP address and port number.

Once a client connection is accepted, the server receives requests from the client to perform functions. These functions include starting a scan, setting data such as rack type and providing information such as the tube data.

2. First Steps

The user should first confirm that the normal reading operation of the reader is functioning correctly by manually scanning some sample racks.

If performance needs to be improved, this may be done by adjusting the camera settings in the "Options" page of the software (See main user manual).To configure the software for unattended use, the user should utilize the option to prevent pop-up dialogs being displayed by the user interface as these can block correct operation when being controlled via the TCP Server.

1)   Within the software UI, expand the configuration button (shown with a cog icon), then choose "Options".
2)   Select the "Message Boxes" tab.
3)   Enable the "Do not show dialog boxes" option.

3.   Enabling the TCP Server.

Enable the TCP Server by expanding the export options and clicking the large pie area, or later referred to as button, for the 'TCP Server' option. This has the effect of both enabling the TCP Server and displaying its configuration properties.

When the TCP Server is enabled, a tick mark is displayed in the button. The current server IP address and port number are displayed in the Server Log tab.

To disable the TCP Server, simply click the button again so that a tick mark is no longer displayed. This will also cause the "Server Log" tab to show blank fields for the IP address and port number.

To view the TCP Server properties without affecting the enabled state, click the arrow in outer ring of the button, then click "config".

Image 1.0. TCP Server is enabled.
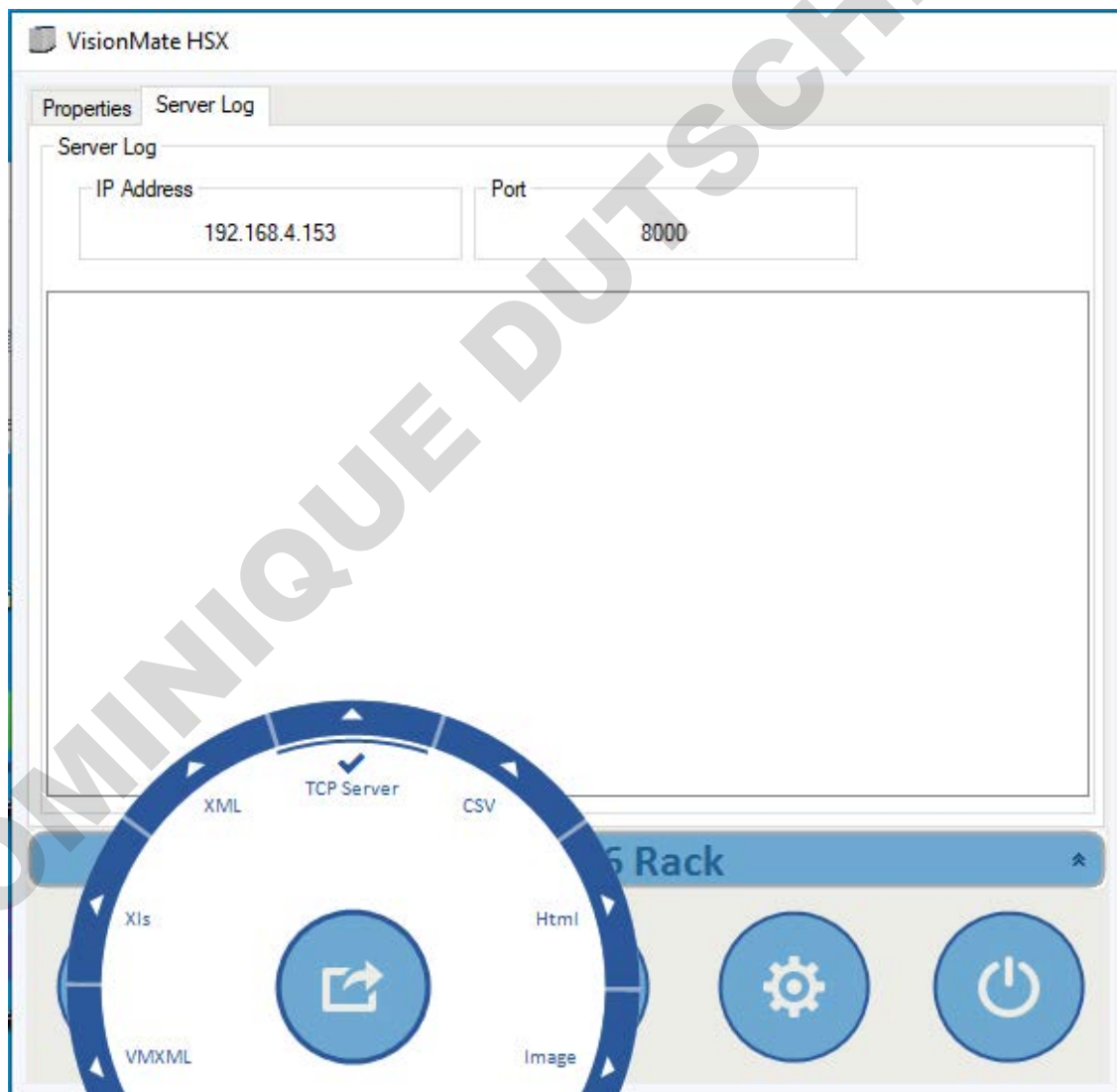
4.   Basic Operation Test.

It might be a good idea to initially test the server connectivity and functionality using a simple terminal client. Here we use a non-affiliated. free client called PuTTY. The version of PuTTY used was a free SSH and Telnet client downloaded from greenend.org.uk.

Within PuTTY, all options are default except for the "Connection Type" which should be set to: "Raw".

1.   Place a fully populated rack onto the scanner. Ignore any scan that may occur for now.
2.   Connect your client to the IP address and port number shown in the "TCP Server" -> "Server Log" screen within the VisionMate application.
3.   The server shows a message indicating that the client connection was successful in the Server Log screen in VisionMate.
4.   In the client, enter an upper-case **S**, then hit enter. The server will reply with **OKS** and the reader will start a scan.
5.   When the scan is complete, enter an **L** then hit enter. The server will reply with **OKL45**. This indicates that the scan is finished, and data is ready.
6.   In the client, enter **D** then hit enter. The server will reply with **OKDcode,code.code……**
7.   This is the basic operation of the server. The cycle can now be repeated as described in this section.

Image 4.0. Basic TCP command and response
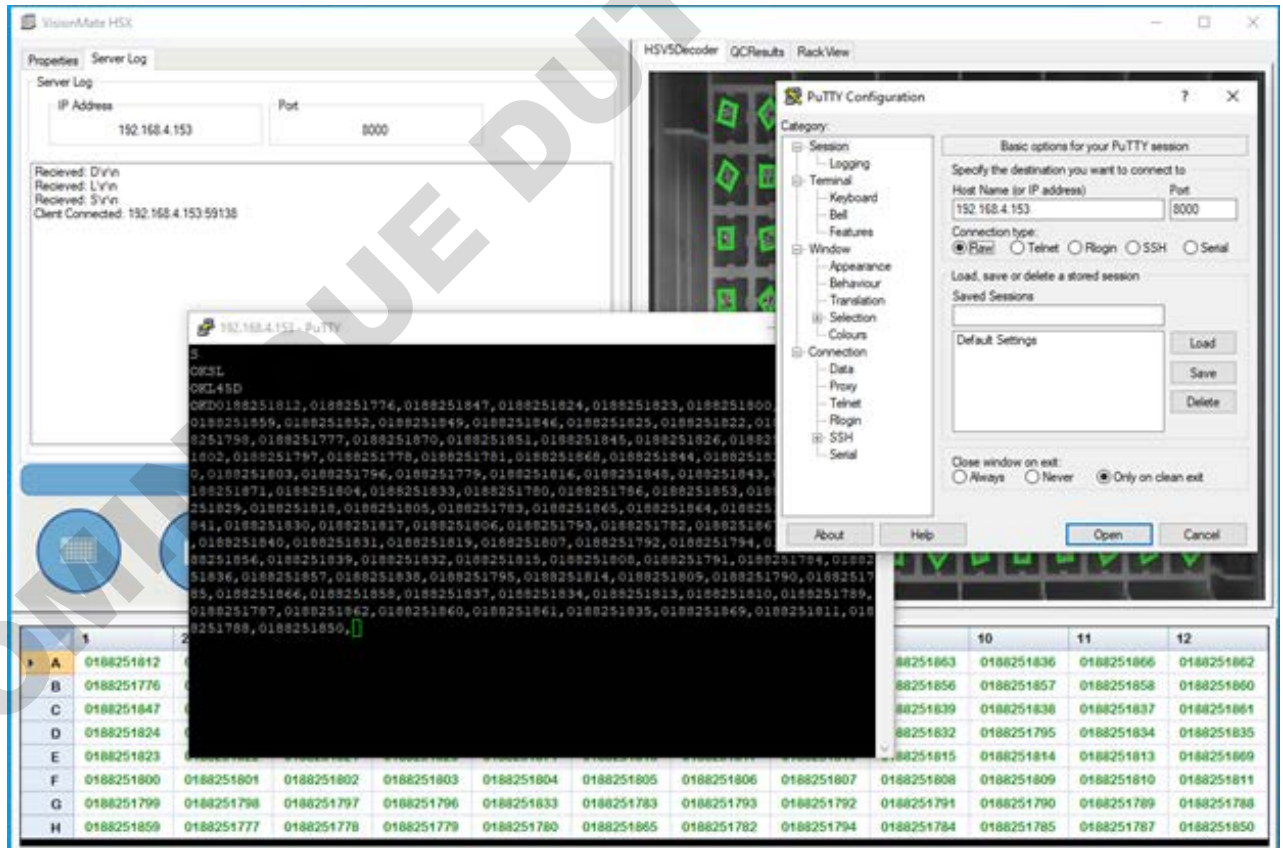
5. Recommended operation method.

The TCP Server exposes many properties and options which are intended to enable it to comply with any user's specific requirements of an operating cycle. Here, we suggest the steps for a possible mode of operation.

Assumptions:

a)   A successful client connection has been made to the server.
b)   The client connection is kept open, rather than being closed after every command.
c)   All options in the TCP Server properties have been left as default.

Initial Configuration Commands:

First, we complete some configuration of the reader. These steps should probably be made each time a connection to the server is made.
1.   Set the "Auto Scan" function to off. This stops the reader from automatically starting a scan every time a rack is placed onto the reader.
Command: **M0**   Reply: **OKM**

2.   Set the required product to the correct rack type. The product is the name of the rack type as it appears under the rack type button. Ex - For an 8x12, 96 tube rack, the default name is "96 Rack".
Command: **P96** Rack Reply: **OKP**

3.   If you are scanning racks that are not fully populated with tubes, then you should set the expected number of tubes as this will dramatically decrease scan time. If you are scanning fully populated racks, you can either set the expected tubes to the full rack value, or simply miss this step.
E.g. If you are reading racks that only contain 12 tubes, you would use the command:
Command: **A12**   Reply: **OKA**

Scanning Process Commands:
        This process could be used to read a rack. The process would likely loop at list item 3 to ensure that the reader has finished reading the rack before requesting data.
1.   Check that a rack is present on the reader before proceeding further.
Command: **R**   Reply   **OKRTrue** (Rack on reader)   or   **OKRFalse** (Rack not on reader).

2.   Start a scan.
Command: **S**   Reply **OKS**

3.   At intervals of perhaps one second, check the status of the scan until you receive a value of 45 which indicates that the scan is finished, and that data is present.
Command   **L**   Reply **OKL45**

4.   Check that the expected number of tubes were read. If the expected number of tubes were not read, repeat a scan from step 2.
Command   **F**   Reply **OKF96** (here, 96 tubes were read).

5.   Get the tube data.
Command   **D**   Reply **OKD[TUBE_CODE_A1], [TUBE_CODE_B1], [TUBE_CODE_C1],.....**

6. TCP Command List

The commands and responses listed below are based on the default configuration of the TCP Server properties.

They can be modified by settings in the Server, Data Structure and Data Format sections.
Ex. The Data Format section can allow the user to make changes to how the data is sent following a **Get Data** command. The Server has an 'Echo Received Commands' option can change the response to all commands. For example, if it is turned off, the response to **Get Status** might change from **OKL45** to just **45**.

NOTE: All commands sent to the server should be suffixed with a **\r[13]**. *Replies sent from the Server will not be suffixed unless a suffix is supplied in the* **Data Structure** *->* **Data Field Suffix** *option.*

Command Name	Command Description	Default Command Format	Response
Change Product	Sets the currently selected product (i.e. rack type). The rack type should exactly match that shown in the rack type button on the main screen.	P[RACK_TYPE] e.g. 'P96 Rack'	OKP
Enable Auto Scan	Turns the auto scan function on or off. The auto scan function controls whether the reader will automatically start a scan when a rack is placed onto the reader. Normally in automation, this should be turned off so that the controller can initiate the scan cycle.	M[ENABLED 0:1] e.g. 'M0' to disable. e.g. 'M1' to enable.	OKM

Enable Expected Tubes	This command is now redundant and has no functional effect but is kept to ensure compatibility with previous versions. Now, simply setting the expected number of tubes is all that is required.	N[ENABLED 0:1] e.g. 'N0' to disable. e.g. 'N1' to enable.	OKN
Get / Set Expected Tubes	Sets the expected number of tubes. After the expected number of tubes has been the read, the scan will stop successfully. This value should be read when reading racks which are not fully populated with tubes to ensure prompt scan times.	A[NUMBER_OF_TUBES] e.g. 'A88' to set 88 tubes expected.	OKA
Get Current Product	Returns the name of the current product (rack type)	C	OKC[RACK_TYPE] e.g. 'C96 Rack'
Get Data	Returns a delimited list of the tube codes which have been read. The format of the list is highly configurable via the 'Data Format' options listed in section 7.	D	OKD[TUBE_CODE_A1], [TUBE_CODE_B1], [TUBE_CODE_C1],.....
Get Decode Time	Returns the amount of time required to completely decode in milliseconds. Although the 'msec' in the return string is perhaps unexpected, it is retained for compatibility with previous versions.	K	OKKmsec[TIME] e.g. 'UKKmsec1361'
Get Hardware Status	This command is now redundant and has no functional effect but is kept to ensure compatibility	Y	OKY0

	with previous versions. It will now always return no errors (zero).		
Get No Reads	Returns the number of 'No Read' results for the last scan.	G	OKG[NUMBER_OF_NO_READS] e.g. 'OKG0' (no No Read results)
Get No Tubes	Returns the number of 'No Tube' results for the last scan.	H	OKH[NUMBER_OF_NO_TUBES] e.g. 'OKH2' (2 No Tube results)
Get Rack I.D.	Returns the rack id from the last scan.	B	OKB[RACK_ID] e.g. 'OKBTS650000081'
Get Rack Orientation	Returns the current orientation of the rack on the scanner. This is a live value, not the value at the time of the last scan. The return value is either: True: A1 False: H12 NONE: Unknown	O	OKO[ORIENTATION True:False:NONE] e.g. 'OKOTrue' (Rack is in the A1 Orientation)
Get Rack Present	Returns a value indicating whether a rack is currently on the reader.	R	OKR[RACK_PRESENT True:False] e.g. 'OKRTrue' (A rack is on the scanner).
Get Reads	Returns the number of successful read results for the last scan.	F	OKF[NUMBER_OF_READS] e.g. 'OKF96' (96 Read results)
Get Scan Error	This command is now redundant and has no functional effect but is kept to ensure compatibility with previous versions. It will always return zero.	E	E0
Get Status	Returns the status of the scanner. Scanner Initialized (when just started, before any scan) = 33	L	OKL[STATUS] e.g. 'OKL35' (currently scanning)

	Scanning = 35

Finished Scan, Data Ready = 45

Finished Scan, Data Sent = 61 | | |
| Get String Status | Returns the status of the scanner as a string.

Scanner Initialized (when just started, before any scan) = 'Ready'

Scanning = 'Scanning'

Finished Scan, Data Ready = 'DataReady'

Finished Scan, Data Sent = 'Ready' | J | OKJ[STRING_STATUS]

e.g. 'OKJScanning' |
| Reset Scanner | This command is now redundant and has no functional effect but is kept to ensure compatibility with previous versions.

It will always return 'True'. | R | OKRTrue |
| Set Decoding Mode | Switches between rack decoding mode and single tube decoding mode | U[DECODING_MODE]

Where DECODING_MODE can be:

0: Rack mode

1: Single tube mode. | OKU |
| I | Sets the Rack ID. | I[RACK_ID]

e.g. 'IThermoRack' | OKI |
| Start Scan | Starts a scan | S | OKS |

Data Format Group

The Data Format options affect how the data is exported when using the 'Get Data' command.

1)   Add Delimiter to Line End.
When **True**, a delimiter character is added after the last tube code in the list.
When **False**, the last tube code is not followed by a delimiter character.

2)   Column Name Uses Leading Zero.
This option only has any effect when the option to 'Export Tube Locations' is set to true.
When **True**, single digit column names are exported with a leading zero. Ex. A01. When **False**, they would be exported as A1.

3)   Date Format.
This option only has any effect when the option to "Export Date" is set to **True**.
The date is formatted as per the chosen date format.

4)   Delimiter Character.
This specifies the delimiter character which separates the exported fields.
Options are comma, semi-colon and tab delimitation.

5)   Export Date.
When **True**, the date is exported before each tube data.
The date format is set using the "Date Format" option.

e.g. "OKD20211203,0188251812,20211203,0188251776,….."

6)   Export Time.
When **True**, the time is exported before each tube data field. The
time format may be modified using the "Time Format" option.
e.g. "OKD10:56:23,0188251812,10:56:23,0188251776,……."

7)   Export Tube Locations.
When **True**, each tube location is exported in front of it's tube data.
The format of the tube location can be altered using the option "Column Name Uses Leading Zero".

e. g. 'OKDA01,0188251812,B01,0188251776,…..'

8)   Send Data Length.
When true, the first value in any response is the number of characters in that response.
Ex. The command **L** might get a response of **5OKL61**.

9)   Time Format
This option only has any effect when the option to 'Export Time' is set to true.
The time is formatted as per the chosen date format.
Format options: H = 24 hr format hour; h = 12 hr format hour, m = minute; s = second; tt = ae.g. am / pm.

8.   Data Structure

These options allow you to specify the format of all messages received from the server by adding a start and end character.

1) Data Field Prefix - The value entered here will prefix all responses from the server. The value can be a character, a non-printable character or a string. To enter a non-printable character, enclose its integer ASCII value in square brackets:
Ex. For a carriage return you would use **[13]** . For a carriage return, line feed, you would enter **[13][10]** .

2) Data Field Suffix - The value entered here will suffix all responses from the server. The value can be a character, a non-printable character or a string. To enter a non-printable character, enclose its integer ASCII value in square brackets:
Ex. For a tab, you would use **[10]**.
Example: If the Prefix = **X** and the Suffix = **[13]** , the server might return "XOKL45\r" for a Get Status command.

3) Order Results By - This command only affects the response to a **Get Data** command. If set to "Column" the results are ordered by e.g. A1, B1, C1….. A2, B2, C2…... If set to **Row** the results are ordered by e.g. A1, A2, A3…..B1, B2, B3,……

9.   Server

The server properties allow you to specify it's IP address etc. Note that the server must be disabled, then re-enabled using the Export TCP Server button in order for any IP address and port changes to take effect.

1) Echo Received Commands - When **True**, the responses from the server always include the "Command Acknowledgement" and the command which is being responded to, followed by any response value if applicable. The "Command Acknowledgement" is set in the "TCP Commands" section. Its default value is **OK**.

Ex. The Start Command S will receive a response of **OKS**.

Ex. The Get Status Command **L** may receive a response of **OKL45**.

When **False** , a command which does not request a value will receive no response, while a command which does request a value will receive only the value as a response.

Ex. The **Start** Command **S** will not receive a response.

Ex. The **Get Status** Command **L** may receive a response of **45**.

2)	Keep Connection Alive - If this value is set to true, the server will disconnect from the client immediately following a received command. The default value is **False**, in which case the Server will not disconnect and will continue to receive commands from the client.

3)	Server IP Address Mode - This sets the method of obtaining the IP Address for the Server. The options are:

Automatic (default): The server will automatically obtain a free IP address from the local network using DNS.

Fixed : The server will use whatever value is set by the user in the "Fixed IP Address" field.
Loopback : The server will use the local loopback address 127.0.0.1.

4)	Server Port Number - The user may set the server port number here. The default value is 8000. However, if connection issues are encountered, it may be because another service is using that port number, so it may necessary to try using a different port number.

22 - ODBC

Exporting using an ODBC connection

- This export function allows you to setup a connection to an existing database table via ODBC.
- The ODBC export method is used to fill existing databases and tables with data records. It does not create databases or tables.
- A demo database is available in the application directory. This is called "Thermo VisionMate Demo Database.mdb". The demo database is a good example of how the database tables should be structured.

- The data may be exported to the following database types:
- Jet (e.g. MS Access)
- SQL Server
- Oracle
- DSN (ODBC Data Source Name)

Viewing the ODBC Configuration Tab

1. Open the "**Export**" menu.
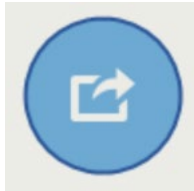
2. Open the "ODBC" sub-menu, and select the "ODBC" option to bring up the ODBC configuration tab.

Connection Details Group (Items Required Are Dependent On The Database Connection Type)

Item	Description
Database	The database file name. Use the browse button to locate the database.
Database Connection Type	The connection type of either MS Access, SQL Server, DSN or Oracle.
Database Login Name	The login name for the database if required.
Database Login Password	The password for the database if required.

Database Server	The database server name if required.
Database Driver	The ODBC driver for the database type. This list is filled using the available drivers registered on the system.
DSN	If using a DSN connection, this is the DSN name. The list is filled automatically using the DSN names registered in Windows.
Table	The name of the table to which you wish to export data.

Data Fields Group

Item	Description
Date Field Name	The field name to which the date should be written
Time Field Name	The field name to which the time should be written
Rack ID Field Name	The field name to which the Rack ID should be written
User Column 1 Field Name	The field name to which the 'User Column 1 Value' should be written
User Column 2 Field Name	The field name to which the 'User Column 2 Value' should be written
User Column 1 Enabled	True or False option to enable writing to User Column 1
User Column 2 Enabled	True or False option to enable writing to User Column 2
User Column 1 Value	The value to write to User Column 1 if enabled
User Column 2 Value	The value to write to User Column 2 if enabled

Pilot System Group

Item	Description
Clear Results before Write	If using the Pilot system, this option clears any results in the data table before commencing to write to it.

Rack Method Group

Add new record for each	Option to either write a database record for each tube, or for a whole rack.

There are two record creation methods:

The difference between the two types is that one makes a new row in the database for each **RACK**. So it might have the rack ID column followed by 96 columns for tube codes A1 to H12.
This gives you a table with a lot of columns, but only one row for each rack.

The second method creates a row in the database for each **TUBE**. So it might have the rack ID column followed by a tube location column, then a tube code column.
This gives a table with much fewer columns, but you will add Ex. 96 rows for each rack.

Create a record for each tube:

- This method creates a new record for each tube in the rack. So for a 96 tube rack, 96 new records will be created.
- Each record can contain the Rack ID, date, time and User ID as well as the tube code and location.
- The tube location can be stored either in a single field (e.g. "Tube_Location") or split into two individual fields for the location row and location column (e.g. "Tube_Row" and "Tube_Column").

Create a record for each rack:

- This method creates a single new record for each rack.
- Each record contains the Rack ID, date, time and User ID.
- Each tube's code is placed in a separate column named A01, A02, A03 etc.

Record Rack Details Group

(Only used if 'Add new record for each Rack' is selected)

| Item	Description
Use Leading zero in Tube Location	True or false option to place a zero in front of single digit tube location fields. E.g. '09' instead of '9'.

Record Tube Details Group
(Only used if 'Add new record for each Rack' is selected)

Item	Description
Store tube location in	Option to record each tube location in a single database field (e.g. Tube_Location), or to record the location in separate fields (e.g. Tube_Row and Tube_Column).
Tube Code Field	The name of the database field where the decoded tube code should be written.
Tube Location Separate Field Name Column	If opting to store the tube location in separate fields, this is the field to which the location column will be written.
Tube Location Separate Field Name Row	If opting to store the tube location in separate fields, this is the field to which the location row will be written.
Tube Location Single Field Name	If option to store the tube location in a single field, this is the field to which the location will be written.

Connecting to the demo database

- A demo MS Access database is installed into the program directory.
- It contains two tables named "Tubes" and "Racks" which store the records in the two possible formats.

1. Open the "Export" menu.
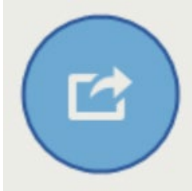
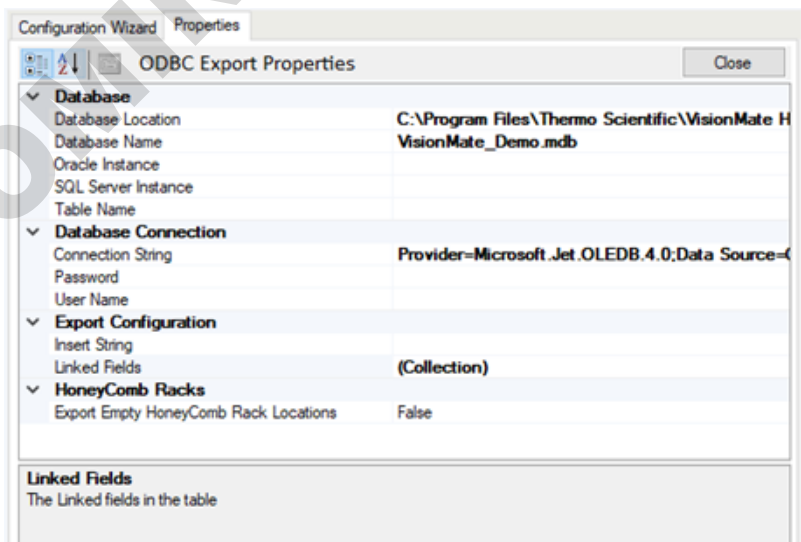2. Open the "ODBC" sub-menu, and select the "ODBC Configuration" option to bring up the ODBC configuration tab.

3. Set the Database location by browsing to the database file.
(By default this will typically be C:\Program Files\Thermo Scientific\VisionMate HSX \Support\ Sample ODBC Database\VisionMate_Demo)

4. Set the following properties within the ODBC configuration tab:- (see picture below)

Property	Value
Database Connection Type	MS Access
Driver	Microsoft Access Driver (*.mdb)
Table Name	Tubes
Date Field Name	Log_Date
Rack ID Field Name	Rack_ID
Time Field Name	Log_Time
User Column 1 Enabled	False
User Column 2 Enabled	False
Add new record for each	Tube
Store Tube Location in	Separate Fields
Tube Code Field	Tube_Code
Tube Location Separate Field	Tube_Col
Name Column	
Tube Location Separate Field	Tube_Row
Name Row	

5. Ensure that you do not have the Tubes table open in MS Access and complete a scan. The results will be stored to the table after the scan is complete.

Connect to a database using the ODBC Wizard.

The ODBC Wizard simplifies the process of configuring data export to a database.
Open the "ODBC" sub-menu of the "Export" menu, and select the "ODBC Configuration"
option to bring up the "Configuration Wizard" tab, displaying the welcome screen.
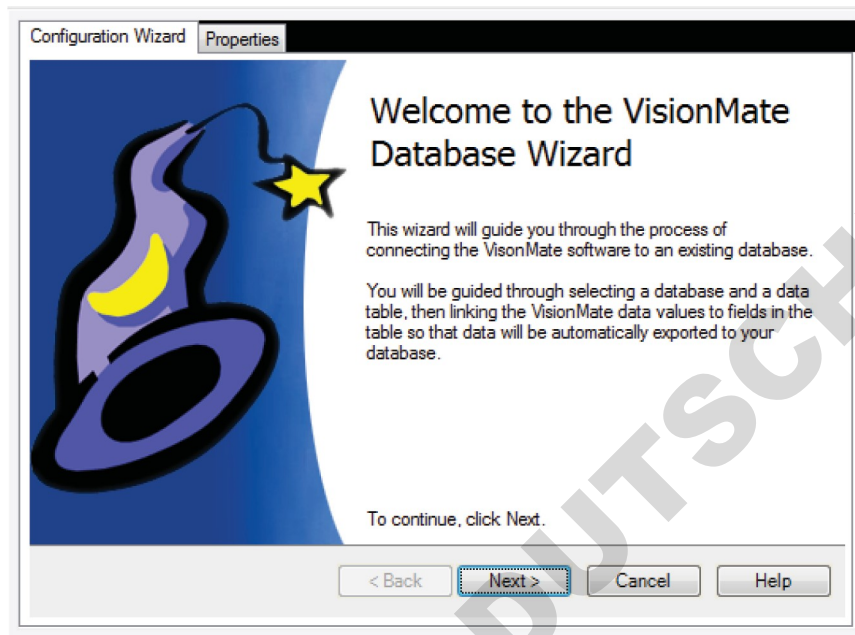
The next page allows you to select the database file you wish to export data. Click the
browse button to locate the database file.
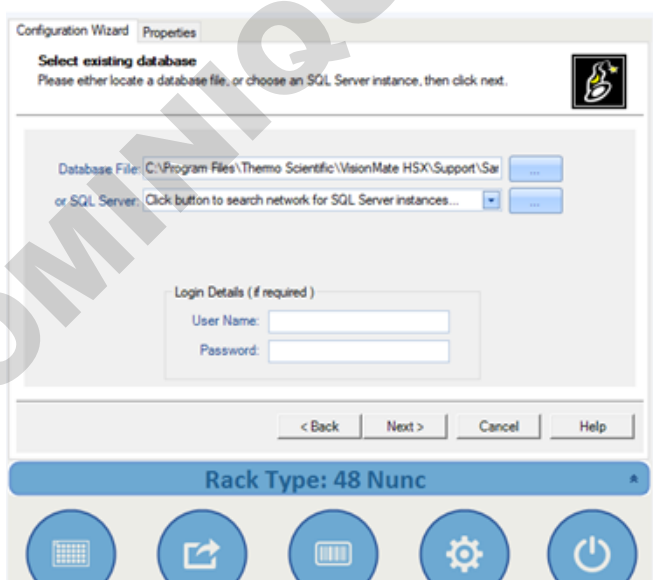
The third screen displays all of the available user tables found in your database. Select the table you wish to use, then click next.

The screen shows all of the available fields in the table to which data can be written.

Column Descriptions:
Name: The name of the field in your table.
Data Type: The data type of the field in your table.
Max Length: The maximum character length of data which can be written to textual fields.

Linked To: A drow-down box which contains a list of the VisionMate parameters which can be written to the database. Link a VisionMate parameter to a table field by selecting the parameter here.

String Constant: To write a fixed string constant to a table field, "String Constant" from the drop-down box and enter the string constant here..

The screen show the generate insert statement. You may optionally specify the exported values that are encapsulated in quotes by enabling and specifying the quote characters.

Click "Test" to perform a test write to the database table.
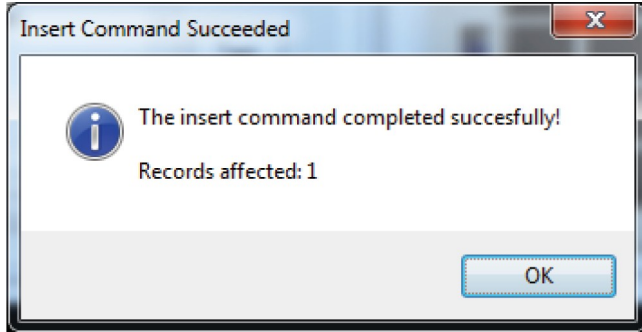
A dialog displaying either a success result or a failure description message will be displayed. In the event of a failure, the user may modify the connection string manually by either editing the "insert Comman Syntax" text box or returning to the previous screen and checking the linked fields that are compatible and valid.

Click Finish to complete the Wizard. The generated configuration parameter are shown in the properties tab and may be edited if required.
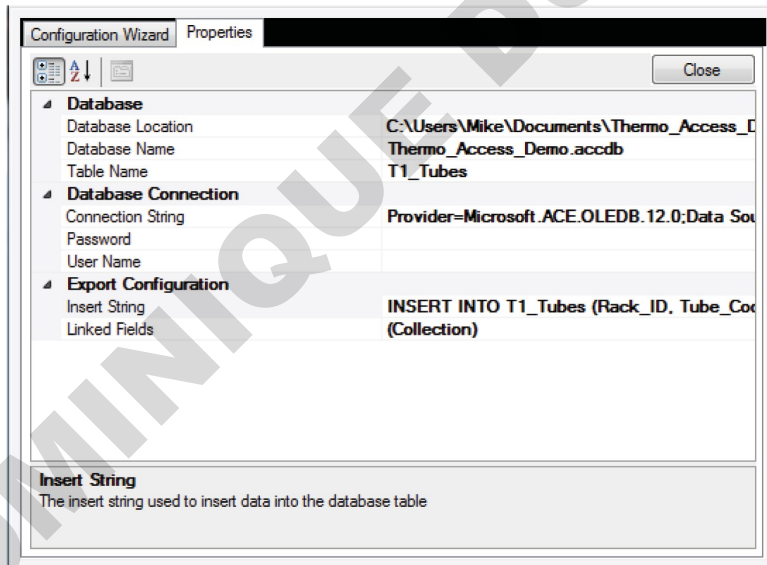
23 - Spills and Cleaning/ Decontamination

Note: If the VisionMate HSX is used in a manner not specified in this manual by Thermo Fisher Scientific, any protection provided by the reader may be impaired.

Condensate from frozen racks should removed from the reading surface of the VisionMate HSX using an absorbent cloth. Do not use any abrasive materials that may cause damage or scratch on the reading surface.

For general cleaning, a cloth wetted with water can be used to wipe down the base reader. Alcohol wipes may be used as well if needed. An absorbent cloth should be used to dry the reader after cleaning. Avoid the use of abrasive chemicals that may cause damage to the housing, reading surface, or USB cables.

If chemical or biological matter is spilled on to your VisionMate HSX, the base reader and 1D linear barcode reader should be disconnected from your computer. This will deenergize the reader. Wipe the spilled material off the reader as soon as possible using an absorbent cloth. Alcohol wipes, dilute bleach solutions, or dilute sodium hydroxide solutions (<1%) can be used for decontamination. Avoid the use of any abrasive chemicals as this may damage the reader and void any warranty.

After the reader has been decontaminated, wipe off any residual moisture on the reader and ensure that the reader is fully dry. Reconnect the base reader to your computer and launch the VisionMate Suite Software. Using a rack with empty tubes, test the functionality of the base reader. If any abnormalities are observed, disconnect the reader from your computer immediately to deenergize. The reader should be returned for Thermo Fisher Scientific for service and should not be used further.

If the VisionMate HSX needs to be returned to Thermo Fisher Scientific for service, it is the responsibility of the user to ensure that the reader is decontaminated prior to shipment. Alcohol wipes, dilute bleach solutions, or dilute sodium hydroxide solutions (<1%) can be used. Contact your local Thermo Fisher Scientific representative or use the contact information at the end of this manual to obtain a decontamination form.

24 - Transportation and Storage

When transporting the VisionMate HSX around your laboratory, please ensure that the reader is protected from accidental damage that may occur in the process. The original product cartons, box, and protective cushioning materials provide resistance to movement and damage to the product during transport. The VisionMate HSX should remain in this packaging until it has been moved to the installation site. At that point, the product can be unboxed and set up as described in previous sections of this manual.

If the VisionMate HSX needs to be returned to Thermo Fisher Scientific, or transported between your facilities, package the reader in a way that will prevent movement and damage during shipping. The cartons, box, and protective cushioning that your product was delivered in should be reused for shipping. The USB cables should be coiled and tied to prevent damage to these components. Once all the VisionMate HSX components have been repackaged in the original product packaging, place inside a second shipping box with sufficient cushioning to fill void space. Environmental conditions for shipping should be between 10-30°C, with a relative humidity of 10-80%. Transportation and packaging methods other than what is described here, including not using an overpack shipping box, may result in damage to your product during shipping. Thermo Fisher Scientific will not be responsible for product damage incurred during shipping from the user to one of our facilities.

The VisionMate HSX should be placed in the original packaging for long term storage. When choosing a storage location, avoid placements that may result in falls or contact with other equipment. The storage environment should be between 10-30°C with a relative humidity of 10-80%.

25 - Technical Specifications

Dimensions (W x D x H)	5.9"/150 mm x 7.8"/200 mm x 6.3"/160 mm
Weight	8.8 lbs/4 kg
Power Supply	Powered by USB: 5V DC / 0.5A
Speed	As little as 1 second/rack
Decoding Capacity	1 rack, 1 tube or 2D code (in single tube mode)
Supported Barcode Type	Any Thermo Scientific 2D Barcoded Storage Tube as well as virtually any other tube with high contrast 2D codes
Computer Requirements	4 GB RAM PC with Microsoft® Windows 10
Connection Method	Via supplied USB cable to internal USB2 or USB3 port (External USB hubs not recommended)
Ingress Protection Rating	Ingress Protection Rating IP66 according to IEC 60529 No rating according to UL 50E / CSA C22.2.94.2.
Installation Site	Indoor use only
Operating Temperature Range	5 – 40°C
Operating Humidity Range	10-80% (non-condensing)
Operating Altitude Range	Sea level to 2000m (6500 ft.) above sea level
Pollution Degree	2

26 - Frequently asked questions

Can I use my VisionMate Scanner to scan 384 tube racks?

Yes, the version HSX scanner reads Thermo Scientific 384-format tube racks

What affects the speed of my VisionMate scanner?

The speed of the scanner is generally influenced by:

- The computer hardware. Increasing memory and processor speed will often decrease scanning times.

- The selected rack type. Ensuring that you have the correct rack type selected will ensure quicker scanning. Sometimes a different rack type will work better on some tubes.

- Environmental Lighting. Avoid placing the scanner in direct sunlight or under a bright light as this can cause variations over the scanning area and may increase scan times and no-tube /no-read recognition.

Can I use a USB 1.x port to connect the VisionMate Scanners?

No, the scanner requires a USB 2 port. Using a USB 1.x port will cause very slow scan speeds and will very likely cause erratic performance and application errors.

Can I scan very cold racks on the VisionMate Scanner?
Yes. The HSX scanner will accept cold racks after removal from storage. The scanner contains protection against internal moisture. If the base of the tubes are frosted, it may be possible to remove this with an alcohol wipe.

Do I need to perform maintenance on my VisionMate scanner?
The VisionMate HSX scanner does not require any maintenance apart from keeping the glass and sensor holes clean and dust-free. Ensure that you do not allow any foreign particles to enter the scanner holes at the two corners of the glass.

27 - Regulatory Information

Europe:
We herewith declare under our sole responsibility that the above mentioned products meet the provisions of the following EC Directives and harmonized standards:

2014/30/EU (EMC Directive)
2014/35/EU (LVD Directive)
2006/42/EC (Machinery Directive)
2012/19/EU (WEEE Directive)
2011/65/EU (RoHS Directive)

United Kingdom:

We herewith declare under our sole responsibility that the above mentioned products meet the provisions of the following UK Requlation(s):

Electromagnetic Compatibility Regulations 2016
Electrical Equipment (Safety) Regulations 2016
Supply of Machinery (Safety) Regulations 2008
The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012

United States of America:

FCC Compliance Statement products subject to **Part 15B**
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation

Canada:

This device complies with ICES-003 (Issue7) of the ISED Rules

CAN ICES-003(B) / NMB-003(B)

28 - Contact Information

For technical support in North America and Europe, please contact us at the following email address for your region:

North America
info.LH@thermofisher.com

Europe
techsupport.labproducts.eu@thermo.com

For technical support of outside the regions listed above, and all for other product inquiries, please visit www.thermofisher.com, and go to the Contact Us page under the Services menu. After choosing a support option, search for your product, and select your country/region to find the most up to date information on:

Product Information
Contact Phone Numbers
Contact Email Addresses
Regulatory Information
Instrument Service

Software updates for Thermo Scientific barcode readers can also be found by visiting out website. Search www.thermofisher.com by catalog number or product name to find the product page, and click the Sample Storage Software Downloads link to access the latest software for your product.

Find out more at **thermofisher.com/samplestorage**

Thermo Fisher Scientific Oy
Ratastie 2
01620 Vantaa
Finland

ThermoFisher
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