User Guide

MESO® QuickPlex Q 60MM

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1 Introduction

MSD develops, manufactures, and markets innovative and high-performance instruments, assays, and software for single and multiplex testing. For more details and information about MSD® products and applications, please visit the MSD website at www.mesoscale.com.

1.1 Intended Audience

This guide describes how to operate the MESO QuickPlex™ Q 60MM instruments using the Methodical Mind® software to acquire electrochemiluminescence (ECL) plate data using MSD MULTI-ARRAY® plates. Users should be familiar with general computer and Microsoft Windows terminology and standard laboratory practices.

ⓘ This guide displays images relevant to Methodical Mind Instrument software versions 1.2.3 and higher. Other software versions may appear or function differently. To update your Methodical Mind Instrument software, contact MSD Scientific Support or Instrument Service.

1.2 Intended Use

MESO QuickPlex Q 60MM instruments are for research use only and are not intended for use in diagnostic procedures.

1.3 Safety Information

The *MSD Reader Safety Guide* provides safety and regulatory information related to the use of the instrument and supplemental information on the proper use and management of the operating system, computer, and software.

MSD provides a printed safety guide with the instrument. Electronic copies are available on the www.mesoscale.com® website and in the Methodical Mind Instrument software (see Section 4.5).

FIGURE 1.1. The MESO QuickPlex Q 60MM system.

2 System Overview

The MESO QuickPlex Q 60MM is operated using the Methodical Mind suite of software, including Methodical Mind Instrument software, which facilitates instrument operation, plate data storage, data review and export. Methodical Mind Instrument software is designed to be used with Methodical Mind Enterprise™ software, which manages experiment design, supports team collaboration, and performs further experimental data analysis and data storage.

The instrument uses a sensitive, high-resolution CCD camera and lens system to detect light emitted from MSD assay plates. The custom-designed lens enables a highly efficient and uniform collection of electrochemiluminescence (ECL) generated light. Plates are transported to the CCD camera viewing area via a high-precision mechanism.

2.1 Specifications Overview

The MESO QuickPlex Q 60MM instrument has the capabilities listed below. For detailed specifications, see Section 11.1.

- High sensitivity with a dynamic range that exceeds 4 logs
- Compatibility with all 96-well QuickPlex Ultra™ and 96-well QuickPlex™ plates
- Read time of 1 minute, 23 seconds per QuickPlex Ultra plate
- Internal barcode reader that automatically detects the plate type and reads customer barcodes
- Integrated plate stacker for loading and unloading up to five plates at a time

2.2 System Components

MESO QuickPlex Q 60MM instruments include the following components.

- Touch-screen Laptop computer
- Preinstalled Windows 10 IoT Enterprise LTSC 2021 operating system
- Preinstalled Methodical Mind Instrument software
- Instrument and computer power supplies
- Power cables
- Printed *MSD Reader Safety Guide*
- QuickPlex electronic test plate
- USB A to B communication cable
- Surge Protector

3 System Component Details

This section describes the components of the system.

3.1 Surge Protector

MSD supplies a surge protector with this instrument. Ensure the surge protector is suitable for the incoming line voltage. Connect both the instrument and the computer AC power cables to the outlets on the surge protector to protect from power line transients.

3.2 Power and USB connections

The On/Off switch and connection ports are on the back of the instrument. For the power connection, connect the 6-pin plug from the power adapter to the 6-pin power input port on the instrument, and connect the AC power cable to the power adapter and the surge protector. For the data connection, connect the USB cable to the USB ports on the instrument and computer.

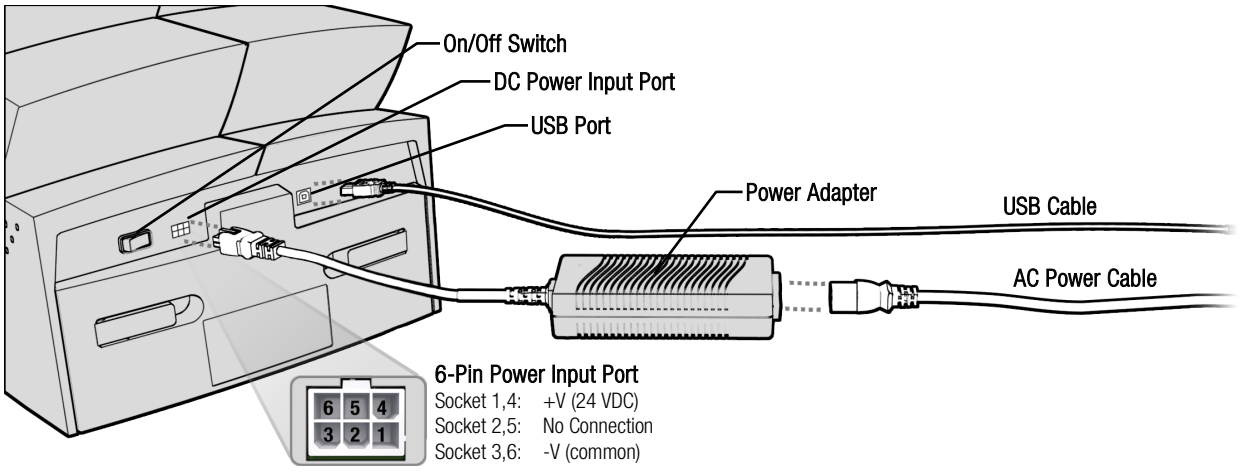

FIGURE 3.1. MESO QuickPlex Q 60MM I/O panel and connections

3.3 Camera and Lens

The cooled CCD camera and lens system is housed inside the tower portion of the instrument. Leave the instrument powered on to maintain the camera's operating temperature.

3.4 Status LEDs

The status LEDs indicate the operational mode of the instrument.

- **Steady blue:** Standby mode
- **Blinking blue:** Processing a plate
- **Steady red:** Instrument not ready to process a plate

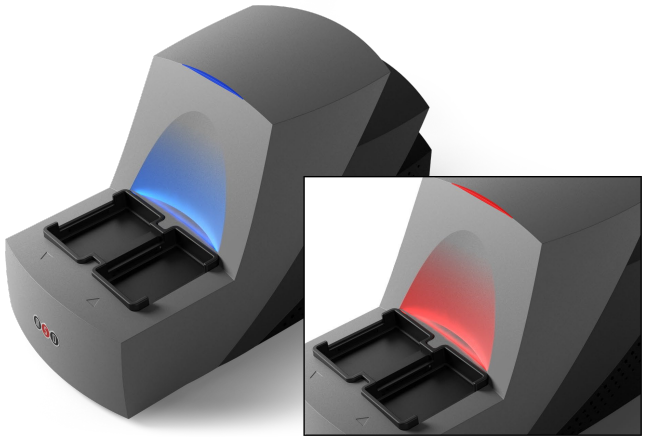

FIGURE 3.2. Instrument Status LEDs.

3.5 Motion Control System

The instrument uses a high-precision mechanism for transporting plates from the input stack (right), into the CCD camera's viewing area, and into the output stack (left).

FIGURE 3.3. Instrument with a plate loaded on the input stack.

3.6 Plate Barcode Reader

The instrument uses a single internal barcode reader to read plate barcodes before reading the plate data. The instrument software uses the MSD plate barcode on each plate for identification and tracking. Customers can also place an additional barcode label on each plate. See Section 7.2 for information on enabling customer plate barcodes.

3.7 Electronic Test Plate

Each instrument includes an electronic test plate to verify instrument operation without using chemical reagents. This plate, which contains an electronic circuit board housed in a plastic carrier, simulates a QuickPlex plate. Keep the electronic plate clean and free of dust and debris and store it in the provided case when not in use.

ⓘ The electronic test plate cannot be used for instrument calibration. Use the appropriate Performance Qualification (PQ) Kit (C/N RA2QQ-1) to test instrument performance. See Section 8.1.2 and the PQ Kit product insert for more information.

FIGURE 3.4. The MESO QuickPlex Electronic Test Plate.

3.8 Methodical Mind Instrument Software

The Methodical Mind Instrument software is used to configure and operate the instrument, acquire, store, and export plate data. The software has multiple modules described below.

3.8.1 System Function Module

The System Function Module is used for software login and configuration.

3.8.2 Installation Module

The Installation Module guides users through the execution of the installation test to verify a new instrument is operating and performing as expected. After completion, the software will unlock the Reader Module.

3.8.3 Reader Module

The Reader Module supports the operation of the instrument, provides access to the last 30 days of data, and automatically exports plate data to a required external customer-defined folder.

3.8.4 Audit Trail Module

The Audit Trail Module provides access to all recorded audit events that have been logged by the instrument software. This module allows users to review and export the audit trail.

4 Getting Started

This section provides information on setting up the computer, configuring the software, connecting the software to your network, and reading plates. If you need help at any point during this process, contact Scientific Support.

> ⚠ CAUTION: Carefully read and understand all information in the *MSD Reader Safety Guide* before using the instrument and the Methodical Mind software. Failure to read, understand, and follow the instructions in the MSD Reader Safety Guide may result in damage to the product, injury to operating personnel, or poor instrument performance.

4.1 Instrument Installation

To install the instrument, refer to the printed *Installation Guide*, included with the instrument.

4.2 Computer and Network Setup

When setting up the computer, your IT department should follow the *Instrument Computer Setup Instructions* and review the *MSD Reader Safety Guide* for relevant warnings.

ⓘ The instrument computer is configured with the default Windows "administrator" user enabled. Your IT department should join the computer to the organization's domain, add the appropriate domain administrators, and disable the default Windows "administrator" user.

Connect the computer to your organization's network and allow traffic to the methodicalmind.com™ domain so the Methodical Mind Instrument software can connect to Methodical Mind Account Services. Once connected, the software will automatically:

- Download ProductLink™ information files that contain MSD-provided data necessary for reviewing and exporting plate data and ensuring the plates being used are genuine MSD-manufactured products.
- Upload performance data, allowing MSD to assist with instrument and assay troubleshooting.

4.2.1 Data Storage

To set the Data Export Location, enter the network location provided by your IT department.

> ⚠ CAUTION: The instrument laptop is not intended to be a data storage device. Failure to specify a network storage location may result in data loss.

4.2.2 Team Mode

Organizations may optionally enable a connection to TeamLink by having users log in with assigned Methodical Mind credentials. TeamLink™ connectivity will enable team collaboration and enforce user access control through user-assigned roles.

ⓘ See the *Methodical Mind TeamLink User Guide* for information on configuring your account, creating teams, and setting up and assigning roles to users.

4.3 Log In to Windows

Log in to Windows. If this is the first time logging in to Windows, use the default Windows administrator password, found in the *Instrument Computer Setup Instructions*.

> ⚠ CAUTION: During the initial log in, you must change the administrator password. Retain this new password until domain administrators are configured in Windows. MSD is not able to recover lost passwords.

4.4 Log In to Methodical Mind Instrument Software

Start the Methodical Mind software using the Methodical Mind shortcut on the Windows desktop. If the software displays the end-user license agreement (EULA) or the Terms of Use (ToU), read the agreement and click *Accept*.

4.4.1 Log in with Methodical Mind Credentials (Team Mode)

To log in to the software with Methodical Mind credentials, you must be a member of a team with a role that has permission to use the Methodical Mind Reader module. If you have not received an email with your team information asking you to set your password, contact your Methodical Mind Team Administrator.

ⓘ For instructions on setting up your account, teams, and users, see the *Methodical Mind TeamLink User Guide*.

If this is your first time logging in to Methodical Mind:

1. Set your password using the link in the email from the Methodical Mind TeamLink module.
2. Check that the login fields are labeled *Username* and *Password*. If the software displays *Windows Username* and *Windows Password*, select *Use Methodical Mind Login* from the MesoSphere™ menu to change the login method.
3. Type your email address in the *Username* field and press Enter.
4. Type your password in the *Password* field and press Enter.

   ⓘ If you do not remember your password, see Section 9.5.
5. If prompted to set up two-factor authentication (2FA), install a 2FA app, such as Google Authenticator, on your mobile device, scan the displayed barcode, and enter the 2FA code displayed in the app.
6. If prompted, select the appropriate account and team.

4.4.2 Log in with Windows Credentials

If the software cannot connect to the Methodical Mind Account Services via Methodical Mind credentials, you may use Windows or domain credentials to log in to the software.

Users logging in with Windows credentials must be members of a *ConfigurationManager* group to access the *Software Configuration* feature. To provide access, create a *ConfigurationManager* group and add authorized users to this group as follows:

1. Type "Computer Management" in the Windows Start menu and select *Run as administrator*.
2. Expand *Local Users and Groups*, right-click the *Groups* folder, and select *New Group*.
3. Type "ConfigurationManager" (no spaces) in the Group name field, click *Create* and click *Close*.
4. Double-click the *ConfigurationManager* group, click *Add…*, and enter each Windows username separated with semicolons.
5. Confirm the usernames by clicking *Check Names*. Click *OK* when all users have been added.
6. Close the *Group* and *Computer Management* dialogs.

Once the users' accounts have been added to the *ConfigurationManager* group, they can log in using their Windows username and password. Users only need to be added to the *ConfigurationManager* group once.

7. After the software loads, ensure it displays *Windows Username* and *Windows Password*. If the software displays *Username* and *Password*, switch the login mode by clicking the MesoSphere and then *Use Windows Login*.
8. Type the same username in the *Username* field that you used to log in to Windows and press Enter.
9. Type your password in the *Password* field and press Enter.

4.5 Access Online User Guides

MSD includes printed copies of the *MSD Reader Safety Guide* and *Instrument Computer Setup Instructions* with new instruments. Select *User Guides* from the MesoSphere menu for electronic copies of relevant guides and instruction documents.

4.6 Instrument Startup

After the Installation module has been completed and the user has logged in for normal use, the software checks for errors. If the software detects no errors, the status bar will be blue. If the software detects an error, the status bar will be red with a message at the bottom of the MesoSphere menu.

FIGURE 4.1. Methodical Mind indicating an error condition.

4.7 Read the Electronic Test Plate

Select *Read* to proceed to the Reader module. Place the Electronic Test Plate included with the instrument into the input stack shown in Figure 4.2. Once the plate is placed in the input stack, click the Run button on the screen to begin the read process.

ⓘ Turn on the instrument at least 10 minutes before reading the electronic test plate to allow the camera to come to the appropriate temperature.

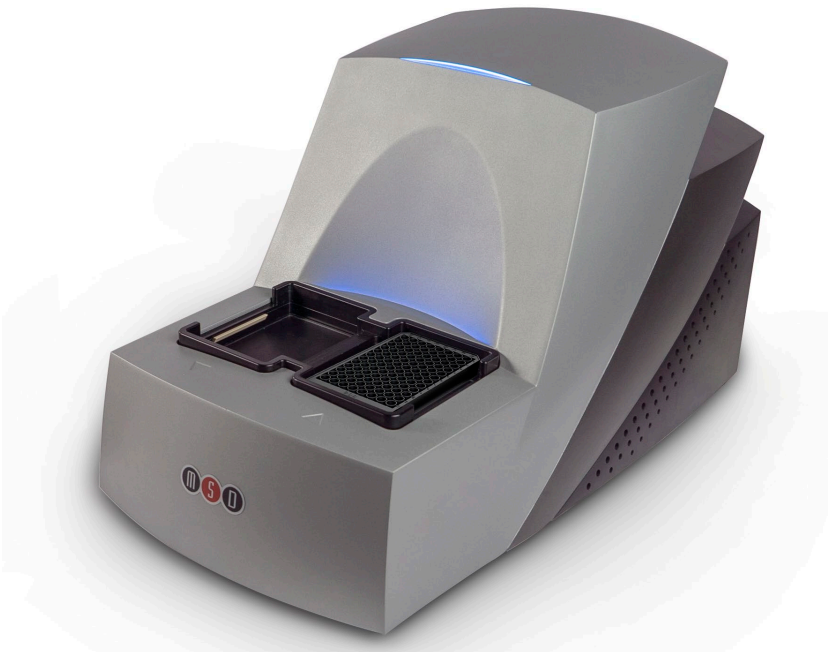

FIGURE 4.2. MESO QuickPlex Q 60MM instrument with a plate loaded on the input stack.

Select *End Run* when prompted.

When reviewing plate data, wells A9, B10, C11, D12, E4, F3, G2, and H1 should display numbers above 2,000. Select *Show Grid View* from the MesoSphere menu to switch the data view to confirm count values. All other wells should display background signal. The heat map should look similar to Figure 4.3.

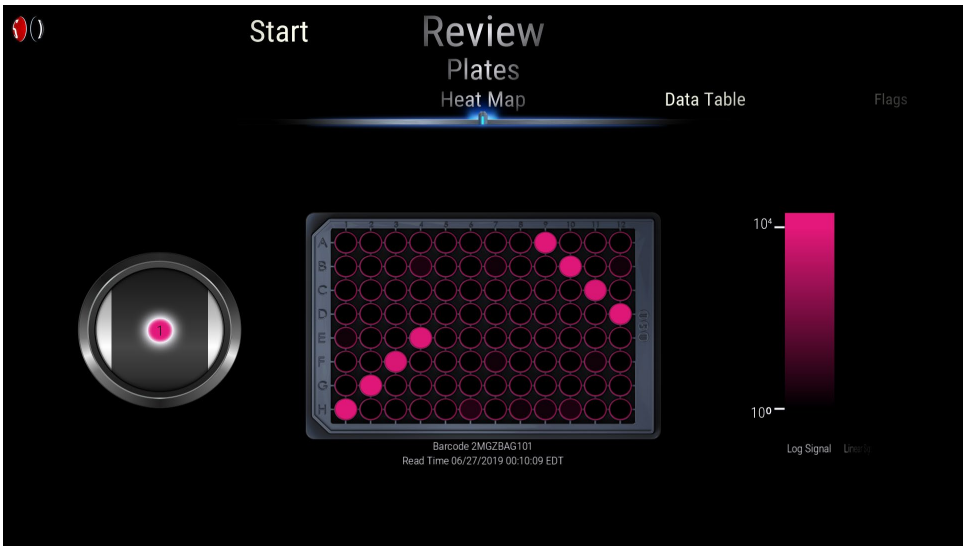

FIGURE 4.3. Electronic Test Plate Heat Map.

Once the Electronic Test Plate has been run, remove it from the output stack and store it in its case when not in use. The Electronic Test Plate can be reused to verify operation of the instrument or to demonstrate operation of the instrument to new users.

5 Read Plates

After you log in to the software, the two primary functions displayed are *Read* and *Review Recent Results*. Select *Read* to proceed.

5.1 Add a Run Name and Comment (optional)

Before selecting the Run button, you may add a run name and a comment. Choose descriptive run names to make it easier to locate your data (do not include any information that may identify individuals). The software displays run names below plate images and incorporates them into filenames with the *Verbose* export format.

If the software does not prompt you for a run name and comment, select the MesoSphere, and then *Set Plate Run Name*.

5.2 Select the Partial Plate Area (optional)

Each well can only be read once; the software will lock the plate data if a well is read more than once. Skip this section if you intend to read the entire plate.

Select *Partial Plate* from the MesoSphere menu to access the Partial Plate function. The software will read wells colored blue and skip those that are gray. All wells will initially be blue. Tap on a well to change it.

For previously read partial plates from the same instrument, enter the plate barcode in the field above the plate image and select *Check* to verify available wells. Wells that were previously read will be black and cannot be selected.

Select *Save Partial Plate* from the MesoSphere menu to return to the Run screen. Partial plate mode will become active for the run.

5.3 Read a Single Plate in a Run

To read a single full plate or a partial plate in a run, follow the steps below.

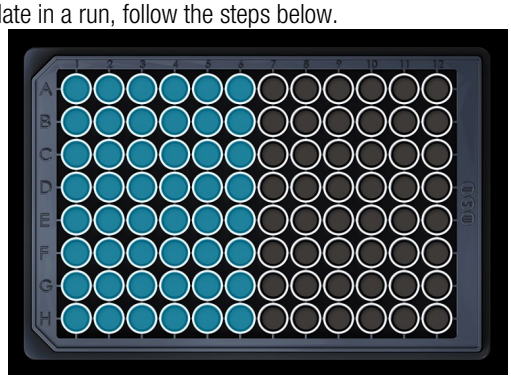

FIGURE 5.1. Partial Plate sector selection.

1. Place a plate on the input stack and select the Run button. After reading the plate, the instrument will eject it to the output stack.

   ⚠ CAUTION: Failure to save changes will results in a full plate read and lock the plate from future partial plate reads.

2. Select *End Run* when the software prompts you to choose whether to end or continue the run.

ⓘ At least 10 minutes before preparing your assays, turn the instrument on, turn the computer on, and log in to the software. This gives the camera time to stabilize its operating temperature. Leave your instrument and computer turned on between assays to allow the camera to remain at temperature.

5.4 Read Multiple Plates in a Run

To read multiple plates in a run, follow the steps below.

1. Load up to five plates on the input stack and select the Run button. The instrument will read each plate, eject it to the output stack, and check the input stack for another plate.

   ⓘ If you are leaving the area and want to prevent someone from canceling the run while the instrument is reading the stack of plates, select *Lock UI* from the MesoSphere menu. While locked, you can still place additional plates on the input stack.

2. Continue to add plates to the input stack and remove them from the output stack. Do not exceed five plates in either location.
3. If the instrument does not find a plate on the input stack, it will prompt you to end or continue the run. Load any additional plates for the run and select *Continue Run*. You can read up to 75 plates in one run.
4. When you have finished reading all plates that need to be grouped in a single run, select *End Run*.

6 Reviewing and Exporting Data

MSD recommends users review run data using Methodical Mind Enterprise's advanced data analysis tools. This section provides information on how to review and export plate data and audit trail events in the Methodical Mind Instrument software only. For more information about using Methodical Mind Enterprise to review analyzed data, refer to the training material available in the Training module of Methodical Mind Enterprise.

6.1 Review Plate Data

You can review plate data for a run immediately after you select *End Run*. You can also review all plate data generated in the last 30 days by selecting *Review Recent Results* from the initial Start step. To retrieve plate data after 30 days, see Section 6.3.1.

Swipe left or right to scroll through the wheel of plates. If more than ten plates are available for review, page numbers will appear below the plates. Select a page number to browse additional groups of plates.

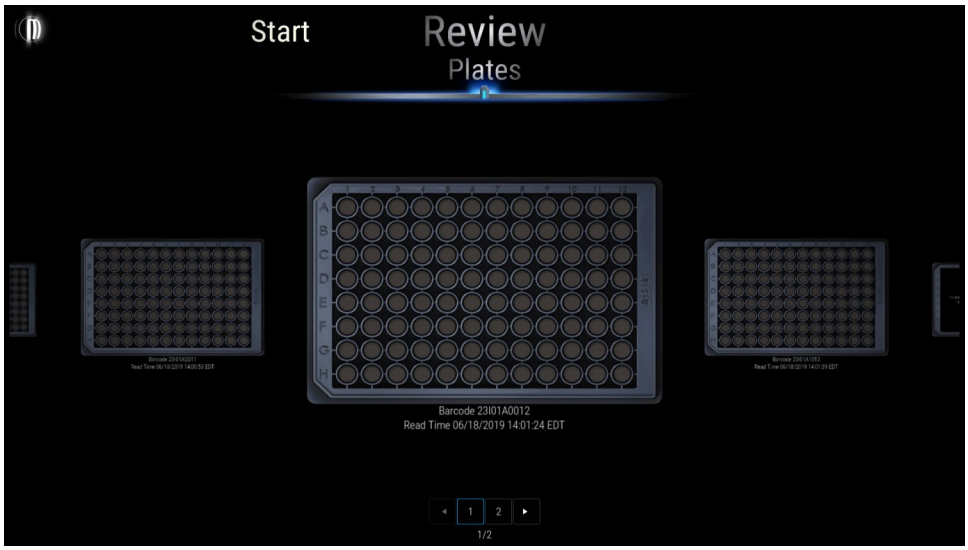

FIGURE 6.1. Review plate data wheel.

Tapping on one of the plate images opens a dynamic plate review screen for the selected plate.

If your plate is marked *Unconfirmed*, contact Scientific Support for assistance with unlocking the plate data.

6.1.1 Plate Data Heat Map

The first time you view a plate, the review screen shows a heat map representation of the ECL data. If you see a grid view representation of the data, select *Show Heat Map* from the MesoSphere Menu to switch the data view.

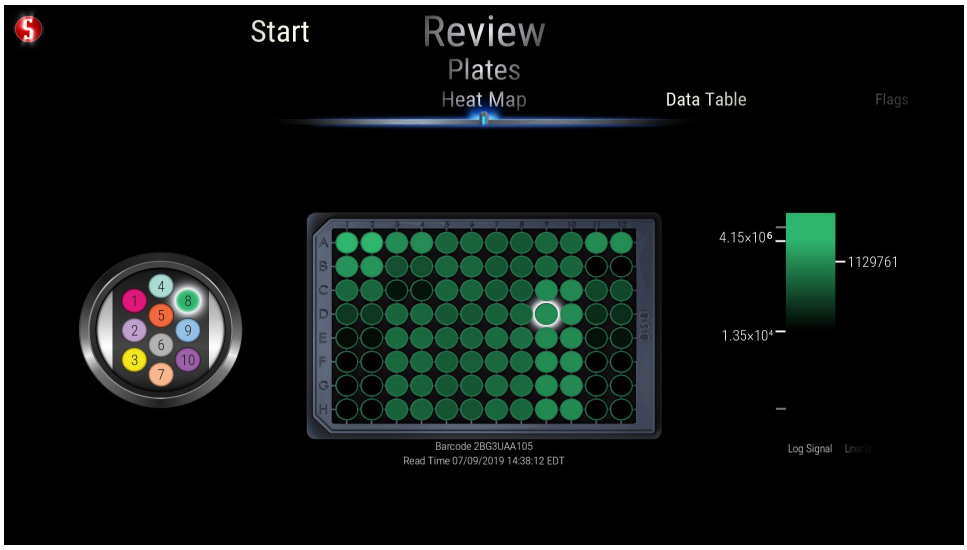

FIGURE 6.2. Plate data heat map view.

Select one of the well spots to the left of the plate heat map to display the selected spot's ECL data.

Select a well within the plate heat map to display the selected spot's ECL value on the scale to the right of the plate heat map. Adjust the color intensity and range by sliding the upper and lower limits of the scale as needed. Toggle the data from *Linear Signal* to *Log Signal* by sliding the wheel below the scale left and right.

6.1.2 Plate Data Grid View

The grid view displays the ECL values in a microplate grid pattern. If you see a heat map representation of the data, select *Show Grid View* from the MesoSphere menu to switch the data view.

Select one of the well spots to the left of the grid view to display the selected spot's ECL data.

Slide the horizontal wheel below the bottom right corner of the grid to toggle the data from *Linear Signal* to *Log Signal*.

FIGURE 6.3. Plate data grid view.

6.1.3 Plate Data Table

View the ECL data for the selected plate in a tabular format by selecting *Data Table* in the horizontal wheel at the top of the screen.

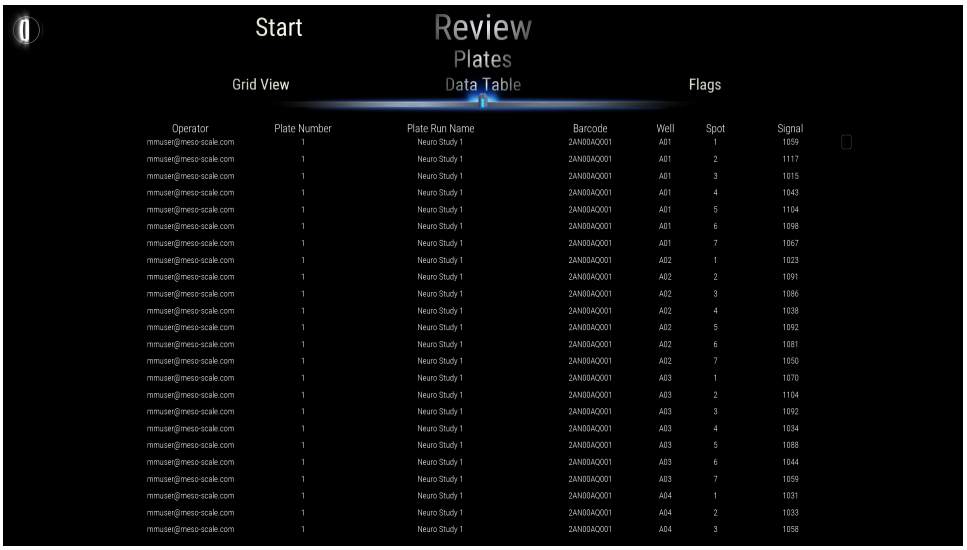

FIGURE 6.4. Plate data table.

6.1.4 Run Flags Table

If the software detects issues that may impact plate data during a run, it records run flags. These issues include scenarios such as failure to maintain camera temperature during the run, expired plates, unidentifiable or invalid test plates, previously read plates, mechanical issues preventing loading or unloading of plates, or the when the run was manually aborted. When run flags are present, an additional table will be available to the right of *Data Table*. Select *Flags* to display this table.

FIGURE 6.5. Run flags table.

6.2 Audit Trail

To review the table of recorded audit events, select *Audit Trail* from the MesoSphere menu. By default, audit events are listed in reverse chronological order with page number buttons at the bottom allowing access to additional pages of events. Reorganize the table by dragging column headers left or right, changing column widths, and clicking column headers to change the order.

Each event has a unique event code. For a list of all possible codes and what will trigger the event, contact Scientific Support.

6.3 Export Data

6.3.1 Automatically Saving Plate Data

The software automatically saves ECL data to a plate data file, as defined in *Software Configuration* > *Reader* > *Export Configuration*. **Users are required to change the export location to a backed-up and secure network folder.** Retain the plate data files as your source data record.

> ⚠ CAUTION: The instrument laptop is not intended to be a data storage device. Failure to specify a network storage location may result in data loss.

6.3.2 Export Plate Data

Users can review and export plate data from within the *Review* feature for up to 30 days.

1. Select *Review Recent Results* from the Start screen.
2. Double-click on the plate you wish to export.
3. From the heat map or a grid view, select *Export Plate* from the MesoSphere menu.
4. Choose a network location to save the plate data file.

Users can retrieve and export plate data at any time using the *Get Plate Data* feature.

1. Select *Review Recent Results* from the Start screen.
2. Select *Get Plate Data* from the MesoSphere menu.
3. Enter the plate barcode for the corresponding plate and select the *Check* button.
4. Select *Choose Format* from the MesoSphere menu to review or update the export format settings
5. Select *Save Copy* from the MesoSphere menu to select a network folder to save the plate data file.

ⓘ The Get Plate Data feature supports re-exporting plate data in a different format from what is defined in Export Configuration.

6.3.3 Export Run Flags

While reviewing run flags, export the run flag data by selecting *Export Run Flags* from the MesoSphere menu.

6.3.4 Export Audit Events

While viewing the audit trail, export the audit events to a CSV file by selecting *Export Audit Trail* from the MesoSphere menu.

Copy audit events to another program by selecting *Copy to Clipboard* from the MesoSphere menu. If rows are selected, only the selected rows will be copied. Data is copied in a tab-separated format and can be pasted directly into a spreadsheet.

7 Configure Software and Instrument Settings

Select *Software Configuration* from the MesoSphere menu to open the Software Configuration tool and select the software feature you wish to configure from the menu at the top of the screen as described below.

ⓘ If you log in with Methodical Mind credentials, you must be a Lab Manager or have another role with Reader and System permissions. If you log in with Windows credentials, you must be a member of the ConfigurationManager Windows or domain group.

7.1 Always Prompt for a Run Name

A user can enter a custom run name and a comment before starting a run. In *Reader* > *Instrument Configuration*, set *Always Prompt for Plate Run Name* to *On* to force users to enter a run name and comment or set it to *Off* to make this step optional.

7.2 Enable Customer Barcodes

You can configure the instrument to read an additional plate barcode and save the barcode information to the plate data record. In *Reader* > *Instrument Configuration*, set *Long Side Customer Barcode* to *On*. Add the barcode to the plate's long side, as shown below.

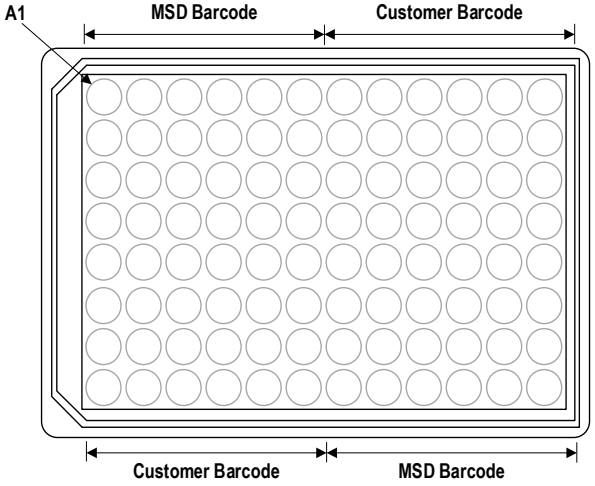

FIGURE 7.1. MSD and Customer Barcode label locations.

7.3 Automatic File Export Options

> ⚠ CAUTION: The instrument laptop is not intended to be a data storage device. Failure to specify a network storage location may result in data loss.

Modify the options in *Reader* > *Export Configuration* to meet your file export and data backup requirements.

- Change the *Export Data Location* path to a secure backed-up network location.
- *Standard Export* is set to *Yes* by default. The standard export file uses the filename format: *MSD Barcode_Read Date and Time.txt*. If you do not want to export plate data in standard format, first enable a *Custom Export* format, and then you can change *Standard Export* to *Off*.
- *Custom Export* is *Off* by default. Select one of the available custom export formats to enable it.
  - *MSD_Mfg* creates a file with additional instrument information used by MSD when investigating an instrument issue.
  - *MSD_Verbose_example* uses the filename format: *Run Name_Read Date and Time.txt*.
- *One Export for Multi-Plate Reads* is set to *No* by default. Change this option to *Yes* to create a single file for a multi-plate run.

7.4 Login/Logout Options (Team mode only)

Modify the options in *System* > *Login/Logout* to meet your login and security requirements.

- *Auto Logout* is set to *No* by default. To automatically log out inactive users, set *Auto Logout* to *Yes* and then set the *Time to Auto Logout* to the desired inactivity period that must pass to trigger the logout.

  ⓘ This feature operates independently of Windows settings and domain policies that lock the operating system.
- By default, users can log in with Windows and Methodical Mind Credentials. Set *Enable Windows Login* to *No* to force users to always log in with Methodical Mind credentials.

7.5 Virtual Keyboard

By default, the software displays a virtual keyboard for use with touch screens when a field requires keyboard input. Temporarily hide the virtual keyboard by tapping the ⌨ key located in the bottom left corner. To disable the virtual keyboard, go to *System* > *Login/Logout* and change *Show Virtual Keyboard* to *No*.

8 Maintenance

MSD instruments require minimal maintenance. Contact MSD Instrument Service for all procedures not listed below.

8.1 User Maintenance

User maintenance consists of keeping the outside of the instrument clean and basic maintenance of the computer. Inspect the instrument before and after each use to ensure no debris is present on or near the input and output stacks. Clean the instrument when needed, as described below.

8.1.1 Computer Maintenance

Periodic maintenance on the computer includes discarding old files, ensuring adequate disk space, and updating Windows. Use Windows *Disk Cleanup* for automated file cleanup. Use the Windows *Check for Updates* utility to install Windows Updates.

8.1.2 Performance Qualification

A Performance Qualification Kit—containing plates, reagents, and a protocol for verifying instrument performance—is available for purchase (C/N RA2QQ-1).

8.1.3 Cleaning and Exterior Decontamination

If fluid is spilled on or near the instrument, disconnect power and clean the outside surfaces using lint-free wipes with an appropriate cleaning solution (water, 70% ethanol, 1% bleach in water, or a mild detergent). Contact MSD Instrument Service if you believe fluid went inside the instrument.

9 Troubleshooting

9.1 SysInfo Software Troubleshooting Utility

The SysInfo Utility is a program that MSD uses to bundle Methodical Mind software settings, instrument configuration information, and log files to assist with troubleshooting.

To create a SysInfo file for Scientific Support to review:

1. Browse to the folder C:\Program Files(x86)\Methodical Mind\bin\
2. Right-click on SysInfo.exe
3. Select *Run As Administrator*
4. Send the file C:\sysinfo\SysInfo.zip to scientific.support@mesoscale.com.

9.2 The Instrument is Not Able to Read the Plate Barcode

If the instrument cannot read the MSD plate barcode, the software will prompt the user to select from the following options:

- *Skip Plate*: This is the recommended option. Use this option to skip this plate and immediately eject it to the output stack. Rotate the plate 180 degrees and place it back on the input stack to allow the instrument to read the second barcode. If the second barcode cannot be read, continue to the next option.
- *Enter Plate Barcode*: If the plate barcode is readily available from the plate pouch, manually enter it in this field.
- *Select Plate Type*: If you cannot use the above options, select the plate type and enter the barcode after the run is complete.

> ⚠ **CAUTION:** Selecting the wrong plate type will produce invalid plate data.

- *Cancel Run*: This will stop the run, eject the plate, and display the review screen.

9.3 How to Unlock an Unconfirmed Plate

To ensure data integrity, Methodical Mind marks plates as *Unconfirmed* in cases where the plate data cannot be linked to ProductLink Information or if the data may have been compromised. Methodical Mind will lock plate data in the following cases:

- *The barcode could not be read*: If the barcode is available from the plate pouch or the plate's side, enter it into the *Plate Barcode* field and press Enter. If the barcode is not available, use a data integrity key to unlock the plate data.
- *The plate has been previously read:* If you are confident that the wells you wish to use have only been read once with MSD Read Buffer added, enter a data integrity key into the *Data Integrity Key* field, and press Enter.
- *This is an Electronic Test Plate, but the data does not match expected patterns*: The software expects electronic test plate data to match a specific pattern (see Section 4.7). If the pattern does not match, the software will lock the data. Reread the electronic test plate. If the problem persists, contact Instrument Service. The instrument or plate may require service.

9.4 How to Request a Data Integrity Key

Go to https://www.mesoscale.com/DataIntegrityKey, fill out the data integrity key form, selecting the correct plate type and spot pattern combination, and MSD will email you a data integrity key and, if needed, a ProductLink file as well, to unlock one plate.

ⓘ You must log in with Methodical Mind credentials for data integrity keys to be confirmed. If you cannot log in with Methodical Mind credentials, contact Scientific Support for further assistance.

9.5 How to Reset or Change Your Methodical Mind Password

To reset your password, select *Forgot Password* from the MesoSphere menu, enter your username, and select *OK*. You will receive an email to reset your password.

To change your password, select *Change Password* from the MesoSphere menu and enter your current password and a new password.

9.6 Issues With Logging In or Software Loading

If you cannot log in, check each of the following items.

- Switch the login type to *Methodical Mind Login* or *Windows Login*, as described in Section 4.3 and Section 4.4.
- Even if you have Methodical Mind credentials, you may not have access to the software. Ask your Methodical Mind Team Administrator to confirm you are on a team and have an Operator, Designer, or Lab Manager role.

If the status bar is red with a network error at the bottom of the MesoSphere menu, visit https://msd.methodicalmind.com/ using Chrome, Edge, or Firefox. If the website does not load, ask your IT department to enable HTTPS traffic to methodicalmind.com and s3.amazonaws.com on TCP port 443.

If problems persist, contact Scientific Support to upgrade to the latest version of the Methodical Mind Instrument software.

9.7 Instrument errors

If you receive an instrument error:

- Make sure Windows is not set to go to sleep.
- Check all cable connections are secure, restart Windows, and run the electronic test plate.
- If you continue to experience the same errors, send Scientific Support the error code(s), message(s), and a sysinfo file.

10 Contact Information

Headquarters for Meso Scale Diagnostics, LLC. is located at 1601 Research Boulevard, Rockville, Maryland, 20850, USA.

Visit our website at www.mesoscale.com or contact us by phone at +1 240-314-2600. Alternatively, contact a specific department using the phone number or email address listed below.

Customer Service
1-240-314-2795
CustomerService@mesoscale.com

Scientific Support
1-240-314-2798
ScientificSupport@mesoscale.com

Instrument Service
1-301-947-2057
InstrumentService@mesoscale.com

11 Appendix

11.1 Instrument Specifications

All performance information given below, including standard signal levels, detection limits, dynamic range, and instrument noise, is based on 150 µL read volumes in 96-well QuickPlex plates using standard plate read parameters.

TABLE 11.1. Instrument Specifications.

Scientific Performance	
Dynamic Range	$>10^4$
Electronic Noise	
Standard Deviation of Dark Noise (one spot plates)	0–16 counts
Read Times	
96-well QuickPlex Ultra plates	1 minute, 23 seconds per plate
Read Volume	
96-well plates	150 µL
Environmental Specifications	
Operational Temperature Range	20–26 °C (68–78.8 °F)
Operational Humidity Range	10 %–80 % relative humidity (non-condensing)
Storage Conditions	-18–50 °C (0–122 °F) at 85 % relative humidity (non-condensing)
Ambient Light	<2,000 lux with no exposure to direct sunlight
Altitude	<6,500 ft (2,000 m)
Power Requirements	
Voltage	100–240 V~ 50/60 Hz
Power Consumption (instrument)	61 W max.
Power Consumption (system)	150 W max. for the instrument, computer, and surge protector
Physical Dimensions	
Instrument Size (W x D x H)	13 x 23 x 14 in (33 x 58 x 36 cm)
System Size (W x D x H)	A minimum of 30 x 30 x 14 in (76 x 76 x 36 cm) should be available for the instrument, surge protector, and computer.
Instrument Weight	36 lb (16 kg)
System Weight	51 lb (23 kg)*
Customer Barcode Compatibility	
Code 39, Code 128	Minimum line width: 7 mils

* The system weight varies due to different surge protector and power cables supplied with the instrument based on the destination power requirements.

11.2 MSD Plate Barcode Label Specification

MSD plate barcode labels conform to ISO/IEC 16388, Information technology – Automatic identification and data capture techniques – Code 39 bar code symbology specification.

11.3 Using Command Line Interface Programs

Three Command Line Interface (CLI) programs enable specific tasks to be automated through a simple programming interface. These programs can be found in C:\Program Files (x86)\Methodical Mind\bin\. This section provides basic information on how to use these programs. For information on setting up scheduled tasks and troubleshooting commands, contact MSD Scientific Support.

11.3.1 BackupDatabase

Run BackupDatabase.exe to create a backup of the local database. This program can be run with the following options:

- -help will display the options and additional help information for this program.
- -output <directory and filename> saves to the defined folder with the defined filename.

Example: "C:\Program Files (x86)\Methodical Mind\bin\BackupDatabase" -output "\\[NetworkBackup]\MMbackup.bak" creates the database backup file MMbackup.bak in the network folder.

11.3.2 ExportAuditRecords

Run ExportAuditRecords.exe to export the audit trail to a CSV file. This program can be run with the following options:

- -help will display the options and additional help information for this program.
- -output <directory and filename> saves to the defined folder with the defined filename.
- -endDate <MM/dd/yyyy> saves all audit trail entries up until the defined date. By default, the endDate is the current day.
- -pastDays <number of days> saves all audit trail entries starting from the defined end date for the past defined number of days. If "0" is entered for the number of days, only values for the end date will be saved.

Example: Running the command "C:\Program Files (x86)\Methodical Mind\bin\ExportAuditRecords" -endDate 07/21/2021 -pastDays 7 on July 22, 2021 at 12:41:31 PM, exports audit trail entries from July 14, 2021 through July 21, 2021 to \\[NetworkBackup]\Results\AuditTrail-2021-07-22-124131.csv.

11.3.3 CheckDigitalSignature

Run CheckDigitalSignature.exe to verify plate data files and audit trail export files have not been modified. This program must be run with a file or folder location defined.

- -help will display the options and additional help information for this program.
- -input followed by the folder or file location will direct the program to read the defined file or all files in a folder

Example: If "C:\Program Files (x86)\Methodical Mind\bin\CheckDigitalSignature" –input "\\[NetworkBackup]" is run after the previous example, the program will return PASS or FAIL followed by the file(s) read, in this case:

PASS \\[NetworkBackup]\Results\AuditTrail-2021-07-22-124131.csv

Customer Service

Phone: 1-240-314-2795
Fax: 1-301-990-2776
Email: CustomerService@mesoscale.com
Hours of Operation: 5:00 AM to 8:00 PM, Monday – Friday, U.S. Eastern Time