

MIRA Cal M



Tutorial

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MIRA Cal M

2.XX or higher

Tutorial

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1 Overview

1.1 Product description

MIRA Cal M is a mobile app for Android™ devices. MIRA Cal M is used together with the Metrohm Instant Raman Analyzer MIRA XTR DS / MIRA DS. MIRA XTR DS / MIRA DS is connected to the MIRA Cal M mobile app via Bluetooth® wireless technology.

MIRA Cal M enables you to do the following:

- Analyze samples.
Set the parameters that are required for your application and acquire samples.
The acquired spectrum of a substance is compared with existing spectra in a library.
- Manage samples.
View spectra and results for library identification and mixture matching.
View sample related information as metadata.
Edit acquired samples. Overlay spectra or reprocess samples, for example.
- Create and import libraries for sample identification and for reprocessing.
- Share or email data.

1.2 Product versions

MIRA Cal M was developed for Android versions 8.0 to 11.0 and MIRA XTR DS / MIRA DS firmware version 8.0.1.136 or higher.

The product is available in the following version:

Designation	Version feature
MIRA Cal M mobile app	Version 2.XX or higher

The following formatting may appear in the documentation:

Refer to the following manuals for information about the instruments:

Insert the product number into the search field on <https://www.metrohm.com> to find the manuals.

2 Safety

2.1 Intended use

Metrohm products are used for the analysis and handling of chemicals and other materials.

Usage therefore requires the user to have basic knowledge and experience in handling chemicals. Knowledge with respect to the application of the fire prevention measures prescribed for laboratories is also mandatory. Be sure to take proper safety precautions when working with chemicals

Adherence to this technical documentation and compliance with the maintenance specifications make up an important part of intended use.

Any utilization in excess of or deviating from the intended use is regarded as misuse.

Specifications regarding the operating values and limit values of individual products are contained in the "Technical specifications" section, if relevant.

Exceeding and/or not observing the mentioned limit values puts people and components at risk. The manufacturer assumes no liability for damage due to non-observance of these limit values.

The EU declaration of conformity loses its validity if modifications are carried out on the instruments and/or the components.

2.2 Responsibility of the operator

The operator must ensure that basic regulations on occupational safety and accident prevention in chemical laboratories are observed. The operator has the following responsibilities:

- Instruct personnel in the safe handling of the product.
- Train personnel in the use of the product according to the user documentation (e.g. install, operate, clean, eliminate faults).
- Train staff on basic occupational safety and accident prevention regulations.
- Provide personal protective equipment (e.g. protective glasses, gloves).
- Provide suitable tools and equipment to carry out the work safely.

The product may be used only when it is in perfect condition. The following measures are required to ensure the safe operation of the product:

- Check the condition of the product before use.
- Remedy defects and malfunctions immediately.
- Maintain and clean the product regularly.

2.3 Personnel requirement

Only qualified personnel may operate this product. A qualified person is a user who has thoroughly reviewed this document and has a comprehensive understanding of the operations of the instrument.

The instrument is used for the analysis of chemical compounds, some of which may be hazardous. The user must be capable of recognizing and avoiding possible dangers, and be aware of standards, laws and regulations governing the handling of such chemicals.

2.4 Safety instructions

2.4.1 Danger from electrical potential



WARNING

Electric shock from electrical potential

A considerable danger of injury exists in connection with touching live parts.

- Never open the housing of the instrument when the power cord is connected. You can not service or replace any parts inside the housing.
- Only personnel who have been issued Metrohm qualification may perform service and repair work on electric and electronic parts.
- The electrical safety of the instrument is ensured as part of the international standard IEC 61010.

2.4.2 Danger from radiation



WARNING

Eye injury by laser radiation

Laser radiation can cause serious eye injuries.

- Follow the safety measures and instructions.
- Instruments must be used by trained personnel only.
- Instruments of the laser class 3B must be used in protected and labeled rooms only.
- When working with open laser beams (Smart Tips of the laser class 3B) appropriate protective glasses must be used, see chapter "Operating specifications" in the MIRA device manuals.
- Observe the nominal ocular hazard distance (NOHD).
- Follow the provisions of the IEC 60825-1 standard "Safety of laser products" and the regulations for the use of laser systems in your country.

2.5 Design of warning messages

There are 4 hazard levels for warning messages. The following signal words are used for classifying the hazard levels in warning messages:

- **DANGER** indicates a hazardous situation which, if not avoided, will result in serious injury or death.
- **WARNING** indicates a hazardous situation which, if not avoided, could result in serious injury or death.
- **CAUTION** indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
- **NOTICE** indicates a hazardous situation which, if not avoided, could result in property damage.

Warning messages differ in design (color and warning sign) depending on the hazard level:



DANGER

Type and source of danger

Consequences when not observing the notice: An irreversible injury that may result in death is very probable.

- Measures to avoid the danger



WARNING

Type or source of danger

Consequences when not observing the notice: A serious injury that may result in death is probable.

- Measures to avoid the danger



CAUTION

Type or source of danger

Consequences when not observing the notice: A minor to moderate injury is probable.

- Measures to avoid the danger

2.6 Meaning of warning signs

This documentation uses the following warning signs:

Table 1 Warning sign according to ISO 7010

Warning sign	Meaning
	General warning sign
	Warning of electrical voltage
	Warning of hand injuries
	Warning of sharp object
	Warning of hot surface
	Warning of biological hazard
	Warning of toxic materials

Warning sign	Meaning
	Warning of flammable materials
	Warning of corrosive substances
	Warning of optical radiation
	Warning of laser beams

Depending on the intended use of the product, the corresponding warning sign stickers must be placed on the product.

3 Functional description

3.1 MIRA Cal M – Overview

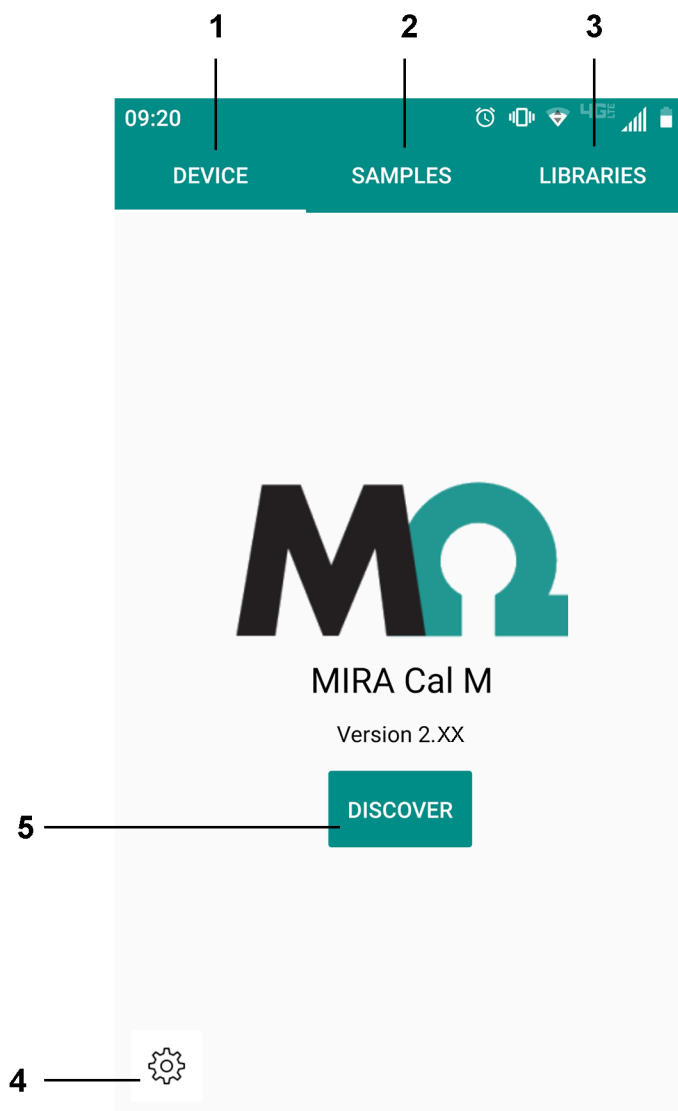


Figure 1 Home screen – Overview

- | | |
|---|---|
| 1 DEVICE tab
(see "DEVICE tab – Overview", page 10) | 2 SAMPLES tab
(see "SAMPLES tab – Overview", page 11) |
|---|---|

(see "LIBRARIES tab – Overview", page 12)

Select **[DISCOVER]** to establish a connection with MIRA XTR DS / MIRA DS.

(see "Connecting MIRA XTR DS / MIRA DS",
page 15).

Export the database to your mobile device,
send logs via e-mail and define app settings.

3.1.1 DEVICE tab – Overview

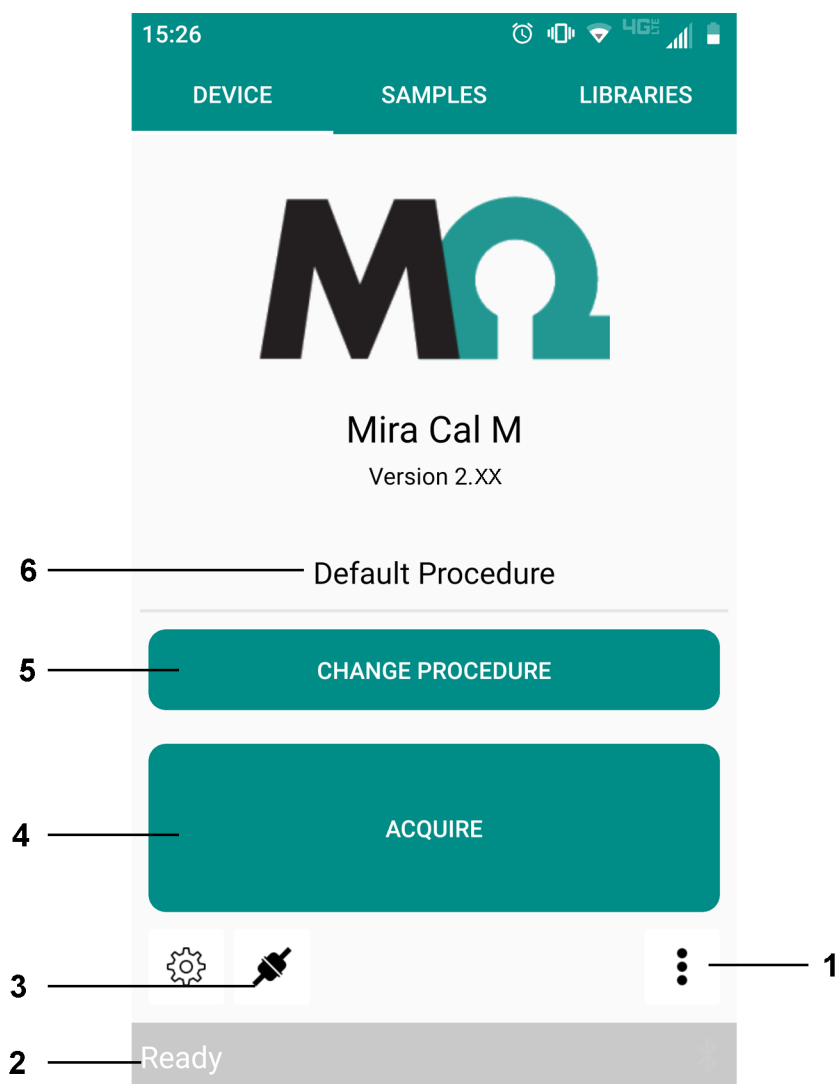


Figure 2 DEVICE tab – Overview

- | | |
|---|--|
| <p>1 Device menu
Perform instrument related actions, e.g. view instrument information, download samples from MIRA XTR DS / MIRA DS to the instrument.

Or calibrate the instrument.</p> <hr/> <p>3 Device connected
Disconnect MIRA XTR DS / MIRA DS.</p> <hr/> <p>5 CHANGE PROCEDURE
Change the operating procedure for an acquisition.</p> | <p>2 Instrument status
Displays the instrument status.</p> <hr/> <p>4 ACQUIRE
Acquire a sample.</p> <hr/> <p>6 Current operating procedure
Displays the operating procedure for an acquisition.</p> |
|---|--|

3.1.2 SAMPLES tab – Overview

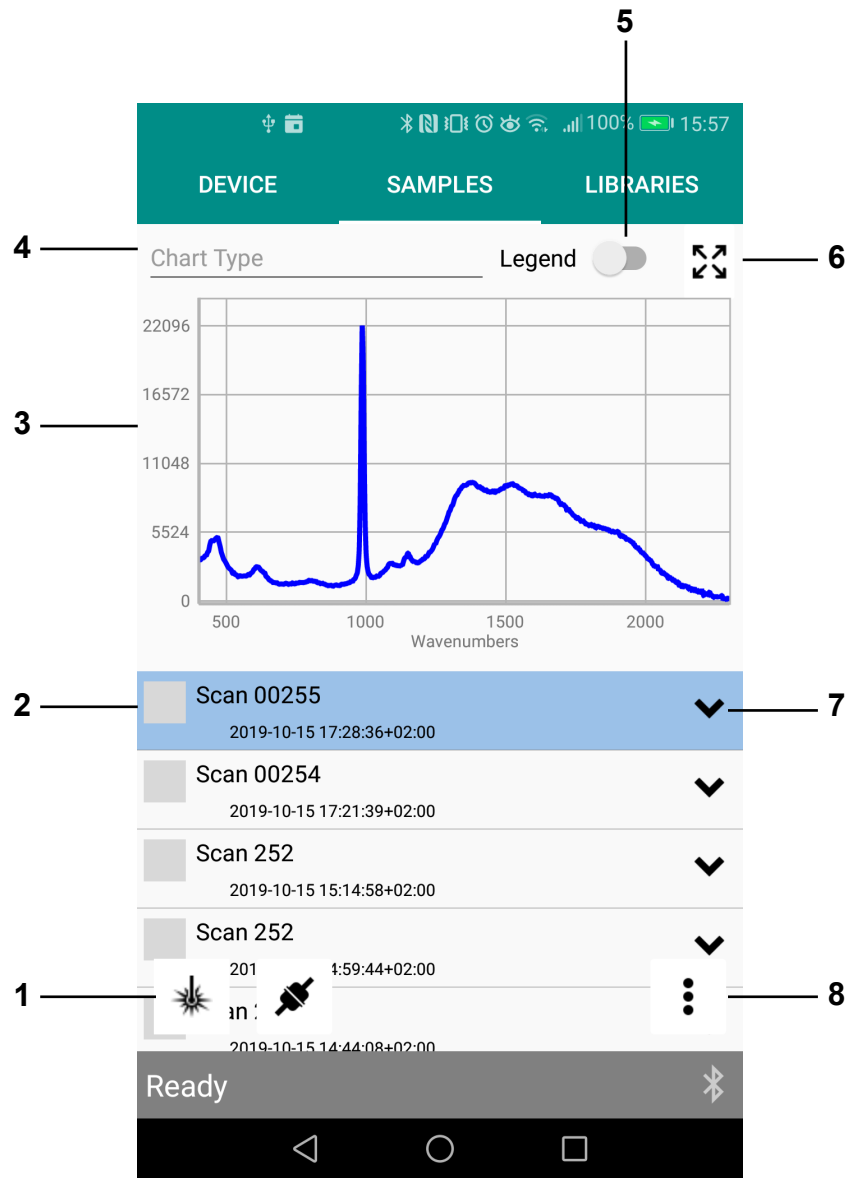


Figure 3 SAMPLES tab – Overview

1 Acquire sample Acquire a sample.	2 Sample View an acquired sample.
3 Spectrum Spectrum of the sample that is selected in the sample list.	4 Chart Type Select a chart type to display spectra.

- | | |
|---|---|
| <p>5 Legend
Show or hide a legend with sample names.</p> <hr/> | <p>6 Full screen
Expand the spectrum to full screen.</p> <hr/> |
| <p>7 Expand
Show identification results and mixture results.</p> | <p>8 Sample menu
Delete samples, edit samples and export data.</p> |

3.1.3 LIBRARIES tab – Overview

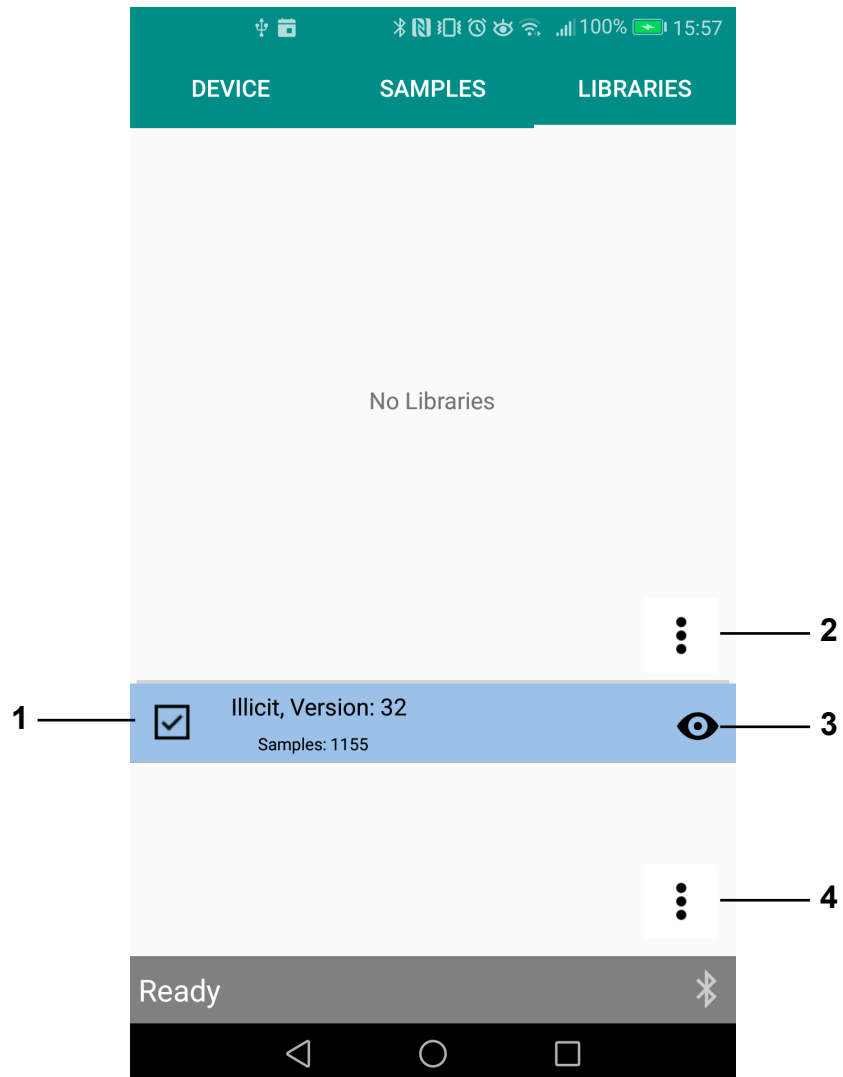


Figure 4 LIBRARIES tab – Overview

- | | |
|--|--|
| 1 Library
Lists all available libraries. | 2 Library menu
Import or create a library. |
| 3 View details
View a library. | 4 Licensed Library menu
Import licensed libraries. |

4 Installation

4.1 Installing MIRA Cal M for Android

Getting the app on Google Play™

MIRA Cal M was developed for Android version 8.0 to 11.0.

- 1 On the Android device, open the Google Play Store app.
Alternatively, you can also go to play.google.com.
- 2 Select the white bar at the top of the page to bring up the keyboard.
Type: **MIRA Cal M**
- 3 Select the **MIRA Cal M** app.
- 4 Select **[Install]**.
- 5 Once download and installation are completed, open the **MIRA Cal M** app.

When prompted, grant the requested permissions.

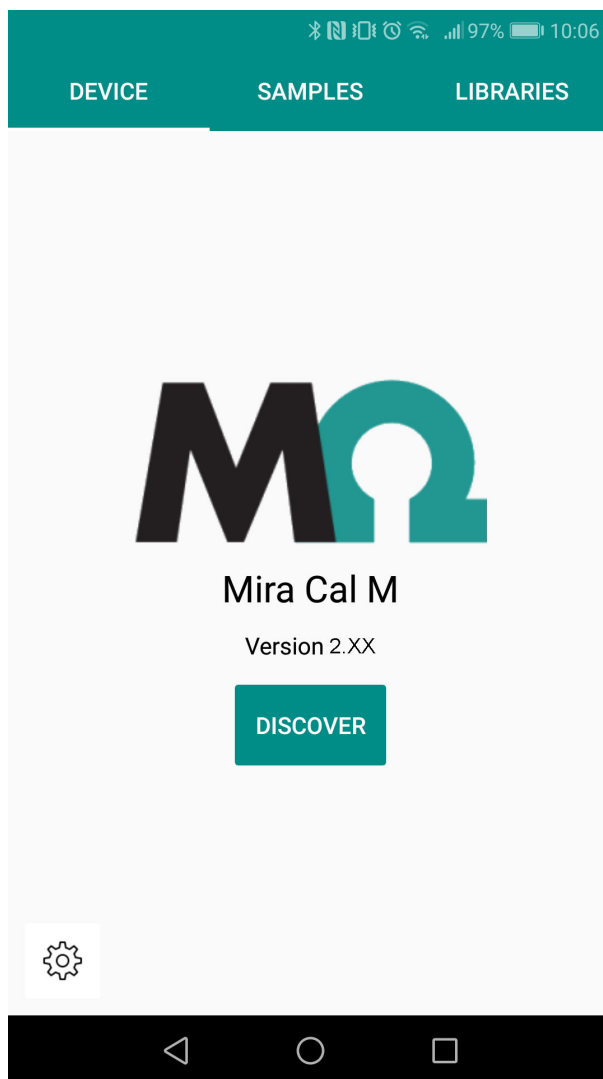


Figure 5 MIRA Cal M home screen



NOTICE

When MIRA Cal M is launched, libraries are downloaded in the background. For a successful download, the app has to be open and the Android device has to be connected to the internet. This process can take a few minutes.

5 Start-up

5.1 Connecting MIRA XTR DS / MIRA DS

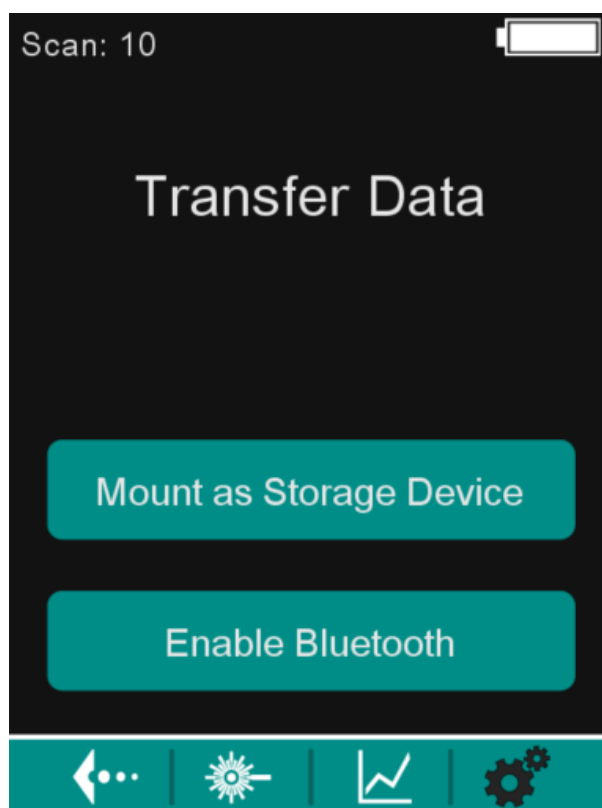
Connecting via Bluetooth® wireless technology

MIRA XTR DS / MIRA DS needs to be within 10 m of the Android device, either tablet or cell phone.

The instrument is switched on. A user is logged in.

1 Enabling Bluetooth on MIRA XTR DS / MIRA DS

On MIRA XTR DS / MIRA DS, select , then **System Settings ► Transfer Data**.

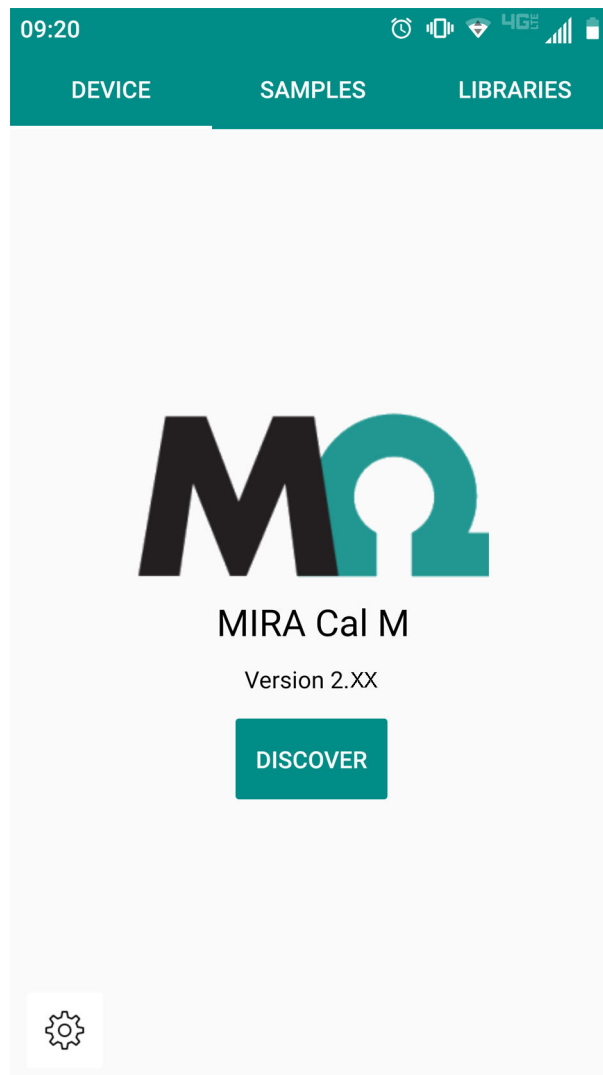


Select **[Enable Bluetooth]**.

MIRA XTR DS / MIRA DS indicates: **Bluetooth Mode**.

2 Pairing and connecting

On the Android device, open MIRA Cal M.



Select **[DISCOVER]**.



NOTICE

MIRA XTR DS / MIRA DS will appear in the available devices with the model name followed by the serial number.

Example: MIRA XTR DS / MIRA DS 192600200020300000

If no devices are detected, ensure that Bluetooth is enabled on the Android device.

- <

PIN Code

1

2

3

4

5

6

7

8

9

DEL

0

OK

The Android device is now connected to MIRA XTR DS / MIRA DS. The instrument is ready to transfer data or acquire a spectrum.



NOTICE

It is advised to disable the lock screen timeout of the Android device. Some Android devices turn off Bluetooth when the Android device is in sleep mode.

To disconnect MIRA XTR DS / MIRA DS, select . MIRA XTR DS / MIRA DS is now disconnected. Follow the procedure above, beginning with step 2, to connect a new MIRA XTR DS / MIRA DS.



6 Operation and control

6.1 Calibrating MIRA XTR DS / MIRA DS

- 1 In MIRA Cal M, go to the **DEVICE** tab.
- 2 Expand the **Device** menu with **:**.
- 3 Select **[Calibrate]**.
A popup window prompts you to attach the Calibration Standard.
- 4 Attach the Calibration Standard. Select **[OK]** to proceed.
MIRA XTR DS / MIRA DS is calibrated.
A popup window confirms the successful calibration.
- 5 Select **[OK]** to close the popup window.
The calibration is finished.
A system suitability test window will appear to continue with a system suitability test.
- 6 Select **[OK]** to proceed.
The system suitability test is performed.
A popup window confirms the successful system suitability test.

6.2 Performing a system suitability test

- 1 In MIRA XTR DS / MIRA DS, go to the **DEVICE** tab.
- 2 Expand the **Device** menu with **:**.
- 3 Select **[System Suitability Test]**.
- 4 A popup window prompts you to attach the Calibration Standard. Attach the Calibration Standard. Select **[OK]** to proceed.
The system suitability test is performed. A popup window confirms the successful system suitability test.

- 5 Select **[OK]** to close the popup window.

The calibration is finished.

A report is generated and exported to the Android device automatically. The report is stored in the following folder on the Android device: **MetrohmRaman ► MIRA Cal M ► Exports ► SST.**

The result is displayed in the **SAMPLES** tab.

6.3 Measuring a sample



NOTICE

Refer to the MIRA XTR DS / MIRA DS product manual (8.926.8001) for detailed information about the Smart Tips.

Prerequisite:

- MIRA XTR DS / MIRA DS is connected to MIRA Cal M.
- MIRA Cal M shows the **DEVICE** tab.
- The correct smart tip is attached to MIRA Cal M.

1 Select an operating procedure

The display shows the current operating procedure. By default, the **Default Procedure** is selected.

- To change the operating procedure, select **[CHANGE PROCEDURE]**.
- Select an operating procedure from the list.
- Go back to the acquisition screen with .

The display shows the selected operating procedure.

2 Define the acquisition settings

To define options for the acquisition, select . Then select **[ACQUISITION STATE]**.

For the available options see "ACQUISITION STATE", page 21.

3 Define the acquisition parameters manually

To define acquisition parameters for the acquisition, select **[CHANGE PROCEDURE]** and select **[Manual procedure]**.

Adjust Integration time laser power and averages.

4 Acquire data

To measure a sample, select **[ACQUIRE]**.

The sample is measured with the defined options.

ACQUISITION STATE	
Multi Acquisition ►	
Continuous	If activated, MIRA XTR DS / MIRA DS executes scans until you select [STOP ACQUISITION] on the acquisition screen. ▪ Delays Duration of interruptions between individual scans in seconds.
Multi	If activated, MIRA XTR DS / MIRA DS executes a defined number of scans. ▪ Count Number of scans that MIRA XTR DS / MIRA DS takes. ▪ Delays Duration of interruptions between individual scans in seconds.
Matching ►	Only accessible if Full Download is deactivated.
Identification Match	▪ Threshold Threshold for matching. A low number increases the chances of false positives. ▪ Max Matches Number of identification results displayed, between 1 and 10.
Mixture Match	Matching against all enabled libraries on the instrument.
General ►	
Download Acquisitions	If activated, the sample and according meta data is downloaded to MIRA Cal M at the end of the acquisition. The sample is displayed in the SAMPLES tab.
Full Download	If deactivated, the Matching section appears. If activated, the matching is performed on MIRA XTR DS / MIRA DS and downloaded to MIRA Cal M after each acquisition.
Result Popup	If activated, a popup window appears at the end of each scan. This popup window shows the result of the acquisition. Only accessible if Download Acquisitions is activated.
Name Prompt	If activated and you select [ACQUIRE], a popup window to enter a sample name appears. Only accessible if Download Acquisitions is activated.

Picture Prompt	If activated and you select [ACQUIRE], the Metadata screen opens. Take a picture of your sample. Select . After the acquisition, the picture is shown in the metadata of the corresponding sample (see "Viewing samples", page 23). Only accessible if Download Acquisitions is activated.
Notify On Acquisition	There are 2 kinds of notification: ▪ Vibrate Vibration at the end of the acquisition. ▪ Sound Sound at the end of the acquisition.

6.4 Measuring a sample with the Autofocus Stand-off Attachment

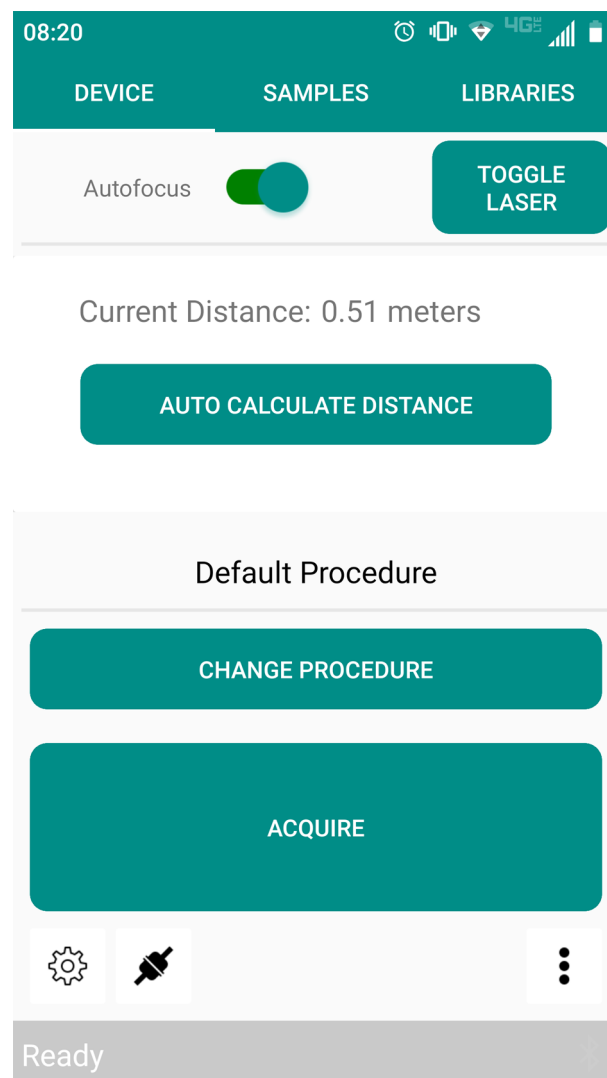


Figure 6 Measuring settings for the Autofocus Stand-off Attachment

1 Turn on the aiming laser

- With the Autofocus Stand-Off attached, select **[TOGGLE LASER]** to turn on the aiming laser.
- Point the aiming laser at the target.

2 Auto calculate the distance

To determine the distance to the target, select **[AUTO CALCULATE DISTANCE]**.

3 Change the distance manually

- Toggle the Autofocus off.
- Input the distance manually.

4 Acquire data

To measure a sample, select **[ACQUIRE]**.

The sample is measured with the defined distance.

6.5 Samples

6.5.1 Viewing samples

Viewing samples

1 To view measured samples, go to the **SAMPLES** tab.

2 Select a sample from the list.

The spectrum of the selected sample is displayed.

3 To change the chart type, select **[Chart Type]**. The **Chart Type** window appears. Select a chart type.

The displayed chart is adapted to the selected chart type.

4 To reprocess a sample, select and hold the sample name to expand the **Sample** menu. Select **[Results]**.

To reprocess with local libraries, select  (see "Editing samples", page 25).

5 Expand the sample information with .

Viewing further sample information

- 1 To view further sample information, go to the **SAMPLES** tab.
- 2 Select and hold the sample name to expand the **Sample** menu.
- 3 To view the samples metadata, select **[Metadata]**.
The **Info** screen appears.
- 4 To view geolocation, select .



NOTICE

Location data is added automatically if the spectrum was acquired or downloaded from MIRA Cal M and the location data was enabled on the Android device during the process.

If the spectrum does not have any location data, only the Geo-Update icon displays: 

Google Maps is launched.

- 5 To update geolocation, select .



NOTICE

Ensure location data is enabled on the Android device.

The geolocation is updated to the current location of the Android device.

- 6** To add a picture to the sample's metadata, select **[Add Photo]**. The camera opens. Take a picture. If the picture is satisfactory, confirm with the check mark.

The picture is added to the metadata.

- 7** Leave the **Info** screen and the **Results** screen with .

Filtering samples

- 1 To filter samples, go to the **SAMPLES** tab.
- 2 Expand the **Samples on Device** menu with .
- 3 Select **[Filter]**.
The **Filter** screen appears.
- 4 Select the desired filter criteria.
- 5 Select .
- 6 A spectrum with the samples that match the filter criteria is shown.
- 7 To view all samples, select .

6.5.2 Editing samples

Deleting samples

- 1 To delete samples, go to the **SAMPLES** tab.
- 2 Select a sample from the list.
- 3 Select and hold the sample name to expand the **Sample** menu.
- 4 Select **[Delete]**.
- 5 The selected sample is deleted.

Exporting samples

- 1 To export samples, go to the **SAMPLES** tab.
- 2 Expand the **Samples on Device** menu with .
- 3 Select **[Export]**.
The **Export Type** screen appears.

- 4** Select export formats and report type.

- 5 Select .

The **Export Location** window appears.

- 6** Select **[External Data]** or **[Email]**.

The **Export** screen appears.

- 7 Select the samples that you want to export. To select a sample, tick the box beside the sample name.

- 8 Select .

If you chose the **External Data** export, the selected samples are exported to the Android device. The samples are stored in the following folder: **MetrohmRaman ► MIRA Cal M ► Exports ► Samples**. Leave the **Export** window with **[OK]**.

If you choose the **Email** export, MIRA Cal M launches the email service selection.

Exporting samples to HazMasterG3®

- 1** To export samples to HazMasterG3, go to the **SAMPLES** tab.

- 2 Select the sample that you want to export.

- 3** Expand the **Samples on Device** menu with **:**.

- 4 Select **[Hazmaster Export]**.

The sample is exported to the HazMasterG3 folder on the Android device. The sample is stored in the following folder:

G3Folder ▶ DetectorMonitor.



NOTICE

The folder for HazMasterG3 data is created automatically when the HazMasterG3 app is installed. The location of the folder can also be defined in the settings (see *"Changing the settings", page 30*).

- 

After the import, the sample will be moved within the **Detector-Monitor** folder to the **Archive** folder.

For **Identification** match, also select the values for **Threshold** and **Max Matches**.

- 4** Select .

Downloading samples

- 1 To download samples from MIRA XTR DS / MIRA DS to MIRA Cal M, go to the **DEVICE** tab.
- 2 Expand the **Device** menu with .
- 3 Select **[Download Samples]**.
The **Download Samples** screen appears.
- 4 Select the samples to download.
The downloaded samples are listed in the **SAMPLES** tab.

6.6 Libraries

Libraries can be managed in MIRA Cal M. Libraries created in MIRA Cal M do not transfer to MIRA XTR DS / MIRA DS.

6.6.1 Viewing libraries

- 1 To view libraries, go to the **LIBRARIES** tab.
- 2 Select the desired library.
- 3 Select  to view library entries.
- 4 Select  to exit library viewing.

6.6.2 Creating libraries

- 1 To create a library, go to the **LIBRARY** tab.
- 2 Expand the **Library** menu with the upper .
- 3 Select **[New]**.

- 10** To save the metadata, select .

11 To save the new library, select .

- 1 Email the library to the Android device.

- 2** Download the library.

6.7 Changing the settings

- 1 To change the settings, go to the **DEVICE** tab.
- 2 Select , then **Settings**.
- 3 For the available options *see menu "Settings", page 30*.
- 4 To save the settings, select .
- 5 Leave the **Settings** menu with .

Settings	
Image Size	If Picture Prompt is activated in the Acquisition State section, MIRA Cal M prompts you to take a picture before a sample is acquired (see " <i>Measuring a sample</i> ", page 20). Specify the size of the image according to its intended use.
Language	Currently English is the only language available.
Load Samples Count	Define the number of listed samples in the SAMPLES tab. This setting allows you to limit the memory usage of MIRA Cal M on the Android device.
Hazmaster Data Location	Define the folder in which HazMasterG3 data is stored. Some Android devices block or move the folder in which HazMasterG3 data is stored. This setting allows you to redirect the HazMasterG3 information into the correct folder.
Local Time Format	If activated, the time format will be updated after a reboot.
Save Location	If activated, the geolocation of the sample is saved in the metadata when the sample is acquired or downloaded from MIRA Cal M.
Calibration Prompt	If activated, a popup window prompts you to attach the Calibration Standard when connecting MIRA XTR DS / MIRA DS. Attach the Calibration Standard and select [OK] to proceed. Calibration is executed automatically on MIRA XTR DS / MIRA DS. If calibration was successful, the Calibrate popup window appears. Select [OK] to leave the Calibrate popup window.
Vibrate	If activated, vibration will occur after each acquisition.
FULL REPORT SETTINGS	The activated parameters are included when a full report is generated in the export of sample data (see " <i>Editing samples</i> ", page 25). Save the settings with  .

**SUMMARY REPORT
SETTINGS**

The activated parameters are included when a summary report is generated in the export of sample data (see *"Editing samples"*, page 25). Save the settings with .

6.8 Exporting the database

The database used by MIRA Cal M can be exported.

- 1 Open MIRA Cal M.
- 2 In the **DEVICE** tab, select , then **Export Database**.
The **Clear** popup window appears.
- 3 Choose if all the samples should be cleared out in the database after the export is complete.

The database is exported to the Android device. The database is stored in the following folder: **MetrohmRaman ► MIRA Cal M ► Exports**.

Once the export is complete, the **Export** window appears. Leave the **Export** window with **[OK]**.

- 4 Email or transfer the database with the desired methods.

7 Exporting log files

Export device logs

Device logs can be shared with the regional Metrohm service representative via MIRA Cal M.

- 1 Connect MIRA XTR DS / MIRA DS to MIRA Cal M (see "Connecting MIRA XTR DS / MIRA DS", page 15).
- 2 Make sure the Calibration Standard is attached to the instrument.
- 3 In MIRA Cal M, go to the **DEVICE** tab and select , then **Device Logs**.



NOTICE

Downloading the device logs can take up to 10 minutes.

- 4 The device logs are generated and exported to the Android device automatically. The device logs are stored in the following folder on the Android device: **MetrohmRaman ► MIRA Cal M ► Exports ► DeviceLogs**
Once the export is complete, the **Export** window appears. Leave the **Export** window with **[OK]**.
- 5 Device logs can be sent by email via the desired email application for further review by Metrohm Service.

Email logs

- 1 Open MIRA Cal M on the Android device.
- 2 In the **DEVICE** tab, select , then **Email logs**.
- 3 Select the desired email application and email the logs to the following email address:
metrohmramandevolvers@gmail.com