

Real-time Gene Amplificator

Software User Manual

Model: isoQuarkM4
SW: isoQuarkM4

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RevoSketch Inc.

11.Dec.2022



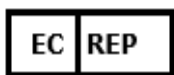
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1. *Product description*

isoQuarkM4 SW from **RevoSketch Inc.** controls all the functionality of the **real-time gene amplification device(isoQuarkM4)** and monitors PCR processes in real time

Working principle

- This product is a device that can check the amplification and accumulation of genes at isothermal temperatures in real-time. The body consists of a thermal block, an optical module, and a stage for moving the optical module. The heat block amplifies the gene while maintaining the sample at a specific temperature, and the optical module excites and detects the fluorescent material associated with the gene.
- This product consists of a main body, software that controls the main body to show changes in the amount of fluorescence in real-time, a USB cable, and an adapter.

1.1. *Main features*

Real-time gene amplification Device for Isothermal PCR

isoQuarkM4 S/W can monitor the PCR amplification process of isoQuarkM4 device in real-time.

User-friendly interface

With one start button, the instrument starts up and can see the final result. You can select and view the desired graph with a simple input while the device is running.

2. Software installation

2.1. Installation SW Environment

- Recommended specifications

Operation System	Android 10
CPU	Octa-core or higher
RAM(memory)	RAM 4GB or more
Storage	64GB Free Space
USB	2.0 High speed or more
Display	2560x1600

- Minimum specification

Operation System	Android 9.0 pie
CPU	Quad-core
RAM(memory)	RAM 2GB or more
Storage	32GB Free Space
USB	2.0 High Speed
Display	1280x800

2.2. Installation method

- 1) Before downloading the software, you must register the product on our website to be able to download it.

Home page: www.revosketch.com

- 2) The software can be downloaded from the website below.

Home page: www.revosketch.com

Installation file: isoQuarkM4 app_version number.apk

- (1) Save the installation file (**isoQuarkM4 app_version number.apk**) to the Internal Storage Download folder.
- (2) Proceed installation with the file(**isoQuarkM4 app_version number.apk**).

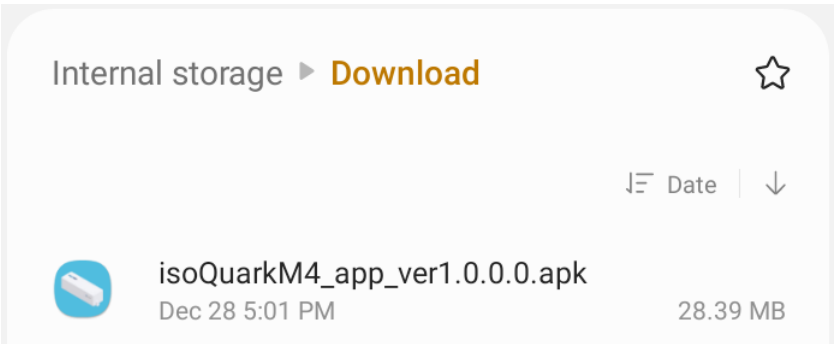


Figure 2.2.1 S/W Installation file

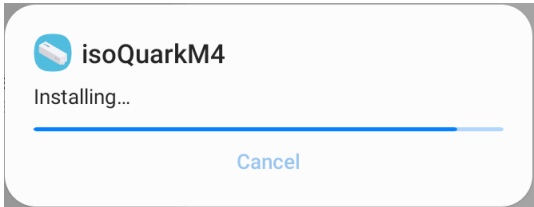


Figure 2.2.2 Installing S/W

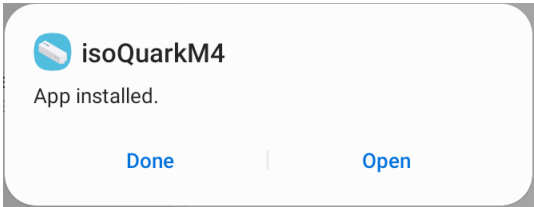


Figure 2.2.3 Installation of S/W completed

(3) If installation fails, delete the app and reinstall.

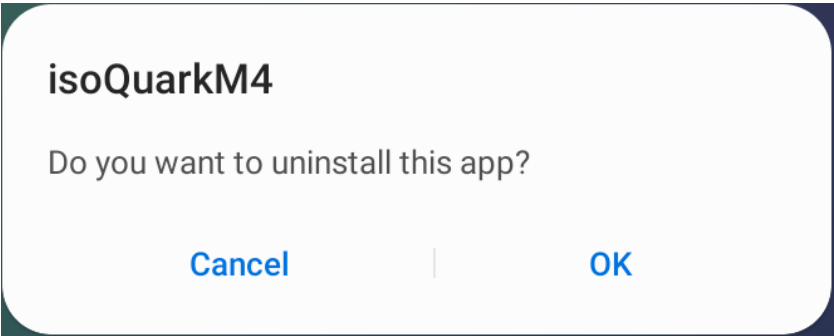


Figure 2.2.4 Delete S/W

3. How to use software

3.1. Run and Close the Software

1) **Run the software**

- (1) Touch the isoQuarkM4 icon.

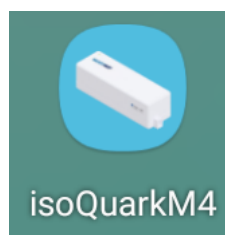


Figure 3.1.1 isoQuarkM4 icon

- (2) Input the password. A password is required every time when running SW. The initial password is set to “admin”.

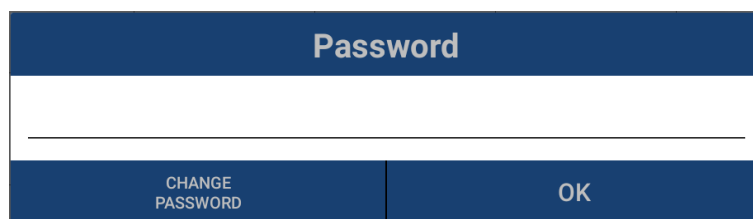
A screenshot of the password input screen. At the top, there is a dark blue header with the word "Password" in white. Below the header is a white rectangular input field. At the bottom, there are two dark blue buttons: "CHANGE PASSWORD" on the left and "OK" on the right.

Figure 3.1.2 Input password

- (3) Change the initial password before using the device for the first time. SW re-installation will be required in case the password is lost.

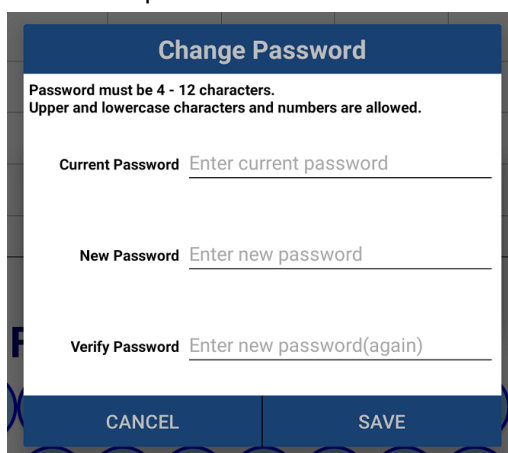
A screenshot of the "Change Password" screen. The title "Change Password" is at the top in a dark blue header. Below the title, there is a text box with the instructions: "Password must be 4 - 12 characters. Upper and lowercase characters and numbers are allowed." There are three input fields: "Current Password" with the placeholder "Enter current password", "New Password" with the placeholder "Enter new password", and "Verify Password" with the placeholder "Enter new password(again)". At the bottom, there are two dark blue buttons: "CANCEL" on the left and "SAVE" on the right.

Figure 3.1.3 Change the password

- (4) After changing the password, click the “SAVE” button to save it. Be careful not to expose your password to outsiders.
- (5) Enter the password, the initial screen is displayed.

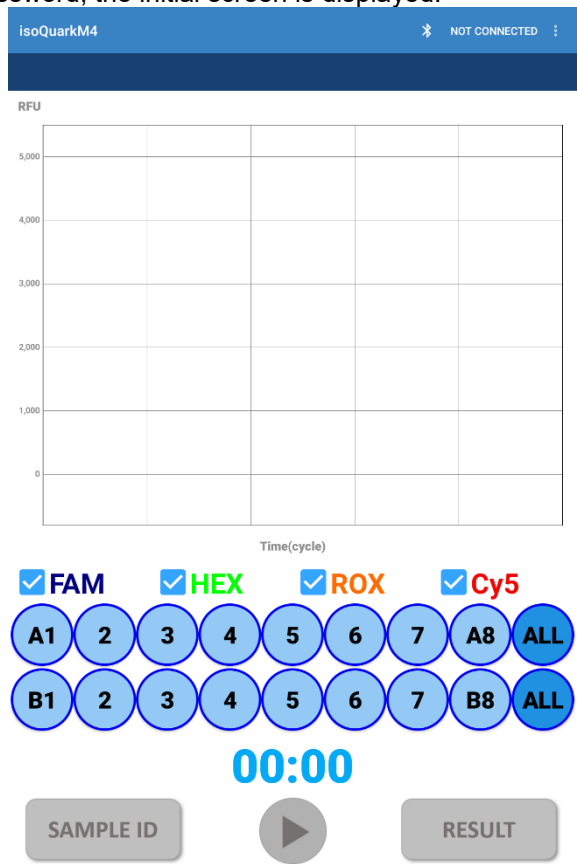


Figure 3.1.4 Initial screen

2) Close the software

Press the Back button() at the bottom of the screen to exit.

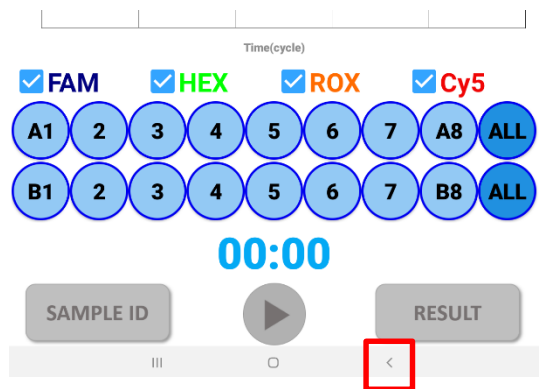


Figure 3.1.5 Back button

3.2. Connect with device

isoQuarkM4 S/W can be connected to isoQuarkM4 via USB or Bluetooth.

1) USB connection

- (1) Connect USB cable to USB port at the back side of device. isoQuarkM4 SW automatically connects with the device and display connecting message at top side.



Figure 3.2.1 USB connected

- (2) If it is not connected as "NOT CONNECTED," check the USB connection status and the isoQuarkM4 device's power, shut down the isoQuarkM4 S/W, and restart.



Figure 3.2.2 USB not connected

2) Bluetooth connection

- (1) With the power turned on, touch the Bluetooth icon on the application screen.



Figure 3.2.3 Bluetooth icon

- (2) Touch the Bluetooth SCAN button on the screen to search for isoQuark products. If the device is not found, power on isoQuark again and try to search.



Figure 3.2.4 Bluetooth scan

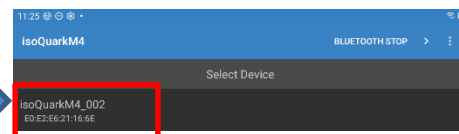


Figure 3.2.5 Bluetooth scan results

- (3) Touch the searched isoQuark name to move to the main screen and complete the connection. Please check the CONNECTED message above the screen.



Figure 3.2.6 Bluetooth connected

3.3. Home screen

1) Screen Configuration

The home screen is the start screen when running the program, and device connection, real-time amplification graph.

This screen shows the control of the device, the status of the device, etc.

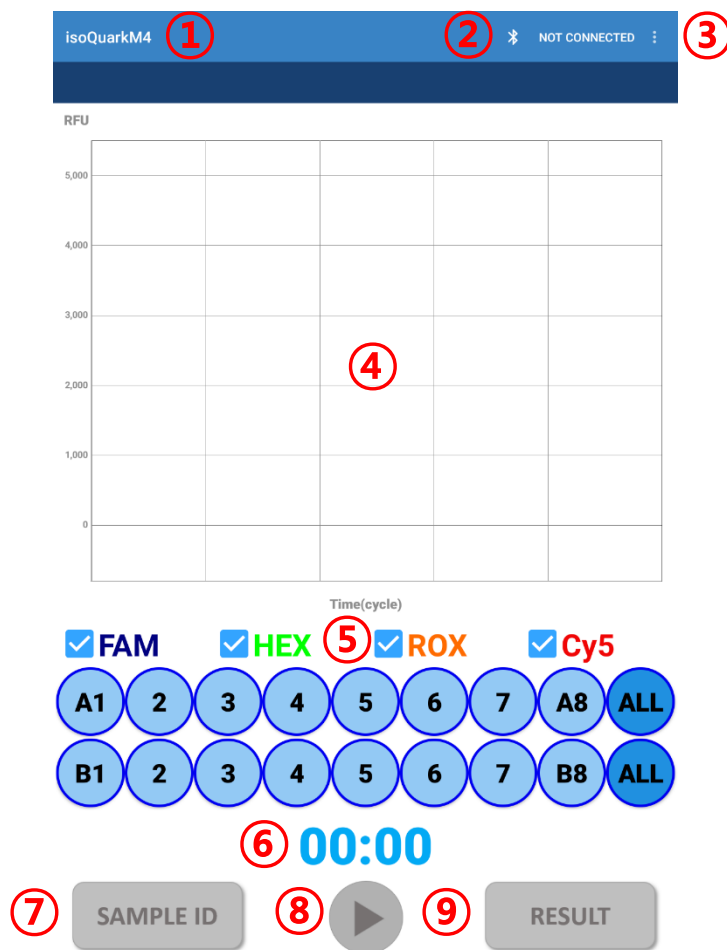


Figure 3.3.1 Home screen

- ① Connected device name
- ② Status of connection
- ③ Menu (save, load, device name change, temperature change, version)
- ④ Real-time PCR amplification graph
- ⑤ Graph selection button for 16 wells (A1~A8, B1~B8) channels (FAM, HEX, ROX, Cy5)
- ⑥ Elapsed time
- ⑦ 16 Well ID Setup
- ⑧ PCR start / stop
- ⑨ PCR result

2) Real time PCR Graph

- (1) Well (A1~A8, B1~B8) 16 of channels (FAM, HEX, ROX, Cy5) can be selected and viewed.
- (2) X axis: Elapsed time, Y axis: RFU(Reference Fluorescence Unit).

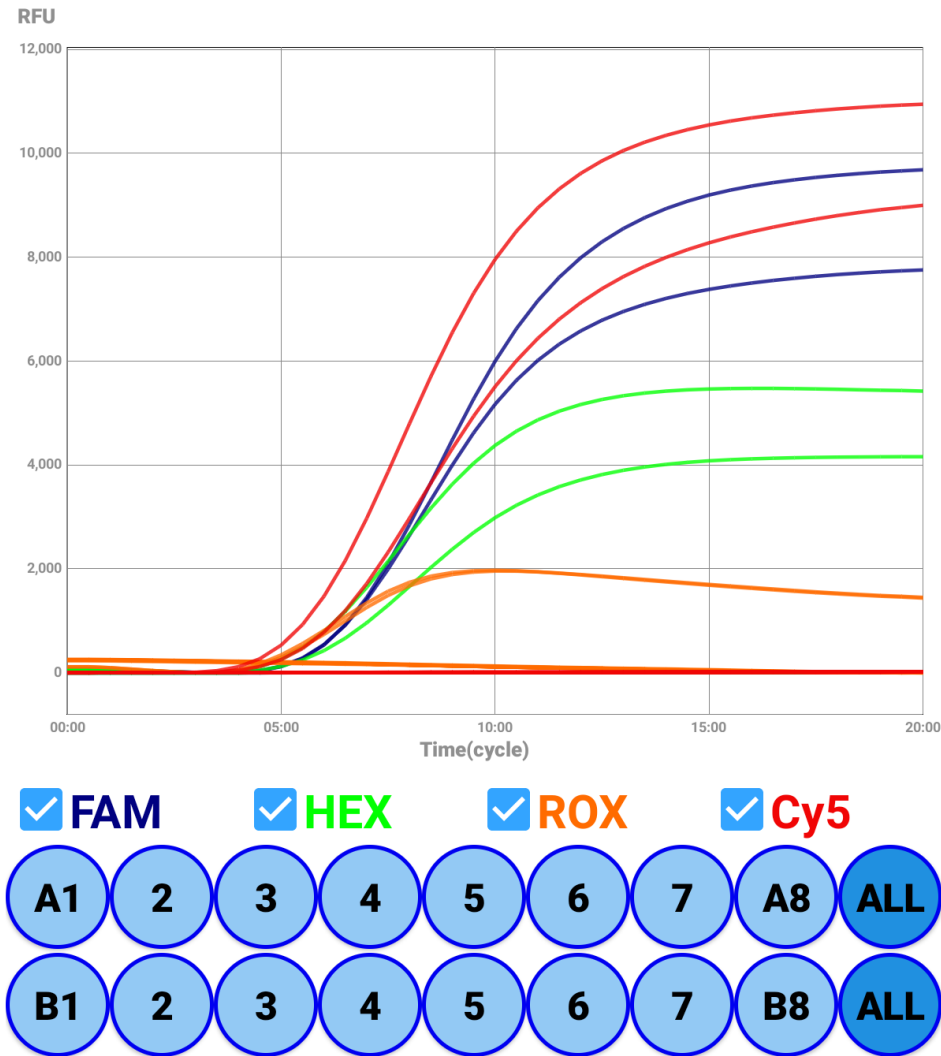


Figure 3.3.2 Real time PCR Graph

3.4. PCR start and stop

- 1) Turn on the isoQuarkM4 device and connect it with software.
- 2) Insert the PCR tube into the device and click the Start button at the bottom of the screen to start the PCR.



Figure 3.4.1 Start button

- 3) Click the RESEARCH MODE button in Select the assay and set the test time. The default time is 30 minutes.

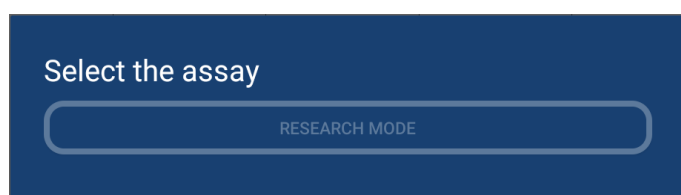


Figure 3.4.2 Select the assay

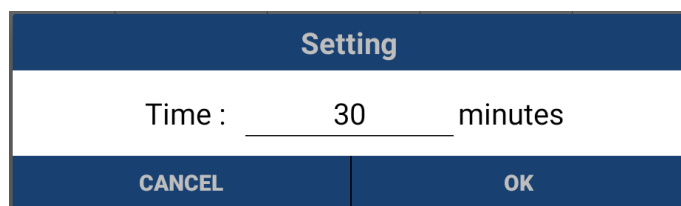


Figure 3.4.3 Set test time

- 4) Confirm the PCR.

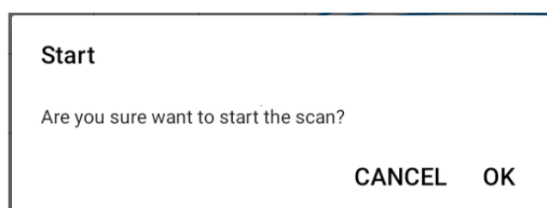


Figure 3.4.4 Start confirmation

- 5) Heating will start to meet the target temperature, and optical module start to scan fluorescence change of PCR.



Figure 3.4.5 Heating timer

- 6) Measured Fluorescence will be updated in real-time and displays FAM in blue, HEX in green, ROX in orange, Cy5 in red. PCR graph of each well can be selectively displayed on the graph by selecting wells below the graph chart

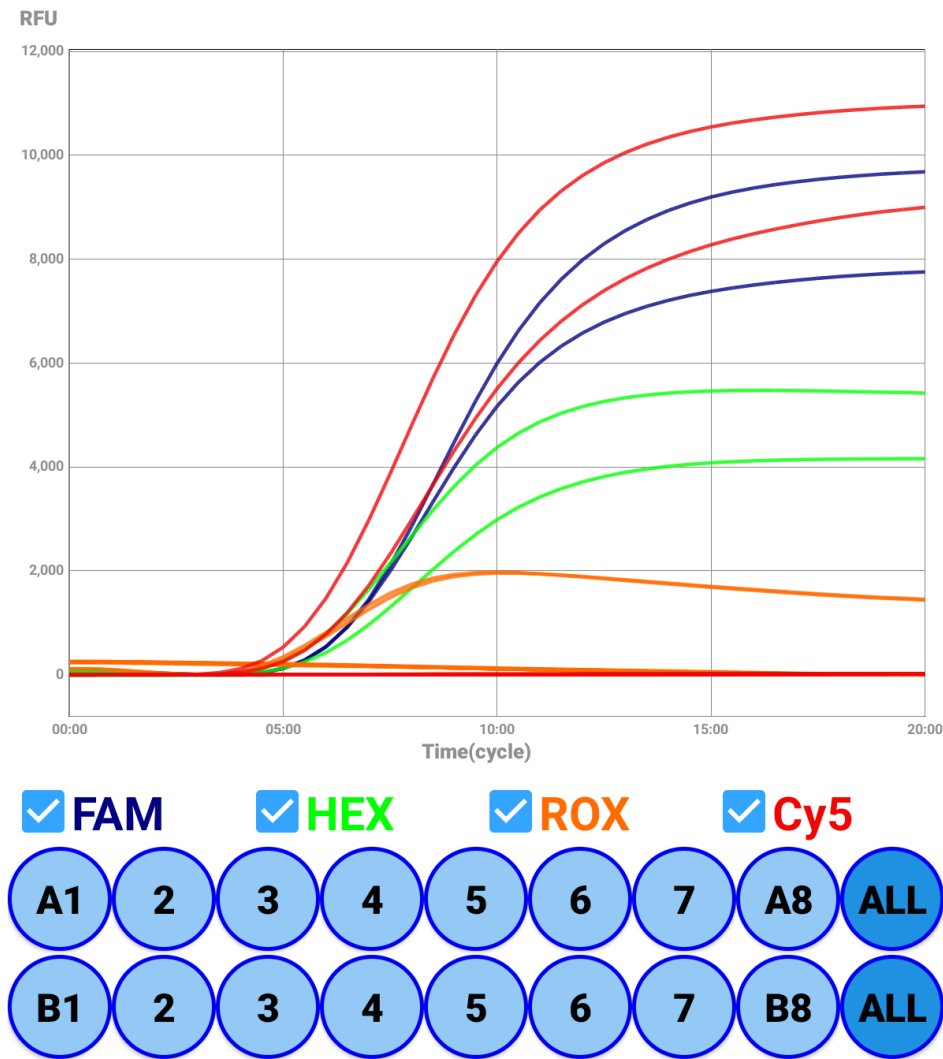


Figure 3.4.6 Real time PCR graph

- 7) After 30 minutes (based on 60 cycle), PCR is terminated, and the results are automatically saved.

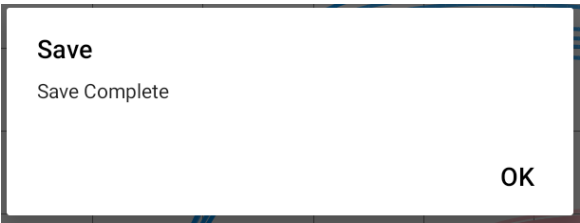


Figure 3.4.7 PCR Automatically save after exiting PCR

Emergency stop

- 1) If malfunction of device or error in PCR experiment occurs, PCR can be stopped at any time with STOP button.



Figure 3.4.8 Stop button

- 2) Confirm before stopping the PCR.

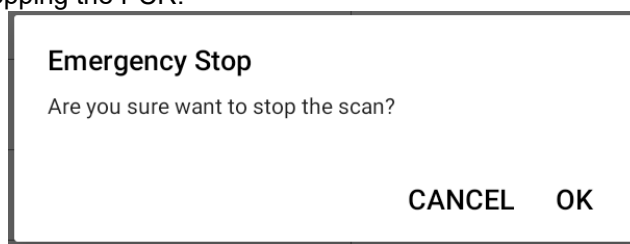


Figure 3.4.9 Emergency Stop Confirmation message

3.5. Save and Load PCR results

1) Save PCR Result

Results are automatically saved with PCR shutdown, and you can also save manually by the Save menu.

- (1) Go to "Menu → Save" then, last PCR result will be saved.

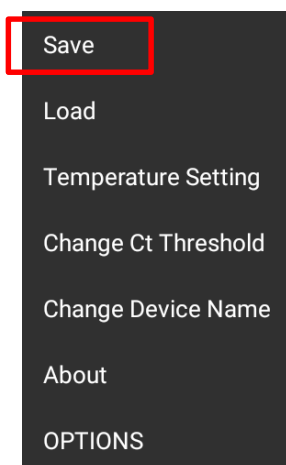


Figure 3.5.1 Save menu

- (2) “Save complete” message will be shown after saving last result

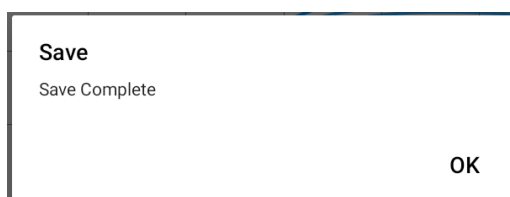


Figure 3.5.2 Save complete

- (3) Otherwise, “Save failed” message will be shown when it’s failed. In this case, please save it again.

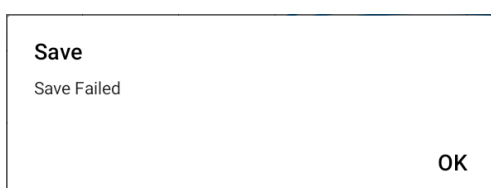


Figure 3.5.3 Save failed

2) Save directory

Internal Memory> Documents> isothermalPCR_M4> Under “Year_Month” folder, it is saved as “isoQuarkM4_name_year_month_day_hour_minute_second”.

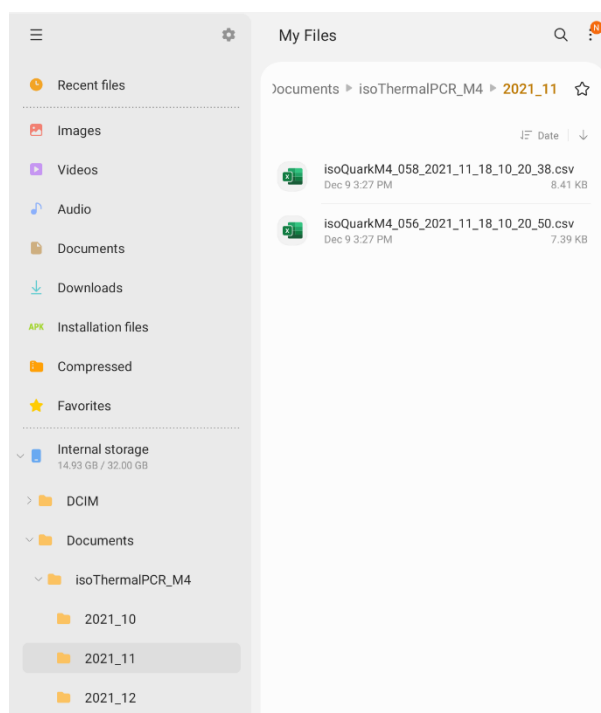


Figure 3.5.4 Save directory

3) Load PCR result

Load the saved results.

- (1) Go to “Menu → Load”.

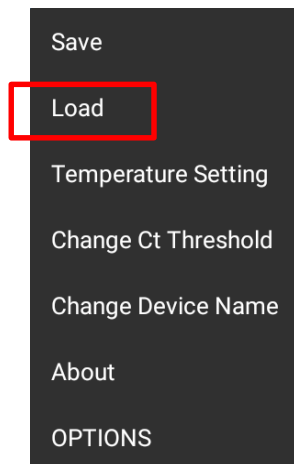


Figure 3.5.5 Load menu

- (2) In the pop-up window that appears, select the desired year and month folder.

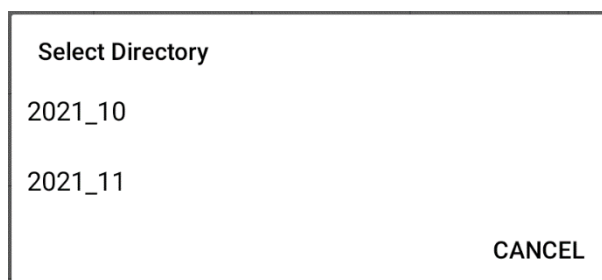


Figure 3.5.6 Select directory

- (3) Select and load a file of the desired date and time.

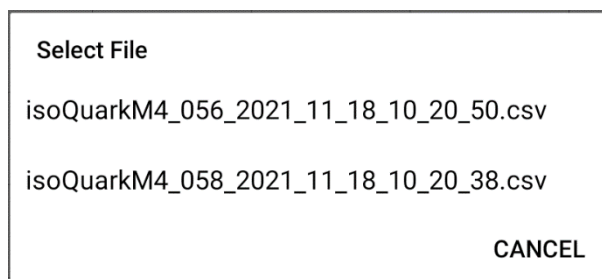


Figure 3.5.7 Select file

3.6. Review PCR Result

After completing the test, you can click the result button to check the result.

- 1) Select “RESULT” at the bottom of screen.

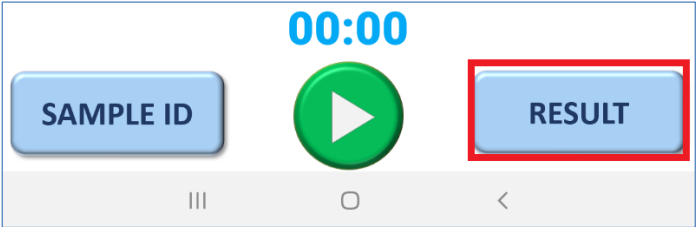


Figure 3.6.1 RESULT button

- 2) The CT values of FAM, HEX, ROX, and Cy5 of 16 wells are displayed.

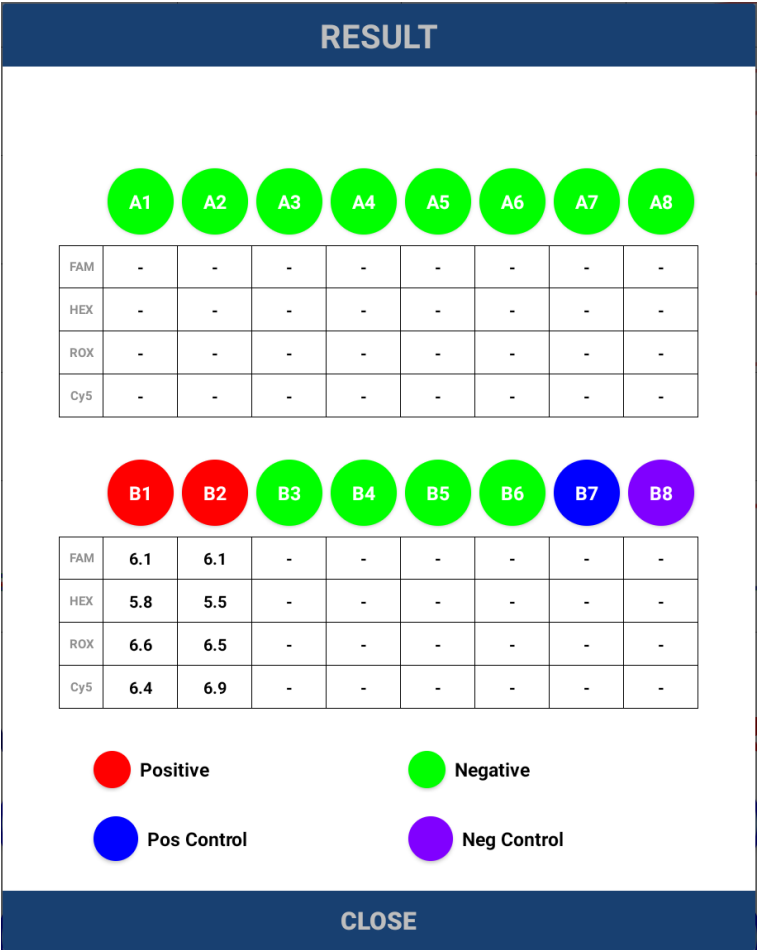


Figure 3.6.2 Result screen

3.7. Change CT Threshold

- 1) Go to “Menu → Change Ct Threshold”.

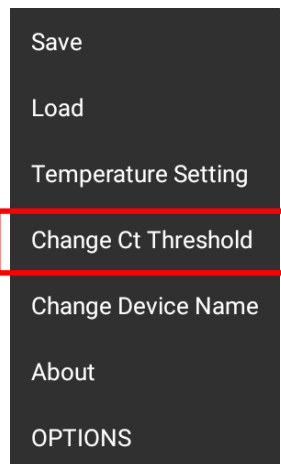


Figure 3.7.1 Change CT Threshold

- 2) Change the FAM, HEX, ROX and Cy5 values and touch the CHANGE button to change the Threshold setting.
- 3) The range that can be set is 100 ~ 60000, and if you press the DEFAULT button, 500 are input.

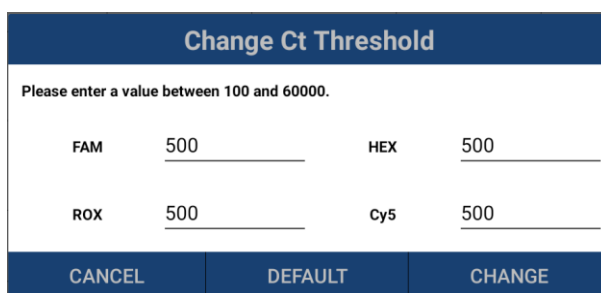
A dialog box titled 'Change Ct Threshold' with a blue header. Below the title, it says 'Please enter a value between 100 and 60000.' There are four input fields arranged in a 2x2 grid: 'FAM' with value '500', 'HEX' with value '500', 'ROX' with value '500', and 'Cy5' with value '500'. At the bottom, there are three buttons: 'CANCEL', 'DEFAULT', and 'CHANGE'.

Figure 3.7.2 CT Threshold Setting

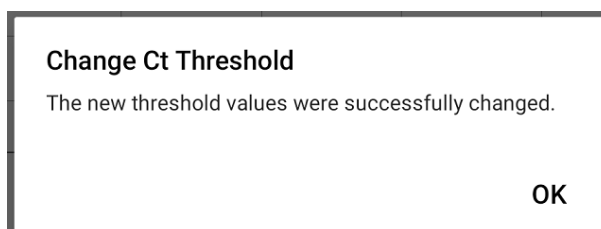
A dialog box titled 'Change Ct Threshold' with a white background and a grey border. It contains the text 'The new threshold values were successfully changed.' and an 'OK' button at the bottom right.

Figure 3.7.3 CT Threshold change completed

3.8. PCR Temperature Setting

- 1) Go to “Menu → Temperature Setting”.

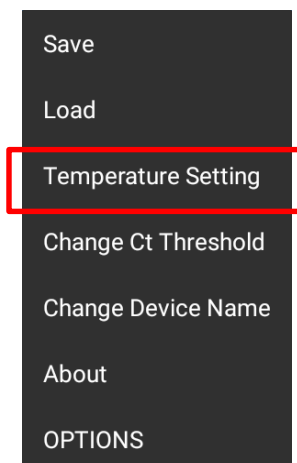


Figure 3.8.1 Temperature Setting

- 2) In the Temperature menu, enter the heating block temperature (40 °C ~ 70 °C) and hottop temperature (80 °C ~ 100 °C) and click the “CHANGE” button.

Temperature	
Block Temperature(40.0°C ~ 70.0°C)	60.0
Top Temperature(80.0°C ~ 100.0°C)	100.0
CANCEL	CHANGE

Figure 3.8.2 Temperature input

- 3) When the temperature change is completed, the following message is output.

Temperature Change	
Success	
OK	

Figure 3.8.3 Temperature change confirmation

3.9. *Change the Device name*

Device name can be easily changed for configuration when using multiple devices.

- 1) Go to “Menu → Change Device Name”.

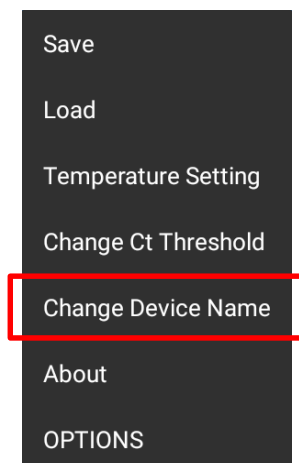


Figure 3.9.1 Change device name

- 2) Enter the three digits and press the CHANGE button to change the device name.

Ex) isoQuarkM4_000, isoQuarkM4_abc

Device Name	
isoQuarkM4_	
CANCEL	CHANGE

Figure 3.9.2 Device name window

- 3) Restart the isoQuarkM4 device.

3.10. *cDNA Synthesis*

Before starting the scan, can set the cDNA Synthesis function to preheat the sample to a certain temperature.

- 1) Connect to isoQuarkM4 device.

- 2) Go to "Menu → OPTIONS"

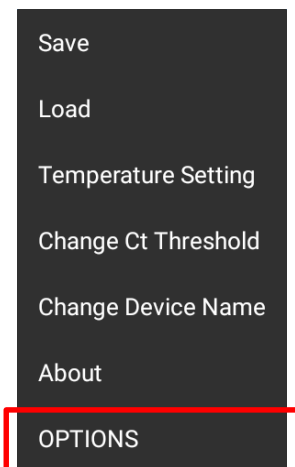


Figure 3.10.1 OPTIONS

- 3) Selecting the check box activates the cDNA Synthesis function. If you don't want to use it, please release the check box.

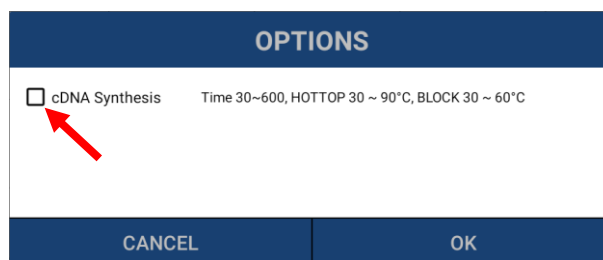


Figure 3.10.2 cDNA Synthesis screen

- 4) When the cDNA Synthesis function is activated, TIME, HOTTOP, and BLOCK can be set.

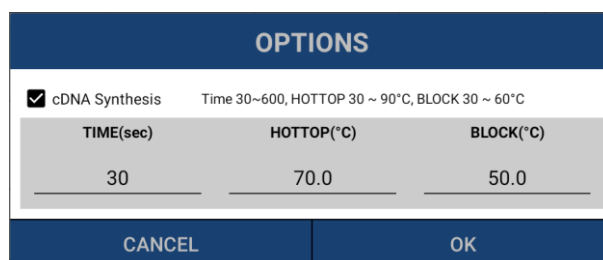


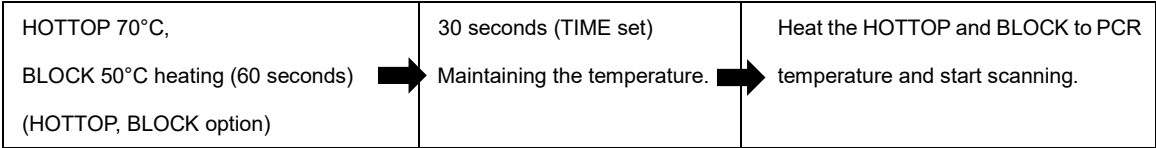
Figure 3.10.3 cDNA Synthesis activated screen

- (1) TIME : The time when the cDNA Synthesis function operates.
 - (2) HOTTOP : HOTTOP temperature set in cDNA Synthesis step.
 - (3) BLOCK : BLOCK temperature set in cDNA Synthesis step.
- 5) Please press "OK" and save it. cDNA Synthesis settings are stored on isoQuarkM4 devices, so cDNA Synthesis settings are maintained even when the isoQuarkM4 device is rebooted.

- 6) When scanning is started with the cDNA Synthesis option activated, the BLOCK and HOTTOP are heated for a time set at the temperature set by the cDNA Synthesis option.
- 7) At the end of the cDNA Synthesis step, heat the HOTTOP and BLOCK to the set temperature (See 3.8. PCR Temperature Setting) for before the scan begins.

※ Example of cDNA Synthesis function

After activating cDNA Synthesis and setting TIME 30, HOTTOP 70, and BLOCK 50, scan start.



3.11. Setup the Sample ID

Give ID and select positive control and negative control for 16 wells. And you can enter a memo about the inspection.

- 1) Touch the “SAMPLE ID” button.

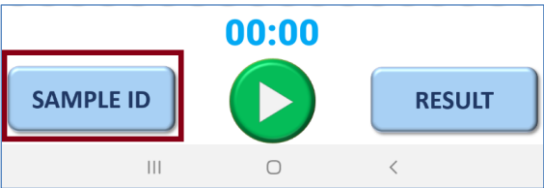


Figure 3.11.1 SAMPLE ID Button

- 2) Select the positive control, negative control, and edit each sample IDs. After editing sample ID, please click the accept button at bottom of the window.

Sample ID

Pos Control

B7

A1

A2

A3

A4

A5

A6

A7

A8

Neg Control

B8

B1

B2

B3

B4

B5

B6

B7

B8

Memo

CANCEL

ACCEPT

Figure 3.11.2 SAMPLE ID

- 3) An edit completion message is displayed.

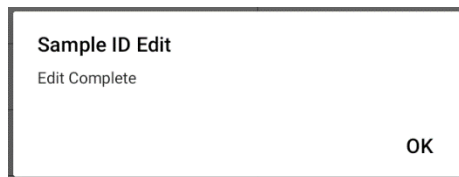


Figure 3.11.3 Edit confirmation

3.12.SW version

- 1) Go to "Menu → About", version of SW will be displayed.

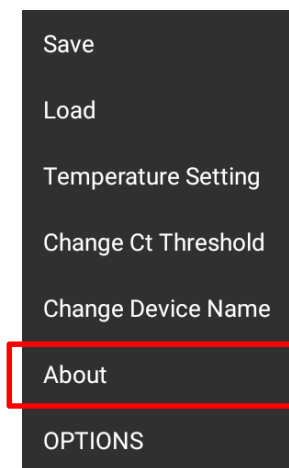


Figure 3.12.1 About

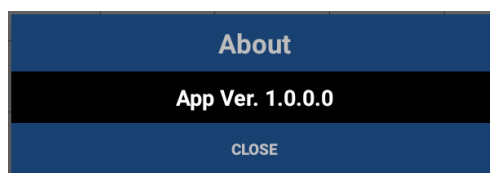


Figure 3.12.2 SW version

4. Warning messages

4.1. Temperature problem

- 1) When the device temperature is abnormal or heater block is removed, a warning message window appears.
- 2) If you get an abnormal temperature message, the test is invalid.
- 3) When temperature problems consistently, contact the service center.

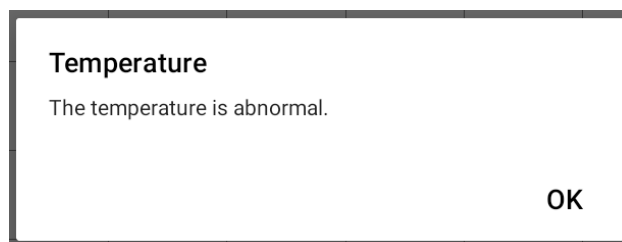


Figure 4.1.1 Temperature warning messages

4.2. Device disconnection problem during use

- 1) When the disconnection with the device, "NOT CONNECTED" is displayed on the top.
- 2) Please check the power to the device, and the USB cable is properly connected.
- 3) If the connection is still not successful, please restart the device.
- 4) When connection problems consistently, contact the service center.



Figure 4.2.1 Not connected state

5. Management and storage

5.1. Caution after using

- 1) If the sample is not removed, there is a risk of contamination inside the device. After use, separate the heating block and remove the sample.
- 2) If you open the heating block for a long time, dust can accumulate and interfere with the analysis. After use, make sure to keep the heater block in the device.

5.2. Notes for cleaning

- 1) Make sure to turn off the power before cleaning the product.
- 2) Do not pour liquid into the product or drop the product.
- 3) If the sample falls on the device and is contaminated, stop the experiment and clean it quickly.

5.3. How to storage device after using

- 1) Make sure to keep the device after use with the power off.
- 2) Please store or use it avoid direct sunlight or near heat sources.
- 3) Please store or use it in a well-ventilated environment.
- 4) Avoid storage in places where there is a risk of falling or where vibration or mechanical impact may occur.
- 5) Avoid near chemicals or where gas is generated.
- 6) Storage and transportation environment of the device.

Temperature: -10°C ~ 65°C.

Humidity: 15 ~ 95%.

6. *Technical support*

When you have some questions during the install or use, please contact the local distributor and us.



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