

# Multi-Bay Real-Time Fluorescence Quantitative PCR System

Maverick qPCR

(MQ6 / MY6 / MQ8 / MY8 Series)

# Instruction Manual

**Version (V1.0)**

The instruction manual must be properly placed in the product box during shipment.

The user is required to keep this manual in a safe place so that it can be consulted when needed.

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Thank you for choosing our products. Please read this instruction manual carefully before use.

Anitoba Biotechnology (Hangzhou) Co., Ltd. (hereinafter referred to as Anitoba) guarantees that the Multi-Bay Real-Time Fluorescent Quantitative PCR System you are using has been fully tested and meets the requirements of the instructions for use. The instructions and safety warnings given in this instruction manual must be followed in order to use the instrument, otherwise the warranty does not apply.

### **Software description**

The software is a necessary tool for the operation of the instrument. For the purpose of improving its performance and reliability, Anitoba has the right to modify its functions or design, etc., in advance or subsequently without informing the clients, and Anitoba has all the intellectual property rights of the modified version.

### **Responsibility statement**

Anitoba is not responsible for direct or indirect incidental damages arising from non-compliance with the operating procedures given in the instructions or incorrect use of the Multi-Bay Real-Time Fluorescent Quantitative PCR System. Only Anitoba 's technicians or its authorized agents may inspect or provide parts for the instrument in question, and we are not responsible for direct or indirect collateral damage resulting from the user's disassembly and replacement of parts. The responsibility of Anitoba is limited to the repair of the machine and the replacement of the parts, but not for the results of the experiments.

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# Chapter 1 Important Notes

The following safety measures must be observed during all phases of operation, maintenance, and servicing of this instrument. Failure to observe these measures or the warnings and precautions indicated in this manual will likely affect the basic protection provided by the instrument. Also, this can undermine the safety standards for which the instrument was designed and manufactured and the intended scope of use of the instrument.

## 1. 1 Instrument grounding

To ensure the personal safety of the operator, please use three-prong grounding plug provided by the manufacturer. When using the adapter, please use a grounding socket that matches the plug to ensure that the input power line of the instrument is reliably grounded.

### 1) Use of power supply

Before the instrument adapter is connected to the power cord, it must be ensured that the AC power supply voltage (100 to 240 VAC) and frequency (50/60Hz) are consistent with those required by the instrument adapter. When making the power cord connection, make sure that the instrument power switch is off. Do not touch the power switch and power cord with wet hands. It is prohibited to disconnect the power cord when the instrument is not powered off. It is forbidden to touch the power cord to the hot surface of the instrument. Do not clean the instrument when it is not disconnected. Please turn off the power when the instrument is no longer in use.

### 2) Power cord

The instrument should normally use the power cord supplied with it. If the power cord is broken, it must be replaced without repair. When replacing the power cord, it must be replaced with the same type of power cord of the same specifications. When this instrument is in use, do not place anything on the power cord, and do not place the power cord in a place where people move around.

### 3) Power cord plugging and unplugging

Power cord plugging and unplugging must be the correct handheld plug operating parts, plug insertion should ensure that the plug is completely, tightly inserted into the socket, do not pull hard when pulling out the plug, or yank the power cord.

## 1. 2 Placement of the Instrument

- 1) The instrument should not be placed in a location where it is difficult to disconnect the power supply.
- 2) The instrument uses semiconductor cooling and fan-assisted heat dissipation, so when placing the instrument, ensure that there is no obstacle within 15cm around the instrument, and when multiple instruments are used at the same time, the distance between each instrument should be not less than 30 cm.

- 3) The instrument should be placed in a place with low humidity, less dust, and far from water sources (such as pools, water pipes, etc.), with good ventilation, no corrosive gas or strong magnetic field interference, and avoiding direct sunlight and strong light sources. The table where the instrument is placed should be horizontal and stable.
- 4) High ambient temperature will affect the testing performance of the instrument or cause malfunction. Do not use this instrument in the place of direct sunlight and strong light source to avoid affecting the fluorescence detection of the instrument, and should be far away from heating, stove and all other heat sources.
- 5) Turn off the power when stop working. When the instrument is not used for a long time, cut off the power, unplug it, and cover it with soft cloth or plastic film to prevent dust and foreign objects from entering.

### 1.3 Precautions

- 1) During the test operation, avoid liquid dripping on the instrument.
- 2) The consumables and reagents used in the test should be disposed of according to the relevant standards, and should not be discarded or dumped at will.
- 3) If there are hazardous substances in the test, related training must be conducted before using them.
- 4) After use, the hazardous substances should be handled and stored properly in strict accordance with the relevant regulations.
- 5) The test personnel who operate the instrument need to be trained and have relevant qualifications.
- 6) When handling toxic, corrosive or infectious substances, safety goggles and gloves must be worn.
- 7) It is strictly forbidden to touch the metal module when the instrument is running and for a period of time just after the operation to avoid burns.
- 8) It is strictly forbidden to open the instrument during the operation of the instrument, otherwise it will cause abnormal experimental results.

### 1.4 After-sales service

- 1) After receiving the instrument, please confirm the relevant content on the after-sales warranty card and contact the shipping unit if you have any questions.
- 2) After unpacking the instrument, please keep the packing box and packing materials properly for use when returning to the factory for after-sales service.
- 3) Before sending the instrument to the maintenance department, the instrument must be disinfected.
- 4) After the instrument is delivered to the maintenance department and unpacked, the maintenance personnel must disinfect the instrument immediately.

## 1.5 Packaging, storage and transportation marking

Table 1-5-1 Package storage and transportation identification

Symbol	Title	Description	Position
	Place carefully and gently	This symbol is used to indicate that the product is a precision instrument and should be handled carefully and gently.	On the packing carton
	Upward	This symbol is used to indicate that the instrument must be kept upward during handling, storage and use, and must not be placed sideways or upside down to avoid damage to the instrument.	On the packing carton
	Afraid of getting wet	This symbol is used to indicate that the instrument must not be stored in a humid environment or in a place where it can be splashed with liquid.	On the packing carton
	Anti-bumping	This symbol is used to indicate that the instrument should be handled, stored, and used with care to avoid any impact on the performance of the instrument.	On the packing carton

## 1.6 Instrument Identification Information

Table 1-6-1 Instrument identification information

Symbol	Description	The location on the instrument where the symbol will appear
	Watch out for high temperatures	On the equipment
	Production date	On the equipment nameplate
	Pay attention to safety	On the equipment nameplate
	Serial number	On the equipment nameplate
	Instruction manual	On the equipment nameplate
	Biological hazards	On the equipment nameplate

## Chapter 2 Product Overview

This chapter mainly describes the usage, characteristics, specifications and performance parameters of multi-bay real-time fluorescence quantitative PCR system.

### 2.1 Product usage

Multi-bay real-time fluorescence qPCR system is a series of qPCR instruments consisting of multiple single chambers (16 wells) that can be freely combined according to demand. Each chamber can be operated independently without interference, so that samples can be tested as they arrive, greatly improving the flexibility of the test, and up to 96 wells can be tested simultaneously to achieve high throughput testing needs. The instrument comes with a 10-inch touch screen for integrated operations such as testing and data analysis.

The product is developed based on our multi-channel fluorescence imaging optical system with CMOS bio-image sensor. The product can be widely used in universities and research institutes, CDC, Entry-Exit Inspection and Quarantine Bureau, Public Security Criminal Evidence Identification Center, veterinary stations, food companies and pharmaceutical companies.

### 2.2 Product Features

- 1) Efficient and fast: with ultra-fast temperature rise and fall system and unique chip technology, fast detection can be achieved.
- 2) Touch operation: 10-inch LCD touch screen, integrated touch operation, no external computer, simple and convenient.
- 3) Testing flexibility: the machine can have up to 6 independent chambers, which can be operated jointly or independently to achieve the "on-the-go" inspection of samples.
- 4) Stable and reliable: the whole machine has no moving parts, and the structure is sturdy and durable without regular calibration even after a long time of use.
- 5) Intelligent management: optional 4G module allows remote management or cloud management of experimental data as needed.
- 6) Multiple options: Support 2 or 4 fluorescence channels (more channels can be customized), suitable for most of current dyes, no cross interference between channels, no need for regular calibration maintenance.
- 7) Stable light source: independent LED light source for each fluorescence channel, stable and non-decaying LED light source, no need for regular replacement.
- 8) High sensitivity chip: the unique "Ultra-Low-Light CMOS Image Sensor (CIS) Chips",

millisecond-level extremely fast shooting without row-by-row scanning, stable and reliable data.

- 9) Modularity: realize the modularity of single chamber, which can be integrated with other systems and has wider application scenarios. The physical picture of the single chamber is shown in Figure 2-2-1.

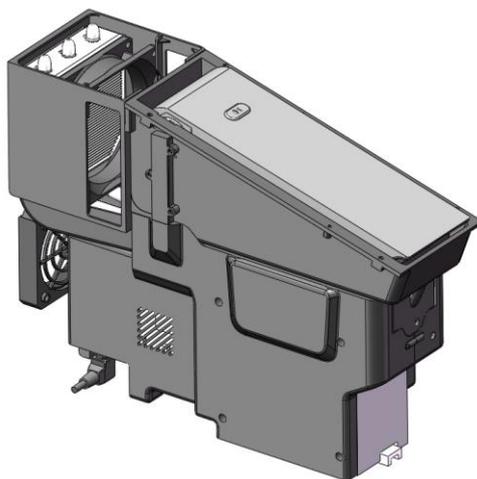
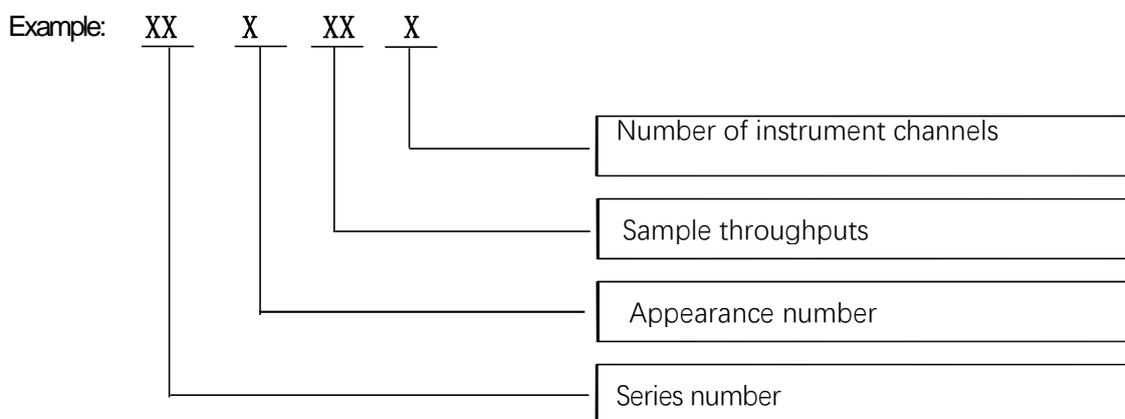


Figure 2-2-1 Single chamber module

### 2.3 Specification model description



### 2.4 Instrument models

Table 2-4-1 Instrument models

Model	Channel	Sample throughput	Applicable consumable
MQ6962	2 channels	96 wells	0.2ml standard PCR tubes
MQ6964	4 channels	96 wells	0.2ml standard PCR tubes
MY6962	2 channels	96 wells	Y-type PCR tubes
MY6964	4 channels	96 wells	Y-type PCR tubes

MQ8482	2 channels	48 wells	0.2ml standard PCR tubes
MQ8484	4 channels	48 wells	0.2ml standard PCR tubes
MY8482	2 channels	48 wells	Y-type PCR tubes
MY8484	4 channels	48 wells	Y-type PCR tubes

## 2.5 Main technical parameters

Table 2-5-1 MQ6 / MY6 main technical parameters

<b>Basic Performance</b>	
Dimension	483*541*252 mm
Bare weight	22 kg
Power	100~240VAC, 50/60Hz
Noise level	≤ 60dB
<b>PCR System Performance</b>	
Sample volume	10 ~ 60ul
Sample throughput	96-well (6×16-well, 6-bay module)
Applicable consumables	Transparent 0.2ml single tube, 8*0.2ml row tube, Y-type tube
Experimental operation mode	Independent operation or free combination of six 16-well experiments
Maximum heating rate	≥ 8.0°C/s
Maximum cooling rate	≥ 5.5°C/s
Temperature accuracy	≤ 0.5°C
Detection repeatability	Ct CV≤ 2%
<b>Fluorescence Detection System Performance</b>	
Light source	High brightness LED
Detector	Ultra-low-light CMOS Bio-imaging chip
Excitation wavelength	F1: 470nm                      F2: 523nm F3: 571nm                      F4: 624nm
Detection wavelength	F1: 527nm                      F2: 564nm F3: 612nm                      F4: 694nm

Table 2-5-2 MQ8 / MY8 main technical parameters

<b>Basic Performance</b>	
Dimension	483*286*252 mm
Bare weight	11 kg
Power	100~240VAC, 50/60Hz
Noise level	≤ 60dB
<b>PCR System Performance</b>	
Sample volume	10 ~ 60ul
Sample throughput	48-well (3x16-well, 3-bay module)
Applicable consumables	Transparent 0.2ml single tube, 8*0.2ml row tube, Y-type tube
Experimental operation mode	Independent operation or free combination of three 16-well experiments
Maximum heating rate	≥ 8.0°C/s
Maximum cooling rate	≥ 5.5°C/s
Temperature accuracy	≤ 0.5°C
Detection repeatability	Ct CV≤ 2%
<b>Fluorescence Detection System Performance</b>	
Light source	High brightness LED
Detector	Ultra-low-light CMOS Bio-imaging chip
Excitation wavelength	F1: 470nm                      F2: 523nm F3: 571nm                      F4: 624nm
Detection wavelength	F1: 527nm                      F2: 564nm F3: 612nm                      F4: 694nm

## Chapter 3 Instrument Installation

This chapter describes the use and storage conditions of the multi-bay real-time fluorescence quantitative PCR instrument, its structural components, removal of the fixture, installation / uninstallation of the software, and preparation for power-up. This chapter takes MQ6964 as an example.

### 3.1 Environmental conditions

- 1) Transportation and storage conditions of the instrument
  - a. Environmental temperature:  $-5^{\circ}\text{C}\sim 40^{\circ}\text{C}$  ;
  - b. Relative humidity:  $\leq 75\%$
- 2) Working conditions requirements
  - a. Environmental temperature:  $15^{\circ}\text{C}\sim 35^{\circ}\text{C}$
  - b. Environmental humidity:  $35\%\sim 75\%$
  - c. Input voltage:  $100\sim 240\text{VAC}$ ,  $50/60\text{Hz}$

### 3.2 Unpacking

- 1) The outer packaging of the product is a cardboard box, filled with shock-absorbing foam inside, after unpacking, first check whether the items you receive are missing or damaged.
- 2) If the outer packaging of the product is obviously damaged during transportation, please do not use it and contact the manufacturer and authorized distributor in time.
- 3) Check the completeness of the provided accessories against the packing list (Table 3-3-1).
- 4) If the instrument or accessories have been damaged or lost in transit, please inform the shipping company personnel and our customer service personnel.

### 3.3 Check the packing list

After opening the box, please check the contents of the box according to the packing list, if the items are found to be damaged or missing, please contact the manufacturer and the authorized distributor immediately.

Table 3-3-1 Packing list

Accessory	Quantity
Multi-Bay Fluorescence Quantitative PCR System	1

Power Cord	1
Instruction Manual	1
Factory Inspection Report	1
Warranty Card	1
Certificate of Conformity	1
USB Flash Drive	1

### 3.4 Power cord connection

Use the power cord supplied with the instrument. When connecting, the instrument power switch should be in the "off" state, and then turn on the instrument switch after connecting.

### 3.5 How to use the instrument

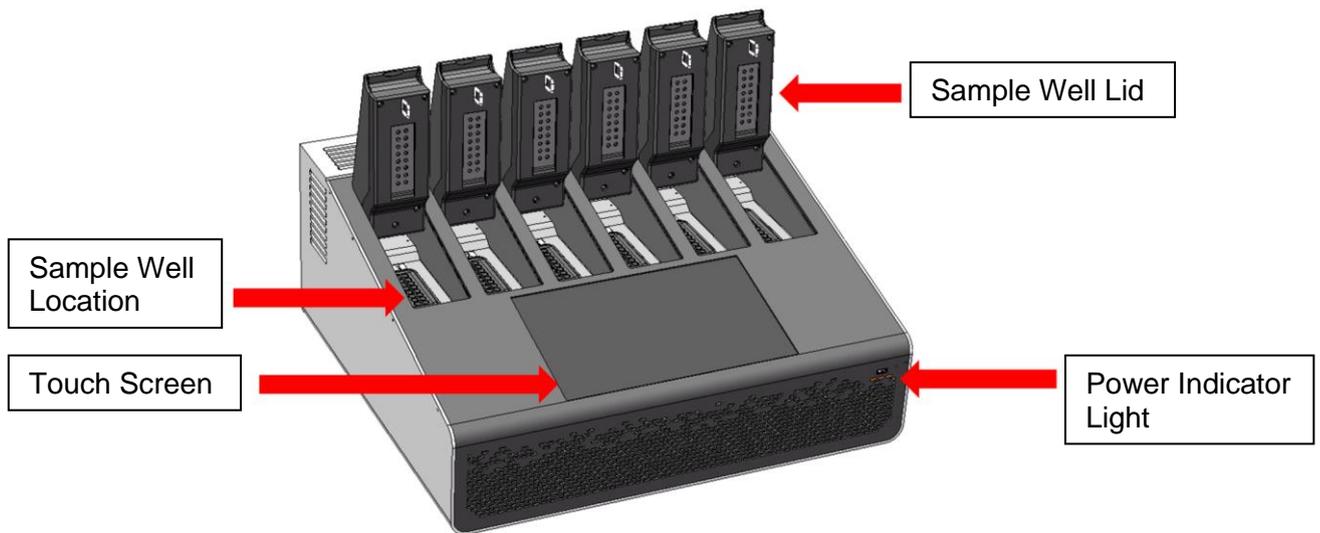


Figure 3-5-1 Front of the instrument

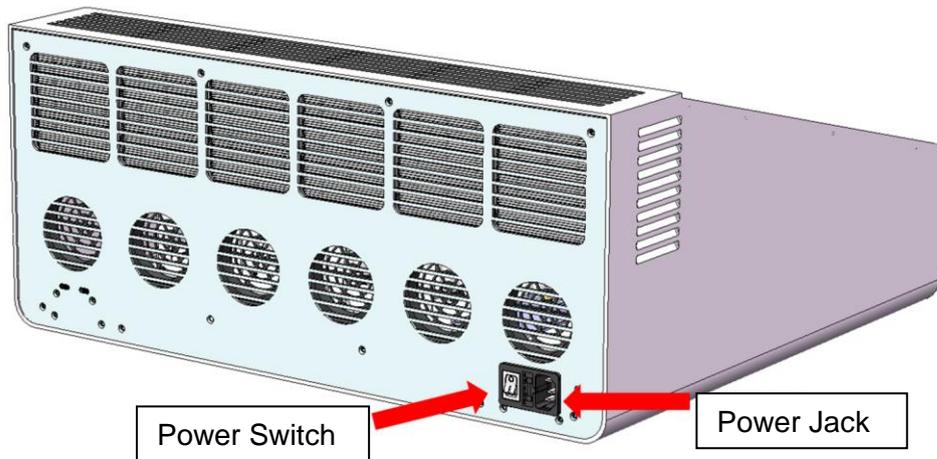


Figure 3-5-2 Back of the instrument

- 1) Insert the DC connector into the power jack of the instrument.
- 2) Turn on the instrument power switch, the power switch lights up red and the instrument power indicator (orange) lights up.
- 3) Click the "Open the Chambers" button on the touch screen to open the lids of the sample well locations and put the collected tubes into the sample wells.
- 4) Close the sample well lids, operate the touch screen panel and start the experiment.

## Chapter 4 Software Operation Guide

This chapter introduces the use of the multi-bay real-time fluorescence quantitative PCR instrument software and the operation related to experimental data. The contents of this chapter take MQ6964 as an example.

Anitoe qPCR software can be used to set up experiments, run experiments, and collect, analyze and manage experimental data. The software contains five main functional modules, namely "Home Page" "Amplification Programs" "Test Results" "System Settings" "User".

- 1) "System Settings" module: mainly contains WLAN, language, virtual keyboard, date and time, display, application information, and customer service.
- 2) "Home Page" module: mainly includes opening the lids, selecting the chambers, selecting the amplification program, setting the parameters of the amplification program, starting the experiment, and viewing and analyzing the experiment results.
- 3) "Amplification Programs" module: mainly includes creating new amplification program, saving amplification program template, setting common amplification programs, and finding and filtering amplification programs.
- 4) "Experimental Results" module: mainly contains experimental data analysis, upload, copy and export, batch analysis, find and filter experimental data, and export reports.

## 4.1 System introduction

1) System settings mainly include user manage, customer service, and system application.

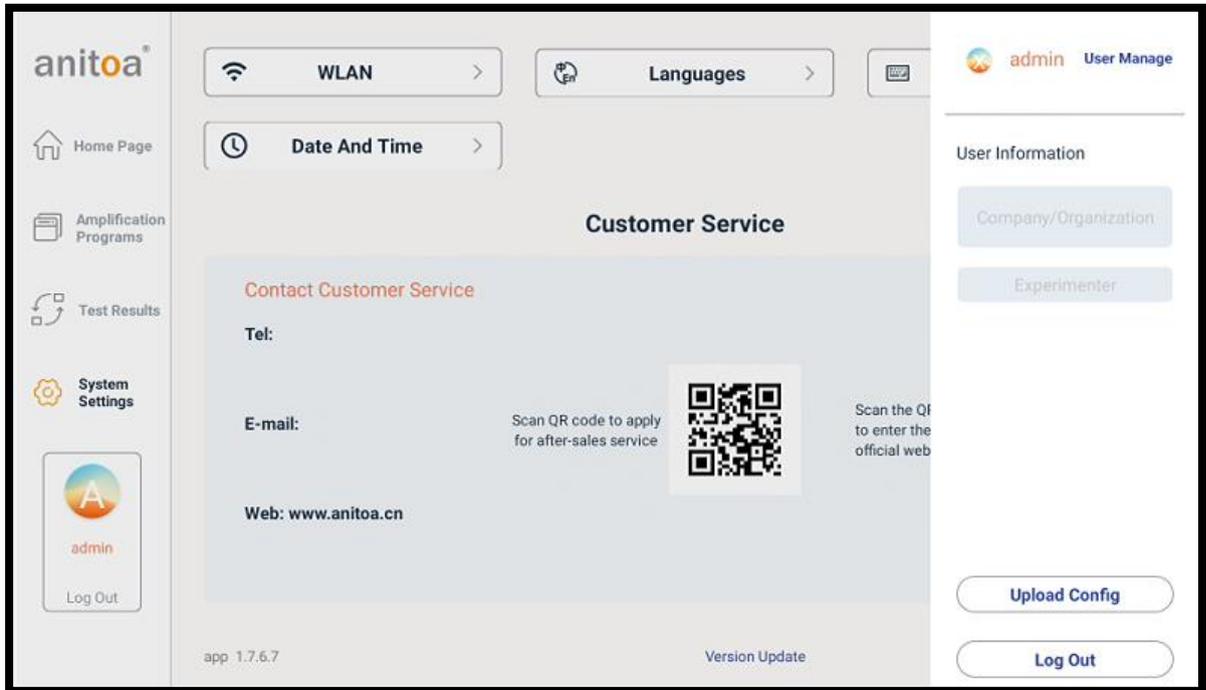


Figure 4-1-1 System settings interface

2) Login: After clicking User Login, you can directly log in using the preset admin account.

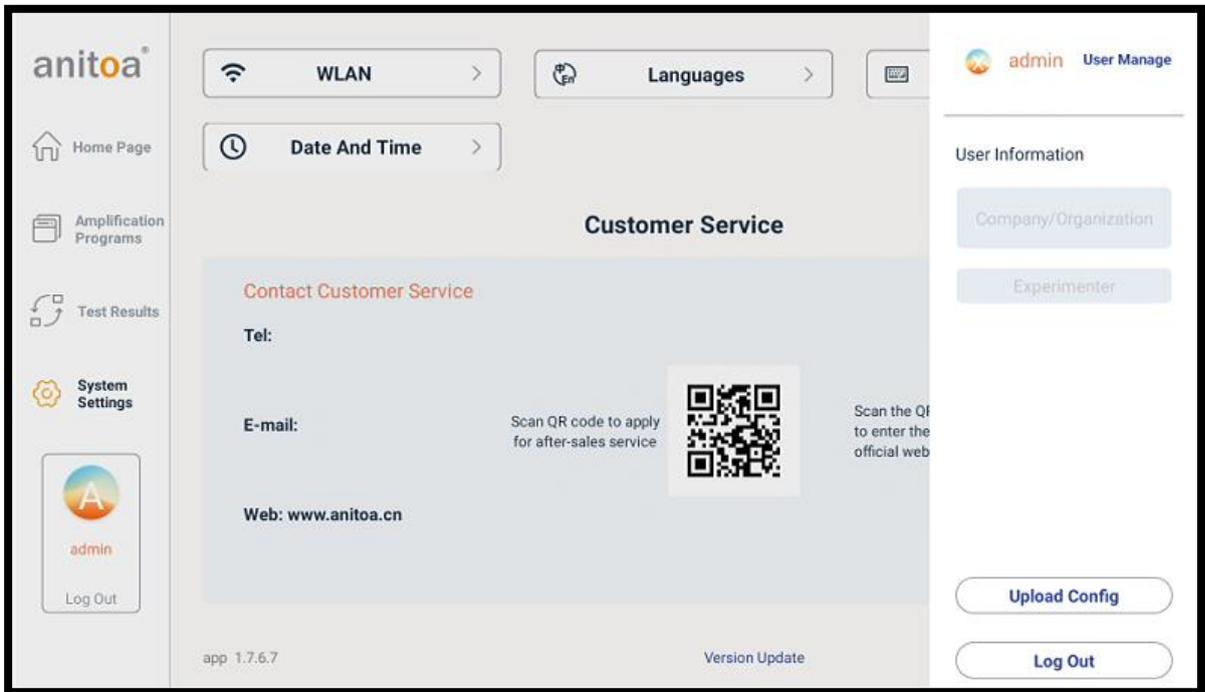


Figure 4-1-2 Login interface

- 3) Customer service: You can scan the corresponding QR code to get the corresponding after-sales service.

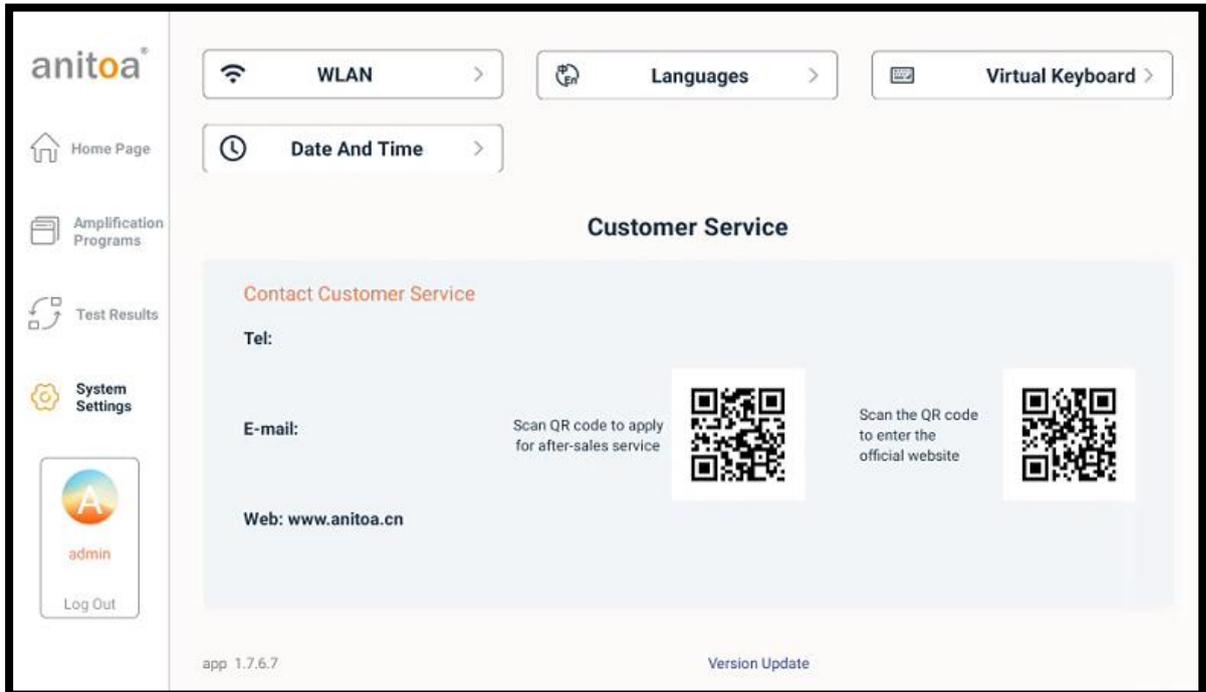


Figure 4-1-3 Customer service

## 4.2 Home page

- 1) Homepage: click on the software to enter the home page, in the home page you can see 6 positions to choose from, each with 16 wells, multiple bays can be run simultaneously (Figure 4-2-1).

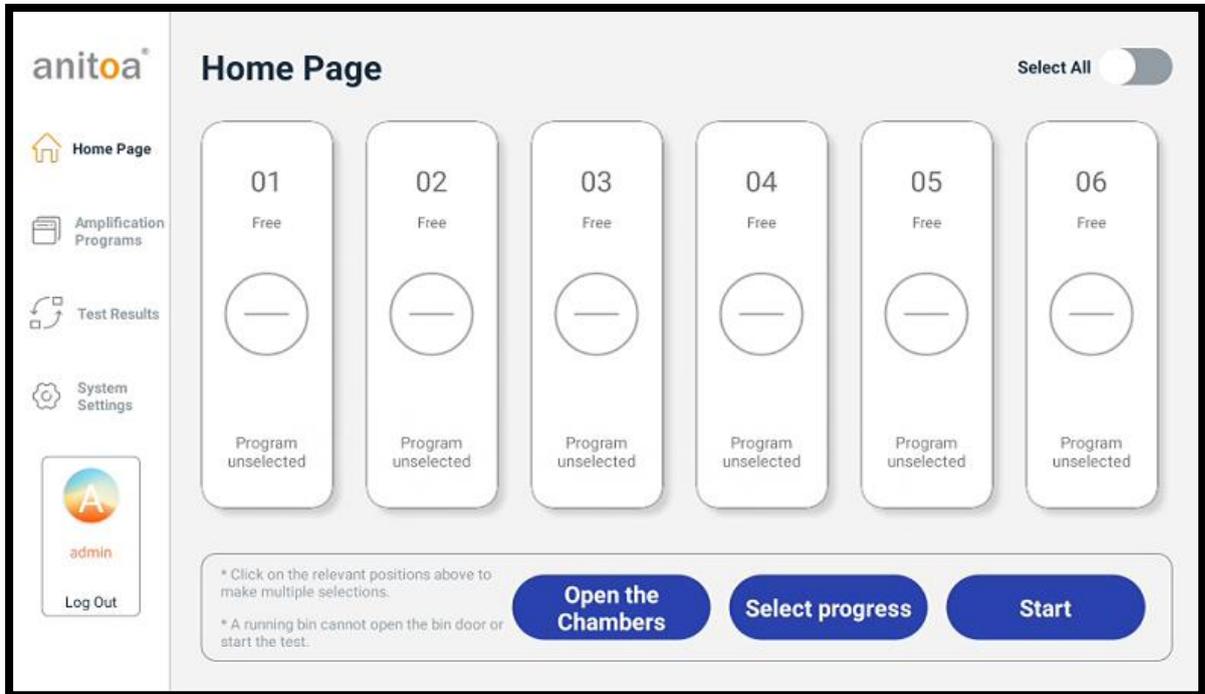


Figure 4-2-1 Home page interface

- 2) Start-up tip: the first time to enter the program will prompt to synchronize the network and time. (Figure 4-2-2)

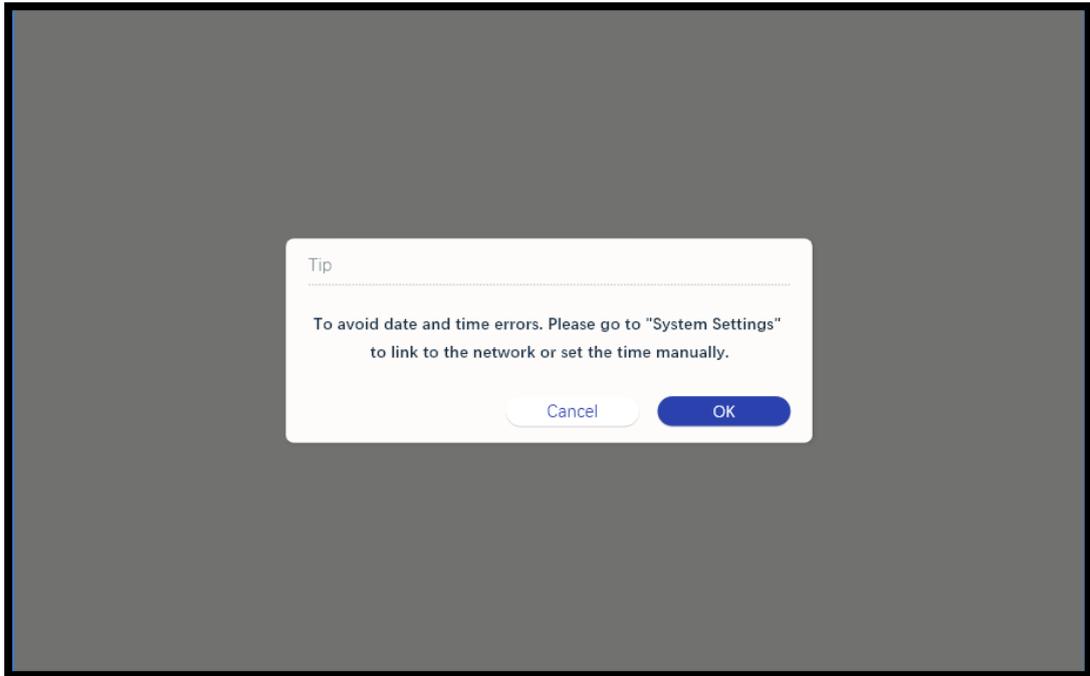


Figure 4-2-2 Start-up tip

- 3) Open the chamber lids: you can click to select any chamber, then open the bay lid, and click below the bays to select the amplification program for the experiment. You can also click the all-select function at the top right to open all bays at once. (The display of idle or complete indicates that the bay is ready to run, Figure 4-2-3 for the multi-chamber mode)

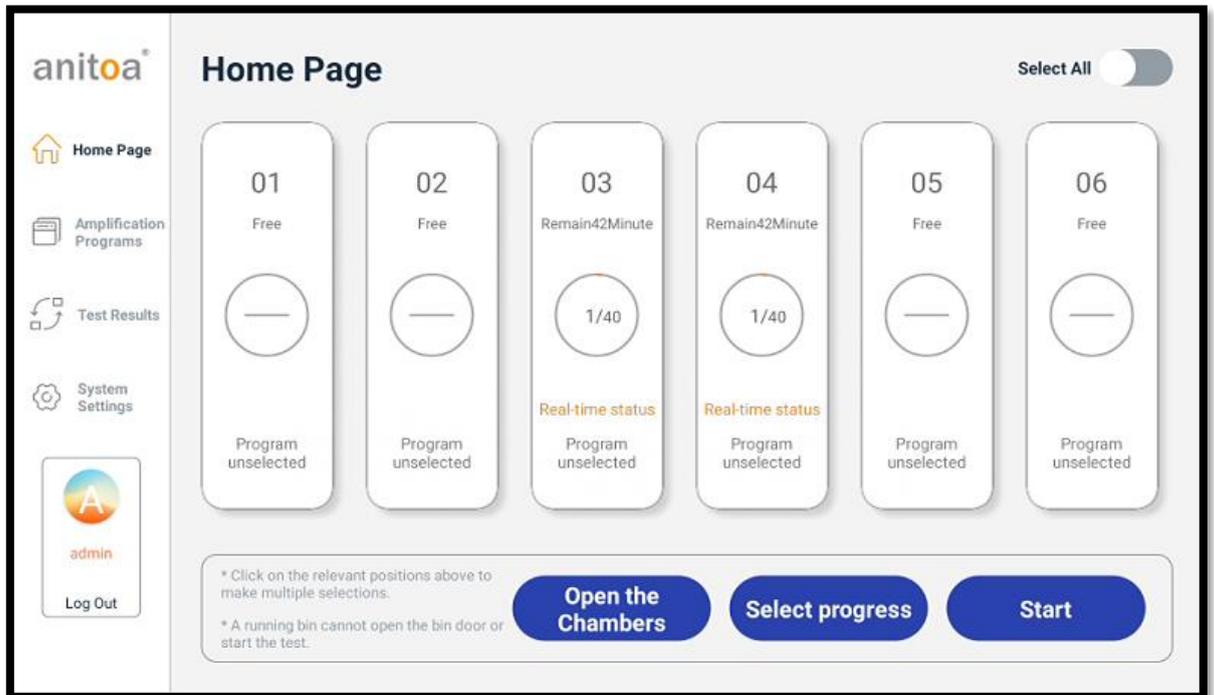


Figure 4-2-3 Multi-chamber mode

- 4) Set up the amplification program: Click "Select a program" at the bottom of the bays to create a new amplification program (parameters such as reaction temperature, reaction time, number of cycles, photo stage, etc.). You can also choose to use the saved amplification program template (Figure 4-2-4).

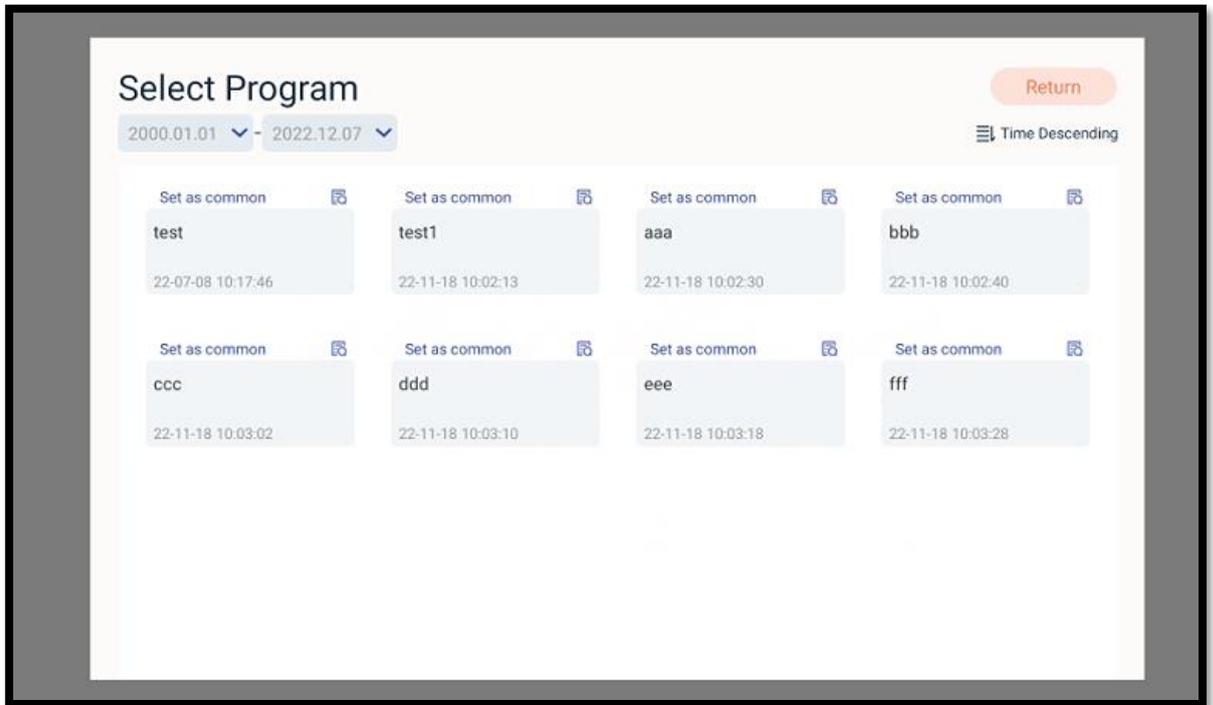


Figure 4-2-4 Select amplification program

- 5) Confirm the amplification program: After selecting the program or creating a new program, enter the confirmation interface to see if you need to modify or save it, and click OK to carry out the experiment after confirming that there is no error. (Figure 4.2.5)

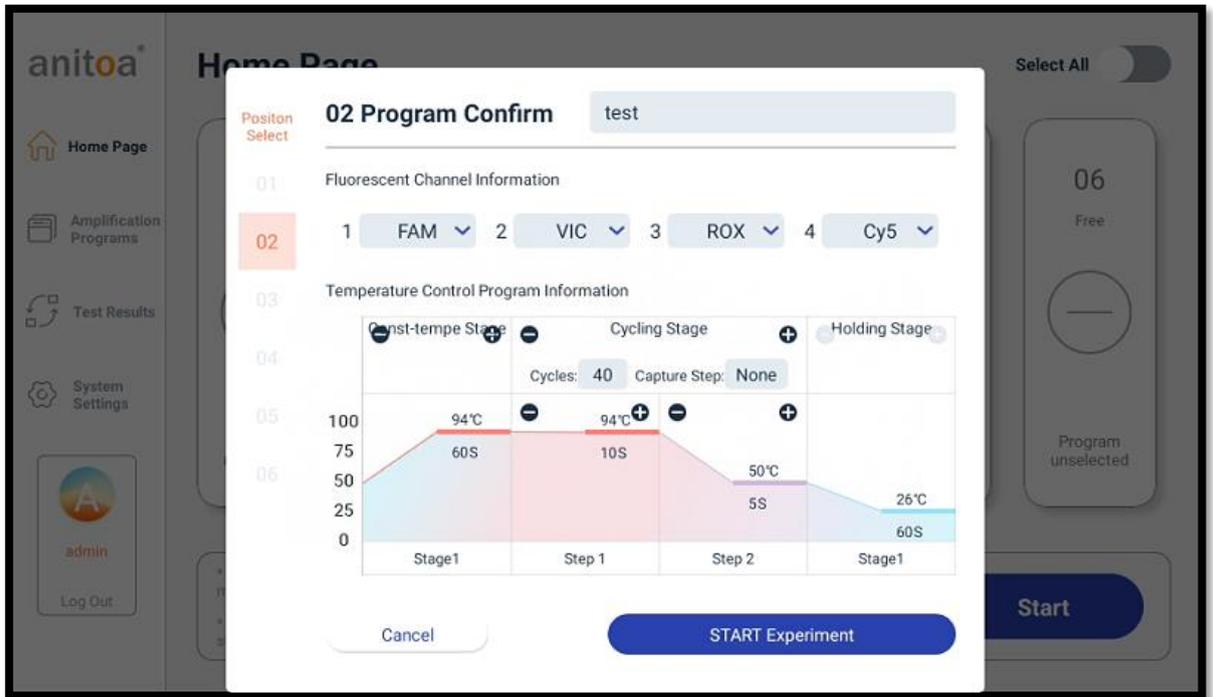


Figure 4-2-5 Confirm the amplification program

- 6) View experiment status: click on the chamber area in the home page to view the corresponding experiment status, you can also terminate the experiment at any time. You can view any running chambers within the experimental state, click the chamber number on the left side of the interface to view.

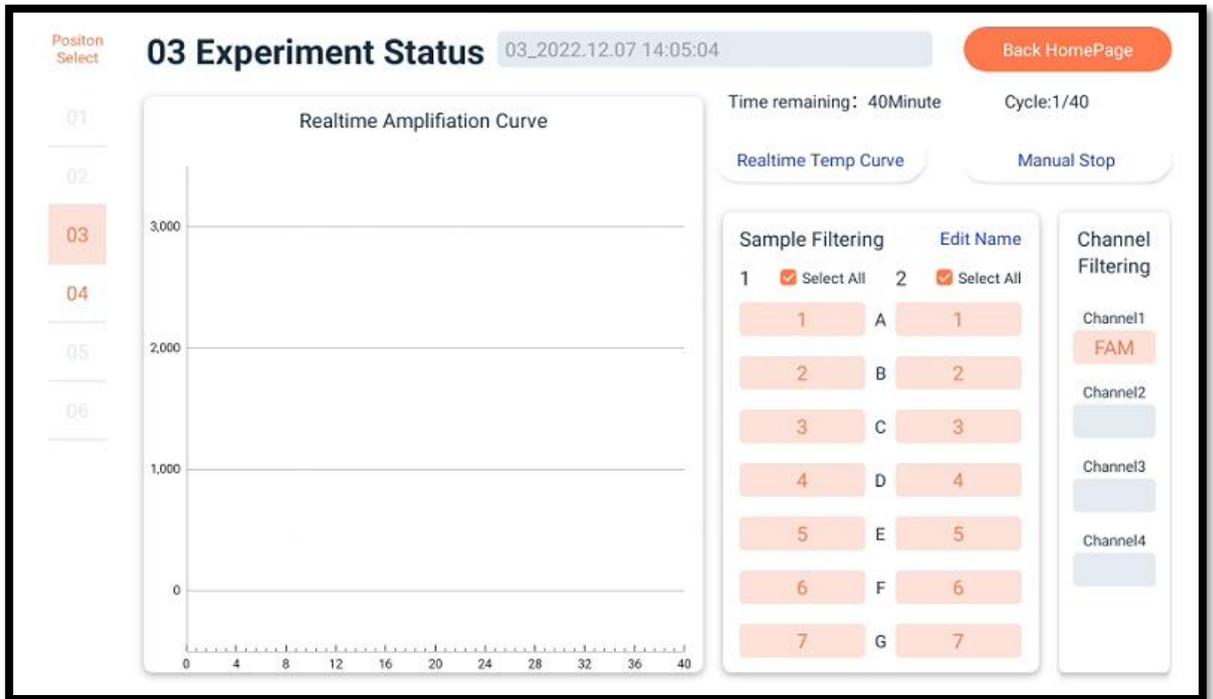


Figure 4-2-6 Experiment status

- 7) Click "Realtime Temp Curve" in the experiment status interface to view the temperature curve of the chamber.

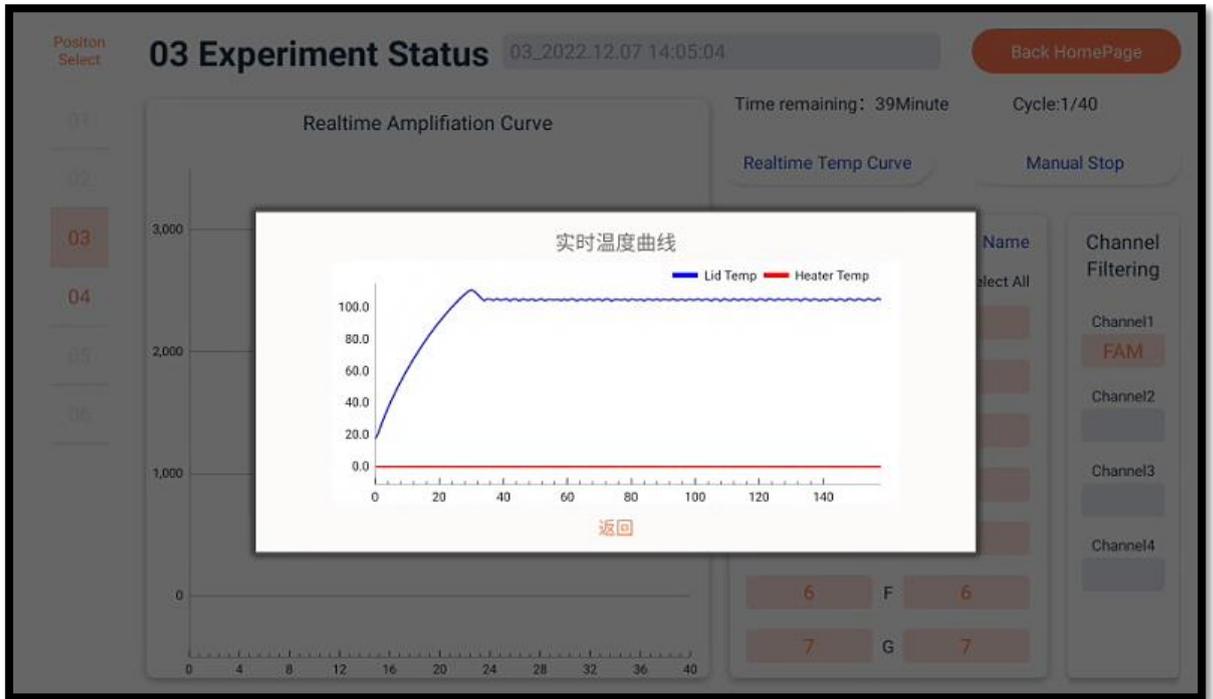


Figure 4-2-7 Real-time temperature curve

### 4.3 Amplification programs

- 1) Amplification program templates: the amplification program folder contains all the amplification program templates saved and downloaded by users.

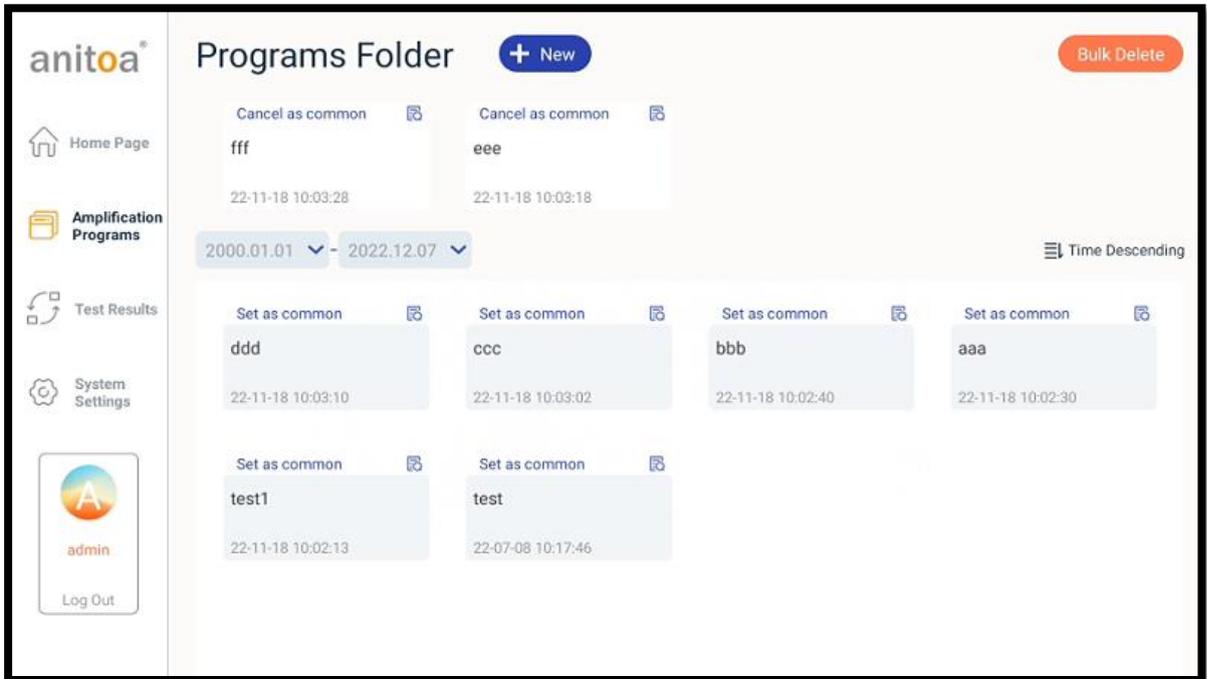


Figure 4-3-1 Amplification programs

- 2) Set common program: users can click the "Set as common" button above the amplification program to add it to the common program, and when the four common programs are full, you can also set another amplification program to replace it.

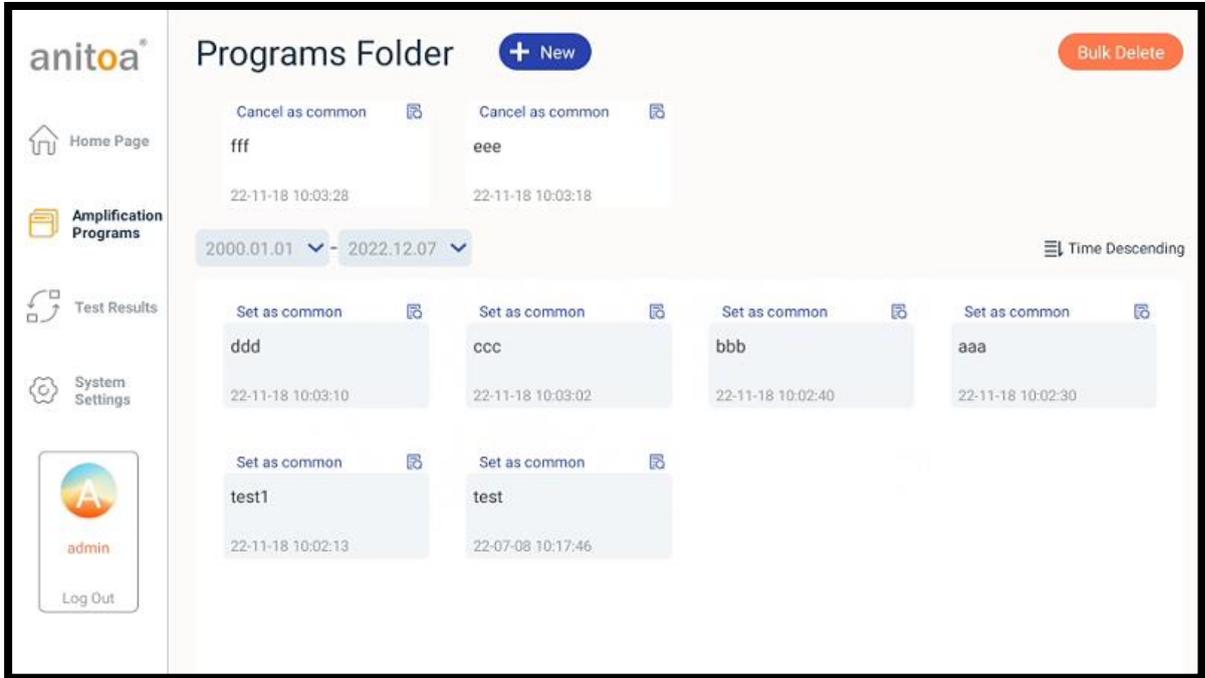


Figure 4-3-2 Replace common programs

#### 4.4 Test results

- 1) After all experiments are finished, the test results data will be saved in the results folder, which can be uploaded to the cloud, while the data will be copied out and the useless test data will be deleted.

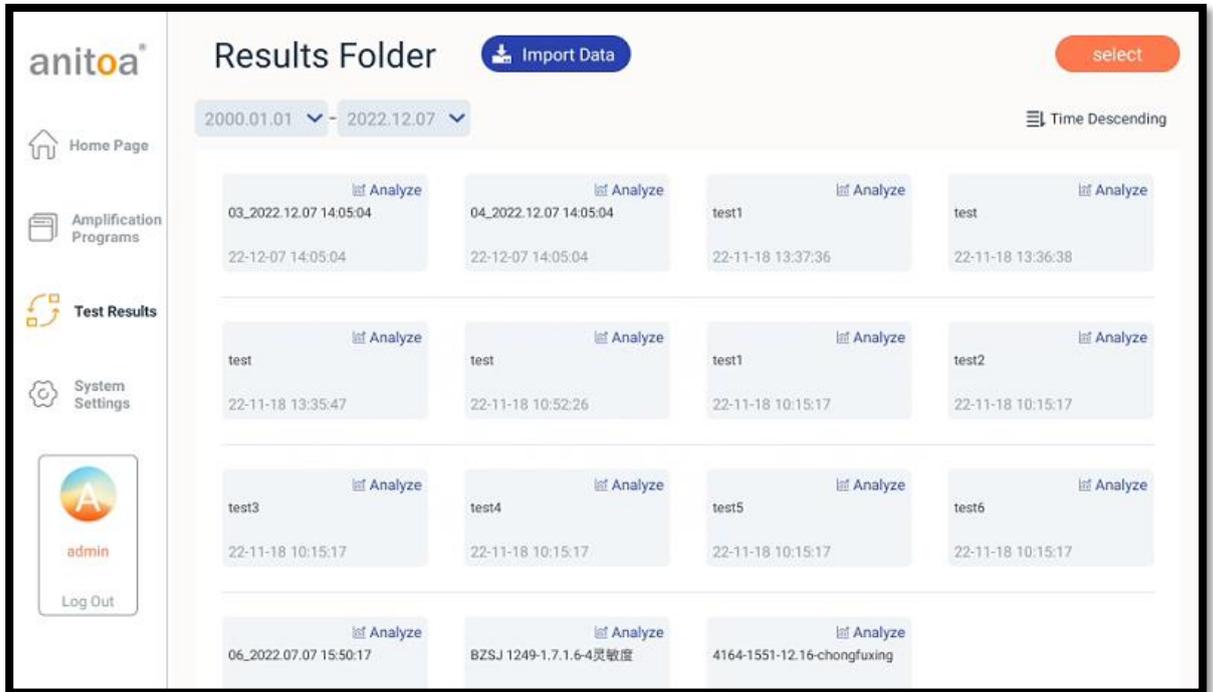


Figure 4-4-1 Test results

2) Experiment analysis: click on the experimental data box to view and analyze the data.

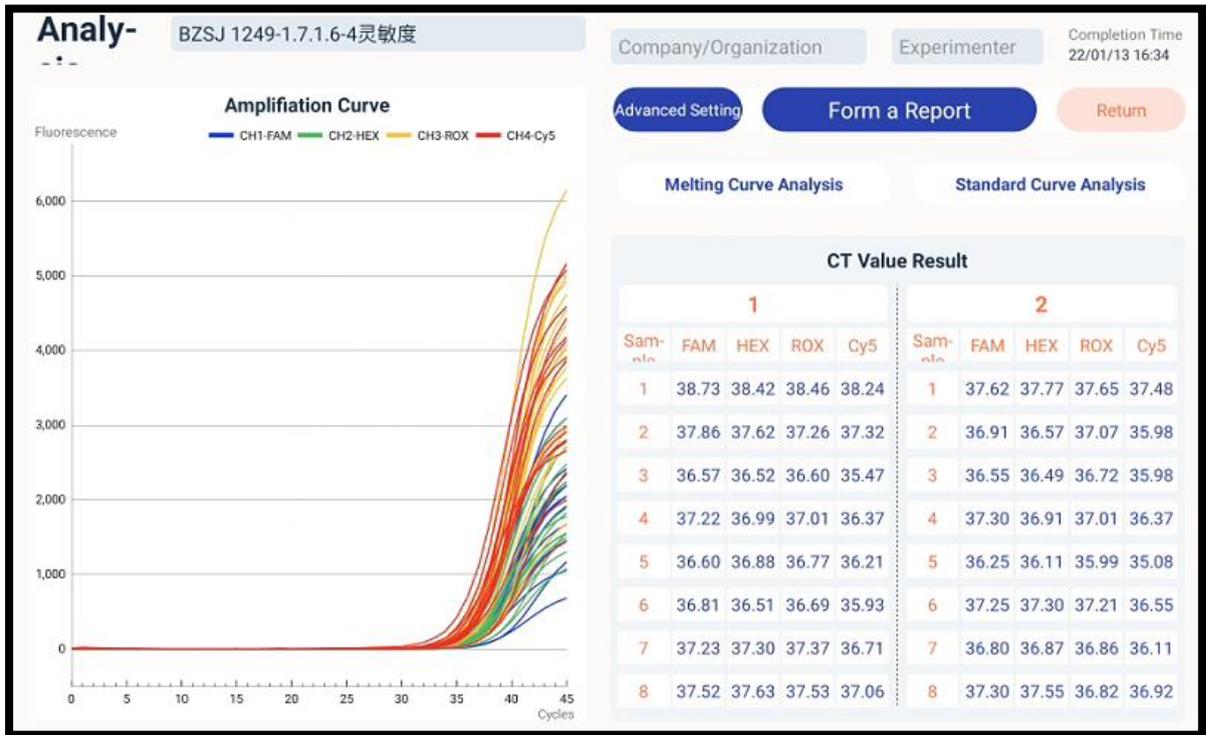


Figure 4-4-2 Analysis page

3) Melting curve analysis: click the Melting Analysis Curve button in the analysis interface.

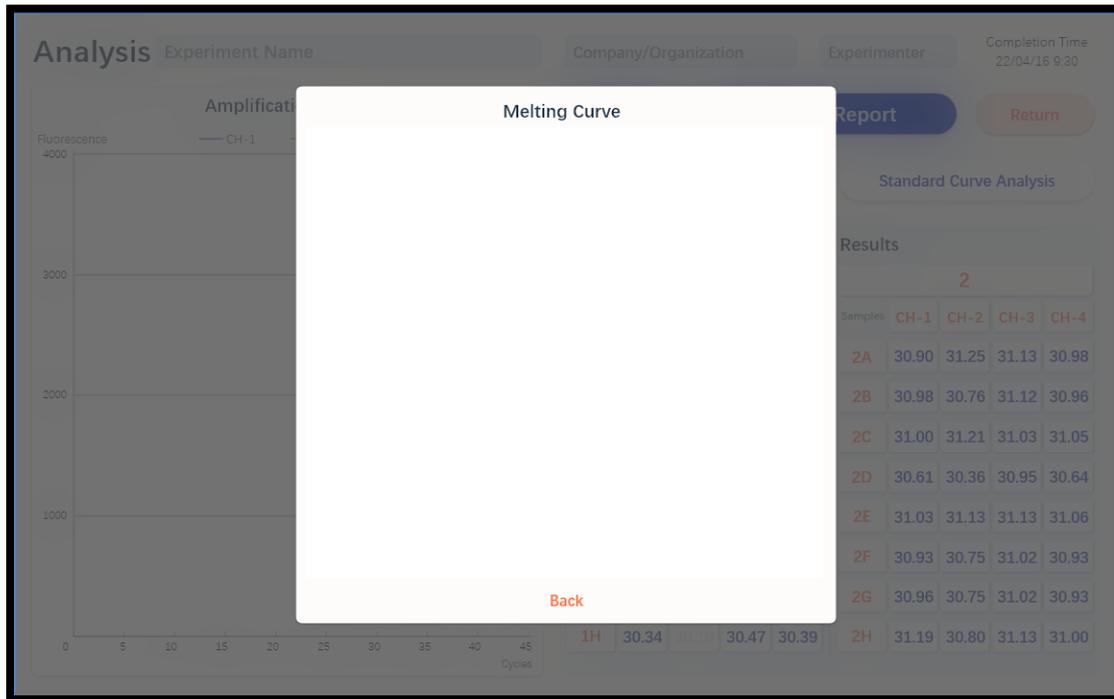


Figure 4-4-3 Melting curve page

4) Standard Curve: Click the Standard Curve button in the analysis interface.

The screenshot displays the 'Standard Curve' interface. On the left, there are two tables. The top table, titled 'Standard Points', is checked and contains the following data:

Sample	Concentration(a..	Ct
A1	↓ E n	38.73
A2	ā E n	37.86
A3	a E n	36.57
A4	a E n	37.22

Below this is an unchecked 'Unknown Points' table with the same headers but no data.

On the right side, there are several buttons: 'Return to analysis page', 'Draw Std Curve', 'Save Std Curve', and 'Find Unknown'. Below these is a 'Sample Well Filter' section with a grid of buttons for wells 1-8 in rows A-H. Wells 1-4 are highlighted in orange.

At the bottom, there is a 'Channel Select' section with four options: Channel1 (FAM), Channel2 (HEX), Channel3 (ROX), and Channel4 (Cy5). Channel1 is selected.

Figure 4-4-4 Standard curve page

5) Report export: click "Form a Report" (PDF format) in the analysis interface.

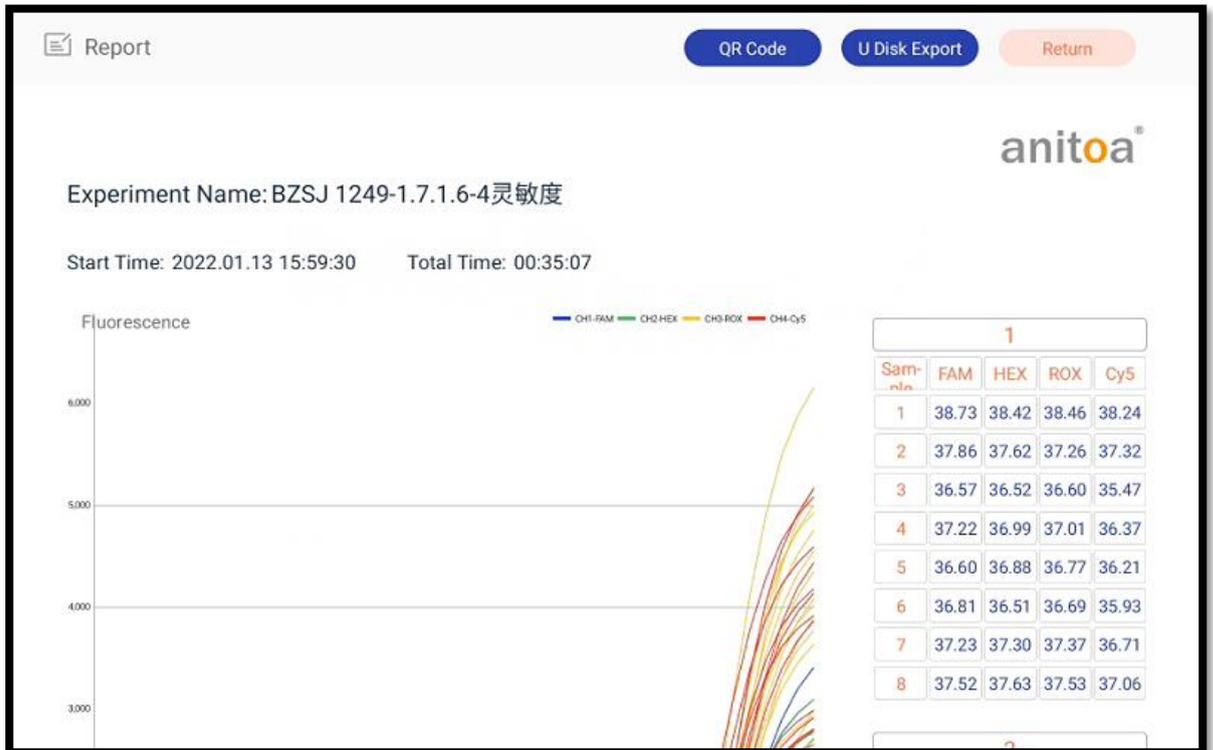


Figure 4-4-5 Form a report

# Chapter 5 Instrument Maintenance

## 5.1 Instrument cleaning

- (1) Instrument surface cleaning: the surface of the instrument should be scrubbed regularly with a soft cloth with a little water, and the instrument should be wiped dry after cleaning.
- (2) Reaction wells cleaning:
  - a. Reaction wells contaminated with dust or impurities can affect PCR amplification and fluorescence detection, so they should be cleaned regularly, generally once every 3 months, and can be gently blown out by a balloon.
  - b. To prevent dust from entering the reaction wells, the flip-up cover must be closed when the instrument is not in use.
  - c. If any reagent enters the sample well, it should be wiped clean with a dust-free soft cloth with 75% alcohol.
  - d.  The power must be turned off and the power cord unplugged before cleaning the instrument.
  - e.  Do not pour liquids into the reaction module or inside the instrument.
  - f.  Do not use corrosive solvents or organic solvents to scrub the instrument.

## 5.2 Instrument protection

- (1) Do not switch the instrument on and off frequently.
- (2) Please use the adapter provided by the original manufacturer.
- (3)  Boiling water bath or low temperature (e.g. 4°C) holding on the instrument is prohibited.
- (4)  It is forbidden to disassemble the instrument by non-original maintenance personnel.

## 5.3 Waste disposal

- (1) After each experiment, there are a large number of amplification products in the test tube, which should be disposed of as soon as possible according to relevant regulations to avoid contaminating the laboratory and instruments.
- (2)  Do not open the cover of the test tube after it is removed from the instrument, otherwise it will easily cause laboratory contamination.

## 5.4 Overheat protection

- (1) When the temperature value of the instrument temperature control module exceeds the set threshold (120°C), the device will automatically stop heating up and force all ongoing actions to stop.
- (2) After the above-mentioned failure of the heating system, the user should stop using

the instrument, and promptly contact the manufacturer or distributor for maintenance.

### **5.5 Operation requirements**

- (1) The operator may be exposed to or left with substances that are harmful or infectious to the organism during the use of the instrument. the operator needs to have relevant training and relevant qualifications.
- (2) The operator should be aware of the hazards and the environment in which this instrument is used should comply with the relevant national regulations for PCR laboratories. The operator needs to be trained and qualified in the relevant field.

## Chapter 6 FAQ

No.	Failure Phenomenon	Troubleshooting methods
1	Unable to turn on	Checking that the power cord is connected properly.
		Whether the power outlet is energized.
		Whether the instrument switch is turned on.
2	Normal operation of the instrument, no experimental data after the end of the operation	Checking that the thermal cycle parameters are set correctly.
		Checking that sample parameters are set correctly and that fluorescent markers are set.
3	Upload or print report errors	Please check whether the instrument WIFI connection is successful, please connect to the network correctly.
4	Test reports show time out of sync with real time	The instrument is the default time without network, please connect to the network, the time and synchronization update.