Bring Technology to Life !

TIANLONG®

Real-Time PCR System

Gentier mini / Gentier mini+

User Manual

Xi'an TianLong Science and Technology Co.,Ltd.

Real-time PCR System

User Manual

Xi'an Tianlong Science and Technology Co., Ltd.

Bring Technology to Life

Disclaimer and Copyright

User Manual Document No. :20EI490000

User Manual Version: V1.0

User Manual Revision Time: 04-Jan.–2023

Suitable Instrument Model: Gentier mini, Gentier mini+

TIANLONG® is a registered trademark for **Xi'an Tianlong Science and Technology Corporate Limited**.

Intended Use

Gentier mini/mini+ real-time PCR system (hereinafter referred to as **Gentier Instrument**) is intended for performing rapid, accurate polymerase chain reaction (PCR), meanwhile real-time measuring nucleic acid signals from DNA-binding fluorescent dyes or labeled probes and converts them to comparative quantitative readouts of DNA or reverse transcribed RNA.

Special Declaration

Before installing and operating Gentier Instrument, please read this manual carefully, observe the warnings and non-recommended functions. Please also bear mind the potential scope for misuse; it is advisable to draw attention to the possible consequences.

User Requirements

Gentier Instrument must only be used by laboratory professionals who have been trained in laboratory techniques and read this manual carefully.

Safety Labels on Transport Package

Label	Description
	**Fragile**: The items inside are fragile, please handle with care.
	**This Side Up**: It indicates the upward side of the transport package.
	**Keep Dry**: keep the transport package away from rain or any liquid.
	**IVD Instrument**: The product belongs to In Vitro Diagnostic equipment.
	**Temperature Limit**: It indicates the temperature limits for the storage and transportation of package.
	**Humidity Limit**: It indicates the humidity limits for the storage and transportation of package.
	**Atmospheric Pressure Limit**: It indicates the atmospheric pressure limits for the storage and transportation of package.
	**Max 6 Packages**: It is prohibited to stack more than 6 layers for the storage and transportation of packages.
	**Recycle**: It indicates the packaging materials are recyclable.

Safety Labels on Instrument

Label	Description
	**Biohazard**: It indicates that a certain area of Gentier Instrument can be easily contaminated with biological reagents or samples. Reminding users to timely disinfect this area, keep necessary precautions during operation and take corresponding protective measures at the same time.
	**High Temp**.: It indicates that a certain area of Gentier Instrument may produce high temperature. Reminding users to pay attention and be careful for burns.

	**Moving Part**: It indicates a certain moving part of Gentier Instrument may cause personal injury. Reminding users to proceed with appropriate caution.
IVD	**IVD Equipment**: Gentier Instrument belongs to In Vitro Diagnostic equipment.

Symbols Used in This Manual

Symbol	Description
	**Caution**: It reminds users to pay attention to a certain operation. Operating Gentier Instrument in any manner unspecified in this manual may result in instrument damage or abnormal function.
	**Reminding**: It provides important information regarding Gentier Instrument operation and application like information explained in further details in this manual.
	**Prohibit**: It prohibits users from a certain dangerous operation. Otherwise, it may result in instrument damage or abnormal functions, and even constitute a personal injury hazard.

Conventions Used in This Manual

Convention	Meaning
Ordered List	Procedure steps must be performed following the list order.
(Double) Click A	Click **A** on the application software.
Click A > B	Click **B** in menu **A** on the application software.
Italic + Bold	Refer to the instructions/options of the application software.
< Italic + Bold >	Refer to the keys/icons of the application software.

Bold	Refer to the instructions/options of the instrument system software.
< Bold >	Refer to the keys/icons of the instrument system software.
[ ]	Refer to the keys on computer keyboard.
Italic + Blue	Indicate the reference chapter.

Safety and Regulatory Compliance

The operation, maintenance and repair of Gentier Instrument shall strictly follow the safety specifications listed in this section and through this manual. The design of Gentier Instrument has fully considered its biological contamination protection, electrical safety protection and mechanical motion protection. Non-observance of the instructions or performing any operations not stated herein may affect the safety protection provided, and may also destroy the safety standards of design and manufacture as well as the expected application scope of Gentier real-time PCR system.

XATL Co., Ltd. *will not be responsible for any possible consequence caused by either not read or violate the instructions mentioned herein.*

⚠ **Caution**: Please read this manual carefully before operating Gentier Instrument. Incorrect understanding or operations may result in instrument damage or inefficiency usage, laboratory damage, even personal injury.

Reminding: Please pay attention to the descriptions with "Caution", "Reminding", "Prohibit" symbols, and the safety labels on the instrument and transport package.

I. General Instrument Safeties and Precautions

⚠ **Caution**: No person except the **XATL Co., Ltd.** professional engineers are allowed to open the instrument, to replace any component or to debug Gentier Instrument.

⚠ **Caution**: Do not drop or damage the instrument, and please handle it with care.

⚠ **Caution**: In case of any following conditions, immediately cut off the power supply and contact the distributor or manufacturer to ask for professional engineer for processing.

- Any liquid has entered into the instrument;
- Abnormal sound or smell appears while the instrument is running;
- The instrument is soaked with water or rain;
- Obvious functional changes of the instrument.

Prohibit: Never handling or move the instrument while it is running.

Caution: For protection against overheating hazards, the openings on the instrument are designed for ventilation. Please do not block these openings or cover Gentier Instrument with dust cover and other materials while it is running.

Caution: Do not open the top lid while the instrument is running. This may break the biological safety and electromagnetic radiation protection measures of the instrument.

Caution: Do not force to place unmatched consumables into the sample block.

Caution: Users can move the instrument when it is power off but should observe the following principles:

- The instrument is power off.
- All network and power cords are detached from Gentier Instrument.
- Gentier Instrument should be packed properly if there is a long-distance movement. See ***G-3 Transportation or Return to Factory*** for more details.

Caution: Please do not use the detachable mains and supply cord with inadequate rating.

II. Personal Safeties and Precautions

Caution: Please move the instrument according to the requirements of the user manual. Moving the instrument in an improper way may result in body injury, pain or instrument damage.

Prohibit: Never touch the plug, the power cord or the power switch with wet hands.

 **High Temp**.: Do not directly touch the sample block and the hot lid while the instrument is running. They may generate enough heat to cause serious burns. Please do not open top lid until the sample block returns to room temperature.

III. Electrical Safeties and Precautions

 **Prohibit**: Please cut off the power supply before opening the instrument shell, and it is prohibited to replace any part of the instrument while it is electrified.

 **Caution**: The instrument should be properly grounded. Any damage of the internal or external grounding path may cause danger.

 **Caution**: Once the electric leakage is found, please cut off the power supply immediately and stop using the instrument.

 **Caution**: Please unplug the power cord before moving the instrument.

 **Reminding:** Under normal circumstances, please use the attached power cord of the instrument. If the original power cord is destroyed, please substitute it with an equal one.

 **Caution**: The ground wire is necessary in the power grid environment.

 **Caution**: The instrument must be grounded properly for protection against electric shock hazards. The instrument adapts with a standard three-pin plug, and please plug it into an appropriate three-wire grounded receptacle for operation safety.

 **Caution**: Please check the power connection carefully. Hold the power plug when you plug the power cord and make sure the power plug is perfectly inserted into the socket, do not pull the power cord to pull out the plug.

 **Caution**: Please keep the power cord away from heater or other high temperature objects. Please do not put anything on the power cord and keep it away from places where people move around.

IV. Environmental Safeties and Precautions

Caution: The instrument is for indoor use only. The room should be well ventilated and without corrosive gas.

Prohibit: Never run the instrument in places that have or may have flammable and explosive gas.

Reminding: The working environment temperature of the instrument should be 10°C~30°C, and the relative humidity should be between 20%~85%.

Reminding: The working ambient pressure of the instrument should be 56.0kPa~106.0kPa (the altitude should below 4000m).

V. Biological Safety and Precautions

Biohazard: The sample objects of the instrument are nucleic acids and please consider all samples as those with potential biohazard. Please take applicable safety protection measures and wear appropriate protective goggles, clothing and gloves while processing the samples.

Biohazard: In case of any liquid overflows during the operation, please immediately disinfect the contaminated area with appropriate detergent to avoid the spreading of contaminant.

Biohazard: Please comply with the local or national applicable regulations to complete the disposal of waste samples and contaminated materials.

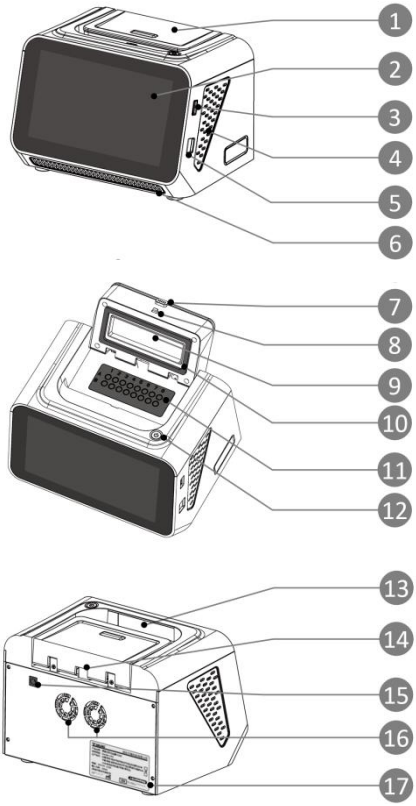
Biohazard: Users should consider the abandoned Gentier Instrument as biological contaminated materials and comply with the local or national applicable regulations to complete the instrument disposal. Before the disposal or recycling of the instrument, please completely clean and disinfect the instrument.

Contents

A. Overview

A-1. Application Fields

Gentier Instrument is intended for performing rapid and accurate polymerase chain reaction (PCR). It can be used to detect target nucleic acids in biological samples, including nucleic acids of various pathogens (viruses, bacteria, mycoplasma, chlamydia, etc.) and genes. Gentier Instrument can be applied to the fields of animal and plant medical treatment, disease control, inspection and quarantine, etc.



1. Top Lid
2. Touch Screen
3. USB Interface
4. Side Air Vent
5. TCP/IP Network Interface
6. Front Air Vent
7. Release Button of Top Lid
8. Lock Catch of Top Lid
9. Hot Lid
10. Heat Insulating Washer
11. Sample Block
12. Power Switch
13. Instrument Handle
14. Electrical Connection Line
15. DC Power Input Interface
16. Rear Air Vent
17. Nameplate

Figure A-1. Instrument Structure

A-2. Product Constitute and Instrument Structure

Gentier Instrument is mainly consisted of control system, power system, temperature control system, detection system, man-machine interface system and software (Version: V1), etc.

A-3. Product Introduction

A-3.1 Instrument Parameters and Characters

A-3.1.1 Instrument General Parameters

- **Instrument Specification:**
  Dimension: 205mm(L) x 156mm (W) x 153mm(H);
  Weight: 3.2kg;
- **Package Specification:**
  Dimension: 290mm(L) × 210mm (W) × 245mm (H);
  Weight: 4.8kg;
- **Power Specification:**
  DC24V 6.25A, 150VA; Overvoltage category: II
  (The instrument is equipped with a special AC power adapter.)
- **Power Adapter:**
  Input: AC 100-240V, 2.5A, 50/60Hz;
  Output: DC24V 6.25A, 150VA;
- **Communication Specification:**
  Network port: TCP/IP protocol;
  Ethernet connection;
  USB 2.0, WiFi (IEEE 802.11 b/g/n);

- **Application Environment:**

  Temperature: 10°C ~30°C;

  Relative humidity: 20%~85%;

  Atmospheric pressure: 56.0kPa~106.0 kPa;

  Altitude: below 4000m;

- **Storage and Transportation Environment:**

  Temperature: -20°C ~55°C, with transport package;

  Relative humidity: 0%~ 93%;

  Atmospheric pressure: 26.4kPa~106.0 kPa;

  Altitude: below 10kms;

- **Running Noise:**

  The maximum running noise does not exceed 65 decibels.

- **Pollution Degree:** 2

A-3.1.2 Instrument Technical Parameters

A-3.1.2.1 Thermal Parameters

- **Temperature Accuracy**: ≤ 0.1°C;
- **Temperature Uniformity**: ± 0.2°C;
- **Temperature Precision**: ≤ 0.1°C;
- **Max Heating Ramp**: 5.0°C/s;
- **Max Cooling Ramp**: 4.0°C/s.

A-3.1.2.2 Optical Parameters

Excitation Light Source: LED Light Sources;				
Detection System: Photodiodes;				
Optical Parameters:	Channel	Dye	Gentier mini+	Gentier mini
	1	FAM, SYBR Green I, etc.	√	√
	2	VIC, HEX, TET, JOE, etc.	√	√
	3	ROX，Texas Red	√	×
	4	Cy5	√	×

A-3.1.2.3 Detecting Parameters

- **Throughputs**: simultaneously detect 16 samples;
- **Repeatability**: CV ≤ 1%;
- **Linear Correlation**: | r | ≥ 0.990, within linear range of test items.

A-3.1.2.4 Man-machine Interactive System Parameters

- **Touch Screen**: with built-in 7.0' inches full-color touch screen. Gentier Instrument can run alone without the main control computer.
- **USB Interface:** The USB interface of this instrument is only used to connect USB flash drive and printer.

Prohibit: The USB interface cannot be used for charging electronic devices.

Prohibit: Do not connect with external devices when the instrument is running an experiment.

Reminding: USB devices connected with Gentier Instrument need pass the safety certification to ensure that the instrument will not be damaged.

Reminding: Before connecting the USB flash drive to Gentier Instrument, please format USB flash drive as FAT32 confirm that there is enough space left in it. It is recommended to reserve 1GB.

- **Main Control Computer**: In advanced mode, Gentier Instrument can be connected to the main control computer for remote control. The recommended configurations of main control computer are listed as below. Customers are allowed to purchase by themselves.
  - **CPU**: Quad-core CPU, 2.5GHz, 64-bit Processor
  - **RAM**: 8G (or higher)
  - **Hard Drive**: 500GB (or higher)
- **Operating System**: Applicable to 64-bit Operating System for Windows 7/Windows 10/Windows 11
- **Application**: Excel 2007(or higher configurations)
- **Network Control**: One computer can be connected with multiple Gentier Instrument to realize the network centralized control and remote control.

Reminding: When Gentier Instrument runs in general mode, it could conduct qualitative analysis without connected to main control computer.

A-3.1.3 Instrument Characters

- **Flexible and Convenient**: Two running modes - general mode and advanced mode. Both of them are designed with result analysis and remote control for user's different application scenarios.
- **Running Alone**: Gentier Instrument can run independently without connection to the main control computer in both modes.
- **Independent Temperature Control**: Gentier Instrument adopts independent temperature control technology and high repeatability temperature zone to realize the optimization of PCR.
- **Power-off Protection**: Gentier Instrument possesses protection function against instantaneous power off, which can continue to run the uncompleted experiment after restarting the instrument.

- **Multiple PCR Step Modes**: Gentier Instrument provides multiple PCR step modes, such as standard step, touchdown step and long step.
- **Remote Running**: Gentier Instrument can be connected to the main control computer in advanced mode to realize remote control, such as test editing, sample editing, experiment running, run monitoring and data transmission.

A-3.1.4 Running Mode Difference

Function Description	General Mode	Advanced Mode	Remarks
Instrument Program Selection	√	√	
Instrument Program Editing	X	√	
Instrument Sample Application	√	√	
Detailed Sample Editing	X	√	In General mode, users can set sample type and sample number, but cannot set target gene, repeated group, standard and concentration.
Running Alone	√	√	
Instrument Test Result Output	√	√	Output simple analysis results, such as PCR Curve, CT Value.
Instrument Test Report Printing	√	√	External USB printer is required.
Remote Control	√	√	
Result Analysis	√	X	Analyze experimental results in detail, and set analysis parameters and create new analyzing modes, etc.
Report System	√	√	Report system can only be used on the application software on the main control computer.
Data Transmission	√	√	In advanced mode, data transmission can be realized when the instrument is controlled remotely by the main control computer.

A-3.2 Software Characters

- **Software Interface**: Easy for operation, wizard-style interface, intuitive layout and program setting.
- **Software Language**: Switchable multiple languages. Default languages are Chinese and English.
- **Multiple Functions**: Multiple analyzing functions that adapt to various experimental requirements, such as absolute quantification analysis, relative quantification analysis, melting curve analysis, high resolution melting (HRM) analysis, genotyping analysis, end point fluorescence analysis, etc.
- **Data Transmission**: Data can be transmitted between the instrument and the main control computer in real-time.
- **Data Storage**: Gentier Instrument can store 1000 test templates /experiment data files at most.
- **Program Setting**: Each stage can contain 99 steps, and the maximum cycle number is 99.
- **Automatic Refrigeration**: A long-time cooling stage can be set to preserve the experimental products.
- **Customized Report**: The customized report templates are to meet various requirements.

A-3.3 Reagent Specifications

- **PCR Reagent**: According to two running mode requirements, differences of PCR reagents are as follows:
  - **General Mode**: Reagents should be matched with the specified experiment project in the preset program.
  - **Advanced Mode**: All quantitative and qualitative PCR reagents matched with the instrument hardware are available.
- **Dye**: FAM, SYBR Green I, LC Green, Eva Green, SYTO 9, VIC, HEX, TET, JOE, ROX, Texas Red, Cy5.

A-3.4 Consumable Specifications

- 0.2mL single PCR tube
- 0.2 mL 8-strip PCR tube

B. Instrument Unpacking and Installation

B-1. Unpacking Instructions

The transport package is as shown in figure B-1. Gentier Instrument and its accessories are well preserved in a carton case. In order to prevent the collision and oscillation during transportation, Gentier Instrument is sealed with dust cover and well supported by protective foams. The top of the foam box is equipped with USB flash drive, power cord, network cable, power adapter, etc. What's more, the user manual and other accessories are in the paper box at the bottom of the carton case.

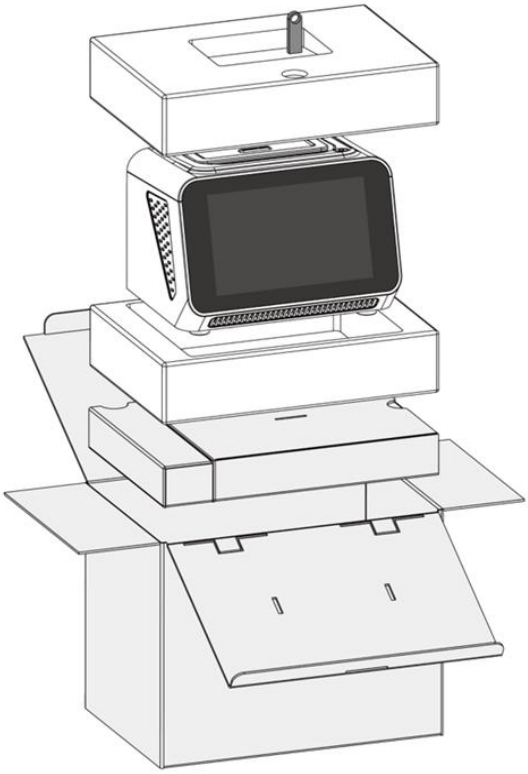


Figure B-1. Exploded View of Package

B-1.1 Unpacking Steps

The unpacking of the transport package mainly includes 3 steps, as shown in figure B-2. The specific operations are as follows.

Step 1: Cut off the packing belt and unseal the transport package.

Step 2: Take out the USB flash drive for software installation, remove the protective foam on top of the instrument, hold two sides of the instrument, take it out of the carton and place it on a stable platform.

Step 3: Take out the accessories at the bottom of the carton case.

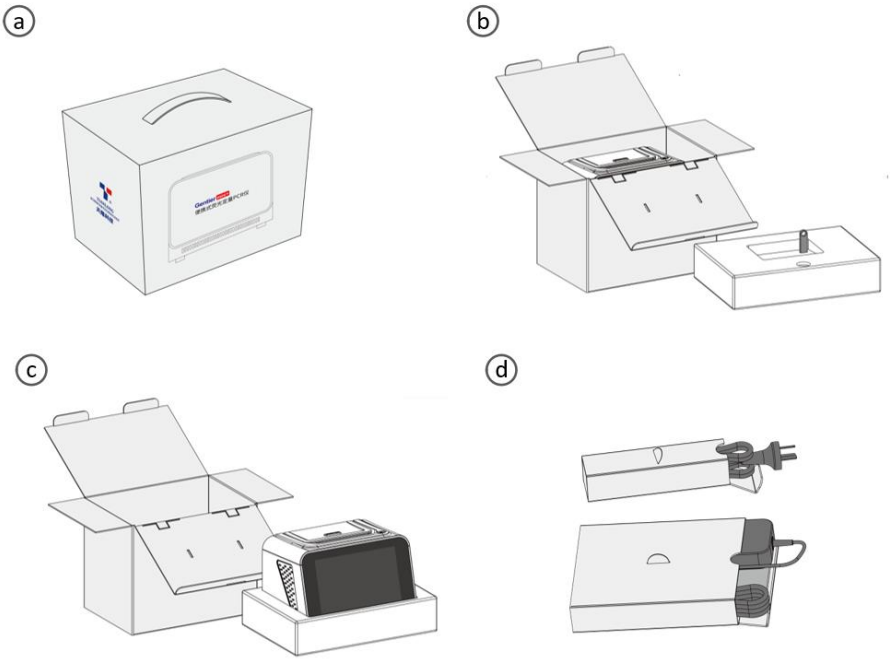


Figure B-2. Unpacking Steps

Reminding: In order to prevent the generation of condensed water, please do not open the transport package until it reaches the room temperature.

Reminding: Please check the package integrity before open it. In case there is any damage, collision or water mark, please contact the transport department or our company.

Reminding: Please check the instrument and accessories according to the packing list and ensure that all components are present and intact. Please report any missing items to **XATL Co., Ltd.**

Caution: Please reserve the original packing materials for future use. The transport package of Gentier Instrument is designed to reduce the instrument damage and ensure its transportation safety. Adopting other packaging materials will break the warranty, and **XATL Co., Ltd.** will not be responsible for damages caused by the improper packaging during the transportation. Please keep the related documents provided by our company for future use, too.

B-2. Working Environmental Requirements

Gentier Instrument is for indoor use only.

B-2.1 Instrument Space Requirements

1) Gentier Instrument should be placed in the room with low humidity (between 20% ~85%RH) and appropriate temperature (between 10°C~30°C). The room should be well ventilated and without corrosive gas.
2) The instrument should be placed on a steady lab workbench and leave enough space for placing the attachments, cables and reagent bottles, etc.
3) Please keep the instrument away from heat (directly sunshine, heater, stoves) and water (such as water pool, water tube etc.).

4) There should be no electromagnetic interference, and no electrical equipment that produces vibration and high frequency wave around the instrument.

5) While Gentier Instrument is running, the distance between the front and rear air vents and the nearest objects should not be less than 20cm; the distance between left and right air vents and the nearest objects should not less than 10cm.

6) For protection against overheating hazard, the openings on the instrument are designed for ventilation. Please do not block or cover these ventilation openings while the instrument is running.

7) For ensuring the stability and heat radiation of the instrument, please do not place the instrument on the soft surface.

8) Do not place the instrument close to the wall or pile up goods at the rear of the instrument. This may affect heat dissipation.

9) This instrument should be placed where is easy to plug and unplug and shouldn't be placed where is hard for power disconnection.

B-2.2 Instrument Power Requirements

1) The power grid environment of Gentier Instrument should possess ground wire and the instrument should be properly grounded.

2) Please ensure the power strip of the instrument has 3~4 three-phase plugs in order to meet the demands for the instrument, main control computer and printer.

3) The power specifications of the instrument are listed in ***"A-3.1 Instrument Parameters and Characters – A-3.1.1 Instrument General Parameters"***. It is recommended to use UPS power supply to prevent circuit system damage and fire.

Reminding: Before connecting the AC power supply, please ensure the consistency of the power adapter required voltage and the power supply voltage. And make sure that the rated load of receptacle is no less than that of the instrument.

Reminding: If the power supply system of the instrument working environment is unstable, please do not connect other electrical equipment at the same power circuit, and it is required to equip with over 150W AC regulated power supply.

Caution: Do not put anything on the power cord and keep it away from places where people move around. Hold the power plug when you plug the power cord and make sure the power plug is perfectly inserted into the socket. Do not pull the power cord to pull out the plug.

Prohibit: Spraying liquid on electrical parts may cause a short circuit and result in fire. Do not use sprays in vicinity of the instrument.

Reminding: Under normal circumstances, please use the instrument attached power cord and adapter. If the original power adapter is destroyed, please substitute it with special accessories.

B-3. Instrument Installation

B-3.1 External Device Connection

The power supply and external devices should be connected before using Gentier Instrument. Two running modes: advanced mode and general mode, are different in external device connection.

B-3.1.1 External Device Connection in General Mode

Gentier Instrument can be operated offline in general mode and just needs to connect the power cord and power adapter. If necessary, USB printer can be connected through USB interface.

Reminding: Users can purchase the USB printer for Gentier Instrument, and the matching model is RG-MTP58B.

B-3.1.2 External Device Connection in Advanced Mode

In advanced mode, Gentier Instrument needs to be connected to the main control computer to realize remote control. The connecting steps are as follows:

Step 1: Connect the power cord and power adapter with the instrument.

Step 2: Connect the instrument and main control computer to local area network with an internet cable; connect the instrument to the main control computer through network settings. Please refer to ***B-3.3 Computer Network Setting*** for more details.

Reminding: In advanced mode, program editing, experiment running and real-time monitoring can be operated offline.

Reminding: Before setting up the network, please confirm that the main control computer is connected with external equipment such as monitor, keyboard, mouse, printer, etc., and then complete the installation of application software according to ***B-3.2 Application Software Installation*.**

B-3.2 Application Software Installation

Before operating Gentier Instrument, users need to install the application software to realize remote control in advanced mode. The specific operations are as follows:

Step 1: Switch on the main control computer and close its firewall.

Step 2: Connect the application software installation USB flash drive with the main control computer.

Step 3: The application software installation interface will pop up, and please follow the prompt to install the software.

Step 4: Double-click the MED-TL icon on the desktop to open the application software.

Reminding: It is unnecessary to follow above steps in general mode.

Caution: The main control computer of the instrument is not designed for online use, so connecting it to internet may cause risks of computer virus infection or hacker attacks. **XATL Co., Ltd.** will not be responsible for any damages caused by improper operations.

⚠ **Caution**: It is not recommended to install other software on the main control computer connected with the instrument. Otherwise, there may be potential risks of software module conflict, and may also influence the results reliability.

⚠ **Caution**: **XATL Co., Ltd.** does not provide anti-virus software. Therefore, if necessary, please take measures to prevent the main control computer from virus.

B-3.3 Computer Network Setting

The network address of the main control computer should be set according to the default network information of the instrument to ensure that the main control computer can connect the identifiable instruments within LAN.

Step 1: Please first check the network information of the instrument, which is displayed on the **General Setting** interface of the instrument, as shown in figure B-3a. For detailed operation, please refer to ***F-2.5.2 Configuration Sub-tab – Network Information***.

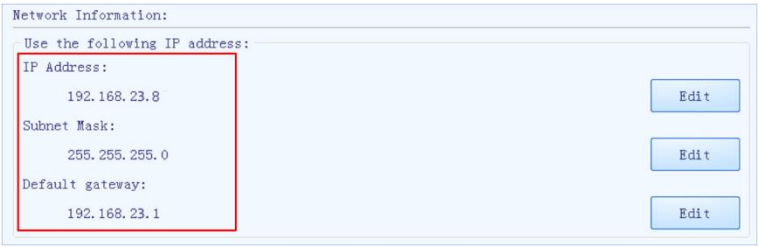


Figure B-3a. Network Information Window - Default Network Information

Step 2: Please open the **Control Panel > Network and Sharing Center > Local Area Connection > Properties > Internet Protocol Version 4 (TCP/IPv4)** on the main control computer, as shown in figure B-3b.

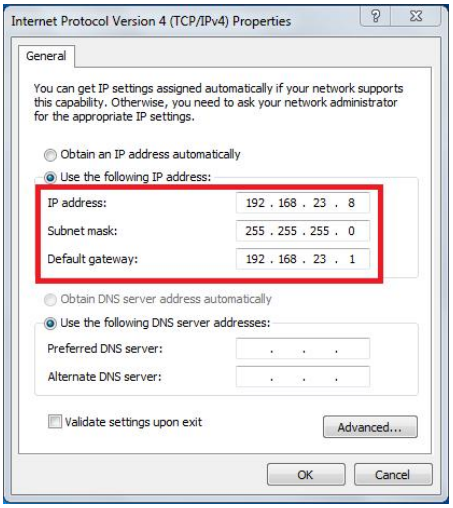


Figure B-3b. Main Control Computer Network Setting

Step 3: Set **Internet Protocol Version 4 (TCP/IPv4)** on the control computer based on the following requirements:

- **IP address**: The first 3 octets of IP address on the main control computer should be identical to the instrument IP address; the 4th octet should be different from that of the default IP address of the instrument.
- **Subnet mask:** The main control computer subnet mask should be identical to the instrument subnet mask.
- **Default gateway:** The main control computer default gateway should be identical to the instrument default gateway.

Step 4: Click **[OK]** to confirm the main control computer network setting.

Step 5: After completing the main control computer network setting, users can connect the identifiable instruments within LAN. For detailed operations, please refer to ***E-3.1.3 Tool (T) submenu- Instrument Management***.

Reminding: It is unnecessary to connect the main control computer in general mode.

C. Preparation Before Experiment

C-1. Instrument Self-inspection

The instrument possesses self-inspection function. It will automatically carry out self-inspection after starting up. Users shall not perform any other operations at this stage to ensure that Gentier Instrument can work normally during the experiment.

Step 1: Short press power switch on the top of the instrument, then the power switch light will turn green.

Step 2: The instrument will automatically conduct self-inspection after starting up. The progress bar will display the self-inspection progress and contents. The self-inspection contents include instrument firmware, software version, electrical system, power supply system and initialization of motor position, etc.

Step 3: The instrument will enter the standby state after the self-inspection.

Reminding: It is unnecessary to connect the main control computer in general mode.

Caution: Before powering up the instrument, please ensure:

- The external devices of the instrument are properly connected.
- The power supply line of the instrument is properly connected.

Caution: Please restart the instrument when it fails to pass the self-inspection. If the self-inspection fails again, do not slap or shake the instrument, and please contact the distributor or XATL Co., Ltd.

C-2. Sample Loading

Step 1: Please follow the operation instructions of PCR kit to prepare the PCR reagent, set up PCR system and seal the PCR consumables.

⚠ **Caution**: After completing the PCR system setup and before loading the PCR consumables, please ensure that consumables have been sealed well to avoid the leakage of aerosols during the experiment.

Step 2: Press the release button to open the top lid, and load the PCR consumables with PCR system to be tested in the sample block.

Step 3: Close the top lid until the lock catch makes a “click” sound.

D. General Mode - Instrument Software Operation

In general mode, the instrument can run independently without connection to the main control computer and output the experiment result. This chapter introduces the instrument software interfaces and basic operations in general mode.

D-1. Startup Interface & Main Interface

After the instrument turns on and automatically conducts self-inspection, the touch screen will display the main interface of general mode, as shown in figure D-1.

Figure D-1. Instrument Software Main Interface

Reminding: The instrument includes two operation modes: ***General Mode*** and ***Advanced Mode***. After the instrument turns on, the software will run in the operation mode that ran before the last shutdown by default. See ***F. Advanced Mode – Instrument Software Operation*** for more details about the main interface in advanced mode.

The main interface consists of three parts: **Status Bar**, **Menu Bar** and a shortcut key **New Experiment**.

1. **Status Bar**: displays the current instrument status, and the system date and time.

- **< Printer >**: It indicates that the instrument has been connected to the printer. The icon will not be displayed when there is no instrument connection.
- **< WiFi >**: It indicates that the instrument has been connected to WiFi. The icon will not be displayed when there is no WiFi connection.
- **< USB >**: It indicates that a USB device has been connected with the instrument. The icon will not be displayed when there is no USB device connection.
- **< Connected >:** It indicates that the instrument has been connected with the network. The interface will display icon when there is no network connection.
- **< Hot Lid >**: It indicates that the top lid is open. The icon will not be displayed when the top lid is close.
- **< Date & Time >**: It displays the current system date and time**.** Format: Year/Month/Day; hh: mm.
- **< Warning > / < Error >:** Tap the icon to view details about **Warning** or **Error**. These icons will not be displayed when the instrument runs normally.

2. **New Experiment**: Press **< New Experiment >** on the main interface, and the software will display the interface of **Run Setting** tab where users can set and run the experimental program. Please refer to ***D-2. New Experiment*** for more details.
3. **< Function Menu >**: Press the icon and the hidden menu bar will pop up, as shown in figure D-1.1.

Figure D-1.1. Main Interface – Menu Bar

The hidden menu bar consists of three function tabs: **< General Settings >**, **< Experimental Data >** and **< Shutdown/ Reboot >**.

- **< General Settings >**: Press icon, and the software will enter the interface of **General Setting** bar where users can view and set the instrument parameters. Please refer to ***D.3 General Settings*** for more details.
- **< Experimental Data >**: Press icon, and the software will enter the interface of **Experimental Data** tab where users can retrieve and query experiment data. Please refer to ***D-4. Experimental Data*** for more details.
- **< Shutdown/ Reboot >**: Shutdown or restart the instrument.

D-2. New Experiment

D-2.1 Experiment Settings

Users can edit and run the experiment program in the **Experiment Settings** interface. The interface consists of five parts: **Title Bar**, **Experiment Name** input box, **Sample Setting** area, **Experiment Projects** area and **Run** tab, as shown in figure D-2.

Figure D-2. Experiment Settings Interface

D-2.1.1 Introduction of Experiment Settings Interface

1. Title Bar: displays the current interface title.

► **< Back >**: Press to return to the **Main Interface**.

2. Experiment Name: Press **Experiment Name** input box and the interface will pop up a keyboard for users to name the new experiment file, as shown in figure D-2.1.

► **< Hide Keyboard >**: Tap to hide the keyboard after completing the experiment name editing.

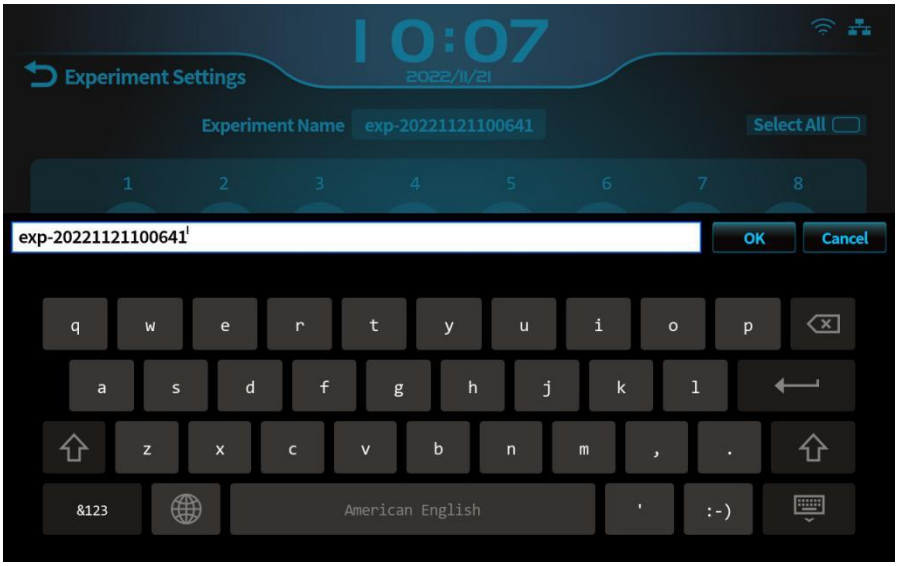


Figure D-2.1 Run Setting Interface – Keyboard

Reminding: The system software defaults to name the current new experiment with the experiment creation time.

Reminding: The experiment name can be included numbers, letters, horizontal lines, underlines, or Chinese characters, but cannot contain special characters.

3. **Sample Setting**: It displays 16 wells with 8 volumes (1~8) and 2 rows (A~B), whose distribution is the same as that of the instrument sample block. Users can tap a well to set its **Experiment Project**. Please refer to ***D-2.1.2. Setting Methods of Samples and Experiment Projects*** for more details.

► < **Selected Sample >:** It indicates the sample has been selected.

► < **Unselected Sample >**: It indicates the sample is not selected.

► < **Specified Sample >**: It indicates the sample has been selected and set to run ***Project1*** in the **Experiment Project**.

Reminding: User could check ***< Select All >*** to select all the wells and which are still all kept selected after the user enters the experiment settings interface again.

4. **Experiment Projects:** It displays experiment projects imported into the instrument. 8 common experiment projects can be listed in this area, and the experiment project can be selected by tapping the corresponding dialog box.

► **< View More Projects >**: Press View More Projects and all experiment projects will be listed. The experiment project can be selected by tapping the corresponding dialog box.

Reminding: In general mode, the instrument can only run the imported experiment projects and users cannot create or edit projects. Please refer to ***D-3.3 Projects Tab*** for more details.

5. **< Run >**: Press it to run experiments that have completed settings and the software will automatically direct to the Run Monitoring interface. Please refer to ***D-2.2 Run Monitoring*** for more details.

D-2.1.2 Setting Methods of Samples and Experiment Projects

When experiment projects have the same temperature programs, the software can run these projects based on the differences of tested samples, and analyzes respective test results based on the sample settings. The setting methods of samples and experiment projects are as follows:

1. **Select Samples**: Tap the needed sample wells in the interface to the **Selected** status and the unneeded to the **Unselected** status.
2. **Select an Experiment Project**: Select an experiment project for selected wells.
3. **Select Multiple Experiment Projects**: Repeat the above two steps until completing the setting of selected samples and experiment projects, as shown in figure D-2.2.

Figure D-2.2. Experiment Setting Interface – Example of Experiment Setting

The experiment name of the example is: exp-20210514125637 and there are 12 samples to be tested.

- 4 samples in the Group 1 (A1-A4); the selected experiment project is ***Project 1***.
- 4 samples in the Group 2 (A5-A8); the selected experiment project is ***Project 2***.
- 4 samples in the Group 3 (B1-B4); the selected experiment project is ***Project 3***.
- 4 unselected samples in the Group 4 (B5-B8) and no detection.

Reminding: Only experiment projects with the **Same Temperature Program** can be run simultaneously.

Reminding: When users select an experiment project, the software will automatically judge and identify experiments that can run at the same time. After users select an experiment, the incompatible experiment options will disappear from the interface to avoid users' selection errors.

D-2.2 Run Monitoring

After running the experiment, the system software will jump to the **Run Monitoring** interface, as shown in figure D-3. Users can real-time view the experiment running and detecting progress.

D-2.2.1 Introduction of Run Monitoring Interface

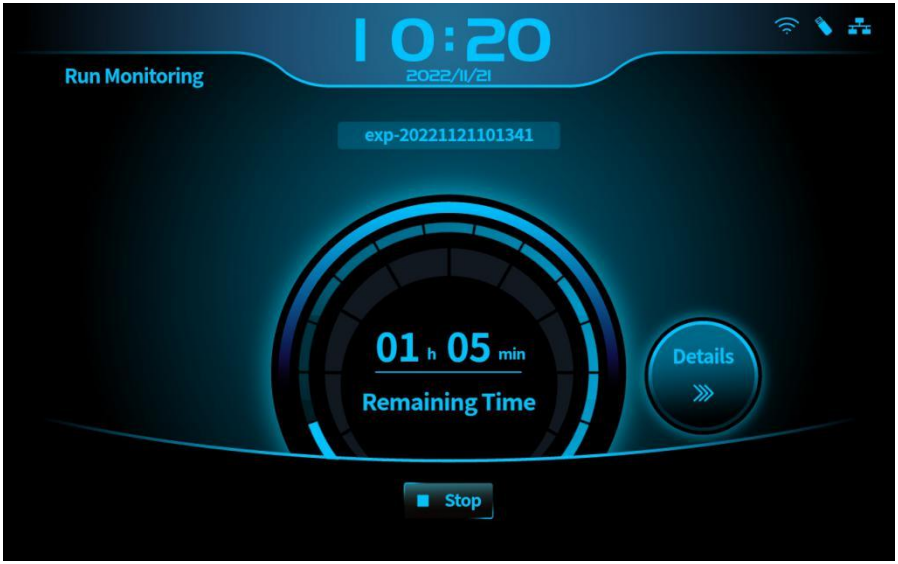


Figure D-3. Run Monitoring Interface

- **< Experiment Name >**: It displays the current experiment name. Users can view but cannot edit it.
- **< Remaining Time >**: It displays the remaining time of running experiment.
- **< Details >**: Users can press this tab to enter **Run Monitoring – Details** interface for viewing real-time fluorescence. Please refer to ***D-2.2.2 Run Monitoring- Details*** for more details.

► **< Stop >**: Users can press it to stop the running experiment. After the experiment stops, the instrument will send out 3 beeps and call up a dialog box, as shown in figure D-3.1. Click ***< OK >*** in the dialog box to confirm the status, and the software will return to the **Startup Interface**.

Figure D-3.1. Run Monitoring – "Experiment Stopped" Dialog Box

D-2.2.2 Run Monitoring – Details

Users can press ***< Details >*** tab in the run monitoring interface during running experiments to enter **Run Monitoring - Details** interface, as shown in figure D-3.2.

Run Monitoring interface consists of four parts: **Title Bar**, **Channel Selection Area**, **Sample Selection Area** and **Real-time Fluorescence**.

1. **Title Bar**: It displays the current interface title. Click icon to turn back to the **Run Monitoring** interface.
2. **Channel Selection Area**: It displays the fluorescence channels involved in the experiment. Users can press the channel tab to view the corresponding fluorescence curve.
3. **Sample Selection Area**: It displays the distribution of 16 sample wells. Users can click wells to view corresponding real-time fluorescence.
4. **Real-time Fluorescence**: It displays the diagram of real-time fluorescence intensity (Y-axis, RFU) against cycle number (X-axis, Cycles) of the running experiment.

► **< Real-time Fluorescence >**: The system software uses different colors to distinguish the fluorescence curves of four channels. Blue is of Channel 1; Green is Channel 2; Orange is Channel 3; Red is Channel 4.

Reminding: The software displays all tested samples and fluorescence curves of all channels by default.

Figure D-3.2. General Mode – Run Monitoring – Details

D-3. General Settings

General settings interface includes two parts: Menu Bar and Information Display Area, as shown in figure D-4. Users can view and set the system information and running parameters of the instrument in this interface.

1. **Menu Bar**: It consists of four function tabs: **< Settings >**, **< Network >**, **< Projects >** and **< About >**.

2. **Information Display Area:** It displays the detailed information of a function tab according to the users' choice. This area displays information of **< Settings >** tab by default.

Figure D-4. General Setting Interface

D-3.1 Settings Tab

Settings tab includes four sub-tabs: **Time**, **Brightness**, **Touch-tone** and **Language**. The interface defaults to fold information for each sub-tab. Users can view details by clicking  icon on the right of each sub-tab.

1. **Time**: Users can swipe the screen up and down to set the system date and time, and the selected numbers will be centered and highlighted. Users can touch **< OK >** to confirm and save the settings, as shown in figure D-4.1. The format of Time is: Year-Month-Day; hh:mm:ss.
2. **Brightness**: Users can slide the circular cursor to adjust the screen brightness.
3. **Touch-tone**: Users can touch the switch to turn on or turn off the screen sound**.**

4. **Language:** Users can select the check box to set the instrument system language. Two options provided are English and Simplified Chinese.

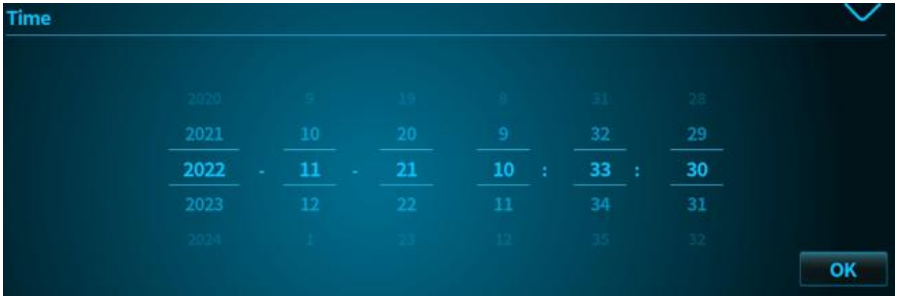


Figure D-4.1 Settings – Time

D-3.2 Network Tab

Network tab includes two sub-tabs: **Wired Network** and **WiFi**. The interface defaults to fold information for each sub-tab, as shown in figure D-5. Users can view details by clicking icon on the right of each sub-tab.

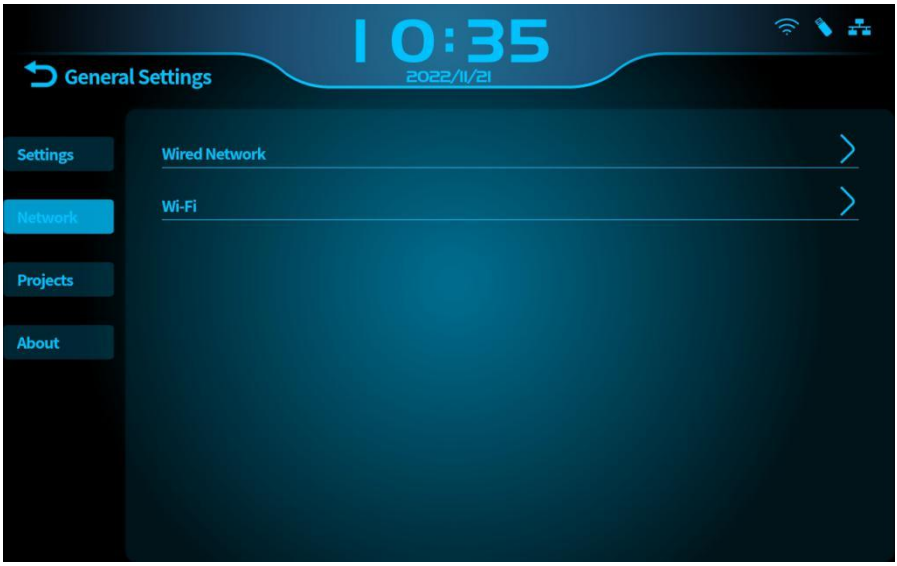


Figure D-5. Network and Connection

1. **Wired Network**: It displays the **Physical Address** and **IP Address** of the instrument, as shown in figure D-5.1. **Physical Address** cannot be edited and the **IP Address** can be set and edited, as shown in figure D-5.2.

► **< Edit >**: Users can touch the **< Edit >** button on the right of the IP Address to call up the editing box; then select IP fields to be edited and input target fields in the keyboard; finally press OK to confirm the new IP address. After completing the editing, users can tap  icon to hide the soft keyboard.

► **< OK >**: Users can press **< OK >** to save the new IP address.

► **< Cancel >**: Users can press **< Cancel >** to give up the IP address editing.

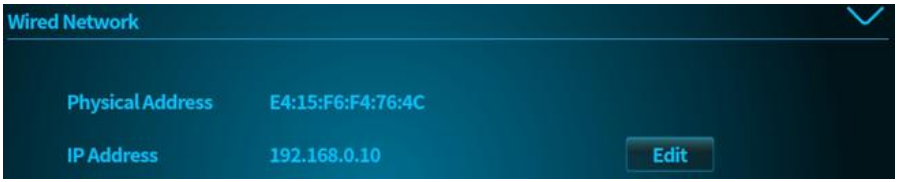


Figure D-5.1 Network – Wired Network

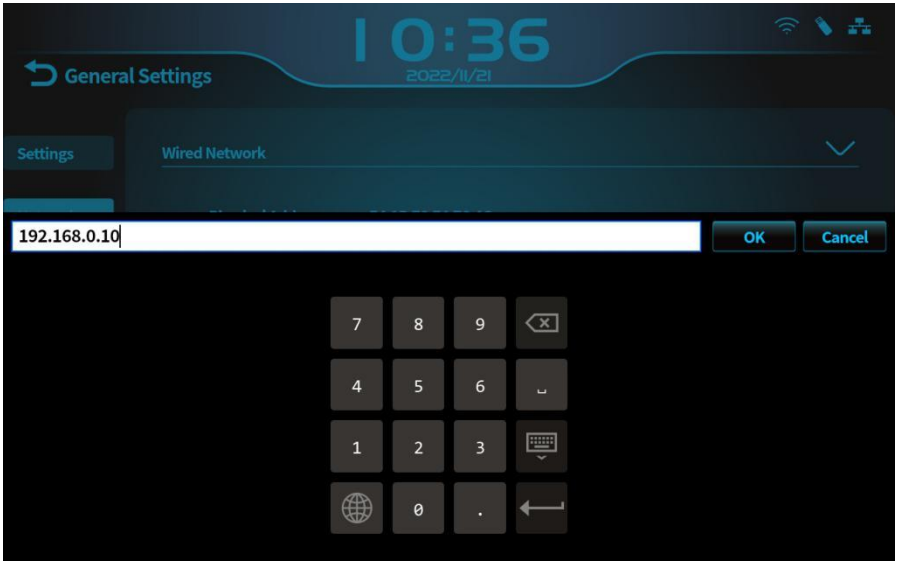


Figure D-5.2 Network – IP Address Editing Box

2. **WiFi**: Users can touch the cursor on the right of WiFi option to turn on or turn off the WiFi. When WiFi is open, by clicking ***< Scan >***, the software interface will display the available WiFi. Users can touch the WiFi and input the password to complete the connection.

D-3.3 Projects Tab

The project interface consists of two parts: **Project List** and **Import/Export** function tab, as shown in figure D-6. Users can set the local experiment projects, import external projects and export local projects in this interface.

Figure D-6. Projects Interface

1. **Project List**: It displays experiment projects imported in the instrument. 12 experiment projects can be displayed on a single page. Users can swipe the screen up and down to view more items and select needed one.

► **< No. >**: This is the sequence number of the experiment projects. It is generated automatically when projects are imported to instrument.

► **< Abbr >**: Users can set a short name for the experiment project when editing the test template.

► **< Experiment Project Name >**: Users can set a complete name for the experiment project when editing the test template.

► **< Print IC >**: If users select this check box to √ status, testing results and IC will be printed both. Users can click the check box to change its status.

► < **Delete >**: Users can touch the icon to delete the corresponding experiment project. The instrument will not run the deleted project until it is imported again.

2. **< Import/Export >** function tab: The dialog box will pop up when users touch the **< Import/Export >** function tab, as shown in figure D-6.1.

Figure D-6.1 Experiment Project Management Interface – Import/Export

► < **Exit >**: Users can press it to exit the **Import/Export** dialog box.

► **< Local Experiment >**: It displays the local experiment project list. Users can select the check box to √ status in front of the target projects, then click < Export > icon to export them to a portable storage device.

► **< Portable Storage >**: It includes the path information of portable storage device and experiment project list in this path. Users can touch <  > icon to select a storage path, select the check box to √ status in front of the target projects and press <  > icon to import them into the instrument.

Reminding: Please insert the portable USB device and confirm its good connection to import or export the experiment projects.

D-3.4 About Tab

About instrument tab includes five sub-tabs: **Instrument Information**, **Version**, **Run Log, Clear Memory and Mode Switch**, as shown in figure D-7. Users can view details by clicking  icon on the right of each sub-tab.

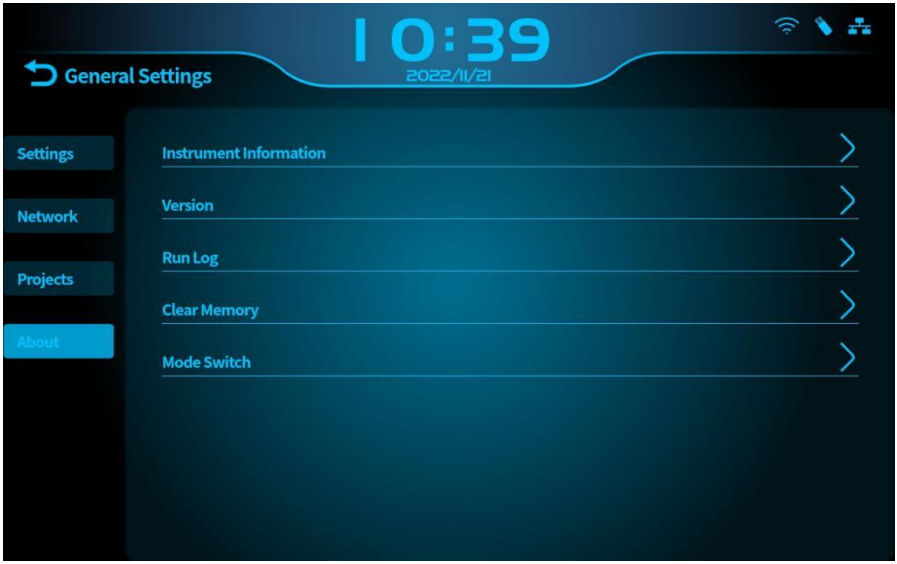


Figure D-7. About

1. **Instrument Information**: It displays **Instrument Name**, **Instrument Model** and **Instrument Serial Number**, as shown in figure D-7.1. The instrument name is editable. Users can press **< Edit >** button to call up the software keyboard, then input the new name and click **< OK >** to save it.

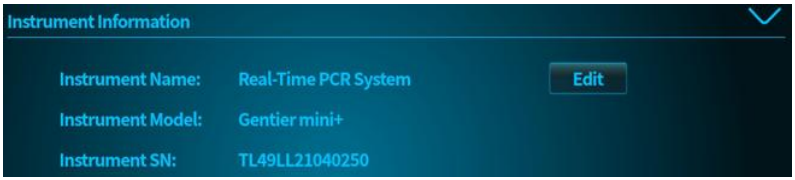


Figure D-7.1 About – Instrument Information

2. **Version**: Users can view the current software version, and click **< Upgrade >** to complete the version upgrade, as shown in figure D-7.2.

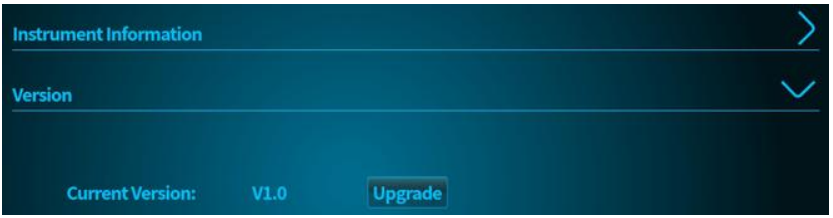


Figure D-7.2 About – Version

3. **Run Log**: Users can enter the operation log interface and click **< Export >** to export the log into a USB flash drive.

   Reminding: Please insert a portable USB device before clicking **Upgrade** and **Export**. The instrument can automatically identify software modules and versions which need to be upgraded.

4. **Clear Memory:** Open this tab and click **<Clear Memory>** to clear all the experiment data saved in the instrument.
5. **Mode Switch**: Open this tab and click **< Switch >** button to switch to advanced mode.

D-4. Experimental Data

Users can press the **< Experimental Data >** tab in the main interface to enter the **Experimental Data** interface where user could search, view and edit the historical experiment data. In addition, the function of experimental data analysis, result printing, etc. Can be conducted here.

D-4.1 Experimental Data Interface

The experimental data interface consists of three parts: **Select Date** bar, **Experiment Information Table** and **Operation Bar**, as shown in figure D-8.

Figure D-8. Experiment Data Interface

1. **< Select Date >**: Users can touch the date box and select the start and end date to query the experiment data before clicking **<OK>**. Clicking **<Reset>** views the experiment data counting backwards one year from reset day.

2. **Experiment Information Table**: It displays historical experiment information saved in the instrument or within the query period. Information of 12 experiments can be shown in a single page. Users can swipe the screen up and down to view more.
3. **Operation Bar**: It consists of four keys: **< Import/Export >**, **< Rename >**, **< Delete >** and **< Open >**.

► **< Import/Export >**: Import the experiment files selected in a USB flash drive to the instrument, or export the files selected in the instrument to the specified path in the USB flash drive.

► **< Rename >:** Rename the selected experiment.

► **< Delete >:** Delete the selected experiment data.

► **< Open >**: Open the selected experiment and view its data analysis result.

D-4.2 Result Analysis

When experiment is completed or opens a historical experiment data, there will enter the **Result Analysis** interface where user could select **Table** or **Curve** to view the current data, and which includes three parts: **Display Format** tabs, **Data Display Area** and **Function Area**, as shown in figure D-9.

1. **Display** tabs: It provides two formats for the experiment data analysis and display.

► **< Table >**: Experiment data are displayed in the Data Display Area in the format of a table. Please refer to ***D-4.2.1 Result Analysis – Table*** for more details.

► **< Curve >**: Experiment data are displayed in the Data Display Area in the format of real-time fluorescence curves. Please refer to ***D-4.2.2 Result Analysis – Curve*** for more details.

2. **Data Display Area:** Displays the test parameters and data analysis results of experiments.

3. **Function Area:** Consists of three keys: **<Save>, < Reanalyze >** and **< Print >**.

- **< Save >**: Click **< Save >** to save all the settings about experiment data after user finishes setting sample type, sample number and experiment projects.
- **< Reanalyze >**: Reanalyze the experiment data after changing the parameter settings. Please refer to ***D-4.2.1 Result Analysis –Table*** for more details on the setting change.
- **< Print >**: After selecting the target sample number, users can click **< Print >** to print the report on the experimental results of the selected samples.

Reminding: <Print> will be activated only in the **Table**. The real-time PCR fluorescence curves of the corresponding samples will be attached to the printed report.

Reminding: The software prints a report for each sample. When users select multiple samples at one time, the printer will print multiple reports continuously.

Figure D-9. Result Analysis Interface

D-4.2.1 Result Analysis – Table

The interface defaults to display the experiment information in the **Table Format**, as shown in figure D-9.1. The list shows information on **Well Number**, **Sample Type**, **Sample Number**, **Experiment Projects**, **Ct Value** and **Result** of two channels.

Figure D-9.1. Result Analysis – Experiment Information Table

- < **Well** >: Non-editable. The number indicates the well number where the sample is located in the sample block.
- **< Sample Type >**: Users can press the icon to call up the drop-down list to set the relevant sample type for the selected wells, including four optional types: **< Empty >**, **< Unknown >**, **< Positive >** and **< Negative >**.
- **< Sample Number >**: Users can press the cell to call up the soft keyboard, and then set an identification number for the selected sample. The software supports the combination of 40 digits and English letters for the editing.

- < **Experiment Projects** >: The list defaults to display the experiment projects set when creating experiments. Users can press the icon to change the test item.
- **< Ct >**: 3 decimal places are reserved for Ct results. The list will display "—" when Ct value is not detected.
- < **Result** >: Test results can be obtained based on the result criterion rule and Ct value analysis.

Reminding: The result criterion rule is set by the technicians when they edit the experiment project templates and cannot be changed. If users need to change the rules, please create a new project on the external device and import the instrument.

D-4.2.2 Result Analysis - Curve

Users can press Curve tab in the Result Analysis interface to view the real-time fluorescence of the experiment, as shown in figure D-9.2.

Figure D-9.2 Result Analysis – Curve Display

Reminding: The system software uses four colors to distinguish four channels. **Blue** indicates Channel 1; **Green** indicates Channel 2, **Orange** indicates Channel 3; **Red** indicates Channel 4.

Reminding: The system software defaults to display real-time fluorescence curves and threshold lines of all channels of all samples.

1. **Real-time PCR Fluorescence**: It displays the real-time fluorescence curves and threshold lines (dotted lines parallel to X-axis) of the experiment results.
2. **Channel Selection Area**: Select a channel to view the corresponding real-time fluorescence.
3. **Sample Selection Area**: Press the wells to select the needed samples.
4. **Threshold Checkbox**: Press the threshold checkbox to decide whether to display threshold lines in the diagram.

E. Advanced Mode - Application Software

This chapter introduces functions of the application software in advanced mode. The functions include user account management, new experiment creation, real-time monitoring and experiment data analysis, etc.

E-1. Start Application Software

After successfully installing the application software on the main control computer, users can double click the icon on the desktop or click the application software file on the start menu to start the application software. The ***Welcome Screen*** of the application software is as shown in figure E-1.1.

Figure E-1.1. Welcome Screen of Application Software

After starting the application software, the Welcome screen will automatically switch to the startup interface and pop up a quick start bar, as shown in figure E-1.2.

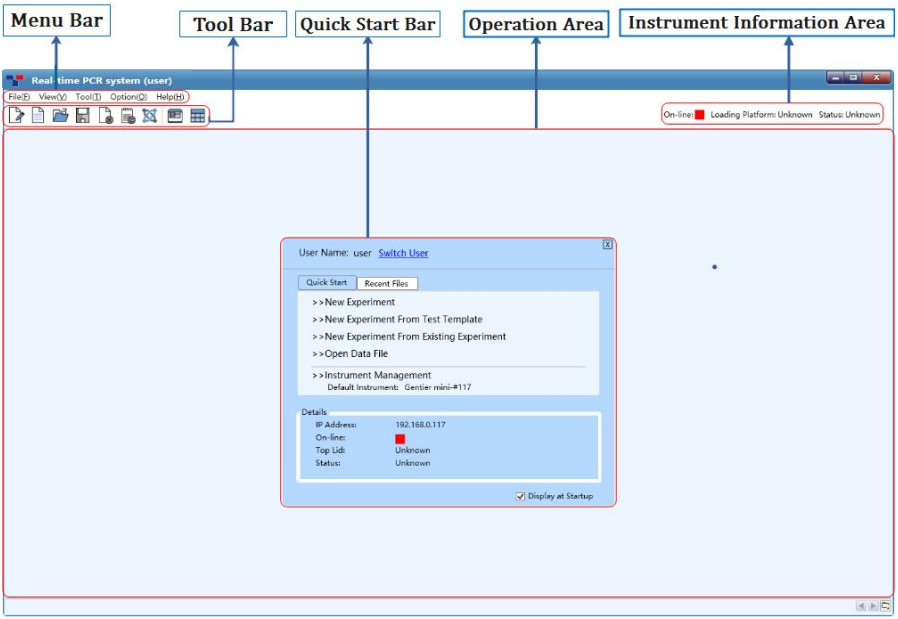


Figure E-1.2 Startup Interface of Application Software

The startup interface of application software is divided into two parts: **Quick Start Bar** and **Main Interface**.

Quick Start Bar: It collects commonly used functions for quick operations.

Main Interface: As the core function area, **Main Interface** consists of Menu Bar, Tool Bar, Operation Area and Instrument Information Area.

E-2. Quick Start Bar

The quick start bar of application software is as shown in figure E-2.1. It consists of **User Management** bar, **Quick Start** bar, **Recent Files** bar and **Details** bar.

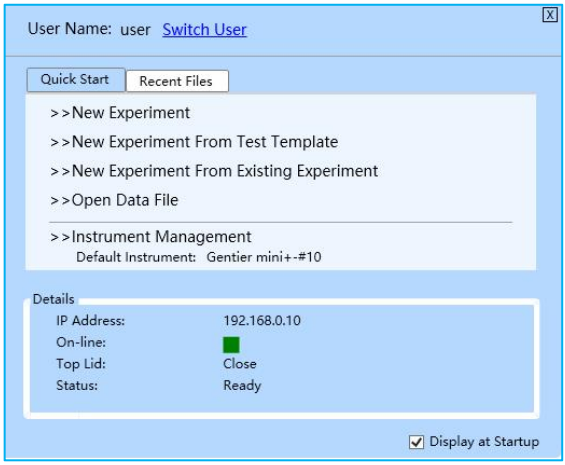


Figure E-2.1 Quick Start Bar

E-2.1 User Management

The current **User Name** is displayed on the top of quick start bar and users can click ***< Switch User >*** to change the current user account.

- **Login**: Users can click ***< Switch User >*** and input the registered account name in the input box; or click drop-down menu to select a registered account name, and then click ***< Login >*** to log in as the current user account, as shown in figure E-2.1a. The application software provides two user names by default: ***user*** and ***admin***. Users need to enter the password when logging in with ***admin*** account.

Figure E-2.1a Quick Start Bar - Login

- **Register New User Account**: Users can click ***< Switch User >***, then click the drop-down list icon and select ***Add User*** to call up a dialog box, as shown in figure E-2.1b. Please enter a new name in the ***User Name*** input box and click ***< OK >*** to register a new user account.

Figure E-2.1b Quick Start Bar - Add User

E-2.2 Quick Start

Quick Start tab: It includes five shortcut keys: ***< New Experiment >***, ***< New Experiment from Test Template >***, ***< New Experiment from Existing Experiment >***, ***< Open Data File >*** and ***< Instrument Management >***.

1. New Experiment

Click ***< New Experiment >*** and the application software will pop up the new experiment dialog box, as shown in figure E-2.2a. Enter a name in the ***Experiment Name*** input box; click to select a save path or enter it in the ***Save Path*** input box ; then click ***< New >*** to create a new experiment file. See ***E-3.3.1 Operation Area - Run Setting*** for parameter setting of new experiments.

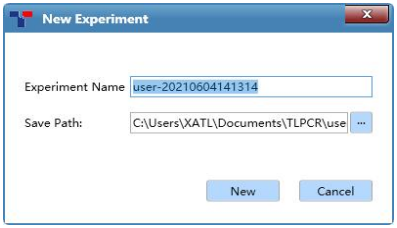


Figure E-2.2a Quick Start Bar - New Experiment

Reminding: The application software defaults to name the current new experiment with the login user account name and experiment creation time.

Reminding: The experiment name consists of numbers, letters, horizontal lines, underlines, or Chinese characters, but cannot contain special characters.

Reminding: New experiments are saved in the exp folder under my documents folder by default.

2. New Experiment from Test Template

Click ***< New Experiment from Test Template >*** and the new experiment window will pop up, as shown in figure E-2.2b. Users can input the ***Experiment Name*** and select the ***Save Path*** for the new experiment. According to the specific test item of the new experiment, users can select the test template and click ***< New >***, then the application software will create a new experiment file with the same experiment settings as the selected test template.

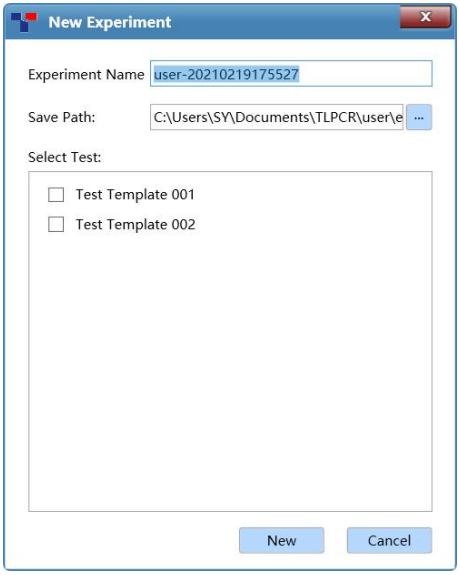


Figure E-2.2b Quick Start Bar - New Experiment from Test Template

Reminding: When users select an experiment, the software will automatically judge and identify experiments that can run at the same time. After users select an experiment, the incompatible experiment options will disappear from the interface to avoid users' selection errors.

3. New Experiment from Existing Experiment

Click ***< New Experiment from Existed Experiment >*** and the application software will pop up the choose experiment file window; user can choose a pre-existed experiment file and click ***< Open >***; then the application software will create a new experiment file with same experiment settings as the selected experiment file.

4. Open Data File

Click ***< Open Data File >*** and the application software will pop up the open experiment file window; users can select an experiment data file from the save path and click ***< Open >*** to view and analyze the experiment data file.

5. Instrument Management

Click ***< Instrument Management >*** and the application software will pop up the instrument management interface; users can manage all instruments within the local area network (LAN). For operation details, please refer to ***E-3.1.3 Menu Bar - Tool (T) submenu - Instrument Management***.

E-2.3 Recent Files

Recent Files tab displays the recent experiments or data files. Users can directly click the file name to open the file, as shown in figure E-2.3. Here display 6 files totally and can be clicked and opened directly. User could click ***< Demo Data >*** to open the demo data.

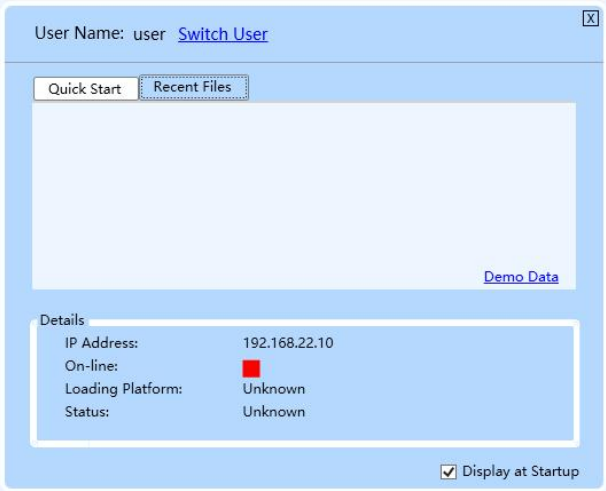


Figure E-2.3 Quick Start Bar – Recent Files

E-2.4 Other Functions of Quick Start

1. **Details**: The details of the default instrument are displayed at the bottom part of quick start bar, including ***IP Address, On-line, Top Lid*** and ***Status***. When users open the application software again after setting the default instrument, the application software will automatically connect the default instrument and display its status.
2. **Display at Startup**: Users can check the ***Display at Startup*** check box to decide whether to open the quick start bar automatically when starting the application software.

3.  **icon**: Users can click the  icon on the upper left corner of quick start bar to close the quick start bar. To open the quick start bar again, please click ***View > Quick Start*** **[Ctrl + G]** in the menu bar of application software's main interface or click ***<***  ***Quick Start >*** icon in the toolbar.

E-3. Main Interface

The ***Main Interface*** consists of ***Menu Bar***, ***Tool Bar, Operation Area*** and ***Instrument Information Area***, as shown in figure E-1.2.

E-3.1 Menu Bar

The menu bar of application software includes five submenus: ***File (F), View (V), Tool (T), Option (O)*** and ***Help (H)***.

E-3.1.1 File(F) Submenu

Options and Functional Description

1. **New Experiment (N)**: Create a new experiment. For detailed functions, please refer to ***E-2.2 Quick Start - New Experiment***.
2. **New Experiment from Test Template**: Users can select a saved test template and create a new experiment file with the same experiment settings as the selected test template. For detailed functions, please refer to ***E-2.2 Quick Start - New Experiment from Test Template***.
3. **New Experiment from Existing Experiment**: Users can select a saved experiment file and create a new experiment file with the same experiment settings as the selected experiment file. For detailed functions, please refer to ***E-2.2 Quick Start - New Experiment from Existing Experiment***.

4. **New Experiment from PANA/Other Device**: Gentier Instrument can be connected with PANA nucleic acid workstation or other device of our company and the application software can establish an experiment according to the PCR system established by the PANA nucleic acid workstation or other device.
5. **Open Data File...**: Users can select an experiment data file from the save path and click **< *Open* >** to view and analyze the experiment data file. For detailed functions, please refer to ***E-2.2 Quick Start - Open Data File***.
6. **Recent Files**: Users can click the experiment name on the list to open the selected data file.
7. **Close Experiment**: Close an opened or created experiment file.
8. **Save...**: The experiment file is saved to the default file path. For detailed functions, please refer to ***E-3.1.4 Menu Bar - Option(O) Submenu – Configuration Management***.
9. **Save As...**: Users shall specify another file save path and save the experiment file.
10. **Export Raw Data ...**: Users can choose a path to export experiment raw data file.
11. **Export All Data Sheets to Excel ...**: Users can choose a path to export the experiment data as an Excel file.
12. **Report Management:** After completing the experiment, users can edit and manage the report information of the current experiment.
13. **Exit**: Exit and close the application software.

E-3.1.2 View(V) Submenu

Options and Functional Description

1. **Quick Start**: Open the ***Quick Start*** bar. For detailed functions, please refer to ***E-2 Quick Start Bar***.

2. **Show Toolbar**: Users can decide whether to show the toolbar on the main interface of application software. For detailed functions, please refer to ***E- 3.2 Tool Bar***.

3. **Show Instrument Information**: Users can decide whether to ***Show Instrument Information*** on the main interface of application software.

► If users check the ***Show Instrument Information*** option in the ***View*** submenu, the instrument information area will be displayed on the top right corner of main interface to remind users the current status of the connected instrument, as shown in figure E-3.1.

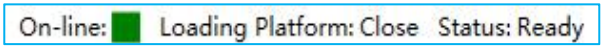


Figure E-3.1 View Submenu - Instrument Information Area

- **On-line**: Display the connection status between the application software and the instrument: indicates disconnected status; indicates connected status;
- **Loading Platform**: Display the status of loading platform, which is ***Close*** or ***Open***;
- **Status**: Display the state of the connected instrument, which is ***Ready*** or ***Running***;

E-3.1.3 Tool(T) Submenu

Options and Functional Description

1. **Instrument Management**: Click ***Instrument Management*** option in ***Tool*** submenu and the application software will call up the instrument management interface, which consists of three parts: ***Instrument List, Details*** tab and ***File Transmission***, as shown in figure E-3.2. Users can manage all instruments within the LAN on this interface.

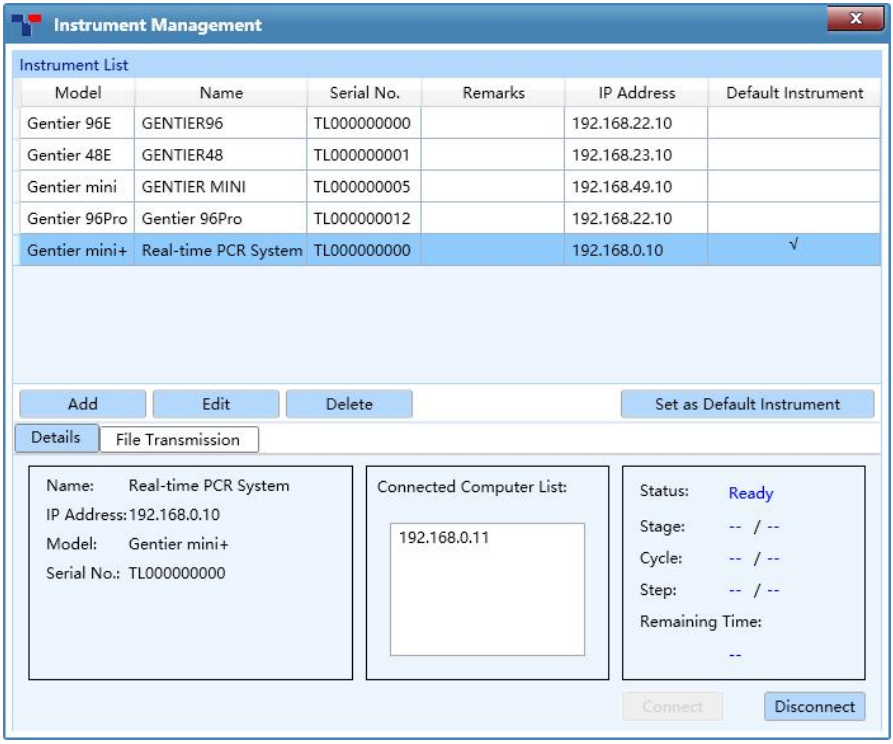


Figure E-3.2 Tool Submenu - Instrument Management Interface

► **Instrument List**: It displays the relevant information of connected instrument, including ***Model***, ***Name***, ***Serial No.***, ***Remarks***, ***IP Address*** and whether the instrument is set as the ***Default Instrument***. There are four function keys under the list: ***< Add >***, ***< Edit >***, ***< Delete >*** and ***< Set as Default Instrument >***.

a. Click ***< Add >*** and the Add Instrument window will pop up, as shown in figure E-3.2a.

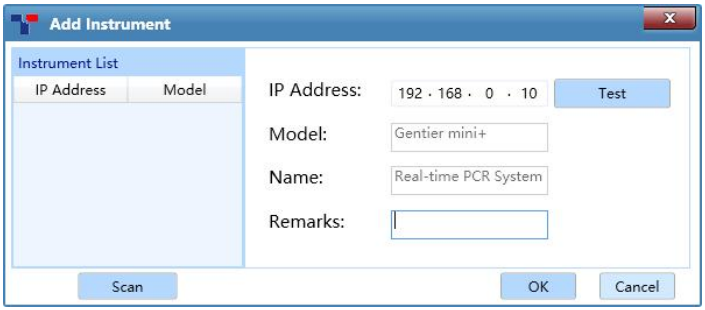


Figure E-3.2a Instrument Management Interface - Add Instrument Window

- Users can click ***< Scan >*** and the application software will automatically scan all identifiable instruments within LAN and display their ***IP Address*** and ***Model*** in ***Instrument List***.
- User can double click a certain instrument IP address in the ***Instrument List*** and the selected IP address will be displayed in the ***IP Address*** input box on the right; click ***< Test >*** and the application software will test the selected IP address; if the test passes, the selected instrument can be connected, then click ***< OK >*** to add the current instrument.
- If users already know the IP address of a certain instrument, you can also manually enter the address in ***IP Address*** input box and click ***< Test >***; if the test passes, the selected instrument can be connected, then click ***< OK >*** to add the current instrument.

b. Click ***< Edit >*** and the Edit Instrument window will pop up; users can change the remarks of instrument in the ***Remarks*** input box, as shown in figure E-3.2b.

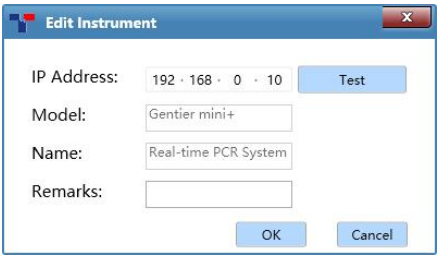


Figure E-3.2b Instrument Management Interface - Edit Instrument Window

c. Click ***< Delete >*** to delete the instrument selected in the list.

d. Select any instrument in the ***Instrument List*** and click ***< Set as Default Instrument >*** to set it as the default instrument to connect with the application software.

► **Details** tab: includes three information areas and two function keys, as shown in figure E-3.2c.

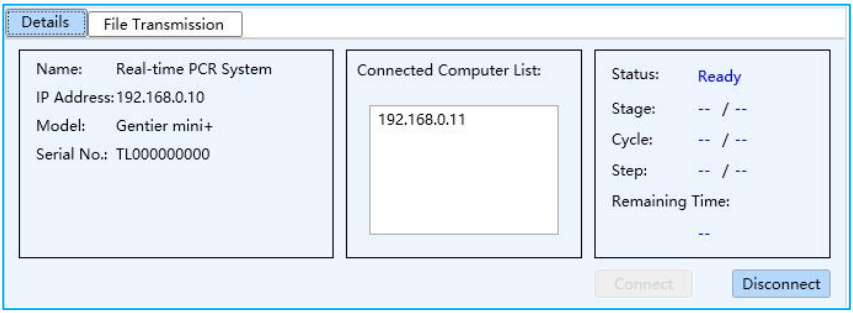


Figure E-3.2c Instrument Management Interface - Details Tab

a. Information Areas:

- **Instrument Information Area**: It displays ***Name***, ***IP Address***, ***Model***, and ***Serial No***. of the selected instrument in the ***Instrument List***.
- **Computer Information Area**: It displays the IP address list of the ***Connected Computer*** within LAN.
- **Running Information Area**: It displays the real-time ***Status*** of connected instrument, such as ***Stage***, ***Cycle***, ***Step*** and ***Remaining Time***.
- **Function Keys**:
- Click ***< Connect >*** to connect the selected instrument in the ***Instrument List***.
- Click ***< Disconnect >*** to disconnect the connected instrument.

► **File Transmission** tab: It transmits files between the main control computer and the connected instrument, as shown in figure E-3.2d.

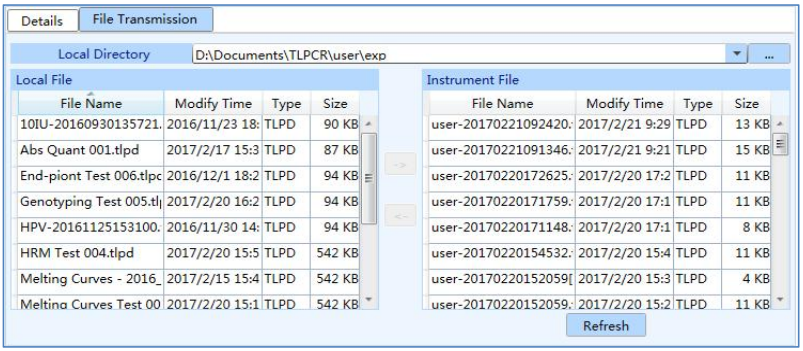


Figure E-3.2d Instrument Management Interface - File Transmission Tab

a. Local Directory: Users can click  or  to select a local experiment file directory or experiment data file directory.

b. Local File: It displays the experiment files and data files under the selected path of the main control computer.

c. **Instrument File**: It displays all experiment files and data files saved in the connected instrument.

d. **Function Keys**:

- Click -> to download the selected ***Local File*** to the connected instrument.
- Click <- to upload the selected ***Instrument File*** to the main control computer and save it in the **Local Directory** selected by users.

2. **T_m Calculator**: Click ***T_m Calculator*** option in ***Tool*** submenu and the application software will pop up the T_m Calculator interface, as shown in figure E-3.3.

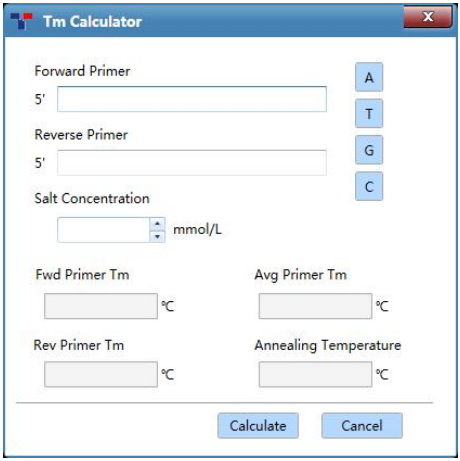


Figure E-3.3 Tool Submenu - T_m Calculator Interface

► Users can click A T G C four keys to input the forward primer sequence in ***Forward Primer*** input box.

► Users can click A T G C four keys to input the reverse primer sequence in ***Reverse Primer*** input box.

► Users can input the salt concentration value in ***Salt Concentration*** input box by using the keyboard or ▲ ▼ keys.

► Users can click ***< Calculate >*** and the application software will automatically calculate ***Fwd Primer T_m value***, ***Rev Primer T_m value***, ***Avg T_m value*** and ***Annealing Temperature***.

3. **Research Report**: Click ***Research Report*** option in ***Tool*** submenu and the application software will pop up the research report interface, as shown in figure E-3.4.

Reminding: Users can enter the scientific research report interface in conditions that they open a completed experiment and enter the analysis interface.

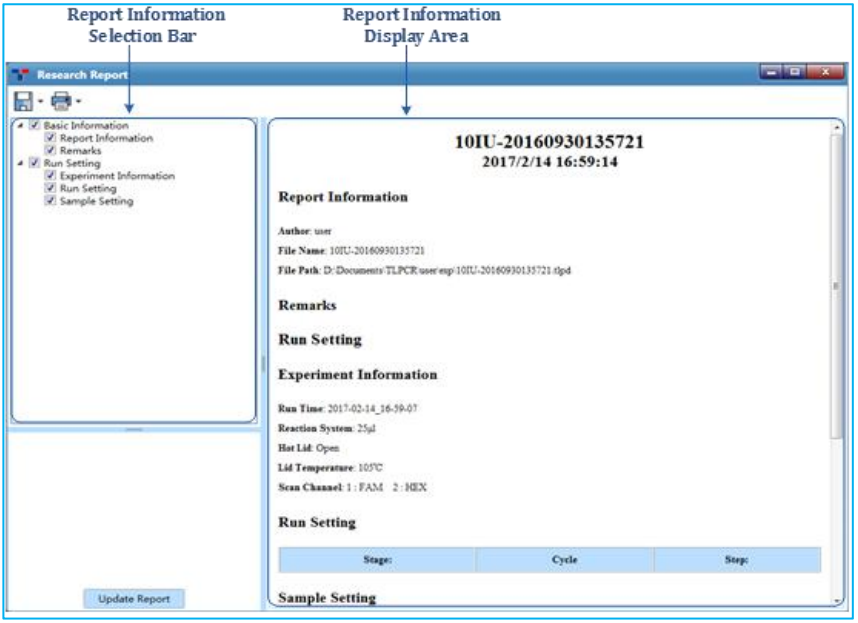


Figure E-3.4 Research Report Interface - Research Report

► **Report Information Selection Bar**: Users can check the relevant information check boxes in the report information selection bar to determine the information to be displayed and printed in research report.

► **Report Information Display Area**: It displays the information selected in the report information selection bar.

► **Update Report**: Users can click ***< Update Report >*** to refresh the information in the research report.

► **Save Research Report**: After editing the research report, please click < Save > icon to choose a path for saving the research report.

Reminding: A research report can be saved as a PDF or html file.

► **Print Research Report**: After editing the research report, user can click < Print > icon to preview and print the research report.

4. **New Test Template**: Click the ***New Test Template*** option in ***Tool*** submenu and the application software will pop up the test template interface, which consists of three tabs: ***Basic Information***, ***Program*** and ***Analysis Parameters***. Users can set the parameters and information of the new test template in this interface. The test template interface displays the ***Basic Information*** tab by default, as shown in figure E-3.5.

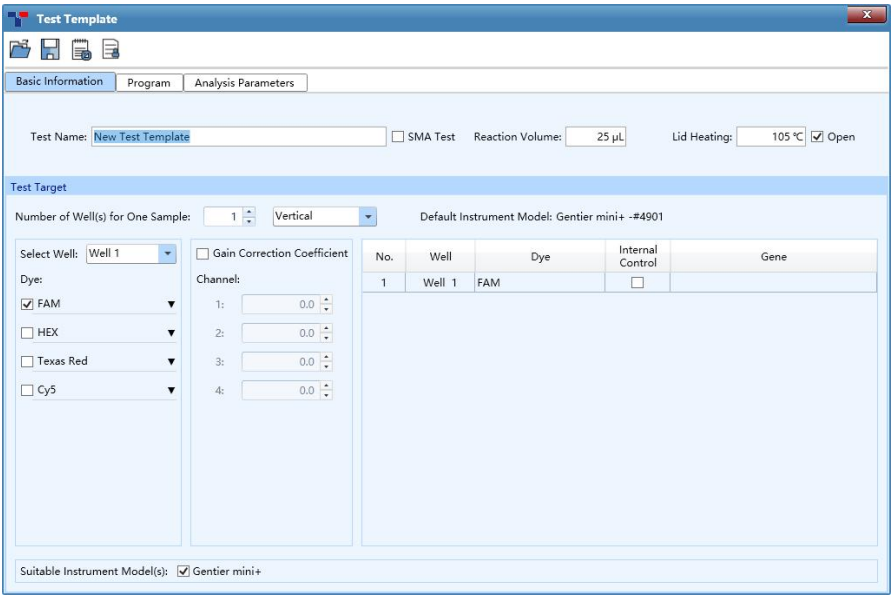


Figure E-3.5 Test Template Interface – Basic Information

► **Function Keys:**

- **<** ***Open Template*** **>** to open the local template.
- **<** ***Save Template*** **>** to save the new template.
- **<** ***Save Template as File*** **>** to save the template as a file.
- **<** ***Encrypt Template*** **>** to encrypt the template.

► **Basic Information** tab: It consists of three parts: ***Test Information***, ***Test Target*** and ***Suitable Instrument Model***.

a. **Test Information:** It includes four parts: ***Test Name***, ***SMA Test, Reaction Volume***, and ***Lid Heating***.

- **Test Name:** Users can input a name for a new test template.
- ***SMA Test*****:** Click this item if preform SMA test.
- **Reaction Volume:** Users can input the reaction volume for the new test template. The editing range is 0μL ~100μL.
- **Lid Heating:** Users can input the hot lid temperature for the new test template and check the check box to determine whether to apply the lid heating function; the editing range is 40.0℃~110.0℃.

b. **Test Target**: Users can set ***Number of Well(s) for One Sample***, ***Select Well, Dye, Internal Control*** and ***Gene***.

- **Number of Well(s) for One Sample**: Users can manually input or use  and  keys to set the number well(s) for one sample, and select well arrangement orientation from the subsequent drop-down list: ***Horizontal*** or ***Vertical***.
- **Select Well**: Users can select all wells or any well of the current sample for setting and also set the selected well dye by checking ***Dye***s below ***Select Well***.
- **Well Table**: Here displays all the settings of ***Select Well*** and ***Dye***s. User could check the ***Internal Control*** box followed by ***Well/Dye*** and set it as the current sample's internal control. Any gene name can be edited in the box of ***Gene*** column, as shown in figure E-3.5a.

No.	Well	Dye	Internal Control	Gene
1	Well 1	FAM	☐	target 1
2	Well 1	HEX	☑	
3	Well 1	Texas Red	☑	
4	Well 1	Cy5	☐	

Figure E-3.5a Test Template Interface – Well Table

c. **Suitable Instrument Model(s)**: Users can select a suitable instrument for the current template.

Reminding: General user can only check the default instrument model of the current application software. Admin user can check different suitable instrument models according to different dye/channel settings.

► **Program** tab: It is shown as figure E-3.5b. For detailed operations, please refer to ***E-.3.3.1 Run Setting***.

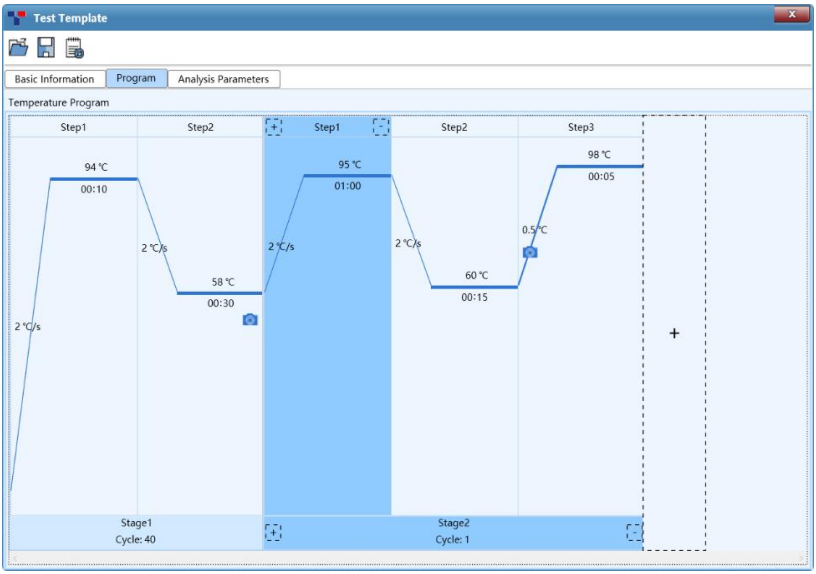


Figure E-3.5b Test Template Interface – Program

► **Analysis Parameters** tab: It consists of two parts: ***Analysis Options*** and ***Parameter Setting***, as shown in figure E-3.5c.

a. **Analysis Options**: Users can set ***Analytical Method***, ***Select Stage*** and ***Select Step***.

- **Analytical Method**: Users can select the corresponding analytical method for the current template in the ***Analytical Method*** drop-down box. ***Abs Quant*** and ***Melting Curve*** can be selected according to the corresponding operation programs.
- **Select Stage**: Users can choose the stages that need to be analyzed.
- **Select Step**: Users can choose the step that need to be analyzed.

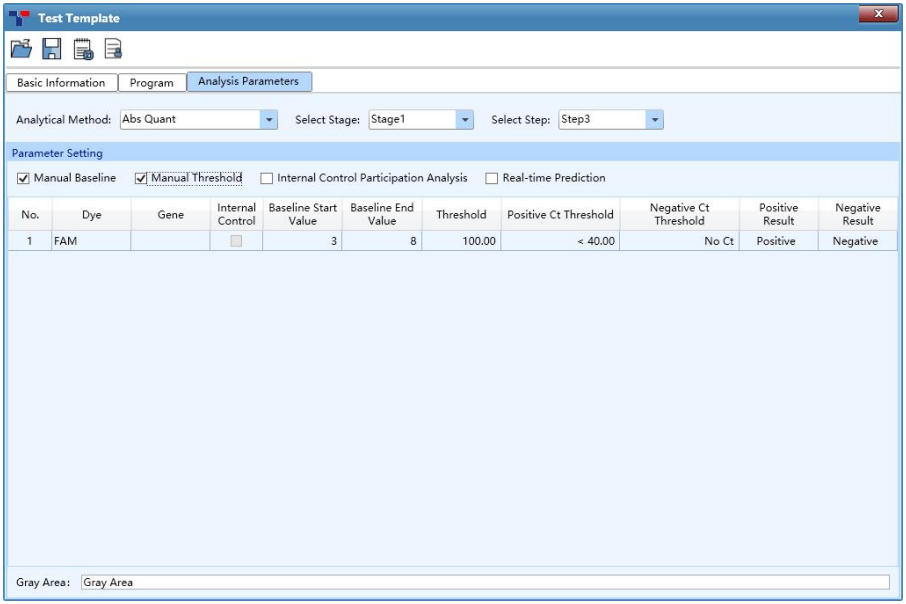


Figure E-3.5c Test Template Interface – Abs Quant Analysis Parameters

b. **Parameter Setting**: This area can be used for detailed ***Analysis Parameter*** setting of ***Test Template***. Two analytical methods: ***Abs Quant*** and ***Melting Curve*** are introduced in the following.

- **Abs Quant**: It displays the parameter settings of ***Abs Quant*** analytical method by default, as shown in figure E-3.5c. The settable parameters are shown in the following table:

Parameter Name	Remarks
Manual Baseline	Users can click the ***Manual Baseline*** check box to confirm whether to use this setting. ***Manual Baseline*** is selected by default.
Manual Threshold	Users can click the ***Manual Threshold*** check box to confirm whether to use this setting. ***Manual Threshold*** is selected by default.
Internal Control Participation Analysis	Users can click the ***Internal Control Participation Analysis*** check box to confirm whether the internal control results affect the result interpretation. ***Internal Control Participation Analysis*** is not selected by default.
Real-Time Prediction	Users can click the ***Real-time Prediction*** check box to confirm whether the results are read in real time during the experiment. ***Real-time Prediction*** is not selected by default.
Baseline Start Value & Baseline End Value	When ***Manual Baseline*** is selected, users can select a single well in the parameter list and input numbers by clicking  and  to set ***Baseline Start Value*** **&** ***Baseline End Value.*** When ***Manual Baseline*** is not selected, these parameters will automatically hide from the parameter list.
Dye Threshold	When ***Manual Threshold*** is selected, users can select a single well in the parameter list and input numbers by clicking  and  to set ***Dye Threshold.*** When ***Manual Threshold*** is not selected, the parameters will automatically hide from the parameter list.
Positive Ct Threshold	After selecting a single well in the parameter list, select "<" or "≤", then click keys  and  or input Ct Value manually to set the CT threshold rule to judge the test result as positive.

Negative Ct Threshold	After selecting a single well in the parameter list, select ">", "≥" or "No ***Ct***", then click keys ▲ and ▼ or input Ct Value manually to set the CT threshold rule to judge the test result as negative.
Positive Result & Negative Result	Select a single well in the parameter list and input "Positive" or "Negative" to specify report descriptions.
Gray Area	***Gray Area*** is at the bottom of parameter setting. Users can manually input Chinese or English in the ***Gray Area*** box to specify the report descriptions of gray area result.

- **Melting Curve:** When ***Melting*** is added in the program, users can select ***Melting Curve*** in the ***Analytical Method*** drop-down box, as shown in figure E-3.5d. The settable parameters are shown in the following table:

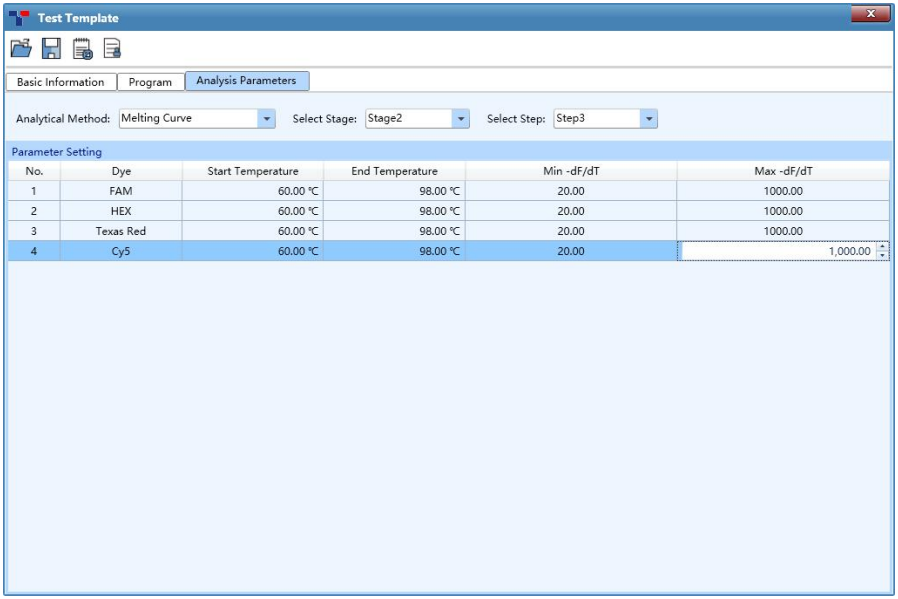


Figure E-3.5d Test Template Interface – Melting Curve Analysis Parameters

Parameter Name	Remarks
Start Temperature **End Temperature**	After selecting a single well in the parameter list, click keys  and  or input numbers manually to set the range of Tm ***Start Temperature*** and Tm ***End Temperature*** for the ***Melting Curve*** result analysis.
Min-dF/dT **Max-dF/dT**	After selecting a single well in the parameter list, click keys  and  or input numbers manually to set the ***Min-dF/dT*** or ***Max-dF/dT*** range for the ***Melting Curve*** result analysis.

5. **Test Template Management**: It consists of ***Test Template List*** and four function keys: ***Import***, ***Copy***, ***Delete*** and ***Setting***. Click the ***Test Template Management*** in ***Tool*** submenu and the application software will call up the test template management interface, as shown in figure E-3.6.

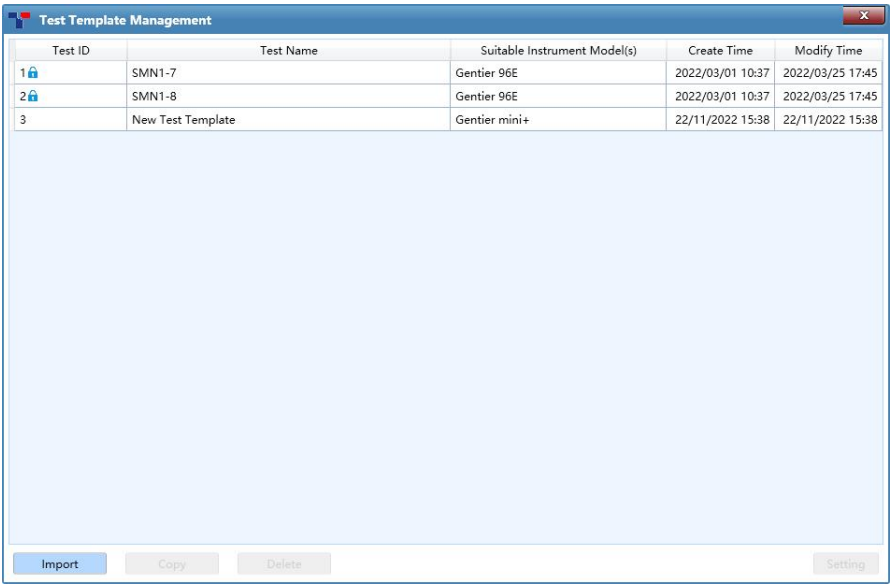


Figure E-3.6 Tool Submenu - Test Template Management

► **Test Template List**: Users can view the test template information saved by the current application in the test template list, including ***Test ID***, ***Test Name***, ***Suitable Instrument Model(s)***, ***Create Time*** and ***Modify Time***.

► **Function Keys:**

- ***Import***: Users can click ***< Import >*** and select a test template saved on the computer to import it into the ***Test Template List***.
- ***Copy***: Users can copy a selected test template and display its copy in the test template list.
- ***Delete***: Users can select a test template and delete it from the test template list.
- ***Setting***: Users can select any test template in the test template list and modify its settings. For detailed functions, refer to ***E-3.1.3 Menu Bar – Tool(T) submenu – 4. New Test Template***.

E-3.1.4 Option(O) Submenu

Options and Functional Description

1. **Configuration Management**: It consists of three function tabs: ***Default Path***, ***Standard Temperature Template*** and ***PANA or Other Device***. Click ***Configuration Management*** option in the ***Option*** submenu and the application software will pop up the configuration management interface, as shown in figure E-3.7a.

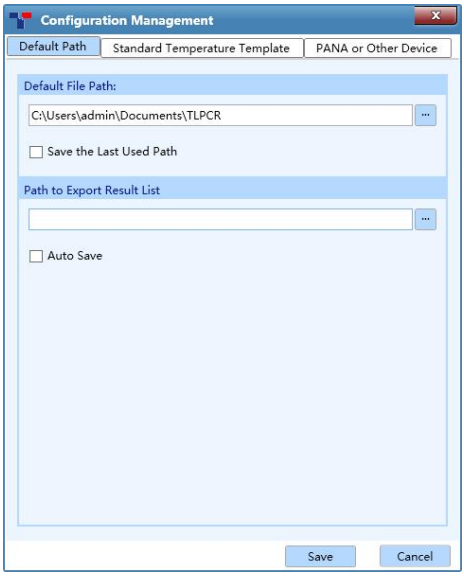


Figure E-3.7a. Option Submenu - Configuration Management Interface - Default Path

► **Default Path** tab: The configuration management interface displays the ***Default Path*** tab by default, as shown in figure E-3.7a. Users can set the default path for saving run parameter template, sample parameter template and other experiment files in ***Default Path*** tab.

- **Default File Path**: Users can manually enter the path name in ***Default File Path*** input box; or click ... icon and select a path from the pop-up Browse Folder.

- **Save the Last Used Path** check box: Users can click this check box to use the same default file path for saving experiment file.
- **Path to Export Result List:** Users can manually enter the path name in ***Path to Export Result List*** input box; or click ... icon and select a path from the pop-up Browse Folder**.**
- **Save/Cancel**: Save or cancel the default file path setting.

► **Standard Temperature Template tab**: 7 predefined standard temperature templates, stage types and parameters are displayed in this tab, as shown in figure E-3.7b.

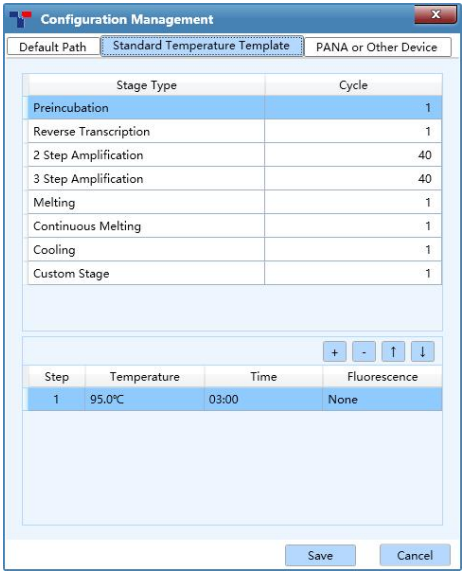


Figure E-3.7b Configuration Management Interface - Standard Temperature Template

- Users can edit the ***Standard Temperature Template*** to change corresponding stage and step settings. For detailed information, please refer to ***E-3.3.1 Run Setting***.

► **PANA or Other Device** tab: Users can check the check box of ***Connect to PANA or Other Device*** and enter the IP address of the PANA automatic nucleic acid workstation or other instrument, click ***< Test >*** to connect instrument.

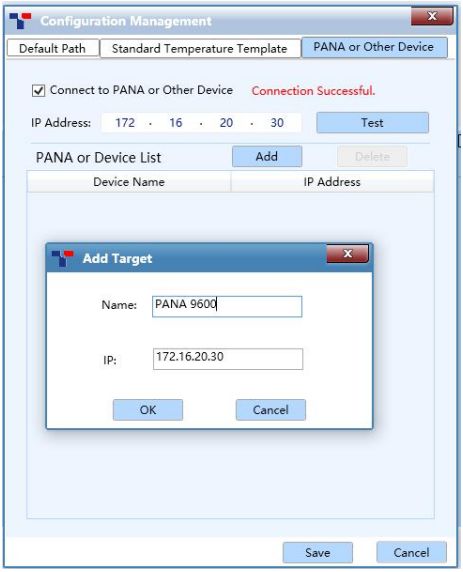


Figure E-3.7c Configuration Management Interface - PANA or Other Device Tab - Add

- Users can enter the instrument name in the pop-up window after connect to the instrument, click ***< OK >*** then ***< Add >*** to add the instrument to the instrument list, as shown in figure E-3.7c.
- Users can click ***< Delete >*** to delete selected **PANA/Other Device** from the current list.

2. **LIS Setting:** Users can set up saving path of LIS files. Click ... icon and select a path from the pop-up Browse Folder or manually enter the path name in the input box to determine ***Saving Path Of LIS Files*****,** shown as figure E-3.8.

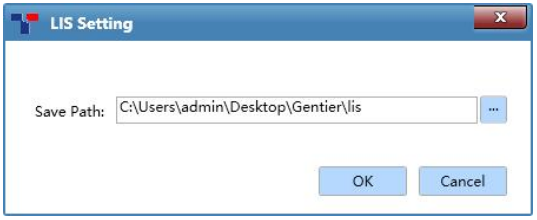


Figure E-3.8 Option submenu - LIS Setting Interface

3. **User**: Click ***User*** in the Option submenu and the application software will pop up the user interface, which consists of two tabs: ***User Management*** and ***General User Permissions.***

► **Admin Mode:** When logging into the software with ***admin*** user account (the password is "admin"), users can enter the admin mode to manage the general user accounts and their permissions, as shown in figure E-3.9a.

- **User Management** tab: It displays the registered general user account list. Click ***Add*** to add a new user account; click ***Delete*** to delete the selected user account.
- **General User Permissions** tab: ***Admin*** user can set the general user permissions by checking relevant ***Permissions*** check box in the ***Permit*** column and click ***< Save >*** to save the current general user permission settings.

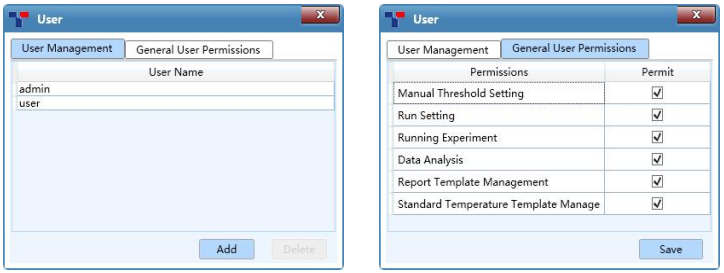


Figure E-3.9a Option Submenu- User Management (*Admin Mode*)

► **General User Mode:** When logging into the software as ***user*** account, users can enter the general user mode to view registered users and general user permissions in this tab, as shown in figure E-3.9b.

Figure E-3.9b Option Submenu- User Management (*General User Mode*)

4. **Choose Language**: Click ***Choose Language*** option in the ***Option*** submenu and the application software provides two optional software languages:
   - ***Chinese***: Check ***Chinese*** option and the software language will switch to Chinese after restarting the application software.
   - ***English***: Check ***English*** option and the software language will switch to English after restarting the application software.

E-3.1.5 Help(H) Submenu

Options and Functional Description

1. **Home Page**: Visit the home page of Xi'an Tianlong Science and Technology Co., Ltd.
2. **About**: It displays the application software version and copyright information, as shown in figure E-4.

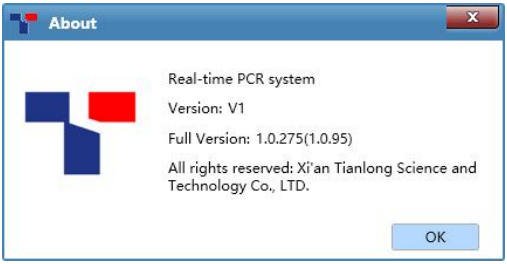


Figure E-4. Help Submenu - About Interface

E-3.2 Tool Bar

The Tool Bar of the application software consists of nine commonly used function icons and eight additional function icons displaying on the different interfaces.

1. Nine Commonly Used Function Icons

- < ***New Experiment*** >: Create a new empty experiment.
- < ***New Experiment from Existing Experiment*** >: Users can select an existed experiment file and create a new experiment file with the same experiment setting as the selected experiment file.
- < ***Open Data File*** >: Open a data file for viewing or analyzing.
- < ***Save Experiment*** >: The experiment file is saved to the default file path set in configuration management interface.
- < ***Close Experiment*** >: Close an opened experiment file.
- < ***Export*** >: After experiment, users can choose a path to export the raw experiment data as an Excel file.
- < ***Report Manager*** >: Users can edit and manage the report information of the current experiment after completing the experiment.
- < ***Instrument Management*** >: Click it to enter the instrument management interface. For detailed operation, please refer to ***E-3.1.3 Tool (T) submenu - Instrument Management***.

► <  ***Quick Start*** >: Click it to open the quick start bar. For detailed operation, please refer to ***E-2 Quick Start Bar***.

2. Eight Additional Function Icons

► ***Run Setting*** tab: When the ***Run Setting*** tab is selected on the main interface, two additional function icons will be shown in the tool bar.

- <  ***Choose Run Parameter Template*** >: Click this icon in the tool bar and the application software will pop up Choose Run Parameter Template window. Users can choose a saved run parameter template to set the current experiment based on the selected template.
- <  ***Save Run Parameter Template*** >: Click this icon in the tool bar and the application software will pop up Save Run Parameter Template window; users can choose a path and save the parameters of current experiment as a template.

► ***Sample Setting*** tab: When the ***Sample Setting*** tab is selected, two additional function icons will be shown in the tool bar.

- <  ***Choose Sample Parameter Template*** >: Click this icon in the tool bar and the application software will pop up Choose Sample Parameter Template window. Users can choose a saved sample parameter template and set current experiment based on this template.
- <  ***Save Sample Parameter Template*** >: Click this icon in tool bar and the application software will pop up Save Sample Parameter Template window. Users can choose a path and save the sample parameters of current experiment as a template.

► ***Analysis*** tab: When the ***Analysis*** tab is selected, four additional function icons will be shown in the tool bar on the analysis interface.

- **<**  ***New Analysis >***: Users can click this icon in the tool bar to create a new analysis method based on the current experiment data; the application software provides users with six analysis methods: ***Abs Quant, Rel Quant, Melting Curve, High Resolution Melting, Genotyping*** and ***End Point Fluorescence***.
- **<**  ***Analysis Setting >***: Users can click this icon in the tool bar to set the relevant parameters for the current experiment data analysis method. For more operations, please refer to ***E-3.3.4.2 Abs Quant Analysis Setting***.
- **<**  ***Delete Analysis >:*** Users can click this icon in the tool bar to delete the selected analysis method.
- **<**  ***Export Lis >***: Users can click this icon in the tool bar to export the current experiment data. One export file format (csv) is provided in English mode.

E-3.3 Operation Area

After creating a new experiment file or open an experiment file, the operation area on the main interface of the application software will be activated, as shown in figure E-5.

1. The experiment file created or opened will be displayed in the experiment file tab at the bottom of operation area and users can select or close any experiment file in this tab.

Reminding: If several experiment files are created or opened at the same time, users can click  or  icon on the right side of the experiment file tab to view all experiment files; or click  icon to view the list of all experiment files.

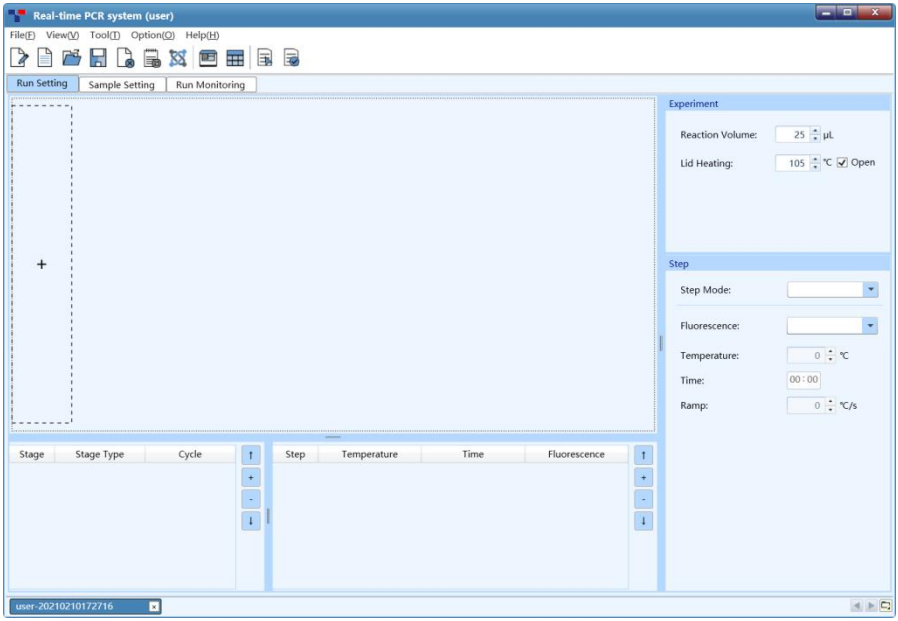


Figure E-5. Operation Area in Main Interface

2. Four Tabs: ***Run Setting, Sample Setting, Run Monitoring*** and ***Analysis*** are added in the operation area. Users can select corresponding tabs for experiment setting and monitoring.

Reminding: Analysis interface is activated only when users open a completed experiment.

Reminding: When the application software displays the interface of ***Run Setting, Sample Setting, Run Monitoring*** or ***Analysis*** tab, different function icons will be shown in the tool bar accordingly. See ***E-3.2 Tool Bar*** for more details.

E-3.3.1 Run Setting

The operation area on the main interface displays ***Run Setting*** tab by default, as shown in figure E-6.

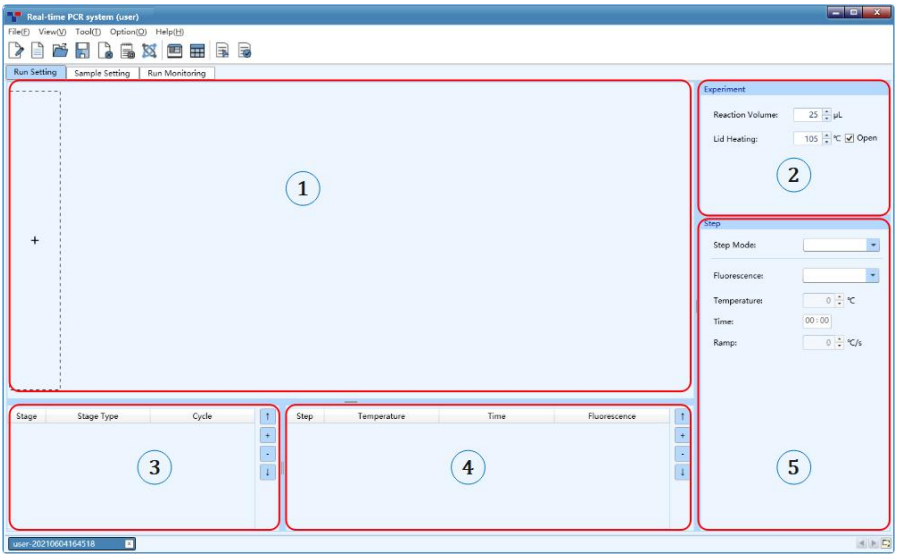


Figure E-6. Run Setting Interface

Run Setting

The Run Setting interface consists of five parts: temperature program area, stage and step lists, experiment and step setting areas.

1. **Temperature Program Area**: Users can view the temperature program of the current experiment, or edit the temperature program stages and steps in this area, as shown in figure E-6.1.

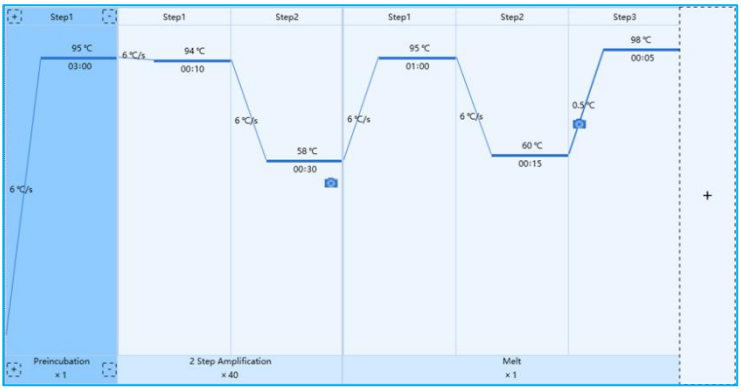


Figure E-6.1 Temperature Program Area – Example Temperature Program

Reminding: Users can view data of a completed experiment but cannot edit its temperature program.

► ***Stage***: One stage includes one or more steps and can cycle between each step.

- Each stage is separated by thick and solid light blue lines.
- The corresponding stage type and cycle number are displayed below each stage box. Click < + > below the stage box to add a stage before the current stage; click < - > below the stage box to delete the current stage.
- The last dotted box represents the stage to be added. Click < + > to add a new stage.

► ***Step***: Each step is an independent temperature control progress.

- Each step is separated by thin and solid light blue lines.
- The step number is shown in the middle of the box above each step. Click < + > to add a step before the current step; click < - > to delete the current

► ***Parameters***: Four temperature program parameters are included: ***Temperature, Time, Ramp*** and ***Fluorescence.***

- ***Temperature*:** Horizontal thick-solid dark blue line represents the temperature control progress of this step in each step box. The corresponding temperature of the current step is shown above the solid blue line. Click the temperature number to edit it.
- ***Time:*** Inside each step box, the corresponding time of the current step is shown below the horizontal thick and solid blue line as the form of ***< mm: ss >***. Click time number to edit it.
- ***Ramp***: The solid blue line between two stages/steps represents the temperature ramp, or increment or fluorescence reading frequency in the melting step. Click the corresponding number to edit it.
- ***Fluorescence***: If users decide to read the fluorescence at a certain step,  icon will be displayed in the corresponding step box.

Reminding: Users can hover mouse over the temperature and time of a certain step in the temperature program area, and the application software will display the temperature setting details of this step.

Reminding: Temperature program, stage, step and step setting are connected each other. When users select a stage/step, other information will display at the same time.

Reminding: Users can double click any step box in the temperature program area and edit the current step in the pop-up step setting dialog box.

2. **Experiment Editing Area**: Users can edit the relevant parameters of the current experiment in the experiment editing area, as shown in figure E-6.2.

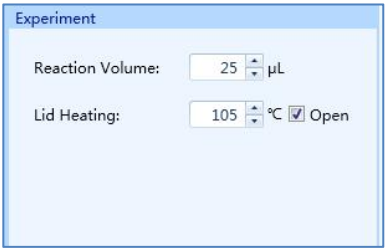


Figure E-6.2 Experiment Editing Area

► **Reaction Volume**: Users can enter the reaction volume for current experiment in the ***Reaction Volume*** input box.

Reminding: The reaction volume setting range is 0μL - 100μL.

► **Lid Heating**: Users can enter the hot lid temperature for current experiment in the ***Lid Heating*** input box. Users can also check the ***Open*** check box to determine whether to use the hot lid heating function

Reminding: The hot lid temperature setting the range is 40.0°C - 110.0°C.

3. Stage List: It is as shown in figure E-6.3.

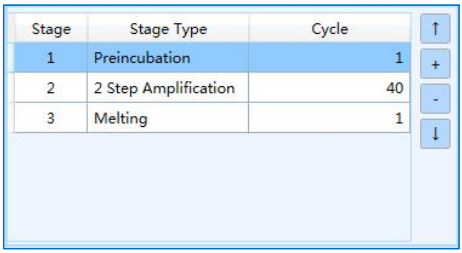


Figure E-6.3. Stage List

► **Stage List**: It displays the stage information of an experiment.

- **Stage**: It displays the stage number.
- **Stage Type**: It displays the type of each stage.
- **Cycle**: It displays the cycle number of each stage. Users can double click this number, then manually enter or use and keys to set the cycle number of the selected stage.

Reminding: Users can also double click the cycle number below the stage box in the temperature program area to complete the cycle setting.

Reminding: The cycle number setting range is 1-99.

► **Add, Delete and Edit function keys**: Users can add or delete any stage, or adjust the sequence of each stage.

- Users can click **<** ***Add*** **>** icon to add a new temperature stage after the selected stage.
- Users can click **<** ***Delete*** **>** icon to delete the selected stage.
- Users can click **<** ***Up*** **>** icon to move up the selected stage.
- Users can click **<** ***Down*** **>** icon to move down the selected stage.

Reminding: Users can also click icon in the dotted box of temperature program area or click **<** ***Insert Stage*** **>** icon below any stage box to add a new stage.

Reminding: Users can also click < >, < >, < > below any stage box in the temperature program area to add or delete the stage. See ***E-3.3.1Run Setting - 1.Temperature Program Area*** for more details.

► **Add:** If users add a new stage, the application software will pop up the ***Stage Type*** window, as shown in figure E-6.4.

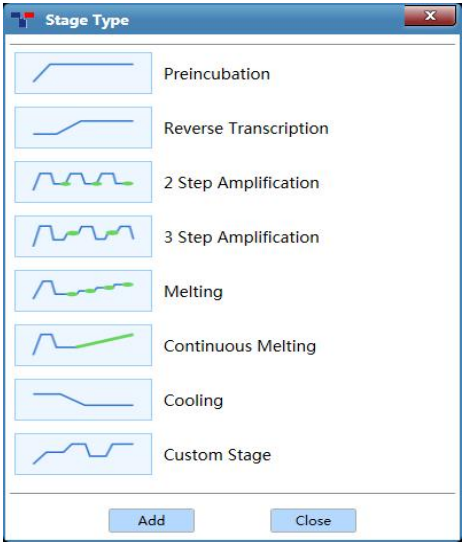


Figure E-6.4 Stage Type Window

► The application software provides the following stage types: ***Preincubation***, ***Reverse Transcription***, ***2 Step Amplification***, ***3 Step Amplification***, ***Melting***, ***Continuous Melting*** and ***Cooling***. Users can choose the corresponding predefined stage in the stage type window and click ***< Add >*** to add the selected stage; or double click any stage to add directly.

► **Custom Stage**: Users can select ***Custom Stage*** and click ***< Add >*** to define the stage setting according to specific experiment requirements.

► After adding needed stages, please click ***< Close >*** to return to the run setting interface. The new stage will be added to the temperature program area and stage list.

Reminding: At least one stage should be included in the temperature program.

4. Step List: It is as shown in figure E-6.5.

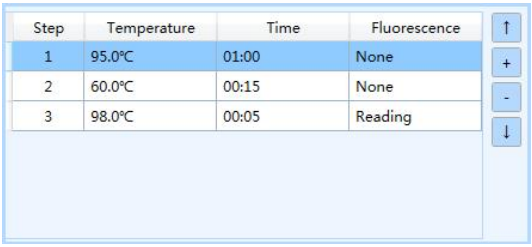


Figure E-6.5 Step List

► **Step List**: It displays step information of the selected stage.

- ***Step***: It displays the number of each step.
- ***Temperature***: It displays the target temperature of the current step.
- ***Time***: It displays the temperature holding time of the current step.
- ***Fluorescence***: It displays whether to read fluorescence at the current step.

► **Add, Delete and Edit function keys**: Users can add/delete the step according to the experiment requirements or adjust the sequence of each step.

- Users can click < ***Add*** > icon to add a new temperature step.
- Users can click < ***Delete*** > icon to delete the selected step.
- Users can click < ***Up*** > icon to move up the selected step.
- Users can click < ***Down*** > icon to move down the selected step.

Reminding: Users can also click < ***Insert Step*** > or < ***Delete Step*** > above any step box in the temperature program area to add or delete a temperature step. See ***E-3.3.1 Run Setting - 1.Temperature Program Area*** for more details.

Reminding: Double click any step in the step list and the interface will pop up the **Step Setting** dialog box, whose operations are the same as ***E-3.3.1Run Setting - 5. Step Setting***.

5. **Step Setting**: Users can edit the parameters of the selected step in the step setting dialog box or step setting area. According to the different step modes of the experiment, the parameters to be edited are also different.

► ***Step Mode***: Users can set the step mode for the selected step in the drop-down list, which includes three modes: ***Standard***, ***Touchdown*** and ***Long***, as shown in figure E-6.6a.

I. ***Standard Step Mode***: Users can set the ***Temperature***, ***Time***, ***Ramp*** for the standard step and decide whether to read its ***Fluorescence***, as shown in figure E-6.6a.

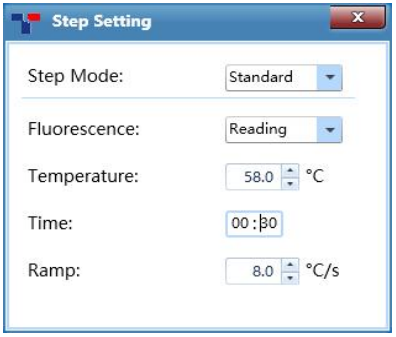


Figure E-6.6a Step Setting Dialog Box – Standard Step Mode

Reminding: The temperature setting range is 0.0°C -100.0°C.

Reminding: The time setting range is 1s~60min and form is: **mm: ss**

Reminding: When the progress is in the cooling step, users can check the **<** ∞ **>** check box to set the current step time to infinite.

Reminding: The ramp setting range is 0.1°C/s~4.2 °C/s.

II. ***Touchdown Step Mode***: Touchdown step allows temperature program to change annealing step temperature from the initial temperature to the target temperature as the cycling proceeds. Users can set the corresponding parameters in the ***Step Setting*** dialog box, as shown in figure E-6.6b.

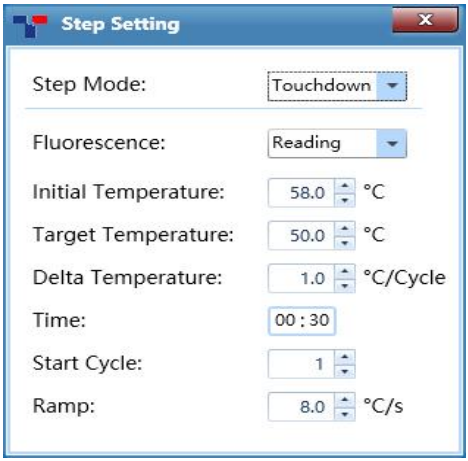


Figure E-6.6b Step Setting Dialog Box – Touchdown Step Mode

Reminding: The initial and target temperature setting range is 0.0 °C - 100.0 °C.

Reminding: The start cycle setting range is 1-Max cycle number of the current stage.

III. ***Long Step Mode***: The long step mode allows the temperature program to change the elongation step temperature holding time from the initial time to the target time as the cycling proceeds. Users can set the corresponding parameters in the ***Step Setting*** dialog box, as shown in figure E-6.6c.

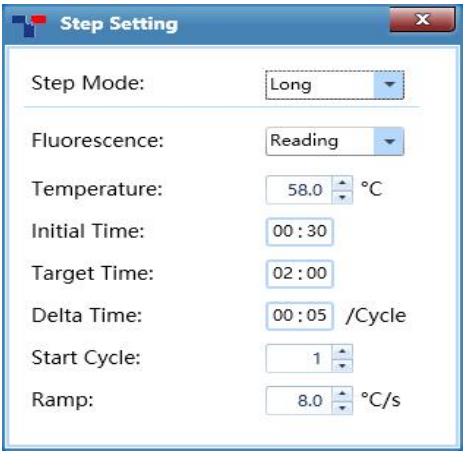


Figure E-6.6c Step Setting Dialog Box – Long Step Mode

Reminding: The initial and target time setting range is 1s~60min

Reminding: the delta time setting range is 1s~10min.

Reminding: The start cycle range is 1~Max cycle number of the current stage.

IV. ***Melting***: Melting stage allows the system to read the fluorescence signals after each temperature increment. If the current step is the last step of melting stage, users can set the temperature ***Increment*** in the ***Step Setting*** dialog box for the current step, as shown in figure E-6.6d.

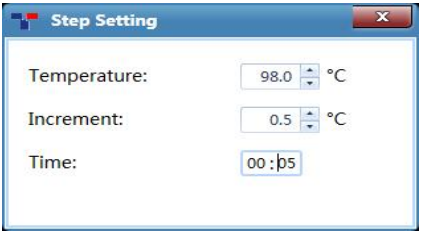


Figure E-6.6d. Step Setting Dialog Box – Melting Step

Reminding: Fluorescence is read in the last step of the melting stage by default, so users do not need to set it.

Reminding: The temperature increment setting range is 0.1°C - 5.0°C.

V. ***Continuous Melting***: Continuous melting stage allows the system to read the fluorescence more frequently. If the current step is the last step of continuous melting stage, users can set the fluorescence reading times per °C for the current step in the ***Step Setting*** dialog box, as shown in figure E-6.6e.

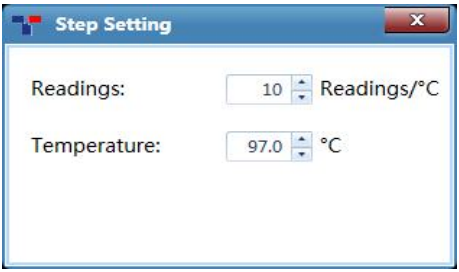


Figure E-6.6e Step Setting Dialog Box – Continuous Melting Step Mode

Reminding: The fluorescence reading frequency setting range is 2 readings/°C–15 readings/°C.

Reminding: Fluorescence is read in the last step in the melting step by default, so users do not need to set it.

E-3.3.2 Sample Setting

After finishing the experiment run setting, users can click ***Sample Setting*** tab to enter the sample setting interface, which consists of sample setting area, sample property editing area and sample type area, as shown in figure E-7.

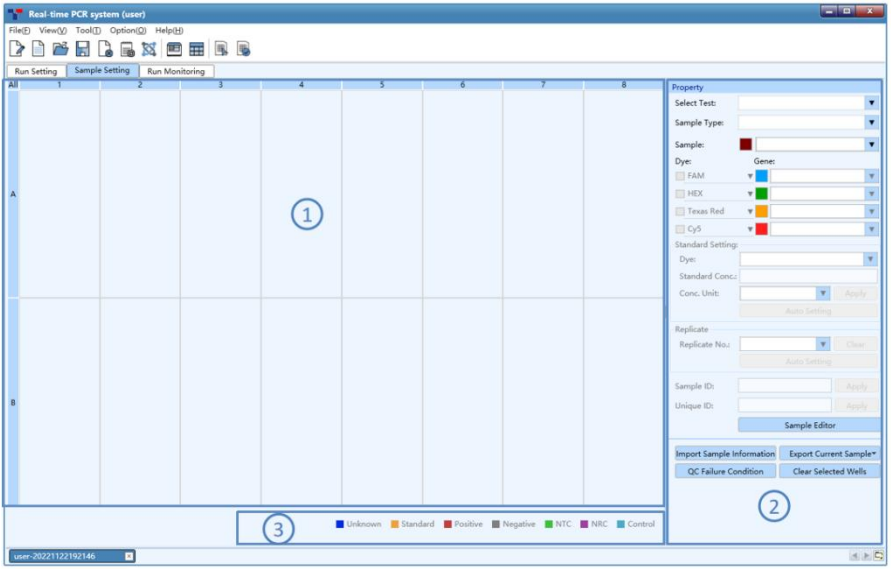


Figure E-7. Sample Setting Interface

Sample Setting Operation

1. **Sample Setting Area**: After entering the sample setting interface, users shall first choose a sample well in the sample setting area, as shown in figure E-7.1. The well distribution in sample setting area corresponds to the well distribution of the sample block in loading platform. There are 16 sample wells in total arranged in 8 columns (1-8) and 2 rows (A-B).

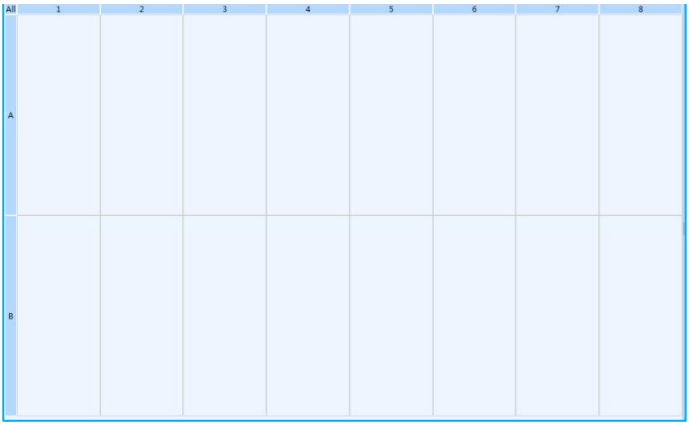


Figure E-7.1 Sample Setting Interface - Sample Setting Area

Introduction to Sample Setting Area

► User can select relevant sample wells in the sample setting area and operations are as follows:

- Click and select a single well in sample setting area.
- Press **[Ctrl]** key on the computer keyboard and click corresponding wells to select multiple discontinuous wells.
- Press **[Ctrl]** key on the computer keyboard and click corresponding column number to select multiple discontinuous columns of wells.
- Press **[Ctrl]** key on computer keyboard and click corresponding row number to select multiple discontinuous rows of wells.
- Click the left mouse button and drag the mouse in sample setting area to select multiple continuous wells.
- Click the left mouse button and drag the mouse on the column number to select multiple continuous columns of wells.
- Click the left mouse button and drag the mouse on the row number to select multiple continuous rows of wells.
- Click ***< All >*** on the top left corner of sample setting area to select all sample.

2. **Sample Property Setting Area**: After selecting one or more sample wells in the sample setting area, users can set the properties for the corresponding wells in the ***sample property setting area***.

► **Sample Property Box**: Users shall edit the ***Sample, Sample Type, Dye*** and ***Gene*** for the selected wells, as shown in figure E-7.2a.

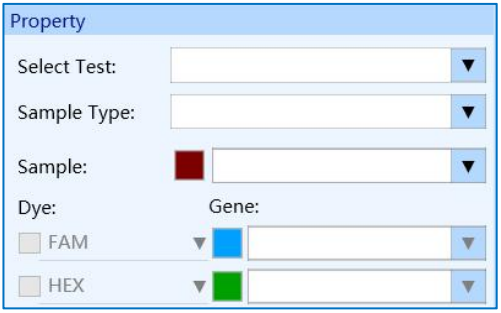


Figure E-7.2a. Sample Setting Interface - Sample Property Box

a. ***Select Test***: If user has created an experiment from the test template, as described in ***E-2.2 Quick Start - 2. New Experiment from Test Template***, the ***Select Test*** drop-down list will be activated. Users can select the test template for the selected well.

Reminding: If user has created an experiment through other ways, the ***Select Test*** drop-down list will not be activated.

b. ***Sample Type***: Users can set the relevant sample type for the selected wells in the ***Sample Type*** drop-down list. The optional sample types and their corresponding colors in sample setting area are ***Unknown***, ***Standard***, ***Positive***, ***Negative***, ***NTC***, ***NRC***, and ***Control***.

Reminding: The sample type and the well identification color are consistent with the sample type keys below the well setting area.

c. ***Sample*:** Users can enter sample name of the selected well in the *Sample Type* input box, or select the previously entered sample name from the drop-down menu.

Reminding: Click the color block before the ***Sample*** input box to specify the display color of all samples with the current name.

d. ***Dye*:** Users can check the relevant dye check box to determine the detection dyes for the selected wells.

e. ***Gene*:** Users can enter the relevant gene name for the selected wells in *Gene* input box or select a gene name in the drop-down list;

Reminding: Users can click the color square before the ***Gene*** input box to select a color for all samples.

► **Standard Setting**: If the sample type for the selected well is ***Standard***, the ***Standard Setting*** box will be activated, as shown in figure E-7.2b.

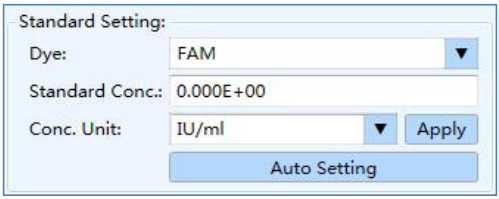


Figure E-7.2b Sample Setting Interface - Standard Setting Box

a. ***Dye***: Users can set the dye for corresponding standard curve from the ***Dye*** drop-down list.

Reminding: Please first set the detection dye for the selected standard samples in the sample property box, and then set the dye for the corresponding standard curve from the ***Dye*** drop-down list in the standard setting box.

b. ***Standard Conc.***: Users can select a single standard sample and enter its standard concentration in ***Standard Conc.*** input box.

c. ***Conc Unit***: Users can select a single standard sample and set its concentration unit from ***Conc Unit*** drop-down list; the application software provides two default concentration units: ***IU/mL*** and ***Copies/mL***.

d. After editing the standard concentration and concentration unit for the selected standard sample, please click ***< Apply >*** to confirm the relevant settings.

e. ***Auto Setting:*** For a series of standard samples diluted according to a certain dilution factor, users can select corresponding standard sample wells in the sample setting area. Please click ***< Auto Setting >*** and the auto concentration setting window will pop up, as shown in figure E-7.2c.

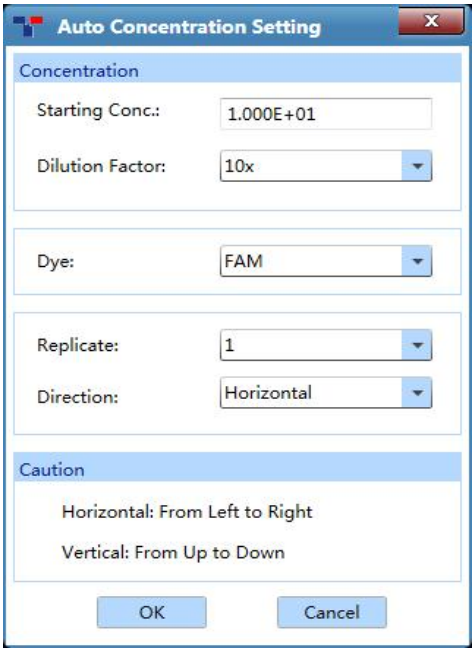


Figure E-7.2c Sample Setting Interface - Auto Concentration Setting Window

- Users can set the starting concentration for a series of diluted standard samples in the ***Starting Conc***. input box.
- Users can select the concentration dilution factor for a series of diluted standard samples from ***Dilution Factor*** drop-down list.
- Users can select the dye for the corresponding standard curve of a series of diluted standard samples from ***Dye*** drop-down list.
- Users can select the number of standard samples from ***Replicate*** drop-down list.
- Users can select the auto concentration setting direction from ***Direction*** drop-down list: ***Horizontal*** (from left to right) and ***Vertical*** (from up to down).
- Users can click ***< OK >*** and the application software will conform to the auto concentration setting direction, calculate and display the concentration of all the selected standard samples.
- Users can click ***< Cancel >*** and the application software will give up the current auto concentration setting and return back to the sample setting interface.

Reminding: When automatic setting is selected, each standard sample should be placed continuously from high to low or from low to high according to the concentration change.

► **Replicate**: According to experiment requirements, user can classify the same samples into one replicate group in the ***Replicate*** group setting box, as shown in figure E-7.2d.

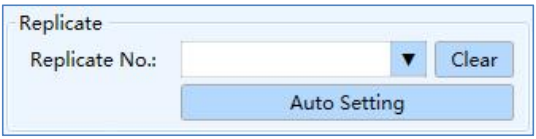


Figure E-7.2d Sample Setting Interface - Replicate

a. **Replicate No.**: Users can select the corresponding sample wells in the sample setting area and select the replicate group number from the ***Replicate No.*** drop-down list, to classify the selected same samples into one replicate group.

b. Users can click ***< Clear >*** to cancel the replicate group number setting.

c. ***Auto Setting***: The application software can automatically divide multiple replicate groups according to user's requirements. Please first select all wells of the same samples in the sample setting area and click ***< Auto Setting >***; then the auto setting dialog box will pop up, as shown in figure E-7.2e.

d. If there are multiple groups of duplicate samples and the number of repetitions in each group is the same, users can select all the corresponding wells in the well setting area, and then click ***< Auto Setting >*** to edit the following parameters in the ***< Auto Setting >*** pop-up window of the duplicate groups to complete the duplicate group setting.

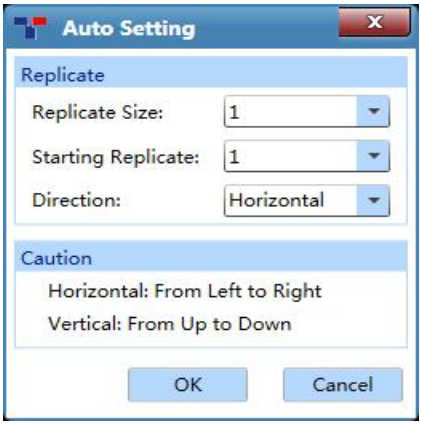


Figure E-7.2e Sample Setting Interface - Auto Setting

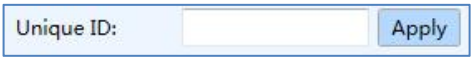
- User can select the number of same samples in each replicate group from the ***Replicate Size*** drop-down list.
- User can select the starting value for replicate group number from the ***Starting Replicate*** drop-down list.
- User can select the direction for auto setting from ***Direction*** drop-down list: ***Horizontal*** (from Left to right) and ***Vertical*** (from up to down).

- Click ***< OK >*** and the application software will automatically divide the replicate group for all the selected samples.
- User can click ***< Cancel >*** and the application software will give up the current replicate setting and automatically return to the sample setting interface.

► ***Sample ID:***

- User can select a well in sample setting area and set the sample ID for the selected well in ***Sample ID*** input box; click ***< Apply >*** to confirm the sample ID;
- User can also select multiple wells in the sample setting area, and let the application software to set the corresponding sample IDs. Please enter the starting ID number in the ***Sample ID*** input box and click ***< Apply >***; then Choose Direction dialog box will pop-up, user could set the ***Horizontal*** or ***Vertical*** direction and then click ***< OK >***, the application software will automatically set the sample IDs for the selected wells according to the direction setting.

► ***Unique ID***:



- User can select a well in sample setting area and set the unique ID for the selected well in ***Unique ID*** input box; click ***< Apply >*** to confirm the unique ID.
- User can also select multiple wells in the sample setting area, and let the application software to set the corresponding unique IDs. Please enter the starting ID number in the ***Unique ID*** input box and click ***< Apply >***; then choose direction dialog box will pop up. User could set the ***Horizontal*** or ***Vertical*** direction and then click ***< OK >***, the application software will automatically set the unique ID for the selected wells according to the direction setting.

⚠ **Warning**: The ***Sample ID*** and ***Unique ID*** should be at least double-digit, and last two digits must be numbers.

Reminding: The ***Sample ID*** setting is primarily intended to facilitate operators to identify and differentiate samples. Samples can only be identified and confirmed according to the ***Unique ID***.

► ***QC Failure Condition Setting***: After completing the sample well setting, please click QC Failure Condition icon and the QC failure condition setting dialog box will pop up, as shown in figure E-7.2f.

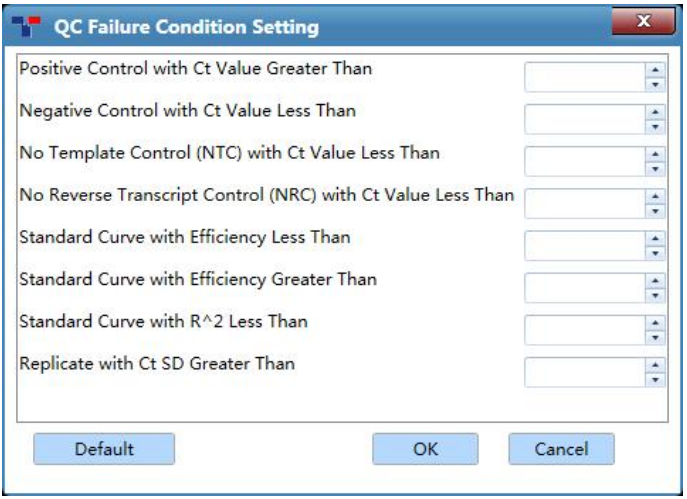


Figure E-7.2f Sample Setting Interface - QC Failure Condition Setting

- User can manually enter or use and keys to set the QC failure conditions, and click ***< OK >*** to confirm the setting.
- User can click ***< Default >*** to clear all QC failure condition settings.

► ***Clear Selected Wells***: User can click Clear Selected Wells icon to clear the relevant property settings for all selected wells.

Reminding: User can also delete the well property settings by clicking ***<Del>*** on keyboard.

E-3.3.3 Run Monitoring

After finishing the experiment run setting and sample setting, users can click ***Run Monitoring*** tab to enter the run monitoring interface to run the experiment and monitor the experiment running process, as shown in figure E-8.

Figure E-8. Run Monitoring Interface

Interface Introduction and Parameter Description

The run monitoring interface consists of six functional modules: ***Real-time Fluorescence, Temperature Program, Sample Setting, Run Info, Sample Info*** and ***Heat Map***. This interface displays four functional modules by default (***Real-time Fluorescence, Temperature Program, Sample Setting, Run Info***).

Reminding:

- ***Functional Module Change***: Users can select the functional module displayed on the run monitoring interface from the drop-down list on the top right corner of each area.

- ***Full-screen Display of Function Modules***: Users can click the ***< Full Screen >*** icon on the top right corner of each area to display the current functional module of the area in full screen.
- ***Run &Stop Experiment***: Users can click ***< Run >*** key in the ***Run Info*** functional module to run the current experiment and monitor the running state of the current experiment on the run monitoring interface.

1. **Real-time Fluorescence**: displays the diagram of real-time fluorescence intensity (Y-axis RFU) against cycle number (X-axis) of the current running experiment, as shown in figure E-8.1. The software displays all the fluorescence curves by default.

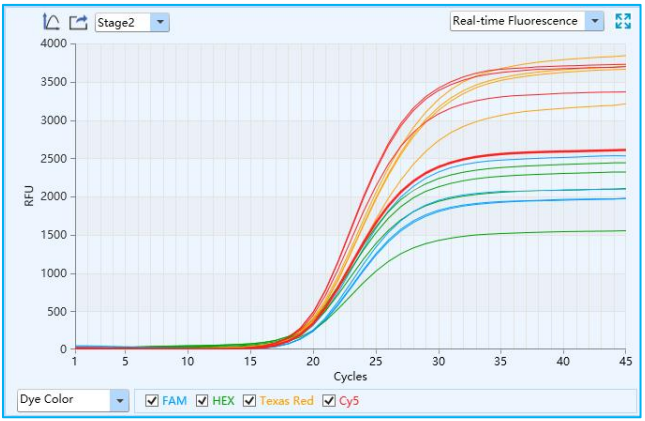


Figure E-8.1 Run Monitoring Interface - Real-time Fluorescence Function Module

► ***< Y-axis Coordinate Adjustment >***: Users can adjust the Y-axis coordinate of the real-time fluorescence monitoring diagram. Please click ***< Y-axis Coordinate Adjustment >*** icon and the coordinate range setting box will pop up, as shown in figure E-8.1a.

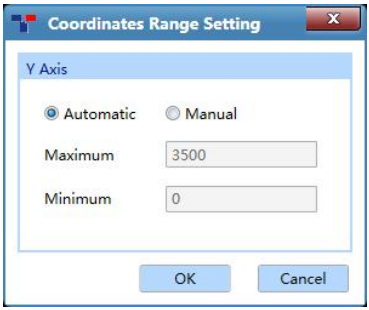


Figure E-8.1a. Run Monitoring Interface - Coordinate Range Setting

- ***Automatic Adjustment***: If the ***Automatic*** option is selected, the application software will automatically adjust the Y-axis coordinate according to the detected fluorescence value.
- ***Manual Adjustment***: If the ***Manual*** option is selected, users can manually enter or use  and  keys to set the maximum and minimum value of Y-axis coordinate range in the ***Maximum*** and ***Minimum*** input box and click ***< OK >*** to confirm.

Reminding: In the display area, users can click the left mouse button and drag the mouse to select the target observation area, or place the cursor in the function module prompt box in the upper right corner of the target observation area, and click the < > drop-down button to select the function module to be displayed in this area in the drop-down menu.

► < ***Export >***: User can click < ***Export >*** icon to export the current real-time fluorescence monitoring diagram and save it to a specified path.

► < Stage2 ***Stage Selection >***: If there are fluorescence frequencies reading in multiple stages, users can click the < > drop-down button to select real-time fluorescence which needs to be displayed.

► < Dye Color ***Display Mode >*** : Users can set fluorescence curve display mode from the drop-down list on the bottom left of ***Real-time Fluorescence*** functional module. The real-time fluorescence curve can be displayed according to ***Dye Color*** and ***Well Color.*** The interface displays ***Dye Color*** by default.

- ***Dye Color***: check the check box of dye color ☑ FAM ☑ HEX ☑ Texas Red ☑ Cy5 to confirm the fluorescence channel of the displayed curve. **FAM** channel color: blue; **HEX** channel color: green; **Texas Red** channel color: orange; **Cy5** channel color: red.
- ***Well Color*****:** 16 sample wells are arranged in 8 columns (1-8) and each column is displayed in one color.

2. Temperature Program: displays the temperature program of the current running experiment, as shown in figure E-8.2. The flashing solid red and blue line represents the running temperature program.

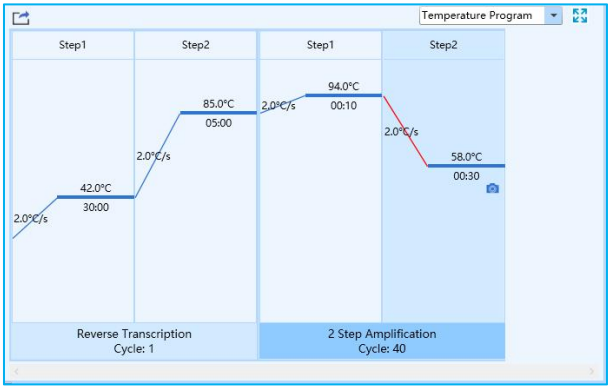


Figure E-8.2. Run Monitoring Interface **-** Temperature Program Function Module

► **Parameter Introduction**: is the same as the parameters introduced in ***E-3.3.1 Run Setting - Temperature Program Area***. Temperature time will be counted down with the experiment running.

► **Function Key Introduction**: Users can click **<** ***Export*** **>** icon to export the temperature program monitoring diagram of the current experiment.

3. Sample Setting: It displays the sample well setting of the current running experiment, as shown in figure E-8.3.

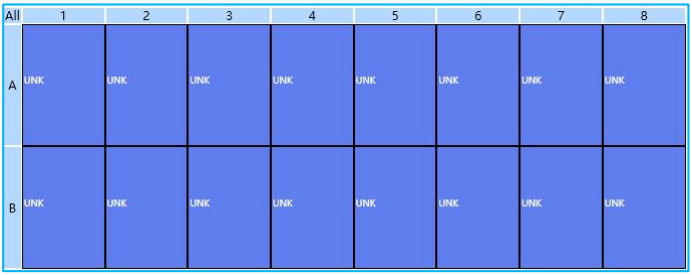


Figure E-8.3. Run Monitoring Interface - Sample Setting Function Module

► **Parameter Introduction**: It is the same as the parameters introduced in ***E-3.3.2 Sample Setting - Sample Setting Area***.

► **Function Key Introduction**: Users can select one or more sample wells in the sample setting function module to display the corresponding fluorescence curve and relevant data in the ***Real-time Fluorescence*** and ***Sample Info*** function modules.

4. Run Info: It displays the current instrument information and the real-time running status, such as the ***Stage***, ***Step***, ***Cycle*** and ***Remaining Time*** of the current experiment, as shown in figure E-8.4.

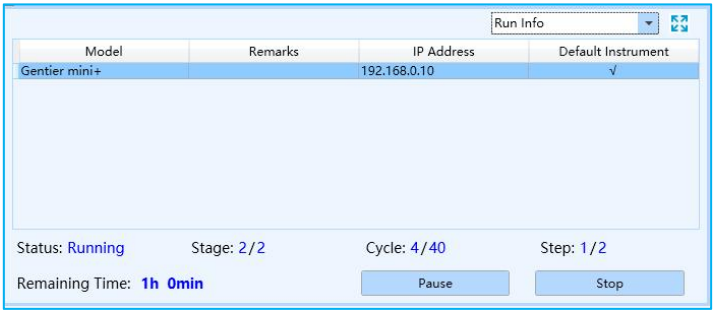


Figure E-8.4 Run Monitoring Interface - Run Info Function Module

► **Instrument List:** The information of connected and running instruments are listed.

► **Function Key Introduction**:

- User can click ***< Run >*** key to run the current experiment.
- User can click ***< Pause >*** key to pause the current experiment.
- User can click ***< Stop >*** key to stop the current experiment.

5. Sample Info: displays the detailed sample information of the current running experiment, as shown in figure E-8.5.

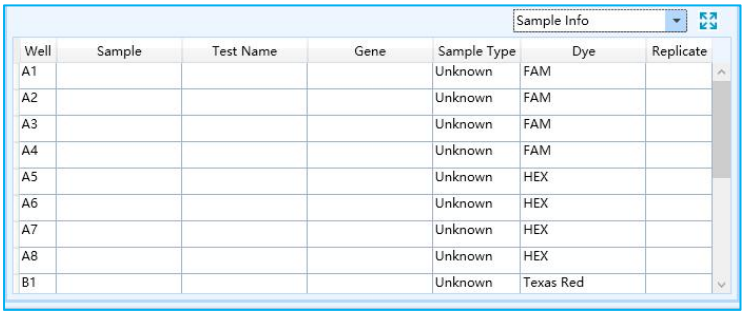


Figure E-8.5. Run Monitoring Interface - Sample Info Function Module

6. **Heat Map**: It displays the real-time fluorescence heat map of current running experiment, as shown in figure E-8.6.

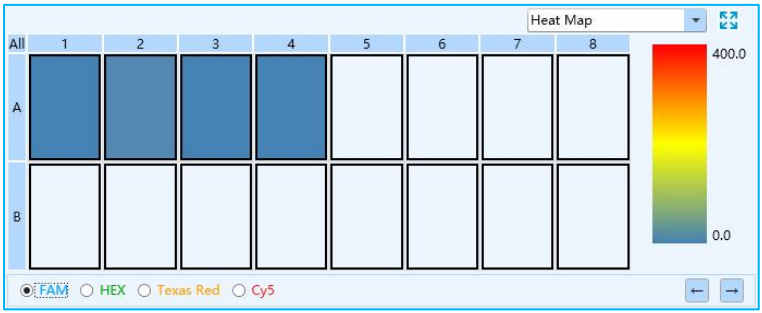


Figure E-8.6. Run Monitoring Interface - Heat Map Function Module

E-3.3.4 Analysis

After experiment completed, users can click the ***Analysis*** tab to enter the analysis interface. According to the experiment settings and requirements, user shall first select the suitable data analysis method for the current experiment.

The application software provides users with six analysis methods: ***Abs Quant***, ***Rel Quant***, ***Melting Curve***, ***High Resolution Melting***, ***Genotyping*** and ***End Point Fluorescence***. After entering the interface, the application software will automatically perform the Abs Quant, analyze the melting curve and display the result. If a new analyzing method is needed, users can click **<** ***New Analysis*** **>** icon in the Tool Bar, the application software will pop up the new analysis window, as shown in figure E-9.

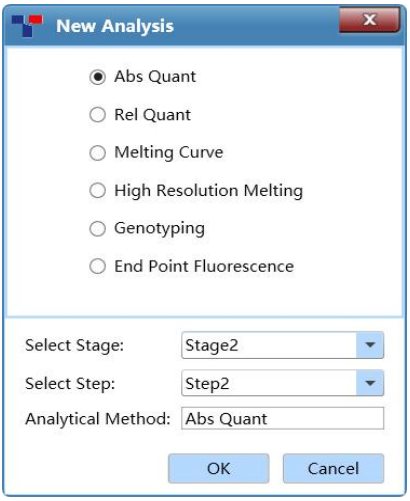


Figure E-9. New Analysis Window

- ***Select Stage***: User can choose the stages that need to be analyzed.
- ***Select Step***: User can choose the step that need to be analyzed.
- ***Analysis Method***: shows the current analysis method for the current step/stage.
- User can choose the relevant data analysis method and click ***< OK >*** to confirm.

► This section will take ***Abs Quant*** analysis method as an example to introduce the analysis interface in details.

E-3.3.4.1 Abs Quant Analysis Interface

The absolute quantification experiment is intended to quantify the nucleic acid concentration of samples. Samples with unknown initial nucleic acid quantities are amplified as well as a dilution series of gene-specific standard samples with known concentrations. The measured Ct values of the standard samples are plotted against their known concentrations to obtain a regression line named standard curve. The initial nucleic acid quantities of the samples can be obtained by plotting their Ct values on the standard curve.

The relative quantification analysis interface consists of seven functional modules: ***Amplification Curve***, ***Standard Curve***, ***Sample Setting***, ***Result Table***, ***Raw Curve***, ***Raw Fluorescence*** and ***Heat Map***. The relative quantification analysis interface is divided into four areas. When users enter the analysis interface, the application software displays four functional modules (***Amplification Curve, Standard Curve, Sample Setting, Result Table)*** by default, as shown in figure E-10.

Reminding:

- **Function Module Change**: User can select the function module displayed on the analysis interface from the drop-down list on the top right corner of each area.
- **Full-screen Display:** User can click the **<** ***Full Screen >*** icon on the top right corner of each area to display the current function module in full screen.

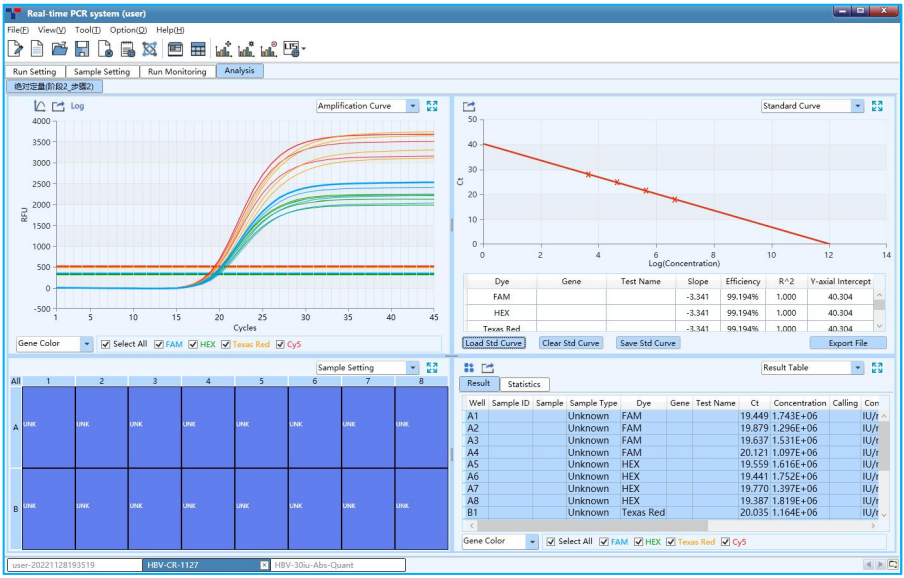


Figure E-10. Absolute Quantification Analysis Interface

Interface Introduction and Parameter Description

I. **Amplification Curve**: displays the diagram of fluorescence intensity RFU (Y-axis) against cycle number (X-axis) of the current experiment, as shown in figure E-10.1. The dotted line parallel to the X-axis is the threshold value of the amplification curve.

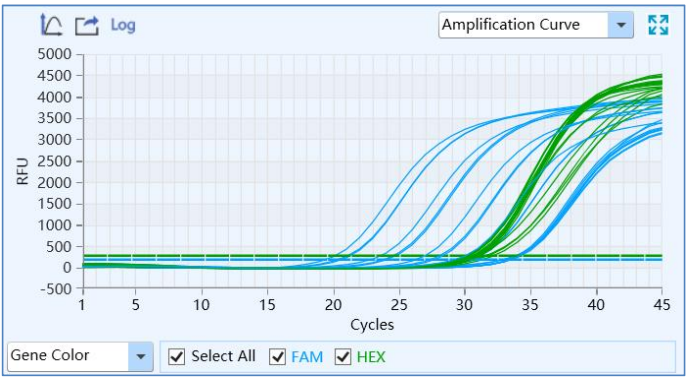


Figure E-10.1 Abs Quant Analysis Interface - Amplification Curve Functional Module

► **Function key introduction**:

- **<**  ***Y-axis Coordinate Adjustment*** **>**: Its functions and operations are the same as ***E-3.3.3 Run Monitoring - 1. Real-time Fluorescence***.
- **<**  ***Export*** **>**: User can click **<**  ***Export*** **>** icon to export the current amplification curve diagram.
- **<**  ***Log View*** **>**: User can click **<**  ***Log View*** **>** icon to view the log image of the amplification curve diagram.

► **<**  ***Display*** **Mode >**: Users can click the <  > drop-down button to select fluorescence display modes. Options include: ***Dye Color, Well Color, Sample Color*** and ***Gene Color.*** The interface displays ***Dye Color*** by default.

- ***Dye Color & Well Color***: It is the same as the description in ***E-3.3.3 Run Monitoring - 1. Real-time Fluorescence***.
- ***Sample Color & Gene Color***: If users set the ***Sample*** and **Gene** in ***Sample Setting***, the amplification curve can be displayed respectively in colors of ***Sample*** and ***Gene.***

Reminding: User can hover the mouse over a certain amplification curve, the curve will be highlighted and its corresponding channel and well coordinate will be displayed on the right of cursor.

II. Sample Setting: It displays the well setting of the current experiment, as shown in figure E-10.2. When one or more wells are selected in the sample setting area, the ***Amplification Curve***, ***Result Table***, ***Raw Curve*** and ***Raw Fluorescence*** will display the real-time fluorescence curves and analysis data of sample detection results correspondingly.

Reminding: The well selecting methods are the same as ***E-3.3.2 Sample Setting - 1. Sample Setting Area***.

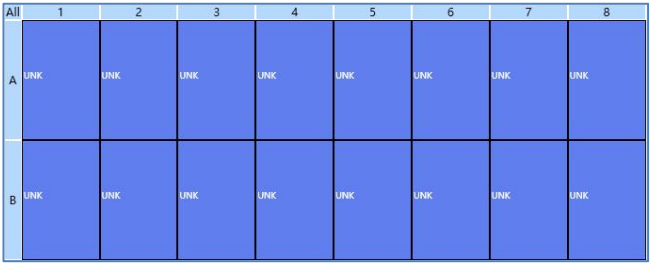


Figure E-10.2 Abs Quant Analysis Interface - Sample Setting Functional Module

III. Standard Curve: It displays the linear relationship between log concentration (X-axis) of samples and measured CT value (Y-axis), as shown in figure E-10.3. For absolute quantification, the standard curve is used to assign initial nucleic acid quantities to samples.

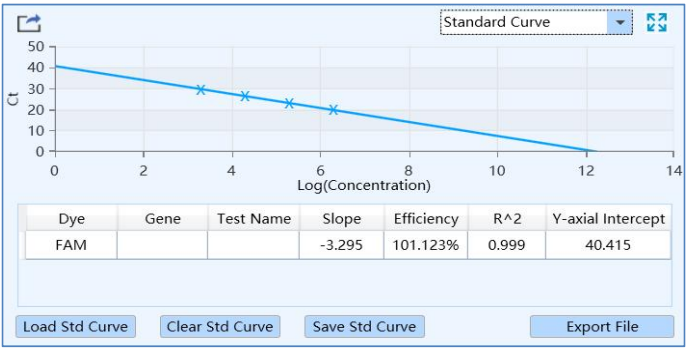


Figure E-10.3 Abs Quant Analysis Interface - Standard Curve Functional Module

► **Parameter Introduction**:

- ***Dye***: It displays the relevant dye of standard curve.
- ***Target Gene***: It displays the target gene of standard curve.
- ***Slope***: It displays the slope of standard curve.
- ***Efficiency***: It displays the amplification efficiency of standard curve.
- ***R^2***: It displays the linear regression coefficient square value of standard curve.
- ***Y-axis intercept***: It displays the Y-axis intercept of standard curve.

► ***< Load Std Curve >***: Click ***< Load Std Curve >*** and the application software will pop up the standard curve window, which consists of three parts ***Import Standard Curve***, ***Select Standard Curve*** and ***Standard Curve Preview***, as shown in figure E-10.3a.

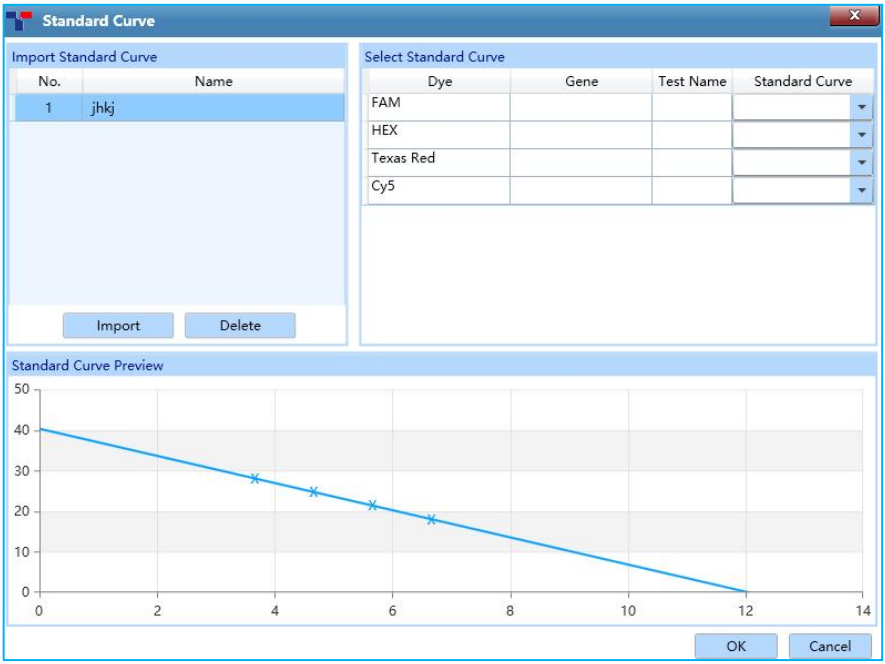


Figure E-10.3a. Abs Quant Analysis Interface - Standard Curve Window

- ***Import Standard Curve***: Users can click ***< Import >*** key and select a saved standard curve file, then import it to the standard curve list. The corresponding standard curve diagram will be displayed in the ***Standard Curve Preview*** area below.
- ***Select Standard Curve***: Users can call one or more standard curves from the selected standard curve file according to the current experiment requirements. Please select a standard curve which corresponds to the current experiment setting from the ***Standard Curve*** drop-down list, and click ***< OK >*** at the bottom of Standard Curve window to load the selected standard curve(s) to the current experiment.
- ***Standard Curve Preview***: It displays the preview of selected standard curve(s) to be loaded.

► ***< Clear Std* Curve >**: Users can click ***< Clear Std Curve >*** to clear the standard curves displayed on the Standard Curve functional module.

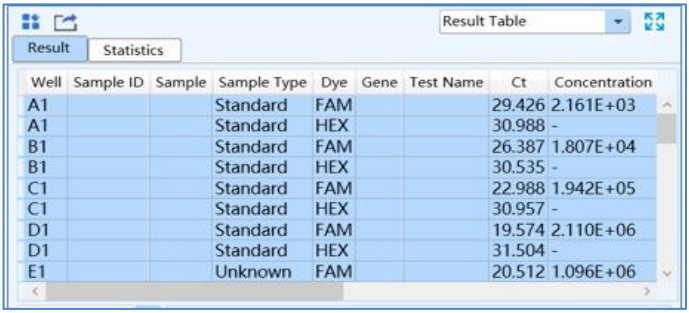
► ***< Save* Std *Curve >***: Users can click ***< Save Std Curve >*** and enter a name in the enter name dialog box for the standard curve file to save; click ***< OK >*** to confirm, as shown in figure E-10.3b.

Figure E-10.3b Abs Quant Analysis Interface - Enter Name Dialog Box

- ***< Export File >***: Users can click ***< Export File >*** to export the current standard curve file to a designated save path.
- ***<***  ***Export Diagram >***: Users can click ***<***  ***Export >*** icon to export the current standard curve diagram.

IV. Result Table: It displays the sample details and result data of the current experiment. The result table functional module consists of ***Result*** and ***Statistics*** sub-tabs, as shown in figure E-10.4a.

► ***Result sub-tab***: It displays the sample details and results of the current experiment.

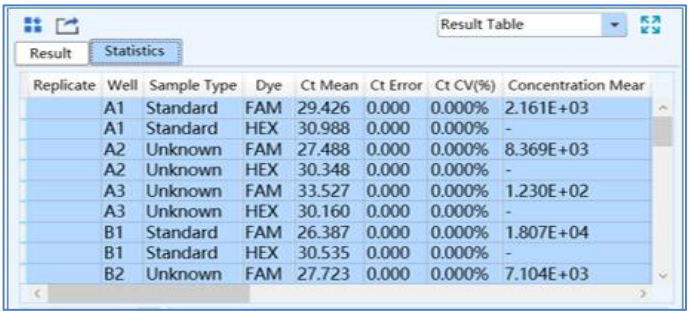


Well	Sample ID	Sample	Sample Type	Dye	Gene	Test Name	Ct	Concentration
A1			Standard	FAM			29.426	2.161E+03
A1			Standard	HEX			30.988	-
B1			Standard	FAM			26.387	1.807E+04
B1			Standard	HEX			30.535	-
C1			Standard	FAM			22.988	1.942E+05
C1			Standard	HEX			30.957	-
D1			Standard	FAM			19.574	2.110E+06
D1			Standard	HEX			31.504	-
E1			Unknown	FAM			20.512	1.096E+06

Figure E-10.4a Result Table Functional Module – Result Sub-tab

- User can double click the title of each column to sort all sample results according to the content in this column.
- User can click the title of each column and drag the column to the left or right to adjust the sequence of sample results.

► ***Statistics sub-tab***: Users can click ***Statistics*** sub-tab to view the statistical results of the current experiment, as shown in figure E-10.4b.



Replicate	Well	Sample Type	Dye	Ct Mean	Ct Error	Ct CV(%)	Concentration Mear
	A1	Standard	FAM	29.426	0.000	0.000%	2.161E+03
	A1	Standard	HEX	30.988	0.000	0.000%	-
	A2	Unknown	FAM	27.488	0.000	0.000%	8.369E+03
	A2	Unknown	HEX	30.348	0.000	0.000%	-
	A3	Unknown	FAM	33.527	0.000	0.000%	1.230E+02
	A3	Unknown	HEX	30.160	0.000	0.000%	-
	B1	Standard	FAM	26.387	0.000	0.000%	1.807E+04
	B1	Standard	HEX	30.535	0.000	0.000%	-
	B2	Unknown	FAM	27.723	0.000	0.000%	7.104E+03

Figure E-10.4b Result Table Functional Module– Statistics Sub-tab

- **<** ***Table Management*** **>**: Users can click **<** ***Table Management*** **>** and decide to ***Display*** or ***Hide*** the corresponding content(s) in the result table by checking its/their check box(s), as shown in figure E-10.4c.

- **<**  ***Export >***: Users can click this icon to save the current result data to a specified path.

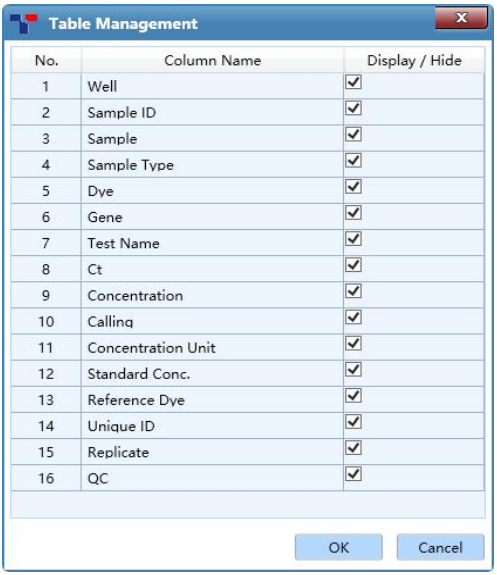


Figure E-10.4c Result Table Functional Module – Table Management

V. Raw Curve: It displays the diagram of raw amplification curve without subtract baseline, as shown in figure E-10.5. The parameters and function keys of raw curve functional module are the same as those of amplification curve functional module.

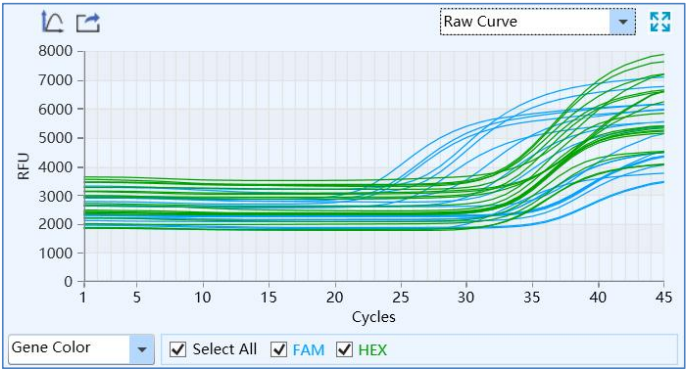


Figure E-10.5 Abs Quant Analysis Interface - Raw Curve Functional Module

VI. Raw Fluorescence: It displays the raw fluorescence data map of the current experiment, as shown in figure E-10.6.

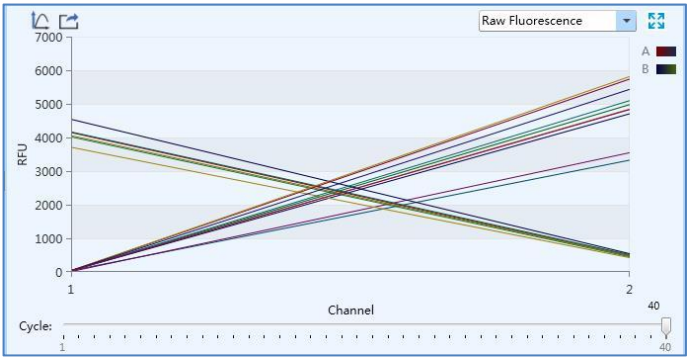


Figure E-10.6 Abs Quant Analysis Interface - Raw Fluorescence Functional Module

► **Function key introduction**:

- User can slide the ***Cycle*** slider at the bottom of raw fluorescence functional module to view the raw fluorescence value of different wells at different cycles.
- **<** ***Y-axis Coordinate Adjustment*** **>** and **<** ***Export*** **>** keys are the same as those of amplification curve functional module.

VII. Heat Map: It displays the ***Ct***, ***Concentration***, ***Fluorescence*** heat map and QC diagram of the current experiment, as shown in figure E-10.7.

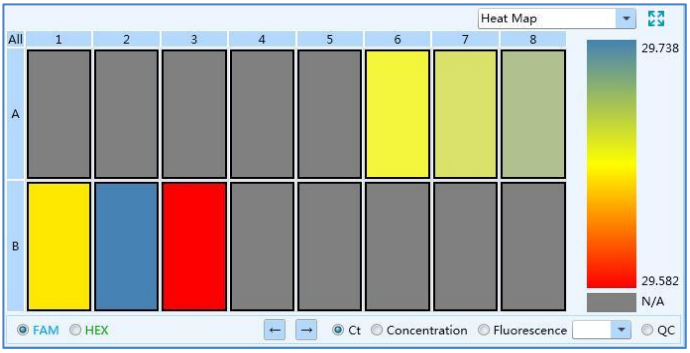


Figure E-10.7 Abs Quant Analysis Interface – Heat Map Functional Module

- ***Ct***: Users can check ***Ct*** option and click any dye to view the relevant Ct heat map.
- ***Concentration***: Users can select ***Concentration*** option and click any dye to view the relevant concentration heat map.
- ***Fluorescence***: Users can select ***Fluorescence*** option and select the cycle number from drop- down list; then click any dye to view the relevant fluorescence heat map at certain cycle.
- ***QC***: Users can select ***QC*** option. If a certain sample or reference conforms to the QC failure condition set on the ***Sample Setting*** interface, the relevant sample well will be displayed as ***N/A*** on QC diagram.

E-3.3.4.2 Abs Quant Analysis Setting

User can click the **<** ***Analysis Setting*** **>** icon in the Tool Bar and the application software will pop up the analysis setting window, which is composed of two tabs: ***Amplification Plot*** and ***Gene and Sample***. User can set corresponding parameters for the current experimental data analysis method in the analysis setting window.

1. ***Amplification Plot*** tab: Users can set the ***Analysis Mode*** and ***Analysis Method*** of the current experiment in the ***Amplification Plot*** interface, as shown in figure E-11.1.

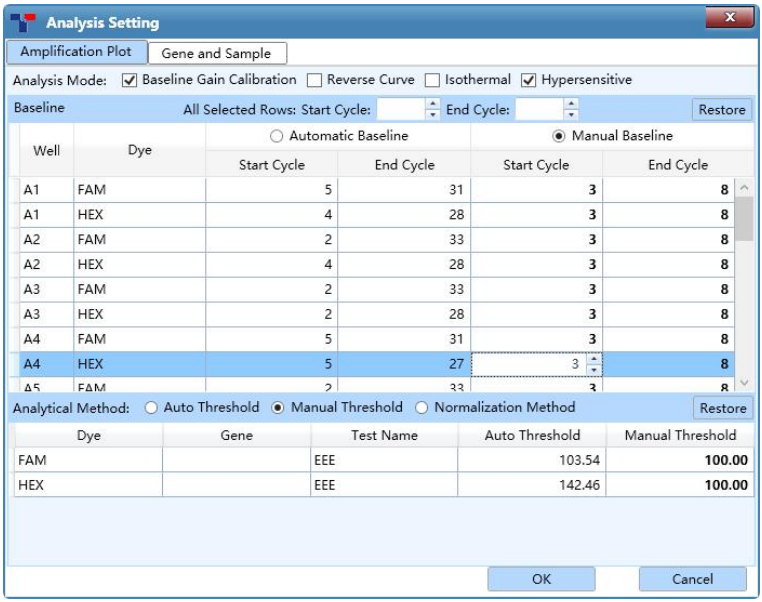


Figure E-11.1 Abs Quant Analysis Setting Interface - Amplification Plot Tab

► ***Analysis Mode***: It consists of 4 modes: ***Baseline Gain Calibration***, ***Reverse Curve***, ***Isothermal*** and ***Hypersensitive.*** Users can check one or more analysis mode check boxes according to the experiment requirements.

- ***Baseline Gain Calibration***: The application software selects the ***Baseline Gain Calibration*** analysis mode by default, which provides users with ***Automatic Baseline*** and ***Manual Baseline*** two baseline setting methods.
- ***Reverse Curve***: Users can check ***Reverse Curve*** analysis mode to analyze the amplification curves of some special detection reagents.
- ***Isothermal***: Users can check the ***Isothermal*** analysis mode to analyze the isothermal amplification experimental data.
- ***Hypersensitive***: For amplification experiments with high sensitivity requirements, users can check the ***Hypersensitive*** analysis mode for experiment data analysis.

► ***Baseline:*** When users select ***Baseline Gain Calibration*** and ***Hypersensitive*** analysis mode, the application software provides two baseline setting methods: ***Automatic Baseline*** and ***Manual Baseline.***

- ***Automatic Baseline:*** The application software automatically sets the baseline for amplification curve, and the ***Start Cycle*** and ***End Cycle*** of the automatic baseline setting are displayed in the columns of the ***Baseline*** list.
- ***Manual Baseline:*** After clicking the ***Manual Baseline*** option, users can select one well in the ***Baseline*** list, and use  and  keys to manually set the ***Start Cycle*** and ***End Cycle*** of the baseline setting for this sample, or choose multiple wells and set the ***Start Cycle*** and ***End Cycle*** for ***All Selected Rows*** on top of ***Baseline*** list.
- Users can click ***< Restore >*** on the top right corner of ***Baseline*** list to restore the ***Start Cycle*** and ***End Cycle*** of the automatic baseline setting.

► ***Analytical Method***: The application software provides users with three Ct value analytical methods: ***Auto Threshold***, ***Manual Threshold*** and ***Normalization Method***.

- Click ***Auto Threshold*** option and the application software will automatically set and show the threshold value for all dyes in its column.
- Click ***Manual Threshold*** option, select one fluorescence and use  and  keys to set the manual threshold value in its column.
- User can click ***< Restore >*** on the top right corner of threshold list to restore the ***Auto Threshold*** settings.
- User can click ***Normalization Method*** option and the application software will automatically calculate the Ct value according to the normalization value of amplification curve.

2. ***Gene and Sample*** tab: Users can set the dye, gene and sample required for the analysis of the current experiment in the gene and sample interface, as shown in figure E-11.2.

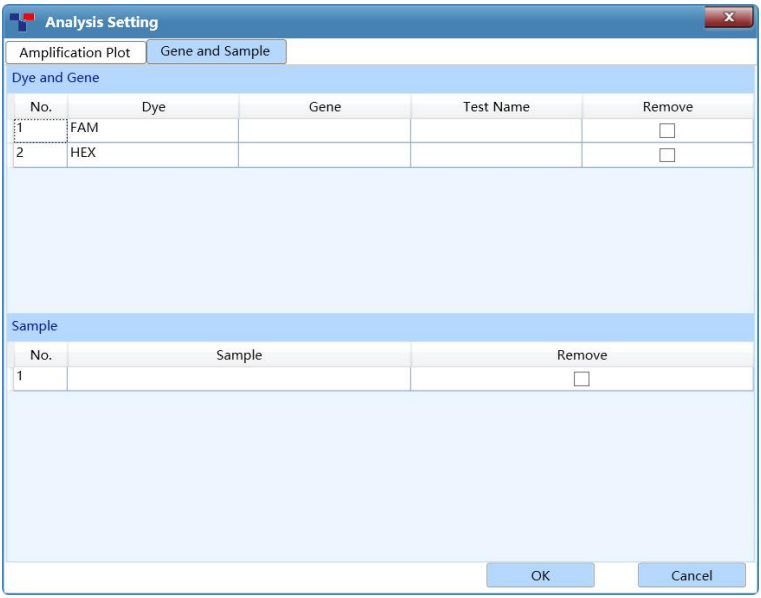


Figure E-11.2 Abs Quant Analysis Setting Interface – Gene and Sample Tab

► ***Dye and Gene***: It displays the name of target gene and its marking dye.

- User can check a certain check box in the ***Remove*** column and click ***< OK >*** to remove the experiment data of the selected target gene and its marking dye.
- Click ***< Cancel >*** to cancel operation and return to the absolute quantification analysis interface.

► ***Sample***: It displays all the sample name of sample setting.

- User can check a certain check box in the ***Remove*** column and click ***< OK >*** to remove the experiment data of the selected sample name.
- Click ***< Cancel >*** to cancel operation and return to the absolute quantification analysis interface.

E-3.4 Instrument Information Area

Please see details in ***E-3.1.2 Menu Bar- View(V)-Submenu- 3. Show Instrument Information.***

F. Advanced Mode - Instrument Software Operation

This chapter introduces the functions of Gentier Instrument software: ***Experiment File, Run Setting, Run Monitoring, Result Analysis and General Setting.***

F-1. Main Interface

After the instrument switched on and automatically conducting self-inspection, the touch screen will display the main interface of advanced mode, which is consisted of status bar, operation area and main function keys, as shown in figure F-1.

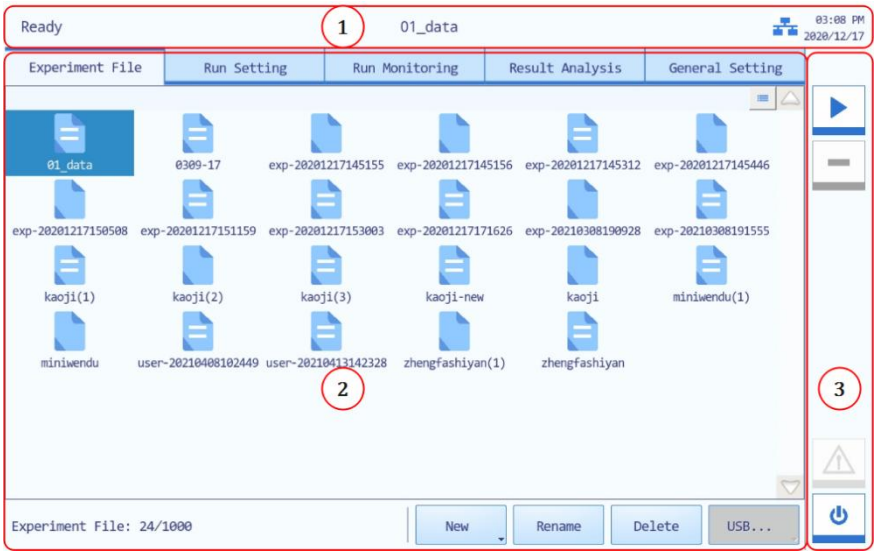


Figure F-1. Instrument Software Main Interface

Interface Introduction & Parameter Descriptions

1. **Status Bar**: It displays the system status, current file name, instrument status and system time.

► **System Status**: It displays the current instrument system status in the form of text on the left of the status bar.

- **Initializing**: The instrument system is in the process of initialization.
- **Ready**: The instrument system initialization is completed and ready for running.
- **Running**: The experiment is running.
- **Pause**: The current running experiment is paused.

► **File Name**: It displays the current experiment file name and its file path in the middle of the status bar.

► **Instrument Status**: It displays the current instrument status on the right of the status bar.

- <  **Disconnected >**: The instrument is not connected to the network.
- <  **Connected >**: The instrument is connected to the network.
- <  **USB >**: The instrument is connected with USB device.
- <  **Hot Lid Used>**: The hot lid heating function is enabled.
- <  **Hot Lid Unused >**: The hot lid heating function is not enabled.
- <  **Top Lid Open>**: The top lid is open.
- <  **Error >**: The instrument hardware or software error has occurred; cannot execute any operation.

► **System Time**: displays the current system date and time.

2. **Operation Area**: It includes four tabs **Experiment File**, **Run Setting**, **Run Monitoring** and General **Setting**. For more operation details, please refer to ***F-2 Instrument Software Operation Area***.

3. **Main Function Keys:** It consists of five function keys and they can be activated according to the system status.

► <  **Run Experiment >**: Start running the current experiment. This function key is activated when the instrument system is under **Ready**, **Pause** or **Stop** status.

► <  **Pause Experiment >:** Pause the current running experiment. This function key is activated when the experiment is **Running**.

► <  **Stop Experiment >**: Stop the current running experiment. This function key is activated when the instrument system is under **Running** or **Pause** status.

► <  **Shutdown / Restart >**: Shutdown or restart the instrument. This function key is inactivated when the instrument system is under **Running** status.

► < /  / **Warning >**: gray icon is inactivated under normal system status, and the icon will turn yellow or red when a certain system error happened. Click this key to view the warning information.

- Yellow icon: The instrument can still execute the current operation.
-  Red icon: The instrument cannot execute the current operation.

F-2. Instrument Software Operation Area

The instrument software operation area includes four tabs: **Experiment File**, **Run Setting**, **Run Monitoring** and **General Setting**. Users can perform relevant operations and set the corresponding contents according to the specific experimental requirements.

► **Experiment File**: It displays experiment file icons and provides the relevant experiment file operations.

► **Run Setting**: It provides the experiment temperature and fluorescence setting operations.

► **Run Monitoring**: It provides the real-time running state of the experiment and display the real-time fluorescence and temperature data of the current running experiment.

- **Result Analysis**: It displays data and analysis of experiment files.
- **General Setting**: It provides general setting operations of the current instrument system.

F-2.1 Experiment File

The main interface of instrument software displays the experiment file tab by default. This tab is consisted of three parts: experiment file display area, experiment file information area and experiment file operation bar, as shown in figure F-2.1a.

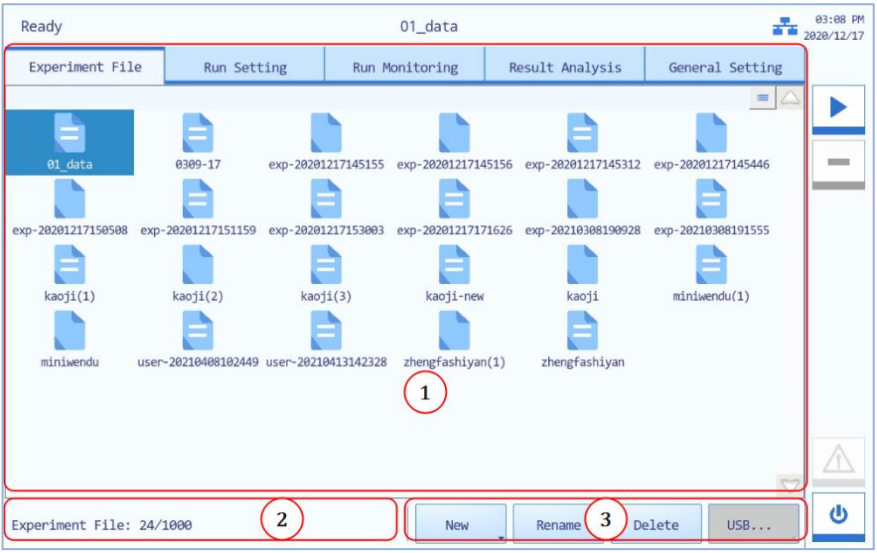


Figure F-2.1a. Instrument Software – Experiment File Interface

Interface Introduction & Parameter Descriptions

1. **Experiment File Display Area**: It displays the pre-existed experiment files in the instrument system.

► Users can slide the slider or press  and  icons to view all the experiment files in the experiment file display area.

► Users can press the  icon on the top left corner of the experiment file display area and it will turn into  icon, and the display mode of the experiment file display area will change from icons to file details list, as shown in figure F-2.1b.

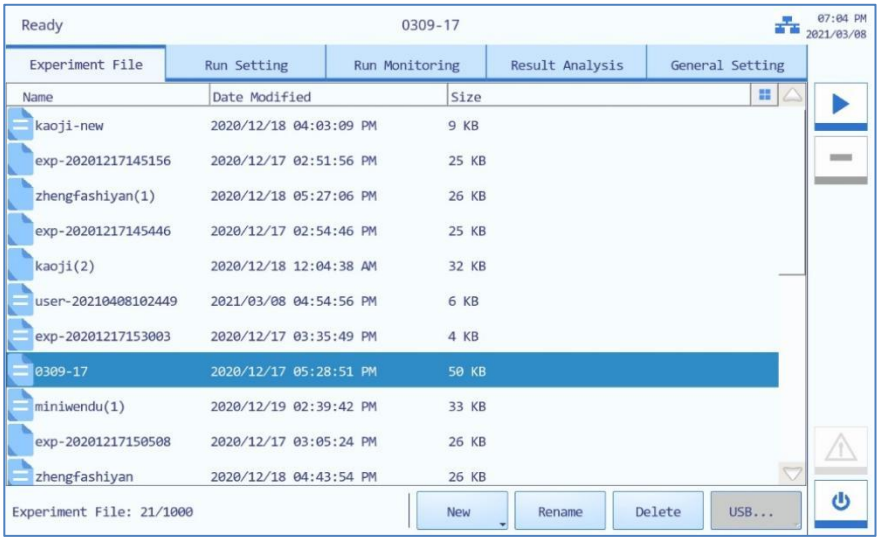


Figure F-2.1b Experiment File Tab - Experiment File Display Area

2. **Experiment File Information Area**: It displays the number of "pre-existed experiment files/ files that can be stored" in the instrument system.

3. **Experimental file operation bar**: It consists of four keys **< New >**, **< Rename >**, **< Delete >** and **< USB... >**.

► **< New >**: Create a new experiment file. Press the icon, there are two options in the drop-down list.

- **New Experiment**: Create a new experiment file.
- **New Experiment from Selected Experiment**: Press and select a pre-existed experiment file in the experiment file display area, and create a new experiment based on the selected experiment settings.

Reminding: The system will pop up a keyboard to name the new experiment file, as shown in figure F-2.1c. User can press **< Close >** to exit the keyboard.

Reminding: The instrument software will name the new experiment file with creation date and time by default.

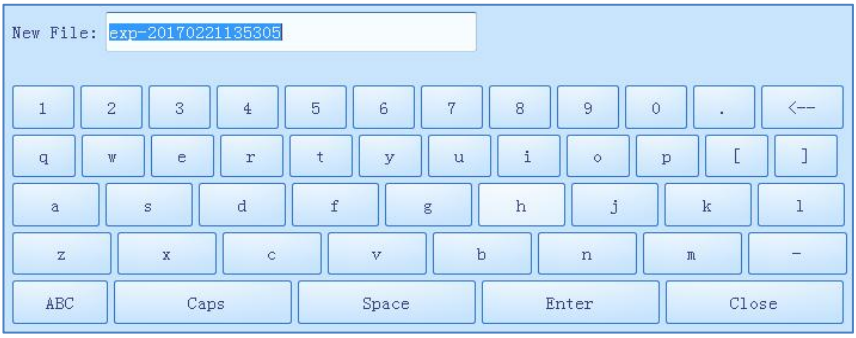


Figure F-2.1c Experiment File Tab – Keyboard

► **< Rename >**: Rename the selected experiment file. This key is inactivated when the instrument system is under **Running** status.

► **< Delete >**: Delete the selected experiment file. This key is inactivated when the instrument system is under **Running** status.

► **< USB… > :** Execute file transmission between the instrument and USB device. Press the icon, and there are two options in the drop-down list.

- **Export Experiment**: Export the selected experiment file from the instrument system to the USB device.
- **Import Experiment**: Import the selected experiment file from the USB device to the instrument system.

Reminding: When there are more than one USB devices connected to the current instrument, the instrument software will pop up USB device list for users to perform **Export Experiment / Import Experiment**.

F-2.2 Run Setting

The run setting tab consists of **Temperature Setting** and **Fluorescence Setting**. Users can set temperature, cycle, reaction volume, lid heating and fluorescence of a new experiment, or view and edit the experimental settings of a selected experiment.

Reminding: The system will automatically enter the run setting interface after a new experiment file creation.

F-2.2.1 Temperature Setting

F-2.2.1.1 Temperature Setting Sub-Tab

The ***Temperature Setting*** sub-tab is selected on the run setting interface by default, as shown in figure F-2.2a. Users can edit and view the relevant experiment settings and temperature program in the **Temperature Setting** sub-tab.

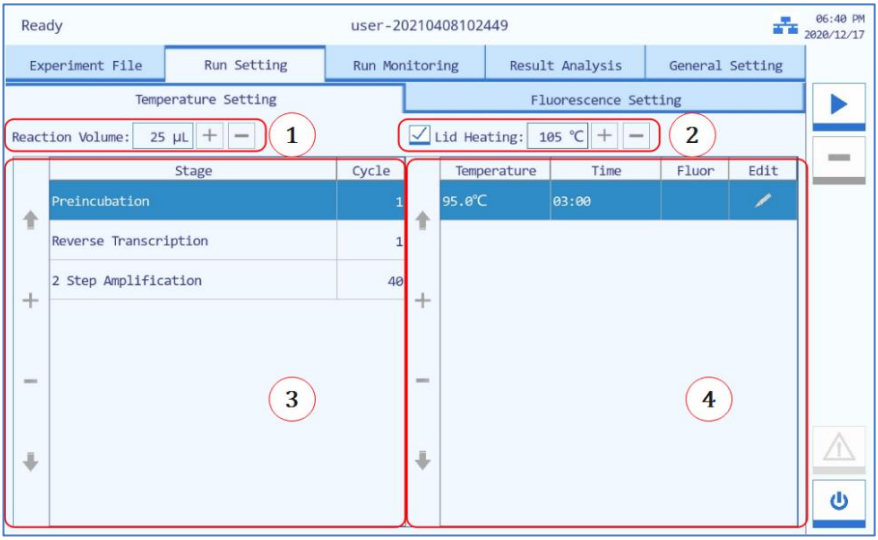


Figure F-2.2a Experiment File Tab – Temperature Setting Sub-tab

Temperature Setting sub-tab consists of four function areas: **Reaction Volume**, **Lid Heating**, **Stage Setting Box** and **Step Setting Box**.

Reminding: Users need to create stages and steps for a new experiment by pressing function keys.

1. **Reaction Volume**: User can manually input numbers or press [+] or [−] icons to set the reaction volume.

Reminding: The reaction volume setting range is 0μL~100μL.

2. **Lid Heating**: Users can press the **Lid Heating** check box to decide whether to utilize the hot lid heating function, and press [+] or [−] icons to edit the hot lid temperature.

Reminding: The hot lid temperature setting range is 40°C ~110°C.

3. **Stage Setting Box**: It consists of two parts: ***stage list*** and ***function keys***.

► **Stage List**: It displays the stage types and cycle numbers of the temperature program.

► **Function Keys**: It consists of four function keys. See ***F-2.2.1.2 Temperature Setting Steps*** for more details.

- **< Up >**: Move up the selected stage.
- **< Add >**: Add a new stage.
- **< Delete >**: Delete the selected stage.
- **< Down >**: Move down the selected stage.

4. **Step Setting Box:** It consists of two parts: ***Step List*** and ***Function Keys***.

► **Step List**: After users select a stage, the step list will display relevant steps, settings of each step including temperature, time and fluorescence and a function key **< Edit >** to edit step settings.

- **Temperature**: It displays the target temperature of the current step.
- **Time**: It displays the temperature holding time of the current step.
- **Fluor**: It displays whether to read the fluorescence at the current temperature step. The icon of means reading fluorescence while empty icon means not readings.
- **Edit**: Press icon in **Edit** column to edit the corresponding step.

► **Function Keys**: It consists of four function keys. See ***F-2.2.1.2 Temperature Setting Steps*** for more details.

- **< Up >**: Move up the selected step.
- **< Add >**: Add a new step.
- **< Delete >**: Delete the selected step.
- **< Down >**: Move down the selected step.

Reminding: Function keys are gray when users view a completed experiment.

F-2.2.1.2 Temperature Setting Steps

Step 1: **Add Stage**

Users can press **< Add >** in the stage setting box and the instrument software will pop up a stage type selection window, as shown in figure F-2.2. b.

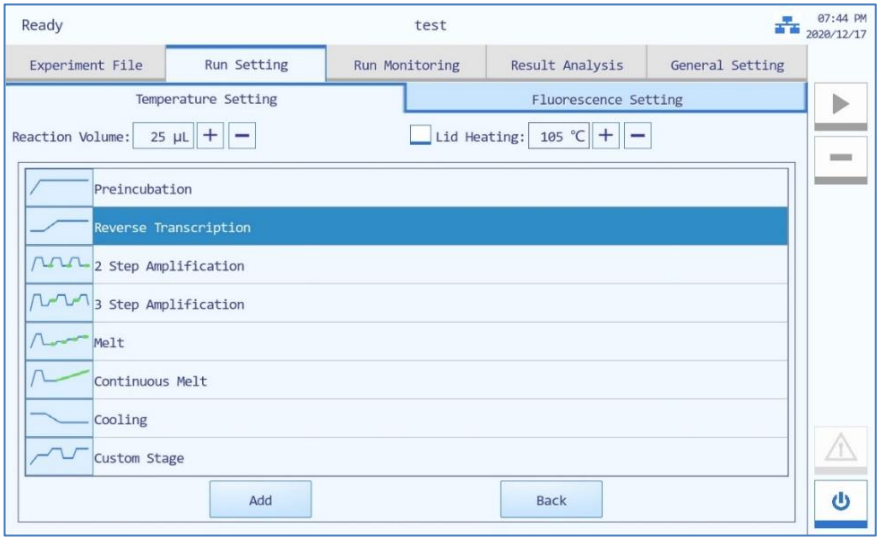


Figure F-2.2.b Temperature Setting Sub-tab - Stage Type Selection Window

- Seven predefined stage types are provided by the instrument software for users: **Preincubation**, **Reverse Transcription**, **2 Step Amplification**, **3 Step Amplification**, **Melting**, **Continuous Melting** and **Cooling**. User can also press **Custom Stage** to define the stage setting according to specific experiment requirements.
- User can press **< Add >** to add the selected stage to stage setting box.
- User can press **< Back >** to return back to the run setting interface.

Reminding: At least one stage should be included in the temperature program.

Step 2: **Edit Stage**

Users can edit the selected stage in the stage setting box according to the experiment requirements.

- The added stage will be automatically displayed in the stage setting box and users can select any stage to delete or change its sequence.
- Users can select a certain stage and press its cycle number in the corresponding **Cycle** column, and the cycle edit box will pop up.
- User can set the cycle number in the cycle edit box, press **< OK >** to confirm the cycle setting or press **< Cancel >** to cancel the setting.

Reminding: The cycle setting range is 1~99.

Step 3: **Select Stage**

- Select a stage in the stage setting box and the step setting box on the right will display the corresponding steps of the selected stage.
- User can add a new step or select a step to delete or change its order.

Reminding: At least one step should be included in one stage.

Step 4: Fluorescence Reading Step Settings

- In the step setting box, users can press the **Fluor** column of a certain step to set whether to read its fluorescence. Press the **Fluor** column of a certain step and the  icon will be displayed; press the  icon and it will disappear in the **Fluor** column.

Reminding: Users can set only one fluorescence reading step in one stage.

Step 5: **Edit Step**

Users can select a certain step in the step setting box, and press the  icon in the corresponding **Edit** column; the instrument software will pop up the step edit window, which consists of two areas: ***Step Mode*** and ***Temperature Parameters***.

► ***Step Mode***: Three **Step Mode** options are provided by the instrument software: **Standard**, **Touchdown** and **Long**. Users can select a certain step mode option by pressing the icon in front of it, and the icon will turn blue, as shown in figure F-2.2.c.

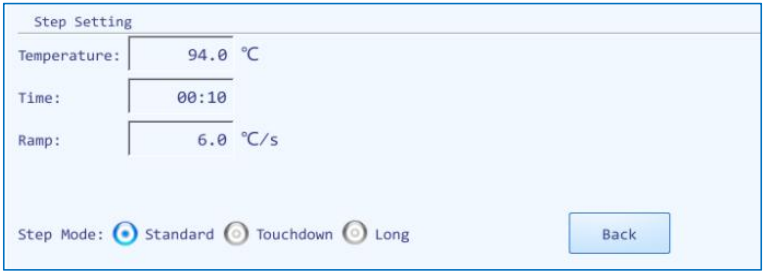


Figure F-2.2.c Temperature Setting Sub-tab - Step Edit Window - Standard Step

1) ***Standard Mode***: The **Standard** step mode option is selected by default.

► User can press the input boxes of **Temperature**, **Time** and **Ramp** to edit the corresponding parameters for the current standard step, as shown in figure F-2.2.c.

Reminding: The temperature setting range is 0.0°C ~100.0°C.

Reminding: The time setting range is 1s~60min.

Reminding: The ramp setting range is 0.1°C/s~4.2°C/s.

2) ***Touchdown Mode***: If the **Touchdown** step mode option is selected, the step edit window will be shown as figure F-2.2.d.

► The touchdown step mode allows the temperature program to change the annealing step temperature from the initial temperature to the target temperature as the cycling proceeds.

► User can press the input boxes of **Initial Temp.**, **Target Temp.**, **Delta Temp.** and **Start Cycle** to edit the corresponding parameters for the current touchdown step.

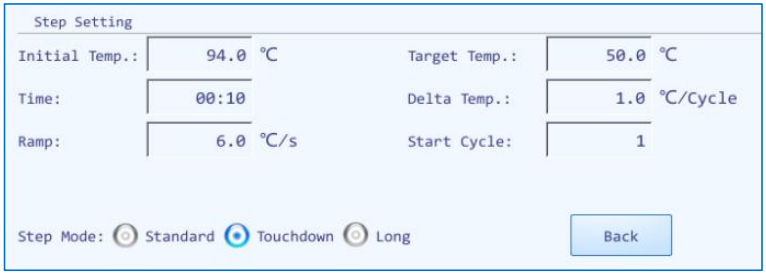


Figure F-2.2.d. Temperature Setting Sub-tab - Step Edit Window - Touchdown

Reminding: The initial and target temperature setting range is 35.0°C ~100.0°C.

Reminding: The delta temperature setting range is 0.1°C ~4.2°C.

Reminding: The start cycle range is 1~ 40 of the current stage.

3) ***Long Step Mode***: If the **Long** step mode option is selected, the step edit window will be shown as F-2.2.e.

► The long step mode allows the temperature program to change the elongation step temperature holding time from the initial time to the target time as the cycling proceeds.

► User can press the input boxes of **Initial Time**, **Target Time**, **Delta Time** and **Start Cycle** to edit the corresponding parameters for the current long step.

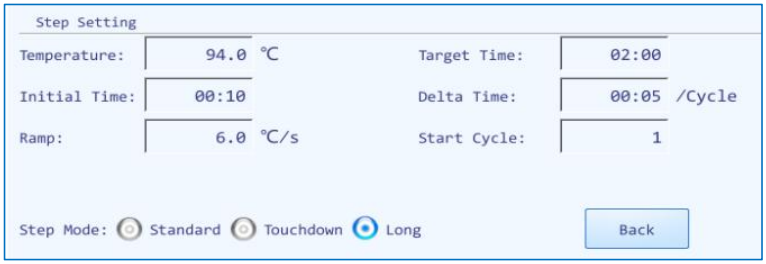


Figure F-2.2.e Step Edit Window - Long

4) ***Step Setting of Melting Stage:*** Melting stage has three steps by default. The editing of the first two steps is the same as those of the standard step mode. If the current step is the last step of a melting stage, the step setting window is as shown in figure F-2.2.f.

Figure F-2.2.f Step Edit Window - Melting Step Mode

► The melting stage allows the instrument system to read fluorescence signals after each temperature increment. Users can edit parameters by pressing the input boxes of ***Temperature***, ***Increment*** and ***Time***. The ***Increment*** setting range is 0.1℃ ~5.0℃.

5) ***Step Setting of Continuous Melting Stage:*** Continuous melting stage has four steps by default. The editing of the first three steps is the same as those of the standard step mode. If the current step is the last step of a continuous melting stage, the step setting window is as shown in figure F-2.2.g.

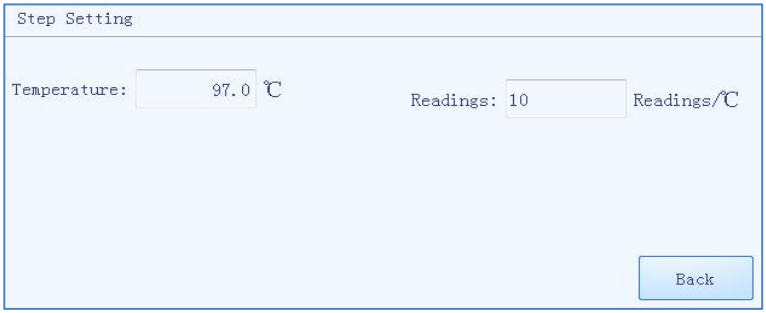


Figure F-2.2.g Step Edit Window - Continuous Melting Step Mode

► Continuous melting stage allows the instrument system to read fluorescence more frequently. Users can set parameters by pressing the input boxes of ***Temperature*** and ***Readings.*** The reading frequency setting range is 2readings/°C - 10readings/°C.

Step 6: **Back to Temperature Setting Sub-tab**

► After completing all step settings, press **<Back>** and return to Temperature Setting sub-tab.

F-2.2.2 Fluorescence Setting

The Fluorescence Setting sub-tab on the run setting interface is as shown in figure F-2.3. Users can set the fluorescence channel and dyes for the current experiment in the *Fluorescence Setting* sub-tab.

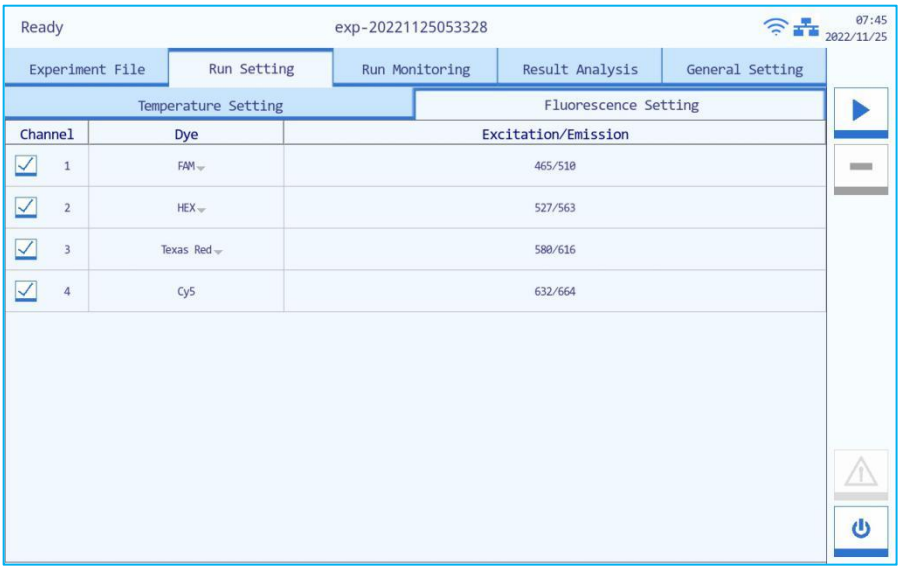


Figure F-2.3. Run Setting Interface - Fluorescence Setting Sub-tab

- User can check the corresponding check box in the Channel column to set the fluorescence channel for the current experiment.
- Users can press the corresponding icon in the Dye column and select the proper dye in the drop-down list.
- User can view the excitation and emission wave length of the corresponding channel in the Excitation/Emission column.

► Please press < ***Run Experiment***> to run the current experiment.

F-2.3 Run Monitoring

After starting running the experiment, the system will enter the run monitoring interface, which is consisted of three parts: **Run Status Bar**, **Run Monitoring Option Bar** and **Run Monitoring Diagram**, as shown in figure F-3.

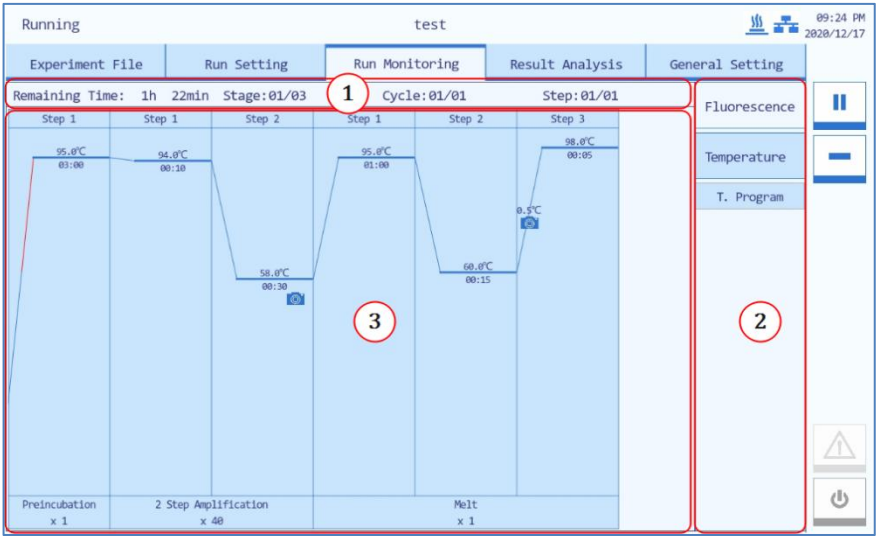


Figure F-3. System Software – Run Monitoring Interface

1. **Run Status Bar**: It displays the real-time running status of the current experiment, including **Remaining Time**, **Stage**, **Cycle** and **Step**.
2. **Run Monitoring Option Bar**: Users can select **Fluorescence** or **Temperature** option in the run monitoring option bar to monitor the corresponding content of the current experiment.

► User can press the **Fluorescence** option to monitor the real-time amplification curve, melting curve and fluorescence heat map of the current experiment.

► User can press the **Temperature** option to monitor real-time temperature program of the current experiment.

3. **Run Monitoring Diagram**: It includes ***Temperature*** and ***Fluorescence***.

► ***Temperature***: The default interface of ***Run Monitoring*** tab. It displays the ***T. Program*** and running process, as shown in figure F-3. The flashing dark blue pattern represents the running step.

► ***Fluorescence***: Users can press << or >> keys below the run monitoring diagram to choose the monitor content: real-time **Amplification** curve**, Melting** curve or fluorescence **Heat Map** of the current experiment.

a. **Amplification**: The run monitoring diagram will display the real-time **Amplification** curve of the current experiment by default, as shown in figure F-3.1.

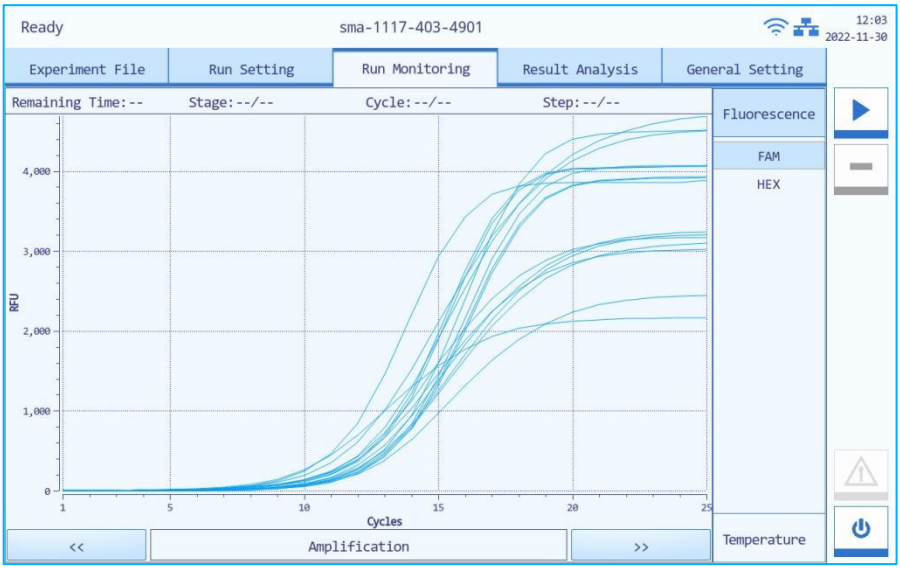


Figure F-3.1 Run Monitoring Diagram - Real-time Amplification Curve

- X axis represents the cycle number.
- Y axis represents the Relative Fluorescence Unit (RFU).

- User can press any dye under the **Fluorescence** option in the run monitoring option bar, and the run monitoring diagram will only display the corresponding real-time amplification curve.

b. ***Melting***: Users can press << or >> keys below the run monitoring diagram to monitor the real-time **Melting** curve of the current experiment, as shown in figure F-3.2.

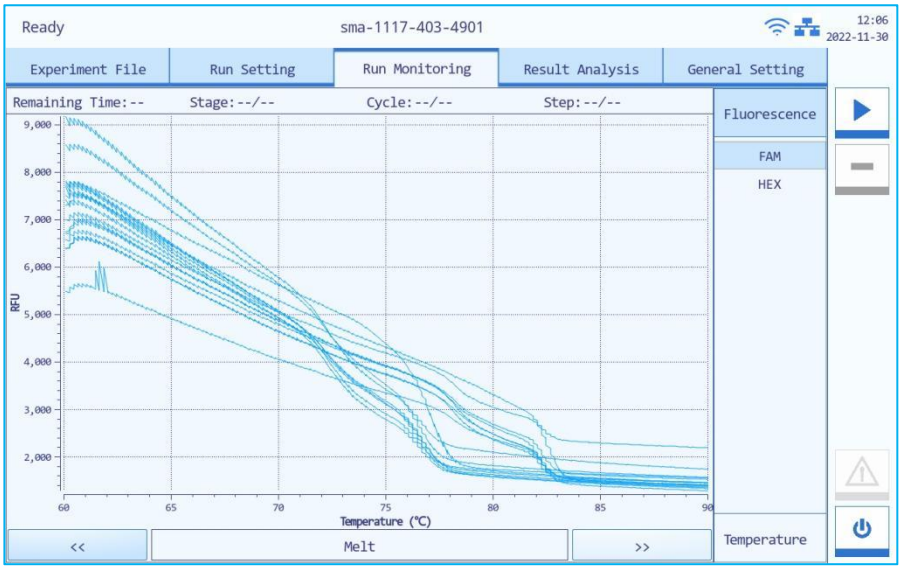


Figure F-3.2 Run Monitoring Diagram - Real-time Melting Curve

- X axis represents the temperature.
- Y axis represents the Relative Fluorescence Unit (RFU).
- User can press any dye under the **Fluorescence** option in the run monitoring option bar, and the run monitoring diagram will only display the corresponding real-time melting curve.

c. ***Heat Map***: Users can press << or >> keys below the run monitoring diagram to monitor the fluorescence **Heat Map** of the current experiment, as shown in figure F-3.3.

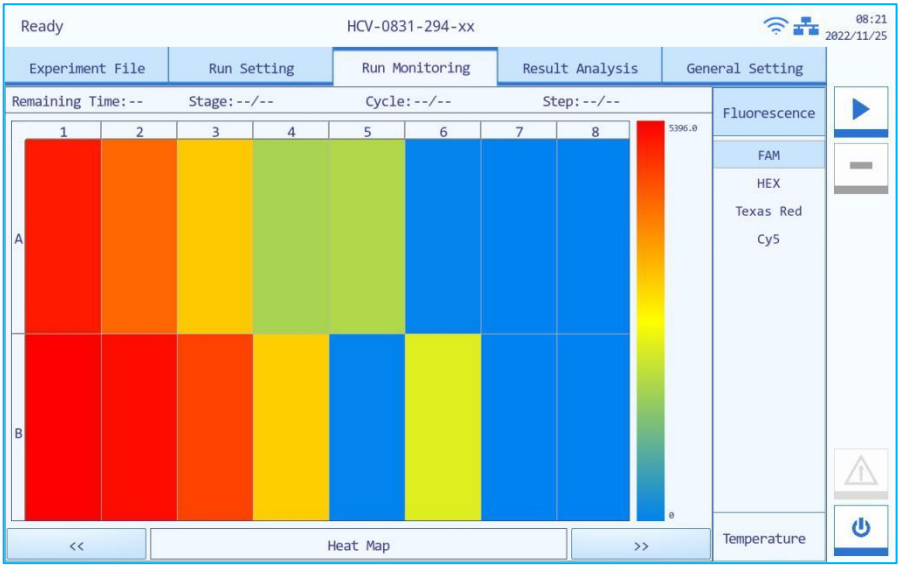


Figure F-3.3 Run Monitoring Diagram - Heat Map

- Fluorescence heat map displays the 16 sample wells corresponding to the sample block.
- The color bar on the right side of fluorescence heat map displays the change tendency of fluorescence intensity and its corresponding color.

F-2.4 Result Analysis

After the experiment completed, users can press the **Result Analysis** tab to analyze the current experiment results.

► ***Heat Map***: The result analysis interface displays the fluorescence heat map of the current experiment by default. Users can select a dye in the right **Fluorescence** option column to view the corresponding fluorescence heat map, as shown in figure F-4.1.

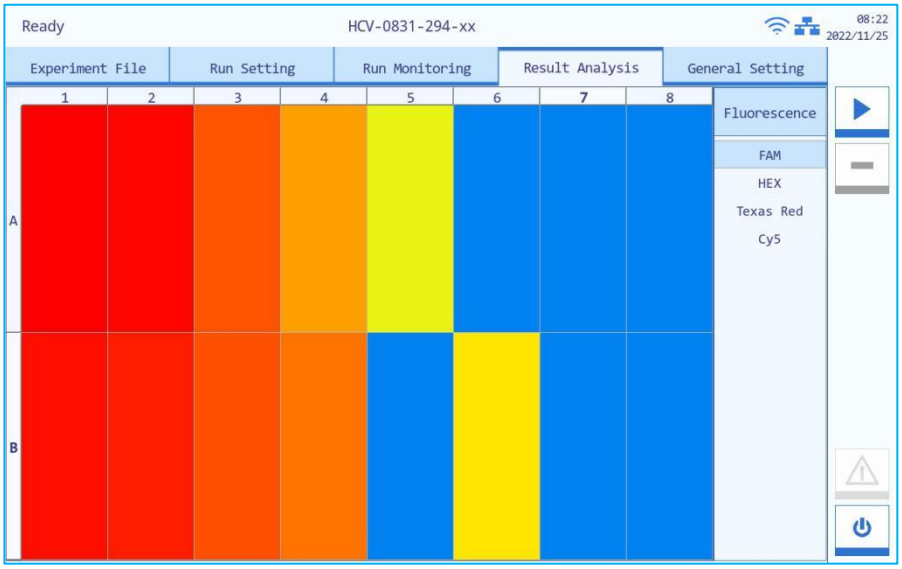


Figure F-4.1 Run Monitoring Diagram - Fluorescence Heat Map

► ***Amplification Result***: Users can press any well on the fluorescence heat map to check the amplification result of this sample, as shown in figure F-4.2.

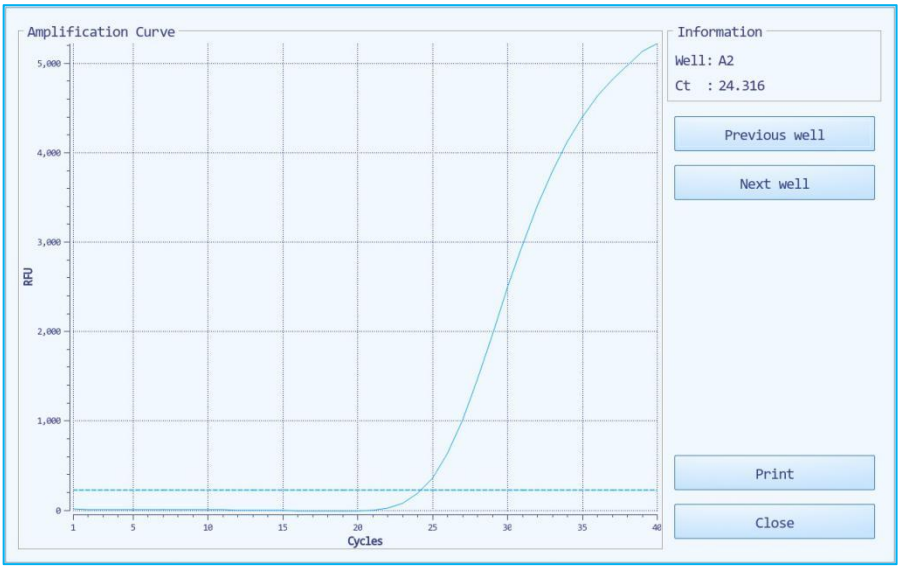


Figure F-4.2 Run Monitoring Diagram - Amplification Result

- The amplification result interface displays the Amplification Curve, Well and Ct value information.
- Use can click **Previous Well** to check the amplification result of the previous well sample.
- Use can click **Next Well** to check the amplification result of the next well sample.
- Use can click **Print** to print the amplification result of the current sample.
- Use can click **Close** to close the amplification result interface.

F-2.5 General Setting

The General Setting tab consists of three sub-tabs: **Instrument**, **Configuration** and **Service**.

F-2.5.1 Instrument Sub-tab

The General Setting tab displays the **Instrument** sub-tab by default, as shown in figure F-5.1.

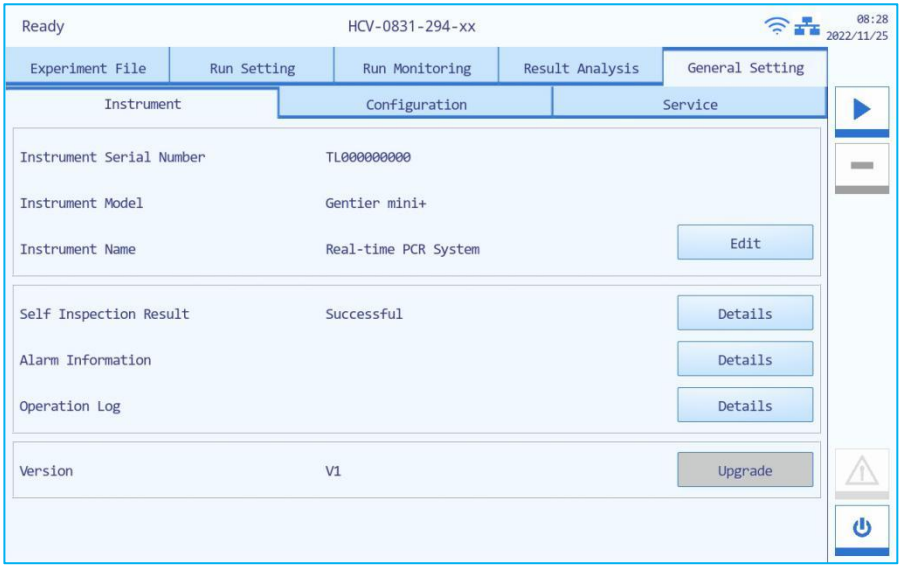


Figure F-5.1 Instrument Software – General Setting Tab - Instrument Sub-tab

Introduction to Instrument sub-tab

- **Instrument Serial Number**: It displays the factory serial number (SN) of the current instrument.
- **Instrument Model**: It displays the current instrument model.
- **Instrument Name**: It displays the name of the current Gentier Instrument. Users can press **< Edit >** and the instrument software will pop up the instrument name edit window.
- **Self-inspection**: It displays the latest self-inspection result of the current instrument. Users can press **< Details >** to view detailed self-inspection information.
- **Alarm Information**: Users can press **< Details >** to view the detailed alarm information occurred during the self-inspection and experiment running.
- **Operation Log**: Users can press **< Details >** to view all the operations executed on the current instrument.
- **Version:** It displays the system version information of the current instrument. Users can press **< Upgrade >** to upgrade instrument system. When a USB flash drive storing the standby software version is connected, the specified module can also be upgraded as needed.

Reminding: The upgrade of instrument system shall be completed by our engineers or under their guidance.

F-2.5.2 Configuration Sub-tab

Users can view or edit the system setting information in ***Configuration*** interface, as shown in figure F-5.2.

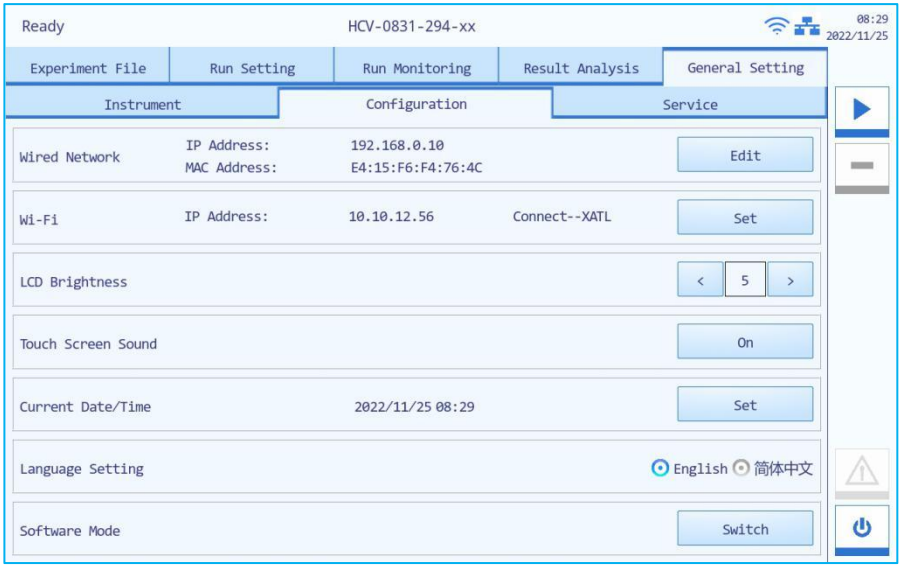


Figure F-5.2 General Setting Tab - Configuration Sub-tab

Introduction to Configuration sub-tab

► **Network Information**: It displays the network information of Gentier Instrument. Press **< Edit >** and the instrument software will pop up the network information window, as shown in figure F-5.2a.

Figure F-5.2a Configuration Sub-tab - Network Information Window

- In the IP Setting box, user can view all the network IP addresses, or press **< Edit >** to modify the corresponding parameter.
- ***Default***: Users can press **< Default >** to recover the default network IP settings of the current instrument.
- ***Back***: Users can press **< Back >** to turn back to the configuration tab.

► **LCD Brightness**: Users can press and icons to adjust the screen brightness (dark: 1 ~ bright: 5).

► **Touch Screen Sound**: Users can press **< Open >** or **< Close >** to decide whether to enable the touch screen sound.

► **Current Date/Time:** Users can press < Set > to set the date and time displayed on the current Gentier Instrument, the date/time setting window will pop up as shown in F-5.2b.

Figure F-5.2b Instrument Sub-tab - Date/Time Setting Window

- **< « > / < » >:** Users can press « and » icons to set the displayed year.
- **< ‹ > / < › >:** Users can press ‹ and › icons to set the displayed month.
- ***Calendar***: Users can set the displayed date on the calendar.
- ***Time setting***: Users can press + and − icons to set the displayed time, including Hour, Minute and Second.
- ***Date Format***: Users can set the displayed date format in the Format drop-down list; users can also press 24-hour or 12-hour option to set the displayed time format.
- ***Confirm***: Users can press < Confirm > to confirm the date and time setting;
- **Back:** Users can press < Back > to return to the Instrument sub-tab interface.

► **Language Setting**: Users can set the instrument system language. Two options provided are **English** and **Simplified Chinese**.

F-2.5.3 Service Sub-tab

Users can view or edit the setting information of instrument system, as shown in figure F-5.3.

Figure F-5.3 General Setting Tab - Service Sub-tab

Introduction to Service sub-tab

- **Clear Memory**: Press **< Clear >** to clear all experiment files.
- **Debug Log**: Connect USB flash drive to Gentier Instrument, and press <Get Debug Log > to download the debug logs of the instrument.
- **Build No.**: Press **< Details >** to view the build number of the current instrument.
- **Debug Mode**: Press **< Enter Debug Mode >** and input the password, and the instrument software will pop up the debug interface.

Reminding: No person except the professional engineers from our company is allowed to enter the debug mode.

G. Instrument Cleaning and Maintenance

Under proper using conditions, Gentier Instrument requires little maintenance. However, Gentier Instrument should be cleaned and maintained on a regular schedule for long time and constant use. This section includes the information on cleaning and maintenance of Gentier Instrument.

G-1. Instrument Cleaning Operation Instructions

Gentier Instrument should be cleaned on a regular schedule (every other month), please carefully read the following instructions before cleaning Gentier Instrument.

Prohibit: Never clean the instrument when it is electrified.

Prohibit: Never pour water or other solutions in into the sample block or any interior parts of the instrument. Fluids can cause electrical shock when the instrument is electrified.

Caution: Ethanol is a flammable and volatile liquid. Its exposure may irritate eyes, skin and respiratory tract, and may lead to central nervous system hypofunction and liver damage. Please wear appropriate protective goggles, clothing and gloves, when using ethanol to clean.

High-Temp: The sample block and hot lid may produce high temperature during running. Do not clean the sample block until it reaches the room temperature.

Biohazard: Please regard all samples as potential biohazard materials, universal safety precautions should be taken when handling or processing samples. Samples pills should be immediately disinfected with an appropriate disinfectant solution to avoid equipment contamination or user's personnel injury.

G-1.1 Clean Instrument Shell

1st step: Switch off the instrument and unplug the power cord.

2nd step: Clean the instrument shell with a piece of damp, soft cloth, and if needed, please rinse the cloth with mild commercial detergent for cleaning.

Prohibit: Do not spray the detergent directly on the instrument, as malfunctions of the electronics or may occur.

Caution: Please do not use organic or strong detergent to clean the instrument shell, which may ruin the surface coating.

G-1.2 Clean Touch Screen

1st step: Switch off the instrument and unplug the power cord;

2nd step: Gently wipe the touch screen with a piece of dry, soft cloth to remove dust, oil or fingerprints.

3rd step: If the touch screen is still not clean, use a piece of damp, soft cloth that moistened with low concentration isopropanol or ethanol to clean the touch screen in a gentle motion.

Prohibit: Do not spray the detergent directly on the touch screen, as malfunctions of the electronics or may occur.

Caution: Do not use abrasive detergent or rough material, as they may scratch the touch screen.

G-1.3 Clean Sample Block

1st step: Switch off the instrument and unplug the power cord;

2nd step: Open the top lid and clean the sample block surface with a piece of damp, soft cloth, and if needed, please rinse the cloth with mild commercial detergent.

3rd step: Clean the sample block wells with the degreased cotton swab moistened with ethanol to ensure the firm contact and good thermal conductivity between the consumables and the wall of block well.

Prohibit: Do not spray the detergent directly on the thermal cycler block, as malfunctions of the electronics or may occur.

Caution: Do not close the top lid before the sample block is completely dry.

G-2. Instrument Maintenance Operation Instructions

G-2.1 Maintain Sufficient Air Flow

The placing area of Gentier Instrument should be checked regularly, as it requires sufficient air flow to precisely reach the correct target temperature. Please ensure that the air flow is unrestricted and other items around the instrument do not interfering with the air flow.

G-2.2 Maintain Stable Power Supply

Gentier Instrument requires stable power supply for proper functioning, therefore its power supply should be checked regularly to ensure the consistent of instrument required voltage and the power supply voltage (allowable deviation ± 10%). And make sure that the rated load of receptacle is no less than the requirement of instrument.

G-2.3 Maintain Instrument Cleanliness

Contamination of sample block or optical parts can interfere with thermal cycling and data collection.

Avoid contaminating Gentier Instrument:

- Always clean the outside surface of consumables before placing them in the sample block.
- Clean the sample block periodically to prevent the buildup of dirt, biohazardous materials or solutions.
- Always seal the consumables with sealing film before running the experiment.

⚠ **Caution:** Never place a consumable with open or leak cap in the sample block. The reagents may escape during heating and cover the sample block and hot lid.

⚠ **Caution:** Never run a PCR reaction with volatile reagents that could contaminate the sample block and hot lid.

⚠ **Caution:** In case the instrument will not be used for a long time, unplug it and cover the instrument with a soft cloth or plastic bags to prevent dust from entering.

G-2.4 Instrument Time Reset

If the instrument has not been used for a long time (the idle time exceeds 20 days), please reset the system time after turning it on. Users can refer to ***F-2.5.2 Configuration Sub-tab - Current Date/Time*** for more details.

G-3. Transportation or Return to Factory

G-3.1 Instrument Disinfection

In case Gentier Instrument will be moved to another lab or needed to return to the after-sale service department for maintenance, please first disinfection the instrument and fill in the disinfection certificate.

The disinfection process of Gentier Instrument is listed as follows:

- ► Please wear protective clothing and medical disposable gloves.
- ► Open the top lid and get all consumables out of the sample block.
- ► Switch off the instrument and unplug the power cord.
- ► Prepare the detergent (lab routine disinfectant), wet the cotton cloth and degreased cotton swabs with the prepared detergent.
- ► Clean the sample block surface with the cotton cloth, clean the sample block well with the degreased cotton swabs, and leave the top lid open until it is dry.
- ► Clean the sample block again with 75% ethanol.
- ► Clean the instrument shell with mild detergent.
- ► Open the top lid and leave the instrument under UV light for 1-hour disinfection.

⚠ **Caution:** Disinfection must be proceeded by the trained professionals in a well-ventilated environment with wearing protective clothing and medical disposable gloves.

⚠ **Caution:** When the user cleans or disinfects the instrument's inner components or materials, please do not use the detergents or disinfectants that may be intermiscible with instrument's inner components or materials.

G-3.2 Product Packaging

Please use the original packaging materials to properly pack Gentier Instrument and its accessories in order to prevent the collision and oscillation during transportation. The specific packing steps of Gentier Instrument are as follows.

Step 1: Pack the instrument with plastic bag and prepare the instrument accessories, like adapter, power cord.

Step 2: Put the random documents, power cord, adapter, etc. into the paper box which should be put at the bottom of the carton case.

Step 3: Place the foam base into the carton case and put the instrument into the base with facing the base's triangle notch.

Step 4: Place the foam cover over the instrument with its triangle notch facing instrument and put the USB flash driver used for software installation into the foam cover.

Step 5: Close the carton case cover with handle first, then close two sides and finish packaging by fastening down the top cover.

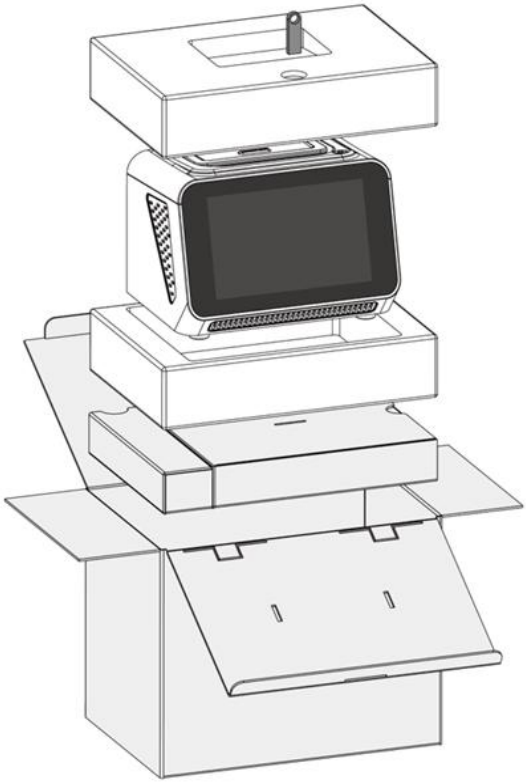


Figure G-1. Exploded View of Package

Caution: The original transport package of Gentier Instrument is designed to reduce the instrument damage and ensure its transportation safety. Adopt other packaging materials will break the warranty, and **XATL Co., Ltd.** will not be responsible for damages as consequences of improper packaging that incur during the transportation back to maintenance department.

Reminding: The transportation of Gentier Instrument can be done via a general transport (with awnings).

G-4. Troubleshooting

In general, corrective instructions will be displayed along with the error messages by the application or instrument software. And under normal circumstances the software running errors can be solved by restarting the computer or the instrument system.

This section describes the main possible errors of Gentier Instrument together with possible causes and corrective instructions.

No.	Error	Possible Cause	Corrective Instructions
1	No display on the screen	Without power supply	Plug the power supply
		Power switch is on 'off' position	Switch on the power switch
		Unstable power cord connection	Connect the power cord again or renew the power cord
		Inappropriate power voltage	Adjust the scope of power voltage into a normal range
		Others	Contact us
2	Boot screen display error message	The activation of system failed.	Please contact us and consult the maintenance engineer
		Power voltage too low	Ensure there is no other appliance or circuit in the same electric circuit.
3	System crashed or out of control	Improper operation	Restart the instrument system
		Others	Contact us

4	No Experiment Results	Wrong operation process	Check the operation process and test again
		Quality problems of reagents	Renew the reagent and run the experiment again.
		Experiment settings do not meet the requirements (temperature is inappropriate or cycle number is not enough).	Reset the experiment procedure
		Others	Contact us
5	Abnormal ramp or incorrect temperature	Air vent is blocked	Clean up the air vent.
		Connecting lines are loose.	Contact us

⚠ **Caution:** In case you cannot judge and eliminate these failures by yourself, please directly contact with our company.

⚠ **Caution:** In case any of following situation occurs, please immediately cut off the power supply and contract us. We will arrange qualified maintenance personnel for processing.

- Any liquid has entered into the instrument.
- Abnormal sound or smell appears inside the instrument.
- Instrument is soaked with water or rain.
- Any housing damage caused by accidentally drop of the instrument.
- Obvious functional changes of instrument.

H. After-sale Service Commitments

H-1. Warranty Service

1. In the condition that user comply with the rules of transportation and operation. Our company guarantees to exchange Gentier Instrument in case any malfunction is caused by the defects of materials and instrument manufacture within 1 month after sale.
2. We will provide 24 months of warranty period beginning from the delivery of Gentier Instrument. Within the warranty period our company guarantees the maintenance of the instrument in case any malfunction is caused by the defects of materials and instrument manufacture. User could contact us, and we will arrange maintenance personnel for processing (We promise to provide the list of components and the electric circuit for the maintenance personnel). Or directly send the instrument back to the maintenance department assigned by our company (User shall be responsible for the transportation fees), and we will send back the well-maintained instrument to the user for free.
3. For post warranty service, we will charge for the maintenance fee according to specific situation.
4. The life span of Gentier Instrument is about 5 years, for any maintenance of the instrument that have been used beyond 5 years, our company will not take any responsibilities.
5. The following circumstances are not within the scope of warranty:
   - The instrument damages caused by improper, negligent operation or force majeure includes war, fire, flood, earthquake, typhoon and any other unforeseen accidents.
   - The parts or components damages caused by abnormal voltage.
   - User did not comply with the rules of transportation and use.
   - User did not comply with the maintenance instructions.
   - Gentier Instrument has been opened or maintained by person, manufacturers or agents that are not authorized by **XATL Co., Ltd**.

H-2. Response Time

We will make response within 24 hours upon receiving the notification, no matter whether Gentier Instrument is within the warranty period or not. For any problems that cannot be solved through the phone, we will provide on-site service within 7 days for the customs located in China.

H-3. Contact Information

Xi'an Tianlong Science and Technology Co., Ltd.

No. 389, Zhuhong Road, Xi'an, Shaanxi Province, P. R. China.

Postcode: 710018

Company Tel: +86-29-82218051/83204255

Company Fax: + 86-29-82216680

After-sale Service: + 86-29-82683675

Email Address: XATL@medtl.com

Website Address: www. medtl.com

SUNGO Europe B.V.

EC REP

Fascinatio Boulevard 522, Unit 1.7, 2909VA Capelle aan den IJssel, The Netherlands.

Tel: +31(0)10 3034500；+31(0)2021 11106

Email Address: ec.rep@sungogroup.com

Appendix 1 - Product Accessories List

	List	Qty.	Replacement Period	Remark
Accessories	Power cord	1	Depend on service condition	1.5m
	USB flash drive	1	Depend on service condition and software update from OEM	Format: FAT32
	Power adapter	1	Depend on service condition	ADT-150A24AA
	Network cable	1	Depend on service condition	3.0m
	User manual	1	/	
	Packing list	1	/	
	Certification, Warranty card	1	/	
	Installation Confirmation List	1	/	For user to confirm the installation conditions after receives the product
	Information Feedback form	1	/	After installation, the engineer will sign the feedback form and bring it back on file

TIANLONG®

Xi'an TianLong Science and Technology Co.,Ltd.

Add:No.389, Zhuhong Road, Xi'an, Shaanxi Province, P.R.China

Tel:+86-29-8268 3675 400-606-1686 Fax:+86-29-8221 6680

http://www.medtl.com