Fluorescent Quantitative Detection system

LineGene 9600 Series

User's Manual

Attention

Users are recommended to read the contents of this manual thoroughly before operating the Bioer Fluorescent Quantitative PCR Detection System.

To carefully observe all special Warnings and Cautions outlined in this manual.

This manual should be maintained properly in good condition for reference.

Caution: Copyright reserved. The Bioer Co. reserves the right to modify this manual at any time without notice.

The manual contains copyright protected and patented material. Without prior written consent from Hangzhou Bioer Technology Co., Ltd., any part of the manual shall not be duplicated, reproduced or translated into any other language.

Thank you for your purchase of this product.
Before initial use of this instrument, please read this manual thoroughly ！

File No.: BYQ60940000000ESM
File Version: Jul 2014 Version 1.0

Important Notes

1. Usual practice

Note: Very important information is contained within this manual and it should be carefully read before first use of the instrument. Failure to operate instrument according to the instruction could result in damage or abnormal functioning of the instrument.

Warning! The warning message requires extremely careful operation of a certain step. Failure to observe the instruction could result in serious personal injury.

2. Safety

During operation, maintenance and repair of this instrument, the following basic safety notes must be observed. In case of failure to follow these measures or the warnings or notes indicated herein, the basic protection provided by the instrument, its safety criteria of design and manufacture, and its predicted use range would be impaired.

Hangzhou Bioer Technology Co., Ltd. shall not be held responsible for any consequences resulting from the user's failure to observe the following requirements.

Note: The instrument, complying with the Standard GB4793.1/IEC61010-1, is a general instrument of class Ⅰ, the protection degree is IP20. It is intended for indoor use.

Note: The instrument, complying with the Standard YY0648/IEC61010-2-101, is used for IVD medical equipment.

a) Instrument earth

In order to avoid an electric shock, the input power cable of the instrument must be properly earthed. This instrument uses a 10A 3-core earthed plug, which is provided with a third (earth) pin. It is for use with an earth type power socket and is a safety unit. If the plug cannot be inserted into the socket, the socket must be fixed by a qualified electrician, to maintain the safety function of the plug and the protection it provides.

b) Keeping apart from the live circuit

Internal maintenance or replacement of any part of the thermal cycler must only be carried out by qualified personnel. The instrument must be disconnected from the mains circuit prior to any maintenance being carried out.

c) Use of power supply

Before connecting to the mains and switching the instrument on, make sure the voltage is consistent with the instruments requirements (100-240V, 50/60Hz). The rated load for the power socket must not be less than the instruments maximum load of 600W

d) Power wire

The instrument is supplied with a power cable which should be used at all times when operating the instrument. If the power cable is damaged it should be replaced with a new one of the same specification. Care must be taken that the power cable does not get compressed or tightly bent and that it does not lie across areas where it may cause a trip hazard to personnel.

e) Insertion and withdrawal of power cable

At insertion and withdrawal of power cable, the back of the plug shall be firmly held with the hand. The plug must be completely and tightly inserted into the socket and must not be

removed by pulling the cable. The back of the plug should be grasped in the hand and pulled directly backwards to remove from the socket.

f) Placement of instrument
This instrument should not be positioned in a place where it is difficult to cut off the power supply.

This instrument should be placed in a low relative humidity (RH) and low dust environment well away from any water (e.g. sinks and pipes). The room should be well ventilated, and free from corrosive gas, or interference from a strong magnetic field. The instrument should not be placed in a wet or dusty location, but should be positioned on a sturdy, level and secure table appropriate to its weight.

The openings on this instrument are for ventilation purposes and in order to avoid over-heating of the instrument they shall not be blocked or covered. When a single set or several sets of instruments are used, the space between its ventilation openings and the nearest object should not be less than 30cm.

Excessive environmental temperature would impair the test performance and could result in failure of the instrument. This instrument should not be used in locations subjected to direct sunlight or strong radiation or light source, as this could impair the fluorescence detection.

The instrument should be kept away from hot gas, furnaces, stoves and all other sources of heat.

When switched off, the power should also be switched off. If the instrument is not going to be used for a long time, the power should be switched off, the power plug withdrawn and the instrument covered with soft cloth or plastic film to prevent dust or foreign bodies entering the machine.

g) Notes during operation
During a test, care should be taken to prevent liquid from dropping onto the instrument.

The waste remaining following a test, such as consumables, reagents, etc. should be treated as advised in your local disposal procedures, and should not be thrown into normal waste or poured down a drain.

If hazardous substances are used in a test, the user must be adequately trained before use. Waste hazardous substances, must be disposed of according to local disposal instructions.

The instrument operator, must be appropriately trained in its use.

Caution: If any of the following should occur, you should immediately switch off the power supply, withdraw the power plug from the power socket, and contact the supplier to effect a repair: Repairs can only be carried out by suitably qualified engineers.

- Liquid gets inside the instrument.
- The instrument is rained upon or water is spilled over it.
- The instrument works abnormally, or generates an abnormal sound/s or generates a strange odour.
- The instrument is dropped or its casing is damaged.
- There is an obvious change in the function of the instrument.

Caution: When you are handling potentially hazardous biological substances such as human or animal derived tissues or fluids, appropriate protective clothing and gloves need to be used.

h) Transportation
If transporting the instrument again, the instrument and its detection wells need be empty and thoroughly cleaned before transportation, and should preferably be disinfected by UV light. The power should be switched off and the unit un-plugged before commencing cleaning procedures.

i) Warning Sign

Warning identification

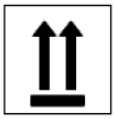
DANGER!		Indicates danger if the instrument is used incorrectly.
SCALDING!		Indicates a scalding hazard as this area will be hot during use.
BIOHAZARD		Indicates a biohazard during use.
PROTECTIVE EARTH		Indicates the location of the protective earth on the instrument

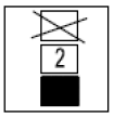
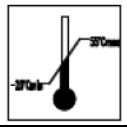
Warning mark

Warning! This indicates a surface which will be hot during and immediately following the running of a programme. Contact with this metal area will cause burns.

Warning! During the use of the instrument the user may come into contact with biologically hazardous materials. Rules for safe handling of such materials must be followed. The operator must be appropriately trained.

j) Signs on the external packaging

Up		Maintain in an upright position as indicated by the arrows facing upwards.

Fragile		Care should be taken during transportation, as there are breakable items contained in the transport package.
Keep Dry		Transport package must be kept dry
Stacking limit		Maximum number of stacking layers of the same package is 2.
Temperature limit		The transport package should be maintained at a temperature between -20C to 55C.

3. EMC Consideration

Note: This is a class A equipment, only suitable for use in establishments other than domestic, and those directly connected to a low voltage power supply network.

4. Maintenance of instrument

Any stains on the instrument can be cleaned with soft cloth soaked with a gentle cleaning solution.

Heat conductive oil medium should not be used in the block wells of this instrument.

Module should not be left open for any period of time as this may allow dust to enter the instrument.

Warning!

- When cleaning the instrument, the power should be turned off.
- The instrument surface should not be cleaned with corrosive cleaning agents.
- The instrument module includes precise optics, dust, foreign matter and residue should be avoided.

5. After-sales services

The warranty content and scope are shown in the warranty sheet.

Note:

- After unpacking, immediately check the goods against the packing list. If any parts are damaged or missing, please contact the supplier immediately.
- After qualification of acceptance, complete the product acceptance sheet and send (or fax) the copied sheet to the supplier for filing and maintenance.
- Before first use of the product, the user shall complete the instrument registration form and send to Hangzhou Bioer Technology Co., Ltd. to obtain the correct operation password.
- After unpacking, the packing box and packing materials should all be kept in case it is required for transportation or service in the future.
- In the event that a repair is required, the instrument must be disinfected before being sent to the repair department. A decontamination sheet should be completed and sent together with the instrument. These are available on request from your local supplier.
- It is recommended that service personnel disinfect the instrument on receipt in the service department, before commencing any scheduled work.
- Hangzhou Bioer Technology Co., Ltd. shall bear no liability in the event of any damage to the instrument occurring during transportation to the service department due to improper packaging.

Contents

CHAPTER 1 GENERAL DESCRIPTION 1

1. APPLICATIONS 1
2. FEATURES 1
3. NOTES TO MODEL AND DESCRIPTION 2
4. PERFORMANCE PARAMETERS 2
5. GENERAL DESCRIPTION OF FUNCTIONS OF THE SOFTWARE 3

CHAPTER 2 PREPARATIONS 4

1. TRANSPORT AND STORAGE CONDITIONS OF THE INSTRUMENT 4
2. NORMAL WORKING CONDITIONS 4
3. PREPARATIONS BEFORE STARTING THE INSTRUMENT 4
   3.1 Connection of power wire and communication wire 4
4. SYSTEM INSTALLATION AND UNLOADING 4
   4.1 System Installation 4
   4.2 System Unloading 5

CHAPTER 3 START 6

1. CHECKS BEFORE START 6
2. START 6
3. STARTING SOFTWARE INTERFACE 7

CHAPTER 4 ABSOLUTE QUANTIFICATION 8

1. DESIGN EXPERIMENT 8
   1.1 Create New Absolute Quantitative Experiment 8
   1.2 Detector Setting 9
   1.3 Sample Information Setting 10
   1.4 Reaction Plate Setting 11
   1.5 Programme Setting 13
2. PREPARE FOR REACTION 14
3. RUN THE EXPERIMENT 15
   3.1 Preparation for reagent sample 15
   3.2 Run Fluorescence Curve 16
   3.3 Run Temperature Curve 17
   3.4 Programme Setting 18
   3.5 Working state indication lamps on instrument 18
      3.5.1. Prompts which may occur during running 19
4. EXPERIMENT ANALYSIS 20
   4.1 Check Results 20
      4.1.1 Check the Amplification Plot 20
      4.1.2 Check Standard Curve 23
      4.1.3 Check Melting Curve 24
   4.2 Adjusting Parameters and Re-analysis 27
5. EXPERIMENT REPORT 28
   5.1 Designing a Report Template 28
   5.2 Print Setting 29
   5.3 Comprehensive Report 29
   5.4 Report Printing 30
   5.5 QC Summary 30
6. DATA EXPORT 31
   6.1 Export to Database 31
   6.2 Experiment Filing 31

6.3 Export Experiment Data to EXCEL 31
6.4 Export Experiment Data to TEXT 31

CHAPTER 5 RELATIVE QUANTITATIVE 32

1. DESIGN EXPERIMENT 32
1.1 Create New Relative Quantitative Experiment 32
1.2 Detector Setting 32
1.3 Sample Information Setting 33
1.4 Reaction Plate Setting 35
1.5 Programme Setting 36
2. PREPARE FOR REACTION 38
3. RUN THE EXPERIMENT 39
3.1 Run Fluorescence Curve 39
3.2 Run Temperature Curve 40
3.3 Programme Setting 42
4. EXPERIMENT ANALYSIS 42
4.1 Check Results 42
4.1.1 Check the Amplification Plot 42
4.1.2 Check Standard Curve 44
4.2 Check Relative Quantification 45
4.3 Adjust Parameter Reanalysis 46
5. EXPERIMENT REPORT 47
5.1 Comprehensive Report 47
5.2 QC Summary 48
6. DATA EXPORT 49
6.1 Export to Database 49
6.2 Experiment Filing 49
6.3 Export Experiment Data to EXCEL 49
6.4 Export Experiment Data to TEXT 49

CHAPTER 6 SNP 50

1. DESIGN EXPERIMENT 50
1.1 Create SNP Experiment 50
1.2 Detector Setting 50
1.3 Sample Information Setting 52
1.4 Reaction Plate Setting 53
1.5 Programme Setting 54
2. PREPARE FOR REACTION 56
3. RUN THE EXPERIMENT 56
3.1. Run Fluorescence Curve 56
3.2 Run Temperature Curve 58
3.3 Programme Setting 59
4. EXPERIMENT ANALYSIS 60
4.1 Check Results 60
4.1.1 Check the Amplification Plot 60
4.1.2 Check SNP 62
4.2 Adjust Parameter Re-analysis 63
5. EXPERIMENT REPORT 64
5.1 Designing a Report Template 64
5.2 Print Setting 65
5.3 Comprehensive Report 65
5.4 Report Printing 66
5.5 QC Summary 66
6. DATA EXPORT 67
6.1 Export to Database 67
6.2 Experiment Filing 67

6.3 Export Experiment Data to EXCEL 67
6.4 Export Experiment Data to TEXT 67

CHAPTER 7 HIGH RESOLUTION MELTING 68

1. DESIGN EXPERIMENT 68
1.1 Create High Resolution Melting Experiment 68
1.2 Detector Setting 68
1.3 Sample Information Setting 70
1.4 Reaction Plate Setting 71
1.5 Programme Setting 72
2. PREPARE FOR REACTION 74
3. RUN THE EXPERIMENT 74
3.1. Run Fluorescence Curve 74
3.2 Run Temperature Curve 76
3.3 Programme Setting 77
4. EXPERIMENT ANALYSIS 78
4.1 Check Results 78
4.1.1 Check the Amplification Plot 78
4.1.2 Check the Standard Curve 80
4.1.3 Check HRM 82
4.2 Adjust Parameter Re-analysis 85
5. EXPERIMENT REPORT 86
5.1 Comprehensive Report 86
5.2 QC Summary 87
6. DATA EXPORT 88
6.1 Export to Database 88
6.2 Experiment Filing 88
6.3 Export Experiment Data to EXCEL 88
6.4 Export Experiment Data to TEXT 88

CHAPTER 8 SERVICE 89

1. USER MANAGEMENT 89
2. EXPERIMENT MANAGEMENT 90
2.1 Experiment Management 90
2.2 Deleted Experiment Management 91
3. TEMPLATE MANAGEMENT 92
4. USER LOGIN 92
5. CHANGE PASSWORD 92
6. SEE RUNNING EXPERIMENT 93

CHAPTER 9 TOOL USAGE 94

1. GAIN SETTING 94
2. BLOCK SCAN METHOD 94
3. DETECTOR LIBRARY 94
4. CUSTOMIZED DYES 95
5. CUSTOMIZE COLUMNS 95
6. COLUMN SELECTION 96
7. SAMPLE COLUMN LIBRARY 97
8. INSTRUMENT CALIBRATION PARAMETERS 97
9. MEASURE CROSSTALK CALIBRATION PARAMETERS 98
10. CROSSTALK GAIN PARAMETER MEASUREMENT 98
11. SYSTEM MAINTENANCE 99
12. UPGRADE EXPERIMENT FILE FORMAT 99
13. TA CALCULATOR 100

CHAPTER 10 OTHER FUNCTIONS 101

1. INSTRUMENT OPERATION 101
1.1 Connect 101
1.2 Disconnect 101
1.3 Instrument Information 101
2. DATA QUERY 101
3. SYSTEM HELP 102

CHAPTER 11 MAINTENANCE 103

1. REGULAR CLEANING 103
2. ANALYSIS AND TROUBLESHOOTING 103

APPENDIX: LINEGENE 9600 SERIES WIRING 106

Chapter 1 General description

This chapter mainly describes the applications, features, specification, model, performance parameters and software functions of this 96-well Fluorescent Quantitative Detection System.

1. Applications

The 96-well fluorescent quantitative PCR detection system allows real-time detection of amplified DNA.

Application areas include research into the human genome, forensics, cancer, tissue, population biology, palaeontology, zoology and botany and in clinical diagnosis of virus, cancer and genetic diseases.

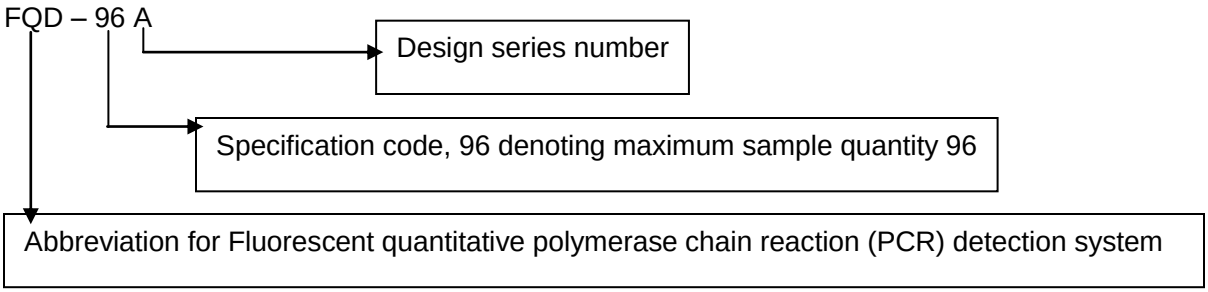
PCR detection system belongs to IVD medical equipment, which is to use the polymerase chain reaction to perform quantitative analysis of different genes in a clinical laboratory.

2. Features

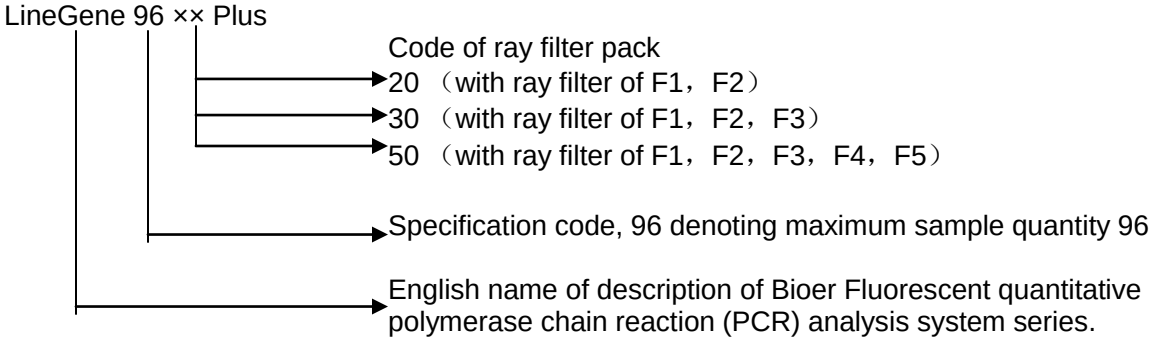
- Novel and human-orientated running interface for smooth operation.
- The adopted fluorescent real-time detection mode realizes simultaneous amplification and detection in the same tube without need of post experimental treatment.
- Advanced thermoelectric technology ensures fast and steady heating and cooling of the ultra-fast heat cycling system.
- Multi-point temperature control ensures consistent temperature of 96 sample wells.
- It can create a temperature gradient with 4 Thermo electric modules.
- Stable and accurate 1～36C gradient function makes optimising PCR conditions simple and easy.
- The constant temperature function of SOAK enables low-temperature storage of PCR reagents.
- It uses maintenance-free long life LED excitation light source.
- The advanced fibre optic transmission technology makes the photo-electric detection system very sensitive and reliable.
- Precise optical path system and ultra-sensitive PMT system provide the most accurate and sensitive fluorescent detection.
- It can create a real-time dynamic monitor of the entire PCR amplification process.
- It has high linear range up to 10 orders of start DNA copies without serial dilution.
- It is unnecessary to open the PCR reaction tube, ensuring samples are protected from contamination during and after PCR and ensures accurate results.
- Multiplexing is possible.
- The hot-lid technology allows for oil-free operation of PCR.
- Automatic hot-lid technology needs no manual opening/closing and ensures constant pressure of the hot-lid used with different height reaction tubes or plates.
- User friendly interface with flexible programme setting and analysis and reporting using the stored parameters.
- It can print out one or more sample report(s).
- Automatic, correct and timely remote networked services provide the latest technical support.
- Unique patented advanced module bottom fluorescent detection technology.

3. Notes to model and description

Model:



Description:



4. Performance parameters

Specification/model	FQD-96A							
Sample capacity	96×0.2ml (suitable for single tube, 8-row tubes and 96-well fully-skirted plate)							
Detection channel	F1	F2	F3	F4	F5			
Applicable dye	FAM, SYBR Green I	VIC, HEX, TET, JOE, Cy3, TAMRA	ROX, TEXAS-RED,	Cy5 Quasar-670	Cy5.5 Quasar-705			
Temperature range of block working	4～105℃ (Minimum division:0.1℃)							
Heating/cooling rate	4.0°C/s (max)							
Temperature fluctuation	≤±0.1°C (full-range), (55°C typical value ≤±0.1°C)							
Temperature accuracy	≤±0.2°C (full-range), (55°C typical value ≤±0.1°C)							
Temperature uniformity	≤±0.4°C (full-range), (55°C typical value ≤±0.3°C)							
Temperature range of hot-lid working	30～110°C (adjustable, default 105°C)							
Repeatability of fluorescent intensity detection	5%							
Running mode	Continuous running							
Operation system	Windows XP/Windows Vista/Windows7/Windows8							
Power supply	100-240V～ 50/60Hz 600W							
Dimensions	410mm×386mm×352 mm							
Weight	28kg							

5. General description of functions of the software

a) Parameters setting-up function (including temperature, time, cycles, heating/cooling rate, selection of detection channel and yield of photo-electric amplification tube).

b) Note function of text contents.

c) Sample material record function (sample No., sample name and sample data).

d) Document running display function (PCR heat cycle data display, fluorescence detection data display and real-time display of each data during running of instrument).

e) Detection data analysis function (The analysis function may be independently used without connection to the instrument).

f) Analysis result output function. It may output the analysis result to various types of document, e.g.: EXCEL, TXT document. It is possible to run an enquiry and print out analysis result, modify the printing format and select/de-select items to print.

g) Document storage function (setting up data, running data and analysis results).

h) Fault protection and alarm function

Caution: The above-mentioned software functions are merely for reference. The software functions may be modified without notice.

Chapter 2 Preparations

This chapter mainly describes use, transport and storage condition, structural composition, installation/unloading of software and preparations before first using the LineGene 9600 series fluorescent quantitative detection system.

1. Transport and storage conditions of the instrument

Environmental temperature: -20℃～55℃
Relative Humidity: ≤80％

2. Normal working conditions

Environmental temperature: 10℃～30℃
Environmental RH: ≤70％
Altitude: < 2000 m
Pollution degree: 2
Power supply: 100-240V ～50/60Hz 600W

Caution: Before using the instrument, please make sure the working conditions meets the above requirements. The power socket shall be a 3-hole socket and properly earthed.

3. Preparations before starting the instrument

3.1 Connection of power wire and communication wire

Connection of power wire: Only the power cable supplied with the instrument should be used. At connection, make sure the instrument power switch is in the “OFF” position and after connection the power cable should be checked to ensure a tight contact with the instrument socket; otherwise it should be replaced.

Connection of communication wire: The supplied communication wire and communication conversion box should be used. One end of the communication conversion box is connected with the DB15 communication interface at the back of the instrument, and the other end connected with the computer USB, RS232C or Bluetooth interface. After connection, screws should be securely tightened.

Caution: If with prolonged use the supplied power cable connection becomes loose, it should be replaced with one of the same type and specification.

The communication conversion box is built with special circuits and must not be opened.

4. System Installation and Unloading

4.1 System Installation

System Environment
Operating system: Windows XP/Windows Vista/Windows7/Windows8
Runtime environment: Net Framework 4.0
Other software: PDF reader

Minimum configuration:
Processor: Intel Core i3
Memory: 2GB
Hard Disc: 10GB

System installation

Double click PcrServer installation file (PcrServerSetup.exe) ► display the installation interface (select installation language) ► set up installation path ► install

Double click LineGene9600 installation file (LineGene9600ScientificSetup.exe) ► display the installation interface (select installation language) ► set up installation

Operating system

1. Double click the LineGene9600 shortcut on the desktop Or Click the start menu ► Program ► LineGene9600
2. Double click the PcrServer shortcut on the desktop Or Click the start menu ► Program ► PcrServer

4.2 System Unloading

Control Panel ► Add/Delete Program ► PcrServer ► Unloading
Control Panel ► Add/Delete Program ► LineGene9600 ► Unloading

Chapter 3 Start

1. Checks before start

After inserting the power plug and switching on this detection system, the following should be checked:

- Check the voltage of the power supply is consistent with the system-required one.
- Check the power cable plug for correct and reliable insertion into the power socket.
- Check the communication converter for correct insertion into the host and tightening and the cable plug for correct and reliable connection to the computer.
- Check the update shift switch MODE of communication converter is set to “normal” state.
- Check the environmental conditions meet the required tolerances.

2. Start

In order to ensure effective connection and communication between the instrument and the computer system, the system shall be started in the following sequence:

1st step: Start computer display and host.

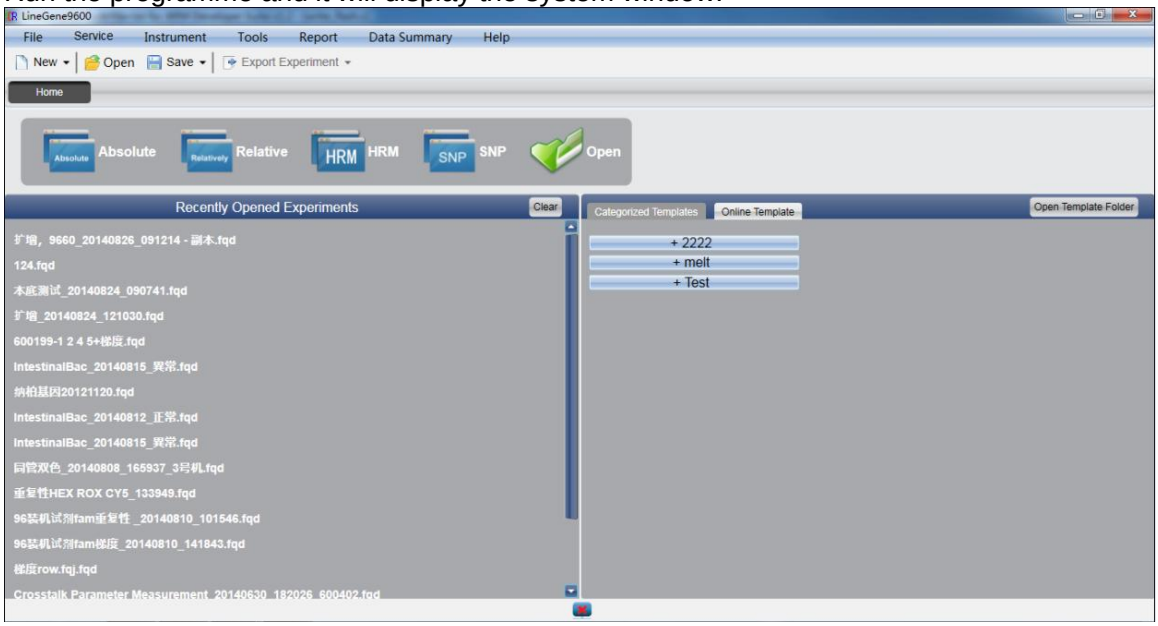
2nd step: Turn on power using the switch on the back of the instrument.

3rd step: Press the Run Switch on the front cover of the instrument to set the system ready to run.

4th step: On the computer after entering operation system, start the LineGene 9600 fluorescent quantitative detection system. To start the software, click “LineGene9600” from [Start]/ [programme] menu or double click the short-cut icon on desktop.

3. Starting software interface

Run the programme and it will display the system window.



The system window consists of the menu bar, the toolbar and the main page.

Chapter 4 Absolute Quantification

1. Design Experiment

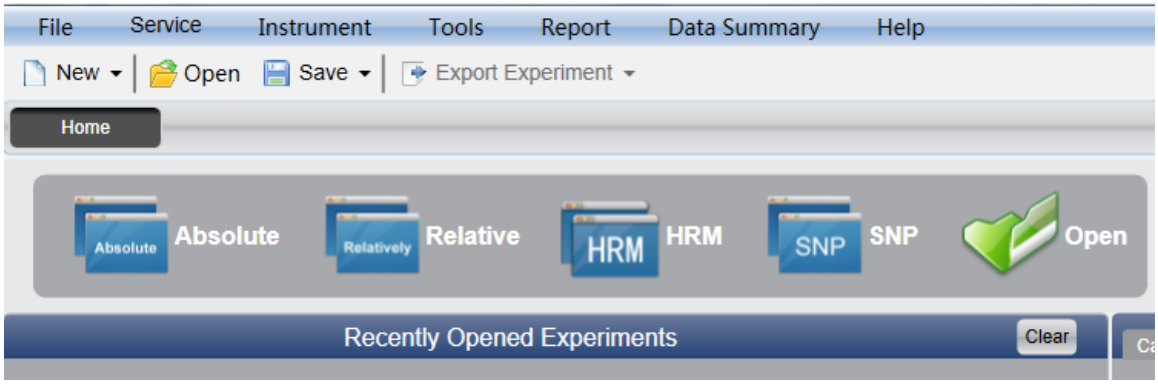
Start
▼
Design experiment
▼
Prepare for the reaction
▼
Run the experiment
▼
Experiment analysis
▼
Experiment report
▼
Data export
▼
End

This section describes how to design a new absolute quantification experiment and covers inspection item setting, sample information setting, reaction plate setting and programme setting.

1.1 Create New Absolute Quantitative Experiment

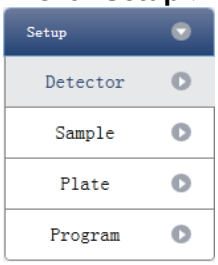
1. Click build **Absolute** on the **Home** interface and this will open the absolute quantitative experiment window.

NOTE: The Absolute quantitative experiment can be also created by:
a. Clicking **File** ▶ **New** ▶ **Absolute** on the menu bar
b. Clicking **New** ▶ **Absolute** on the toolbar



1.2 Detector Setting

1. Click **Setup** ▶ **Detector**

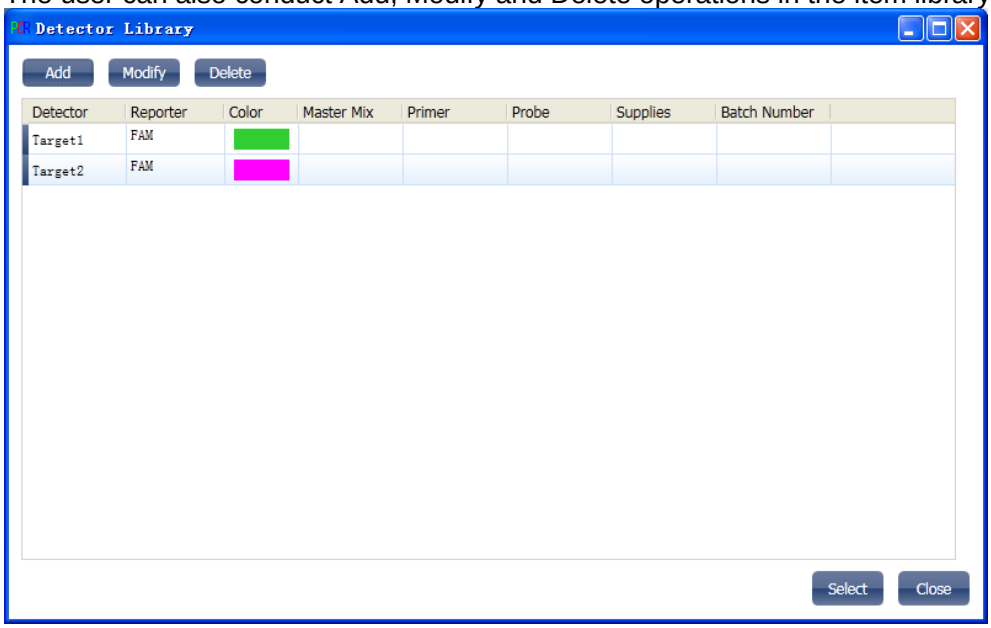


2. Input experiment properties
Input the experiment name, user name and any comments in the experiment properties column.

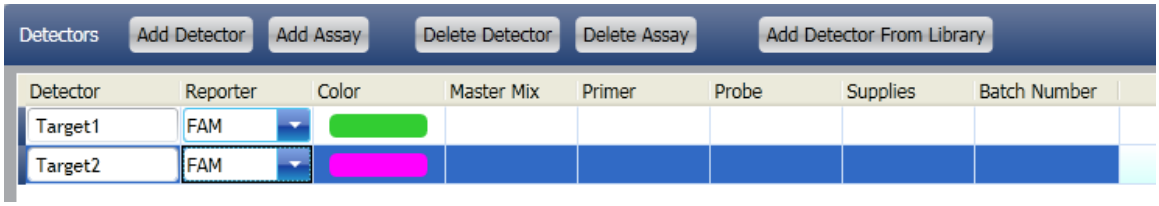
3. Detector Setting
Set up the Detector, Assay, Dye and Colour.

If necessary, the user can also:
a. Add detector
b. Add assay
c. Delete detector
d. Delete assay
e. Add the detector in the Detector Library: click **Add Detector From Library** ▶ the **Detector Library** window will pop up ▶ select the Detector in the window to be added

The user can also conduct Add, Modify and Delete operations in the item library.



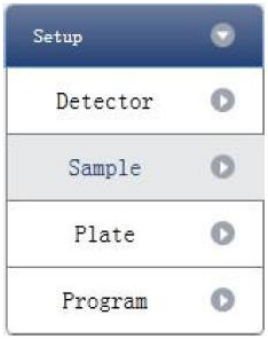
f. Set up the detector, set up the assay, set up the dye name and set up the colour



4. Set up reference dye

1.3 Sample Information Setting

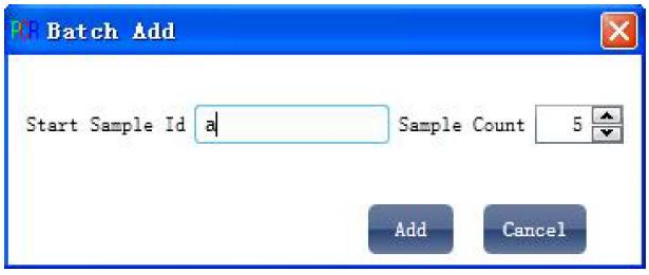
1. Click **Setup** ▶ **Sample**



2. Add sample information

a. Itemized addition: input ID in **Sample ID** ▶ press **Enter** ▶ add information for one sample

b. Batch addition: click **Batch Add** ▶ the Batch Add window will pop up



3. Delete sample information

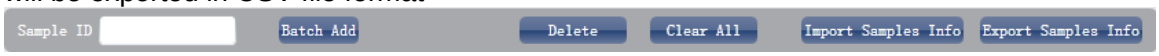
a. Itemized deletion: select one sample ▶ click **Delete** ▶ delete the selected sample information

b. Delete all: click **Clear All** ▶ delete all sample information

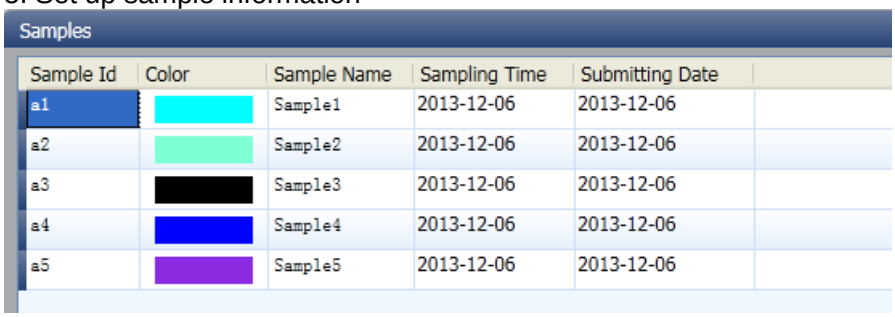
4. Import/Export sample information

a. Click **Import Sample Info** ▶ the File Import window will pop up ▶ import sample information file in CSV format

b. Click **Export Sample Info** ▶ the Save As window will pop up ▶ the sample information will be exported in CSV file format

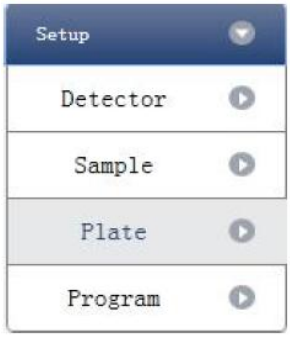


5. Set up sample information



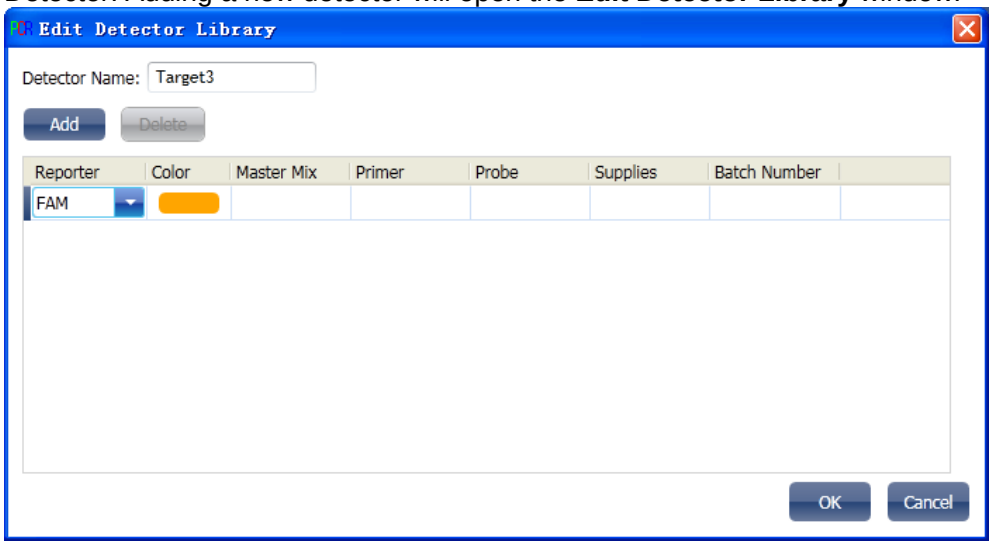
1.4 Reaction Plate Setting

1. Click **Setup ▶ Plate**



2. Set up the inspection criteria of the reaction plate
a. Select reaction plate well site: click Reaction Plate well Site

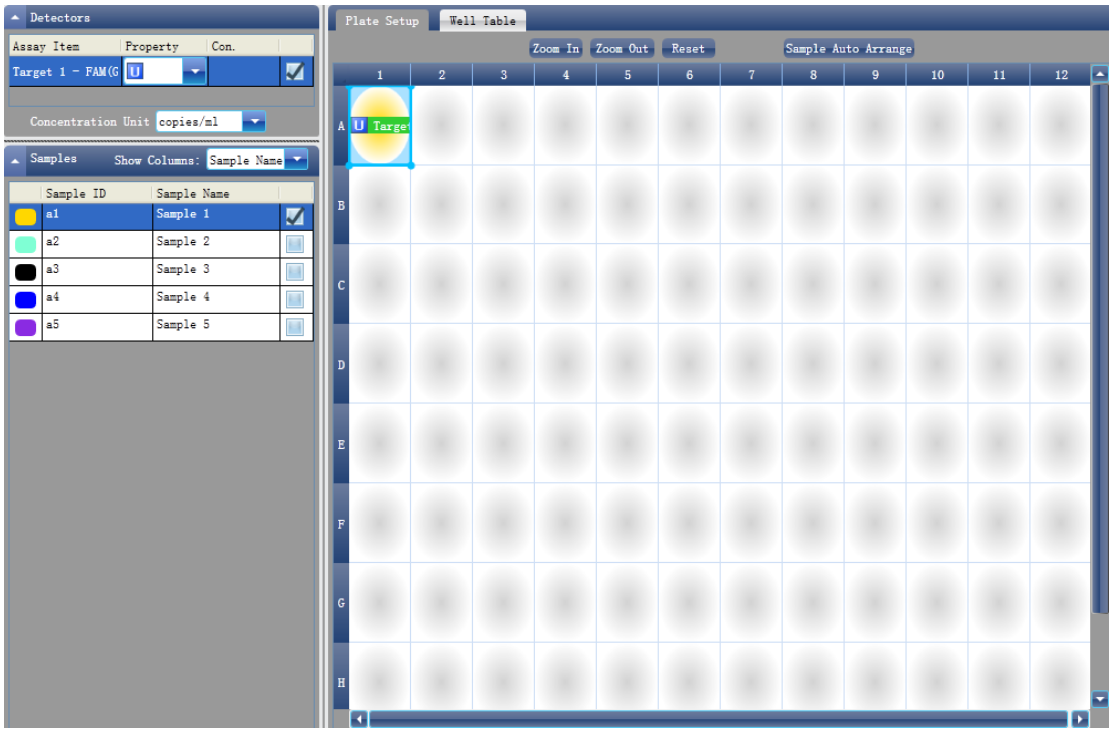
The user can also right click the reaction plate well site to Copy, Paste and Add New Detector. Adding a new detector will open the **Edit Detector Library** window.

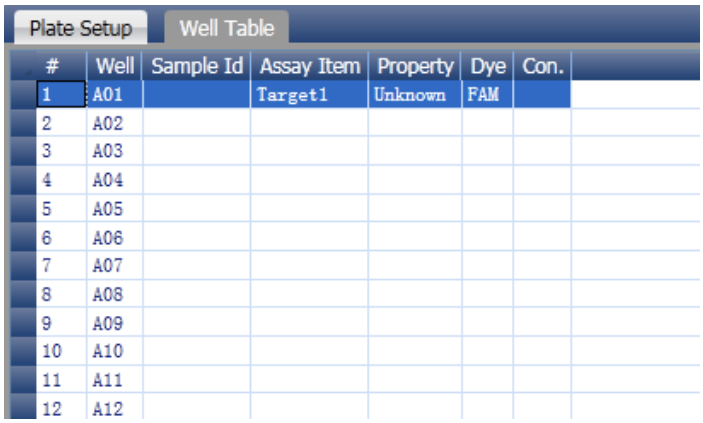


b. Select Assay item and modify the property, concentration and concentration unit.

Property	Name	Concentration	Concentration unit
U	Unknown	NO	Copies/ml
S	Standard	YES	IU/ml
N	Negative	NO	Fg/ml
P	Positive	NO	Pg/ml

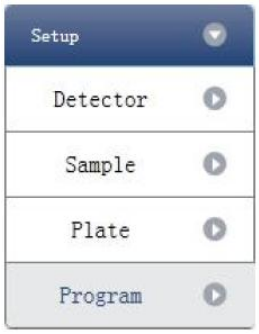
c. Select a sample and the list displayed will change
d. Zoom-In, Zoom-Out and reset the reaction plate.
e. Sample Auto Arrange
f. Check Well Table





1.5 Programme Setting

1. Click **Setup ► Programme**



2. Run Programme Setup

a. Create new stage: the user can create a new **Hold Stage**, **Cycling Stage** or **Melting Stage**

The user can also click **Add Stage** directly and the default will be creating a new **Cycling Stage**.

b. Create new step: the user can create a new step **Before** or **After** the currently selected step

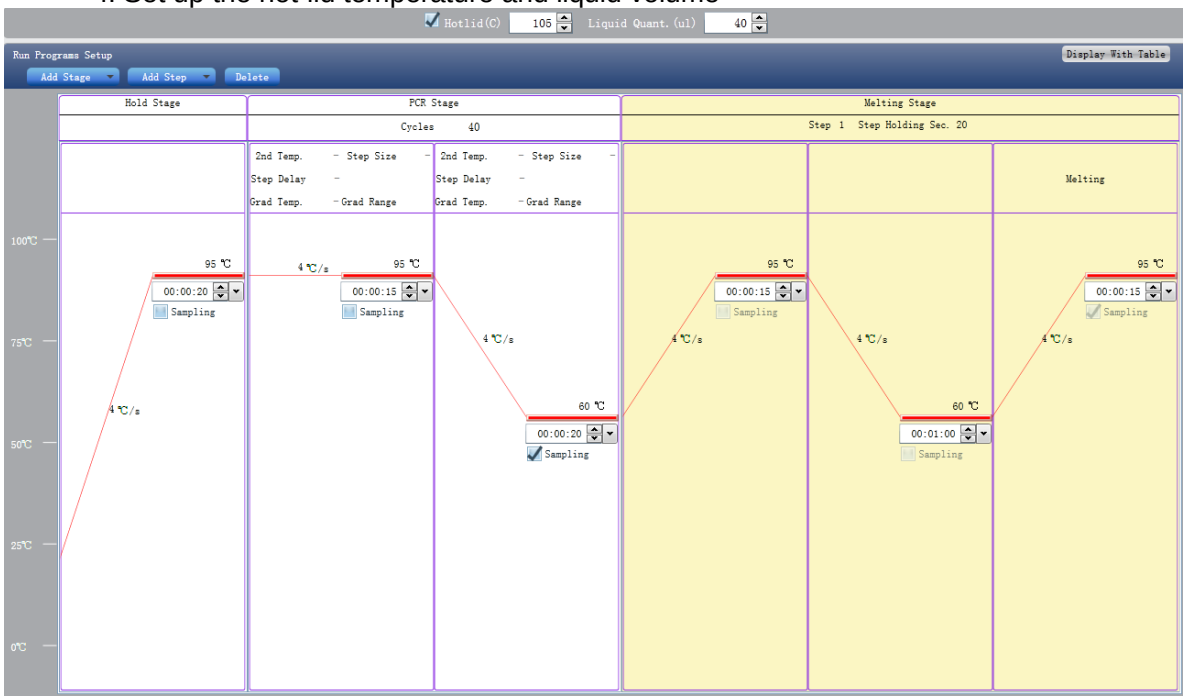
The user can also click **Add Step** and the default will be adding a new Step at the end of the currently selected stage or after the currently selected step.

c. Delete: the user can delete the currently selected step or stage

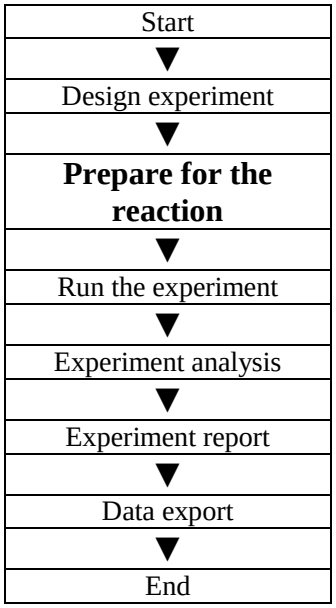
d. Display form: click **Display With Table ►** new window will pop up **►** the details of the current experiment will be displayed in a table.

e. Set up the experimental data of the hold stage, cycling stage and melting stage melting section

f. Set up the hot-lid temperature and liquid volume



2. Prepare for Reaction



The user should make full preparations prior to the experiment:
• Ensure appropriate materials are used.
• Ensure the arrangement of the PCR reaction plate is consistent with the setting layout of the reaction plate in Section 1.4.

3. Run the Experiment

Start
▼
Design experiment
▼
Prepare for the reaction
▼
Run the experiment
▼
Experiment analysis
▼
Experiment report
▼
Data export
▼
End

This section describes how to run/operate the experiment after loading the reaction plate and includes how to operate the fluorescence curve, the temperature curve and programming

Caution: Before starting, make checks and follow the procedure for correct start up of the system.
The green lamp of the run switch will be lit and the system will be ready to run.

Caution: Before running the programme, push the module smoothly until the locking sound is heard and the alarm lamp is switched off.
If the module is pulled out or is improperly closed, the software will produce a pop-up warning and the alarm lamp will light up.
In this case, the temperature programme can be run but the fluorescence scanning data would become invalid.

3.1 Preparation for reagent sample

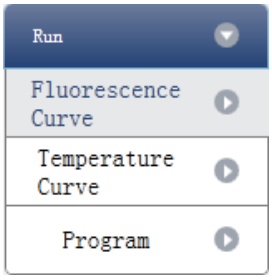
- Preparation for reagent: The LineGene 9600 series fluorescent quantitative PCR detection system uses 0.2ml PCR tubes, strip tubes or 96 well PCR plates to conduct the reaction. The recommended reaction volume is 10μl～50μl for an optimal reaction system.
- The tube, strip tube or 96 well PCR plate, must have an optically clear bottom.
- Centrifugal operation: Before placing reactions into the instrument, it is recommended that a short centrifugal spin is used to ensure that the reagent is at the bottom of the reaction tube and the reagent/sample mix is free from bubbles.
- To insert test tube: If individual tubes or strip tubes are used, and the sample quantity is less than the maximum capacity of the instrument, it is recommended the sample tubes should be evenly distributed across the block as far as possible. This will create even pressure across the hot-lid, ensuring consistent pressure on all the tubes during running, which greatly improves temperature consistency across all sample tubes.

Correct.
The sample is at the bottom of the PCR tube

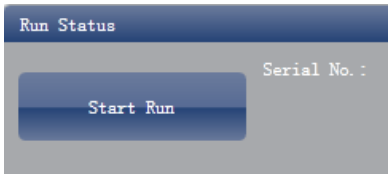
Incorrect
1. Requires a greater spin speed
2. Requires a longer spin time

3.2 Run Fluorescence Curve

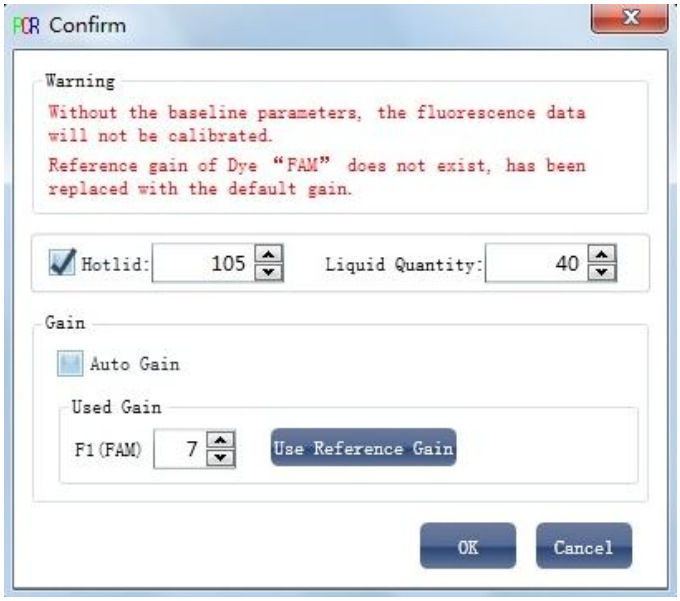
1. Click **Run ▶ Fluorescence Curve**



2. Click **Start Run**



3. Operating confirmation
    a. Modify hot-lid temperature and liquid quantity (sample volume).
    b. Gain (baseline) parameter setting
    c. Target fluorescence value setting

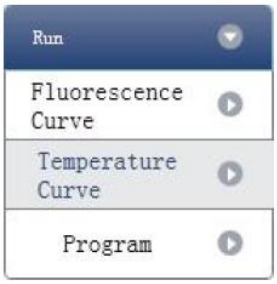


4. After it starts operating, the user can:
    a. Skip the current stage
    b. Add a cycle
    c. Delete a cycle
    d. Stop run

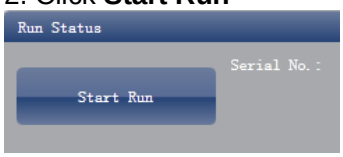
5. Plot display setting
    a. Assay item
    b. Plot colour

3.3 Run Temperature Curve

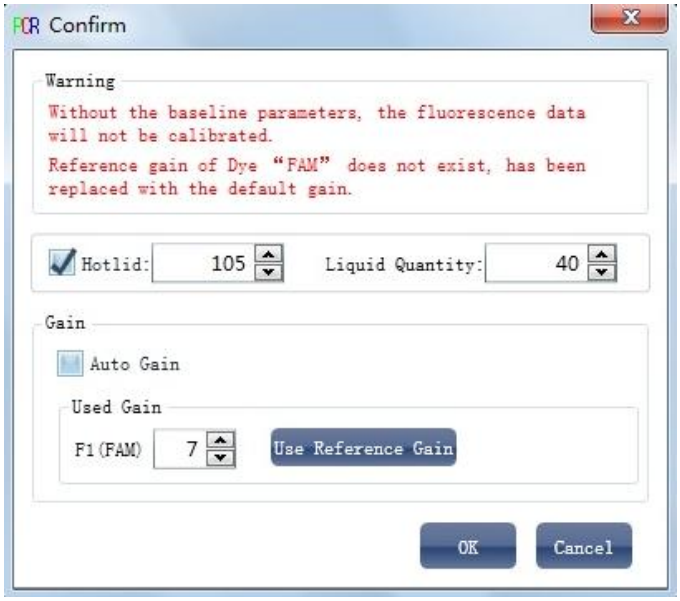
1. Click **Run ► Temperature Curve**



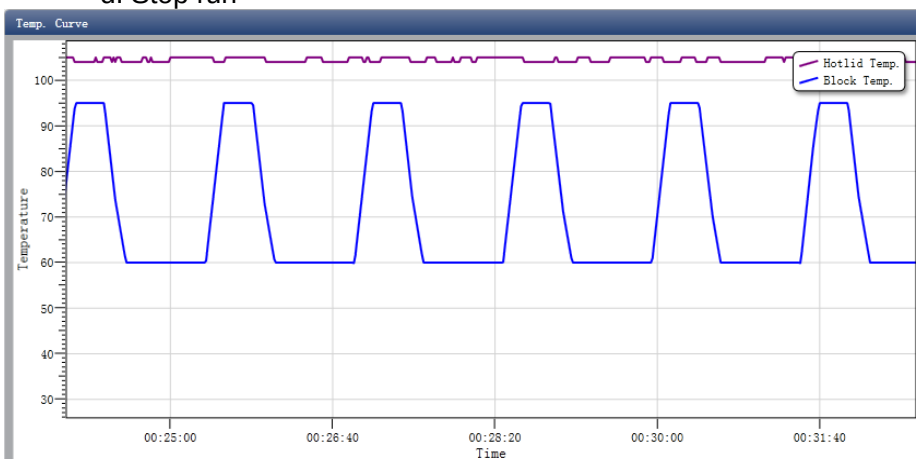
2. Click **Start Run**



3. Operating confirmation
    a. Modify hot-lid temperature and liquid quantity (sample volume).
    b. Gain (baseline) parameter setting
    c. Target fluorescence value setting



4. After it starts running, the user can:
    a. Skip the current stage
    b. Add a cycle
    c. Delete a cycle
    d. Stop run



3.4 Programme Setting

The user can only check the programme setting but cannot make modifications.

3.5 Working state indication lamps on instrument

The panel at the right of the instrument is fixed with 1 lamp and the colors related to the system state during the running of a programme:

- **Standby**: The indicator lamp lights **blue**, which denotes that the entire machine is ready to operate.
- **Running**: The indicator lamp lights **green**, which denotes that the entire machine is running a programme.
- **Error**: The indicator lamp lights **red**, which denotes that the instrument has detected a fault.

Caution: For prolonged shutdown, switch off the power at the back of the instrument and at the socket. When switched on again, the hot-lid and module will revert to the default settings.

The front cover of the instrument is fixed with a self-locking key to control energizing of its internal control system:

- Run Switch: running/standby switch.
- After pressing this key, the green indicator lamp is lit on the instrument, the internal system is energized and the instrument is ready to run the programme.
- After pressing this key again, the key will spring out, the green indicator lamp goes off, the instrument internal system is de-energized and the system is under standby.

Caution: The run switch is for ease of operation and is merely used for temporary or short term closing down of the control system. When the system is under the standby state, the instrument internal AC circuit remains live.

3.5.1. Prompts which may occur during running

- Hot-lid temperature sensor alarm prompt
- Sink temperature sensor alarm prompt
- Environmental temperature sensor alarm prompt
- Module temperature sensor alarm prompt
- Module sensor short-circuit or short-circuit alarm prompt

Caution: In case the temperature alarm displays during the running of a programme, the PCR detection system will terminate the current programme. The instrument should be switched off and then re-started.

4. Experiment Analysis

Start
▼
Design experiment
▼
Prepare for the reaction
▼
Run the experiment
▼
Experiment analysis
▼
Experiment report
▼
Data export
▼
End

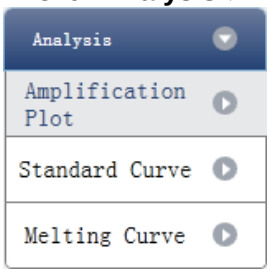
This section describes how to view the experiment analysis results after running an experiment and adjusting parameters for re-analysis.

This section covers the analysis of amplification curves and standard curves, adjusting parameters for re-analysis and importing parameters.

4.1 Check Results

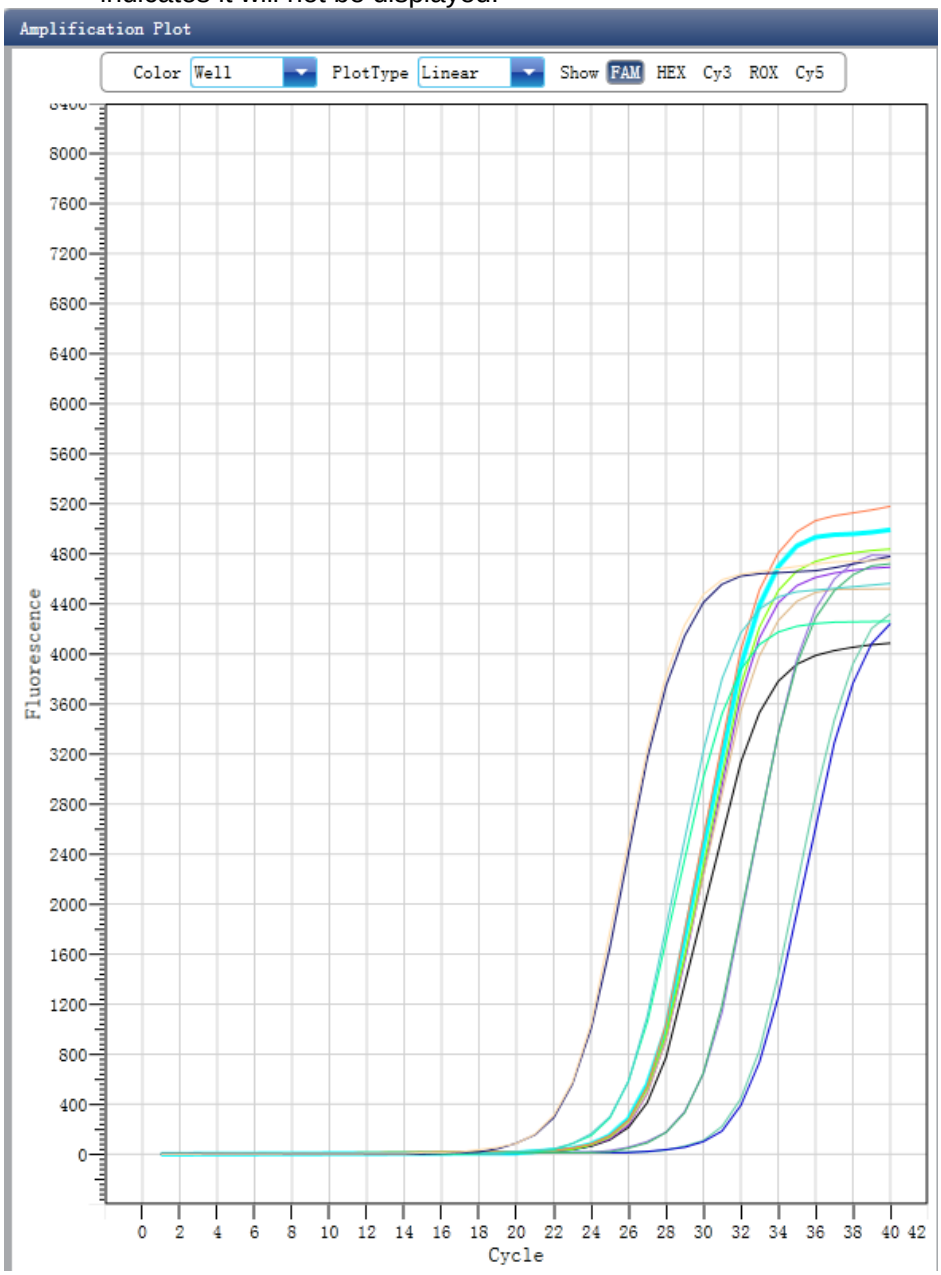
4.1.1 Check the Amplification Plot

1. Click **Analysis** ▶ **Amplification Plot**



2. Check the amplification curve
    a. Set up colour
    b. Set up plot type
    c. Set up show dye

    When the background colour of a dye name is blue, it will be displayed; while white indicates it will not be displayed.



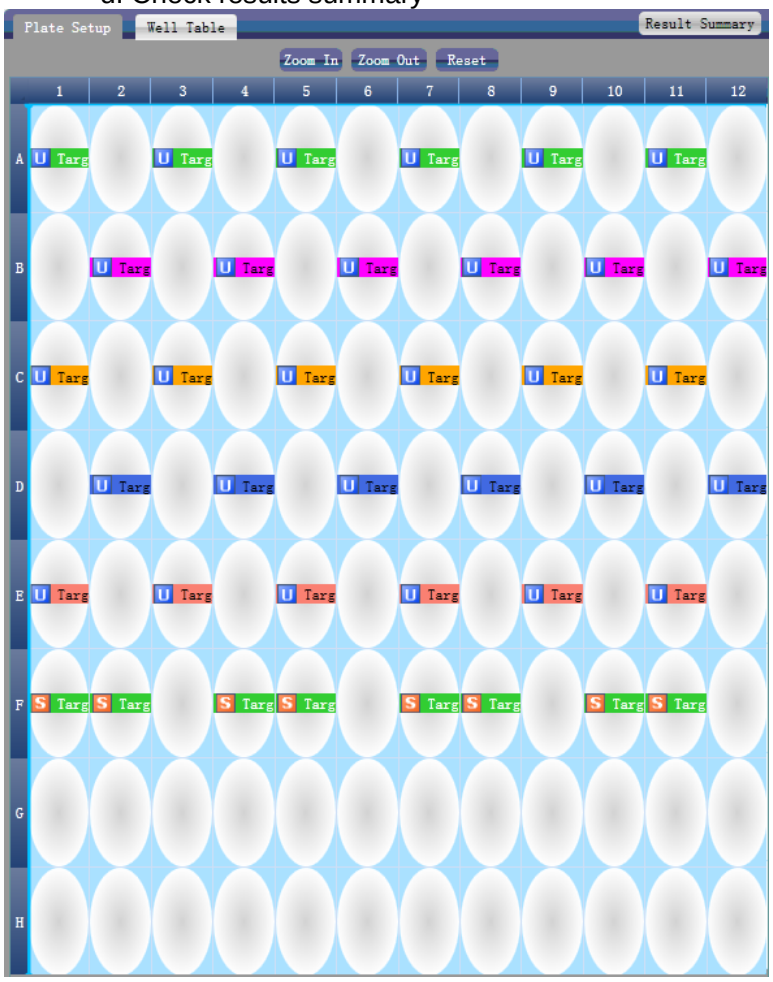
3. Check the reaction plate

a. Select reaction plate well site and check corresponding well site curve
The default is all wells are selected

b. Zoom-In, Zoom-Out and reset the reaction plate

c. Check well table

d. Check results summary



4. Set up assay

a. Set up assay

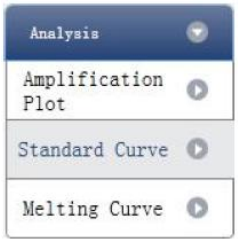
b. Set up threshold

c. Set up automatic baseline

When the threshold value is not automatic, the user cannot set up the automatic baseline

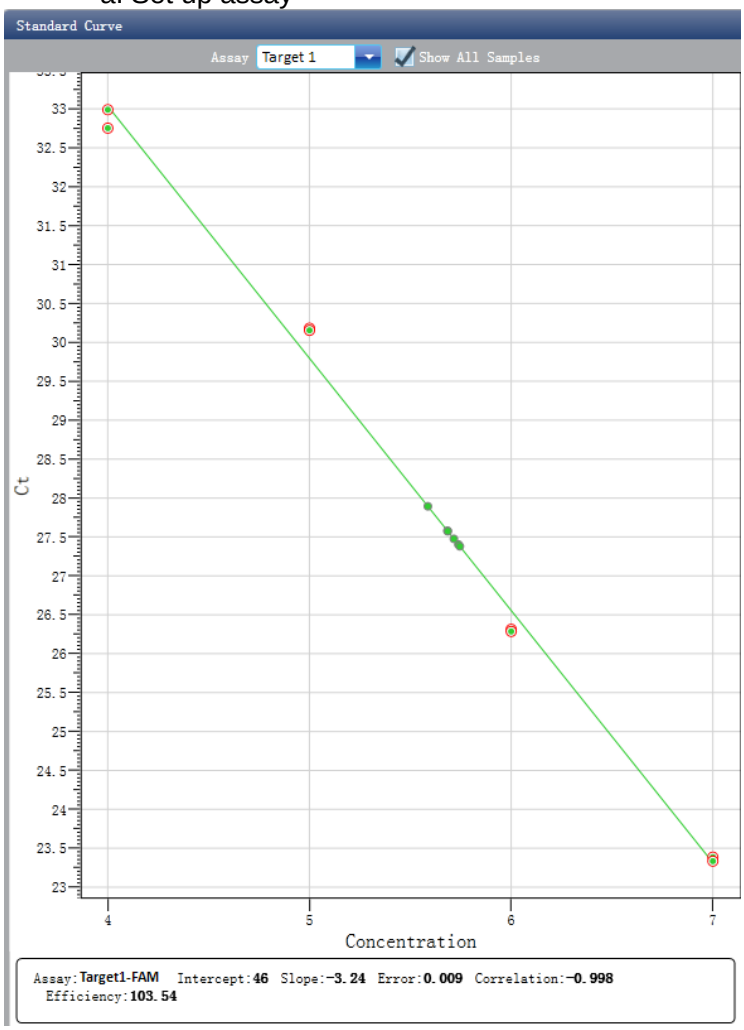
4.1.2 Check Standard Curve

1. Click **Analysis ▶Standard Curve**



2. Check standard curve

a. Set up assay



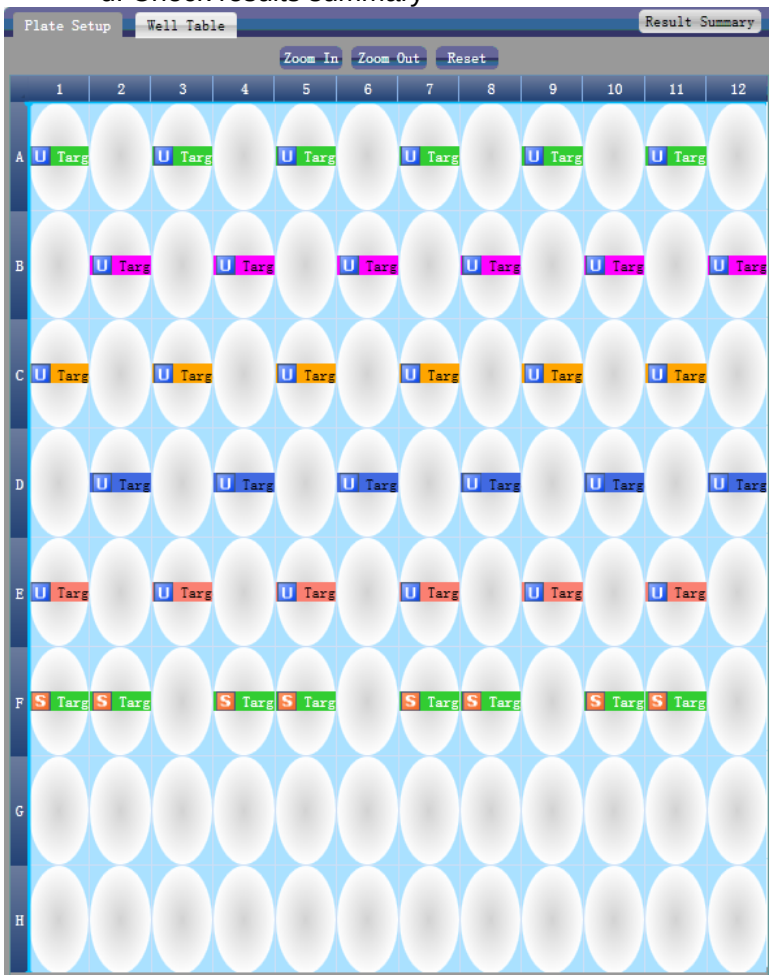
3. Check the reaction plate

a. Select reaction plate well site and check corresponding well site curve
The default is all wells are selected

b. Zoom-In, Zoom-Out and reset the reaction plate

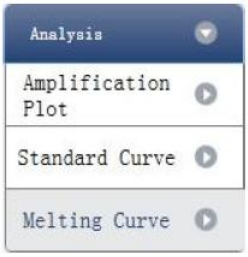
c. Check well table information

d. Check results summary

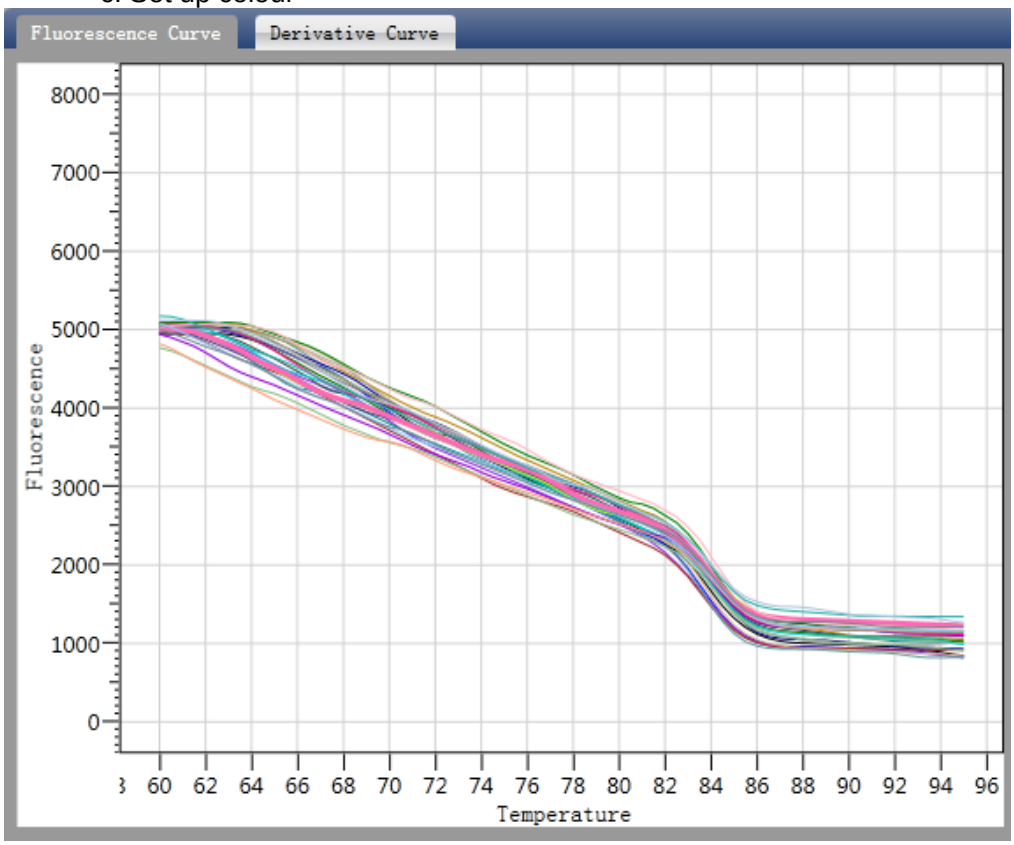


4.1.3 Check Melting Curve

1. Click **Analysis ▶ Melting Curve**



2. Check the melting curve
    a. Check the fluorescence curve
    b. Check the derivative curve
    c. Set up colour



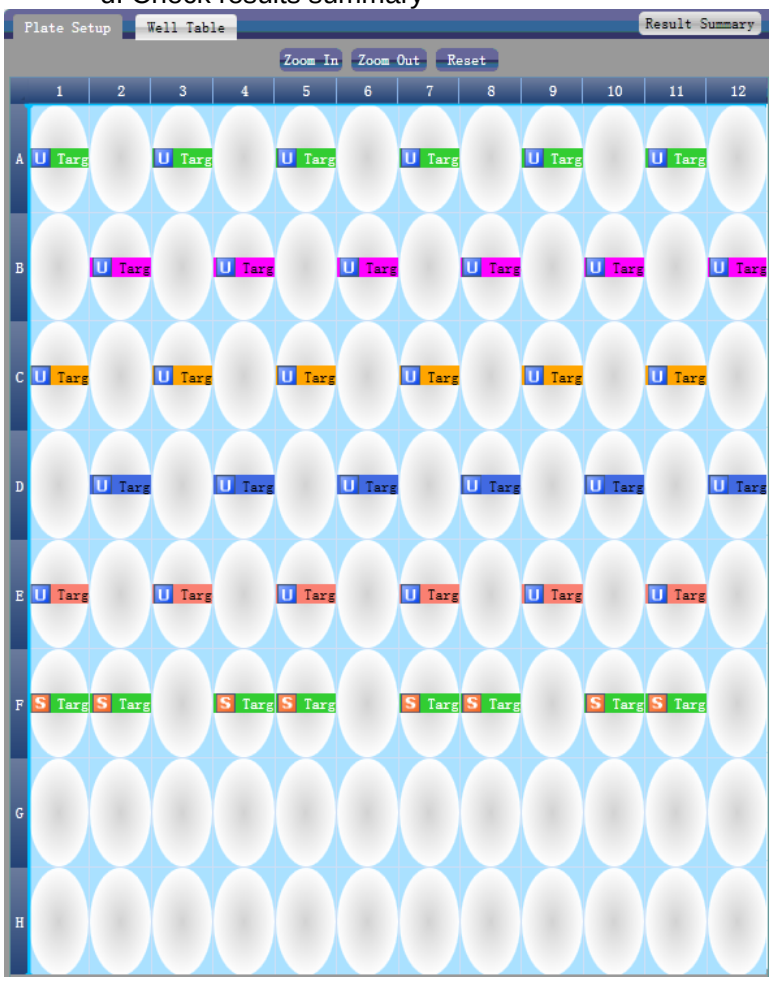
3. Check the reaction plate

a. Select reaction plate well site and check corresponding well site curve
The default is all wells are selected

b. Zoom-In, Zoom-Out and reset the reaction plate

c. Check well table information

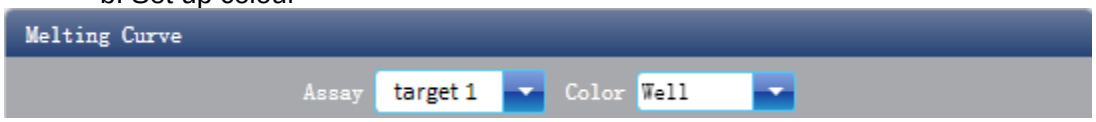
d. Check results summary



4. Set up assay

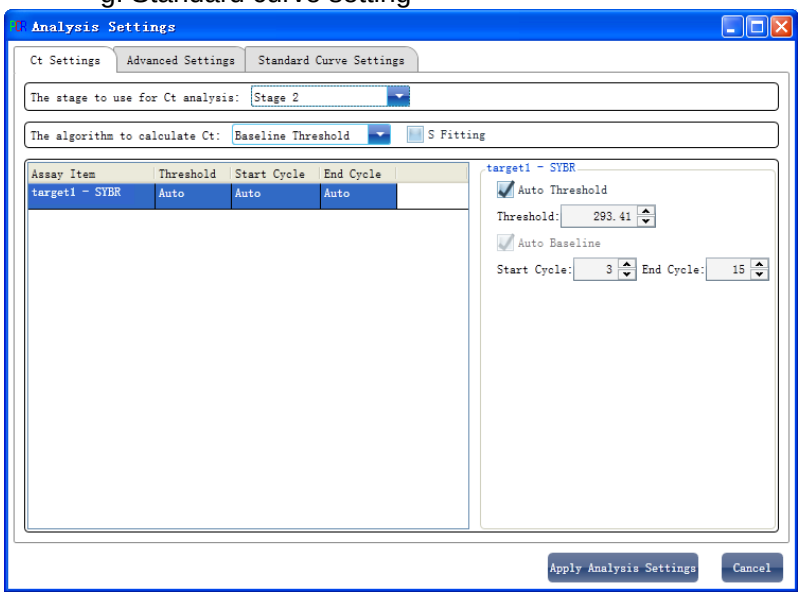
a. Set up assay

b. Set up colour



4.2 Adjusting Parameters and Re-analysis

1. Click **Analysis Settings** ▶ the Analysis Settings dialog box will pop up
    a. Adjust the start cycle and end cycle of the baseline
    b. Adjust Ct analysis algorithm
    c. Set up the use of S fitting
    d. Set up the stage to use for Ct analysis
    e. Set up the automatic threshold value
    f. Advanced setting
    g. Standard curve setting



5. Experiment Report

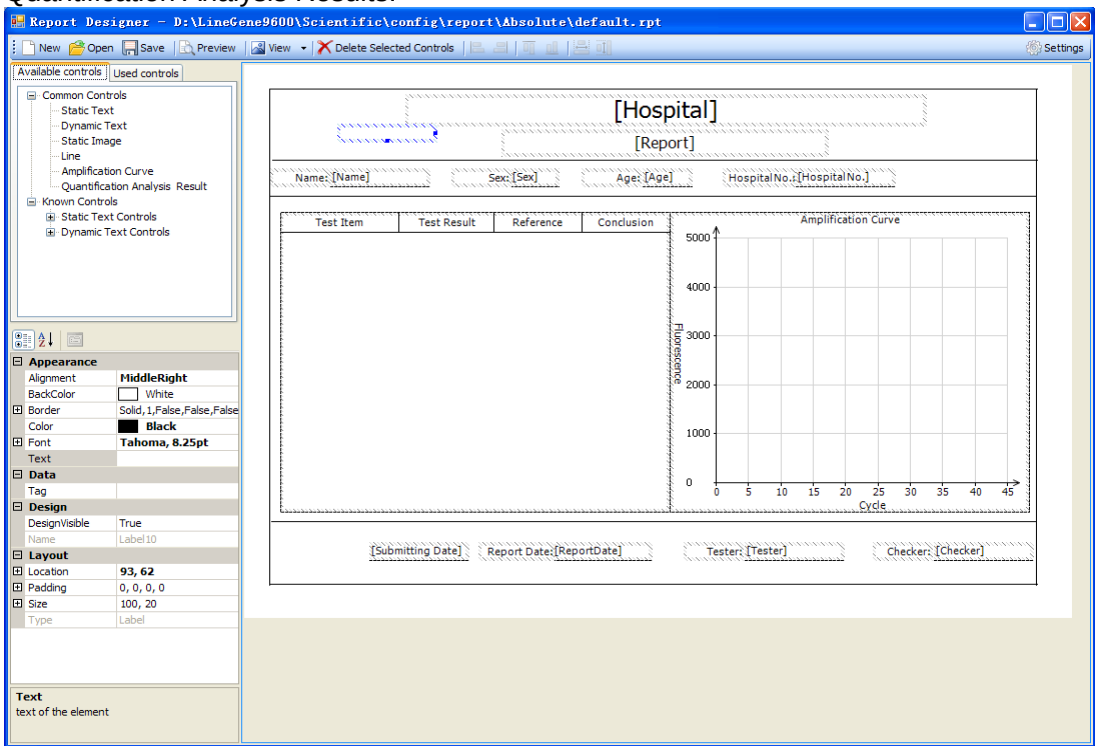
Start
▼
Design experiment
▼
Prepare for the reaction
▼
Run the experiment
▼
Experiment analysis
▼
Experiment report
▼
Data export
▼
End

This section describes how to print an experiment report and covers designing of a report template and print settings.

5.1 Designing a Report Template

1. Click **Report** ▶ **Report Template Editor** ▶ the Report Designer window will pop up

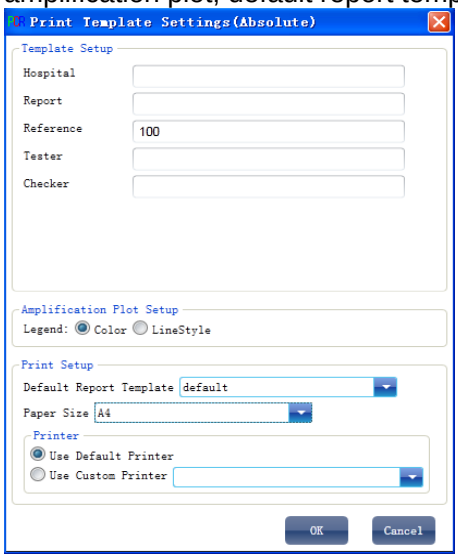
The report consists of controls and the user can add, modify and delete controls. Available controls include Static Text, Dynamic Text, Line, Static Image, Amplification curve and Quantification Analysis Results.



5.2 Print Setting

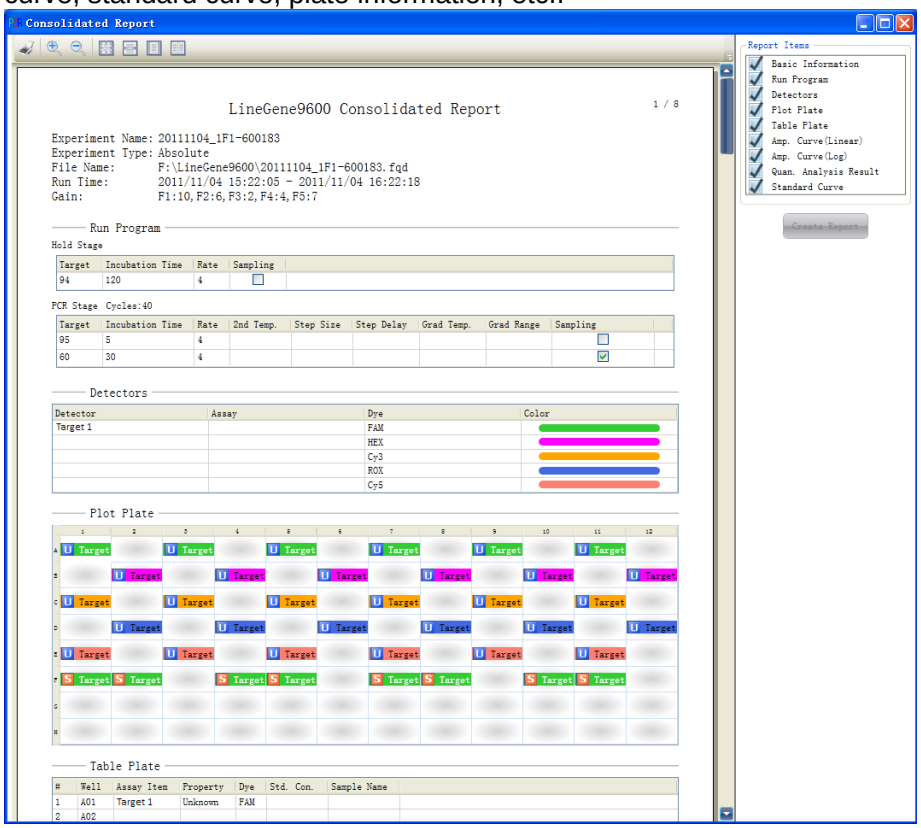
1. Click **Report ► Print Template Setting ►** the Print Template Setting window will open

The user can set up the laboratory name, report name, reference value, tester, checker, amplification plot, default report template and paper size.



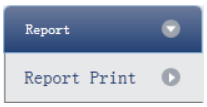
5.3 Comprehensive Report

1. Click **Report ► Consolidated Reports ►** the Consolidated Report window will pop up
The Consolidated Report includes the basic information, sample information, amplification curve, standard curve, plate information, etc..

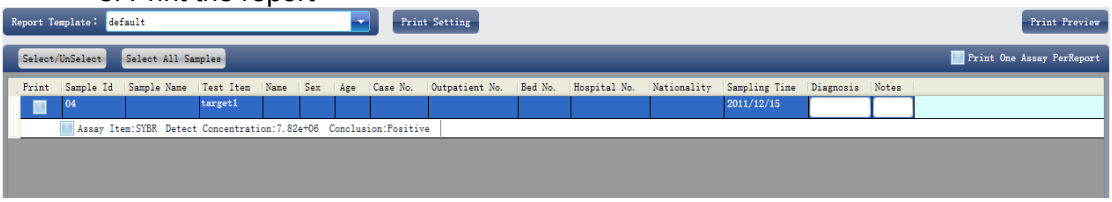


5.4 Report Printing

1. Click **Report ▶ Report Print**



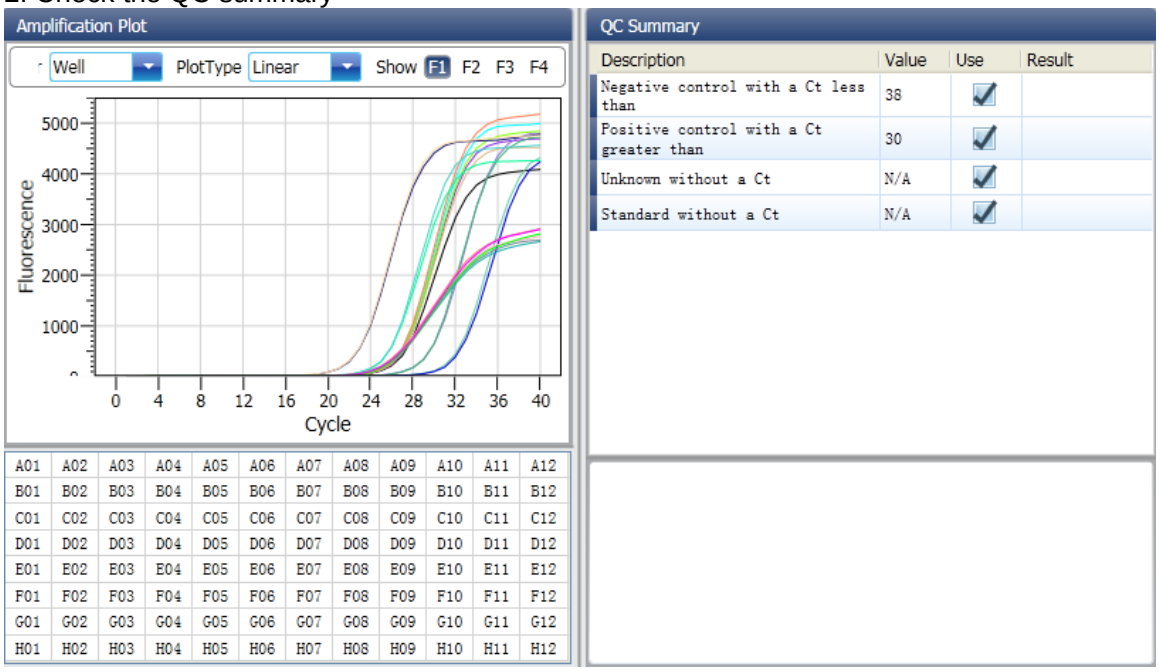
2. Report print setting
    a. Set up report template
    b. Print setting (please refer to Section 5.2)
    c. Select items to print
    d. Print preview
    e. Print the report



5.5 QC Summary

1. Click **Report ▶ QC Summary**

2. Check the QC summary



6. Data Export

Start
▼
Design experiment
▼
Prepare for the reaction
▼
Run the experiment
▼
Experiment analysis
▼
Experiment report
▼
Data export
▼
End

This section describes how to export data and covers exporting to a database, experiment filing and exporting the experiment data to EXCEL.

6.1 Export to Database

Click **Data Summary** ▶ **Export to Database** ▶ the Save File dialog box will pop up ▶ save the exported database file

6.2 Experiment Filing

1. Click **Data Summary** ▶ **Archived Experiment Directory** ▶ the Experimental archive storage directory window will pop up ▶ set up the storage path of file.

2. Experiment filing

Click **Data Summary** ▶ **Archived Experiment** ▶ export the filed experiment file
The suffix of the filed experiment file is .fqh

6.3 Export Experiment Data to EXCEL

Click **Data Summary**▶**Export Experiment** ▶ **Export Experiment to Excle** ▶the exported experiment data will generate EXCEL file

6.4 Export Experiment Data to TEXT

Click **Data Summary**▶**Export Experiment** ▶ **Export Experiment to Text**▶ the exported experiment data will generate TEXT file

Chapter 5 Relative Quantitative

1. Design Experiment

Start
▼
Design experiment
▼
Prepare for the reaction
▼
Run the experiment
▼
Experiment analysis
▼
Experiment report
▼
Data export
▼
End

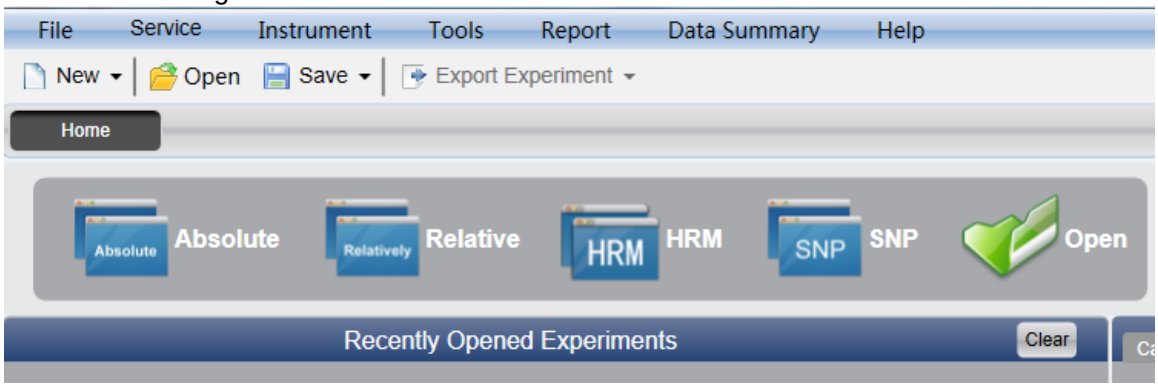
This section describes how to design a relative quantitative experiment and covers creating new relative quantitative experiment, inspection item setting, sample information setting, reaction plate setting and programme setting.

1.1 Create New Relative Quantitative Experiment

1. Click **Relative** on **Home** interface and create Relative Quantitative Experiment window. Relative quantitative experiment can be also created by:

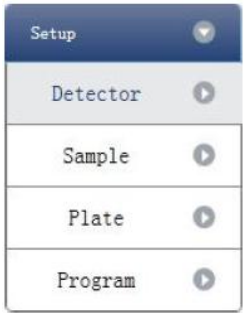
   a. Clicking **New** ▶ **Relative** on the toolbar

   b. Clicking **File** ▶ **New** ▶ **Relative** on the menu bar



1.2 Detector Setting

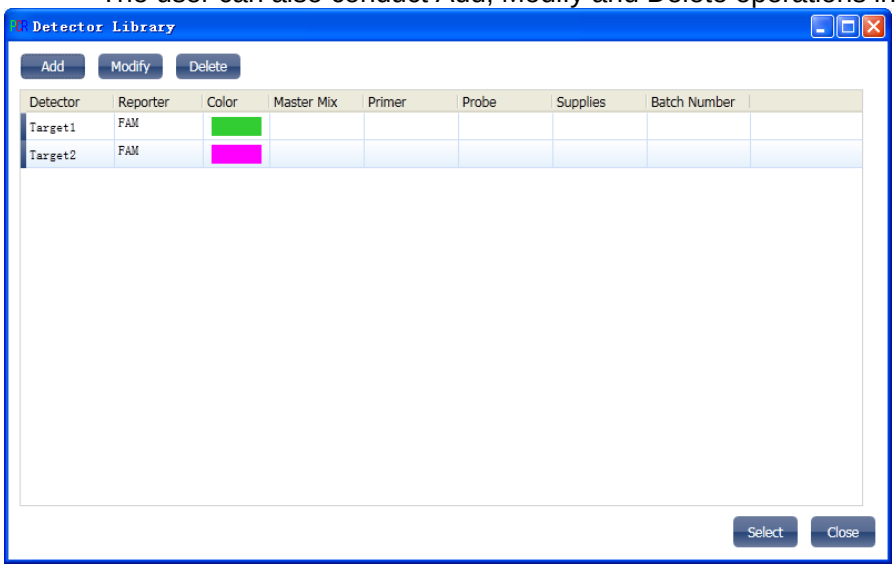
1. Click **Setup** ▶ **Detector**

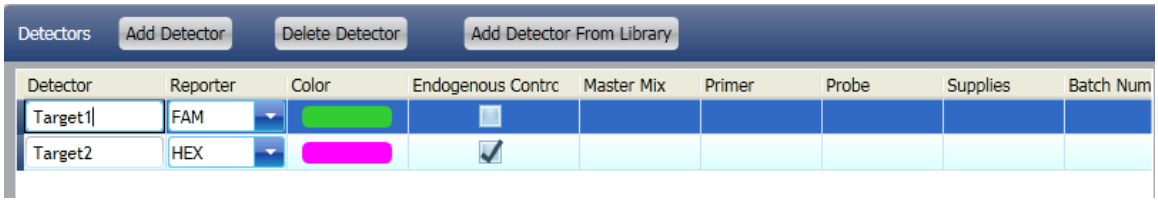


2. Input Experiment Properties
Input the Experiment name, User name and Comment in the basic information column.

3. Inspection Item Setting

a. Set up the Detector, Assay, Dye and Colour.
b. Add detector
c. Delete detector
d. Add detector from library
The user can also conduct Add, Modify and Delete operations in the item library.

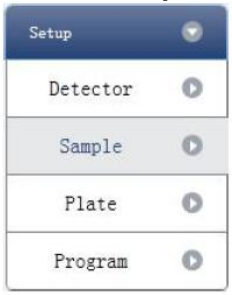




4. Set up reference dye

1.3 Sample Information Setting

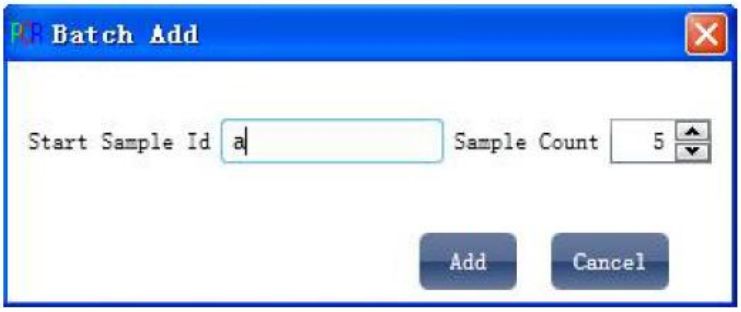
1. Click **Setup ▶ Sample**



2. Add sample information

a. Itemized addition: input ID in **Sample ID** ▶ press **Enter** ▶ add information for one sample.

b. Batch addition: click **Batch Add** ▶the Batch Add window will pop up



3. Delete sample information

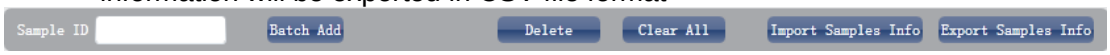
a. Itemized deletion: select one sample ▶ click **Delete** ▶ delete the selected sample information

b. Delete all: click **Clear All** ▶ delete all sample information

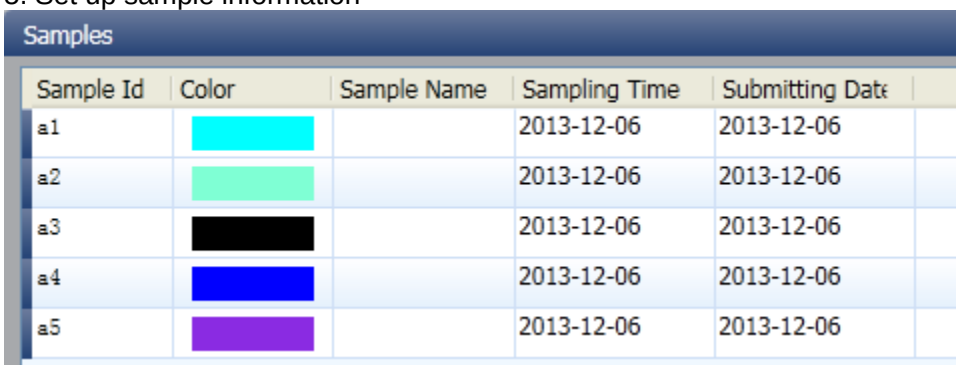
4. Import/Export sample information

a. Click **Import Sample Info** ▶ the File Import window will pop up ▶ import sample information file in CSV format

b. Click **Export Sample Info** ▶ the Save As window will pop up ▶ the sample information will be exported in CSV file format

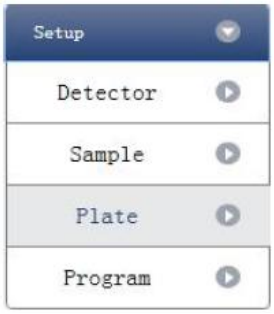


5. Set up sample information



1.4 Reaction Plate Setting

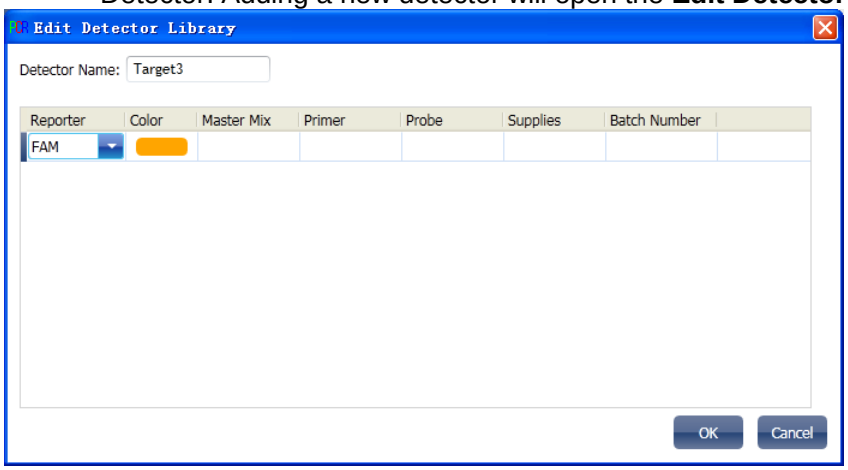
1. Click **Setup ▶ Plate**



2. Set up the inspection criteria of the reaction plate

a. Select reaction plate well site: click Reaction Plate well Site

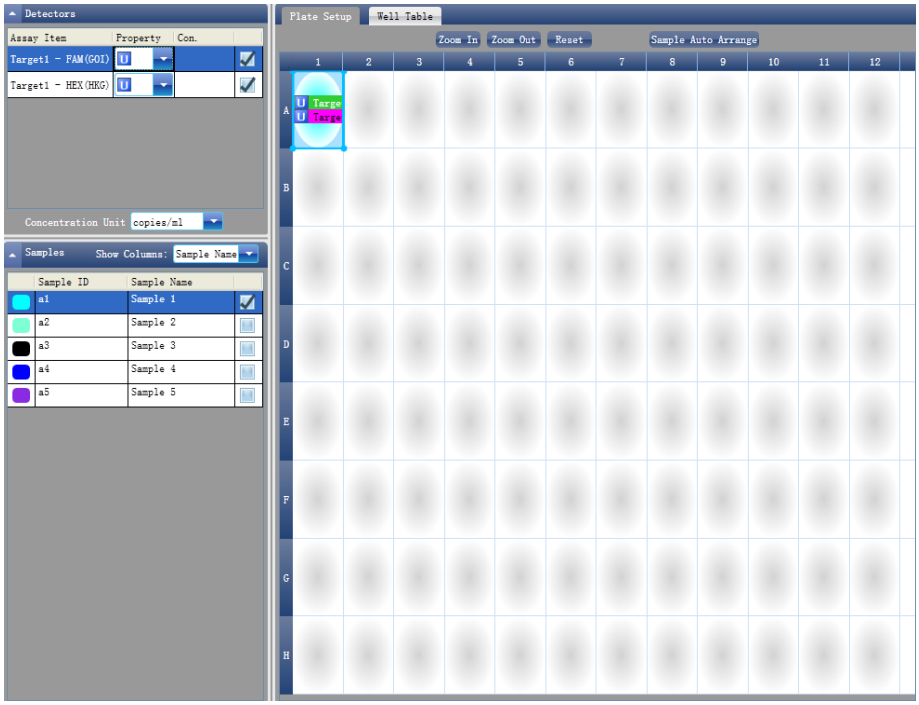
The user can also right click the reaction plate well site to Copy, Paste and Add New Detector. Adding a new detector will open the **Edit Detector Library** window.



b. Select inspection item and modify the property, concentration and concentration unit.

Property	Name	Concentration	Concentration unit
	Unknown	NO	Copies/ml IU/ml Fg/ml Pg/ml
	Standard	YES	
	Negative	NO	

c. Select a sample and the list displayed will change
d. Zoom-In, Zoom-Out and reset the reaction plate.
e. Sample Auto Arrange
f. Check Well Table



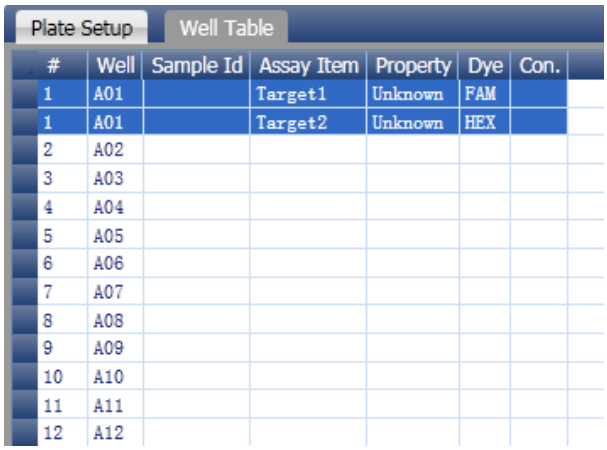
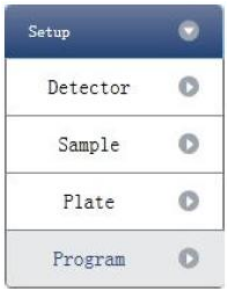


Plate Setup | Well Table

#	Well	Sample Id	Assay Item	Property	Dye	Con.
1	A01		Target1	Unknown	FAM	
1	A01		Target2	Unknown	HEX	
2	A02					
3	A03					
4	A04					
5	A05					
6	A06					
7	A07					
8	A08					
9	A09					
10	A10					
11	A11					
12	A12					

1.5 Programme Setting

1. Click **Setup ▶ Programme**



2. Run Programme Setup

a. Create new stage: the user can create a new **Hold Stage**, **Cycling Stage** or **Melting Stage**

The user can also click **Add Stage** directly and the default will be creating a new **Cycling Stage**.

b. Create new step: the user can create a new step **Before** or **After** the currently selected step

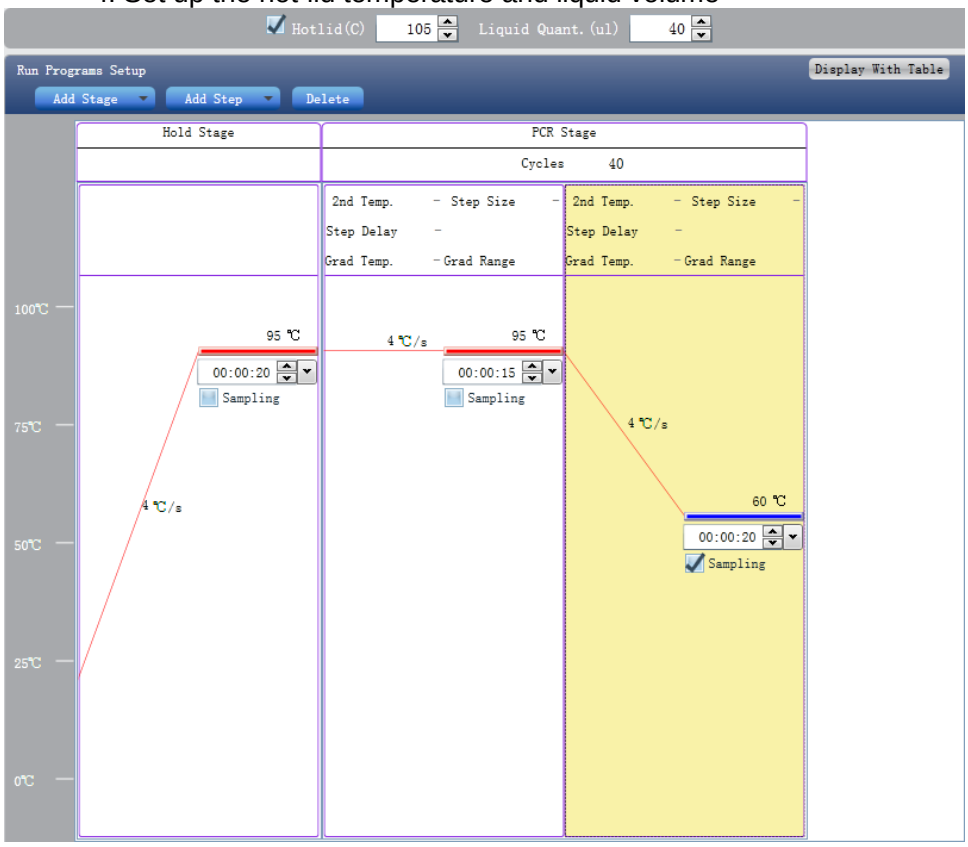
The user can also click **Add Step** and the default will be adding a new Step at the end of the currently selected stage or after the currently selected step.

c. Delete: the user can delete the currently selected step or stage

d. Display form: click **Display With Table** ▶ new window will pop up ▶ the details of the current experiment will be displayed in a table.

e. Set up the experimental data of the hold stage, cycling stage and melting stage melting section

f. Set up the hot-lid temperature and liquid volume



2. Prepare for Reaction

Start
▼
Design experiment
▼
Prepare for the reaction
▼
Run the experiment
▼
Experiment analysis
▼
Experiment report
▼
Data export
▼
End

The user should make full preparations prior to the experiment
• Ensure appropriate materials are used.
• Ensure the arrangement of the PCR reaction plate is consistent with the setting layout of the reaction plate in Section 1.4.

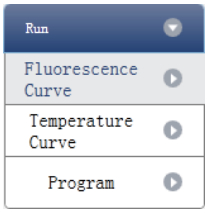
3. Run the Experiment

Start
▼
Design experiment
▼
Prepare for the reaction
▼
Run the experiment
▼
Experiment analysis
▼
Experiment report
▼
Data export
▼
End

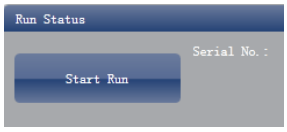
This section describes how to run/operate the experiment after loading the reaction plate and includes how to operate the fluorescence curve, the temperature curve and programming

3.1 Run Fluorescence Curve

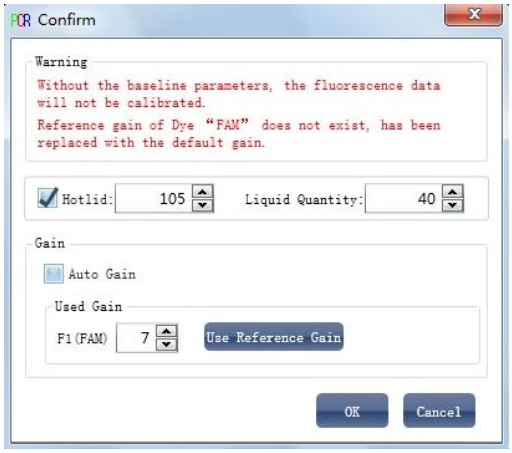
1. Click **Run ▶ Fluorescence Curve**



2. Click **Start Run**



3. Operating confirmation
   a. Modify hot-lid temperature and liquid quantity (sample volume)
   b. Gain (baseline) parameter setting
   c. Target fluorescence value setting

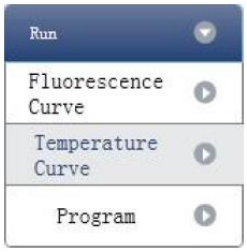


4. After it starts running, the user can:
    a. Skip the current stage
    b. Add a cycle
    c. Delete a cycle
    d. Stop run

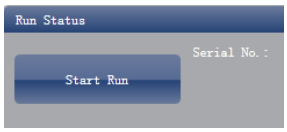
5. Plot display setting
    a. Assay item
    b. Plot colour

3.2 Run Temperature Curve

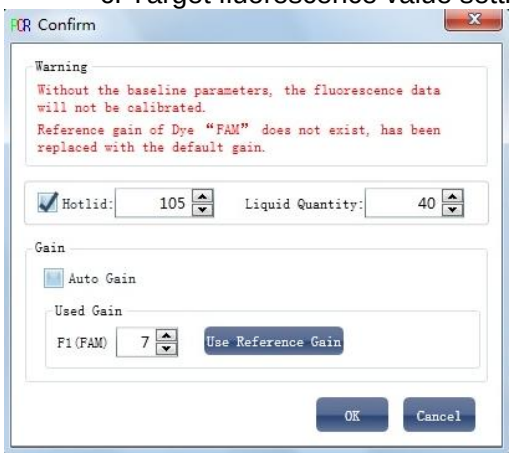
1. Click **Run ► Temperature Curve**



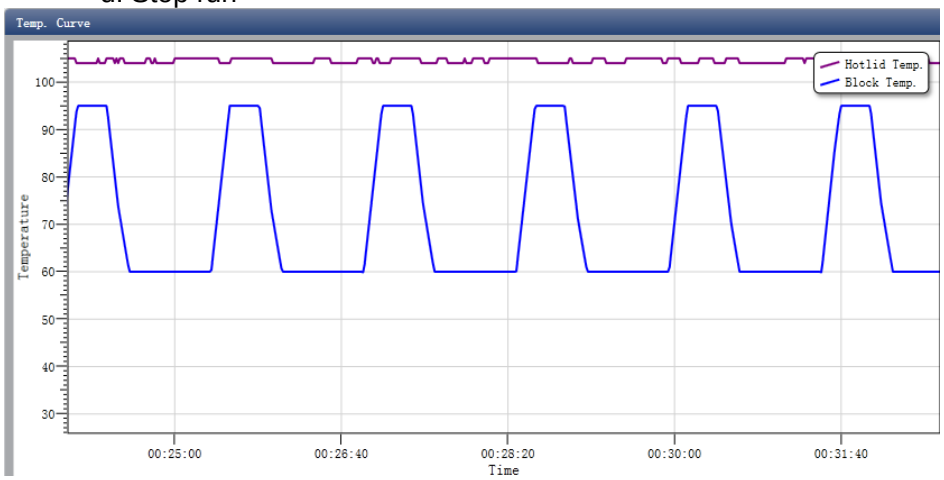
2. Click **Run ► Start**



3. Operating confirmation
    a. Modify hot-lid temperature and liquid quantity (sample volume)
    b. Gain (baseline) parameter setting
    c. Target fluorescence value setting



4. After it starts running, the user can:
    a. Skip the current stage
    b. Add a cycle
    c. Delete a cycle
    d. Stop run



3.3 Programme Setting

The user can only check the programme setting but cannot make modifications.

4. Experiment Analysis

Start
▼
Design experiment
▼
Prepare for the reaction
▼
Run the experiment
▼
Experiment analysis
▼
Experiment report
▼
Data export
▼
End

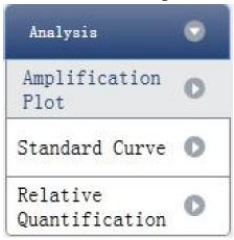
This section describes how to view the experiment analysis results after running an experiment and adjusting parameters for re-analysis.

This section covers the analysis of amplification curves and standard curves, the analysis of relative quantification, adjusting parameters for re-analysis and importing parameters.

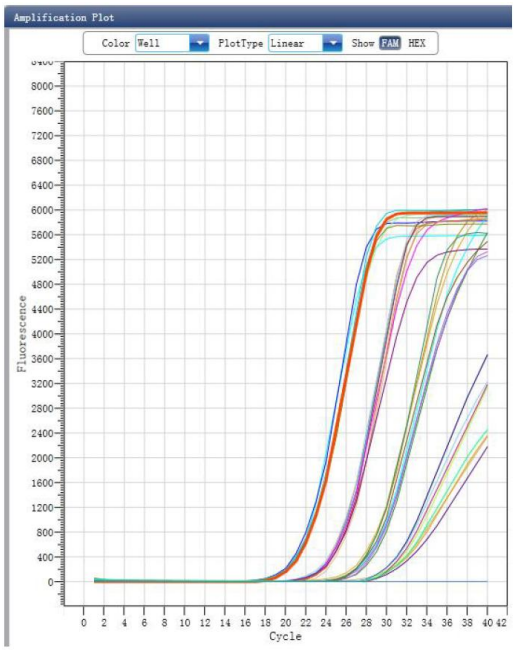
4.1 Check Results

4.1.1 Check the Amplification Plot

1. Click **Analysis ► Amplification Plot**

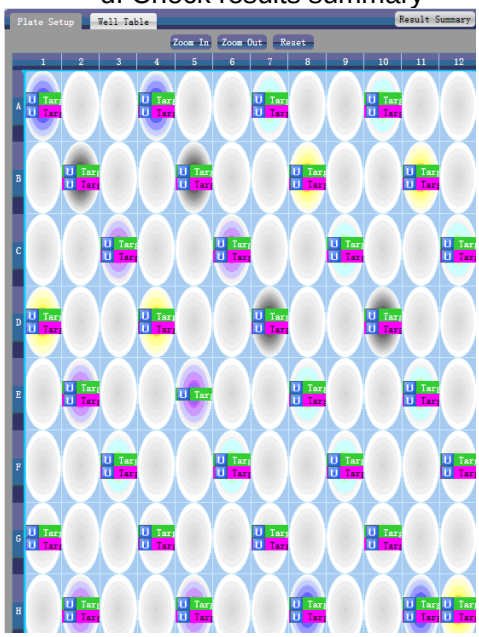


2. Check the amplification curve
   a. Set up colour
   b. Set up plot type
   c. Set up show dye
   When the background colour of a dye name is blue, it will be displayed; while white indicates it will not be displayed.



3. Check the reaction plate

a. Select reaction plate well site and check corresponding well site curve
The default is all wells are selected
b. Zoom-In, Zoom-Out and reset the reaction plate
c. Check well table
d. Check results summary

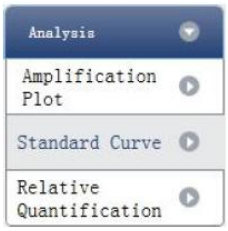


4. Set up assay

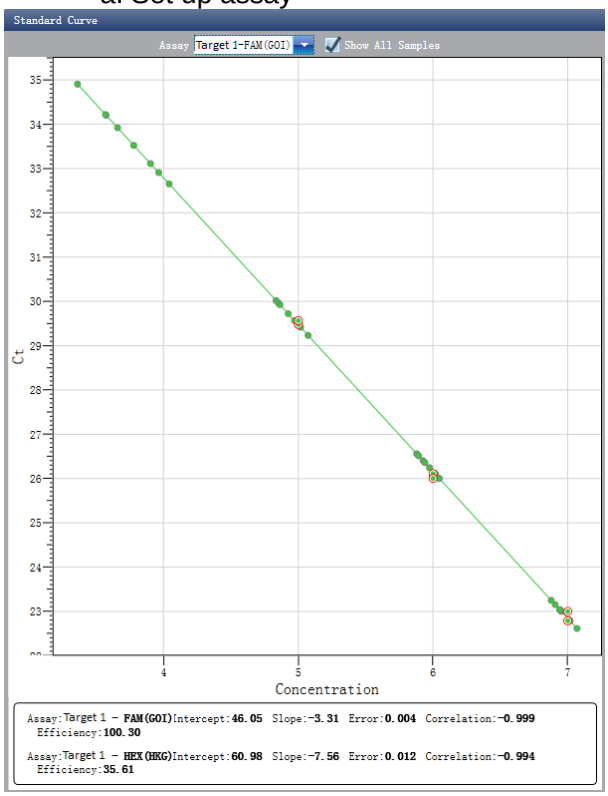
a. Set up assay
b. Set up threshold
c. Set up automatic baseline
When the threshold value is not automatic, the user cannot set up the automatic Baseline

4.1.2 Check Standard Curve

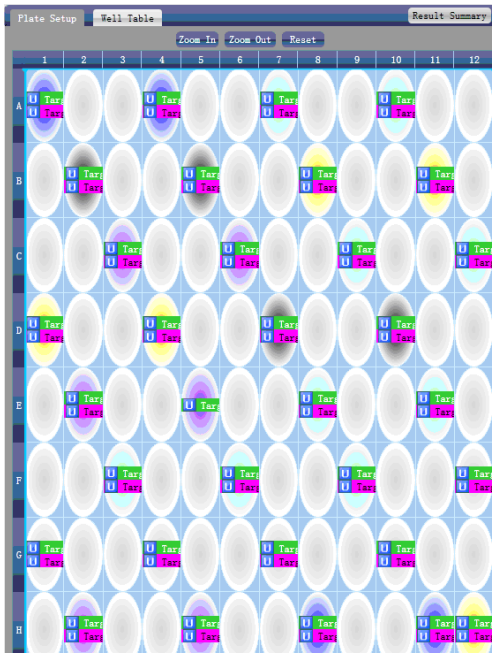
1. Click **Analysis ▶ Standard Curve**



2. Check standard curve
   a. Set up assay

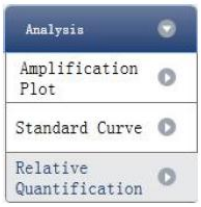


3. Check the reaction plate
   a. Select reaction plate well site and check corresponding well site curve
   The default is all wells are selected
   b. Zoom-In, Zoom-Out and reset the reaction plate
   c. Check well table
   d. Check results summary



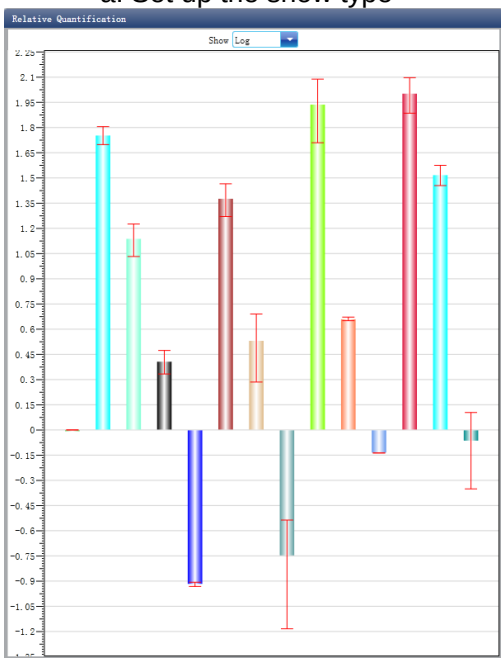
4.2 Check Relative Quantification

1. Click **Analysis ▶ Relative Quantification**

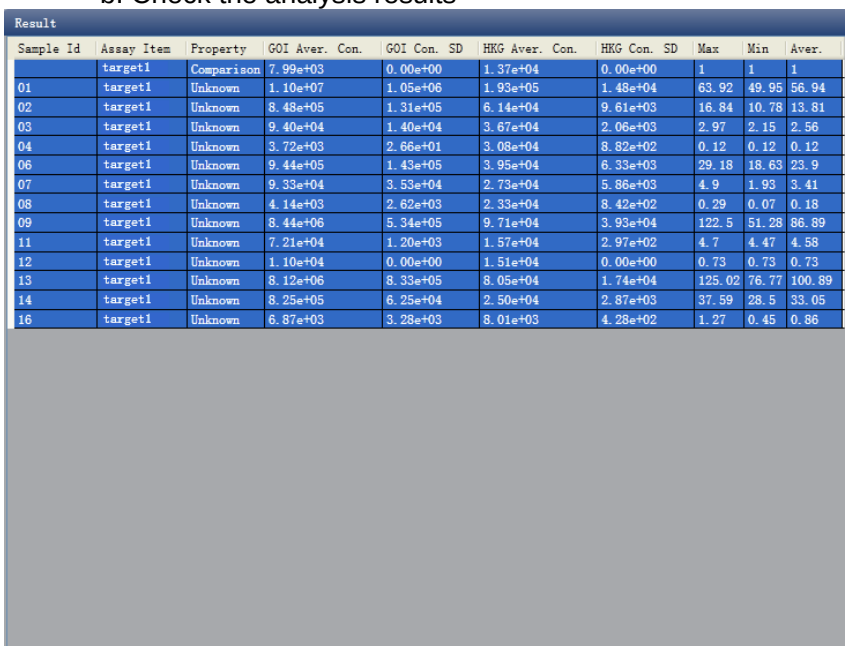


2. Check relative quantitative

a. Set up the show type



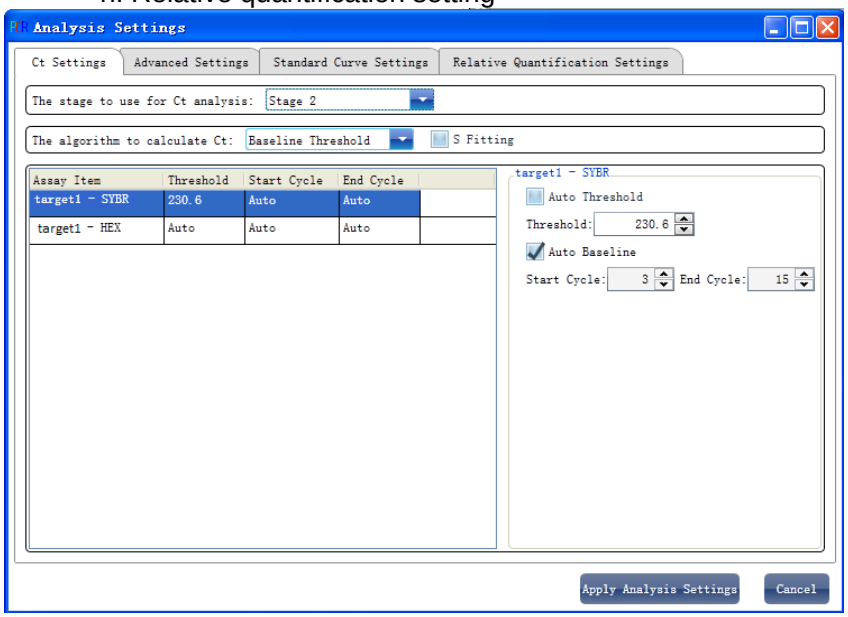
b. Check the analysis results



Sample Id	Assay Item	Property	GOI Aver. Con.	GOI Con. SD	HKG Aver. Con.	HKG Con. SD	Max	Min	Aver.
	target1	Comparison	7.99e+03	0.00e+00	1.37e+04	0.00e+00	1	1	1
01	target1	Unknown	1.10e+07	1.05e+06	1.93e+05	1.48e+04	63.92	49.95	56.94
02	target1	Unknown	8.48e+05	1.31e+05	6.14e+04	9.61e+03	16.84	10.78	13.81
03	target1	Unknown	9.40e+04	1.40e+04	3.67e+04	2.06e+03	2.97	2.15	2.56
04	target1	Unknown	3.72e+03	2.66e+01	3.08e+04	8.82e+02	0.12	0.12	0.12
06	target1	Unknown	9.44e+05	1.43e+05	3.95e+04	6.33e+03	29.18	18.63	23.9
07	target1	Unknown	9.33e+04	3.53e+04	2.73e+04	5.86e+03	4.9	1.93	3.41
08	target1	Unknown	4.14e+03	2.62e+03	2.33e+04	8.42e+02	0.29	0.07	0.18
09	target1	Unknown	8.44e+06	5.34e+05	9.71e+04	3.93e+04	122.5	51.28	86.89
11	target1	Unknown	7.21e+04	1.20e+03	1.57e+04	2.97e+02	4.7	4.47	4.58
12	target1	Unknown	1.10e+04	0.00e+00	1.51e+04	0.00e+00	0.73	0.73	0.73
13	target1	Unknown	8.12e+06	8.33e+05	8.05e+04	1.74e+04	125.02	76.77	100.89
14	target1	Unknown	8.25e+05	6.25e+04	2.50e+04	2.87e+03	37.59	28.5	33.05
16	target1	Unknown	6.87e+03	3.28e+03	8.01e+03	4.28e+02	1.27	0.45	0.86

4.3 Adjust Parameter Reanalysis

1. Click **Analysis Settings** ▶ the Analysis Settings dialog box will pop up
   a. Adjust the start cycle and end cycle of the baseline
   b. Adjust Ct analysis algorithm
   c. Set up the use of S fitting
   d. Set up the stage to use for Ct analysis
   e. Set up the automatic threshold value
   f. Advanced setting
   g. Standard curve setting
   h. Relative quantification setting



5. Experiment Report

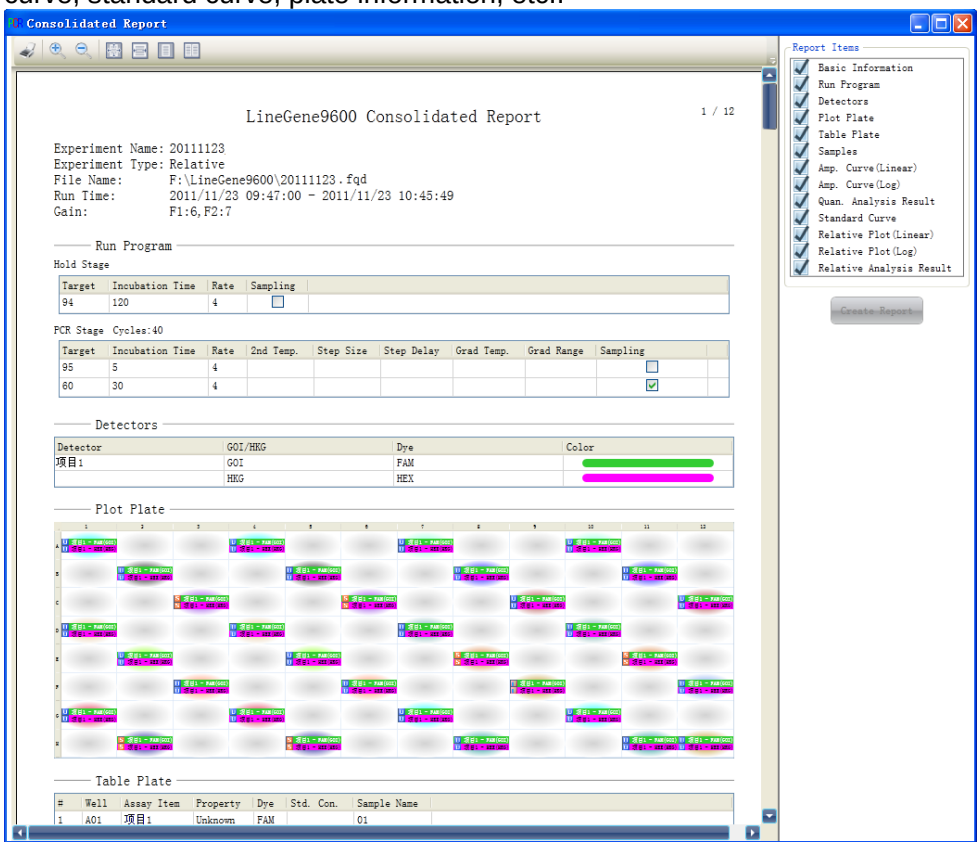
This section describes how to print experiment report and covers report template designing and print setting.

Start
▼
Design experiment
▼
Prepare for the reaction
▼
Run the experiment
▼
Experiment analysis
▼
Experiment report
▼
Data export
▼
End

This section describes how to print an experiment report and covers designing of a report template and print settings.

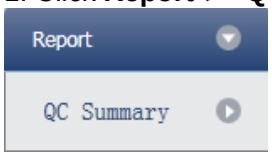
5.1 Comprehensive Report

1. Click **Report** ► **Consolidated Reports** ► the Consolidated Report window will pop up The Consolidated Report includes the basic information, sample information, amplification curve, standard curve, plate information, etc..

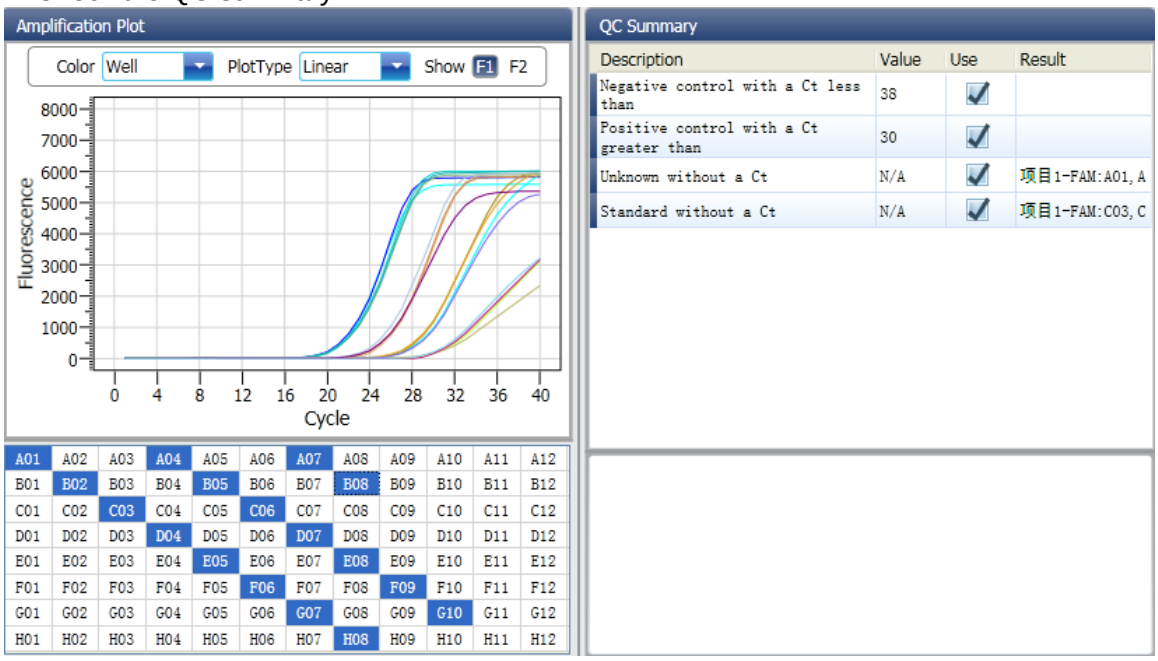


5.2 QC Summary

1. Click **Report ▶ QC Summary**



2. Check the QC summary



6. Data Export

Start
▼
Design experiment
▼
Prepare for the reaction
▼
Run the experiment
▼
Experiment analysis
▼
Experiment report
▼
Data export
▼
End

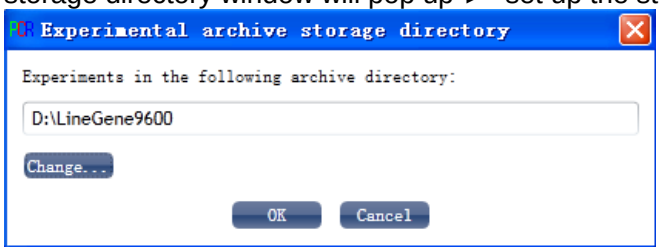
This section describes how to export data and covers exporting to a database, experiment filing and exporting the experiment data to EXCEL.

6.1 Export to Database

Click **Data Summary** ▶ **Export to Database** ▶ the Save File dialog box will pop up ▶ save the exported database file

6.2 Experiment Filing

1.Click **Data Summary** ▶ **Archived Experiment Directory** ▶ the Experimental archive storage directory window will pop up ▶ set up the storage path of file



2. Experiment filing

Click **Data Summary** ▶ **Archived Experiment** ▶ export the filed experiment file

The suffix of the filed experiment file is .fqh

6.3 Export Experiment Data to EXCEL

Click **Data Summary**▶**Export Experiment** ▶ **Export Experiment to Excle** ▶the exported experiment data will generate EXCEL file

6.4 Export Experiment Data to TEXT

Click **Data Summary**▶**Export Experiment** ▶ **Export Experiment to Text**▶ the exported experiment data will generate TEXT file

Chapter 6 SNP

1. Design Experiment

Start
▼
Design experiment
▼
Prepare for the reaction
▼
Run the experiment
▼
Experiment analysis
▼
Experiment report
▼
Data export
▼
End

This section describes how to design an SNP experiment and covers creating a new SNP experiment, inspection item setting, sample information setting, reaction plate setting and programme setting.

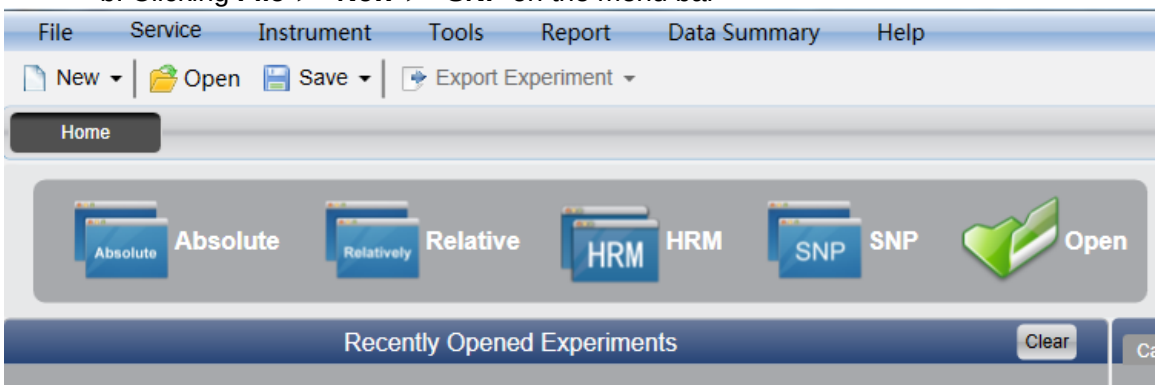
1.1 Create SNP Experiment

1. Click **SNP** on **Home** interface and create SNP Experiment window.

An SNP experiment can be also created by:

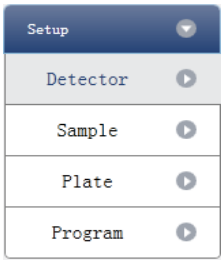
a. Clicking **New** ▶ **SNP** on the toolbar

b. Clicking **File** ▶ **New** ▶ **SNP** on the menu bar



1.2 Detector Setting

1. Click **Setup** ▶ **Detector**



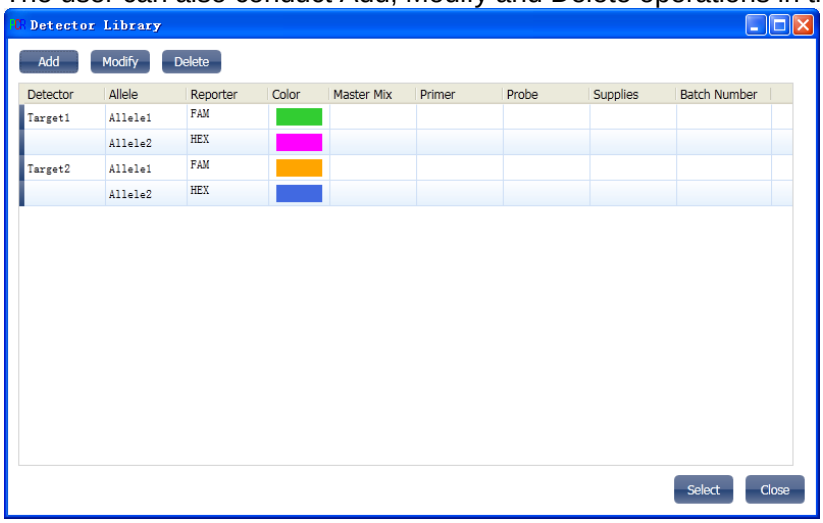
2. Input basic information
Input the experiment name, user name and any comments in the experiment properties column.

3. Inspection Item Setting
Set up the Detector, Allele, Dye and Colour.

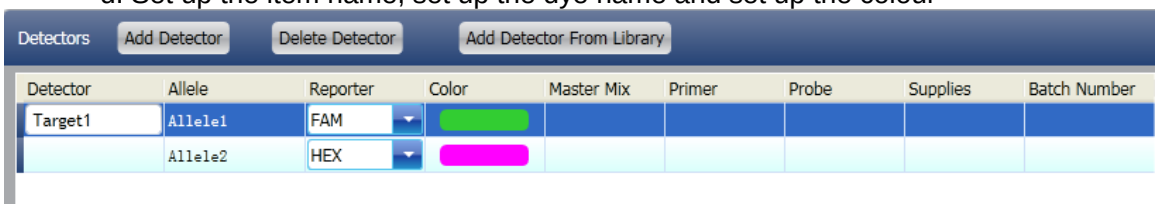
If necessary, the user can also:

a. Add Detector
b. Delete Detector
c. Add the Detector in the Detector library: click **Add Detector From Library** ▶ the **Detector Library** window will pop up ▶ select the Detector on the window to be added

The user can also conduct Add, Modify and Delete operations in the item library.



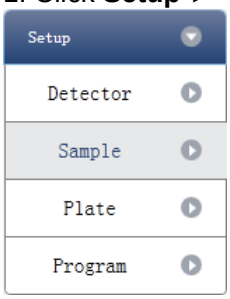
d. Set up the item name, set up the dye name and set up the colour



4. Set up reference dye

1.3 Sample Information Setting

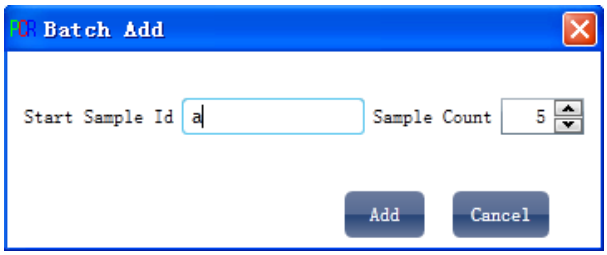
1. Click **Setup** ▶ **Sample**



2. Add sample information

a. Itemized addition: input ID in **Sample ID** ▶ press **Enter** ▶ add information for one sample

b. Batch addition: click **Batch Add** ▶ the Batch Add window will pop up



3. Delete sample information

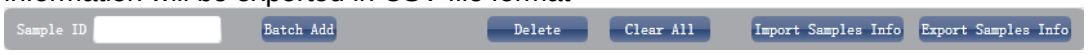
a. Itemized deletion: select one sample ▶ click **Delete** ▶ delete the selected sample information

b. Delete all: click **Clear All** ▶ delete all sample information

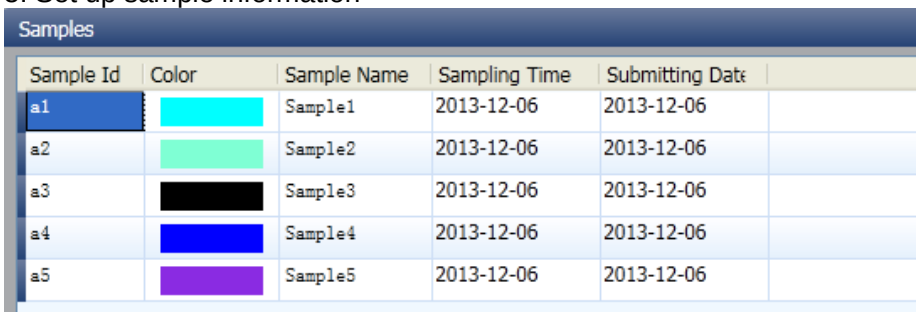
4. Import/Export sample information

a. Click **Import Sample Info** ▶ the File Import window will pop up ▶ import sample information file in CSV format

b. Click **Export Sample Info** ▶ the Save As window will pop up ▶ the sample information will be exported in CSV file format

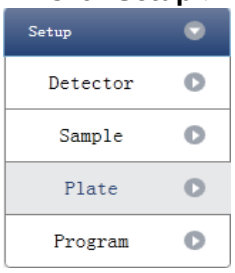


5. Set up sample information



1.4 Reaction Plate Setting

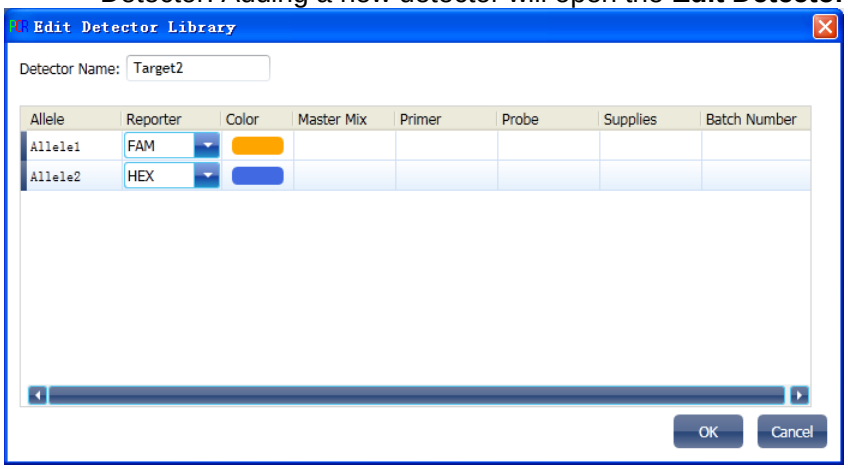
1. Click **Setup ▶ Plate**



2. Set up the inspection criteria of the reaction plate

a. Select reaction plate well site: click Reaction Plate well Site

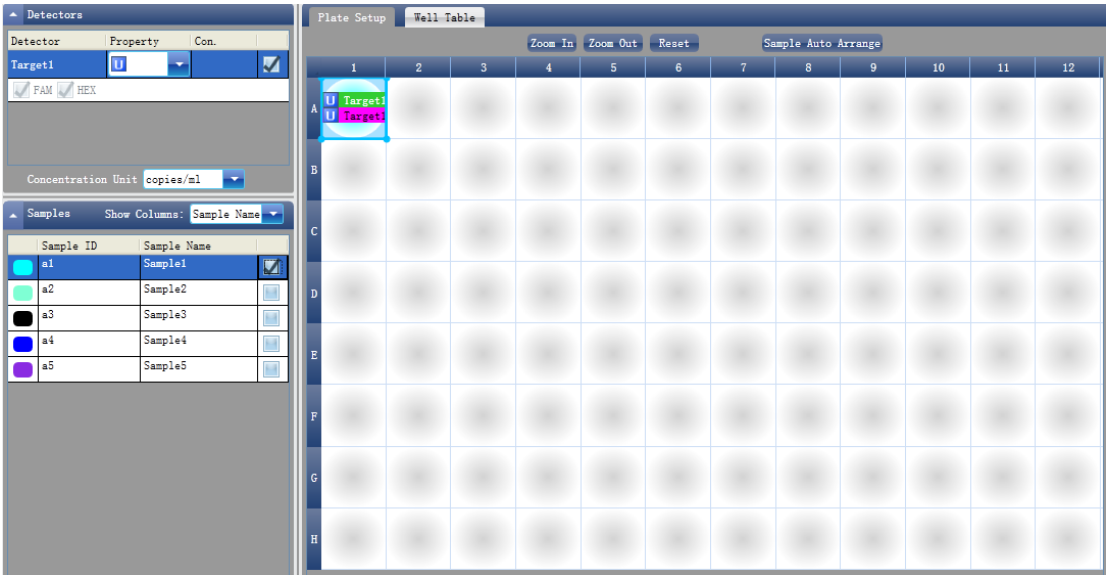
The user can also right click the reaction plate well site to Copy, Paste and Add New Detector. Adding a new detector will open the **Edit Detector Library** window.

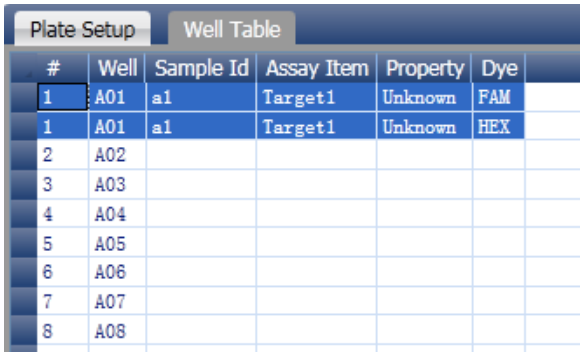


b. Select inspection item and modify the property, concentration and concentration unit.

Property	Name	Concentration	Concentration unit
	Unknown	NO	Copies/ml IU/ml Fg/ml Pg/ml
	Negative	NO	
	Positive Allelic gene 1	NO	
	Positive Heterozygous	NO	
	Positive Allelic gene 2	NO	

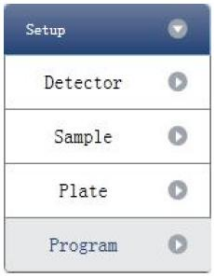
c. Select a sample and the list displayed will change
d. Zoom-In, Zoom-Out and reset the reaction plate.
e. Sample Auto Arrange
f. Check Well Table





1.5 Programme Setting

1. Click **Setup** ▶ **Programme**



2. Run Programme Setup

a. Create new stage: the user can create a new **Hold Stage**, **Cycling Stage** or **Melting Stage**

The user can also click **Add Stage** directly and the default will be creating a new **Cycling Stage**.

b. Create new step: the user can create a new step **Before** or **After** the currently selected step

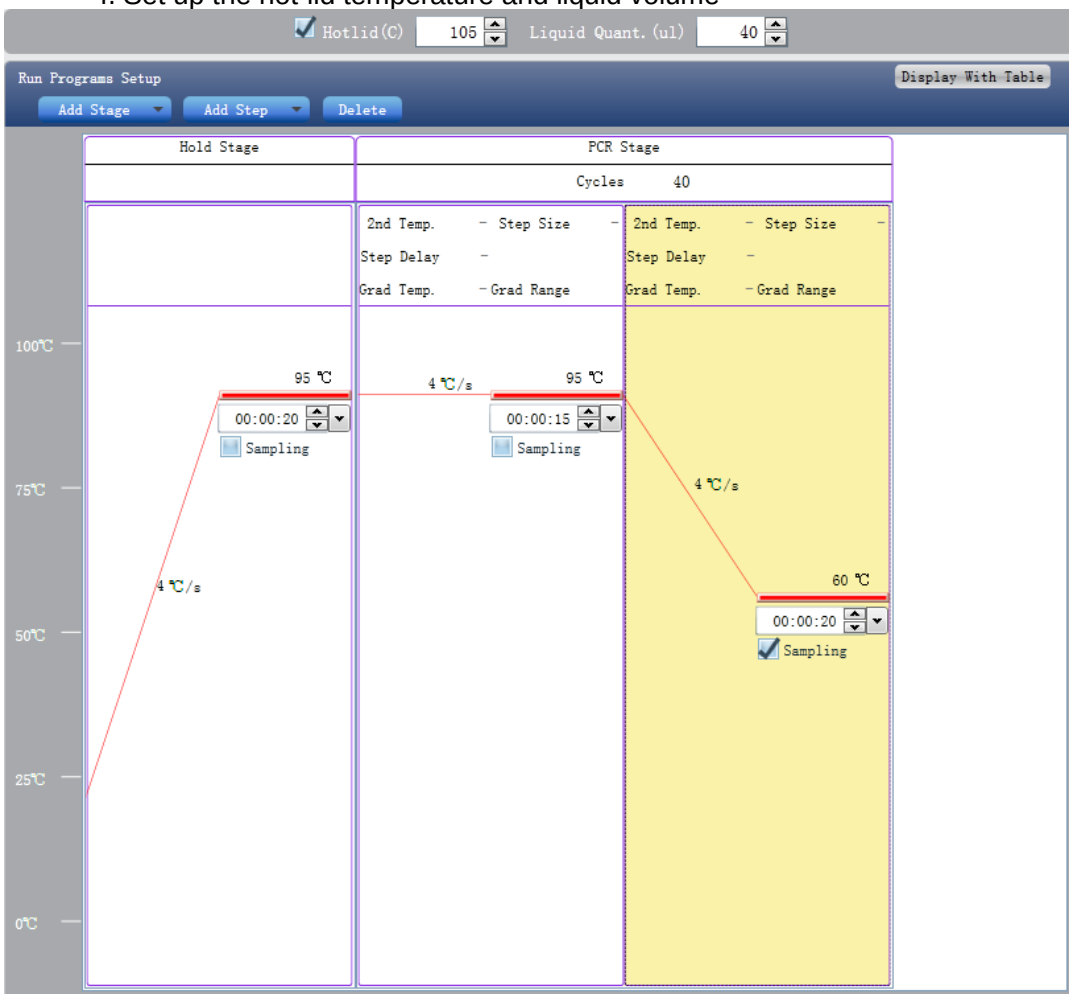
The user can also click **Add Step** and the default will be adding a new Step at the end of the currently selected stage or after the currently selected step.

c. Delete: the user can delete the currently selected step or stage

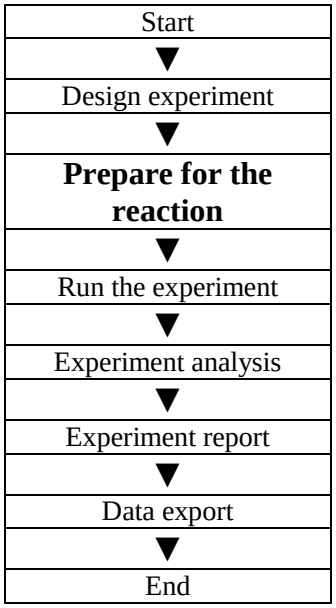
d. Display form: click **Display With Table** ▶ new window will pop up ▶ the details of the current experiment will be displayed in a table.

e. Set up the experimental data of the hold stage, cycling stage and melting stage melting section

f. Set up the hot-lid temperature and liquid volume



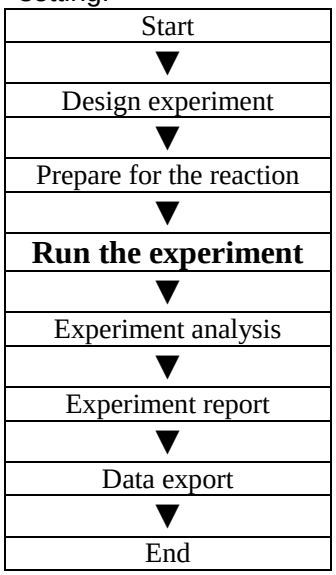
2. Prepare for Reaction



The user should make full preparations prior to the experiment:
• Ensure appropriate materials are used.
• Ensure the arrangement of the PCR reaction plate is consistent with the setting layout of reaction plate in Section 1.4.

3. Run the Experiment

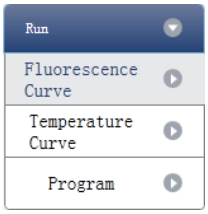
This section describes how to run the experiment after loading the reaction plate and covers the operating of fluorescence curve, the operating of temperature curve and programme setting.



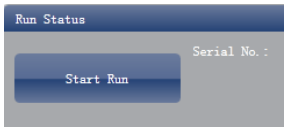
This section describes how to run/operate the experiment after loading the reaction plate and includes how to operate the fluorescence curve, the temperature curve and programming

3.1. Run Fluorescence Curve

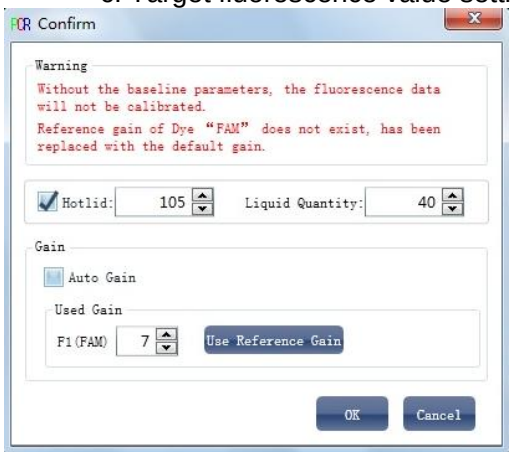
1. Click **Run ► Fluorescence Curve**



2. Click **Start Run**

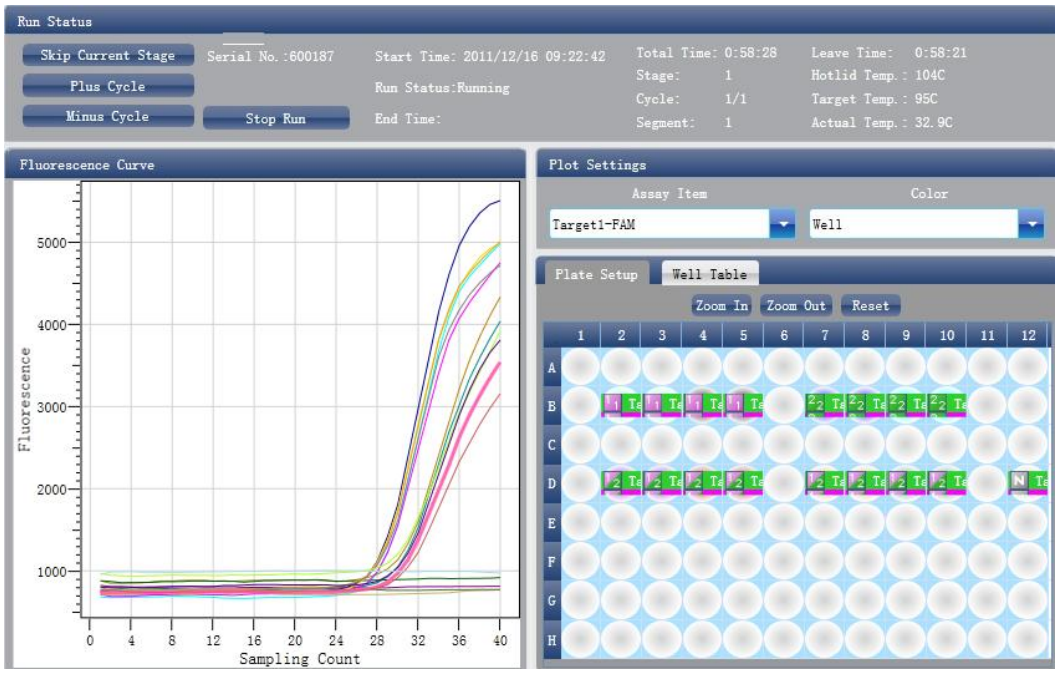


3. Operating confirmation
    a. Modify hot-lid temperature and liquid quantity (sample volume).
    b. Gain (baseline) parameter setting
    c. Target fluorescence value setting



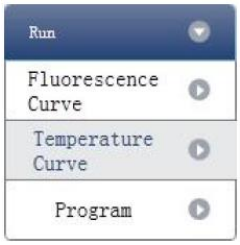
4. After it starts running, the user can:
    a. Skip the current stage
    b. Add a cycle
    c. Delete a cycle
    d. Stop run

5. Plot display setting
    a. Assay item
    b. Plot colour

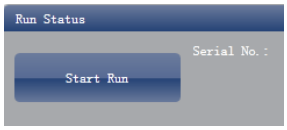


3.2 Run Temperature Curve

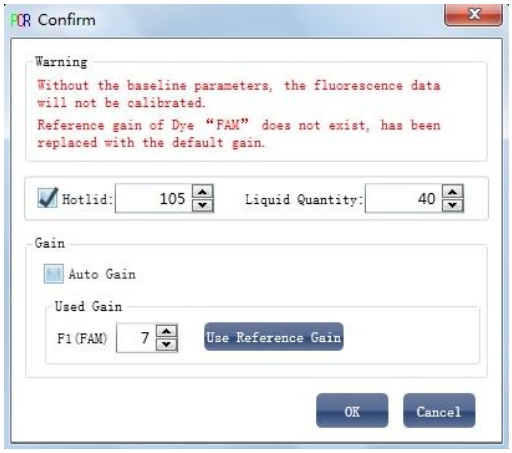
1. Click **Run ► Temperature Curve**



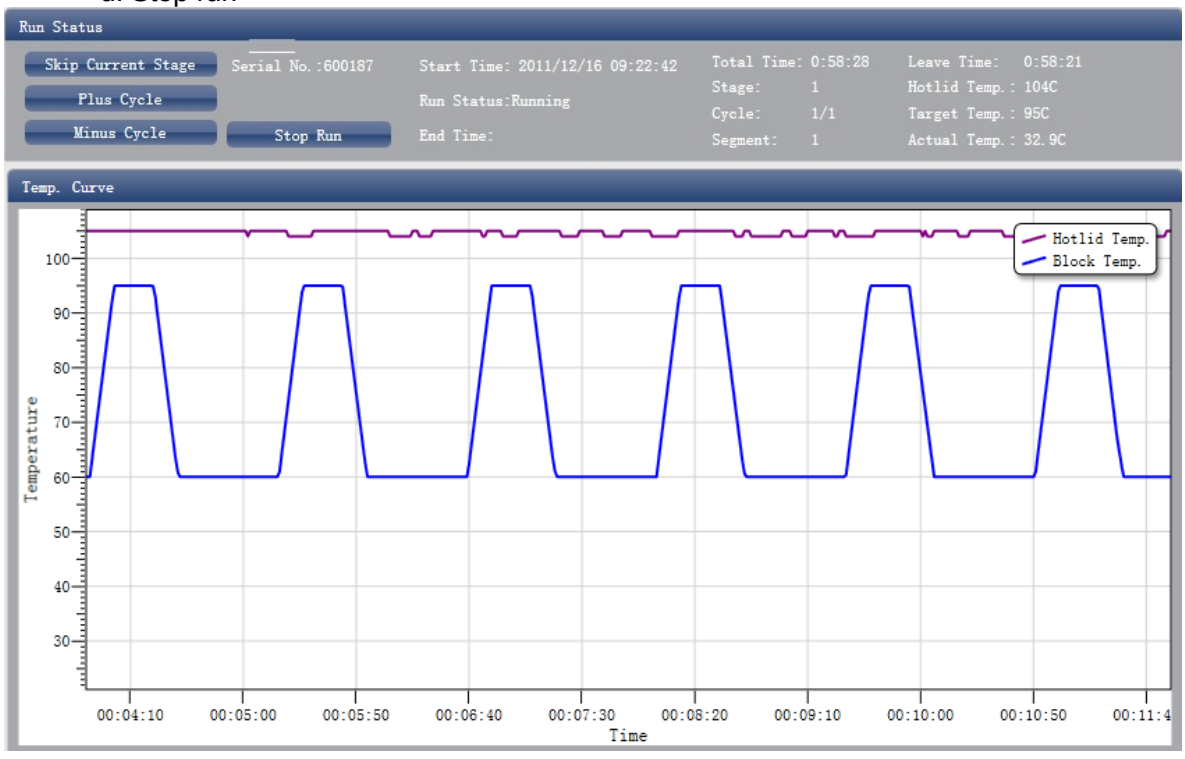
2. Click **Start Run**



3. Operating confirmation
   a. Modify hot-lid temperature and liquid quantity (sample volume).
   b. Gain (baseline) parameter setting
   c. Target fluorescence value setting



4. After it starts running, the user can:
    a. Skip the current stage
    b. Add a cycle
    c. Delete a cycle
    d. Stop run



3.3 Programme Setting

The user can only check the programme setting but cannot make modifications.

4. Experiment Analysis

Start
▼
Design experiment
▼
Prepare for the reaction
▼
Run the experiment
▼
Experiment analysis
▼
Experiment report
▼
Data export
▼
End

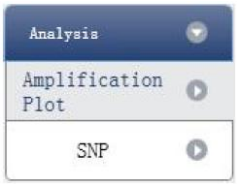
This section describes how to view the experiment analysis results after running an experiment and adjusting parameters for re-analysis.

This section covers the analysis of amplification curves and standard curves, adjusting parameters for re-analysis and importing parameters.

4.1 Check Results

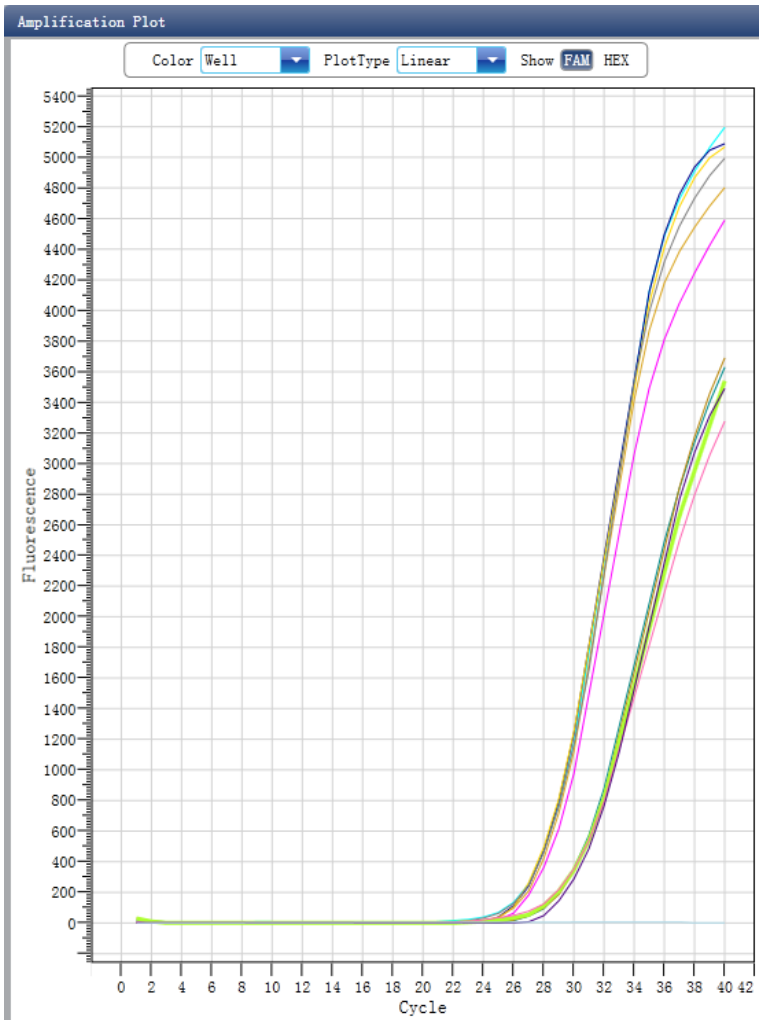
4.1.1 Check the Amplification Plot

1. Click **Analysis ► Amplification Plot**

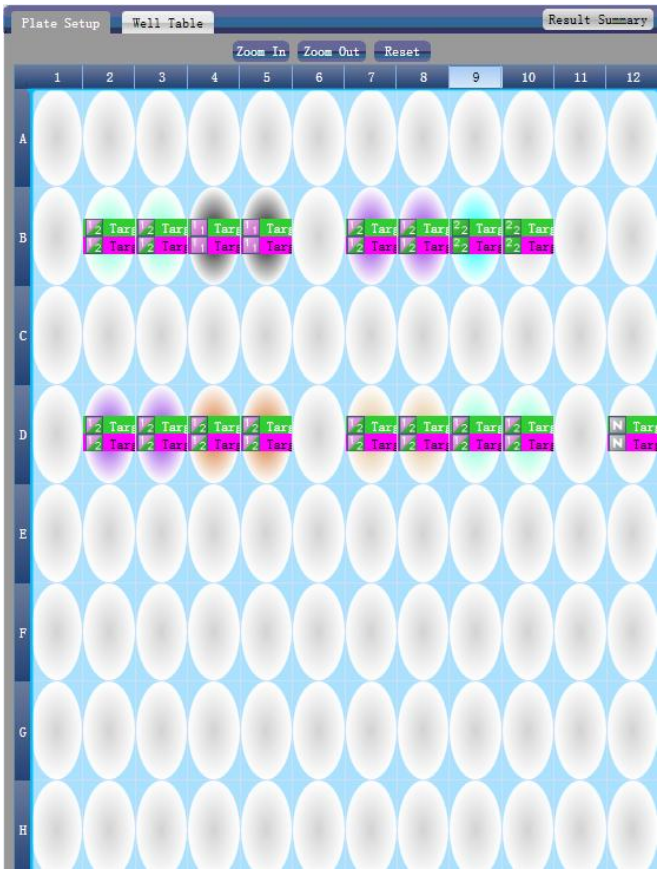


2. Check the amplification curve
    a. Set up colour
    b. Set up plot type
    c. Set up show dye

    When the background colour of a dye name is blue, it will be displayed; while white indicates it will not be displayed.



3. Check the reaction plate
    a. Select reaction plate well site and check corresponding well site curve
    The default is all wells are selected
    b. Zoom-In, Zoom-Out and reset the reaction plate
    c. Check well table
    d. Check results summary

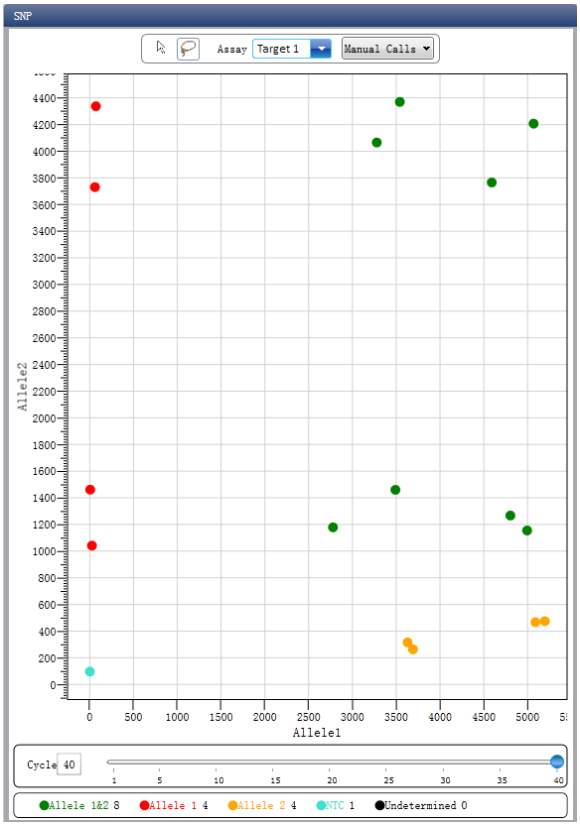


4. Set up inspection item
    a. Set up assay
    b. Set up threshold
    c. Set up automatic baseline
    When the threshold value is not automatic, the user cannot set up the automatic baseline

4.1.2 Check SNP

1. Click **Analysis ► SNP**

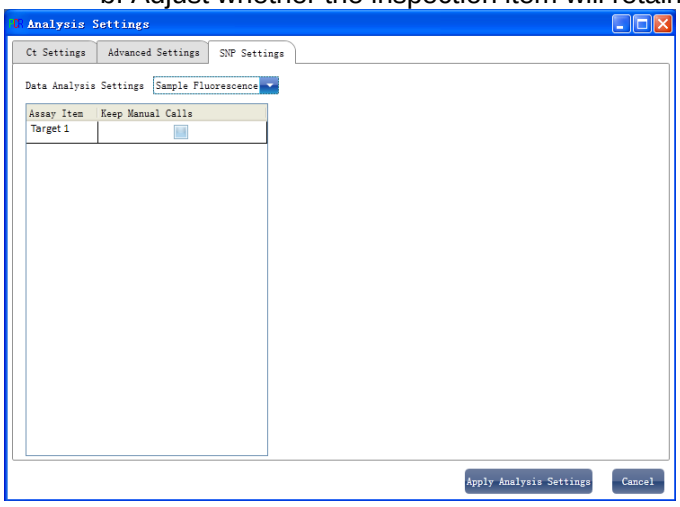
2. Check SNP
    a. Select well site
    The user can select well site by dragging a rectangle with the mouse around the wells of interest or select wells one by one.
    b. Set up Assay
    c. Set up manual calls



3. Check the reaction plate
    a. Select reaction plate well site and check corresponding well site curve
    The default is all wells are selected
    b. Zoom-In, Zoom-Out and reset the reaction plate
    c. Check well table information
    d. Check results summary

4.2 Adjust Parameter Re-analysis

1. Click **Analysis Settings** ▶ the Analysis Settings dialog box will pop up
    a. Adjust analysis data
    b. Adjust whether the inspection item will retain manual recognition genotype



5. Experiment Report

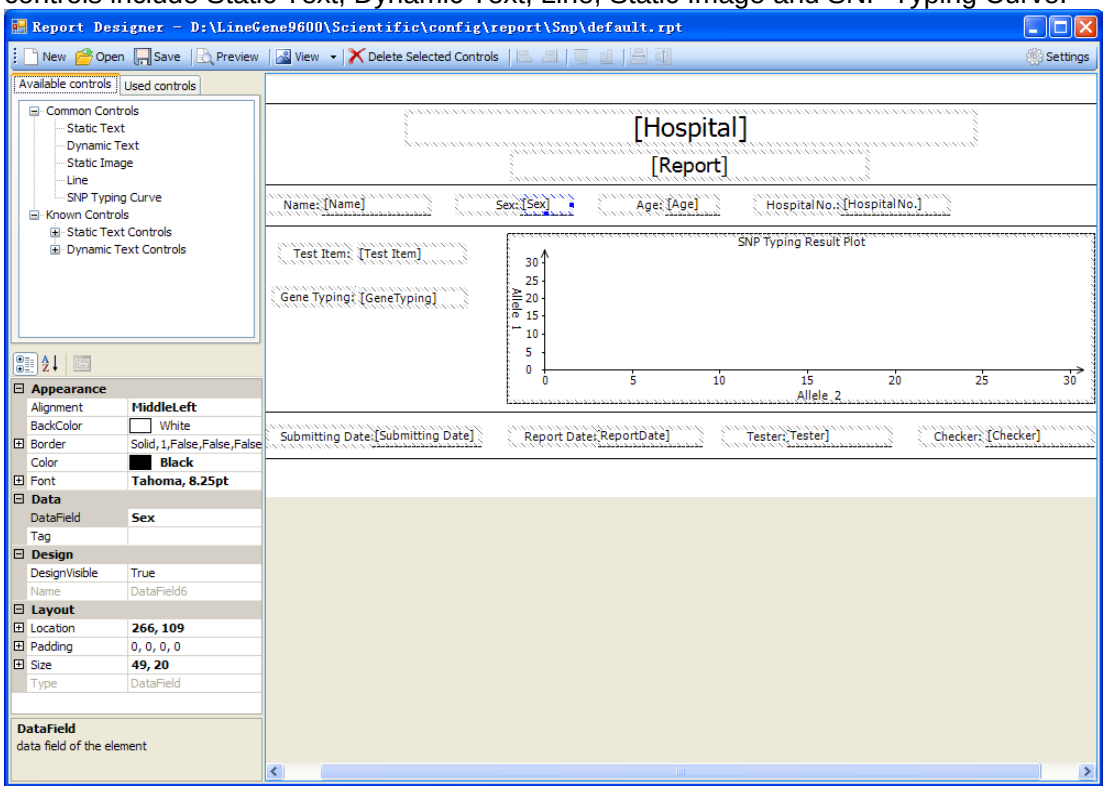
Start
▼
Design experiment
▼
Prepare for the reaction
▼
Run the experiment
▼
Experiment analysis
▼
Experiment report
▼
Data export
▼
End

This section describes how to print an experiment report and covers designing of a report template and print setting.

5.1 Designing a Report Template

1. Click **Report** ► **Report Template Editor** ► the Report Designer window will pop up

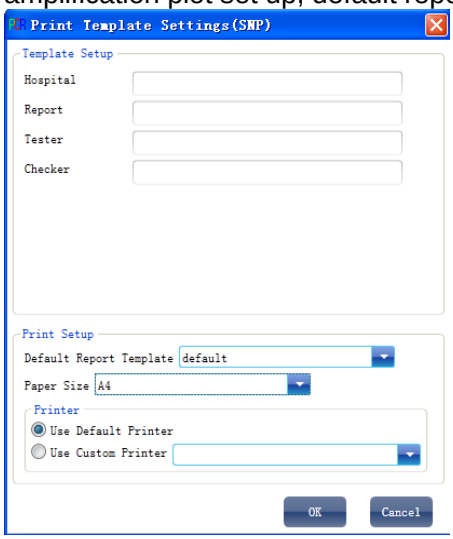
The report consists of controls and the user can add, modify and delete controls. Available controls include Static Text, Dynamic Text, Line, Static Image and SNP Typing Curve.



5.2 Print Setting

1. Click **Report** ► **Print Template Setting** ► the Print Template Setting window will pop up

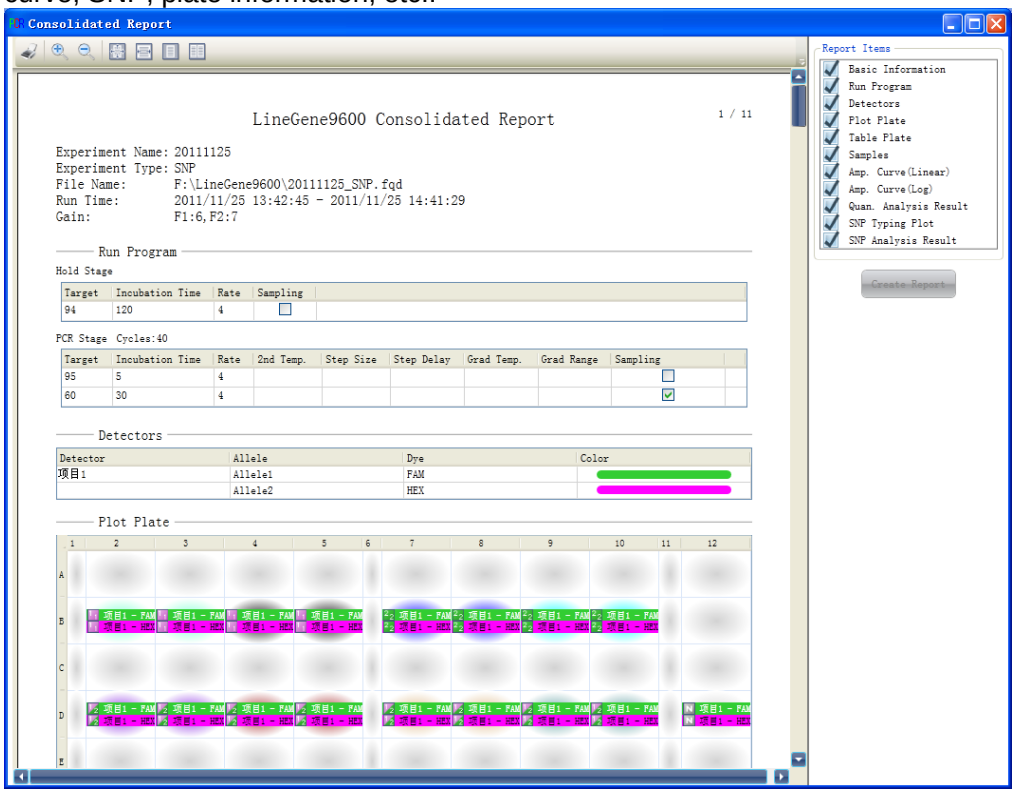
The user can set up the laboratory name, report name, reference value, tester, checker, amplification plot set up, default report template and paper size.



5.3 Comprehensive Report

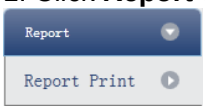
1. Click **Report** ► **Consolidated Reports** ► the Consolidated Report window will pop up.

The Consolidated Report includes the basic information, sample information, amplification curve, SNP, plate information, etc..

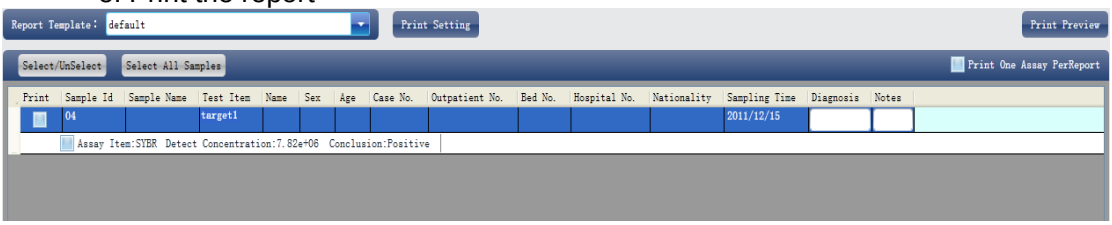


5.4 Report Printing

1. Click **Report ► Report Print**



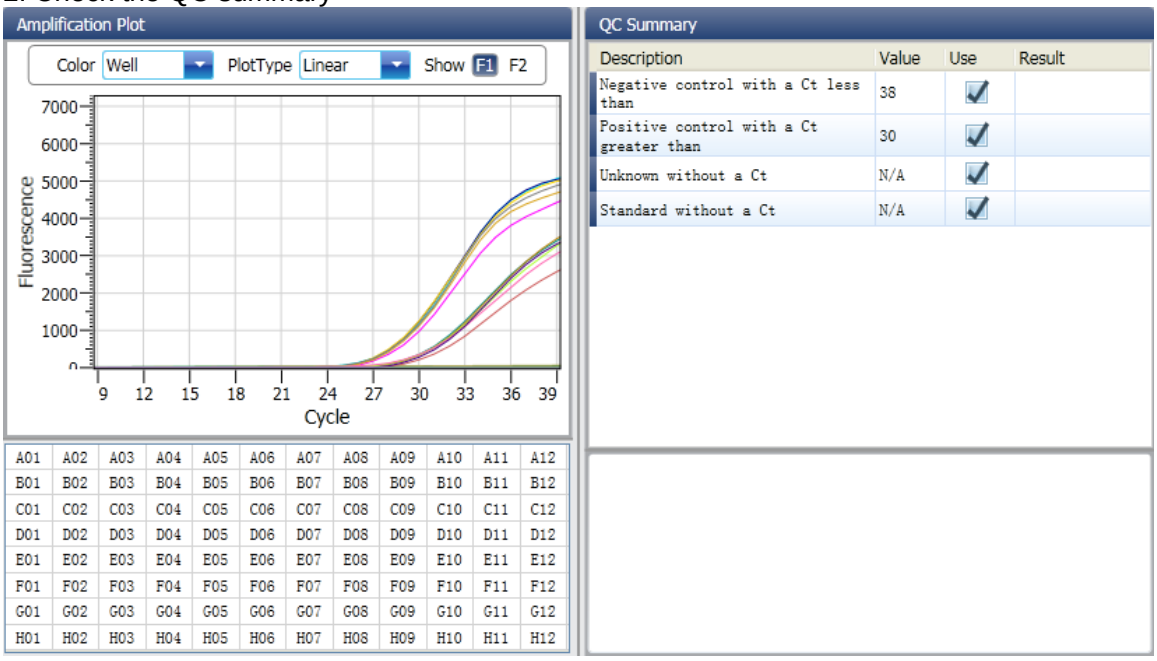
2. Report print setting
    a. Set up report template
    b. Print setting (please refer to Section 5.2)
    c. Select print items
    d. Print preview
    e. Print the report



5.5 QC Summary

1. Click **Report ► QC Summary**

2. Check the QC summary



6. Data Export

Start
▼
Design experiment
▼
Prepare for the reaction
▼
Run the experiment
▼
Experiment analysis
▼
Experiment report
▼
Data export
▼
End

This section describes how to export data and covers exporting to a database, experiment filing and exporting the experiment data to EXCEL.

6.1 Export to Database

Click **Data Summary** ▶ **Export to Database** ▶ the Save File dialog box will pop up ▶ save the exported database file

6.2 Experiment Filing

1. Click **Data Summary** ▶ **Archived Experiment Directory** ▶ the Experimental archive storage directory window will pop up ▶ set up the storage path of file

2. Experiment filing

Click **Data Summary** ▶ **Archived Experiment** ▶ export the filed experiment file

The suffix of filed experiment file is .fqh

6.3 Export Experiment Data to EXCEL

Click **Data Summary**▶**Export Experiment** ▶ **Export Experiment to Excle** ▶the exported experiment data will generate EXCEL file.

6.4 Export Experiment Data to TEXT

Click **Data Summary**▶**Export Experiment** ▶ **Export Experiment to Text**▶ the exported experiment data will generate TEXT file.

Chapter 7 High Resolution Melting

1. Design Experiment

Start
▼
Design experiment
▼
Prepare for the reaction
▼
Run the experiment
▼
Experiment analysis
▼
Experiment report
▼
Data export
▼
End

This section describes how to design an SNP experiment and covers creating a new SNP experiment, inspection item setting, sample information setting, reaction plate setting and programme setting.

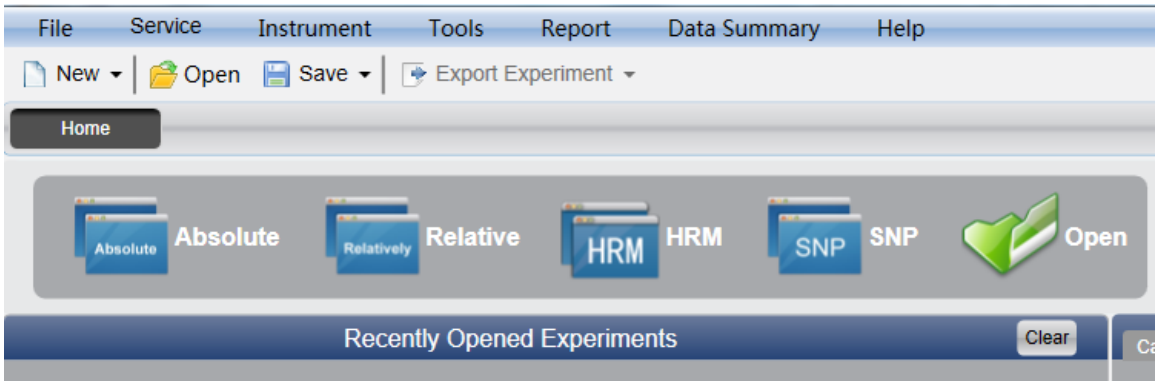
1.1 Create High Resolution Melting Experiment

1. Click **HRM** on **Home** interface and create SNP Experiment window.

An SNP experiment can be also created by:

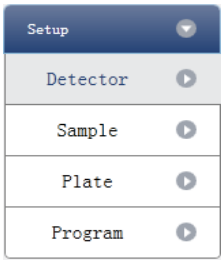
a. Clicking **New** ▶ **HRM** on the toolbar

b. Clicking **File** ▶ **New** ▶ **HRM** on the menu bar



1.2 Detector Setting

1. Click **Setup** ▶ **Detector**



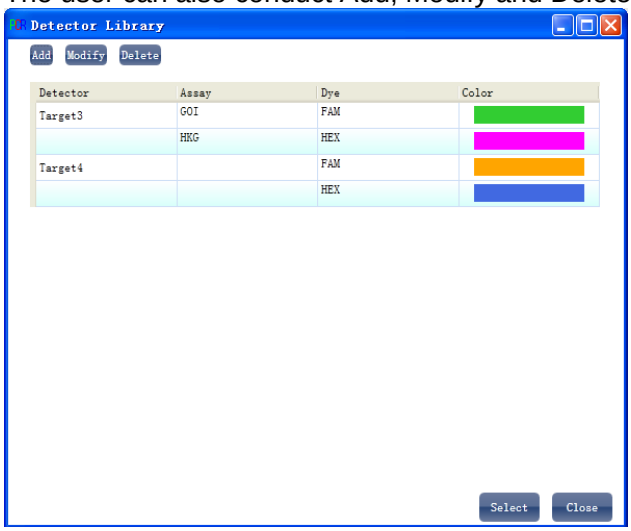
2. Input basic information
Input the experiment name, user name and any comments in the experiment properties column.

3. Inspection Item Setting
Set up the Detector, Allele, Dye and Colour.

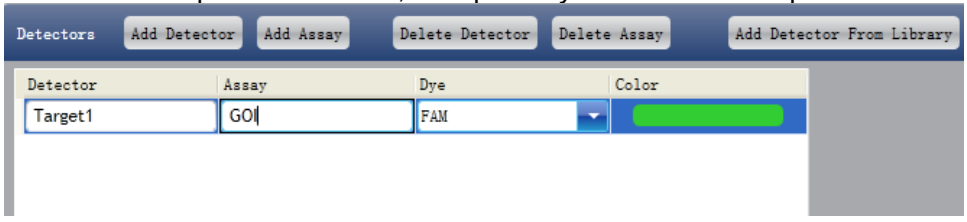
If necessary, the user can also:

a. Add Detector
b. Delete Detector
c. Add the Detector in the Detector library: click **Add Detector From Library** ▶ the **Detector Library** window will pop up ▶ select the Detector on the window to be added

The user can also conduct Add, Modify and Delete operations in the item library.



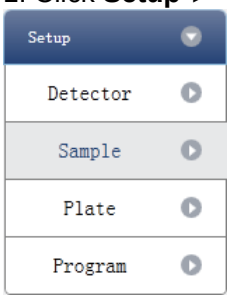
d. Set up the item name, set up the dye name and set up the colour



4. Set up reference dye

1.3 Sample Information Setting

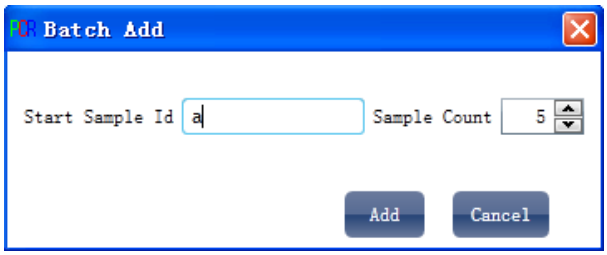
1. Click **Setup** ▶ **Sample**



2. Add sample information

a. Itemized addition: input ID in **Sample ID** ▶ press **Enter** ▶ add information for one sample

b. Batch addition: click **Batch Add** ▶ the Batch Add window will pop up



3. Delete sample information

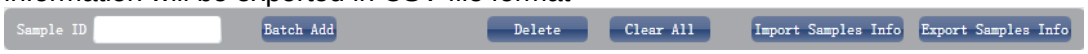
a. Itemized deletion: select one sample ▶ click **Delete** ▶ delete the selected sample information

b. Delete all: click **Clear All** ▶ delete all sample information

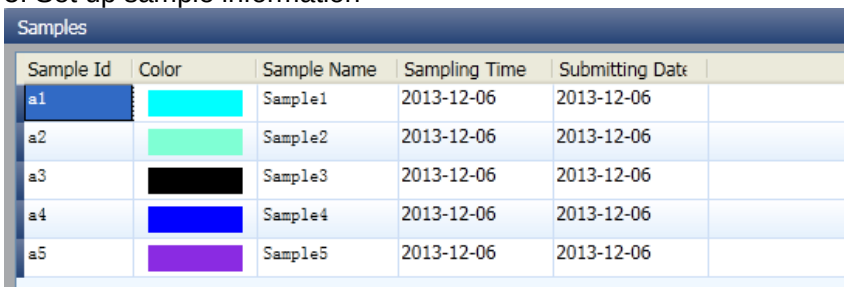
4. Import/Export sample information

a. Click **Import Sample Info** ▶ the File Import window will pop up ▶ import sample information file in CSV format

b. Click **Export Sample Info** ▶ the Save As window will pop up ▶ the sample information will be exported in CSV file format

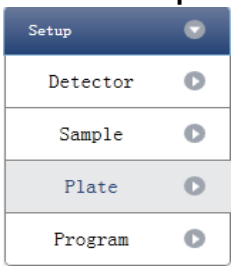


5. Set up sample information



1.4 Reaction Plate Setting

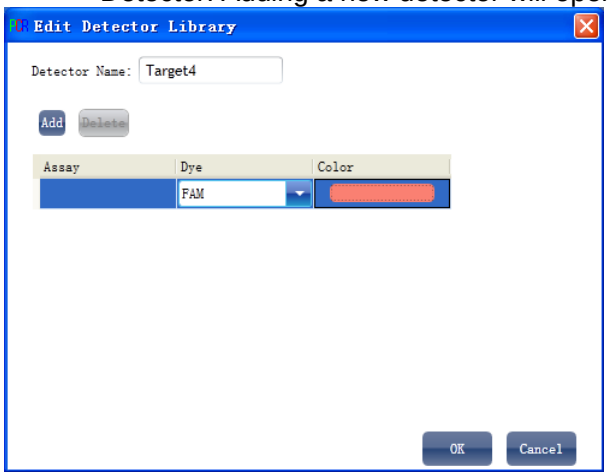
1. Click **Setup** ▶ **Plate**



2. Set up the inspection criteria of the reaction plate

a. Select reaction plate well site: click Reaction Plate well Site

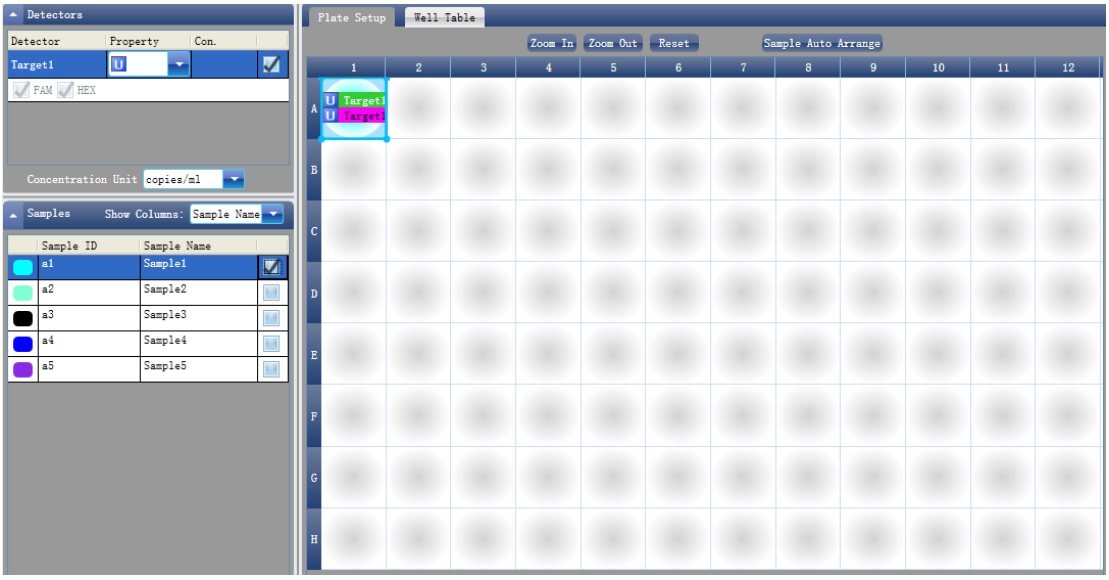
The user can also right click the reaction plate well site to Copy, Paste and Add New Detector. Adding a new detector will open the **Edit Detector Library** window.

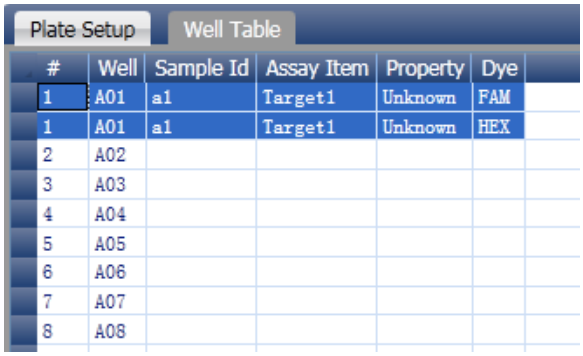


b. Select inspection item and modify the property, concentration and concentration unit.

Property	Name	Concentration	Concentration unit
U	Unknown	NO	Copies/ml
S	Standard	YES	IU/ml
N	Negative	NO	Fg/ml
P	Positive	NO	Pg/ml

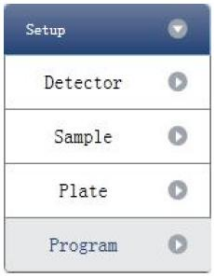
c. Select a sample and the list displayed will change
d. Zoom-In, Zoom-Out and reset the reaction plate.
e. Sample Auto Arrange
f. Check Well Table





1.5 Programme Setting

1. Click **Setup** ▶ **Programme**



2. Run Programme Setup

a. Create new stage: the user can create a new **Hold Stage**, **Cycling Stage** or **Melting Stage**

The user can also click **Add Stage** directly and the default will be creating a new **Cycling Stage**.

b. Create new step: the user can create a new step **Before** or **After** the currently selected step

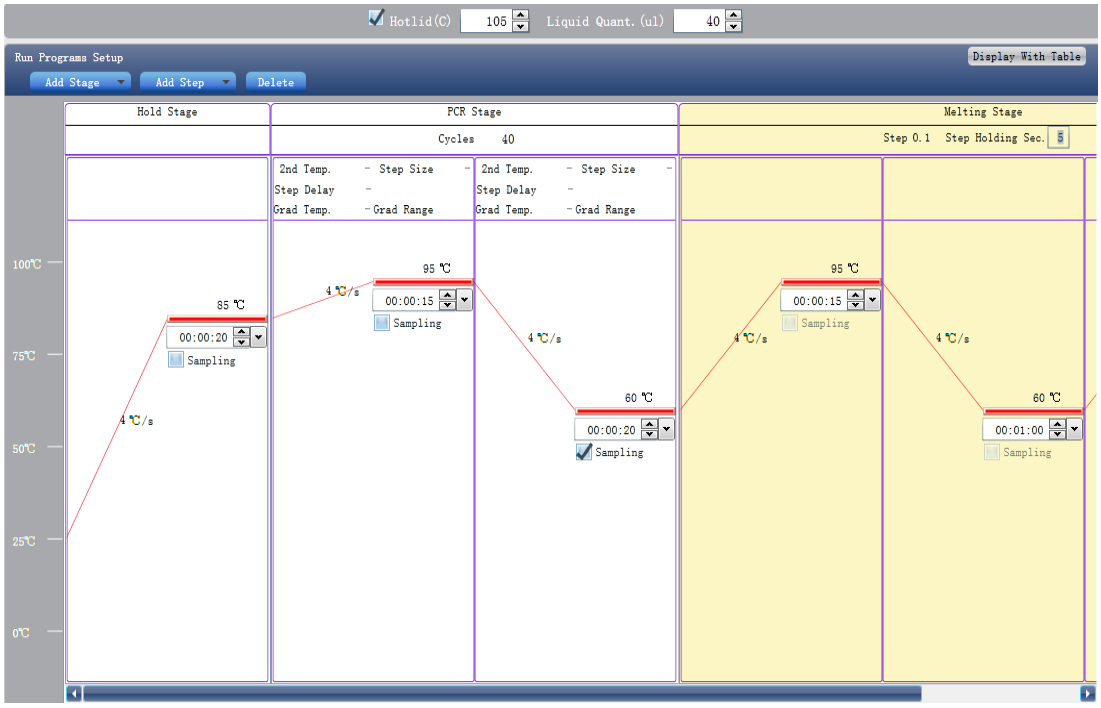
The user can also click **Add Step** and the default will be adding a new Step at the end of the currently selected stage or after the currently selected step.

c. Delete: the user can delete the currently selected step or stage

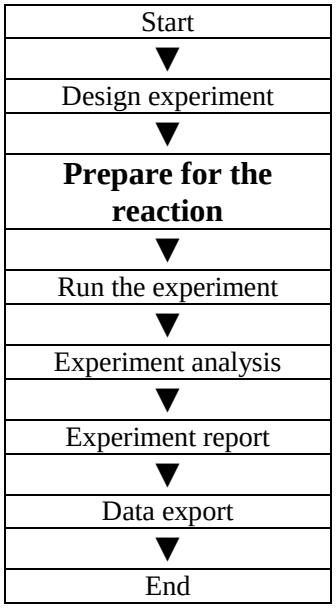
d. Display form: click **Display With Table** ► new window will pop up ► the details of the current experiment will be displayed in a table.

e. Set up the experimental data of the hold stage, cycling stage and melting stage melting section

f. Set up the hot-lid temperature and liquid volume



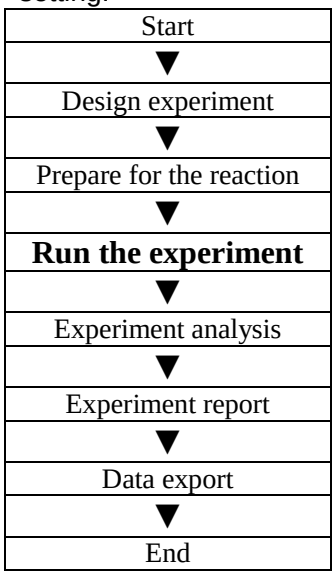
2. Prepare for Reaction



The user should make full preparations prior to the experiment:
• Ensure appropriate materials are used.
• Ensure the arrangement of the PCR reaction plate is consistent with the setting layout of reaction plate in Section 1.4.

3. Run the Experiment

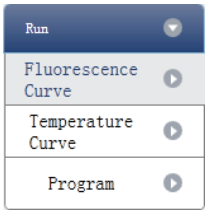
This section describes how to run the experiment after loading the reaction plate and covers the operating of fluorescence curve, the operating of temperature curve and programme setting.



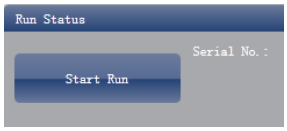
This section describes how to run/operate the experiment after loading the reaction plate and includes how to operate the fluorescence curve, the temperature curve and programming

3.1. Run Fluorescence Curve

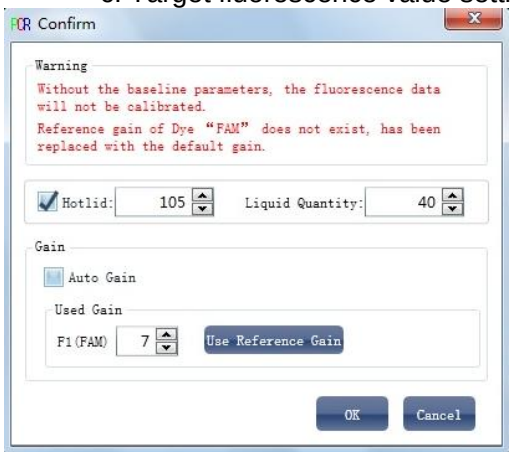
1. Click **Run ► Fluorescence Curve**



2. Click **Start Run**

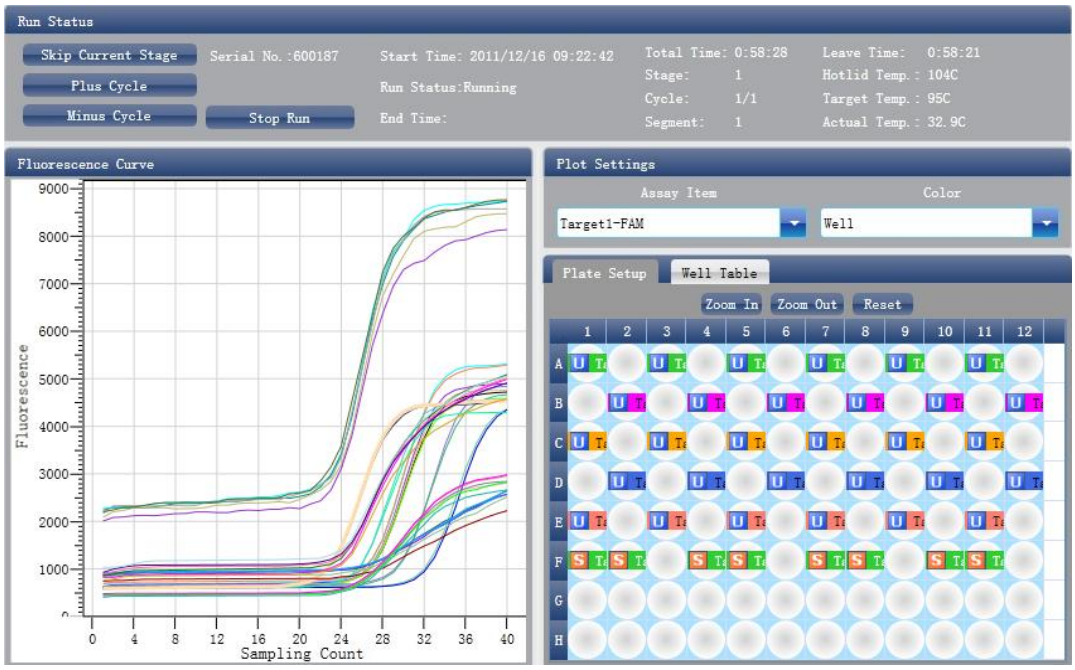


3. Operating confirmation
    a. Modify hot-lid temperature and liquid quantity (sample volume).
    b. Gain (baseline) parameter setting
    c. Target fluorescence value setting



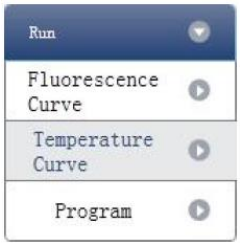
4. After it starts running, the user can:
    a. Skip the current stage
    b. Add a cycle
    c. Delete a cycle
    d. Stop run

5. Plot display setting
    a. Assay item
    b. Plot colour

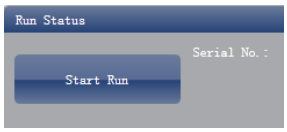


3.2 Run Temperature Curve

1. Click **Run ► Temperature Curve**

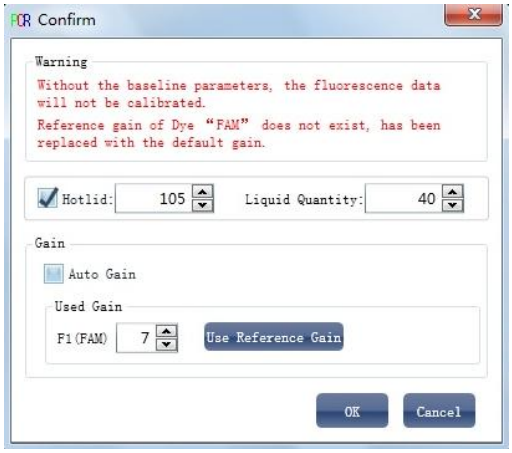


2. Click **Start Run**

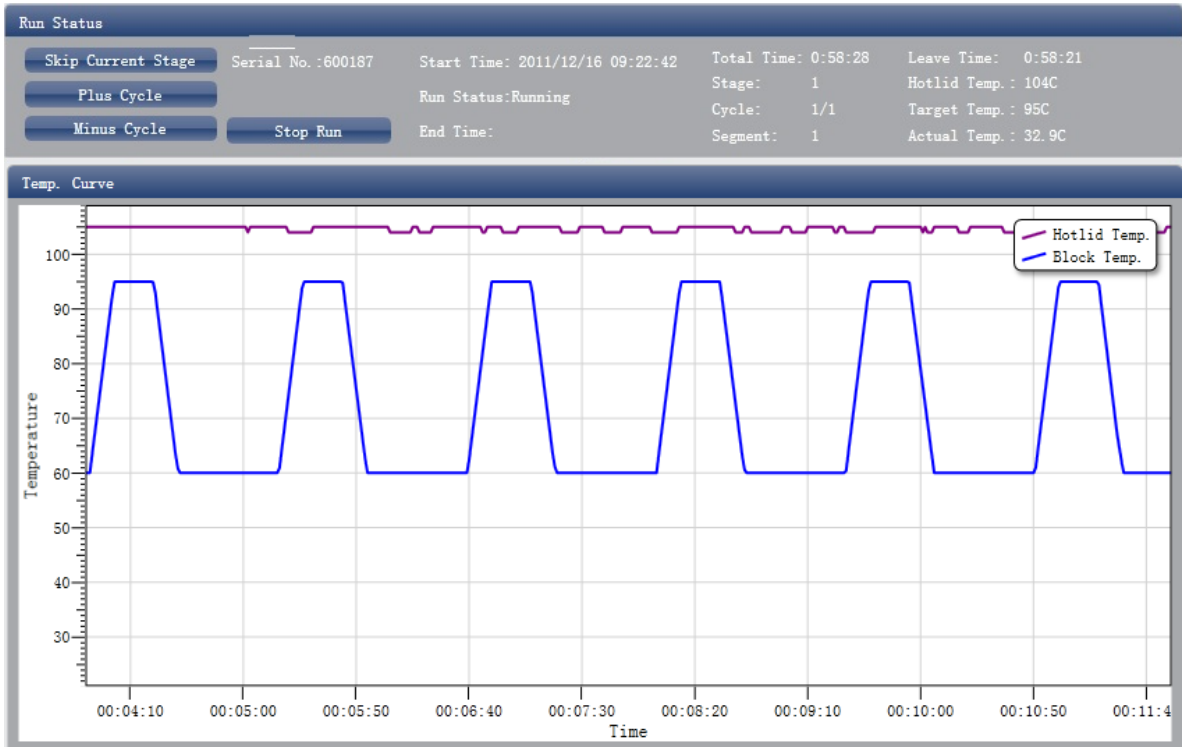


3. Operating confirmation

a. Modify hot-lid temperature and liquid quantity (sample volume).
b. Gain (baseline) parameter setting
c. Target fluorescence value setting



4. After it starts running, the user can:
    a. Skip the current stage
    b. Add a cycle
    c. Delete a cycle
    d. Stop run



3.3 Programme Setting

The user can only check the programme setting but cannot make modifications.

4. Experiment Analysis

Start
▼
Design experiment
▼
Prepare for the reaction
▼
Run the experiment
▼
Experiment analysis
▼
Experiment report
▼
Data export
▼
End

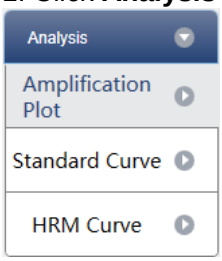
This section describes how to view the experiment analysis results after running an experiment and adjusting parameters for re-analysis.

This section covers the analysis of amplification curves and standard curves, adjusting parameters for re-analysis and importing parameters.

4.1 Check Results

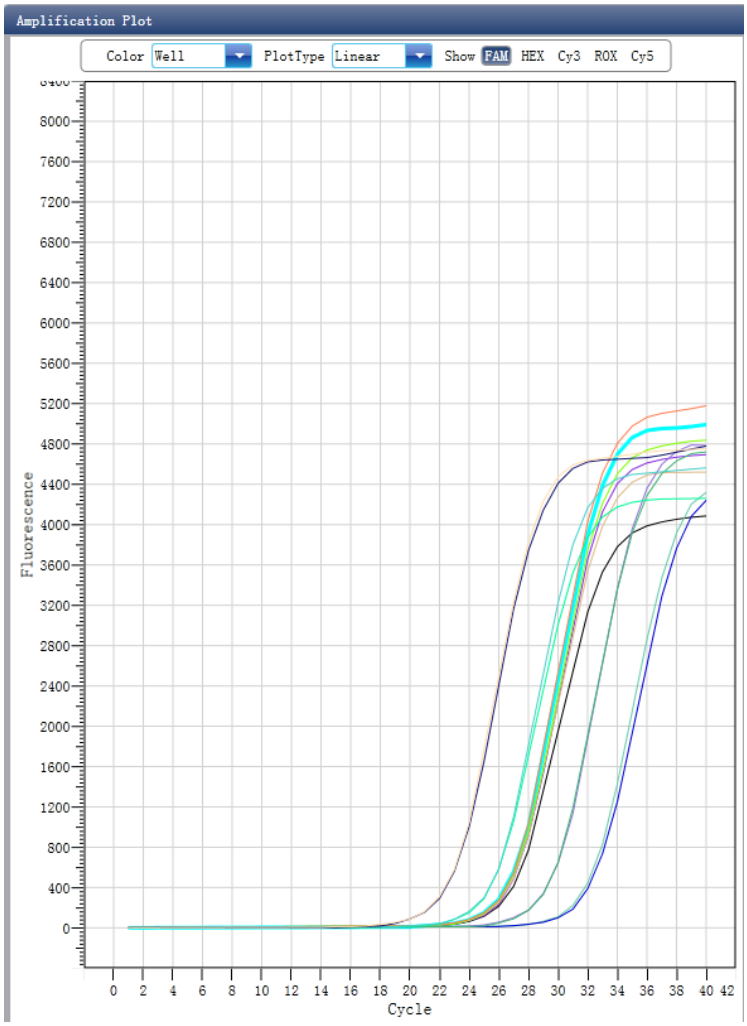
4.1.1 Check the Amplification Plot

1. Click **Analysis** ▶ **Amplification Plot**

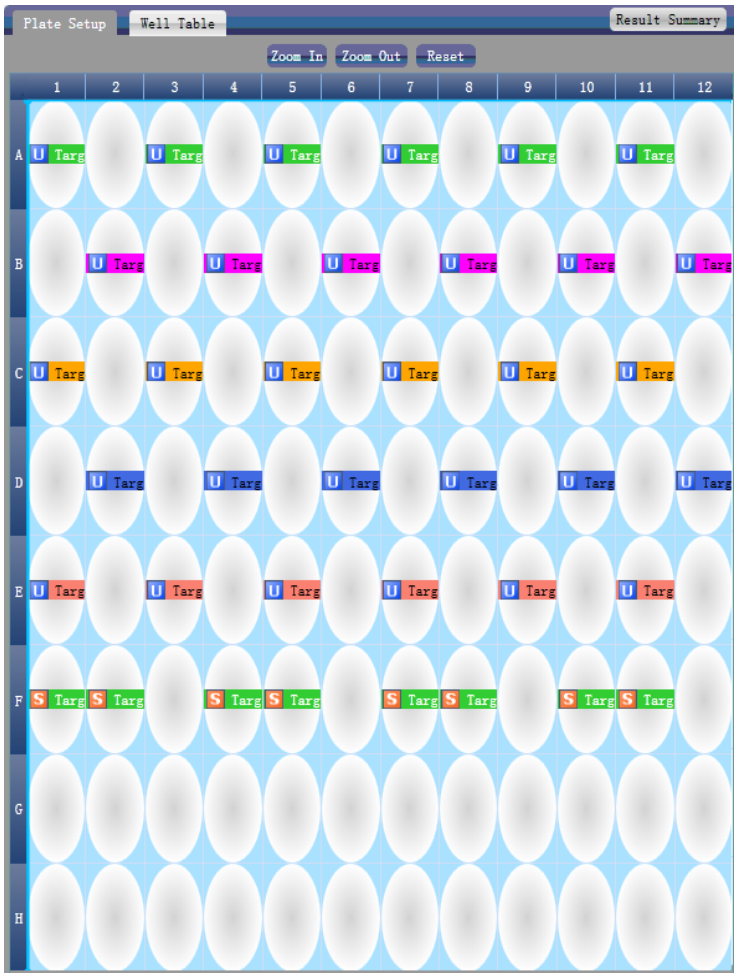


2. Check the amplification curve
    a. Set up colour
    b. Set up plot type
    c. Set up show dye

    When the background colour of a dye name is blue, it will be displayed; while white indicates it will not be displayed.



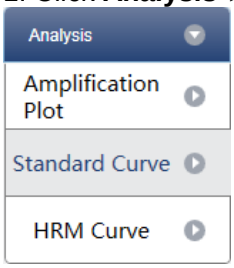
3. Check the reaction plate
    a. Select reaction plate well site and check corresponding well site curve
    The default is all wells are selected
    b. Zoom-In, Zoom-Out and reset the reaction plate
    c. Check well table
    d. Check results summary



4. Set up inspection item
    a. Set up assay
    b. Set up threshold
    c. Set up automatic baseline
    When the threshold value is not automatic, the user cannot set up the automatic baseline

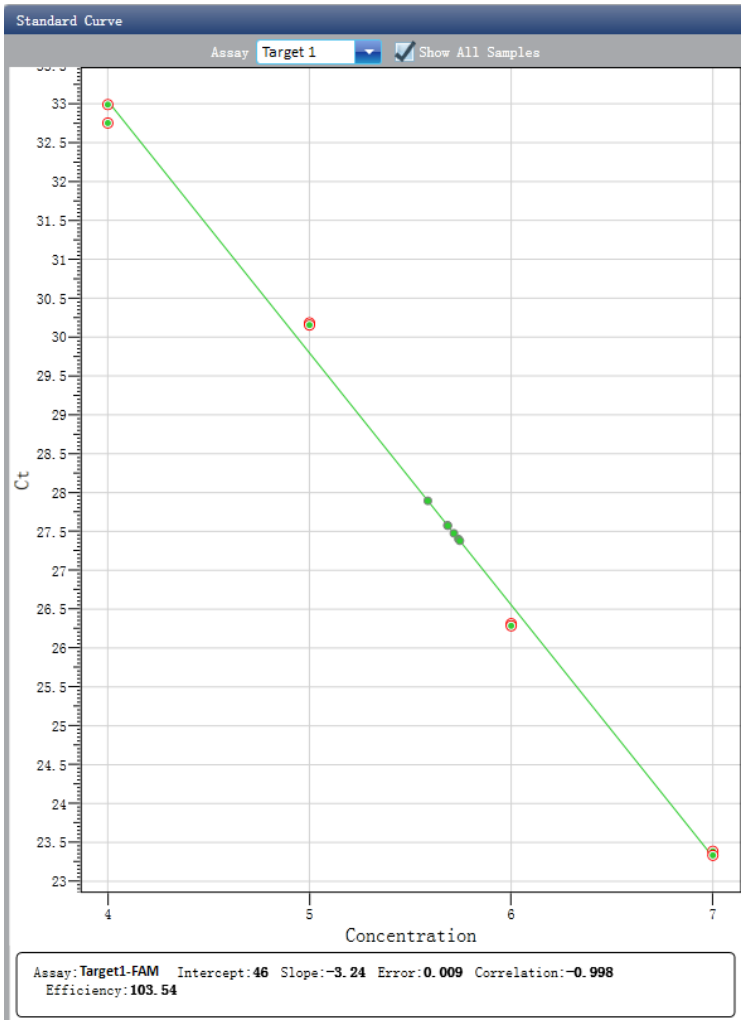
4.1.2 Check the Standard Curve

1. Click **Analysis** ▶ **Standard Curve**



2. Check the Standard Curve

a. Set up array



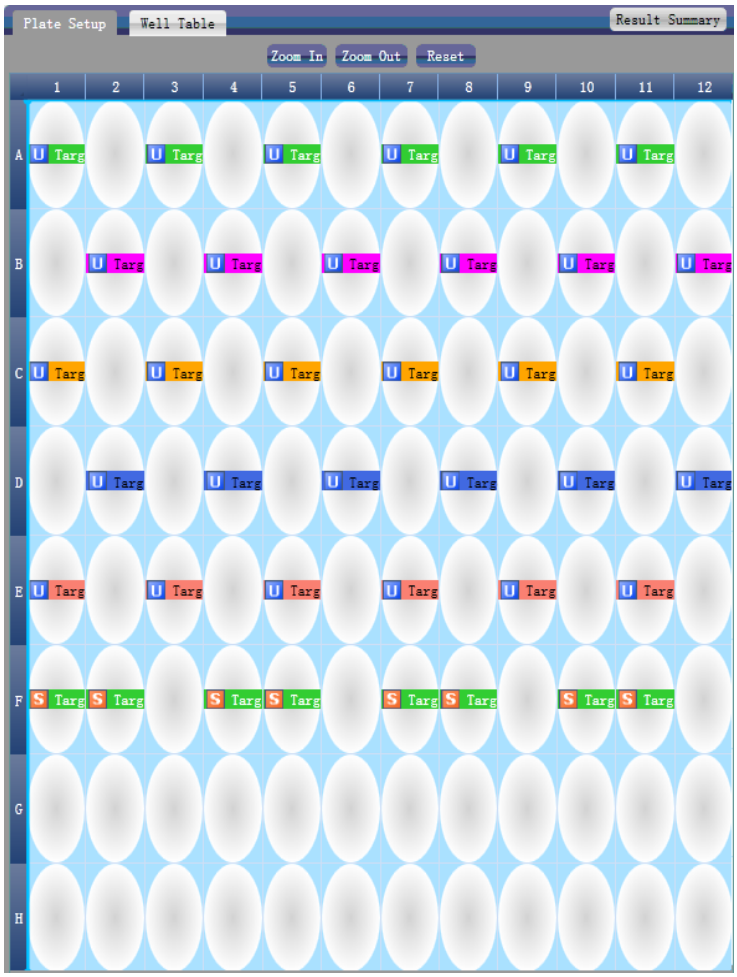
3. Check the reaction plate

a. Select reaction plate well site and check corresponding well site curve
The default is all wells are selected

b. Zoom-In, Zoom-Out and reset the reaction plate

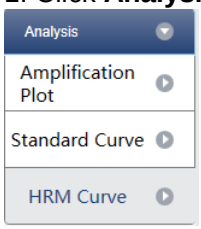
c. Check well table

d. Check results summary

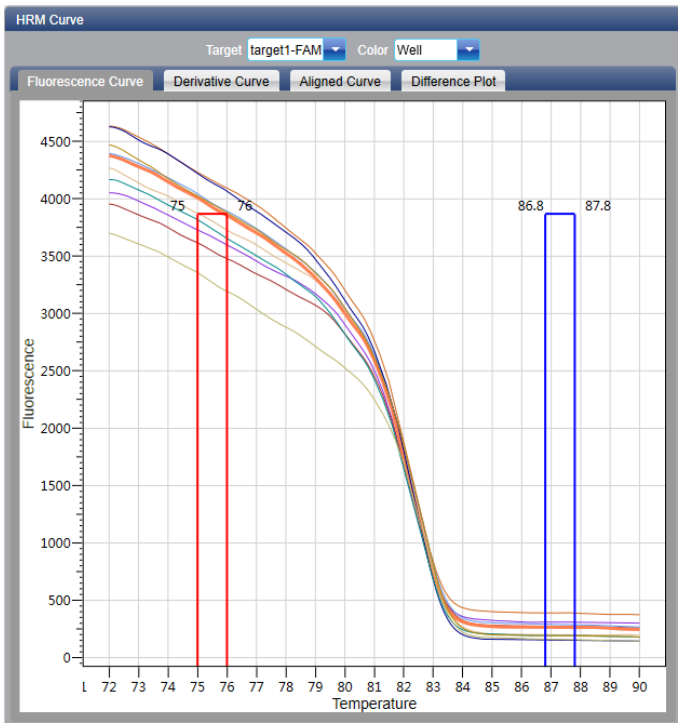


4.1.3 Check HRM

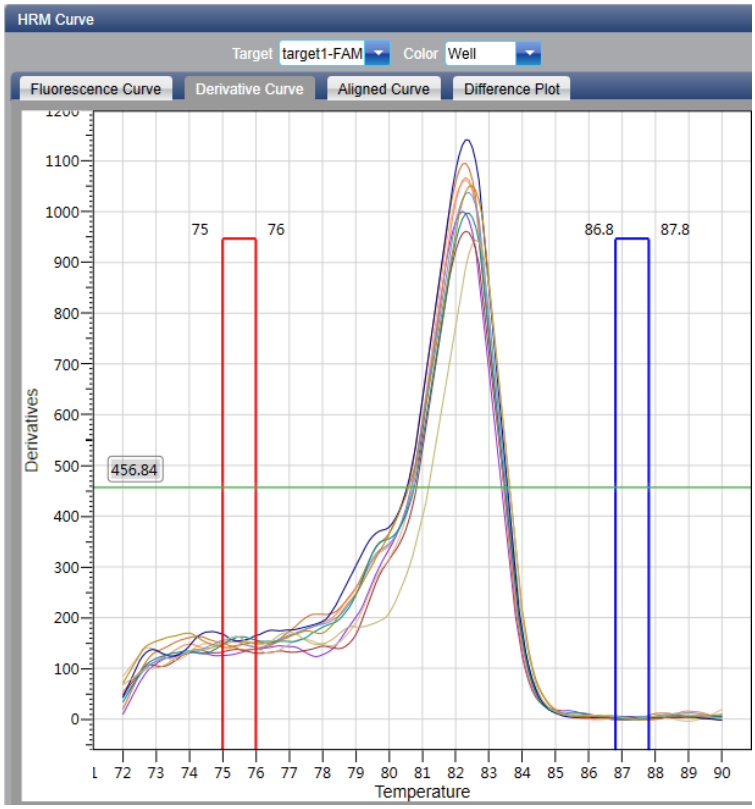
1. Click **Analysis ► HRM Curve**



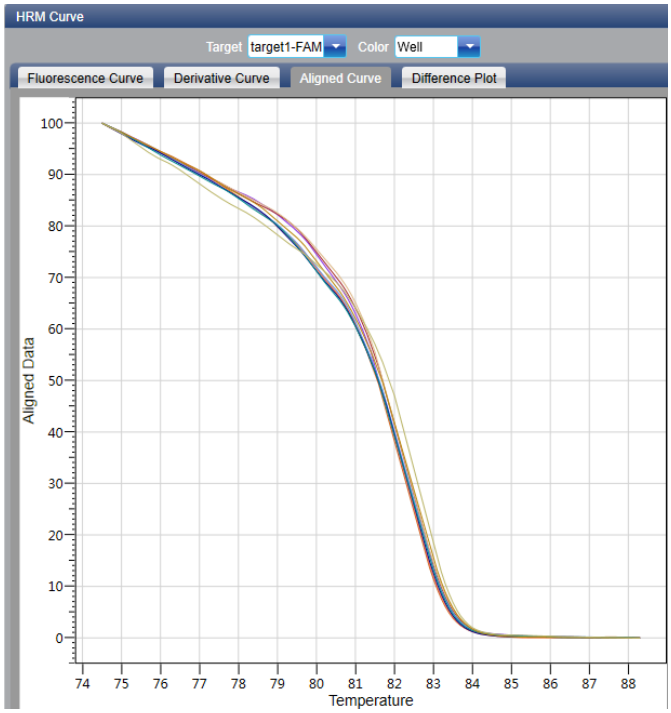
2. Check the fluorescence curve
    a. Set up target
    b. Set up color



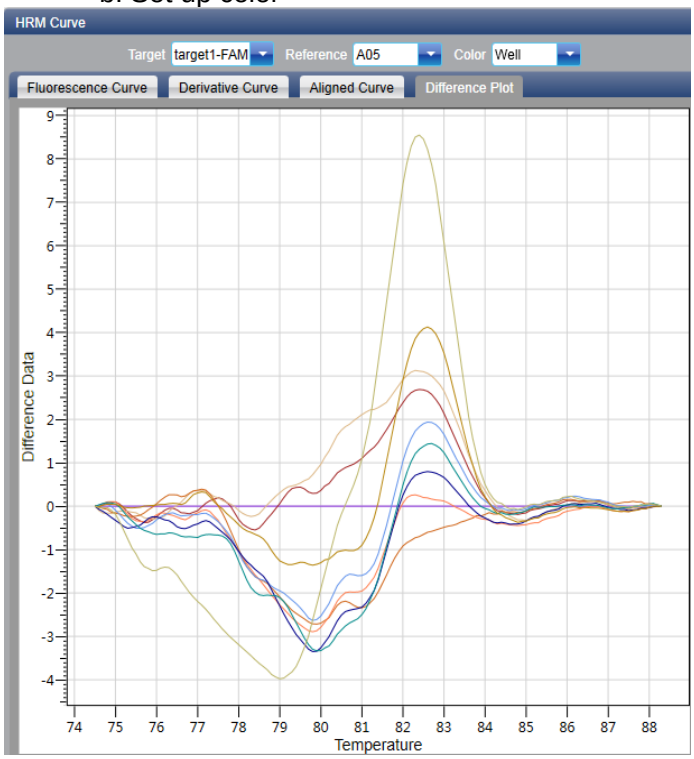
3. Check the derivative curve
    a. Set up target
    b. Set up color



4. Check the aligned curve
    a. Set up target
    b. Set up color



5. Check the Different Pilot
    a. Set up target
    b. Set up color

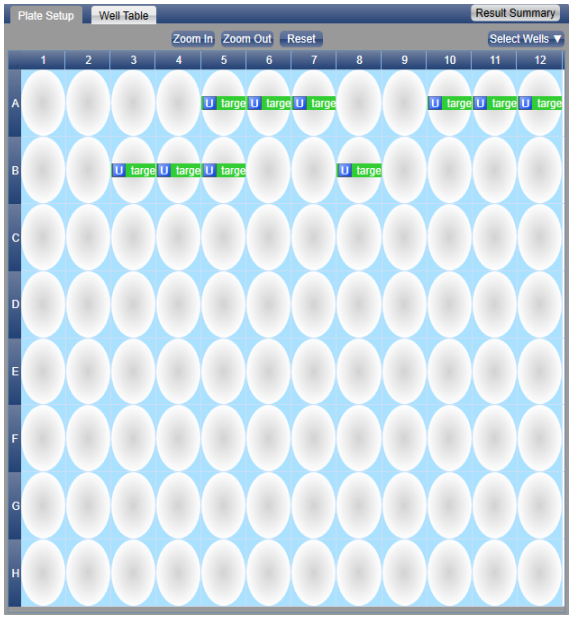


6. Check the reaction plate

a. Select reaction plate well site and check corresponding well site curve
The default is all wells are selected

b. Zoom-In, Zoom-Out and reset the reaction plate

c. Check well table

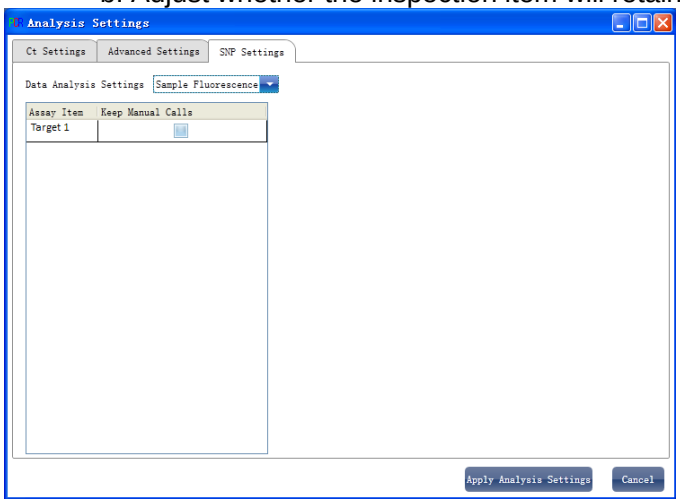


4.2 Adjust Parameter Re-analysis

1. Click **Analysis Settings** ▶ the Analysis Settings dialog box will pop up

a. Adjust analysis data

b. Adjust whether the inspection item will retain manual recognition genotype



5. Experiment Report

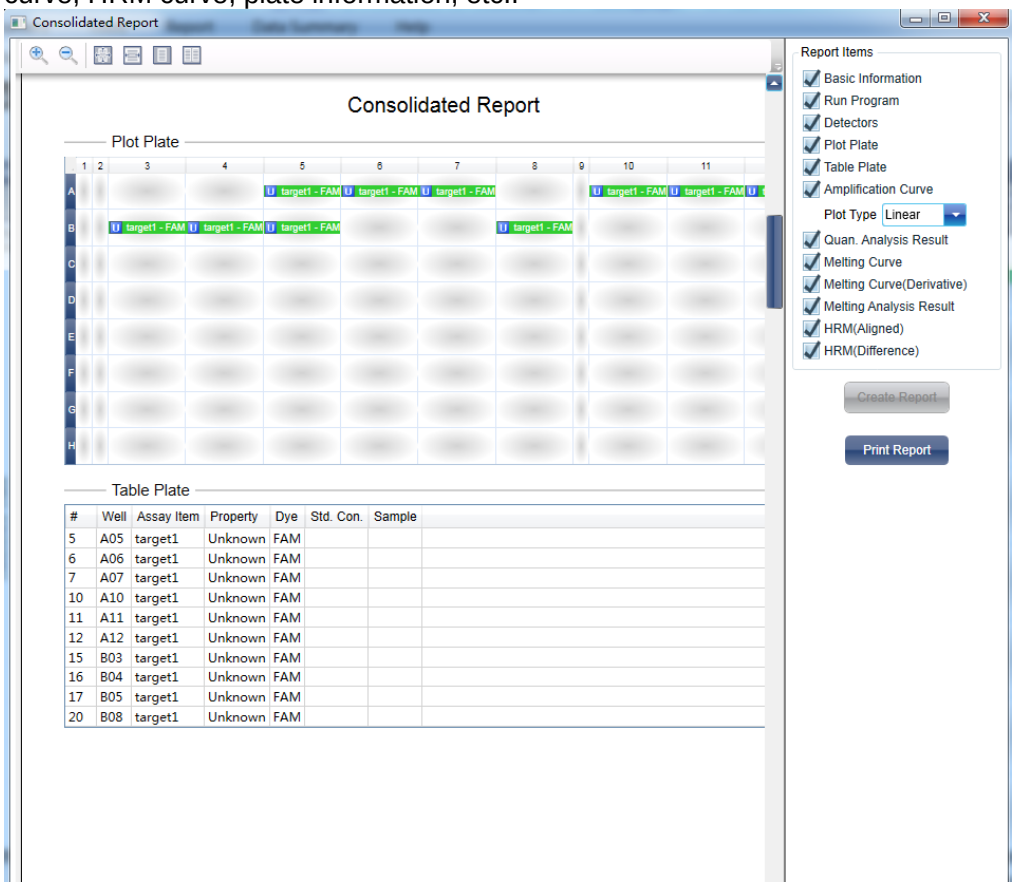
Start
▼
Design experiment
▼
Prepare for the reaction
▼
Run the experiment
▼
Experiment analysis
▼
Experiment report
▼
Data export
▼
End

This section describes how to print an experiment report and covers designing of a report template and print setting.

5.1 Comprehensive Report

1. Click **Report** ► **Consolidated Reports** ► the Consolidated Report window will pop up.

The Consolidated Report includes the basic information, sample information, amplification curve, HRM curve, plate information, etc..

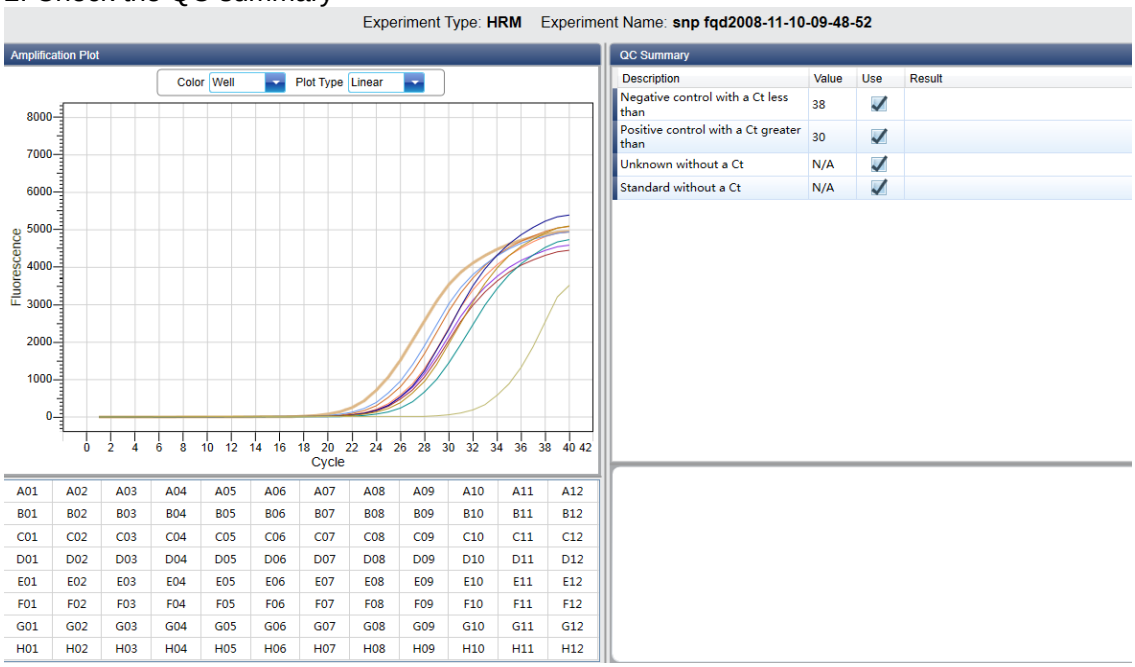


#	Well	Assay Item	Property	Dye	Std. Con.	Sample
5	A05	target1	Unknown	FAM		
6	A06	target1	Unknown	FAM		
7	A07	target1	Unknown	FAM		
10	A10	target1	Unknown	FAM		
11	A11	target1	Unknown	FAM		
12	A12	target1	Unknown	FAM		
15	B03	target1	Unknown	FAM		
16	B04	target1	Unknown	FAM		
17	B05	target1	Unknown	FAM		
20	B08	target1	Unknown	FAM		

5.2 QC Summary

1. Click **Report ▶ QC Summary**

2. Check the QC summary



6. Data Export

Start
▼
Design experiment
▼
Prepare for the reaction
▼
Run the experiment
▼
Experiment analysis
▼
Experiment report
▼
Data export
▼
End

This section describes how to export data and covers exporting to a database, experiment filing and exporting the experiment data to EXCEL.

6.1 Export to Database

Click **Data Summary** ▶ **Export to Database** ▶ the Save File dialog box will pop up ▶ save the exported database file

6.2 Experiment Filing

1. Click **Data Summary** ▶ **Archived Experiment Directory** ▶ the Experimental archive storage directory window will pop up ▶ set up the storage path of file

2. Experiment filing

Click **Data Summary** ▶ **Archived Experiment** ▶ export the filed experiment file

The suffix of filed experiment file is .fqh

6.3 Export Experiment Data to EXCEL

Click **Data Summary**▶**Export Experiment** ▶ **Export Experiment to Excle** ▶the exported experiment data will generate EXCEL file.

6.4 Export Experiment Data to TEXT

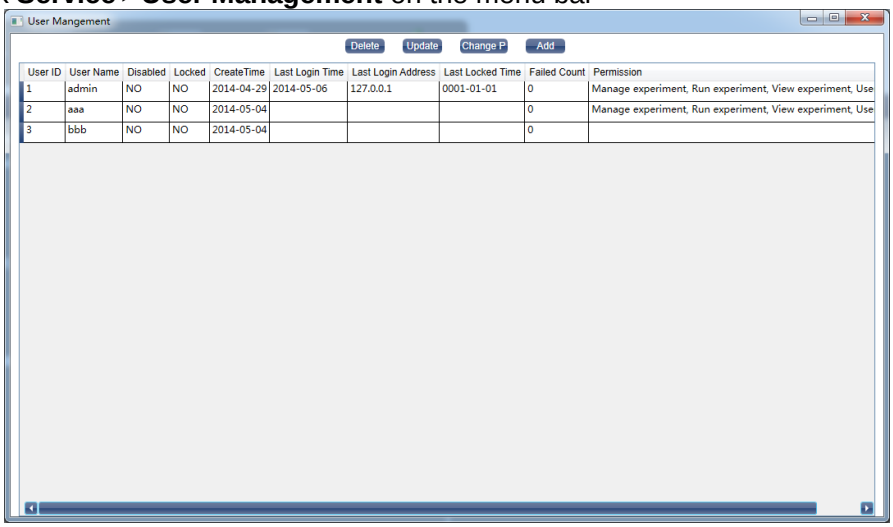
Click **Data Summary**▶**Export Experiment** ▶ **Export Experiment to Text**▶ the exported experiment data will generate TEXT file.

Chapter 8 Service

1. User Management

User management is used to manage user information

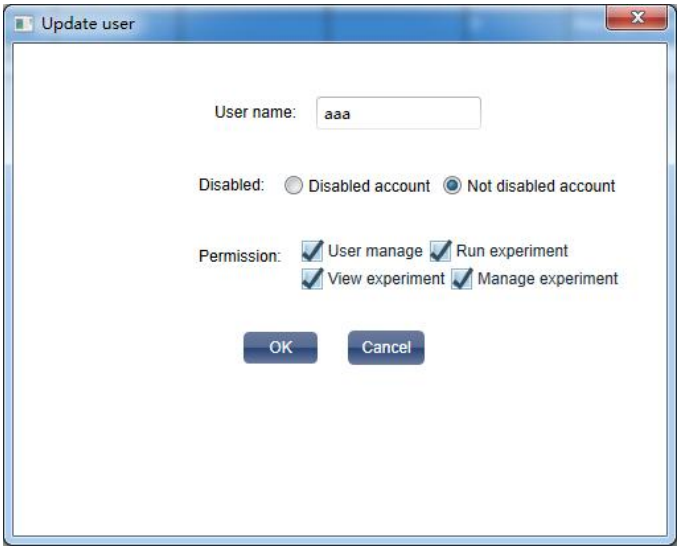
Click **Service►User Management** on the menu bar



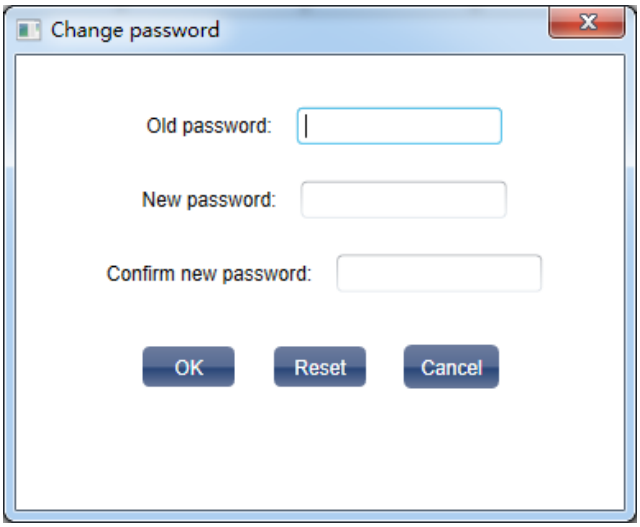
The user can:

a. delete user

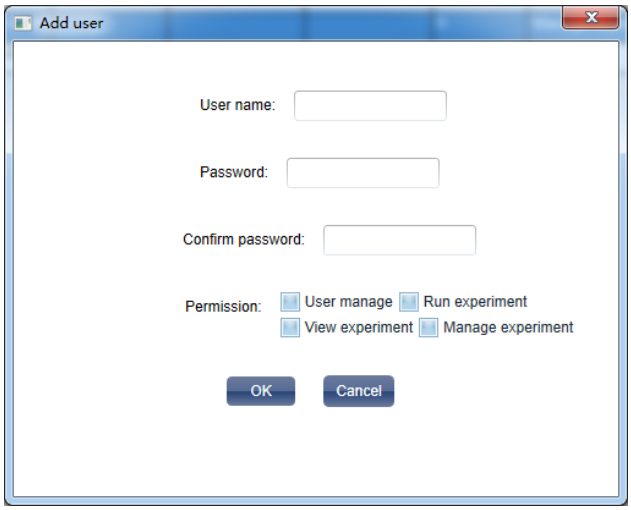
b. update user



c. change password



d. add user



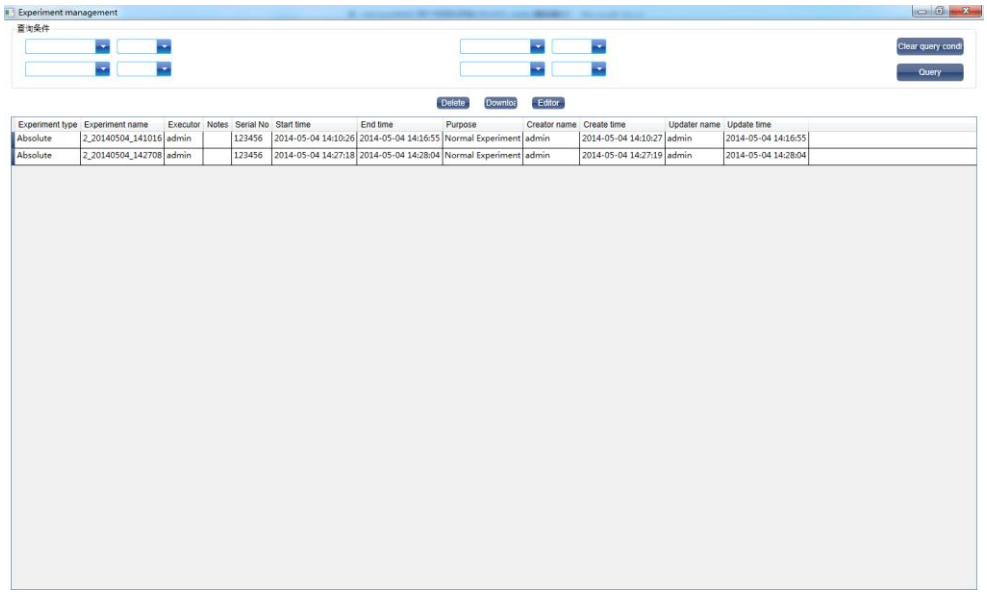
2. Experiment Management

Experiment Management is used to manage experiment information and deleted experiment information。

2.1 Experiment Management

Click **Service►Experiment management► Experiment management** on the menu bar the user can：

a. clear query condition
b. set query condition
c. query
d. delete experiment
e. download experiment
f. edit experiment

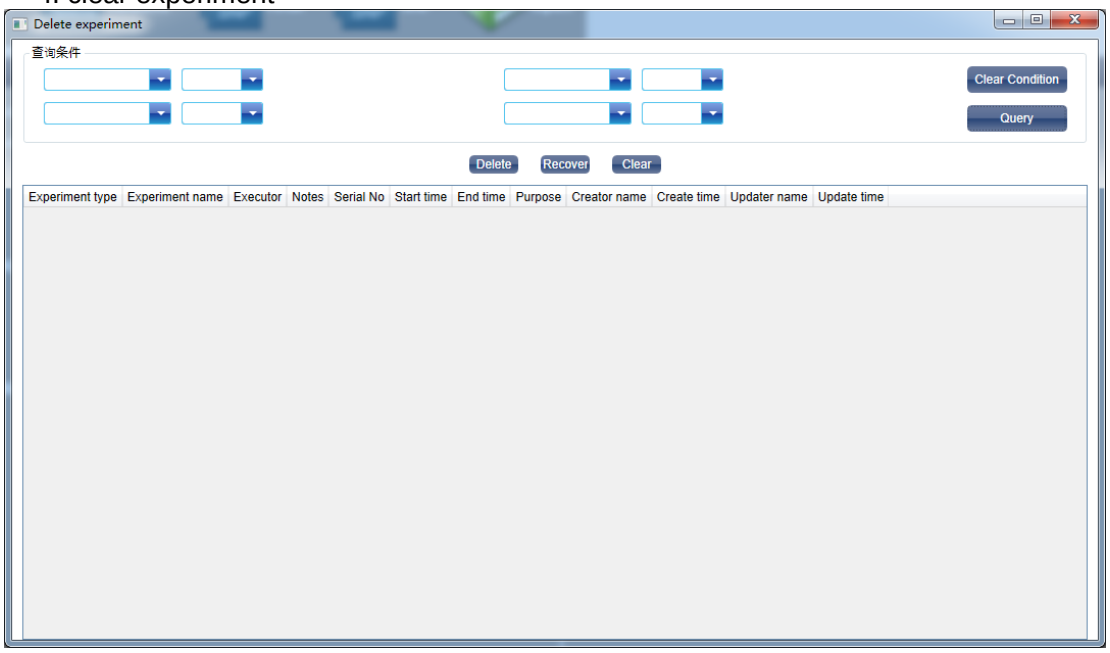


2.2 Deleted Experiment Management

Click **Service►Experiment Management►Deleted Experiment Management** on the menu bar

The user can：

a. clear query condition
b. set query condition
c. query
d. delete experiment
e. recover experiment
f. clear experiment



3. Template Management

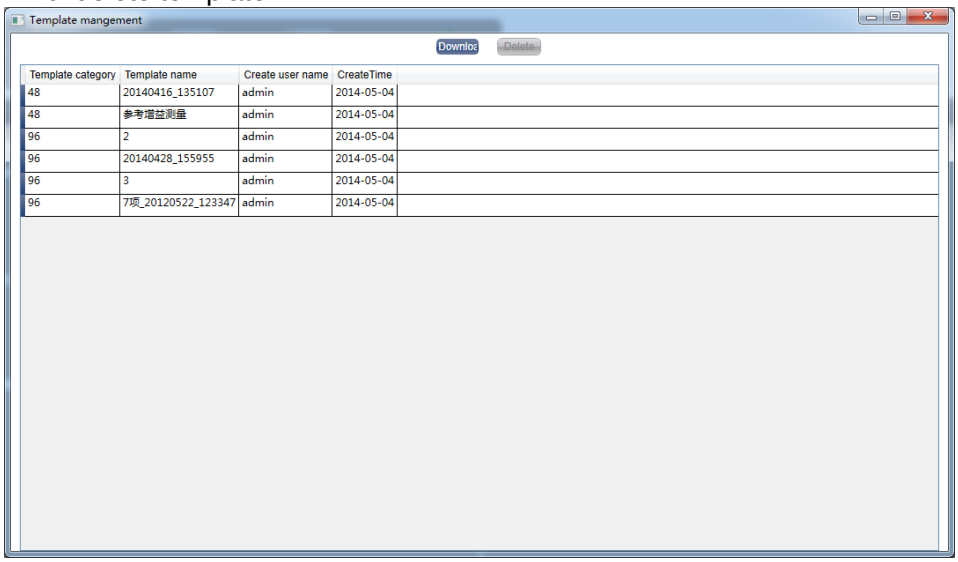
Template Management is used to manage template information。

Click **Service►Template Management** on the menu bar

The user can：

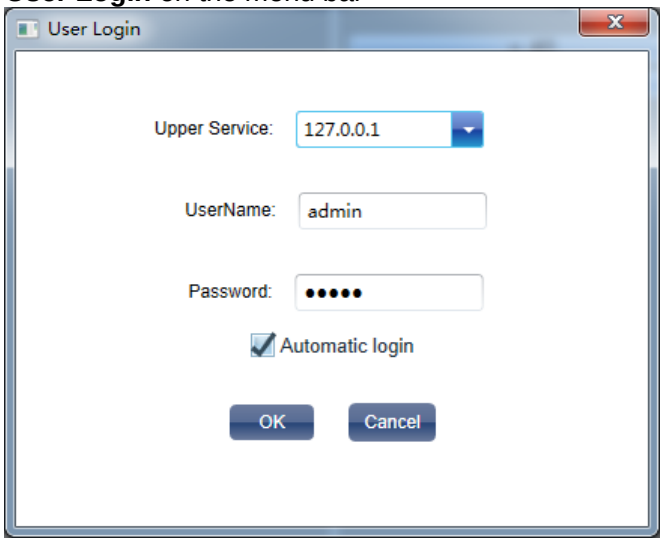
a. download template

b. delete template



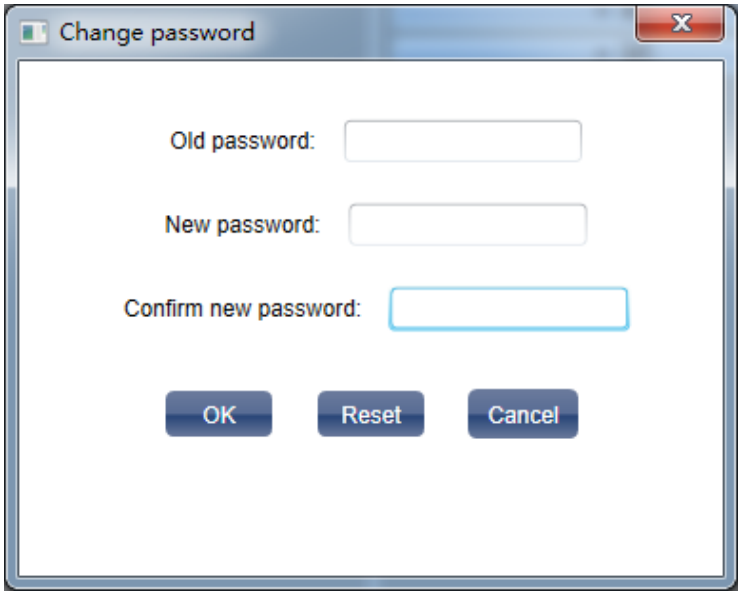
4. User Login

Click **Service►User Login** on the menu bar



5. Change Password

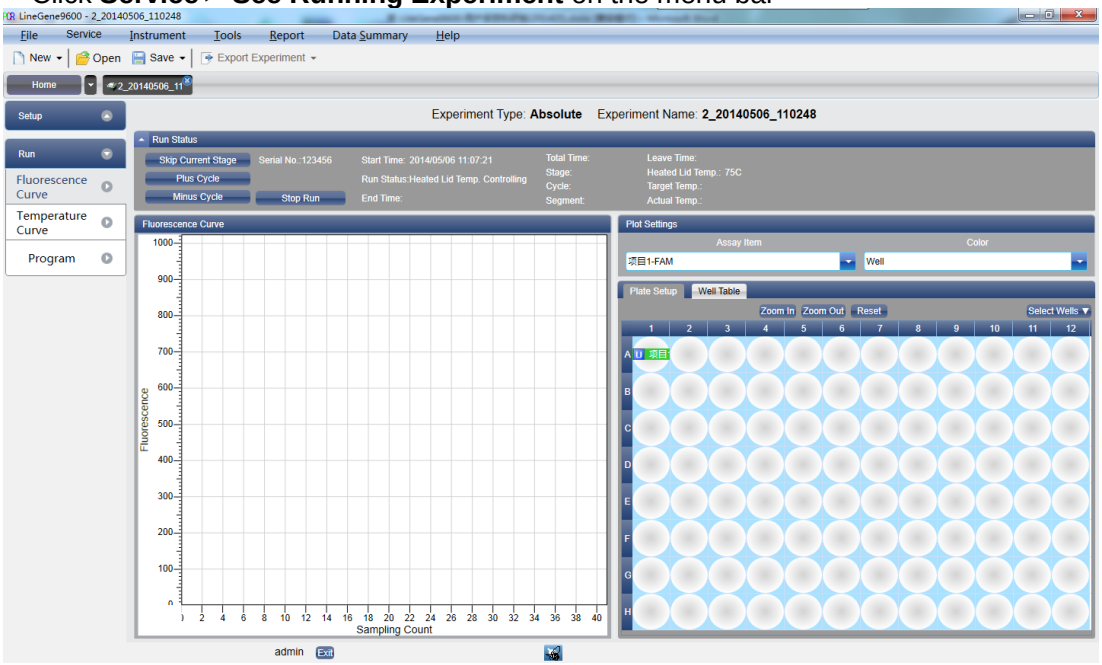
Click **Service►Change Password** on the menu bar



6. See Running Experiment

See Running Experiment is used to see running experiment which is running on connected instrument。

Click **Service▶ See Running Experiment** on the menu bar



Chapter 9 Tool Usage

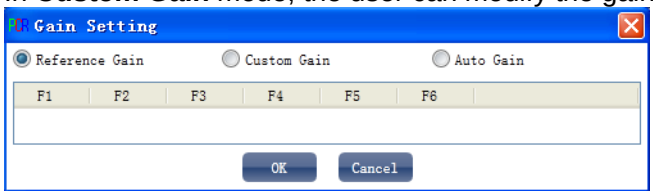
1. Gain Setting

The **Gain Setting** tool is used to set up gain modes.

Click **Tools** ▶ **Gain Setting** ▶ the following window will pop up

Gain setting can be set up as: **reference gain, custom gain and auto gain**

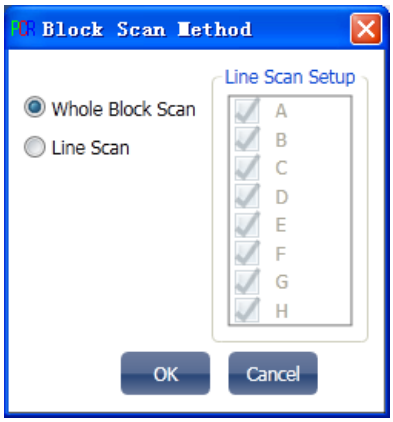
In **Custom Gain** mode, the user can modify the gain value.



2. Block Scan Method

Click **Tools** ▶ **Block Scan Method** ▶ the following window will pop up.

The user can select Whole Block Scan or Line Scan.



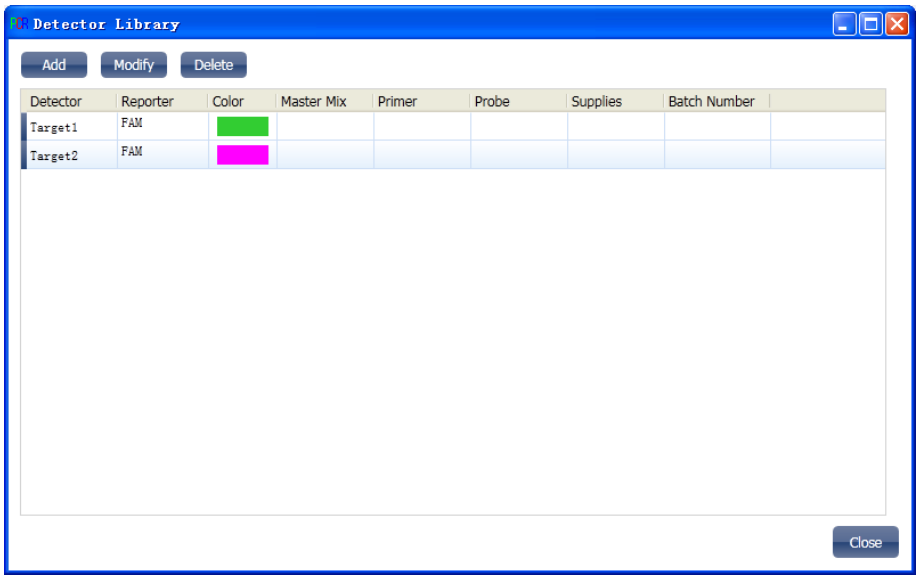
3. Detector Library

The **Detector Library** tool is used to set up the inspection libraries of absolute quantitative, relative quantitative and SNP analysis.

Click **Tools** ▶ **Detector Library** ▶ **(Absolute /Relative/SNP)** ▶ open the following window

The user can:

a. Add Detector
b. Modify Detector
c. Delete Detector



4. Customized Dyes

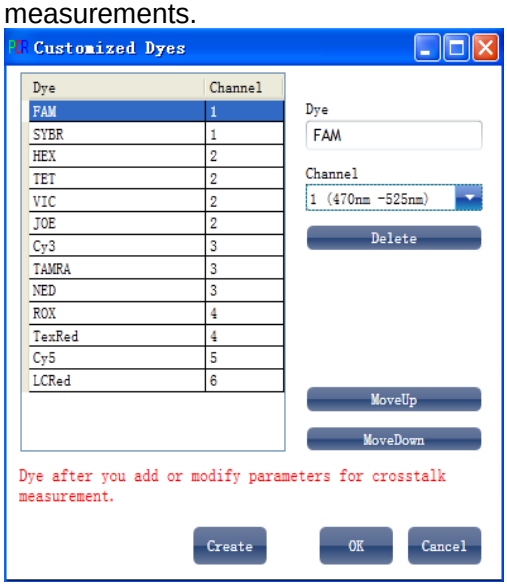
The **Customized Dyes** tool is used to set up existing dyes and newly added dyes.

Click **Tools** ► **Customize Dyes** ► open the following window

The user can:

a. Create dye
b. Modify dye name and channel
c. Delete dye
d. Move dye upward
e. Move dye downward

After adding new dyes or modifying dyes, the user should conduct crosstalk parameter measurements.

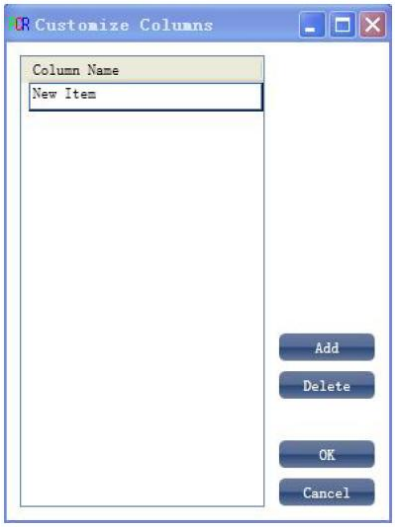


5. Customize Columns

Click **Tools** ► **Customize Columns** ► the following window will pop up

The user can:

a. Add columns
b. Delete columns
c. Modify column name

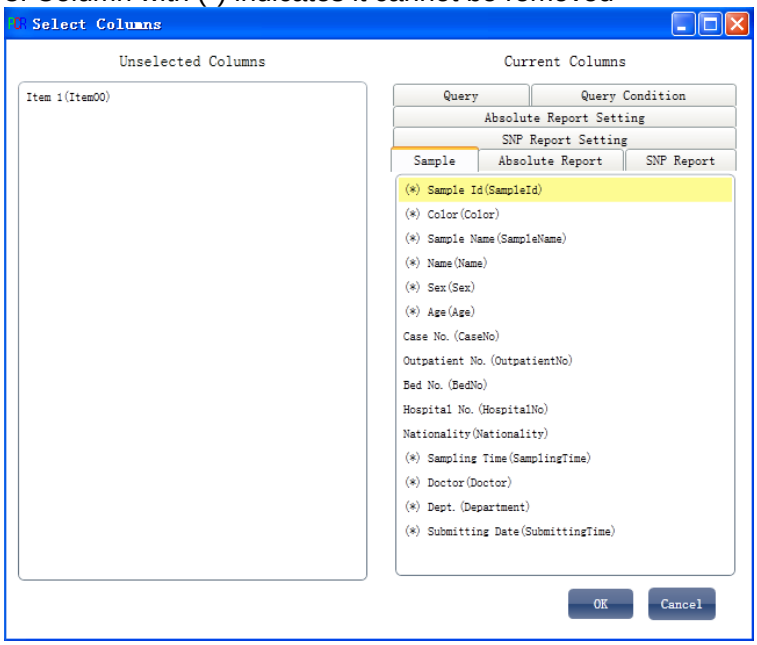


6. Column Selection

The **Select Columns** tool is used to add the new columns in above section into current existing columns, or remove existing columns in current column.

Click **Tools ► Select Columns ►** the following window will pop up

1. Current existing column items include sample, report, report setting, query and query condition
2. Double click column can add or remove a column
3. Column with (*) indicates it cannot be removed



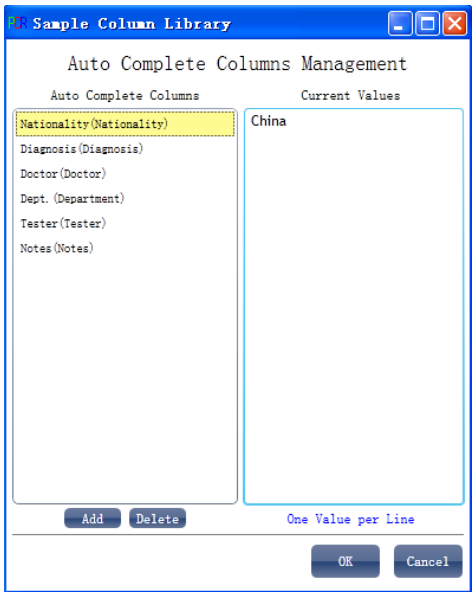
7. Sample Column Library

The **Sample Column Library** tool is used in the experiment design phase. The user can select the definition of contents in the drop-down box when setting up sample information.

Click **Tools** ► **Sample Column Library** ► the following window will pop up

The user can:

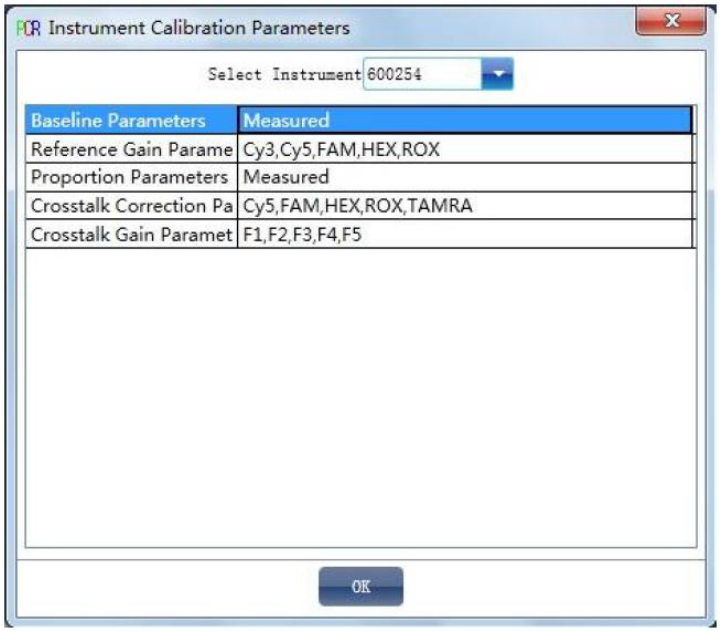
a. Add columns
b. Delete columns
c. Edit the columns content



8. Instrument Calibration Parameters

The **Instrument Calibration Parameters** tool is used to calibrate the instrument parameters.

Click **Tools** ► **Instrument Calibration Parameters** ► the following window will pop up

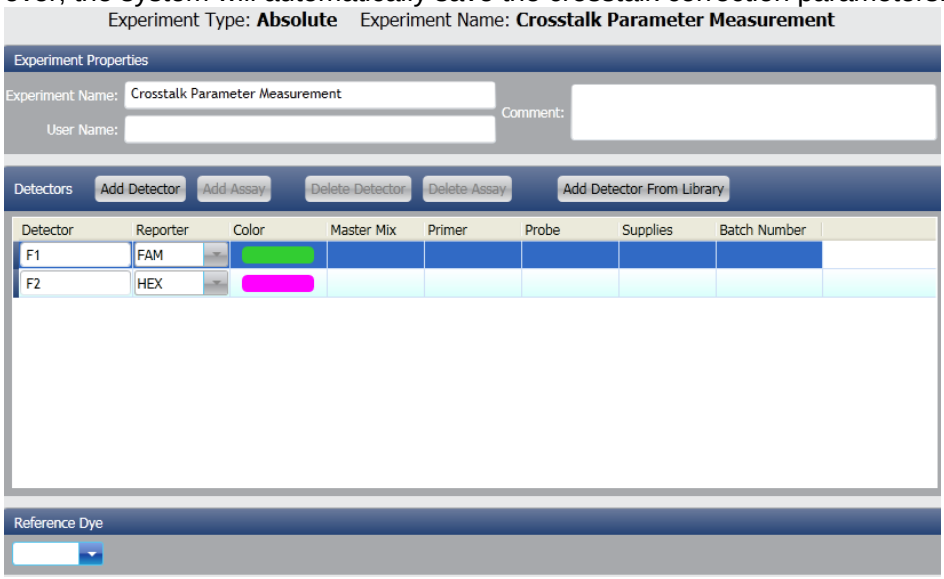


9. Measure Crosstalk Calibration Parameters

The **Measure Crosstalk Calibration Parameters** tool is used to measure crosstalk correction parameters.

Click **Tools** ▶ **Measure Crosstalk Calibration Parameters** ▶ the following window will pop up

The user can add and modify the channels to be tested and dyes according to his needs; upload corresponding reaction plates and operate the experiment. When the experiment is over, the system will automatically save the crosstalk correction parameters.

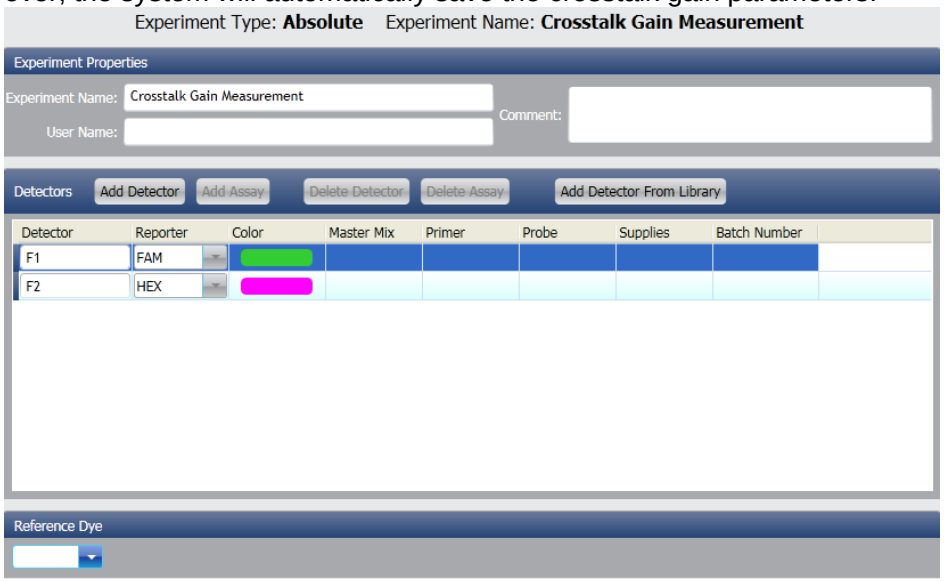


10. Crosstalk Gain Parameter Measurement

The **Crosstalk Gain Parameter Measurement** tool is used to measure crosstalk gain parameters.

Click **Tools** ▶ **Measure Crosstalk Gain Parameters** ▶ the following window will pop up.

The user can add and modify the channels to be tested and dyes according to his needs; upload corresponding reaction plates and operate the experiment. When the experiment is over, the system will automatically save the crosstalk gain parameters.



11. System Maintenance

The **System Maintenance tools** are used for system maintenance.

Click **Tools** ► **System Maintenance** ► the Password Input box will pop up ► input the correct Password ► conduct the following settings:

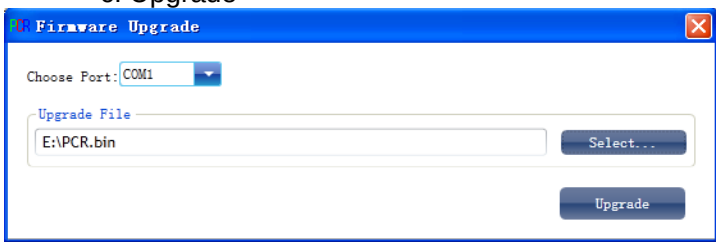
a. Y-axis commissioning
b. X-axis origin calibration
c. Machine serial number setting
d. Photomultiplier setting
e. Runtime zero clearing
f. Background measurement
g. Reference gain measurement
h. Fluorescence incremental calibration
i. Firmware Upgrades

Firmware Upgrade tools are used to upgrade the firmware.
Software updates are achieved by connecting to the computer with the RS232 interface supplied with the instrument.

- Set the MODE update switch of the communication box on the back of the instrument to the right hand side ►Update.
- Switch the power on and connect the serial port line.
- The instrument is in update status.
- In the panel, indicator light flashes green and red at the same time, which is normal.
- Click **Tools** ► **System Maintenance** ►**Firmware Upgrade** ► the following window will pop up.

The user can:

a. Select serial ports
b. Select the BIN file to be upgraded
c. Upgrade



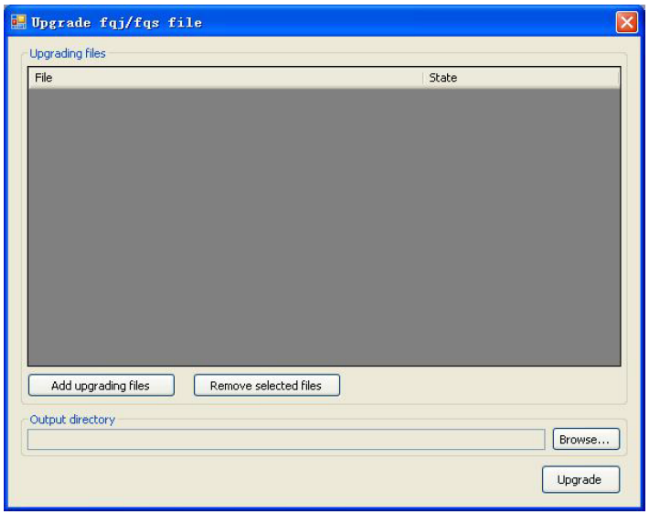
12. Upgrade Experiment File Format

The Upgrade Experiment File Format tools are used to convert old files with the suffix of .fqj or .fqs into new files with the suffix of .fqd.

Click **Tools** ► **Upgrade Experiment File Format** ► the following window will pop up.

The user can:

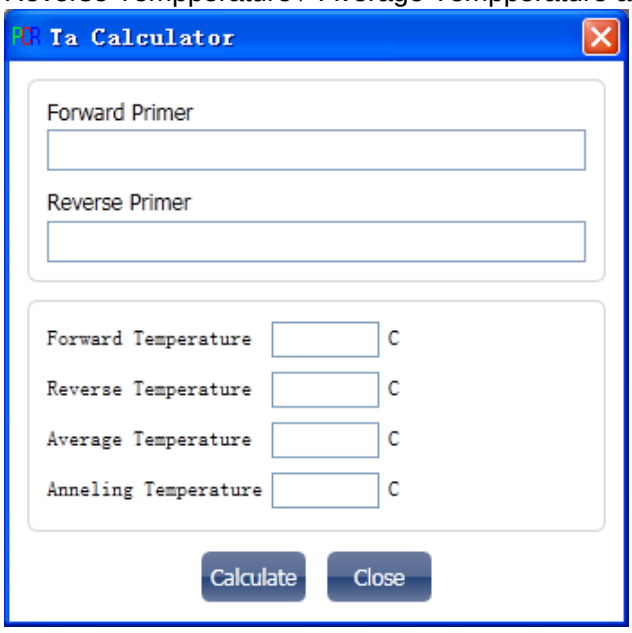
a. Add files to be upgraded
b. Remove selected files
c. Select the output directory of new files
d. Upgrade



13. Ta Calculator

Click **Tools** ► **Ta Calculator** ► the following window will pop up.

Input Forward Primer and Reverse Primer,click Calculate to gain Forward Tempperature、Reverse Tempperature、Average Tempperature and Anneling Tempperature.



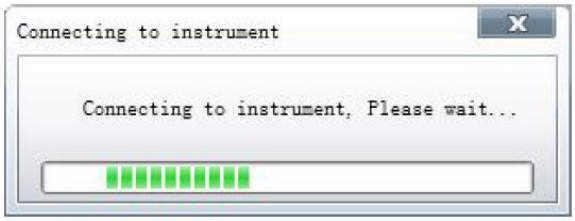
Chapter 10 Other Functions

1. Instrument Operation

The Instruments operations include **Connect** instrument, **Disconnect** instrument and **Instrument Information**.

1.1 Connect

Click **Instrument** ► **Connect** ► select port number or select automatic port matching.



When the instrument is connected, the icon on the status bar will be ; if the instrument is disconnected, the icon on the status bar will be

1.2 Disconnect

Click **Instrument** ► **Disconnect** ► disconnect currently connected instrument

1.3 Instrument Information

When the instrument is connected, the user can check the instrument information.

Click **Instrument** ► **Instrument Information** ► the following dialog box will pop up

Instrument information includes instrument serial number, runtime, currently connected ports, and whether an experiment is in operation.

2. Data Query

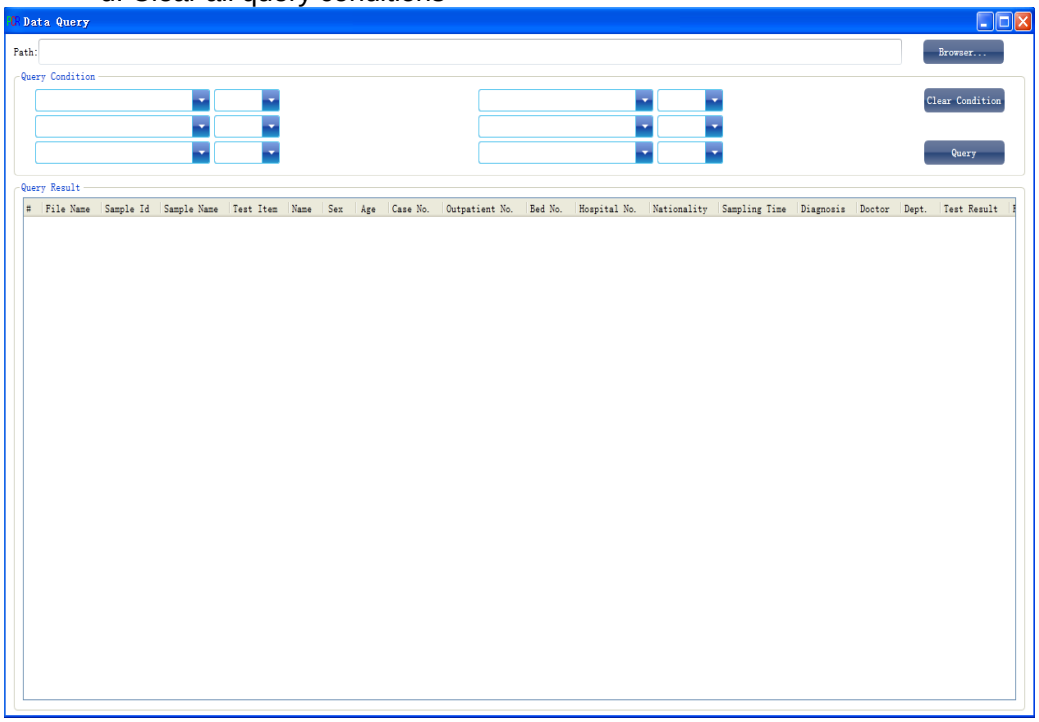
Data Query is used to query the data already exported to the database.

Click **Data Summary** ► **Data Query** ► the following window will pop up

The user can:

a. Select database files

b. Set up query condition
c. Query
d. Clear all query conditions



3. System Help

Click **Help ► Help Topics**

Chapter 11 Maintenance

1. Regular cleaning

In order to ensure normal operation, detection and use, the instrument needs to be cleaned regularly.

- To clean the outer surface: Clean only with a soft cloth, and if necessary, the cloth may be soaked with alcohol, distilled water or a mild detergent.
- To clean the module wells: Wells may be cleaned with nail wipes which does not bring dust and if necessary, they may be soaked with 95 percent of absolute ethyl alcohol used in medicine or distilled water.
-

Warning!

1. Before cleaning this instrument, the power supply must be switched off.
2. When cleaning the conical wells of the module, care must be taken to prevent any cleaning agents from dropping into the wells.
3. The surface of this instrument **MUST NOT** be cleaned with corrosive cleaning agents.
4. In order to avoid scratches or damage to the optics in the wells, **NEVER** use sharp or hard objects to clean the wells.

2. Analysis and Troubleshooting

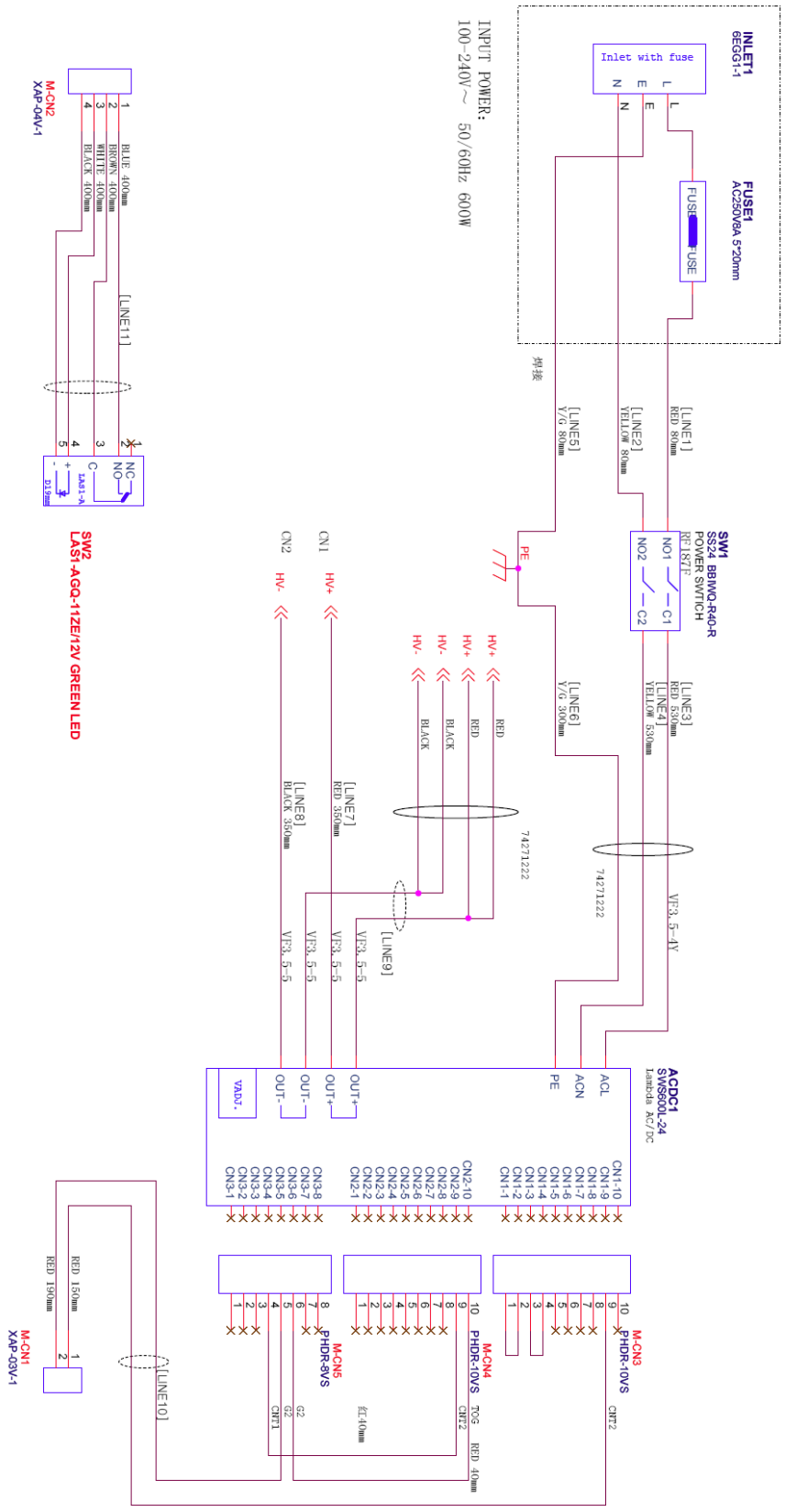
No.	Problem	Possible Cause	Correction
1	The power switch at the rear of the instrument is set ON, but the instrument makes no response.	The run switch at the front of the instrument is not switched on. The internal switching power will have no voltage output.	For working the instrument, its run switch must be pressed and the green indicator lamp should be lit green to indicate energizing of the control system.
2	The display of system parameters menu requires input of “Password”.	The system parameters are for instrument manufacturer’s internal calibration and require special accession password.	The function is not required for the end user and for calibration contact the manufacturer or supplier’s service personnel.
3	After turning the power switch on, the power lamp fails to light up	The run switch is not pressed	This switch is used for temporary turning on/off of the output power and is equivalent to “standby” mode. For prolonged shutdown, the rear power switch should be switched “Off”.
		Power is not switched on.	Check and switch on power
		Burnt fuse	Replace fuse (250V 8A Φ5x20)
		Damaged switch	Replace switch
		Other	Contact the supplier or manufacturer

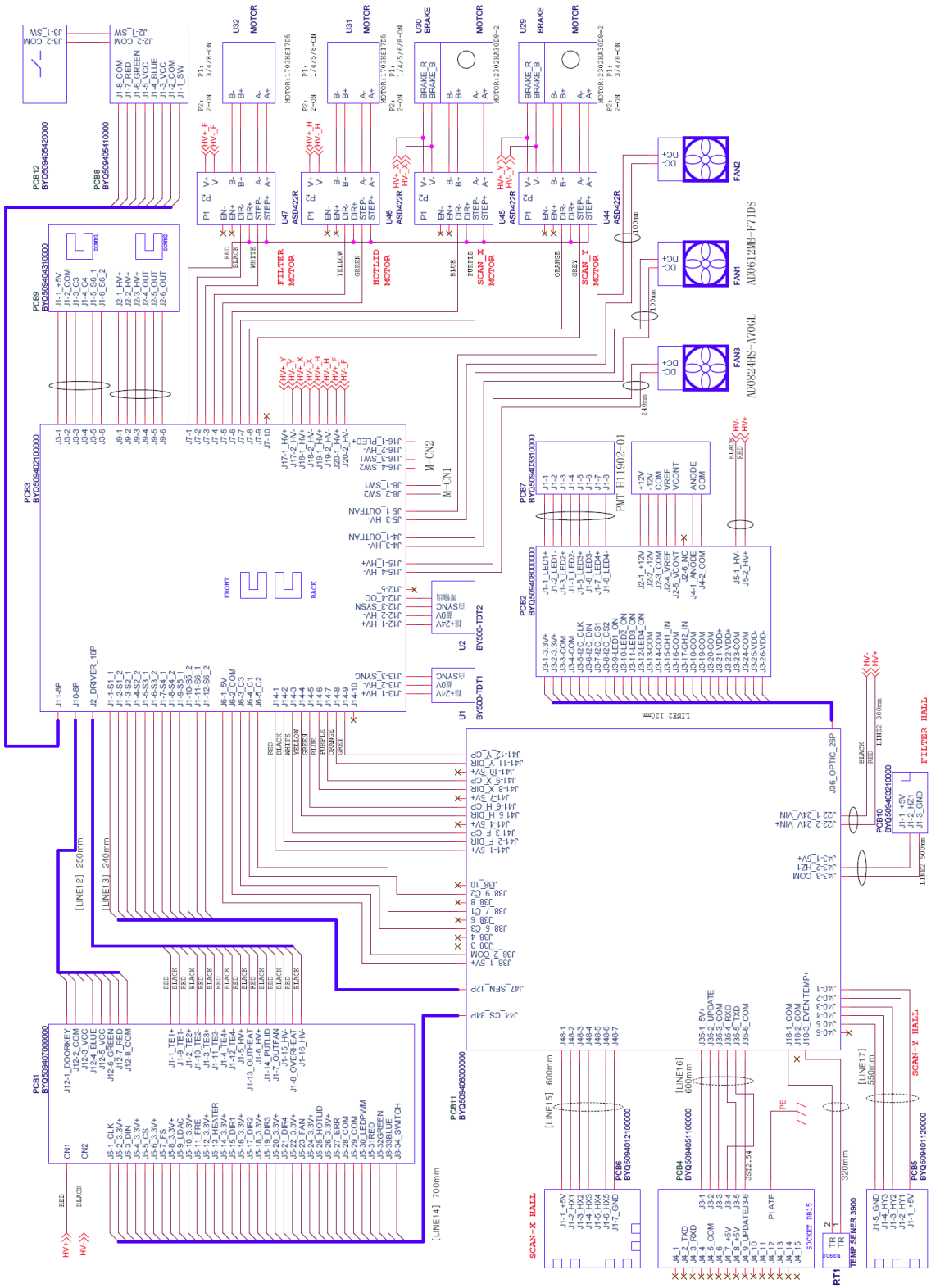
4	At detecting sample position, the step motor fails to work and the communication fails.	Poor contact or damage of the interface wire	Check, connect or replace interface wire
		The power switch is not turned on or is turned on only after the programme starts running	Turn on the power switch and restart the programme
		The step motor or the drive is damaged	Contact the supplier or manufacturer
		The fixing clamp is not fully inserted	Tighten it into the UNLOCKER port, and switch on power again after shutdown
5	After detecting sample position, the actual temperature displays 0C or 100C	The module temperature sensor is damaged. It accompanies panel red lamp alarm and a software prompt, and the instrument automatically stops running.	Contact the supplier or manufacturer
		The power switch is turned on only after the programme starts running	Switch on the power and restart the programme
		The programme is searching communication port and during this period data would be not sent.	If the trouble still exists after researching, contact the supplier or manufacturer
6	Module temperature heating or cooling rate obviously decreases or temperature control is incorrect.	The ventilation opening is blocked.	Clear the ventilation opening
		Loose connection wire	Contact the supplier or manufacturer
		The refrigerating sheet is damaged	Contact the supplier or manufacturer
		Fan is damaged or fails to run	Contact the supplier or manufacturer
		The temperature sensor is damaged	Contact the supplier or manufacturer
7	The module fails to heat and refrigerate.	The inside of the instrument is damaged	Contact the supplier or manufacturer
		The refrigerating sheet is damaged	Contact the supplier or manufacturer
		During hot-lid heating-up	Waiting until the hot-lid temperature comes to the target value. When stopping running, module temperature holds down 30C automatically.
8	Abnormal temperature or fluorescence curve: straight line or loss of partial data	The running programme is infected by a virus	After removing the virus, re-install the application software
		Computer configuration fails to meet requirements	Configure as per requirements

		or the setup of communication port is not appropriate.	
9	Yellow lamp on panel lights on	The module is not fully pushed in and the optic coupler fails to detect the module	Push in again, if the light is still on, contact the supplier or manufacturer
10	The hot-lid is will not heat	Thermal-sensitive fuse is damaged	Contact the supplier or manufacturer
		Loose plug-pieces	Contact the supplier or manufacturer
		Heating elements of hot-lid is damaged	Contact the supplier or manufacturer
		Temperature sensor of hot-lid is damaged	Contact the supplier or manufacturer
11	Under no test tube state, the fluorescence value difference between wells increases or the background value is very high.	The test tube well or hot-lid is contaminated, or baseline******.b96 background parameters are set incorrectly.	Eliminate contamination. Each instrument shall correspond to baseline96 document. After perennial use, offset would occur in the optical elements. In this case, contact the manufacturer to re-calibrate the background value.
12	Reagent evaporation	The PCR tube cap does not sealing tightly enough.	Change consumable to one with a tighter fitting cap.
13	Signal crosstalk among channels	Dye signal crosstalk among channels can happen.	You can measure by using “Crosstalk Measurement”, and save parameters to modify.
14	Fluorescence detection value -abnormal	Irradiation by external strong light	Switch off external light source, or remove instrument from external light source
		During a programme run, the hot-lid is opened	Close the hot-lid (detection result unreliable)
		The photo-electric system is damaged	Contact the supplier or manufacturer

Caution: During the warranty period, opening the instrument casing to inspect the internal workings will invalidate the warranty. If any problems should arise please contact the supplier or manufacturer in the first instance.

Appendix: LineGene 9600 series wiring





Note：