LabTurbo

384 Liquid-Handling System

Automation for 384-well plate PCR setup and liquid-handling

2019/06

www.labturbo.com

TAIGEN®

1. Preface

1.1 Purpose of this manual

This manual is to guide and let the operators understand how to use LabTurbo PCR Setup Systems to prepare, allocate, and distribute PCR reagents and nucleic acid aliquot.

2. Safety Precautions

This manual provides information and warnings that must be followed by the user to ensure safe operation of the LabTurbo workstation and to maintain the instrument in a safe condition. Potential hazards that may harm the users or result in damages to the instrument are clearly stated throughout this manual.

The signs are intended to warn the users against the followings:

 WARNING：Ignoring this sign could lead to potentially lethal consequences.

 CAUTION：Ignoring this sign could lead to physical injuries and/or damage to the machine or hardware parts.

Before operating the machine, please read and follow the manual in detail.

2.1 Normal Use

 WARNING: Improper use of the LabTurbo system may cause personal injuries and/or damage to the instrument. The use of the machine should be under the instruction of trained technical staff. Qualified personnel should follow the manual to operate the device.

 WARNING: It is mandatory that suitable protective equipment must be worn at all times when using the machine. The machine should be turned off when cleaning, repairing, or lubricating.

 CAUTION: In case of emergency, switch off the LabTurbo PCR Setup System power

located on the right side of the device.

CAUTION: We strongly recommend the users to use accessories and consumables of LabTurbo PCR Setup Compact. Non-LabTurbo accessories and disposables may result in damages of the instrument.

CAUTION: Please do not eat, drink, smoke, apply cosmetics, or handle contact lens near the machine. Wash hands thoroughly after handling samples and reagents.

2.2 Equipment assembling, carrying, and positioning requirements

CAUTION: LabTurbo PCR Setup System is a device manufactured and assembled in the certified factory. There are no special requirements for the installation of the device. When carrying the machine, make sure the passageways are clear of all obstructions. Instruction must be received prior to any lifting methods applied.

CAUTION: The device should be placed and anchored securely on a sturdy pedestal or platform.

2.3 Ventilation requirement

CAUTION: This device is equipped with a ventilation fan. Please confirm that the vent is clear and free of obstacles to ensure proper functions of the device.

2.4 Additional equipment positioning requirements

WARNING: The main power cord of LabTurbo PCR Setup System is on the right side of the equipment. Be sure to keep the right side of the device at least 15 cm from the wall or any other obstacles.

2.5 Description of safety marks on the equipment

All of the signs on the equipment are marked according to the standards of IEC/EN/UL 61010.

2.6 Biological hazard

 WARNING: The plastic wares used for this device, such as filtered tips and eppendorf tubes, may have chemical or biological residuals. Collect the biohazard waste and follow the associated waste disposal regulations and requirements for proper waste disposal.

2.7 Mechanical hazard

 WARNING: LabTurbo PCR Setup System has a safety door. Once LabTurbo PCR Setup System is on and working, the user should not reach into the workstation under any situations.

2.8 Electrical hazard

 WARNING: Opening protective covers or removing electrical parts is likely to expose the operator under dangerous voltages. Modification of any electrical components (wires, cables, circuit boards, etc.) of LabTurbo PCR Setup System by unauthorized personnel is prohibited.

2.9 Operation condition

 Caution: Temperature: 15-30 °C, Humidity: 10-75%

3. EXTERIOR FEATURES

3.1 Built-in touch screen

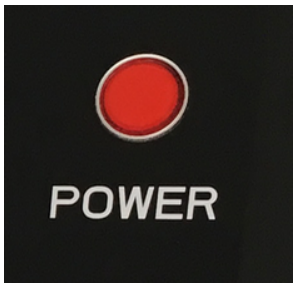
The sensitive built-in touch screen is on the top front of the machine. This control panel is equipped with Windows operation system. Once the panel is turned on, the LabTurbo PCR Setup program will automatically activate and users can select the desired protocol to start. A stylus for the touch screen is included.

3.2 Safety door

When LabTurbo PCR Setup System is up and running, opening the safety door will immediately pause the operation to prevent injuries of the operator.

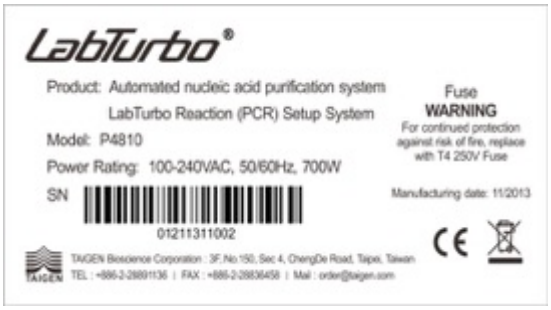
3.3 Power button

The red power button locates on the front of the workstation. Press the red button to turn on the workstation and directly enter the LabTurbo program. To turn off the system, shut down the LabTurbo program and then press the power button directly.



3.4 Label

The label consists of the product name, model, serial number with barcode, manufacturing date, and power rating.



3.5 Side panel

The side panel is on the right side of the machine.

It consists of the following:

A. Monitor Adaptor is the port for the RS232 plug of external monitor.

B. USB Accessory is for the peripheral with the USB port such as the mouse, keyboard or USB flash drive.

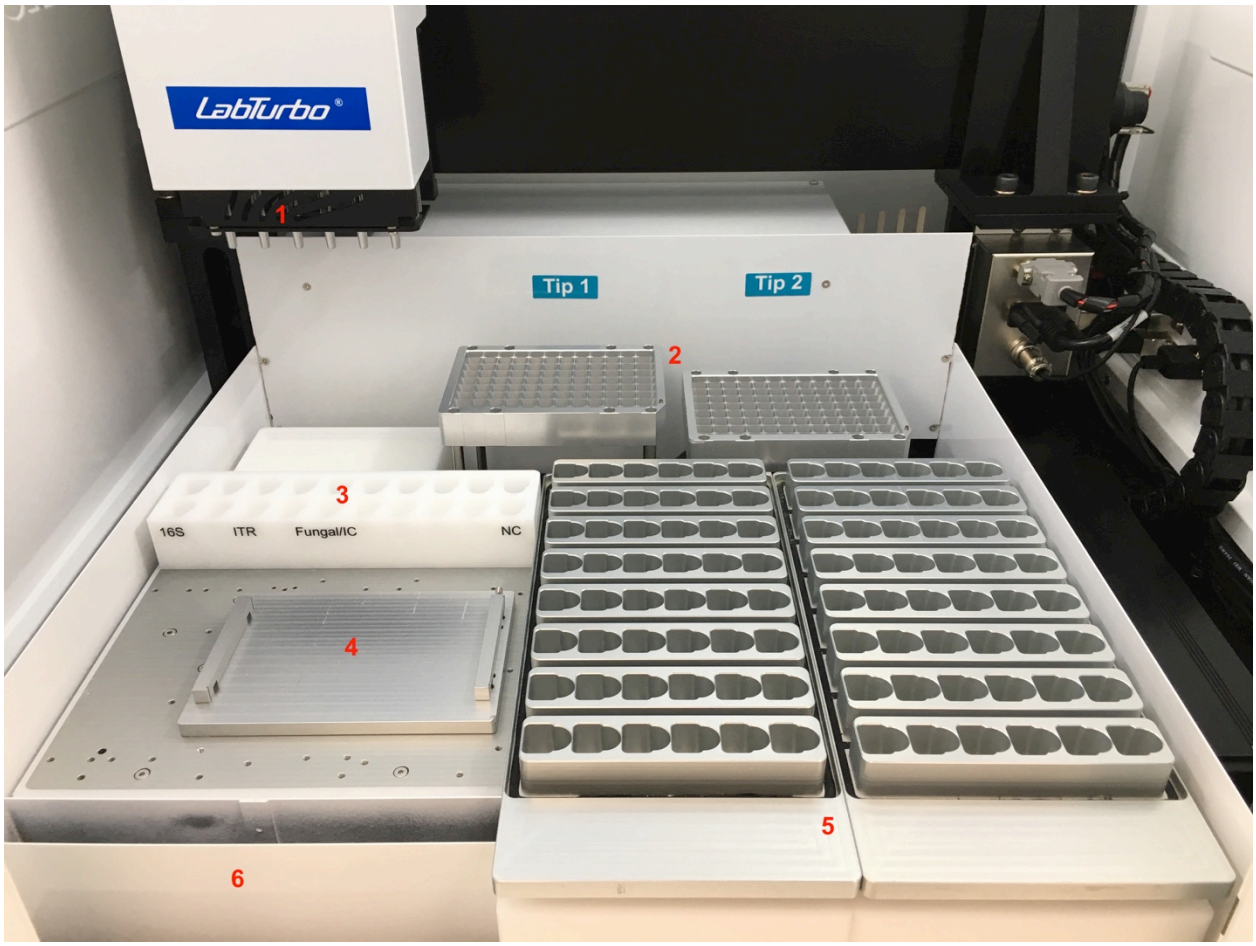
C. AC 110V/220V and ON/OFF are the main power switch and the power cord socket. The fuse chamber is in between the main power switch and the power cord socket.

NOTE: Voltage values showed on pictures in this manual are for demonstration purpose only. The actual voltage supply of individual machine may vary based on its module.

3.6 Machine feet with wheels

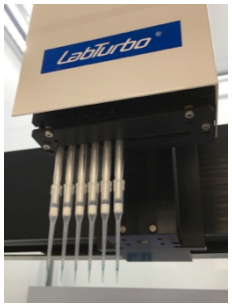
The height of the machine feet is adjustable and accompanied with the wheels. Manage the level of the workstation by adjusting the height of the machine feet. The wheels provide convenience for short distance transfer of the workstation.

4. Worktable



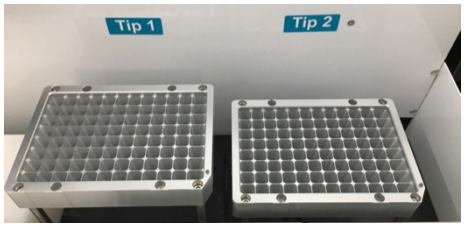
(1) Spacing-adjustable pipette (2) 96-well tip rack (3) PCR master mix rack (4) PCR setup plate adaptor (5) 1.5 ml/2.0 ml eppendorf template rack (6) Tip disposal (The picture portraits the standard layout of the worktable of LabTurbo Reaction Setup System. The actual worktable layout may vary depending on the particular models.)

4.1 Spacing-adjustable pipette



The tip adaptor of the spacing-adjustable pipette is for the assembly of 50 ul tip with aspiration volume range of 1-250 ul. The device is equipped with a 4-pipette channel or 6-pipette channel spacing-adjustable pipette system depending on the device model. The space between each pipette channel can be adjusted between 9 mm or 18 mm to facilitate liquid-handling functions for 96-well plate.

4.2 96-well tip rack

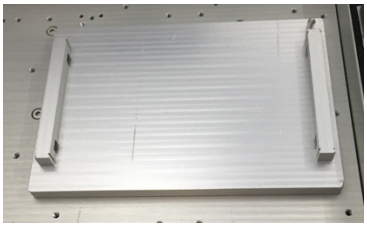


The racks are for placing 50 ul tip in 96-well plate format. 2 plates of 50 ul tips can be mounted on 2 racks.

4.3 PCR master mix rack

The PCR master mix rack is for placing PCR master mixes contained in 1.5 ml or 2.0 ml Eppendorf tubes. Up to 20 master mixes can be placed in this rack.

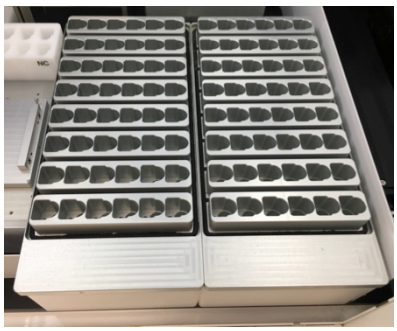
4.4 PCR setup plate adaptor



The PCR setup plate adaptor is for mounting 384-well PCR plate. A cooling pad (10 ± 2°C) is embedded underneath the adaptor for the preservation of allocated aliquot in PCR plate.

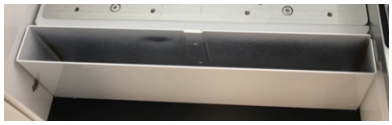
4.5 Template rack

The template rack is to accommodate nucleic acid template contained in 1.5 ml or 2.0 ml eppendorf tubes.



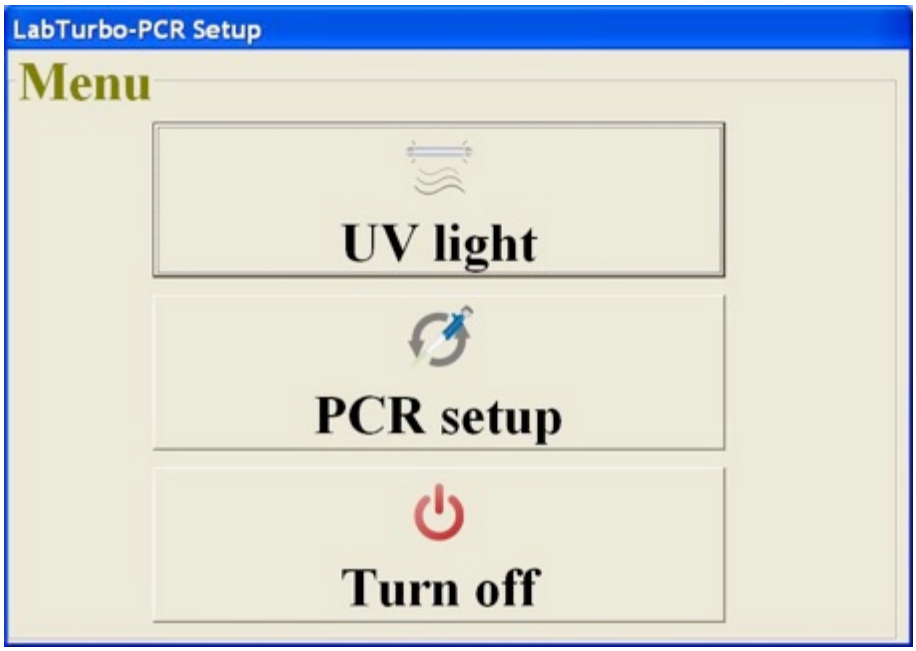
4.6 Tip disposal channel

The tip disposal channel is for the removal of used tips.



5. Software interface and operation

Note: The worktable layout and software interface may vary for customized models.



Main menu

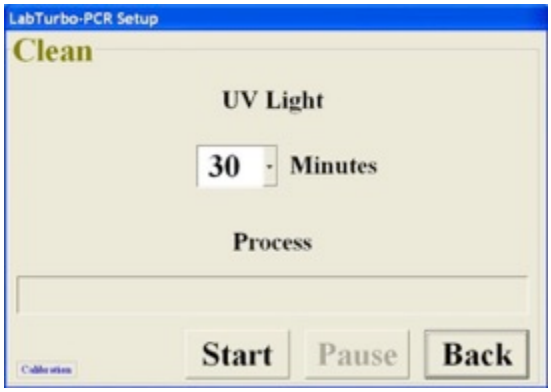
UV light：to initiate UV sterilization.

PCR setup：for PCR setup functions.

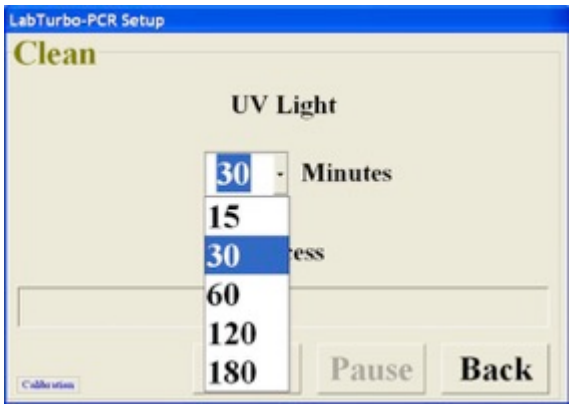
Turn off：to shut down LabTurbo PCR setup software.

5.1 UV light

1. Select ‘UV light’



2. Select the desired duration for UV sterilization, then click ‘Start’ to initiate the process.



5.2 PCR setup

1. PCR Setup: select ‘PCR setup’ and enter the page of PCR setup functions. The functions include single transfer (X1), duplicate transfer (X2), triplicate transfer (X3) and user-defined function (384 import).

Function description

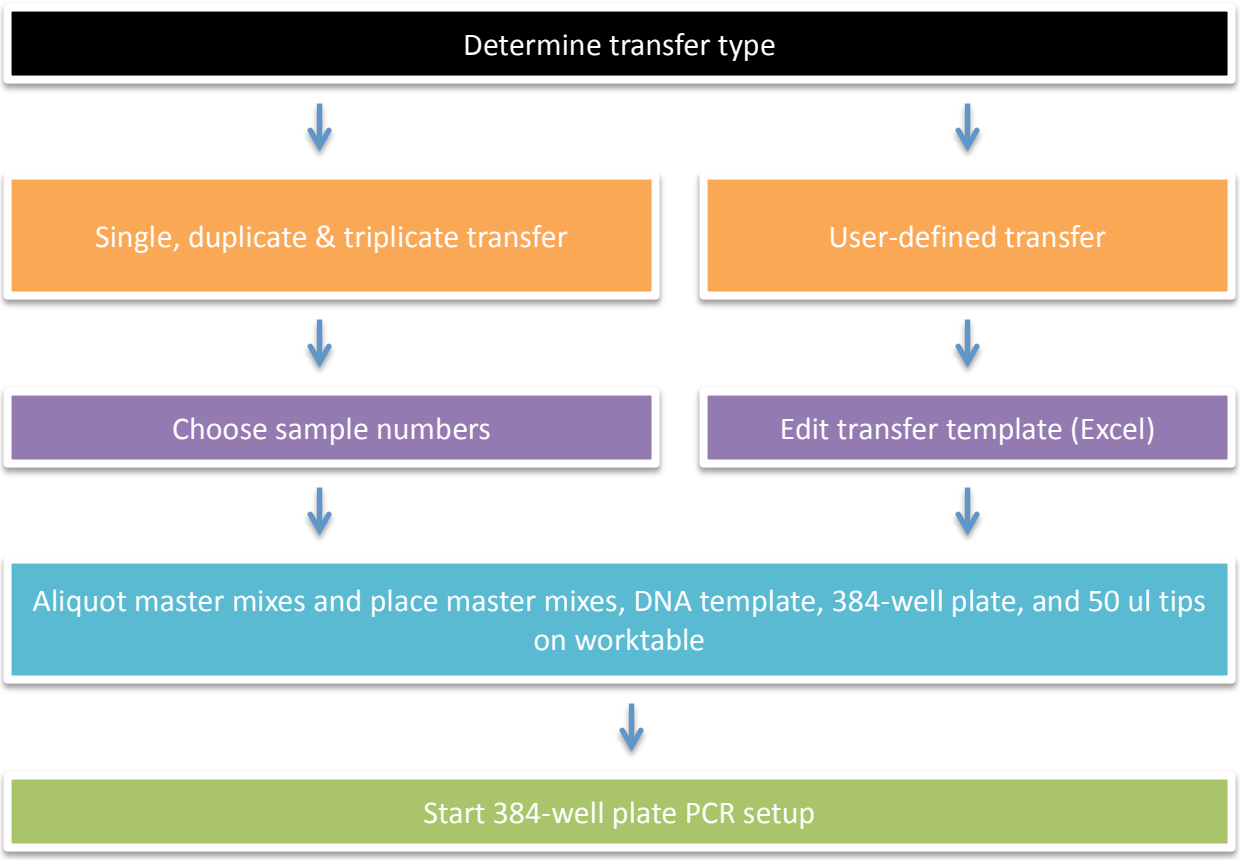
Single transfer (X1)	Transfer master mixes and DNA template (including PC, NC) to assigned wells on 384-well plate.
Duplicate transfer (X2)	Transfer master mixes and DNA template (including PC, NC) in duplicate format to assigned wells on 384-well plate.
Triplicate transfer (X3)	Transfer master mixes and DNA template (including PC, NC) in triplicate format to assigned wells on 384-well plate.
User-defined mode (384 import)	Transfer master mixes and DNA templates to assigned wells on 384-well plate based on the Excel template edited by users.

2. Cooling

Check the box for turning on the Cooling function. The cooling pad will maintain the temperature of PCR tube or 96-well PCR plate within 10 ± 2°C

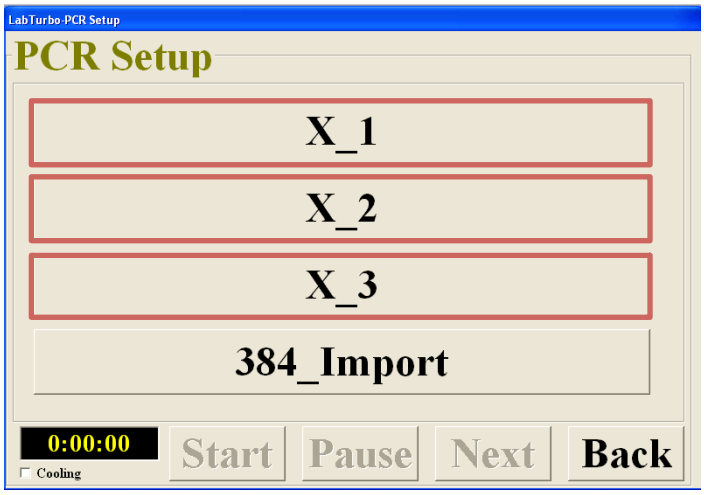
5.2.1 Operation flowchart

LabTurbo PCR setup system provides an extremely convenient process for setting up PCR experiments involving the distribution and preparation of nucleic acid and PCR reagents. Users can freely edit a user-defined Excel file or txt files exported from compatible PCR thermocyclers (Ex: ABI 7500、Stratagene、Biometra ...etc) for the distribution of nucleic acid template and PCR reagents completely based on their purposes. The following is the flowchart of LabTurbo PCR Setup System operation.

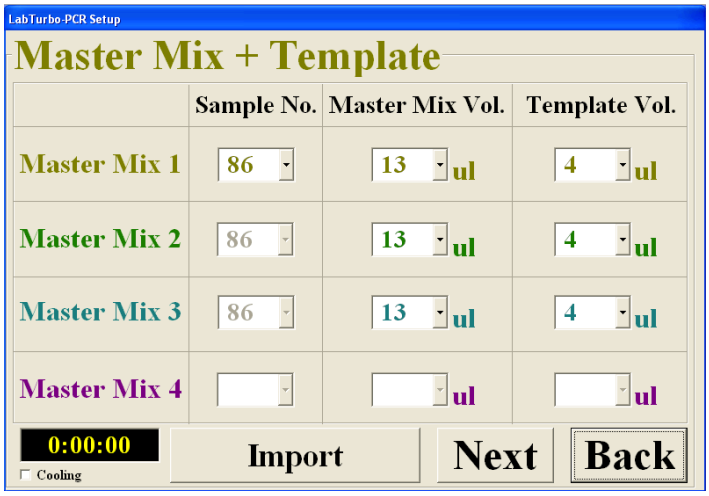


5.2.2 Single, Duplicate, Triplicate Transfer

1. Select '**Single (X1), Duplicate (X2), or Triplicate (X3)**'.

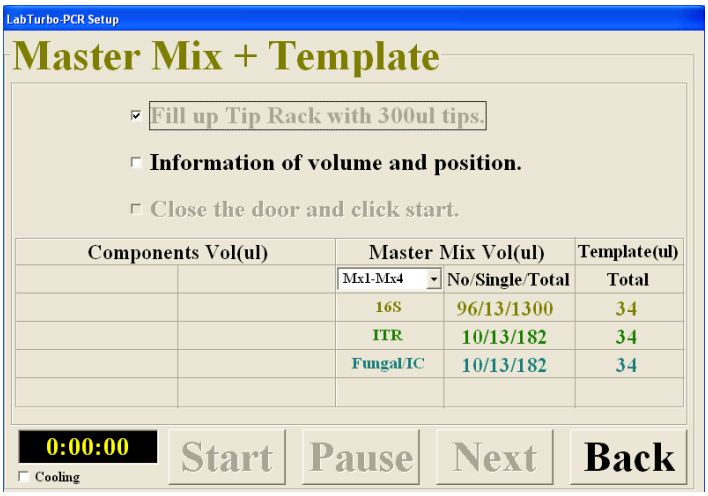


2. Select sample number and the volume of master mix and template to transfer.



3. Follow the loading check list on the screen and place 2 plates of 50 ul 96-well plate tips, 384-well plate on PCR plate adaptor, and 1.5 ml or 2.0 ml eppendorf tube with nucleic acid template on template rack.

4. Check the required volume for each master mix as shown on the screen. Place the master mix tubes on the assigned positions on the master mix rack.

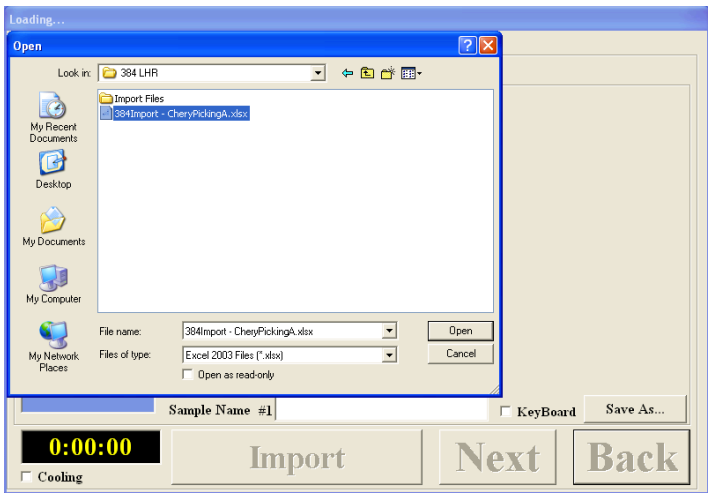


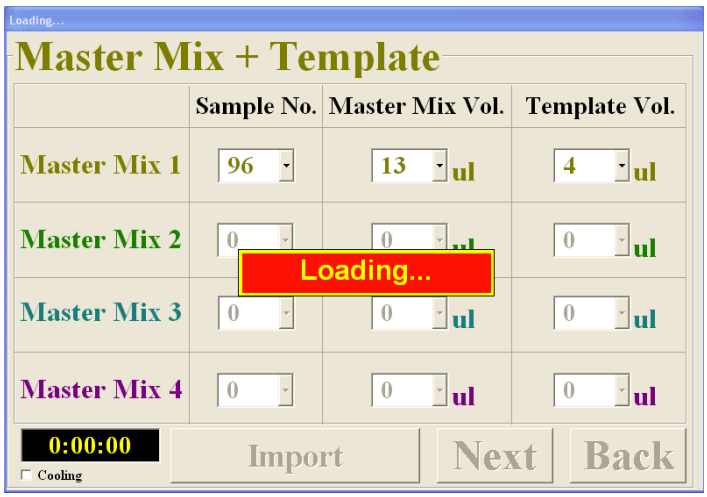
6. Click 'Start' to begin PCR setup.

5.2.3 User-defined transfer

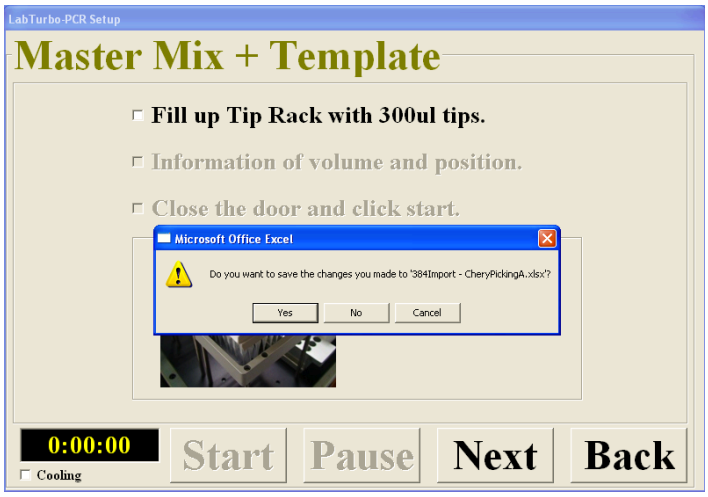
1. Select ‘384-import’.

2. Select the Excel import file and click ‘Open’.





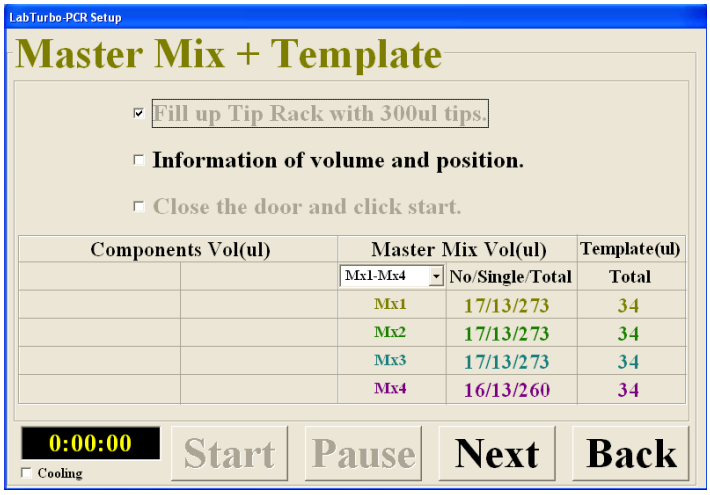
Note: it might take a few minutes for the system to load the file and automatically assign the 384-well plate transfer



Note: Click "Yes" to obtain the automatically assigned 384-well transfer map

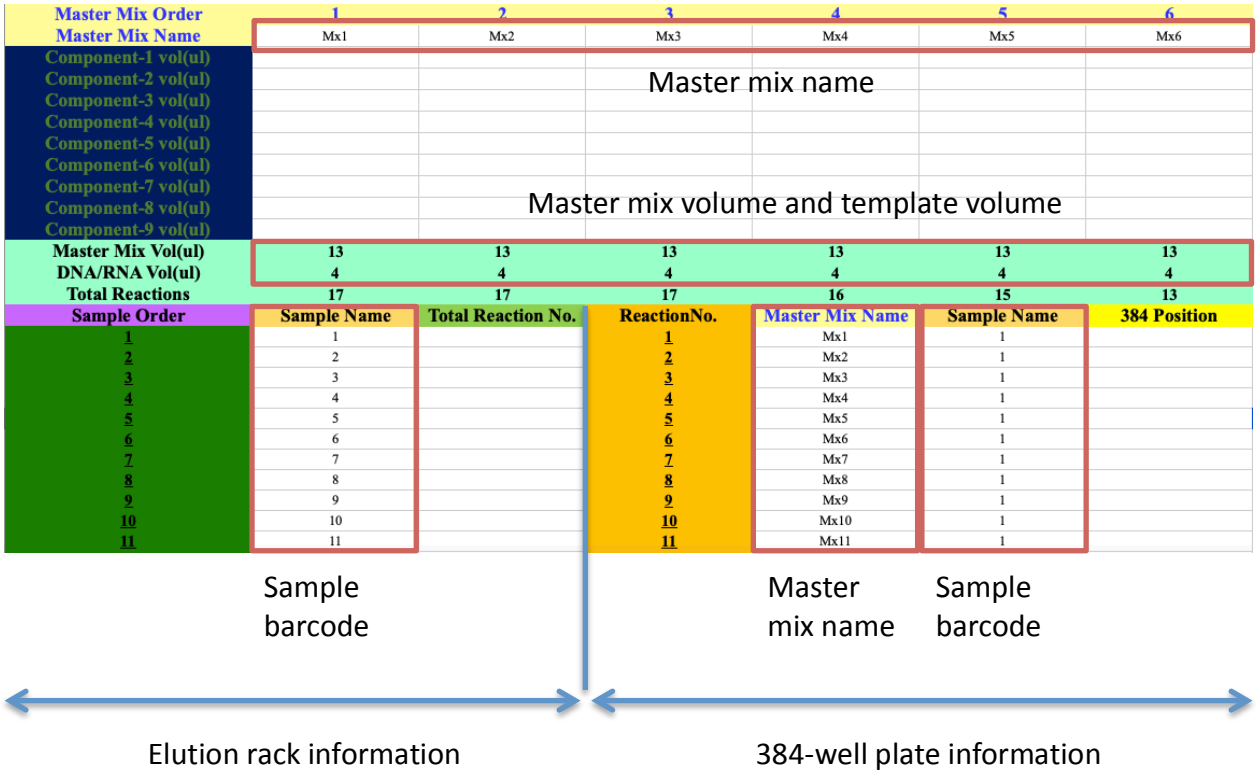
3. Follow the loading check list on the screen and place 2 plates of 50 ul 96-well plate tips, 384-well plate on PCR plate adaptor, and 1.5 ml or 2.0 ml eppendorf tube with nucleic acid template on template rack.

4. Check the required volume for each master mix as shown on the screen. Place the master mix tubes on the assigned positions on the master mix rack.



6. Click ‘Start’ to begin PCR setup.

5.3.1 Excel import file editing



Master Mix Order	1	2	3	4	5	6
Master Mix Name	Mx1	Mx2	Mx3	Mx4	Mx5	Mx6
Component-1 vol(ul)						
Component-2 vol(ul)						
Component-3 vol(ul)						
Component-4 vol(ul)						
Component-5 vol(ul)						
Component-6 vol(ul)						
Component-7 vol(ul)						
Component-8 vol(ul)						
Component-9 vol(ul)						
Master Mix Vol(ul)	13	13	13	13	13	13
DNA/RNA Vol(ul)	4	4	4	4	4	4
Total Reactions	17	17	17	16	15	13

Sample Order	Sample Name	Total Reaction No.	ReactionNo.	Master Mix Name	Sample Name	384 Position
1	1		1	Mx1	1	
2	2		2	Mx2	1	
3	3		3	Mx3	1	
4	4		4	Mx4	1	
5	5		5	Mx5	1	
6	6		6	Mx6	1	
7	7		7	Mx7	1	
8	8		8	Mx8	1	
9	9		9	Mx9	1	
10	10		10	Mx10	1	
11	11		11	Mx11	1	

Note: the "Total Reaction No." and "384 Position" should be blank when editing the Excel import file.

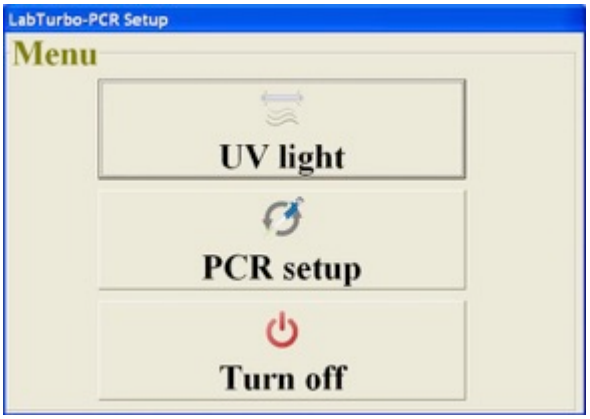
Note: the 384 position for each master mix+sample will be automatically assigned by the system

Master Mix Order	1	2	3	4	5	6
Master Mix Name	Mx1	Mx2	Mx3	Mx4	Mx5	Mx6
Component-1 vol(ul)						
Component-2 vol(ul)						
Component-3 vol(ul)						
Component-4 vol(ul)						
Component-5 vol(ul)						
Component-6 vol(ul)						
Component-7 vol(ul)						
Component-8 vol(ul)						
Component-9 vol(ul)						
Master Mix Vol(ul)	13	13	13	13	13	13
DNA/RNA Vol(ul)	4	4	4	4	4	4
Total Reactions	17	17	17	16	15	13
Sample Order	Sample Name	Total Reaction No.	ReactionNo.	Master Mix Name	Sample Name	384 Position
1	1	11	1	Mx1	1	A1
2	2	5	2	Mx2	1	A2
3	3	11	3	Mx3	1	A13
4	4	3	4	Mx4	1	D9
5	5	11	5	Mx5	1	D10
6	6	11	6	Mx6	1	D24
7	7	8	7	Mx7	1	E22
8	8	6	8	Mx8	1	E24
9	9	11	9	Mx9	1	F1
10	10	5	10	Mx10	1	F2
11	11	11	11	Mx11	1	F3
12	12	11	12	Mx1	2	A3
13	13	4	13	Mx2	2	A4
14	14	10	14	Mx3	2	A15
15	15	8	15	Mx4	2	D11
16	16	6	16	Mx5	2	D12
17	17	6	17	Mx1	3	A5
18			18	Mx2	3	A6

Note: After the transfer, the system will automatically list the total reaction number and 384 position on the same Excel import file.

5.4 Turn off

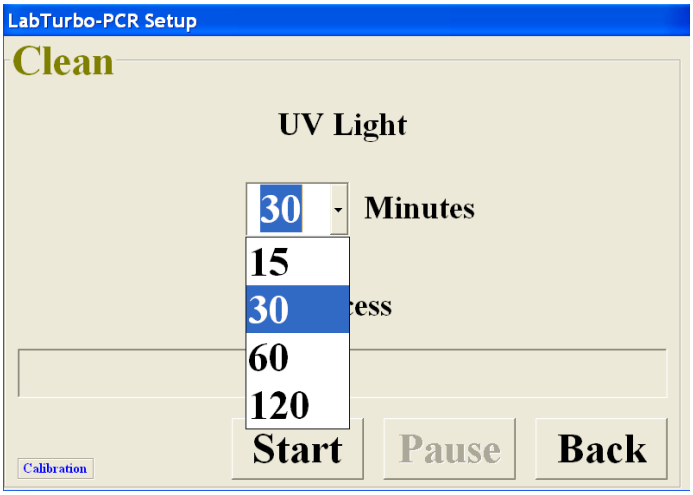
Select 'Turn off' to shut down LabTurbo PCR setup software.



6. MAINTAINANCE

6.1 UV LIGHT

1.Select ‘UV light’



2. Select the desired duration for UV sterilization. (Recommended for 30-60 minutes)

3. Close the safety door and click ‘Start’ to initiate UV sterilization.

6.2 DAILY CLEAN & MAINTENANCE

1. Fill up all the tips in each tip rack.

2. Wipe the worktable with 70% ethanol.

7. TROUBLE SHOOTING

“DAQ connection error”

This message indicates that the system controller fails to connect to computer. Please turn off the LabTurbo PCR Setup software and the machine. After all are turned off, switch the main power off and on once, and then turn on the machine again.

“Close the door”

This message indicates that the safety door is opened. Please close the door and start the run again.

“X or Z or Y-Axis error”

This message indicates that the robotic arm of the machine is temporarily out of function. Please contact our engineer for more information and support.

“Run Time error”

This message indicates that the machine is overloading with unknown reasons. Please click ‘OK’ and restart the machine.

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