TaKaRa PCR Thermal Cycler Dice[™] Touch

Code TP350 User's Manual



Takara bio inc.

Attention

• Users are recommended to carefully read the contents of this manual before operating the TaKaRa PCR Thermal Cycler Dice system.

·Carefully observe all special Warnings and Cautions outlined in this manual.

•This manual should be stored for reference in a secure and accessible location.

NOTICE

L18 Gradient Thermocycler

This product is licensed under U.S. Patent Nos. 5,525,300; 5,779,981; 6,054,263; 6,962,821, and corresponding foreign counterparts thereto.

L45 Heated Cover

This product is covered by the claims of U.S. Patent 5,552,580, and their corresponding foreign counterpart patent claims.

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Precautions for Using TaKaRa Scientific Instruments

- Users are recommended to carefully read the content of this manual before operating the TaKaRa PCR Thermal Cycler Dice system.
- After familiarizing themselves with the information in this manual, users are recommended to store it in secure and convenient location from which it is always available for reference

Introduction

All Takara scientific instruments are sold strictly for use in research applications and should not be used by those who are not experts in this field.

Due to ongoing improvements, product specifications and the external appearance are subject to change without prior notification.

Warranty and Responsibilities

Refer to the Warranty card included with this product for detailed description of the Warranty

conditions and period.

This product is designed to ultimate safety standards. Nevertheless, should any safety-related issues arise, users are requested to immediately contact the nearest sales agent.

Precautions (safety and accident prevention) for System Use

(1) Danger Warnings

The various messages and labels provided on the product itself and in the various manuals are designed to ensure the system is operated safely to prevent personal injury or damage to property. Users are strongly recommended to read and observe the warnings included with the symbols shown below.



Warnings indicate incorrect system operation and handling procedures that can lead to serious accidents.



Cautions indicate incorrect system operation and handling procedures that can lead to accidents.

(2) General Precautions Regarding Takara Scientific Instruments

It is important to observe the various precautions described below to ensure optimum system performance and prevent accidents before they happen. Ensure safe and correct system operation by carefully reading the precautions.

[Precautions for Installation Location]

Observe the following precautions in order to prevent fires and electrical shocks.



- If the system tips over or falls, immediately turn off power to the system and all connected devices and disconnect the power supply cables.
- Avoid blocking the paths to any air vents included on the product. Blocked air vents can lead to internal overheating that may result in physical burns or fire.

WARNING

- Avoid installing the system in locations subject to dust or strong vibrations.
- Avoid installing in locations subject to direct sunlight and wide temperature fluctuations as this may result in internal overheating and may cause physical burns or fire.
- Do not place objects on top of the system.
- Do not install the system in locations other than research institutions or related facilities.

[Electrical Precautions]

Observe the following precautions when using electrically powered scientific instruments in order to prevent electric shocks and fires.



- Avoid operating system with power sources that do not conform to system power supply specifications.
- Avoid sharply twisting, altering, marking or otherwise damaging the power supply cable. Avoid applying stress to, heating or placing objects on the power cable.
- Always ground the system to prevent electric shocks due to leakage current.

• Be sure to compare system power supply requirements with the rated power capacity of the power source to ensure system current requirements do not exceed power socket capacity. Confirm that the total power requirements of all connected equipment do not exceed the rated power supply capacity of the common power source.
• The system body and power supply cable are subject to high voltage levels(The maximum voltage is a line voltage AC100V~240V). Avoid inserting metal or flammable objects inside the system or handling it with wet hands, as this can result in electric shock and/or other dangers.
• When moving the system, be sure to first disconnect the power cable as well as any peripheral devices.
 Be sure to disconnect the power cable prior to cleaning or servicing the system.
 Avoid inserting metal objects, flammable materials or other foreign objects into the various openings on the system case. Never remove the system cover or attempt to alter it in anyway.
 Avoid inserting metal objects, flammable materials or other foreign objects into the various openings on the system case. Never remove the system cover or attempt to alter it in anyway. Avoid disassembling or making any direct contact with internal parts of
 the system. Should noxious fumes smoke or other abnormal signs appear, immediately terminate operation, turn off system power and disconnect the power cable. Wait until conditions stabilize before contacting the nearest sales agent or the company technical support line.
 Should water or other foreign matter enter the system, immediately terminate operation, turn off system power and disconnect the power cable. Wait until conditions stabilize before contacting the nearest sales
 agent or the company technical support line. Do not sit on the system. Do not disassemble the system

(3)Warning Safety Labels Applied to System Case

Users are advised to avoid accidents by carefully reading the warnings and cautions contained on warning stickers at key locations on the interior and exterior of the system.

Possible Danger	Warning Type Location of Danger Type d'Avertissement Localisation du Danger	Warning Label	Description of Danger
Electric shocks and fires	Disassembly Prohibited System Interior Démontage Interdit Intérieur de l'Appareil	Caution/Attention/注意 Disassembly Prohibited Démontage Interdit 分解厳禁	Never disassemble system, as this may lead to electrical short-circuits, leakage current and/or fire.
Electric shocks	Warning! High Voltage Power cable Attention! Haute tension Cordon d'alimentation	Marning/Mise en Garde/警告 Warning! High Voltage Attention! Haute tension 高電圧注意	The case and power cable are subject to high voltage levels, so take care to avoid electric shocks.
Electrical shocks and fires	Grounding Mandatory Power cable Mise à la Terre Obligatoire Cordon d'alimentation	Warning/Mise en Garde/警告 Grounding Mandatory Mise à la Terre Obligatoire 接地敲守	Always ground the system to prevent electric shock from leakage current.
Burns	High Temperatures Heat cover & Heat block Haute Température Couvercle Chauffant	Caution/Attention/注意 High Temperatures Haute Température 高温注意	Avoid touching the heat cover, which reaches very high temperatures and may cause burns.
Burns and fires	Installation Precaution Air vents Précautions d'Installation Prises d'air	Caution/Attention/注意	Be sure not to block air vents when installing the system, as this can cause internal overheating.
Low accuracy and/or Condensation	ALWAYS OPERATE WITH LID CLOSED To ensure accuracy and reduce condensation	ALWAYS OPERATE WITH LID CLOSED To ensure accuracy and reduce condensation	Be sure to close the cover while the system is in operation as to ensure accuracy of control temparature and to reduce condensation around the sample block.



This symbol means caution or warning.

 \bigcirc

This symbol means an action is prohibited.

This symbol means an instruction must be followed.

(4) Electrical Symbols

The symbols shown on this page are adapted to the TaKaRa PCR Thermal Cycler Dice. Read the explanations and make sure you understand what the symbols mean before you interact with the instrument in any way.



This symbol indicates the on position of the main power switch.



This symbol indicates the off position of the main power switch.

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•Chapter 1: Overview

Thank you for purchasing TaKaRa PCR Thermal Cycler Dice[™] *Touch*.

TaKaRa PCR Thermal Cycler DiceTM *Touch* is more small PCR device and easy to use the big touch panel, that reconfigure TaKaRa PCR Thermal Cycler DiceTM series as usual.

This page is introduced to the features of TaKaRa PCR Thermal Cycler DiceTM *Touch.*

<Feature of device>

Achieve the ultimately miniaturized size of PCR device to reconfigure the TaKaRa PCR Thermal Cycler Dice[™] series as usual.

Size (Rid closed, except the projection) : 180 (W) x 285 (D) x 205 (H) mm

- Have a 7" color touch screen giving a vibrant and flexible means of run setup and monitoring.
- Utilize six Peltier devices to actively heat and cool the block are arranged into three zones with independent sensing and control capabilities.
- High performance block cycling system configured and optimized for industry standard 0.2ml individual or strip tubes (domed or flat-capped) or 96 well plates.
- Applications of thermal gradient technology (gradient of between 0~24°C, 12 steps across the block) include the ability to optimize the annealing temperature of an assay in a single experiment by determining the temperature of the wells that yield the best result.

<Feature of software>

- A powerful thermal profile may contain up to 100 events. Each 4 kinds of 'event' can be either a hold a temperature, ramp, pause or 2 to 5 step cycling with up to 99 repeats,
- The Long Range feature enable the time of particular cycling step to be automatically increased or decreased by a specified range of cycle repeats. It is most useful for targets longer than about 1kb.
- The Touchdown function enables the temperature of a step to be automatically decrease (or increase) by a preset amount over a range of successive cycle repeats.
- The Ramp function enables to set the time from initial temperature to end temperature.

- The Pause function allows the user to pause the profile at any number of pre-programmed points with an audible beep.
- The Holds are useful if there is a need to remove tubes at add reagents at a particular point in a run.
- The Auto Restart feature is restart a run if power has been lost for any reason during cycling.
- The Rate Limiting feature is controllable the rate of heating and cooling between

 $0.1^{\circ}C/sec \sim 2.5^{\circ}C/sec$ during a run.

- Manual Control mode enables the user to set the block to a specific temperature quickly without creating a thermal profile. This function is useful for incubating reactions such as DNA digestion or ligation. (The feature is able to use directly not to save as a program file.)
- Save and transfer PCR run files and logs between the default or individual user directories and a USB memory drive.
- A facility has provided to update the software which resides on the TaKara PCR Thermal Cycler Dice *Touch* with USB memory stick.

•Chapter 2: Installation Requirements

1. Installation Conditions

To ensure optimum performance and long and stable product life, observe the following precautions when selecting an installation location.

Note that installing the system in a location that does not meet the requirements listed below can result in malfunctions and/or system breakdown. Replacement of components and system repairs for any deterioration in performance or damage caused by failure to adhere the following conditions will not be cover by warranty.

- 1. Install system in a comparatively dust-free location
- 2. Avoid locations subject to corrosive or flammable gases.
- Avoid locations subject to either strong shocks or continuing low levels of vibration.
- 4. Install the system away from direct sunlight.
- 5. Install the system as far away as possible from electrical equipment that generates strong magnetic fields, electrical fields and high frequencies. Avoid locations near equipment that generate noise caused by electrical motors and transformers.
- 6. Choose a flat location capable of withstanding the design weight of the system.
- The installation environment must be within 15 to 30°C temperature range and a 20 to 80% relative humidity range.
- 8. Avoid locations subject to sharp temperature fluctuations, exhaust from air-conditioning systems and condensation caused by sharp humidity fluctuations.
- 9. Avoid locations air vents located on the right and left and rear sides. (Leave a space of the both sides at least 15cm and the backside at least 10cm)
- 10. Choose an operating location with good ventilation.
- 11. Do not operate the system in a cold room.
- 12. Select a room that can provide sufficient power (frequency, voltage and current) for system operation.
- 13. Do not attempt to move the system while holding it by the cable of backside, as this can damage to components. Doing so can also result in personal injury due to part breakage resulting in the system falling down.
- Do not open the lid for the PCR reactions. It is expected to decrease the accuracy of temperature and generate the condensation at the low temperature (below 10°C)

2, Installation

Use the following procedures when installing system.

- 1. Confirm that the system power switch is set to off.
- 2. Connect the system side of the power cable to the power connector on the rear of the system.
- 3. Plug the AC power plug of the cable into power outlet.

The system is designed to operate normally with a 100 to 240V AC,

50/60Hz power line. Make sure that the power outlet is designed for a 3-pronged plug with ground line.



In the interests of safety, and avoiding electric shocks, be sure to connect the system to a properly grounded power outlet.

- 4. Turn on the system power.
- 5. The software starts as soon as power is applied.

Follow the installation procedures outlined in Chapter 4.System Operation.

3. Moving the System

Follow the procedures described below when moving the system to a new location after it has been installed.

• New Location Within the Same Site

Follow the precautions listed below when moving the system to a new location within the same site.

- 1. Thoroughly clean the system and make sure that there are no tubes or plates remaining in the sample block.
- 2. Avoid any shock during movement that can affect the operation of this highly sophisticated system.
- 3. When lifting and carrying the system, be sure to place one hand on either side of the system and lift and carry in a balanced way.
- 4. Make sure that the new location conforms to the installation requirements described in section "1. Installation Conditions" in Chapter 2.
- 5. Follow the installation procedures outlined in section "2.Installation" in Chapter 2.

• Moving to a New Site

When moving the system to a new site, clean it carefully and repack it in the packaging in which it was delivered. Note that damage sustained by the system during transport due to improper packaging will not be covered by Warranty period is still valid. Follow the instructions provided in this chapter when reinstalling the system at the new location.

Front View	d Lock
③Lid	2Lid Handle
(4) Touch Panel (5) USB Port General Description	 (6) Air vents (exhaust; Left and Right sides) (7) Stylus (Touch Pen)
①Lid Lock	The Lid Lock is slided behind the unit, so that the Lid picks a Lock.
②Lid Handle	The Lid Handle bring up the same as sliding the Lid Lock behimd the unit, when the Lid open.
③Lid	The Lid is designed the Top Heater at the interior side to protect against evaporation resulting from heating of the reaction tube and reaction plate.
	[Caution] Avoid inserting fingers as the Top Heater (interior) of the

• Chapter 3: Names of Parts and Their Functions

interior of the unit.

of your finger or stylus (touch pen).

unit reaches very high temperature (up to 115°C) in operation.

(Exhaust :Left and Right sides) Opening used to cool the

also facilitates the direct use of mouse with the unit.

7 inch, vivid color touch screen controls the program at your tip

A handy USB port allows for file transfer and save the files, and

[Caution]Do not block any of the air vents

⑦Stylus (Touch pen) Used to operate the program on the Touch Panel.

(4) Touch Panel

⑤USB Port

6 Air Vents



Backside USB Port Do not use this port.

•Chapter 4: System Operation

1. Introduction

Plug the unit into a power outlet and power the unit on with the switch located on the rear of the unit. Do not worry about selecting the correct power voltage for your country, Takara Dice *Touch* is designed to operate in any country in the world with no charges.

The unit is also designed to be resistant to power surges and drop-outs the occur in countries with less reliable power grids.

Electrical AC100V~240V, 50/60Hz Consuming electric power 500VA (5A @100V)

1-1. Power Switch

On Power up the Takara Thermal cycler Dice *Touch* will display the logo and take a few moments to initiate the software.

[Caution] Please do not touch the Touch panel and shut down the system until the main menu appear on the panel screen. That is the cause to the trouble of apparatus and wrong moments.

1-2. Touch Panel

The Takara Thermal cycler Dice *Touch* has a 7" color touch screen giving vibrant and flexible means of run setup and monitoring. This internal graphical user interface controller provides a powerful yet intuitive and easy to use interface, and directly control at your tip of your finger or stylus (touch pen) attached instrument above the icon and menu on the screen.

[Caution] If you use a sharp tip tool except stylus (touch pen) attached instrument to operate the Touch panel, that is damaged to the Touch panel depending on the situation.

1-3. Home

After power up the unit defaults to the home screen from where all features may be accessed.



The 4 screen icons provide access the following features:

- PCR Run is used to load or create a new PCR thermal profile and initiate its execution.
- 2 Manual Control- Allows immediate manual setting of block temperature.
- ③ Configuration Takes you to the configuration page allowing of machine options.
- ④ Information Displays a general information screen which includes such information as serial number, software and hardware version numbers. An on-screen user manual is accessible from under this page menu.

2. PCR Profile Creation

From the 'home' screen the 'PCR Run' icon will bring you to the experiment page. Here you will have 4 options, and you can load an existing experiment from either the internal drive or an external USB drive, or create a new thermal profile using either the Wizard or the Manual Experiment Editor.



When loading files from the 'Internal Drive' you only have access to the files under the directory of the user that you are currently logged in as. If you are not logged in as a registered your file access will be under the 'Default' user directory.

2-1. Wizard Mode

The Dice *Touch* software includes a Wizard utility which enables the user to configure easy to moderate complexity profiles in just moments. To activate select 'Wizard' from the PCR start-up screen

<Wizard Mode> Quick Start

Configure the running program using Wizard Mode	2-2
②Confirm the configured running program	2-4
③Select to use the tubes or plates	2-5
\rightarrow \rightarrow Starting a run	
<manual (manual)="" editor="" experiment="" mode=""></manual>	
Configure the running program using Manual Mode	2-3
(Optional setting etc.)	
2 Confirm the configured running program	2-4

- ③Select to use the tubes or plates 2-5
- $\rightarrow \rightarrow$ Starting a run

2-2. Configure the running program using Wizard Mode

The TaKaRa PCR Thermal Cycler Dice[™] *Touch* software includes a Wizard utility which enables the user to configure easy to moderate complexity profiles in just moments. To activate select 'Wizard' from the PCR or One Step RT-PCR start-up screen.



The Wizard screen displays each of the steps which occur in a typical range of profiles. At a minimum there are 3 steps, Preheat and then denaturation and anneal which are cycled. You may enable up to a further 3 steps (cDNA, Extension & post run hold) by clicking on the corresponding check boxes. Each of the steps will be executed in the order they are shown arranged down the screen with the denaturation, Anneal and Extension (if enabled) steps being cycled. After the amplification run has been completed the temperature may be held at a defined temperature until the user disables the unit.

'Hold on Completion' is checked to hold at 8°C(defaut) that amplificated samples keep cooling.

To adjust any of the parameters click on the corresponding time or temperature boxes and keypad will be presented allowing entering of new numbers. The number of cycles can also be adjusted between 1 (single execution, no loops) and 99 cycles.

2-3. Manual Profile Generation and Execution

The manual profile editor is evoked from the PCR Experiment screen. This screen displays the current experiment profile in a 'tree list' format. The run will be displayed graphically on the right side of the screen, showing a maximum of five steps at a time. Arrows on the graph allow navigation of the steps. The event parameters can be edited numerous ways. To edit the temperature or time of an event touch the corresponding temperature or time on the graph to edit them. If the event has a touchdown or long range step then entire event will be reviewed by pressing the text. Selecting the event on the Tree list allowed the entire event to be edited, detected or moved up or down in order.



<Explanation of Manual Profile Generation screen >

The profile generation screen contains 4 buttons under the tree list and 7 icon buttons with the following functionality:

①Move Up -	This button is used to move up the order of optional event on the
	tree list.
2 Move Down -	This button is used to move down the order of optional event on
	the tree list.
③Edit -	This button is used to edit the content of optional event on the
	tree list.
④Delete -	This button is used to delete the content of optional event on the
	tree list.
5 Start Run -	This button is used to activate a run. Pressing the button will
	show a profile review before commencing a run.

- ⑥Add Event Evokes the Add Step wizard to build a new profile step after the last current step.
- ⑦Experiment Allows the operator to edit the experiment details. By selecting the user picture brings up the user log in screen. By selecting the title of the experiment brings up the keyboard and allows an experiment title to be edited. The sample volume can be edited by using the up/down arrows. Notes can be added to the experiment by pressing the link. The thermal details can be edited by pressing the link. See 4-3. Machine Settings for details.



(8)Load Load a pre-saved profile from the internal flash memory. The Takara Thermal Cycler Dice *Touch* displays a list of the saved file on the unit in the directory of the currently selected user. If no user it will show the saved in the default user directory. To access a different user's filed you need to log in as that user.
 (9)Save Allows a given profile to be saved to internal flash memory disk. The unit has very large internal memory allowing virtually unlimited profiles to be saved (in the order of tens of thousands). Saving a profile also stores the device options configurable under the settings menu, i.e. top heater temperature and other functionality. You may enter any valid file name for saving. Profile file will be saved to the current user directory or the Default directory if no user is selected.

①Cancel Returns the user to the experiment page.

<Creating a new Event>

To create a new event select the 'Add Event' icon in the manual profile editor. The first screen of the Add Event Wizard which will be displayed lets the user select the type of event.



You may choose from 4 event types.

- ①Cycling x Step will proceed to generate a multi step cycling event. The scroll button to the right allows you to change the number of steps between 2 and 5 for the cycling event. Within the cycling configuration screens there are numerous options. There are also options for Gradient , Touchdown and Long range features Selecting these checkboxes will display extra buttons to configure these features.
 - <u>Gradient</u>: allows both the left and right temperatures that is programmable 0~24°C across block width (12wells) may be set separately and the predicted well temperatures can be shown by clicking the '<u>View Gradient Temp</u>' link.
 - Touch down:allows for the temperature of a given step within acycling event to be progressively increased or decreased from
an initial value to a final value over a defined number of steps.
 - Long Range: allows the hold time of a given step within a cycling event to be progressively increased or decreased from an initial value to a final value over a defined number of steps.

After the parameters for each step are configured the operator is prompted to enter the number of times to repeat the cycle.

②Hold – is a simple hold at given temperature for a set time. It may be performed either with or without a gradient across the

block. If you wish to hold the temperature infinity, you may touch the 'Infinite' button.

③Ramp – Allows the block temperature to be ramped either up or down between two set temperatures over a preset length of time. The block target temperature is updated every second and with a 0.025 degree minimum step resolution. It may be performed either with or without a gradient across the block.
 ④Pause – will hold the temperature at the last set point and pause the run with an audible warning. This is useful if the operator needs to perform a certain action of the samples at given point in the run. The operator clicks OK when complete and the run will continue with the next event.

2-4. Confirm Run



When the user is happy with the profile parameters just click on the tick. A run review screen will now be shown with a text description of the profile steps. Click on OK to commence run execution or 'Edit Profile' if you require to further modify the wizard created profile. (See 2-3. Manual Profile Generation and Execution) The 'Save & Run' Icon allows you to save the profile then run it.

Once the profile is confirmed, if the 'Use Top Heater' checkbox option is selected (default) then you will be prompted with a screen asking if you wish to wait for the top heater or reach target temperature before commencing the run. If you select to wait for the top heater to achieve temperature a waiting screen will be displayed. You may skip the waiting step at any time if you wish to commence the run immediately. Depending on the set temperature of the Top Heater it will take up to

several minutes to preheat to this temperature.

When the run commences the software will automatically proceed to the 'Run' screen. You are not able to modify the profile once a run has commenced but you may save or edit it after it completes or is terminated.

[NOTE]

From the run review screen you may also check the option 'Run in virtual (simulated) mode'. This will make the Dice *Touch* simulate the run rather than performing the actual thermal steps on the block. This can be useful if you wish to check complicated run prior to performing them.

2-5. Selecting to use tube or plate and Starting a run

Activating the 'Start Run' button will show a profile review page which allows the operator to check over the profile (displayed in text format) before confirming commencement. Top Heater Wizard screen, you select your plasticware, 96well plate, single tubes or strip tubes.



The profile review will also contain general run options regarding the Top Heater evaporation control and actions on run completion. These are configurable under the configuration menu. You have the option to perform the run in virtual mode; this will simulate the run without actually thermally varying the block.

Once the profile is confirmed, if the 'Use Top Heater' checkbox option is selected (default) then you will be prompted with a screen asking if you wish to wait for the top heater or reach target temperature before commencing the run.

If you select to wait for the top heater to achieve temperature a waiting screen will be displayed You may skip the waiting step at any time if you wish to commence the run immediately. Depending on the set temperature of the Top Heater it will take up to several minutes to preheat to this temperature.



When the run commences the software will automatically proceed to the 'Run' screen. You are not able to modify the profile once a run has commenced.

	Zone1 (left)	Zone2		Zone3 (right)		
100						
80						
60						
40						
20						
0				00:00	00:30	01:00
Run	Progress	Event 2 of 3 Stop 1 of 2	Run Controls			
3:05 Tota	i PM 9/26/2012 al (est): 40:47	Cycle 1 of 25 Block T. Liquid T		3%		
Elap Holo	sed: 1:14 ina - 8	95 95 Top Hoster: 104.4c		Stop Pause		
Estin Use	nated completion 3:44 PM	Heat Sink: 38.78c				

On run completion the post run report screen will show and if enabled an audible alarm will sound. The alarm may be muted by pressing the mute alarm button. The post run report can be saved as a text file to a USB memory stick for inclusion into lab books etc. Note that post run reports are not saved to internal memory.



3. Manual Control

The manual mode screen allows immediate manual setting of the block temperature. To activate this mode simply press the blue 'start' button. Terminating the mode is achieved by pressing the red 'stop' button. To program the set temperature press the 'Temp' button to the left of the graph and enter the desired value. You may program the temperature set point to 0.1 degree C resolution.



Gradient: If the 'Gradient' checkbox is checked the 'Temp Left' and 'Temp Right' buttons appear and you are able to set different temperatures hat is programmable $0 \sim 24^{\circ}$ C across block width (12wells) for both the left and right sides of the block with a roughly linear thermal gradient presented between the two outer well sides and the predicted well temperatures can be shown by clicking the '<u>View Gradient</u> Temp' link.

50 50.72 52.16 54.56 57.92 60.50 63.66 66.92 72.32 73.76 74 Predicted Well Temperatures

Top Heat: To enable the Top Heater evaporation control click the 'Top Heat' checkbox. The target temperature of the top heater is configured under the Configuration \rightarrow Setting menu. Note the top heater will take a few minutes to reach its operating temperature. Time Hold: The 'Time Hold' checkbox is a simple hold at given temperature for a set time. It may be performed either with or without a gradient across the block (maximum 9 hours).

The left side of the screen displays the temperature of the 4 zones. Other information also displayed is the event, step and cycle numbers for when a profile is being executed. At the bottom of this display box is the top heater (TH) and internal heat sink (HS) temperature.

4. Configuration Tools



The configuration page provides access to the following features.

①File Manager:	For managing the PCR run files on the device and copying
	from the device using USB memory stick.

②Machine Settings: Allow changes to be made to the instruments settings.

③Time & Date: Used to set the Time for the instruments internal clock.

- (4) Thermal Calibration: The thermal calibration feature is used to adjust the machine calibration. Takara Thermal cycler Dice *Touch* are factory calibrated and should not require user recalibration for the life of the machine. The recalibration procedure is not covered in this user manual. If it is required, contact the support line service of Takara-Bio. The thermal calibration is password protected to prevent it accidentally being charged.
 (5) User Accounts: User account control.
- ⑥Software Update: Allows upgrading of the Takara Thermal cycler Dice Touch operating Software.
- ⑦Touch panel calibration: You can also perform a calibration of the touch-panel interface using the calibration wizard. If the calibration has varied click on this button and follow the instructions to re-calibrate the screen. If you are having difficulties

navigating to this option because the touch panel is out of calibration then you may use a USB mouse plugged into the front USB port to reach the touch panel calibration wizard.

4-1. User Accounts



In the users area you are able to select an existing user or create or delete a user profile. When a user is selected thermal profiles will be loaded or saved to a directory specific to that user. Logging out will change back to default user. To create a new user select the 'Add New User' lcon and then enter name and choose a user profile image.

4-2. File Manager



The file manager area enables you to transfer PCR run files between the default or individual user directories and a USB memory drive. Plug your USB drive into the connector on the front of the unit and you may browse the directories on the Takara Thermal cycler Dice *Touch* and transfer files to or from. You may also delete any

thermal profiles from the Dice *Touch*. Press on the 'Home' icons to refresh the directory list back to the root directories. Select files in either the Dice *Touch* or the USB stick and press the transfer logos to copy the files across. Files may be moved between different user directories by first copying them to a USB stick and then back into the destination user directory.

4-3. Machine Settings

Block Settings
🖬 Audible alarm on run completion
■ Use predicted liquid temperature for hold times * -> <u>About this feature</u>
Accelerated Thermal Equilibration * -> About this feature
Auto Resume Run After Power Outage * -> About this feature
Rate limit heating cooling rates
Top Heater Settings I Use Top Heater
Top heater temperature (deg C) 105
☑ Disable Top Heater when set temperature < 30 deg C
System Diagnostics

The following features are available under this page.

< 96 well thermal block settings >

Audible alarm on run completion :

toggles whether there is an audible alarm or just a screen message to alert the operator that the run has completed.

Use predicted liquid temperature for hold times :

The Takara Thermal cycler Dice *Touch* software implements a thermal model which predicts the actual liquid temperature inside the reaction vessels (Sample volume is $10 \sim 50 \ \mu$ l). Hold times can be based on this model (default) or based purely on the block temperature. Using the predicted temperature effectively increases the hold time (and total run time) slightly but gives a more accurate representation of the hold time of the actual sample liquid. Most manufacturers' thermal cyclers purely use the block temperature for timing.

Accelerated Thermal Equilibration :

If this feature is selected the temperature model will use overshoot and undershoot to get the liquid to temperature faster (Sample volume is $20 \sim$ 30 µl). This is useful for highly sensitive chemistries or thermal profiles with short hold times.

Auto Resume Run After Power Outage:

If this feature is available on your cycler (not available on all models) then when this box is checked a run will automatically resume at the same place if power should be momentarily lost during a run.

Rate limit heating cooling rates:

sets the rate limit for a run. This has a limit of 0.1°C/sec to 2.5°C/sec.

This feature is only available in runs not manual mode.

< Top heater evaporation control settings >

Use Top Heater:

will cause the top heater to be used during a run if it is checked. Entry box for top heater temperature. Temperature is programmable between $60 \sim 115^{\circ}$ C (default 105° C). 'Turn on Top heater NOW' Button for manually enabling the top heater to preheat it if required and Top heat checkbox is checked on the manual mode screen at the same time.

Disable top Heater when set temperature < 30 deg C:

feature is implemented to reduce the high thermal load placed on the peltiers when holding the samples at low temperature (i.e. 8 degrees). This prevents excess heat from the top heater heating the chilled samples. It is best to leave this option enabled.

[Note] The Top Heater is only activated when a run is started or the operator enables it in manual mode.

System Diagnostics:

This item is only use for system diagnostics.

4-4. Software Update

A facility has been provided to update the software which resides on the Takara Thermal cycler Dice *Touch*. The upgrade file you receive from our support team should be placed on the main root directory of your USB memory stick. You may then select it to upgrade the unit's software. After selecting the software file read the message box and press OK and wait. Upgrade will take up to $1\sim2$ minutes. Once upgrade is complete you can check that the new version is installed by visiting the 'Information' page from the home screen and check the installed software version.

[Important Note] Do not interrupt the unit while a file upgrade is in progress. Switching off the power during upgrade may render the unit inoperable.

•Chapter 5: Diagnosis Functions

The following functions are provided in three test files to program of 'Dice' account folder.

- > Cycle Test: Test cycling time and stability of control operations
- > Up Down Test: Measures time required from heat up to 98°C to cool down to 20°C
- > Ramp Rate Test: Tests heating and cooling rate
- [Caution] Confirm that standby temperature is set at room temperature prior to commencing test.

The Diagnosis function performs the following three tests

1. Cycle Test

- From the 'home' screen the 'PCR Run' icon will bring to the experiment page.
 You can load an existing experiment from the internal drive.
- 2 Click the user icon (Default to chart below) on the 'Currently logged in as'.



③ 'Dice' select the user in user account and Log In is click then OK.



④ Select the Cycle Test.s3P file to preset program in 'Dice' and click the checkmark.



(5) The screen displays the current experiment profile in a 'tree list' format. You confirm the content of program.

Program details: 94°C for 30sec, 55°C for 30sec, 72°C for 30sec (1 cycle)



- (6) Activating 'Start run' button under the icons will show a profile review page which allows the operator to check over the profile (displayed in text format) before confirming commencement.
- ⑦ Top Heater Wizard screen, select your plasticware. You select the single tubes and set some tubes that is empty or into reacted solution on the block.



⑧ The Program is started to touch the OK button at the lower right.



(9) The below report is described to the end of Cycle Test program.

Run Started, Run completed and Run duration is appeared.

(The report is able to save the USB drive).

(9) You checked that the run duration (cycle time) is less than the Standard Value.

The Reference Value: less than 4 minutes (Cycle time)



2. Up Down Test

- From the 'home' screen the 'PCR Run' icon will bring to the experiment page.
 You can load an existing experiment from the internal drive.
- ② Click the user icon (Default to chart below) on the 'Currently logged in as'. Dice' select the user in user account and Log In is click then OK.
- ③ Select the Up Down Test.s3P file to preset program in 'Dice' and click the checkmark.
- ④ The screen displays the current experiment profile in a 'tree list' format. You confirm the content of program.



Program details:98°C for 1min, 20°C for 1min. (1 cycle)

- (5) Activating 'Start run' button under the icons will show a profile review page which allows the operator to check over the profile (displayed in text format) before confirming commencement.
- (6) Top Heater Wizard screen, select your plasticware. You select the single tubes and set some tubes that is empty or into reacted solution on the block.



⑦ The Program is started to touch the OK button at the lower right.



- The below report is described to the end of Up Down Test program.
 Run Started, Run completed and Run duration is appeared.
 (The report is able to save the USB drive).
- (9) You checked that the run durations less than the Standard Value.

The Reference Value: less than 5 minutes 30 second (Cycle time)



3. Ramp Rate Test

- From the 'home' screen the 'PCR Run' icon will bring to the experiment page.
 You can load an existing experiment from the internal drive.
- Click the user icon (Default to chart below) on the 'Currently logged in as'.
 Dice' select the user in user account and Log In is click then OK.
- ③ Select the Ramp Rate Test.s3P file to preset program in 'Dice' and click the checkmark.
- ④ The screen displays the current experiment profile in a 'tree list' format. You confirm the content of program.



Program details: 25°C for 30sec, 95°C for 30sec, 40°Cfor 30sec (1 cycle)

- ⑤ Activating 'Start run' button under the icons will show a profile review page which allows the operator to check over the profile (displayed in text format) before confirming commencement.
- ⑥ Top Heater Wizard screen, select your plasticware. You select the single tubes and set some tubes that is empty or into reacted solution on the block.
- O The Program is started to touch the OK button at the lower right.



(8) The below report is described to the end of Ramp Rate Test program.



④ Click the lower right check then the 'Configuration' is selected from the 'home' screen.



1 Select the 'Thermal Calibration' from the 'Configuration' menu.



① Touch the 'Ramp Rate' button on the Calibration Wizard screen.

Calibration Wizar	d
Connect CalTastic	
Manual Cal Mode	
Auto Calibration	
Auto Verification	Skip Temp
Manual Test	Block Top Heater 95 95
Exit	Ramp Rates

1 The Max Cool rate and Max Heat rate is displayed on the System Massage





3 After ramp rate is checked, OK (Green check) is clicked.

The System message is reset to change the initial rate (0.00°C/sec).



•Chapter 6: Troubleshooting and Maintenance

If a problem with Thermal Cycler Dice[™] Touch arises the table below outlines the troubleshooting steps that should be followed and the possible solutions to the problem.

Problem	Possible Cause	Solution	
Unit does not power up.	The power cable is unplugged.	Plug the power cable into the	
		back of the machine.	
	The Main power is not turned on.	Turn the main power switch on.	
	The Power Supply is not working	Need to replace the Power	
	correctly.	Supply Unit.	
	The Fuse is blown.	Need to replace the fuse with a	
		20A blade fuse.	
The machine restarts when	The PCB is fault.	Need to replace the Main	
heating or cooling is commenced.		module.	
The Top Heater does not heat.	The thermal fuse has blown in the	Need to replace the Top Heater	
	Top Heater module.	Module.	
	PCB fault.	Need to replace the Main	
		Module.	
Touch screen does not work but	The touch screen has become	Need to replace the Front	
when a mouse is plugged in it	defective.	Screen Module.	
works and the touch screen cannot			
be recalibration.			
The screen does not turn on but	The LCD screen has become	Need to replace the Front Screen	
fans can be heard come on when	defective.	Module.	
initial power up.			
Bank(S) heats to fast.	The Main block is malfunctioning.	Need to replace the Main	
Bank(S) do not heat.		Module.	
Top Heater Temperature on screen	The temperature connector has	Check the connector.	
is zero (0) degree or a warning is	come malfunctioned.		
displayed on screen indicating a	The thermistor on the heater board	Need to replace Top Heater.	
Top Heater sensor failure.	as malfunctioned.		
One of the peltier banks reads	The Main block is malfunctioning.	Need to replace the Main Block.	
zero (0) degree.			

Problem	Possible Cause	Solution
Warning message "Block Sensor	The Main block is malfunctioning.	Need to replace the Main Block.
Failure" is displayed on screen		
indicating a block sensor failure.		
Warning message is displayed on	The Main block may be	If problem occurs repeatedly
screen indicating "system has	malfunctioning.	then replace the main block.
restarted".		
Warning message "Heat sink	The heat sink temperature sensor	Please contact your distributor
sensor Failure" is displayed on	on the cooling fin (Heat sink) under	support for service.
screen.	the main block fails.	
Log message "The power was	Power loss during a programmed	Refer to the next page.
interrupted during the run"	run operation.	

Maintenance

Be careful especially of the following point before beginning maintenance check.

- 1. Especially the maintenance work without directions of operation should surely turn off the main power switch and take off the power cord for safety.
- 2. Warn to spill neither water nor a reagent to mechanism parts and electric parts. Moreover, please place neither detergent nor medicine on equipment.
- 3. Please do not touch with a hand other than the appointed place.
 - Routine maintenance work
- 1. Please clean a main part periodically and suitably.
- 2. Wipe all outside surfaces of the equipment with a diluted neutral detergent solution.
- 3. When a liquid is spilt, please wipe off a sample block circumference part as early as possible.
- 4. Since dust is easy to collect, please clean a sample block frequently. If dust and garbage adhere to a sample block, a temperature control performance will fall and temperature homogeneity will also become bad simultaneously.
- 5. Please check it that the air filters of the back of equipment, the left and right-hand side is not closed. Please wipe off, when dust has adhered.



Neither strong alkali, high-concentration alcohol nor use of the organic solvent can be performed. It becomes the cause of breakage, such as discoloration, deterioration, and a crack.

Power failure

Power failure occurred on the program running and then power was recovered. The machine was resumed and the following message appeared on the screen.



When touch the OK button, start to run the program from the stopped state. When a heated top heater becomes by power failure below in a predetermined temperature, resume operation after warming a heated top heater to an appropriate temperature.

The program will be ended and then the "Post Run Report" will appear on the screen.

Show a sample as followings.

The power was interrupted during the run. T Care should be taken as reaction results ma	his occured at Event 1, Step 1 and Cycle 1 y not be valid.
Run Details Executed on SuperCycler SC300 machine Seria By user : Default Profile containing 2 events Top Heater Enabled : 105 deg C Maximum Heat/Cool Speed	I# S31205007 Post Run Report
Event 1: (Hold) Temp 95 Hold Time 0:00:01 Event 2: (Cycling 3 steps - 5 repeats) Step 1 : Temp 95 Time 0:00:30 Step 2 : Temp 60 Time 0:00:05 Step 3 : Temp 72 Time 0:00:30 Audiable alarm will sound on completion End Profile	Run completed at 11:34 AM 9/10/2012 The power was interrupted during the run. This occured at Event 2, Step 2 and Cycle 27 Care should be taken as reaction results may not be valid. Run Details Executed on SuperCycler SC300 machine Serial# S31205007 By user : Default Profile containing 2 events Top Heater Enabled : 105 deg C Seve run report to USB stok

SC Run Report 15hr51min 10-9-2012.txt

"Post Run Report" message can be saved on an USB memory of yours.

Chapter 7: Specification

(*)Performance specification apply when system is operated in the 20 to 23 degree C temperature range.

Product name	TaKaRa PCR Thermal Cycler Dice [™] Touch	
Model No.	TP350	
Operating environment	Ambient temperature 15°C~30°C	
	Humidity 20% ~ 80% RH	
Heating and cooling effect	Peltier Device	
Heating rate	Max. 3.0 °C/sec	
Cooling rate	Max. 2.5 °C/sec	
Temperature Accuracy (*)	±0.5 °C (30°C~99°C)	
Temperature Uniformity (*)	±0.3 °C (30°C~99°C)	
Temperature Range	4 ℃ ~ 99 ℃	
Tubes and Plates	0.2ml x 96 Tubes	
	0.2ml 8 Strips x 12	
	96 Well Microtiterplate (12 x 8) x 1	
Internal Memory	256MB, enough for 10,000+ saved profiles (USB Flash	
	memory is enable to use)	
Heated Top Heater range	Controllable 60°C~115°C	
Internal Interface	Embedded graphycal controller with 7" widescreen	
	touch sensitive color backlight display	
Linear thermal gradient	Programmable 0-24°C across block width (12wells)	
	Allowable in range 4-99°C	
Programming Function	Long Range function、Touch down function 、Ramp	
	function, Pause function, Auto Restart function, Rate	
	limit heating cooling rates function, Manual control	
	function	
Security Device	Main module: Fuse(20A)	
	Top Heater : Temperature Fuse(144°C)	
Battery for backup	Lithium battery (3V)	
	Model CR2032	
Electrical	AC 100V ~ 240V 50/60Hz, 5A (@100V)	
Dimensions(mm)	180(W) x 285(D) x 205(H)	
	(Lid closed, Exclude projection)	
Weight	5.0 kg	

Appendix 1: Accessories list and packing

Confirm that the following items are included in the system package when delivered.

Standard accessories		Quantity
1. Power cable		1
2. User's Manual		1
3. Stylus (Touch pen)		1
4. Warranty sheet		1
5. TaKaRa Supplied PCR Tub	es trial set	
< Single Tube >		
0.2 ml Hi-Tube Flat Cap	Single Tube (Cat.# NJ202)	100
< 8 Tube & Cap >		
0.2 ml Hi-8-Tube	8 Tube (Cat.# NJ300)	12
0.2 ml Hi-8-Flat Cap	8 Cap (Cat.# NJ302)	12
< 96 well plate & cap >		
96 well snap plate	96 well plate (Cat.# NJ710)	1
Flat cap for snap plate	8 Cap for snap plate (Cat.# NJ720) 12



• Appendix 2: Consumable list

List of Supplies (Tubes and Plates)

Cat. #	Product Name	Quantity
0.2 ml Single Tube		
NJ200	0.2 ml Hi-Tube Dome Cap	1,000
NJ201	0.2 ml Hi-Tube Dome Cap Recovery※	1,000
NJ202	0.2 ml Hi-Tube Flat Cap	1,000
NJ203	0.2 ml Hi-Tube Flat Cap Recovery※	1,000
0.2 ml 8-Tube & 8-Cap		
NJ300	0.2 ml Hi-8-Tube (8 - Tube)	125
NJ301	0.2 ml Hi-8-Dome Cap	125
NJ302	0.2 ml Hi-8-Flat Cap (8 - cap)	125
NJ600	NJ6000.2 ml 8-strip tube, individual Flat Caps120	
0.2 ml Plate & Cap		
NJ710	96 well snap plate (12x8, 96 well Plate)	10
NJ720	Flat cap for snap plate (8- Cap)	120

* High recovery type that the sample is not hard to remain on the tube.

Servicing Request and Safety Check

Attention: Distributor of Taka	ira Bio Inc.	
Product Name: TaKaRa PCI	R Thermal Cycler Dice [™] <i>Touch</i> Model : TP350	
Serial No	Date of request:	
Requested by		
Name	Contacts : (Telephone, Email)	
Company/Institute N	ame	
Address		
Details of request:		
(Current status)		
Customers are requested to and any safety consideration system, as well as safety of th the customer is requested to	provide the following information on the type of the function hs. Safety check covers all personnel involved in using the he location in which the system was operated. If contaminated, decontaminate the system prior to servicing.	
1. Material in use ()	
•Pathogenicity: (□none,□possibly,□yes) •Toxicity (□none, □possibly, □yes) •Padioative substances: (□ not used □ used □puclide())		
2. System contamination statu	IS	
\Box no contamination, \Box	decontamination, Dossibly contaminated	
OThis is to confirm that t	he system is free of contamination	
OThis is to confirm that there is risk of contamination and the specific safety measures		
and decontamination procedures were implemented.		
Date (year/month/day) / /		
Company/InstitutionWitness by(signature)		
****	****	
The Safety C equipment t work. We re those who co	Confirmation Form shall be presented as statement of the safety of the be serviced by customers requesting servicing and maintenance quest your cooperation as it is designed to ensure the safety of all ome into contact with the system.	
Caution *Note that w receive the	e may decline to perform servicing and maintenance work if we do Safety Confirmation Form.	