Operating Manual
Model UF-150 GENECHECKER®
Ultra-Fast Real-time PCR System

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Contents

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1. General Information

This operating manual contains basic instructions that should be followed during operation and maintenance of Model UF-150 GENECHECKER® Ultra-Fast Real-time PCR System (catalog number: 001150). Accordingly, it is recommended that any user thoroughly reads this document before handling the instrument. This manual should be always kept at the operation site of the instrument for immediate reference when necessary.

For any inquiry which is not described in this manual, please contact Victory Scientific.

1.1 Product Description

Model UF-150 GENECHECKER® Ultra-Fast Real-time PCR System described in this manual is polymer chip based real-time PCR (polymerase chain reaction) detection instrument which is performing rapid amplification of genomic templates and real-time qualitative and quantitative analysis. This instrument integrates camera module inside and is to be used in connection with Windows® 10 based personal laptop computer which is included in basic system package. Using dedicated software, GeneRecorder which is installed and calibrated in the laptop computer, user can make real-time detection of target DNA. Post-reaction melting cycle is performed so that melt curve and peak are available with relevant Ct and Tm values. By defining the type of analysis, standard curve is also available for DNA quantitation.

Model UF-150 GENECHECKER® Ultra-Fast PCR System has a compact and portable design and can be carried to any location conveniently. This instrument adopts DC 12V power input and can be connected to general car power source when optional car power connection kit is equipped.

Key concepts of this instrument can be summarized as follows.

- Microfluidic chip based PCR reaction for rapid DNA amplification
- Real-time detection and analysis through GeneRecorder software - Portable characteristic allows POC(Point of Care) tests

Model UF-150 GENECHECKER® Ultra-Fast PCR System is recommended for following applications.

- Research and development in molecular diagnostics technology
- Laboratory PCR in biochemical and molecular biological study
- Field applications for veterinarian diagnostics
- GMO and food analysis
- Environmental detection
- Pharmaceutical or biological quality control
- On-site pathogen detection (POC tests)

System

Model UF-150 GENECHECKER® Ultra-Fast PCR System is not a medical device and not intended for clinical applications.

1.2 Technical Specification

Model UF-150 GENECHECKER® Ultra-Fast Real-time PCR System	
Operating Mechanism	Precise Control of Peltier Element
Temperature Accuracy	± 0.5°C
Temperature Uniformity	± 0.5°C (Well to Well)
Temperature Stability	± 0.5°C
Ramping up Rate	8.0°C / second
Ramping down Rate	8.0°C / second
Range of Temperature Setting	30 ~ 65°C (1.0°C Increment) for RT Step 20 ~ 99°C (1.0°C Increment) for PCR
Sample Format	Polymer Based 3-Dimensional Chip*
Number of Samples per Run	10
Required Sample Volume	10µl
Typical PCR Duration	Approx. 12 minutes for 30 cycles (without RT Step)
Method of Detection	Analysis of Digitized Fluorescence Signal
Display	4 Line Text LCD
Integrated Memory	Saves up to 12 reaction protocols
Type of Excitation	High Brightness LED
Wavelength	465nm ± 10nm
Number of Detection Channel	1
Method of Fluorescence Measurement	Integrated Cameral Module
PC Connection	USB 2.0 A to B (PC to Device)
Power	AC 100-230V/50/60Hz (Input Power : DC 12V)
Power Consumption	120 W
Dimension	200mm (w) x 200mm (d) x 127mm (h)
Weight	Instrument : 3.2kg (Instrument Only)

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Rapi:chip™ PCR Chip for GENECHECKER®	
Dimension	38mm (w) x 25mm (d) x 6 mm (h)
Weight	3.56 g
Number of Wells	10 Wells
Volume of Each Well	10 μL
Aperture Diameter	0.6mm
Channel Height	0.5mm
Channel Length	8.0mm
Channel Width	2.0mm
Material	Transparent Polymer
Transparency	More than 95%

1.3 Dimensional Information

Figure 1   Dimension of the instrument with the drawer closed

System

Figure 2   Dimension of instrument with the drawer opened

2. Safety Instructions

This instrument is equipped with peltier elements, therefore, the surface temperature is sometimes elevated during instrument operation. Accordingly, caution is required to avoid possible damage caused by heat. This chapter of the manual introduces general safety instructions which the instrument user should comply with.

2.1   Safety symbols in this manual

The GENECHECKER® Ultra-Fast PCR System is designed to meet recognized technical regulations and is built with state-of-the-art components. Nevertheless, risks to users, property and the environment can arise when this instrument is used carelessly or improperly. Safety instructions explained with following symbols represent danger to the user:

⚠️ Danger symbol   ♨️ High temperature symbol

🔶 Caution symbol - Risk of damage to the instrument is possible unless user complies with the instruction marked with this symbol.

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2.2 User qualification and training

The users operating, servicing and inspecting the instrument should be equipped with the appropriate qualification to properly handle the instrument. This manual assumes that the users of the instrument know how to handle biological samples including DNA, RNA and any other analytics to be introduced to the instrument and prepare them for the PCR process. If the users do not have suitable knowledge to properly operate the instrument, they should be trained prior to use. The instrument supplier and manufacturer are not responsible for possible damage of instrument which is caused by inappropriate qualification of users. If necessary, the instrument supplier can provide training for the users in order to have them get enough knowledge to operate the instrument.

2.3 Safety instruction for user

This instrument includes a heating plate in it, of which temperatures can be elevated up to 100°C while the instrument is performing thermal cycling. In order to avoid possible damage caused by high temperature of the heating plate, the user should not open the chip drawer while the instrument is running. The user can identify the status of the instrument by the LED indicator installed around jog-dial. If the red LED is blinking, it means that the instrument is running and user should not open the chip drawer.

This instrument is delicate and sensitive electronic device and should be protected against dust, water vapor condensation, high humidity, water, aggressive gases and liquids. Dusts can block air ventilation holes of the instrument, which will reduce cooling efficiency of the heating plate. Keep air ventilation holes of the instrument clean.

This instrument is delicate and sensitive electronic device and should be protected against rough handling or external shocks. When the instrument is being transported for onsite analysis, please make sure the instrument is sufficiently protected with the materials offering cushioning effect. The design of original packaging of the instrument is optimized for the instrument. We recommend users to keep the original packaging of instrument in case of transportation or long-time storage.

Install the instrument on the flat area and do not move this while the instrument is running. The chip drawer is opened and closed by a physical locking mechanism and external stress could cause unintended opening of the chip drawer.

Only the electricity described in the chapter 1 should be applied to the instrument.

The power of the instrument should be switched off before disconnecting the power cable from the instrument. Also, the power switch should be at the "O" position before connecting the power cable to the instrument.

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⚠️ Do not handle the instrument with wet hands as this can cause electric shock to the user.

⚠️ Do not open the DC adaptor of the instrument because there is the risk of electric shock when the cover is opened.

🔶 This instrument should be used with exclusive chip (Rapi:chip™) only and any other material should not be installed on the heating plate of the instrument for any purpose.

🔶 This instrument is designed and manufactured for the purpose of thermal cycling and fluorescence analysis of biological samples loaded in the exclusive chip (Rapi:chip™). Any other use is considered improper and may result in damage to the instrument and/or unreliable analysis result.

3. Getting Started

Congratulations on your purchase of Model UF-150 GENECHECKER® Ultra-Fast Real-time PCR System. This chapter of the manual will introduce how to have the instrument ready from the point when the instrument is delivered. This chapter includes four topics:

- Unpacking of product
- Features and use of the system
- Power and electrical considerations
- Cabling

Please get familiar with the contents of this chapter before actual use of the instrument.

3.1 Unpacking product

This instrument uses eco-friendly bio-degradable packaging materials made of corrugated paper sheet and no plastic cushioning material is used for the packaging of the instrument. Only anti-scratch films and plastic bags are used for packaging instrument accessories.

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Figure 4. Outer packaging of Model UF-150

Figure 4 is the image of outer packaging of instrument. When the instrument is delivered, the left and right side of the upper surface are sealed with paper tape. Using sharp device, carefully cut the tape alongside two edges of the outer carton (red lines in Figure 4).

Figure 5. Opening the outer carton

As in Figure 5, simply pull the flap at the center of front surface of carton then the carton can be opened.

Figure 6. Inside of outer carton – upper space

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Inside the carton, you will find 1 PK of Rapi:chip™ PCR Chip for the GENECHECKER® (Cat. No. : 002001), operating manual, power cable set, chip scrubbing cloth and USB communication cable. Depending the country, Victory Scientific will enclose the appropriate power cord in the product package. If you have received the incorrect power cord, please contact your local representative.

Figure 7. Inside of outer carton - bottom spac e

After removing Rapi:chip™ and the power cable, you will see the final packaging of GENECHECKER®. Remove upper cover and carefully take out the instrument.

Figure 8. All the components of GENECHECKER® included in the packaging

Please check if all the components listed below are included in the product package.

- 1 SET of GENECHECKER® Main Instrument
- 1 PK of Rapi:chip™ PCR Chip (Cat. No. : 002001)
- 1 EA of AC to DC Power Adaptor
- 1 EA of Power Cable Corresponding to Your Local Electricity
- 1 EA of USB Cable
- 1 EA of USB Storage where GeneRecorder is Contained

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- 1 SET of Operating Manual
- 1 SET of Chip Scrubbing Cloth
- Packaging Materials

Three steps of inspection are performed at Victory Scientific prior to shipping the instrument. However, for any possibility of missing or damaged components, it is highly recommend that you open the carton and check the components as soon as the instrument is delivered. In case any missing or damaged part is found, contact your local representative immediately for corrective actions.

3.2   Features of the Instrument

GENECHECKER® has intuitive and user-friendly interfaces for day-to-day PCR tasks in laboratory as well as on-site. However, it is recommended that you get more familiar with the functions of each part of GENECHECKER® through this topic before you operate the instrument and perform PCR, in order to avoid possible mishandling of instrument.

Figure 9. Features and Use of GENECHECKER®

① RUN/STOP button
The selected PCR protocol is executed when this button is pressed. To stop the current PCR cycle press this button while the instrument is running.

② LCD display
4 line text LCD offers a clear identification while protocol setting and status monitoring.

③ Jog dial
Rotating the jog-dial rightwards or leftwards adjusts set values and pressing the jog-dial selects what the cursor indicates.

④ LED indicator

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LED indicator is illuminated in two different colors, blue and red. The Blue LED indicates that the instrument is idle and ready for use. The Red LED indicates that the instrument is in use, i.e. PCR cycles are being performed.

⑤ Chip presser
Automatically presses the upper surface of the chip when the chip drawer is closed so that the bottom surface of the chip is securely in contact with heating plate. This part is intended for automatic movement, please do not touch the Chip presser.

⑥ Heating plate
The heating plate is where the chip is loaded for PCR cycles.

⑦ Air ventilation holes
Allows the machine to cool and operate properly, do not block the air ventilation holes.

⑧ Chip drawer
This part transports the chip into the instrument. The mechanically stable and robust design offers soft movement and maintenance-free features of this frequently used part.

⑨ PUSH bar
The chip drawer is gently opened and the chip presser automatically moves up when this bar is softly pressed.

⑩ Groove for easy handling
This part is to enhance the portable characteristic of instrument.

⑪ MENU button
The main menu screen is displayed when this button is pressed.

3.3 Power and electrical considerations

GENECHECKER® has adopted DC power operation in order to apply the instrument to versatile applications. In order to secure stable operation of the instrument, your electrical preparation should meet the following requirements.

- Input Voltage : AC 100-240V (50/60Hz)
- Input Current : 2.0A

The output power of the AC/DC adaptor to GENECHECKER® is as per the following specification.

- Input Voltage : DC 12V
- Maximum Current : 10.0A

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3.4 Cabling and Placement

As introduced in section 3.3, there is an AC/DC power adaptor and power cord included in the instrument package. Connect power adaptor and power cord like Figure 10.

Figure 10   Connecting cable to DC adaptor

Figure 11   Connecting DC adaptor and USB cable to the instrument

Then, place the male 4-pin power jack of AC/DC adaptor to the female power socket at the back side of the instrument and apply slight pressure forward to connect to the power jack of the instrument. The flat surface of power jack (with marked arrow) should face the bottom and round surface of the power jack should face up. Applying pressure with the wrong direction of power jack will damage the socket. For the communication with the software, connect the enclosed USB cable to the port located on the upper part of the power socket. The round shaped side should face up.

Figure 12   Back side of GENECHECKER with power cable and
USB cable connection

There should be more than 15cm of clearance around the sides of GENECHECKER® in order to adequately cool the system. Never block air ventilations holes at the front and back sides of the instrument because this can lead to a malfunction of instrument and cause physical damage to heating system of GENECHECKER®.

Now, GENECHECKER® is ready for operation.

Go to the next chapter to learn how to operate the instrument.

4. **Operation**

This chapter will describe the steps that are needed to conduct an experiment and how to set the instrument to properly perform ultra-fast PCR tasks. The following topics are introduced in this chapter.

- Tools needed to start
- Sample and enzymes for PCR with GENECHECKER®
- How to handle Rapi:chip™
- Setting and saving protocols
- How to use GeneRecorder software for analysis
- Collection of samples for additional treatment
- How to use the car power kit (option)
- Shut down and storage
- Instrument alarms

4.1   Tools needed to start operation

GENECHECKER® requires several tools used for general biological experiments. Before starting your PCR protocol, please check the items below and have them ready.

Tools that should be ready before using GENECHECKER®		
Adjustable Volume Micropipette	Pipetting Range : 0.5-10µL	1 EA
Pipette Tip	Volume : 1~10µL	As required
Tweezers	Straight or Curved	1 EA
Tubes	To prepare sample mixture	As required
Vortex and/or Centrifuge	For mixing sample	1 EA

Based on the assumption that you are familiar with the PCR preparation process, this manual doesn't describe the details how to prepare PCR samples. In order to mix samples with the enzyme etc., general micropipette and tips are needed for accurate volume handling and general small volume mixing tools like tubes (with vortex and/or centrifuge) is needed to mix the sample properly. Tweezers having straight or curved tip is needed to handle sealing tapes which is quite thin and small to deal with finger. If you are equipped of these things, you are set to start experiment with GENECHECKER®.

4.2   **Sample and enzyme for PCR protocol with GENECHECKER® Nucleic acid extraction and purification**

We do not require any specific method of sample preparation (extraction and purification) for use with GENECHECKER®. General methods of sample preparation used for conventional PCR task are acceptable for GENECHECKER®.

PCR Enzyme

GENECHECKER® has two key characteristics which are: 1. extremely fast thermal cycling and 2. Capability of real-time detection in connection with the dedicated software, called GeneRecorder. In order to make the best use of these key features and minimize trial and errors in the enzyme selection, we recommend users use the following master mixes supplied by Victory Scientific which are optimized for use with GENECHECKER®.

Cat. No.	Description	Pack Size
004001	Rapi:Detect Master Mix with Fluorescent Dye	2 x 1ml Tube
004002	Rapi:1-Step One-step RT-PCR Kit with Fluorescent Dye	2 x 1ml Tube

The series of master mixes of Victory Scientific are a 2x concentrated, ready-to-use reaction cocktail containing all components, except primers and template, for ultra-fast PCR protocols. These premixes includes a novel antibody-mediated hot-start DNA polymerases with improved speed compared to other commercial polymerases, as a standard. The master mix for real-time detection includes a double strand DNA specific-binding fluorescent dye and one for reverse transcriptase is available for one-step RT-PCR applications. For the customers who want to use their own enzymes for a reaction, it is recommended to source one with similar features to what is supplied by Victory Scientific and green dye such as SYBR Green II, EvaGreen should be included for detection. Please consider the excitation wavelength of the instrument (465nm $\pm$ 10nm).

Recipe of sample mixture

There is no fixed recipe to create a sample for PCR and it is recommended that users find their own recipe optimized for GENECHECKER® through actual experiments. However, a user can start with the following example of a sample recipe. Please note that final volume of sample should always be 10μL.

Item	Volume
Master Mix	5 μL
Primer (Reverse and Forward)	2 μL
RNAase/DNAase Free Water	2 μL
Template	1 μL

Size of DNA template

There is no fixed DNA size that needs to be used with GENECHECKER® but it shows maximum (fastest) performance when the size of template is no longer than 1,000 bp. However, GENECHECKER® can run with DNA larger than 1,000 bp by optimizing the protocol.

Concentration of Primer

Concentration of primer is one of key factors affecting to the quality of analysis. Annealing becomes inefficient if the concentration of primer is too low while primers can non-specifically bind to undesired section of the template or bind to each other if concentration is too high. There is no recommended molar concentration of DNA template but it is recommended to start with 10 pmol concentration because well designed primers that works perfectly with GENECHECKER® is in the range of concentration : 10 pmol or under.

4.3   How to handle Rapi:chip™

Rapi:chip™ is key component to achieve ultra-fast PCR result using GENECHECKER®. Here are several tips to make sure you get the best use and results from Rapi:chip™

- The bottom surface is a key to achieve your best ultra-fast PCR results. Therefore, it should be always kept clean. Any dust or particles existing on the bottom surface can disrupt the heat transfer.

- Rapi:chip™ requires a slightly different pipetting technique. You should inject the sample into the wells of chip and never drop the sample on the chip surface. Therefore, you should insert end of pipette tip into the apertures of the chip wells. This point is very important because Rapi:chip™ is a small device and the distance between adjacent ports are very close, i.e. improper technique can cause cross contamination.

- If needed the user can freeze samples in each well of the Rapi:chip™ . However, please keep in mind that, in some cases, the bottom surface can burst while Rapi:chip™ gets frozen due to volumetric expansion of the sample existing in each well.

You are now set to start actual experiment with Rapi:chip™ in connection with GENECHECKER®. Please be familiar with each part of Rapi:chip™.

Figure 13   Getting familiar with Rapi:chip™
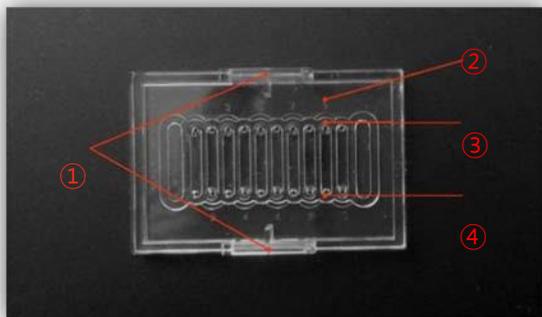
① Wings
These parts are used for picking up Rapi:chip™ with fingers or tweezers.

② Printed Well Numbers

Well numbers from "1" to "10" are printed on the upper surface of the chip. Odd numbers of the wells (1, 3, 5, 7 and 9) are printed on the top and even numbers of the wells (2, 4, 6, 8 and 10) are printed on the bottom.

③ Inlet Hole

The holes neighboring the printed well numbers are the inlet hole of each well where pipette tip is inserted for injecting reaction sample into the well.

④ Outlet Hole

The hole at opposite side of each well's inlet hole is outlet hole through which air existing inside the well is escaping while reaction sample is loaded into the well. Excess volume of each well volume (10μl) is run out through this hole.

Figure 14 Rapi:chip^{TM} packaging

Figure 14 shows standard packaging of Rapi:chip^{TM} (Cat. No. : 002001). This package contains 48 individual chips, however, Rapi:chip^{TM} is also supplied in different packages as follows.

Cat. No.	Description	Pack Size
002001	Rapi:chip^{TM} PCR Chip, Small Pack	48/PK
002003	Rapi:chip^{TM} PCR Chip, Large Pack	768/PK

Cat. # 2003: large pack comes with 16 PK of cat. #. 2001. These options of purchase are available to extend volume purchase discount to the users.

The carton of Rapi:chip^{TM} with wrapped with plastic film. You can open the carton after removing wrapping film.

Figure 15

Rapi:chip™ is placed inside the rack in 4 rows and 12 chips are stacked in each row of the rack. Besides the chips, there are sealing tapes in each carton. Sealing tapes are used for sealing apertures of Rapi:chip™ after the samples are loaded in each well. In order to seal 10 wells of Rapi:chip™, one piece is needed. Sealing tape is white in color and it can be written on using a laboratory marking pen if necessary.

Figure 16   Peeling plastic film inside the package

The upper surface of the stacked chips are sealed with plastic film in order to prevent possible contamination. This film can be peeled easily using your fingers like shown in Figure 16. For storage of the remaining chips, you may seal the upper surface of the rack using the same film. Rapi:chip™ is manufactured in clean room area but not sterilized. If sterilization is needed, please use ETO gas sterilization method only. Autoclaving is not recommended due to the possibility of warping.

Figure 17   Removing Rapi:chip™ from the packaging

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For easy transportation using tweezers or fingers, Rapi:chip™ has two wings at its sides. Using general tweezers (straight or curved), hold either side of wings and move the chip out of the packaging as Figure 17.

TM

Figure 18   Sample loading into Rapi:chip

After preparing the reaction sample, aspirate with a pipette and vertically place the tip in the inlet hole like shown in Figure 18. The inlet hole is next to the printed well number and size of this hole is a bit bigger than outlet hole (Refer to Figure 13). The hole on the opposite side of the well is outlet whole where the air existing in the well and excess volume of the sample is going out.
While sample loading, make sure that the end of tip fits securely into the inlet hole of the well and apply slight force downward. Slowly dispense the sample into the chip. You can observe the sample flow inside the well while loading.

Rapi:chip™ is designed to accommodate exact volume of 10μL in each well and the sample flow should stop without overflowing unless there is an error in pipetting process.

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If you observe that dispensing of a sample is not completed and sample flow reaches opposite aperture of the well, you should stop dispensing sample.

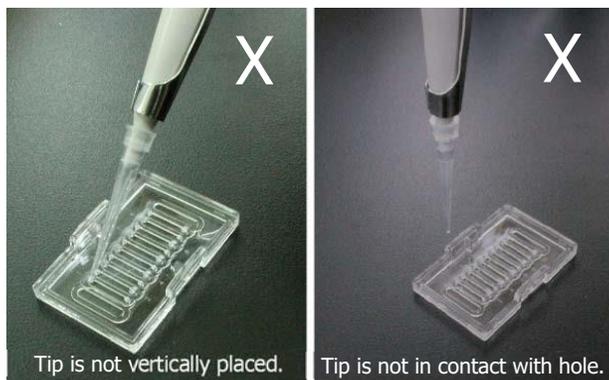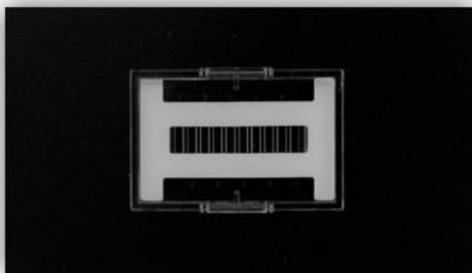**Figure 19** Examples of wrong sample loading

Figure 19 shows wrong examples of sample loading. As introduced earlier, the pipette tip should be inserted to the aperture of Rapi:chip™ and its direction should be vertical.

Figure 20 Sealing Rapi:chip™

After the sample loading process, every hole of the wells should be sealed using enclosed precut sealing tape. This is to prevent contamination as well as evaporation of the samples during thermal cycling. Every hole of the chip should be sealed with one piece of tape like Figure 20.

**Figure 21** Preparing the sealing tapes

System
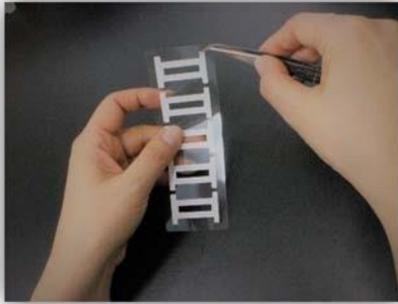
TM

In the box of Rapi:chip (Cat. No. : 002001), there are 10 strips of sealing tape and each strip contains 5 pieces of sealing tape, i.e. total 50 pieces of sealing tape comes with Rapi:chip^{TM} (actual quantity needed : 48 pieces based on 48 chips).
Taking out one strip of sealing tape from the plastic bag in the box, peel one piece of sealing tape from the strip using tweezers like shown in Figure 21.

Figure 22 Sealing holes with sealing tape
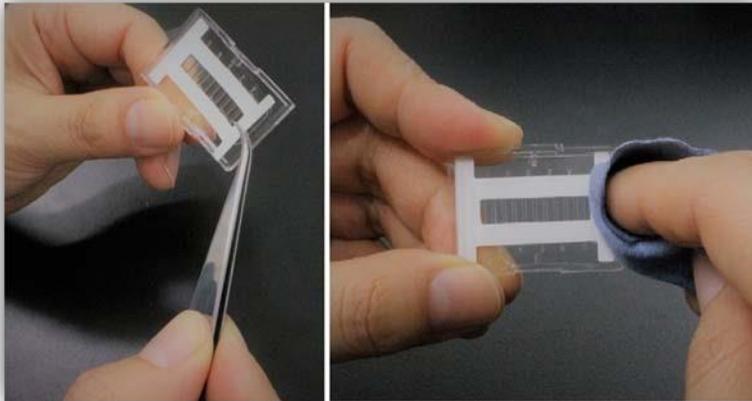
As in Figure 22, place one end of sealing tape alongside one end of Rapi:chip^{TM} and seal entire holes. Then, rub the surface of sealed points using finger or enclosed rubbing cloth.

Figure 23 Loading samples on the heating plate

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Once every aperture of Rapi:chip™ is securely sealed with the sealing tape, you can proceed with the Rapi:chip™ loading process. As in Figure 23, gently push the button on the front side of instrument. The instrument drawer will open and you will find a rectangular space at the center which is the heating plate. This is where the prepared Rapi:chip™ is loaded. Using fingers or tweezers place the prepared Rapi:chip™ on the heating plate. Make sure that the Rapi:chip™ is loaded flat and secure on the heating plate. Improper loading can cause the door to jam and possibly damage the components inside the drawer. Next, close the drawer by pushing front surface of drawer until you hear the "click" which indicates that the drawer is properly closed. Never try to open the drawer and withdraw the chip while instrument is running. This can cause burns to the user.

4.4 Setting and saving protocols

GENECHECKER® has a simple user interface which enables the user to intuitively set reaction protocols and run PCR cycles. The user can control GENECHECKER® with the three parts: 1. "Jog dial", 2. "MENU" button and 3. "RUN/STOP" button. Refer to Figure 9 on page 11 to get familiar with each part of instrument. Basic functions of these three control interfaces are as follows.

Jog Dial
- Rotating jog dial leftwards indicates upper menu in MENU screen.
- Rotating jog dial rightwards indicates lower menu in MENU screen.
- Rotating jog dial leftwards decreases indicated number.
- Rotating jog dial rightwards increases indicated number.
- Pressing jog dial selects indicated menu
- Pressing jog dial inputs indicated number and indicates the next parameter to set.
- Rotating jog dial leftwards or rightwards moves the screen to previous or next screen in case selected menu consist of multiple screens (ex. Setting and loading protocol screen)
- Pressing and holding will save the protocol in integrated memory.

MENU button

- Pressing the button at initial screen moves the screen to MENU screen.
- Pressing the button moves the screen to previous screen.
- Pressing the button while adjusting parameter escapes from the parameter that user was setting.

RUN/STOP button

- Pressing the button at initial screen moves the screen to MENU screen.
- Pressing the button starts instrument operation when this button is pressed at the protocol screen
- Pressing the button makes the screen display "Are you sure to stop?" when this button is pressed while instrument is running.
- Pressing the button stops instrument operation when this button is pressed while "Are you sure to stop?" is displayed in the screen.

The Jog dial is surrounded by LED lamps which illuminates in different colors depending on instrument status.   This is to identify the status of instrument from a distance without checking the screen.

| Lamp Color	Status
None	Instrument completed operation and now it is idle.
Blue	Instrument is idle and waiting for instruction.
Red (Blinking)	Instrument is running.

Figure 24

Power switch of GENECHECKER®

GENECHECKER® has its power switch on the back of instrument. The switch shown in Figure 24 is two position power switch. "O" is off position and "I" is on position. User can switch on GENEHCECKER® by setting th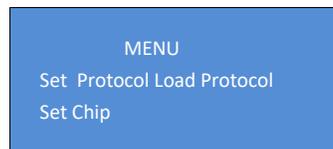e switch to "I" position and off GENECHECKER® by setting the switch to "O" position. Never touch the switch with wet hands.

Initial Display

Ultra-Fast
PCR System
Model UF-150
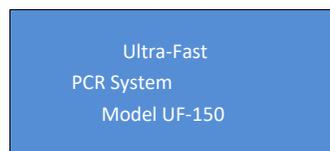
This is displayed on the screen when the instrument is switched on.
Model number and instrument name is displayed.

MENU

| MENU |
| Set Protocol Load Protocol |
| Set Chip |

When the "MENU" button or jog dial is pressed from the initial display, the screen at left will be displayed. The blinking menu can be chosen once jog dial is pressed and you can move up and down by rotating jog dial leftwards or rightwards. Pressing the jog dial selects the blinking menu and proceeds to the next screen. The screen returns to initial screen unless there is a user adjustment for 30 seconds. Basic description of each menu is as follows and details on how to set is explained later.

- Set Protocol: You can program your own protocol in this menu. You can set temperature, time of each step and set number of cycles (denaturation – annealing – extension) to be repeated.

- Load Protocol: You can load the protocol which has been saved in integrated memory of instrument.

- Set Chip: You can turn on and off the LED lamp of the instrument. This menu is intended for displaying well status on the GeneRecorder software to adjust camera angle or the location of fluorescence signal reading box. The LED lamp of the instrument is turned on when this menu is selected then description of this menu is changed to "LED On". When "LED On" is selected the LED of the instrument is turned off and description of menu returns to "Set Chip".

Setting Protocol

| [RT-PCR Setting] Step RT |
| 50°C 15Min |

The screen on the left is displayed when you select "Set Protocol" from the menu screen. This screen is for setting RT (Reverse Transcriptase) PCR cycle. If you press jog dial, the number 50 in left screen starts to blink. This number is the temperature for the RT-PCR cycle. You can adjust this number by rotating jog dial leftwards or rightwards. Range of number (temperature) you can set is from 35 to 65. If you press the jog dial after temperature adjustment, the adjusted number is set as the temperature and the number 15 in left screen starts to blink. This number is the running time (minutes) for which you want to maintain the set temperature. The user can adjust this number from 0 to 30. By pressing the jog dial, the adjusted number (running time) is set and the screen proceeds to next screen. If you do not want to run a RT-PCR protocol, the time should be set to "0". Then, the RT step will be skipped.

| Step1 95°C 30sec |
| Step2 95°C 4sec |
| Step3 95°C 4sec |
| Step4 95°C 4sec |

The screen on the left is displayed when you complete setting RT-PCR cycle. Step1 through step 4 will be displayed on the screen This shows initial-denaturation (step 1), denaturation (step 2), annealing (step 3) and extension cycle (step 4). Temperature and running time (second) can be adjusted and set by the same method used in RT-PCR setting.
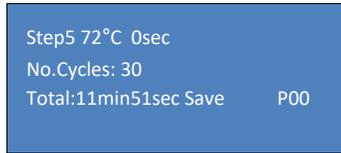
Step5 72°C 0sec
No.Cycles: 30
Total:11min51sec Save   P00

The screen on the left is displayed when you slightly rotate jog dial rightwards at initial screen of protocol setting or presses jog dial after adjusting temperature of step 4. This screen includes step 5 which is final-extension cycle and this can be set by the same method described above. The range of temperature and running time that can be set for each step is as follows:

Step	Cycle	Temperature Rage	Duration
RT	Reverse Transcriptase	35~65 °C	0 ~ 30 minutes
1	Initial-denaturation	1~99 °C	1 ~ 900 seconds
2	Denaturation	1~99 °C	1 ~ 30 seconds
3	Annealing	1~99 °C	1 ~ 30 seconds
4	Extension	1~99 °C	0 ~ 30 seconds
5	Final-extension	1~99 °C	0 ~ 30 seconds

Step 4, the extension step can be set at "0", which will enable the UF-150 to perform a 2-step protocol when needed.

You can also set the time of the repeating "denaturation – annealing – extension" cycles (step 2 through 4 of the protocol setting screen). "Total" indicates total running time including melting cycle based on currently set protocol which is automatically calculated.

"Save" will blink when you complete setting the number of cycles. If you desire to save the set protocol in the integrated memory, the screen will proceed to a new screen by pressing jog dial, where you can save the set protocol. If you don't want to save it, the instrument can start the currently set protocol by pressing "START/STOP" button.

"P00" in the screen indicates the address where current protocol is saved. "P00" means that this protocol has no address and can be saved if wanted. If the protocol is loaded from integrated memory, the address of the loaded protocol is displayed in place of "P00" of the screen. GENECHECKER® has an integrated memory where up to 12 protocols can be saved and its address is displayed in format of "POO" such as "P01", "P12" and so on.

Saving Protocol

[P01:   ]
    P02:
    P03:Mike#7
        P04:BetaDNA

 The screen on the left is an example of the display which is shown when you press the jog dial while "Save" of the protocol setting screen is blinking. The cursor moves up and down by rotating jog dial and you can save the set protocol by pressing the jog dial and holding it down for 3 seconds at

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the address which cursor indicates.   Then, you can name the protocol by combination of following characters.

Item	Character
Alphabets	A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
Numbers	1 2 3 4 5 6 7 8 9 0
Signs	. ( ) * # -
Others	Spacing

By rotating the jog dial, you can see above characters in order and set desired character by pressing jog dial. You can input up to 7 characters for naming and the protocol will be automatically saved once the last (7th) character has been input.

If you want to name the protocol with less than 7 characters, the protocol can be saved by pressing the jog dial and holding for 3 seconds after entering last character. If you save the protocol in the address where other protocol already exists, the old protocol will be replaced by newly saved protocol.

Loading Protocol

```
[ P01:JIM        ]
   P02:A-DNA
   P03:B-RNA
         P04:0812-13
```

The screen on the left is an example of what is shown when you select "Load Protocol" from menu screen. You can select the protocol which already exists in each address of the memory by locating the cursor with the jog dial and select the desired protocol by pressing the jog dial. Once the protocol is selected, the selected protocol will be displayed in the screen and you can run the loaded protocol by pressing the "START/STOP" button. The parameters of the protocol can be changed and newly saved with updated parameters.

Starting and Stopping Operation

```
   Run.. P01
StepRT (RT Mode)
Cycles to Go 30
Timer:29min50sec
```

```
   Run.. P01
S1 S2 S3 S4 S5 Cycles to Go 30
Timer:29min50sec
```
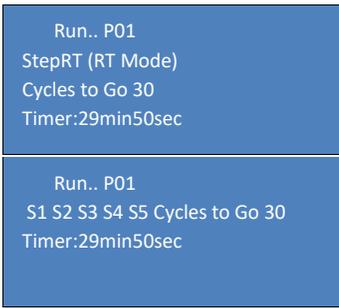
The screen on the upper left is an example of what is shown while the RT-PCR cycle is performed. "StepRT" blinks while this cycle is performed. After the RT-PCR cycle is finished, the screen is changed to the below left screen which shows set PCR protocol consisting of 5 steps. "S1" through "S5" will blinks and that will indicate which step GENECHECKER® is on. For example, "S2" blinks if instrument is performing step 2 - denaturation cycle. "Cycles to Go" means the total remaining cycles (denaturation – annealing – extension) to be completed. Currently running PCR cycle and indicated time after "Timer" is the total remaining time to finish entire PCR protocol being performed.

PCR Protocol Completed

Ending.. P01
S1 S2 S3 S4 S5
No.Cycles 00Cyc
Timer: 0min 0sec

A unit will beep and the result of the reaction will be displayed on GeneRecorder software. This screen is displayed until user intervention.

4.5 Data analysis using GeneRecorder software

GeneRecorder is easy-to-use and user-friendly data analysis software to be used with Model UF-150 GENECHECKER® Ultra-Fast Real-time PCR System. GeneRecorder is installed on the Windows® 10 based laptop computer included in the system package or if the computer was not purchased with the unit, free software will be included to install on the users own computer. In order to record and analyze the reactions on the UF-150 GENECHECKER® Ultra-Fast Real-time PCR System, the instrument should be always connected to the laptop computer using enclosed USB cable.

Running GeneRecorder software

Please follow the procedure below to run GeneRecorder software.

1) Turn on the power of main instrument while laptop computer is turned on and ready for use after the booting process.

2) Make sure there is a proper connection between the main instrument and laptop computer through the USB communication enclosed in the package of instrument.

3) Double click below shortcut icon on the desktop of the PC and run GeneRecorder software.

Another option for running GeneRecorder is navigating the folders and running "GeneRecorder.exe" file (the file in red box of below screenshot) which is located in "GeneRecorder" folder in the "C:" drive of the PC.

4) When GeneRecorder is successfully loaded, the software window should be displayed like Figure 25. The Software window can be enlarged to full screen by clicking full screen box or double clicking title area of the software screen.

Figure 25 Initial display of GeneRecorder software
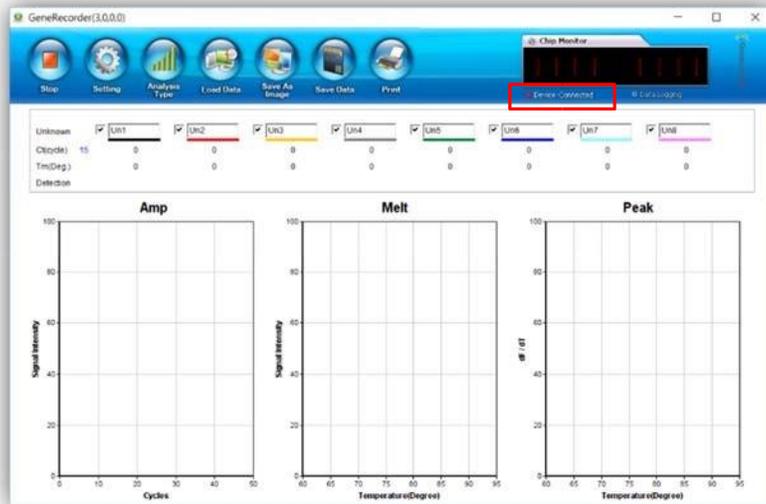
The red square on the left of "Device Connected" indication (the red box of Figure 25) blinks when the computer and main instrument is properly connected and communication is established.

5) By clicking "Setting" button on the top of the screen, adjust camera focus and the location of signal detection box of each well (Refer to page 29 through 30 of this manual for setting.).

6) Set the PCR protocol on the main instrument (Refer to "Setting protocol" section in the page 23 of this manual).

7) Press the 'START/STOP" button of the main instrument and run the PCR protocol. Recording and analysis procedures of GeneRecorder software are automatically performed.

8) The instrument beeps when the Protocol is finished and result of analysis is displayed on the software screen.

Getting familiar with GeneRecorder software

Figure 26 Sections of main screen of GeneRecorder
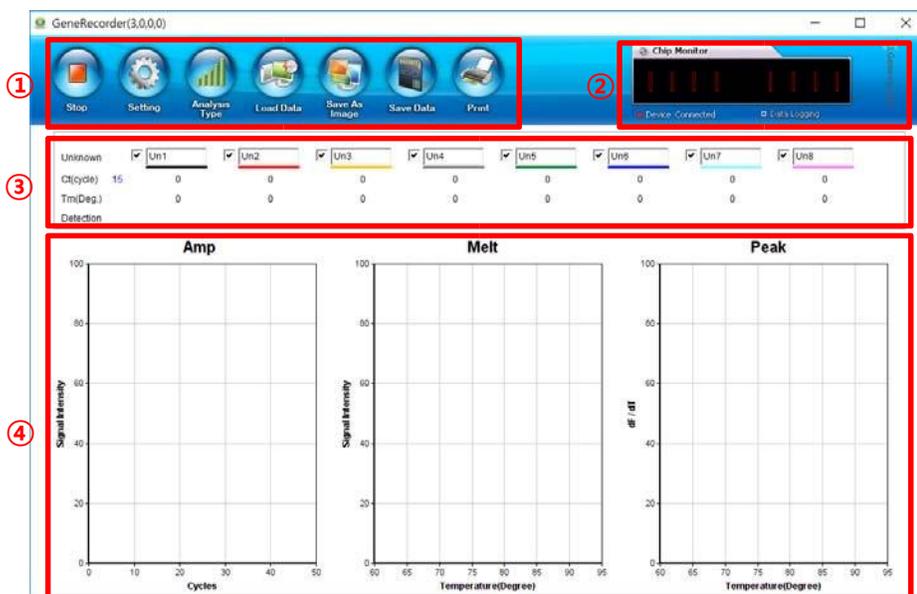
The Main screen of GeneRecorder consists of four sections. The functions of each section are as follows.

① Top Menu
User can set the parameters of the software using each menu in this section

② Chip Monitor
User can visually monitor the status of amplification. Displayed image is real-time status of chip surface (detection area).

③ Well Property
User can type the name of each well (Default name is "Un#" or "St-A#" depending on the type of analysis.). After PCR cycles are finished Ct value and Tm value of each well are displayed in this area. Depending on the setting of detection parameters (Ct and Tm), "Detection" area displays "positive (red sign)" or "negative(green sign)" result of each well.

④ Charts(Graphs)
Three curves are displayed in this section after reaction. "Amp" stands for "Amplification" and real-time amplification curve is displayed in this section. "Melt" stands for "PostReaction Melting Curve" and melting curve is displayed in this section. By changing display mode, this curve can be switched to "Standard" which stands for "Standard Curve". Please refer to page 36 which explains how to display standard curve. "Peak" is the section to display peak data of each melting curve for easier identification of results.

Top Menu of GeneRecorer

There are 7 menu buttons on the "Top Menu" section of GeneRecorder. Function of each menu is as follows.

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Figure 27 "Top Menu" of GeneRecorder

① This menu indicates whether the camera of the main instrument is connected or not. GeneRecorder starts with the camera is connected, i.e. initial display of main screen shows "Stop".
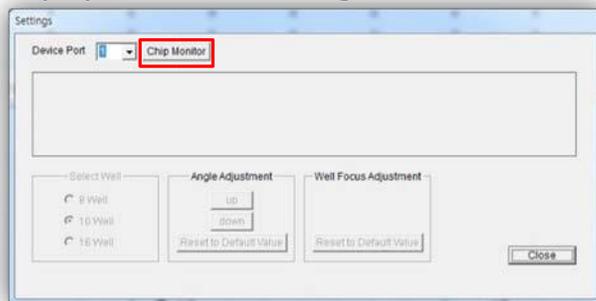

Camera of main instrument is connected and recording is in progress.

Camera of main instrument is not connected. Click play to activate camera and start recording

② This menu is for setting the camera of main instrument. The window of Figure 28 is displayed when this menu is clicked.

Figure 28 Pop-up window of "Setting" menu

By clicking "Chip Monitor" button (the button in red box of Figure 28), the user can display the wells of the Rapi:chip™ which is currently loaded in the instrument.

Figure 29   Display in setting window as "Chip Monitor" button is clicked.
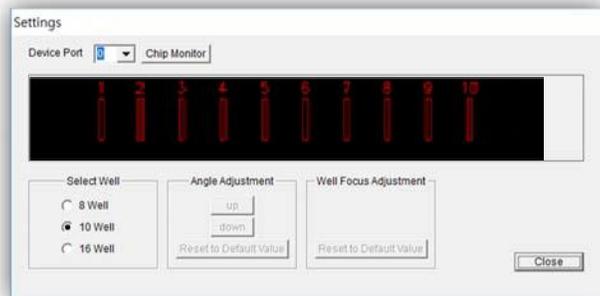
Go to the main instrument and have the LED of the instrument turned on. LED is turned on when the jog dial is pressed with the "Set Chip" menu of main display blinking. Then, the setting window will display the surface of Rapi:chip™ currently loaded in the instrument as illustrated in Figure 30.
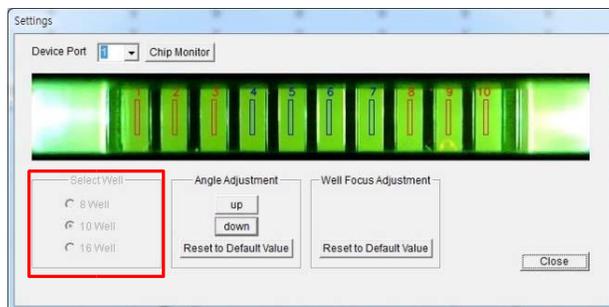
Figure 30   Display in the setting window as the LED of the main instrument is turned on.
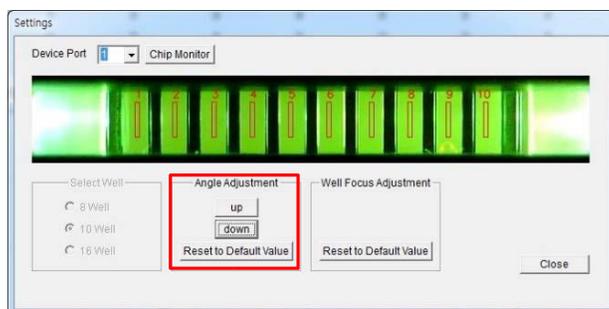
Using the "Angle Adjustment" section of the window (the buttons in red box of Figure 30), adjust the camera angle of the main instrument so that the wells of Rapi:chip™ are properly displayed in the middle. The red rectangles below the well numbers are the areas in which fluorescence signals are detected. User can adjust the locations of these rectangles so that they can be located in clean areas without bubbles or dust on the chip surface.

The user can choose certain rectangle by clicking that rectangle with right button of the mouse. By dragging with the right button of the mouse, the user can choose multiple rectangles. By clicking or dragging with the right button of mouse while "Ctrl" button of keyboard is pressed, the user can choose separate well(s). Once rectangle(s) is (are) chosen, user can move the location(s) of chosen rectangle(s) by one of following methods.

1) Click chosen (blue) rectangle with the left mouse button pressed and move to the desired location.
2) Using arrow keys of the keyboard, move to the desired location.

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Figure 31 Displays that wells #4 through #7 are chosen for adjusting location of rectangles.

After everything is set as desired, turn the LED of main instrument off and close the setting window by clicking "Close" button. Please note that this setting window is not closed without turning off the LED of the main instrument.

This process of setting the locations of florescence signal detection areas should be performed every time when a new Rapi:chip™ is loaded for reaction and analysis.

The section for choosing chip format in "Setting" menu (the area in the red box of Figure 31) is not activated and reserved for future upgrade.

③ Analysis Type

Figure 32 Types of analysis are diaplayed when "Analysis Type" button is clicked.

The user can choose type of analysis using "Analysis Type" menu. By clicking the button the user can choose one from following three analysis types. Default type of analysis is "Unknown".

1) Unknown
This is the type of analysis that is performed without any standard well. Every well from 1 through 10 can be used in accordance with user's experiment set-up.

2) Standard A
This is the type of analysis which is defining one kind of standard for the analysis. The user should set 3 to 5 wells as standard wells. For instance, if the customer wants to

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use 4 wells for standard samples, well #1 through #4 are the wells where standard samples should be loaded. The other remaining wells (well # 5 through #10) can be used for loading samples for analysis. Please note that in this case the standard samples in #1 through #4 should be loaded in consecutive serial dilution i.e. 10^3 copies in well #1, 10^4 copies in well#2, 10^5 copies in well #3 and 10^6 copies in well#4 or 10^6 copies in well #1, 10^5 copies in well#2, 10^4 copies in well #3 and 10^3 copies in well #4.
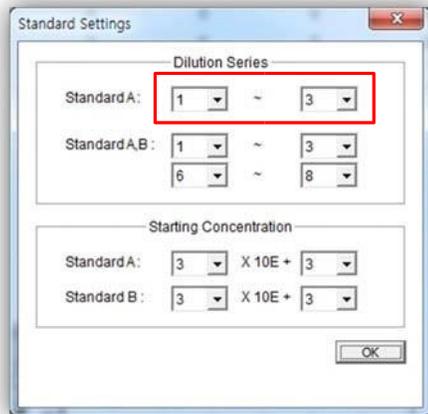
3) Standard A, B
This is the type of analysis which is defining two kinds of standards for the analysis. User should set well #1, #2 and #3 as the wells for the first standard and set well #6, #7 and #8 as the wells for the second standard. The samples to be analyzed in reference to first standard should be loaded in well #4 and #5 and the samples to be analyzed in reference to second standard should be loaded in well #9 and #10. Please note that the standard samples in #1(#6) through #3(#8) should be loaded in consecutive serial dilution i.e. 10^4 copies in well #1(#6), 10^5 copies in well#2(#7), 10^6 copies in well #3(#8)or 10^6 copies in well #1(#6), 10^5 copies in well#2(#7), 10^4 copies in well #3(#8).

Figure 33   Display of well property according to defined type of analysis

4) Standard Settings

By clicking "Standard Settings" of "Analysis Type" menu, the user can define the starting concentration of the standard well in the pop-up window shown at Figure 34. Define the starting concentration of the standard samples.

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Figure 34   Setting starting concentration of standard samples

For the analysis type of "Standard A", user can set from 3 up to 5 standard samples for analysis. The user can set the number of standard samples at the red box section of Figure 34. It can be set as one of "1~3", "1~4" and "1~5"

For the analysis type of Standard A, B, there is no option for the user to set the standard samples.   It is always set as "1~3" for standard A samples and "6~8" for standard B samples (This section of setting is reserved for software upgrade for use with 16-well chip in future.).

After setting the conditions for the standard samples, starting concentration of the samples should be defined. Starting concentration can be set from 10^1 up to 10^5. Upper limit of analysis of GeneRecorder is 10^7 copies hence starting the concentration of any sample cannot be set at higher than 10^7. When the concentration of any well is set at higher than 10^7, a warning window will pop up and the concentration is automatically set at the maximum settable value. After setting starting concentration, click "OK" button to close the window.

5) Detection Settings

GeneRecorder can display the qualitative result of the analysis within the "Detection" area of the main screen. The samples analyzed to be positive are displayed as red sign while the samples analyzed to be negative are displayed as green sign as shown in Figure 35.

**Figure 35**   Display of Qualitative Result of Analysis

The parameters to define qualitative results of analysis are Ct value and/or Tm value. The thresholds of these detection parameters can be set by clicking "Detection Settings" from the Analysis Type menu. As "Detection Settings" is clicked a window will pop up like Figure 36.

Figure 36 Window for Setting Thresholds for Detection Parameters
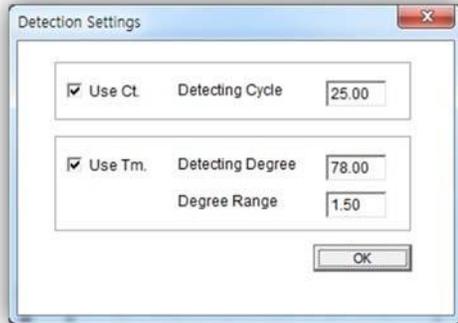
The user can choose parameter(s) to use for detection by ticking the box of Ct and/or Tm. The user can type threshold values. For the Tm value, user can set the temperature in Celsius and also define the tolerance of the temperature. For instance, for the case when the temperature is set at 78 and Degree Range is set at 1.50 like Figure 36, the result would be displayed as positive if the Tm value of sample is within the range of 76.5 and 79.5. Click the "OK" button to complete setting the thresholds.

6) Color Settings

For easier identification of the curves, the user can define the color of each curve. When "Color Settings" of Analysis Type is clicked, the left window of Figure 37 is displayed. The colors of each well displayed in this window are default colors but this can be set to the user's own colors by clicking the well that the user desires to change. When a well is clicked, the right window of Figure 37 is displayed where the user can define the desired color.

Figure 37 Window of Color Settings
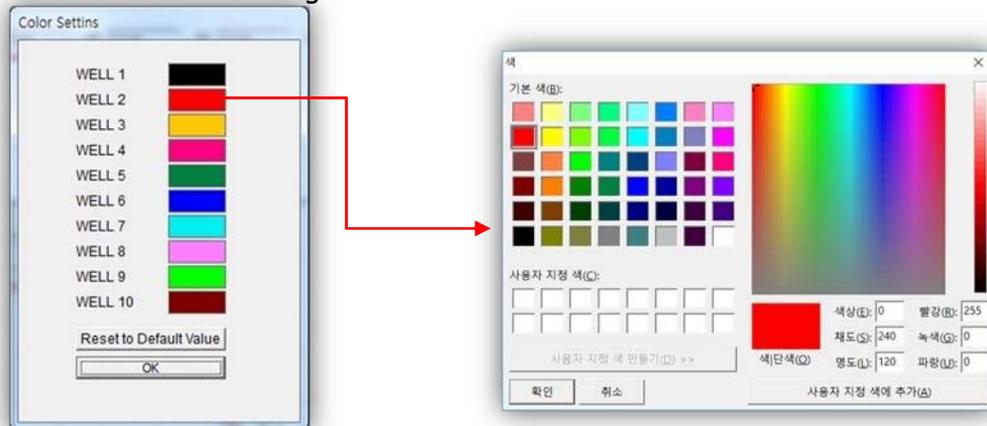
④ Load Data

By clicking this menu, the user can load the analysis data saved in the hard disk or any other storage media. In order to properly load the analysis data, the user should choose

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experiment.csv file (not experiment_melt.csv or experiment_summary.csv) when loading.

⑤Save As Image

By clicking this menu, the user can save the currently displayed analysis charts – Amp, Melt and Peak as image file (JPG format) in the desired location.

⑥Save Data

Once the reaction is completed, three kinds of data files in csv format: yyyy-mm-dd[hh-mm-ss].csv, yyyy-mm-dd[hh-mm-ss]_melt.csv and yyyy-mm-dd[hh-mm-ss] summary.csv are automatically created in the route of "GeneRecorder > savedata > date folder in "yyyymmdd" format > time folder in "testhhmmss" format". The data files, yyyy-mm-dd [hh-mm-ss].csv and yyyy-mm-dd [hh-mm-ss]_melt.csv contain fluorescence data of amplification and melting cycle respectively. The data file, yyyymm-dd [hh-mm-ss]_summary.csv contains the summary of the reaction data.

Also, by clicking this menu, the user can save the currently displayed analysis data in the desired location.

⑦ Print

By clicking this menu, user can print out screenshot of currently displayed GeneRecorder window.

Result Analysis

1) Defining baseline threshold

The user can define the baseline threshold from the Amp chart. Locate the mouse pointer at the blue dotted line of Figure 38. Then, drag the line to desired location with the left button of mouse pressed. The threshold value is displayed in the box.

Figure 38 Defining Baseline threshold from the Amp chart

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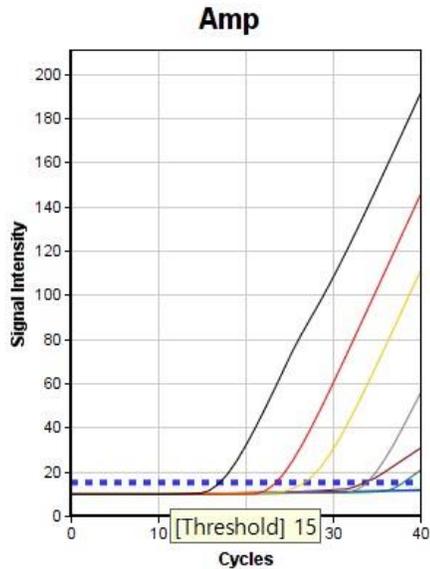
2) Selecting wells for analysis
The user can select or deselect wells for analysis by clicking the tick boxes on the left of each well in well the property section or by simply dragging the tick box area. You can select or deselect discrete well(s) if you click or drag well(s) by pressing the "Ctrl" key on the keyboard.

3) Zooming in and out of curves
By Rolling the wheel of the mouse while the pointer is located within the chart area will zoom in or zoom out the chart. Rolling forward will zoom in on the chart and rolling backward will zoom out the chart.

4) Highlighting specific curve
The user can highlight a specific curve on the chart by placing the mouse pointer on the curve within chart area. By clicking the colored line below the name of each well (red box area in Figure 39) will also highlight the curve corresponding to that specific well. The data within the Well Property area relevant to the highlighted curve will be displayed in red for easy identification.
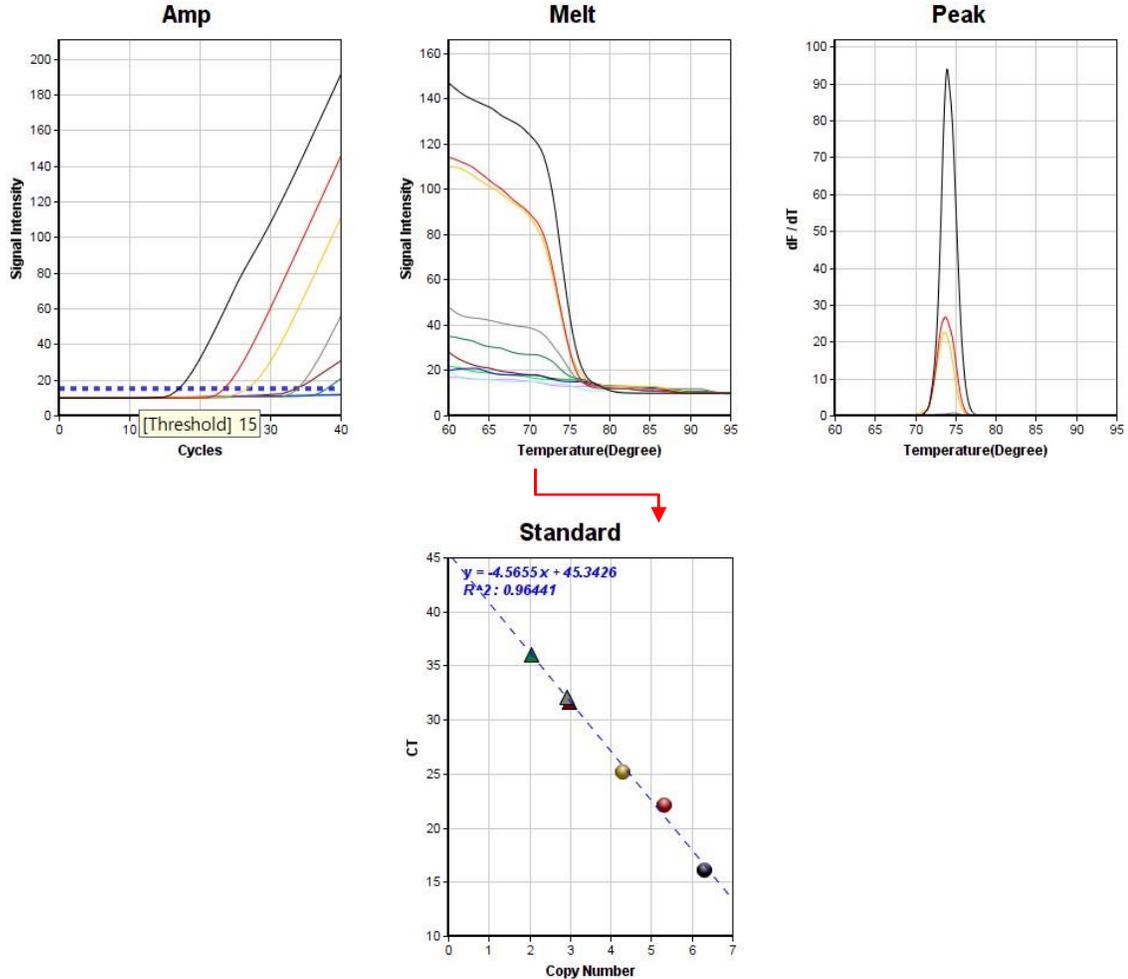
Figure 39   Highlighting specific curve
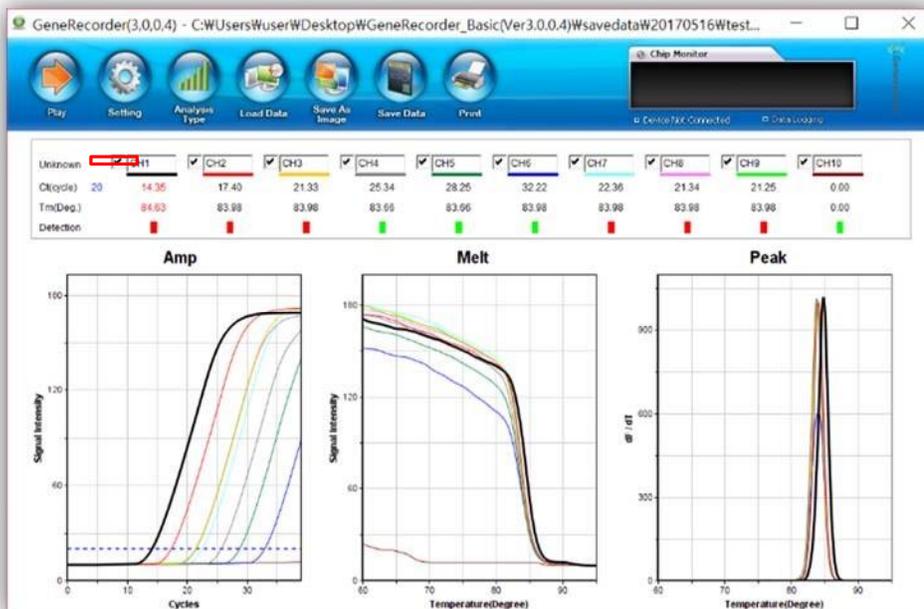
5) Displaying Standard Curve
Click "Analysis Type" from the "Top Menu" of GeneRecorder then, choose "Standard A" or "Standard A, B". The Melt chart will be converted to "Standard" as shown in Figure 40 which stands for "Standard Curve".

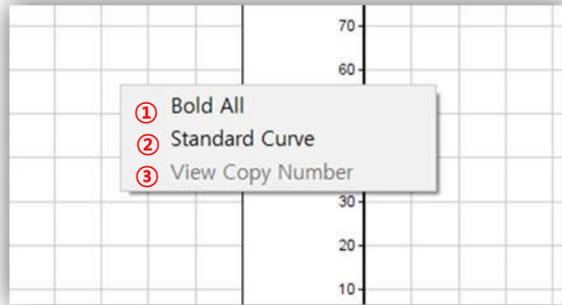**Figure 40**   Melt curve is converted to Standard curve.

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6) Values of specific points on the curves

When the mouse pointer is located on the specific point of a chart, the actual value of that point is shown in the box. That value is the "Y" axis value of each chart and the Amp, Melt and Peak charts provides these values. In the Standard chart, only the values of the standard samples are displayed and the measured values of the actual samples should be confirmed from the Copy Number data which is shown in the window which will pop up by double-clicking the Standard curve.

7) Reaction Data

The window in Figure 41 is activated when the right button of the mouse is pressed while the mouse pointer is located within the standard curve area.

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Figure 41   Additional features of the standard curve

Functions of each menu are as follows.

① Bold All
Display every curve in the chart in bold lines.

② Standard Curve (or Melt)
 Convert the chart to standard curve from melt curve or to melt curve from standard curve.
 (Only applicable when Standard A or Standard A, B is selected from "Analysis Type" menu.)

③ View Copy Number
Copy number of the sample in each well is displayed like in Figure 42. The same feature
is available when the standard curve area is double-clicked.

Figure 42   Display of copy number
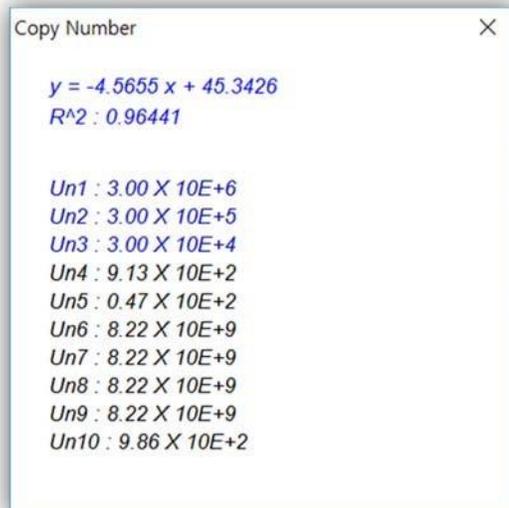
4.6   Collection of samples for additional treatment

The user who wants to perform gel electrophoresis can collect the sample in the
Rapi:chip™ as follows.

- Remove sealing tapes.

- Insert pipette tip to aperture of each well of Rapi:chip™ while the pipette is ready for aspiration, and aspirate sample.
- Make sure that pipetting volume should be 10 μL or larger. - Bring sample to electrophoresis or other treatment.

4.7 How to use car connection power kit (option)

GENECHECKER® has adopted a DC 12V power input which enables the users to apply the instrument for versatile PCR applications. GENECHECKER® can be operated using a car power jack using the car connection power kit (P/N: 003001). The car connection power kit has a DC voltage regulator which stabilizes unstable output voltage from a car power jack and supplies appropriate power to GENECHECKER®. Simply connect the car connection power kit to the back of instrument and connect the other end to the car power jack and follow the general method of using GENECHECKER® described earlier the chapter. Drive anywhere and apply GENECHECKER® to your POCT applications!

4.8 Instrument Alarms

Sound	Status
Short "beep-beep"	Instrument is turned on
Short "beep" at high tone	MENU button or jog dial is pressed. Jog dial is rotated rightwards
Short "beep" at low tone	START/STOP button is pressed. Jog dial is rotated leftwards.
"Beep-beep-beep"	Prompted PCR cycle has been finished and Well-Viewer is going to be turned on after 8 seconds.
"Beep-beep-beep-beep-beep"	Well-viewer is turned off and instrument is waiting for user's intervention to proceed with other jobs.
Endless "beep-beep- …"	Peltier or temperature sensor is out of order. User should immediately contact your local representative.
Endless "beep------------------"	Heat limit sensor is activated and instrument is shut down for protection.

4.9 Shut down and storage

In order to turn off GENECHECKER®, switch off the instrument while GENECHECKER® is idle (when the LED of the jog dial has no color or is in blue color).
Simply set the switch on the back of instrument to "O" position then all power connected to instrument will be shut off. For long term storage, it is recommended to disconnect

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power cord and put the instrument into the original carton. It is recommended that the instrument is kept in a dry and cool space in order to protect the instrument.

5. Maintenance

GENECHECKER® is maintenance free instrument which requires minimized actions to keep the instrument in good condition. In order to ensure proper operation of GENECHECKER®, please read the following and perform the recommended.

- The key parts to secure 100% efficiency of the instrument are the heating plate and the bottom surface of Rapi:chipTM and these two parts should kept always clean. In order to have the entire bottom surface of Rapi:chipTM securely in contact with the surface of the heating plate, remove dust or any other materials from the heating plate or bottom surface of Rapi:chipTM using manual air blower. Use a soft cloth or dust-free wipes to clean the heating plate. Never use alcohol or solvent to clean the heating plate as it will damage the surface coating of the heating plate. Only small volume of water is recommended for wiping the surface of the heating plate.

- GENECHECKER® has air ventilation holes in three locations the front, bottom and back of the instrument. Air vents at the front face are the air intake vents and the vents at other two faces are for expelling air. Always keep the vents clean in order to ensure proper air ventilation.

- Please keep in mind of the details on the alarm sounds of GENECHECKER® introduced in chapter 4.7 and contact your local representative for service in case of any instrument failure.

- It is strictly prohibited for users to disassemble the instrument without prior approval of Victory Scientific. There are seals on the assembled parts of the instruments and damage of those seals or disassembling or modifying the instrument without approval of Victory Scientific will void the warranty.

6. Error screen and troubleshooting

- Error screen

System Err ....
HALT   !!!! Err Code: OO
INFO:
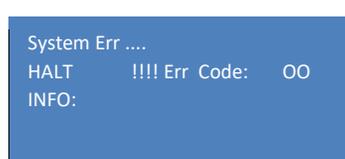
Left image is the error screen that is shown when the instrument has an error. If the place where "OO" is shown indicates "F0" or "F2", it means that temperature sensor is damaged. If the place where "OO" is shown indicates the codes other than "F0" or "F2", it means that peltier is damaged. Please contact your supplier if this screen is displayed.

- Troubleshooting

Trouble	Cause	Solution
Nothing is indicated on the screen when instrument is switched on.	Power failure	Check if the lamp of DC adaptor is in green color Check if power jack is properly inserted (See the direction).
Chip drawer is not closed.	Error in chip loading	Place the chip on the heating plate flatly and securely.
Chart is not generated on the GeneRecorder.	Intended interval	Please wait until the chart is displayed as it takes some time depending on the PC performance.
The curve on GeneRecorder doesn't show any signal value.	Sample recipe and /or PCR protocol is not optimized.	Adjust the sample recipe and PCR protocol
Instrument is alarming	Component failure	Refer to chapter 4.7 for detail
Abnormal screen is shown	Component failure	Contact local representative.
Dots are shown in the wells when Rapi:chip™ is observed through GeneRecorder.	Bubbles are formed due to poor sealing of apertures. Sample is evaporated during thermal cycling. Sample volume is less than 10μL.	Securely seal the apertures by firmly scrubbing sealing tapes. Securely seal the holes by firmly scrubbing sealing tape. Dispense precise volume of sample into wells of Rapi:chip™
Chip is wetted after thermal cycling	Holes of Rapi:chip™ are sealed poorly.	Securely seal the holes by firmly scrubbing sealing tape.
Stains along the chip well position are shown on the heating plate.	Heat generated during thermal cycling	Wipe the plate. If it is not completely removed use as it is. It doesn't effect to instrument performance at all.

7. Service and Warranty

Warranty of GENECHECKER® is extended against defects of materials and/or workmanship and its period is 1 year from purchase. If any defect should occur during warranty period, Victory Scientific will repair or replace the defective part free of or

Model UF-150 Operating Manual   Technical specification subject to be changed without prior notice.

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replace the defective unit at our discretion. However, the warranty will be void in the following cases.

- Disassembling GENECHECKER® without prior approval of Victory Scientific.
- Damage of warning labels that seal each part of instrument. - Defects caused by improper operation - Deliberate or accidental misuse.
- Damages caused by use of improper samples
- Damage caused by disasters

8. Ordering
   information

Cat. No.	Description	Pack
001151	Model UF-150 GENECHECKER® Ultra-Fast Real-time PCR System	1 SET
002001	Rapi:chip™ PCR Chip for GENECHECKER® – Small Pack	48/PK
002003	Rapi:chip™ PCR Chip for GENECHECKER® – Large Pack	768/PK
003001	Car Connection Power Kit	1 SET

9. Contact Information

For any technical questions on the instrument, please contact Victory Scientific using following contact details or its local representative.

Victory Scientific
305 Snowy Owl Court
Sewell, NJ 08080

Phone: 609-915-5371

Email: CS@victoryscientific.com

Website: Victoryscientific.com