The World's fastest Real-Time PCR Thermal Cycler

User Manual

BJS BIOTECHNOLOGIES
A LIFESCIENCE COMPANY

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xxpress xxplates, and xxsealer are the brand names for BJS Biotechnologies own range of PCR thermal cycler products and accessories. For further details please visit our web site.

www.xxpressPCR.com

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Contents

Tables

1 Glossary of Terms and Abbreviations

ANSI	American National Standards Institute
BJS Bio	BJS Biotechnologies Limited, UK Company Number 02959160
Deepwell Plate	Plate with an SBS footprint featuring 48, 96 or 384 wells with a larger volume than microplates
DWP	Deepwell plate
EMC	Electro-Magnetic Compatibility
Microtitre Plate	Plate with an SBS footprint featuring 24, 48, 96 or 384 wells
MTP	Microtitre plate
PCR	Polymerase Chain Reaction
PPE	Personal Protective Equipment
Real-Time PCR	Polymerase Chain Reaction where the result is delivered through the PCR process by the capturing of fluorescence emitted by the reaction.
SBS	Society for Bio molecular Screening
Semi-skirted PCR Plate	PCR plate with an outer surrounding half edge
Skirted PCR Plate	PCR plate with an outer surrounding edge
Thermal Cycler	A machine that moves samples from one precise temperature to another repeatedly
Un-skirted PCR Plate	PCR plate without an outer surrounding edge
Well	A single sample cavity in a Microtitre plate, PCR plate or Deepwell plate
xxplate	BJS Bio PCR test plate for the **xxpress** real-time thermal cycler. Available in 24, 54, and 96 well formats.

2 Symbols Used in this Instruction Manual

The following advisory symbols are used in this manual.

Table 1: Advisory Symbol Meanings	
 **DANGER**	Indicates a Risk of Electric Shock which could, if not avoided, result in serve injury or death.
 **DANGER**	Indicates a Burn Hazard which could, if not avoided, result in serve injury or death.
 **DANGER**	Indicates a Risk of Explosion which could, if not avoided, result in serve injury or death.
 **WARNING**	Indicates a hazardous situation which could, if not avoided, result in serve injury or death; or severely damage the unit.
 **CAUTION**	Indicates a hazardous situation which could, if not avoided, result in minor or moderate injury; or degrade or impair the functionality of the unit.
 **CAUTION**	Indicates a Risk of Crush hazard due to moving parts which could, if not avoided, result in minor or moderate injury.
	Advisory note or other useful information.
⇨ ***NN***	Refer to “Section NN” for more details.

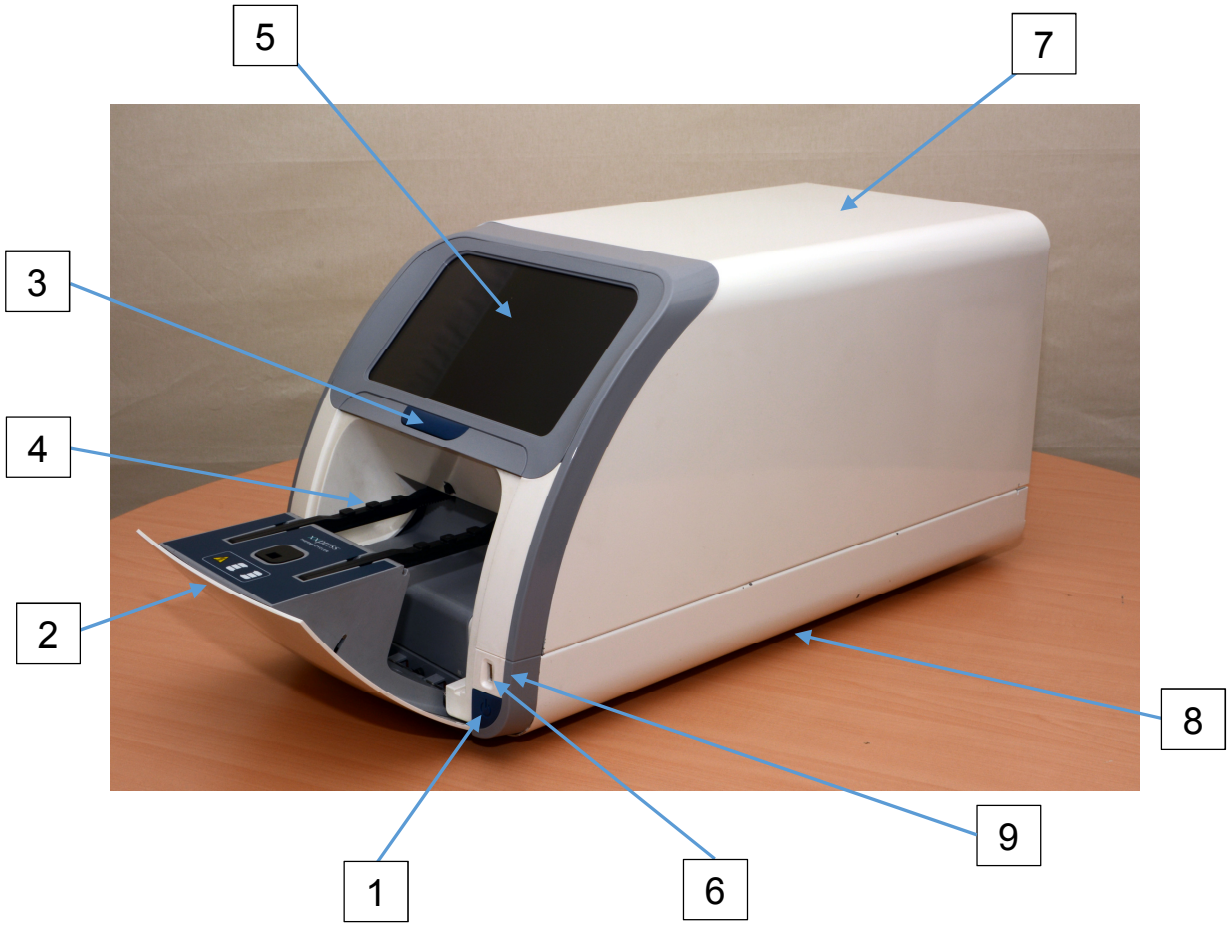
3 Unit Description

The **xxpress** Real-Time Thermal cycler provides a safe and controlled method heating and cooling the test samples placed within the **xxplates** whilst measuring the level of fluorescence emitted by the samples.

xxpress has five fluorescence measurement channels that enable fluorophores with a wide range of excitation and collection frequencies to be used.

To protect the samples from evaporation and contamination during the heating and cooling of a PCR process the **xxplates** are sealed using a clear film.

The **xxpress** unit has the following external features:



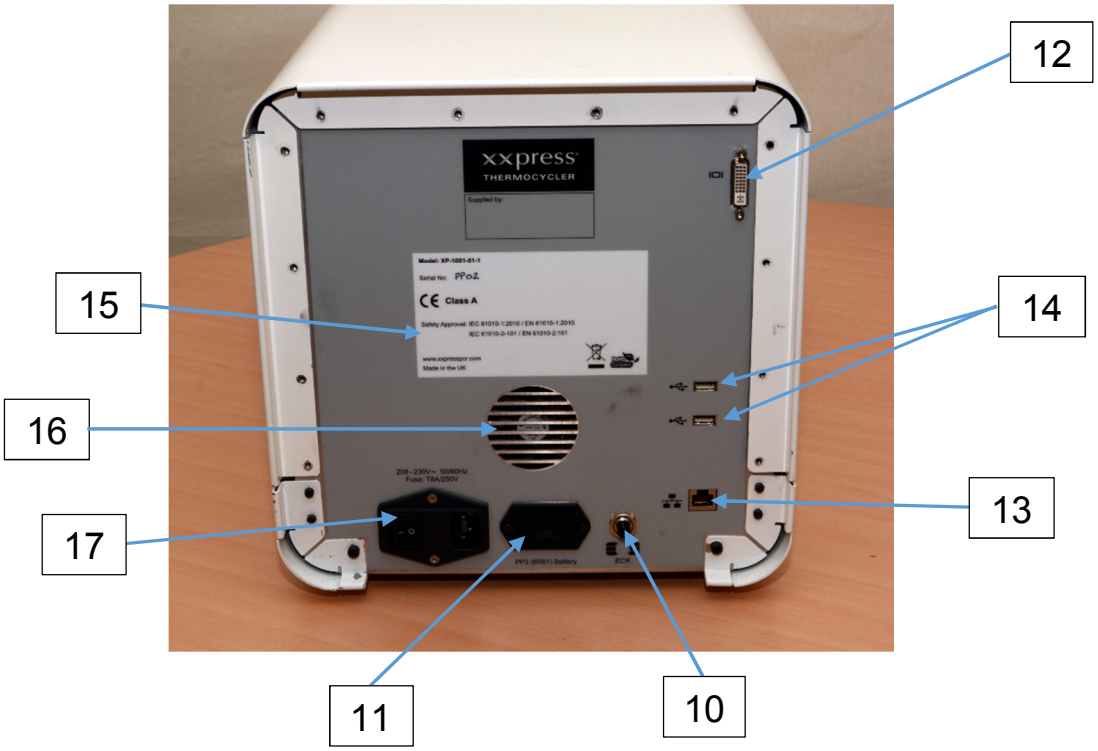
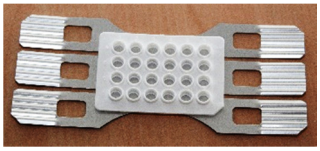
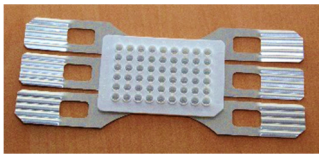
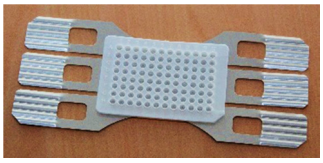


Table 2: Unit Features	
1	**xxpress** Power On/Off Button
2	Front Door
3	Front Door Release Button
4	**xxplate** location
5	**xxpress** Display and Touch Screen
6	Front USB Connector
7	Rear Cover
8	Air Intake Vents and Filters (under unit)
9	Power on LED
10	Emergency Release Button (ECR)
11	Battery Compartment for Emergency Release Battery – (PP9)
12	DVI-D Connector for External Monitor
13	RJ45 Connector (Network)
14	Rear USB Connectors
15	Voltage Input Label
16	Unit Air Expelling Fan
17	Mains Input connector fuse and switch

The **xxpress** unit is designed to be used with a range of sample plates and accessories – some of which are listed below:

Table 3: xxpress Sample Plates and Accessories	
Picture	**Description**
	**BJS xxplate 24 well** (sample volume 10-40 uL)
	**BJS xxplate 54 well** (sample volume 4-15 uL)
	**BJS xxplate 96 well** (sample volume 1-5 uL)
	**xxsealer**
	**xxpress** centrifuge

Other specialist accessories may be available at request. Please contact your distributor for details.

4 Technical Specification

Model Type

Model Name	**xxpress**
Model No	XP-1001-01-1

Physical Unit Properties

Dimensions (W x D x H)	300 mm x 520 mm x 315 mm
Weight	35 kg

Mains Supply

Power Cord Rating	IEC C13, 3-Core, 10A min
Inlet Module Type	IEC C14, DPST, Single Fuse
Supply Voltage	230 VAC ±10%
Supply Frequency Range	50 Hz ±5%
Power Consumption	1000 W max
Fuse Ratings and Sizes	T8AH 250V 20x5mm
Mains Supply capability	The power for this unit must come from a stable mains supply. Do not power from inverters, frequency convertors, or generators. (See Section 5 for further details)

Operating Environment

Temperature Range	+18 to +30 °C (Ambient temperatures above 25°C can reduce the rate of cooling)
Relative Humidity Range	20% to 80% non-condensing
Maximum Operating Altitude	2000 m above sea-level

Storage and Transportation

Temperature Range	-10 to +50 °C
Relative Humidity Range	20% to 95% non-condensing

PCR Performance

Thermal Ramp Rate	Maximum Ramp Rate 10°C per second Adjustable from 0.1°C to 10°C per second in 0.1°C steps.
Thermal Uniformity	±0.3°C well to well across the test plate Uniformity achieved after 0.5 seconds
Fluorescence Detection	5 Channel Fluorescence Detection LED illumination CCD image capture

Detection Channels and Frequencies

Channel	Excitation (nm)	Emission (nm)	Common Dyes
Channel 1 Blue	470	513-531	FAM/SYBR Green
Channel 2 Green	530	569-588	NDE/TAMRA
Channel 3 Amber	590	600-617	ROX/Texas Red
Channel 4 Red	627	662-685	Cy 5
Channel 5 Red	627	694-734	Cy 5.5

5 Safety Precautions and Limitations of Use

It is essential that all users of this equipment have fully read and understood the following safety precautions and limitations of use before installing or operating the **xxpress** unit.

IMPORTANT	
 **WARNING**	The protection provided by this equipment may be impaired if it is not used in a manner described in this manual.
 **WARNING**	It is essential that the user of this equipment is aware of the potential hazards associated with the unit and its accessories. All operators should be familiar with the safety precautions and warnings given in these instructions before attempting to operate the unit. Improper use of this unit or its accessories may impair their functionality and invalidate the manufacturer's warranty.

Unit Handling Precautions	
 **CAUTION**	Care should be taken not to drop the unit or subject it to rough physical handling, both during normal use and during transportation and storage.
 **WARNING**	The unit should be supported using the base of the unit when being lifted or moved. Do not lift the unit by any other part of the casework. Care should be taken when lifting the unit due to its weight.
 **CAUTION**	Care should be taken not to knock the LCD display. Do not use excessive force when touching the touch screen or operating the buttons.

Unit Installation and Operating Environment	
 **DANGER**  **WARNING**	The **xxpress** unit is designed for indoor laboratory use only. The acceptable operating temperature range is 18ºC to 30ºC, with a relative humidity of 20% to 80% non-condensing, at a maximum altitude of 2000m above sea level. If the unit is stored in conditions outside of these ranges, it must be left to stand unpowered until it has acclimatised to within these environmental limits before being powered.
 **DANGER**	Use only the AC mains power cord provided with the unit or as specified Section 4. The unit must be connected to a suitably earthed mains supply, with appropriate earth-leakage and over-current protection.
 **WARNING**	Always ensure that the mains power connector is securely inserted into the rear of the unit, and any excess power cord does not pose a potential trip or pull hazard.
 **WARNING**	The power for this unit must come from a stable mains supply. Do not power from inverters, frequency convertors, or generators. This unit requires a power supply with both a stable voltage and stable frequency. Inverters, frequency convertors, and generators do not provide acceptable stability and the unit can perform outside its specification, or fail to perform, or be damaged by the use of these forms of power supply.
 **DANGER**	Do not operate the unit in any area which is, or has been, or is thought to have been exposed to explosive or flammable gases, vapours or liquids.
 **WARNING**	The unit must be installed and operated on a solid, stable and level working surface; ensuring that the ventilation holes under the unit and at the rear of the unit are not obstructed.

General Operating Precautions	
 **DANGER**	Ensure that the power is switched off at both the AC mains supply outlet and at the back of the unit before inserting or removing the mains power cord.
 **DANGER**	The **xxplate** can reach temperatures of over 100°C and can remain hot for a time after the xxpress system is turned off. If conditions are set such that the experiment is finished with the plate at a high temperature it will exit the unit with the potential to burn the operator and care should be taken.
 **DANGER**	The unit is intended for use with plates containing biological samples only. Never use the unit to seal any explosive, volatile or highly reactive substances or chemicals.
 **CAUTION**	There is a possible finger crush hazard due to the moving parts of the door. Care should be taken when closing the door.

Unit Maintenance and Serviceability	
 **DANGER**  **WARNING**	There are no user or operator serviceable parts inside the unit. Do not remove the unit casework. Removal of the unit's casework will void the manufacturer's warranty and may expose the user to a Risk of Electric Shock resulting in serious injury or death.
 **DANGER**	Once installed, the externally accessible unit fuse will only blow under a fault condition. This fuse should only be changed after the unit has been thoroughly inspected by a qualified engineer. See Section 8.1 for details.
 **DANGER**	Always switch off the unit and disconnect the power cord before performing any cleaning or decontamination procedure. If liquid is spilt into or over the unit, switch off and disconnect the power from the AC mains outlet before attempting to deal with the spillage.
 **CAUTION**	Ensure that the xxpress unit has cooled down to room temperature before performing any cleaning operation and before moving or storing the unit.
 **CAUTION**	The use of harsh chemicals and cleaning agents may damage the unit and degrade its performance. Always follow the cleaning and decontamination procedures specified in Sections 8.2 and 8.3 of this instruction manual.
 **CAUTION**	Do not autoclave any part of the unit or its accessories.

6 Unit Installation

Before installing the **xxpress** unit, please check that the delivery is complete and that the unit and any accessory parts are intact and free from any signs of transportation damage. Also ensure that all external and internal packaging has been removed from the unit before installation.

Please retain all packaging for future transportation and storage of the unit and its accessories.

The **xxpress** unit should be installed in a location which meets the following requirements:

- Safe and suitable operating environment (see Section 5)
- Solid, stable, level working surface
- At least 10cm clearance around the unit to adjacent objects and walls
- Earthed AC mains power connection (see Section 4)

WARNING

Please also observe and abide by the **Unit Installation and Operating Environment** safety precautions and preconditions listed in Section 5.

WARNING

The power for this unit must come from a stable mains supply that matches the specification on the back panel of the unit. Do not power from inverters, frequency convertors, or generators (see Section 5).

WARNING

Ensure that the correct fuse type has been fitted in the mains inlet fuse holder as detailed on the back of the unit. See Section 4 for details.

WARNING

If the unit has been stored in a cool environment, it must be left to stand unplugged until it has acclimatised to the new room temperature before being powered.

Install and test the **xxpress** unit using the following procedure:

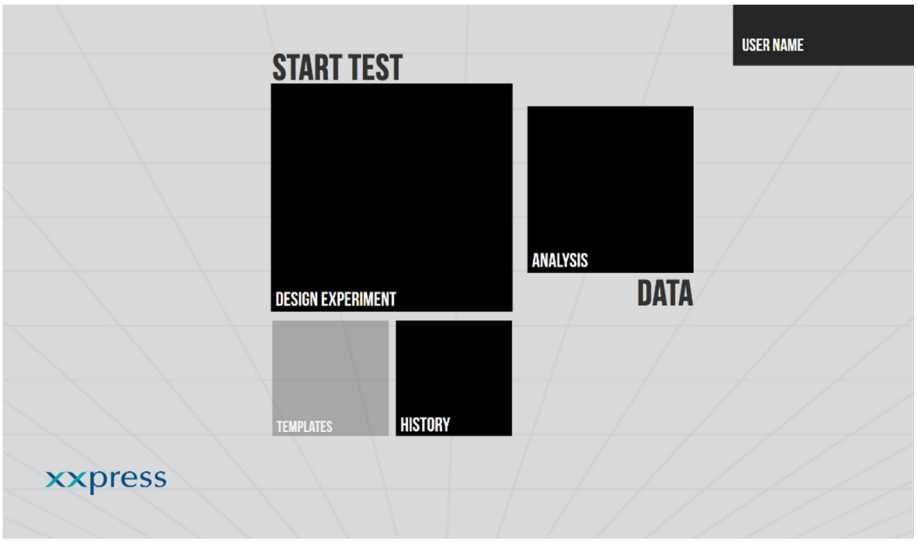
1) Place the unit on the suitably selected working surface (as specified above), ensuring that the ventilation holes underneath and on the rear of the unit are not obstructed.

2) Connect the unit to the AC mains power outlet using the mains power cord supplied or as specified in Section 4.

3) Switch the mains power on at supply outlet first, and then switch the unit on using the power switch located at the rear of the unit.

4) Touch the blue xxpress Power On/Off button located on the front of the unit once and wait whilst the unit starts up.
This can take 30seconds as the unit initialises the system and runs a self-test.

5) Start-up is complete when this screen is shown.



7 Unit Operation

WARNING

Please ensure that you have read and fully understood all of the **Safety Precautions and Limitations of Use** listed in Section 5 before attempting to operate the **xxpress** unit.

7.1 User Touch Screen Display and Controls

The unit's user interface consists of a large high definition colour LCD display which has an integrated touch screen that will support multi-finger gestures. (The touch screen is designed to operate when wearing standard laboratory gloves.)

The unit is controlled through an application that runs on the xxpress unit that has been designed to match the operation of the Real-Time PCR Thermal Cycler to the normal experimental procedures used by Biotechnologist's so that it is intuitive and so easy to use.

A version of the software that runs on the xxpress instrument will be available to run on a standard PC. This will enable the design and analysis of experiments away from instrument so enabling effective use of the platform. The notes about this use of the software therefore apply to both versions of this software.

The software will be regularly updated as will the user instructions, you can find details of the latest versions at www.xxpressPCR.com

7.2 Operation of the xxpress qPCR system

7.2.1 Turning on xxpress

- Before connecting **xxpress** to the mains electrical connection make sure that the voltage and frequency detailed on the label at the rear of the unit (see table 2) matches the supply voltage.

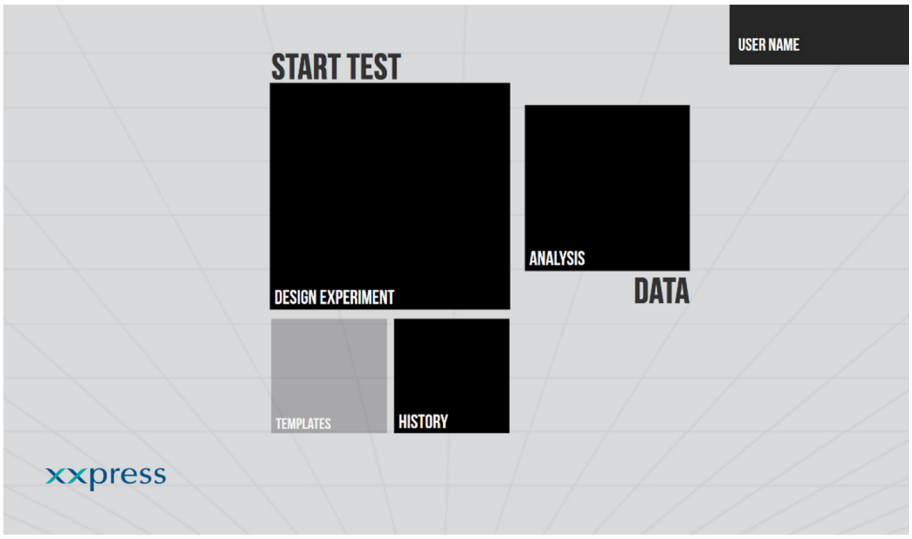
- Connect the supply using the IEC cable provided with the unit. Turn the power on at the wall (if switched) then turn the power input switch on the mains input connector on (see table 2).

- The unit is now powered and so the rear fan may operate depending on the temperature of the unit and the environment.

- To wake-up **xxpress** press the blue Power On/Off Button on the front panel once. **xxpress** will wake up, run through a self-test and initialise its systems. Once a screen like the one in Figure 1 is visible the **xxpress** is ready to use. This is the **HOME** screen and can always be returned to by touching the logo at the bottom left of the other screens.

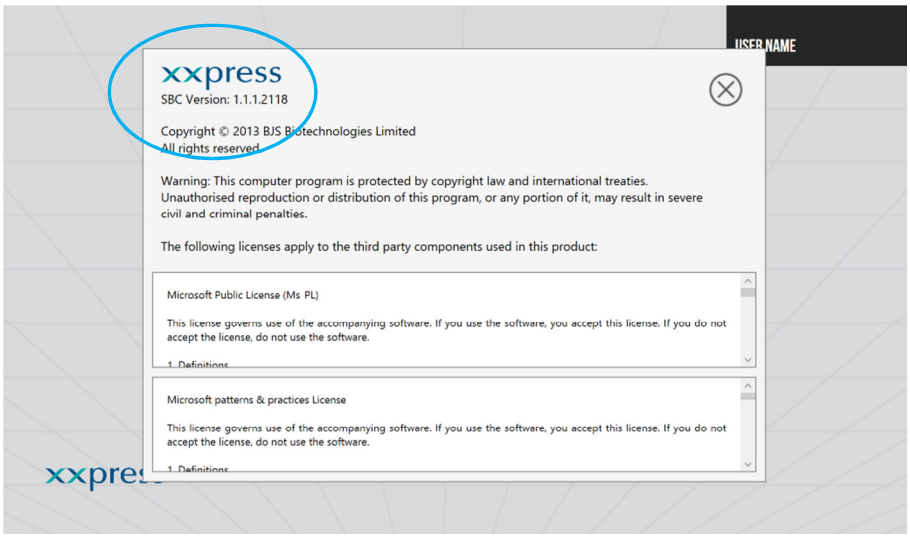
- From the **HOME** screen it is possible to create new experiments, run previously designed experiments, and analyse completed results of previously run experiments. For each of the operations **xxpress** will guide the user through the steps required.

Figure 1



- To check the version of the software running on **xxpress**, from the **HOME** screen touch the **xxpress** logo in the bottom left of the screen. A pop-up information window will appear listing the version and also the software licence terms. See Figure 2.

Figure 2



Close the screen by touching the ⊗ symbol in the top right corner of the screen.

The next sections of this manual will guide the user through the regular operations that can be completed using **xxpress**.

7.2.2 Designing a New PCR Experiment

- To create a new test method or experiment touch the **DESIGN EXPERIMENT** square or tile on the screen (**xxpress** is fitted with a touch screen, it is quite sensitive and doesn't need high force to operate).

- The next menu asks what type of PCR experiment you wish to perform. The menu is scrollable using a simple up/down gesture on the touch screen. Touch the experiment type desired, it will become highlighted, see Figure 3. An alternative can be selected by just touching a different type.

- Once the desired experiment type has been chosen touch the arrow symbol at the bottom right of the screen to proceed to the next screen.

  (Choosing the PCR type enables **xxpress** to structure the starting

thermal cycling profile shown in later screens to match the experimental need).

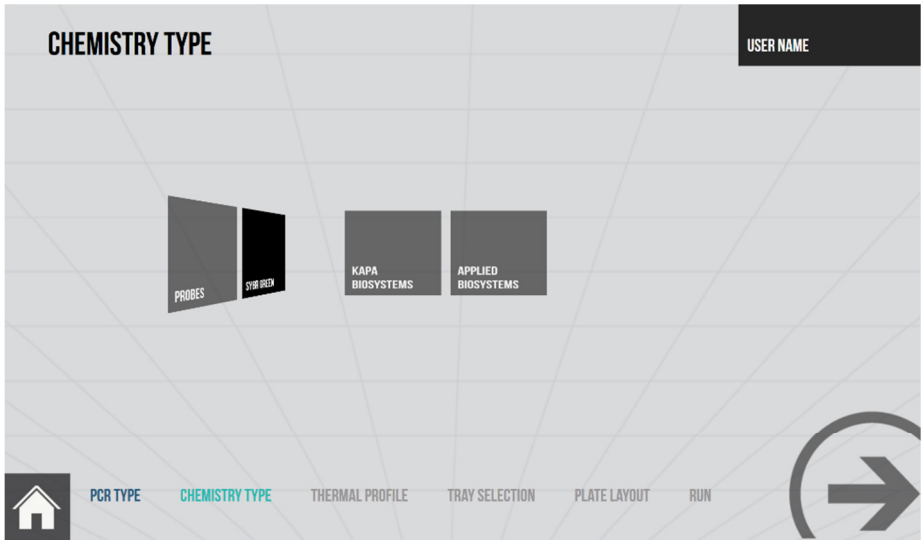
Figure 3

- In this example we have selected a 3-Step Real-Time PCR.
- You will also notice running along the bottom of the screen is a navigation bar similar to that often seen on a web-site. The highlighted cyan text indicates the current stage or screen.
- Touching the arrow advances the user to the next screen (Figure 4), this is where the details of the chemistry type that will be used in the experiment is chosen.

Figure 4

- The first selection is to choose between a **PROBE** based test or one the uses **SYBR GREEN** based signalling, this information enables **xxpress** to preselect the camera sensitivity. Touch the selection required.

Figure 4a



- Here we have selected **SYBR GREEN** see Figure 4a.

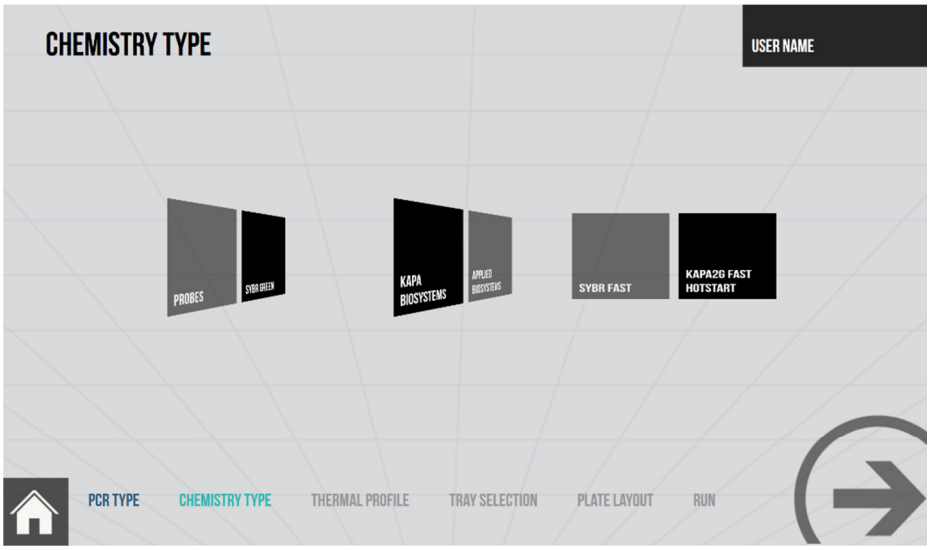
- Next there are two specific selections that identify the chemistry supplier and the specific product that will be used, (this information is used to prepopulate the thermal profile with a suggested set of parameters).

  xxpress is so much faster than traditional thermal cyclers that the team at BJS Bio have developed some typical profiles to help the user move quickly to an optimised assay. The figures are only a starting point and all the parameters are adjustable in later screens.

- If the chemistry the user wants to use is not listed on the screen then they can chose a similar product as their starting point and edit the values on the later screens.
  With each new software release BJS Bio will add new chemistry options, in between releases application notes for other chemistries can be found on the **xxpress** web-site, www.xxpressPCR.com .
  If a user wants specific advice on setting a profile for a chemistry they can email support@xxpressPCR.com with their question.

- Once the chosen supplier and type of chemistry is selected (Figure 4b) then the user proceeds to the next screen by touching the arrow at the bottom right of the screen as before.

Figure 4b



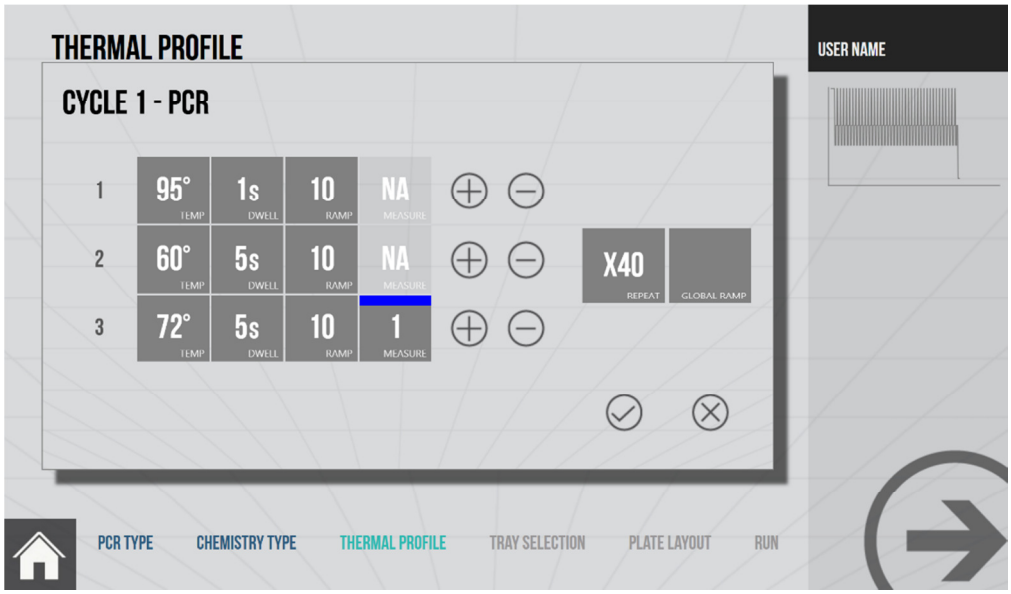
- The next screen controls the thermal profile required for the experiment, see Figure 5. From the information already input into **xxpress** the system pre-populates this screen with the correct experiment structure and recommended starting values.

Figure 5

- Looking at our example 3-Step PCR, we chose a SYBR Green based test and Kapa SYBR 2G Fast Hot Start chemistry. In Figure 5 the thermal profile reflects this with an initial hot start at 95°C for 20 seconds followed by a 3-Step cycle which is repeated 40 times. Finally there is a cooling step to bring the plate down close to ambient enabling safe removal from the unit.

- Touching each part of the profile will pop-up a screen allowing the parameters to be modified, see Figure 5a.

Figure 5a



- Select the parameter to be changed, here we have selected the dwell time on the second step of the cycle which is now highlighted. Then type in the desired value or select the option required using the keypad on the right of the display.
  Once the user is happy with their changes they can save them by touching ⊘ the tick symbol or cancel and lose their changes by touching the ⊗ cross.

- In the example in Figure 5a there are 3 steps to the PCR. Initially the temperature is raised to 95°C at a ramp rate of 10°C per second. Then the temperature is held at that value for 1 second.

- In the second step the temperature is reduced to 60°C, the ramp rate is again 10°C per second. Once the temperature is at 60°C then this value is held for 5 seconds.

- In the third step the temperature is increased to 72°C, the ramp rate is again 10°C per second. Once the temperature is at 60°C then this value is held for 5 seconds. At the end of this dwell there is a fluorescence measurement made using the channel 1 filter settings.

- The temperatures for each step can be specified anywhere between 40°C and 99°C in 0.1°C steps.

- The thermal ramp rate can be specified for each step independently or set as a **GLOBAL RAMP** rate using the tile on the right of the pop-up screen. Value can be set from zero to 10°C per second in 0.1°C steps.

- The number of times the cycle should be run in is set in the **REPEAT** tile, in the example in Figure 5a the 3 step cycle is repeated forty times.

- Touch the ⊘ tick to accept these conditions or the ⊗ cross to reject.

- For experiments where multiple cycles are required these can be added by touching ⊕ the "plus" symbol and editing them in the same manner. Unwanted steps can be deleted using the ⊖ "minus" symbol

- The final segment sees the temperature being reduced to 45°C and held for 10 seconds to complete the experiment.

- Based on the chemistry choice **xxpress** will select a recommended sensitivity for the camera that measures the fluorescence, this is a combination of gain and exposure time. Touching the blue **CAMERA** tile will pop-up a window that will allow the sensitivity of the measurements in each of the five fluorescence channels to be individually adjusted, see Figure 5b.

- To adjust touch the circle and then drag it to the position along the line that gives the desired value. The value range is from zero to 100. (To drag the circle maintain finger contact with the touch screen.)

Figure 5b

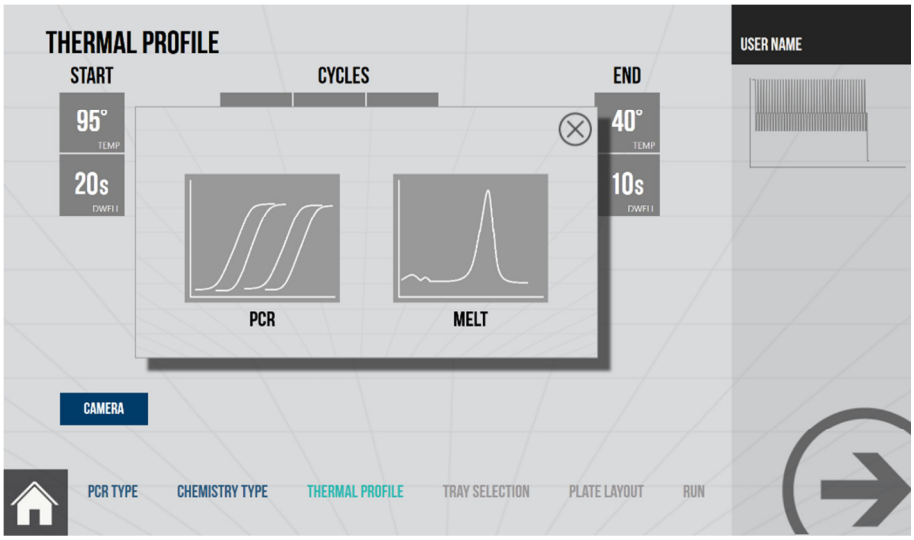
- Touch ⊘ the tick or ⊗ cross to accept or reject the changes as before.

- At this stage if a Melt Curve is to be run as part of the experiment it can be added as an additional cycle. It will then be run immediately after the PCR, see Figure 5c. BJS recommend this approach, see section 7.2.3 for how to set-up a Melt.

Figure 5c

- Touch the ⊕ plus symbol to add the extra cycle, see Figure 5c

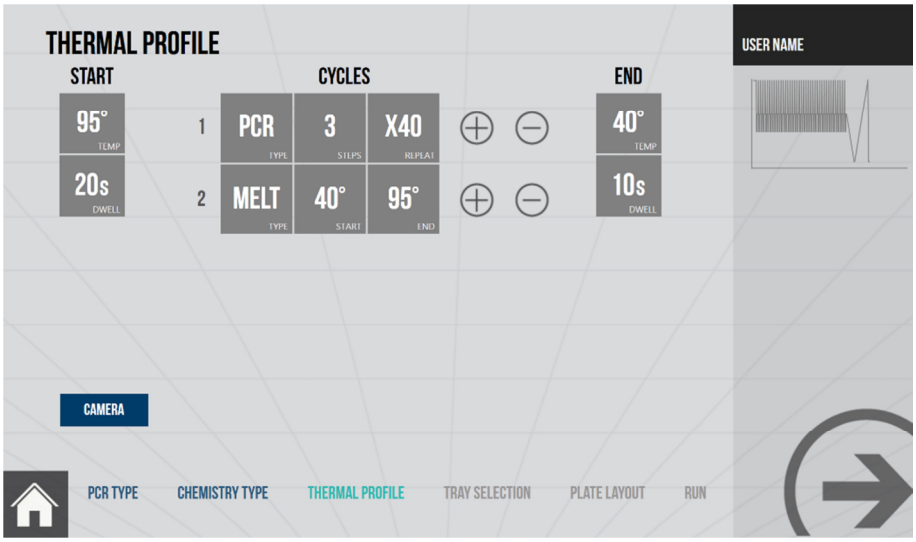
Figure 5d



- Touch the **MELT** tile to add a Melt Curve cycle to the experiment, see Figure 5d.

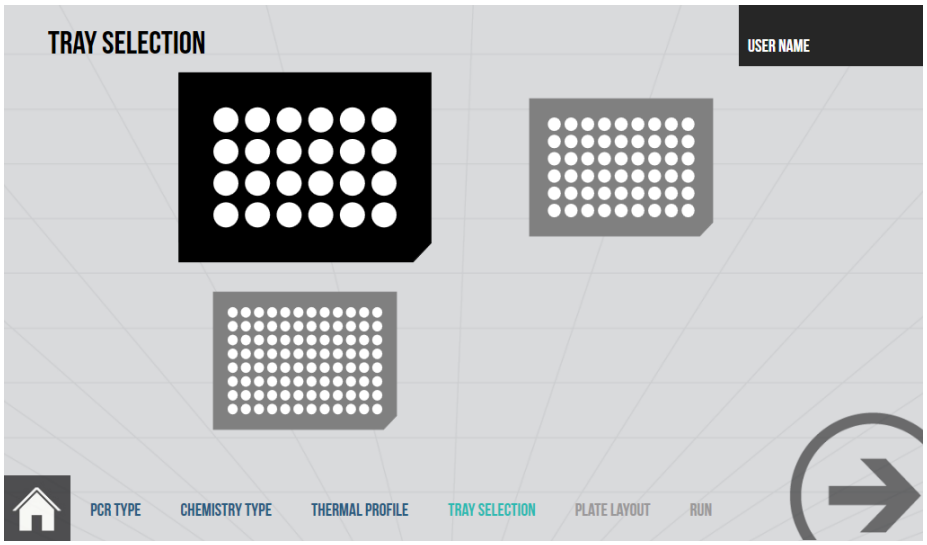
- The Melt cycle is then added to the list of cycles and can be edited by touching. See section 7.2.3 for how to set-up a Melt

Figure 5d



- Once all the conditions are as required touch the forward arrow on the bottom right of the screen to advance to the Tray Selection.

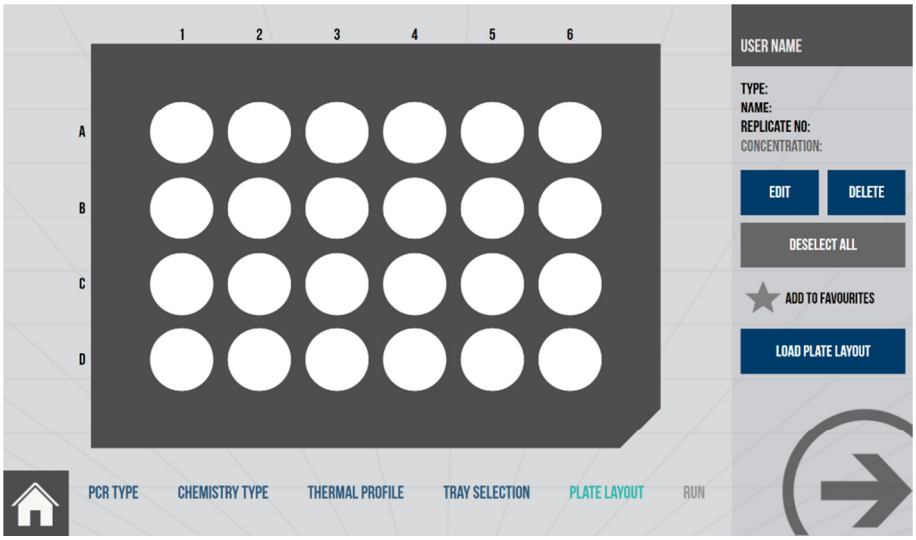
Figure 6



- Chose the desired test plate size by touching it. **xxpress** has a range of three standard test plates called **xxplates**, 24 well, 54 well, and 96 well. See Table 3 for the sample volumes they can accept.

- Touch the forward arrow at the bottom right of the screen as before once the selection is correct. **(xxpress** will recognise the **xxplate** size so the correct selection is important.)

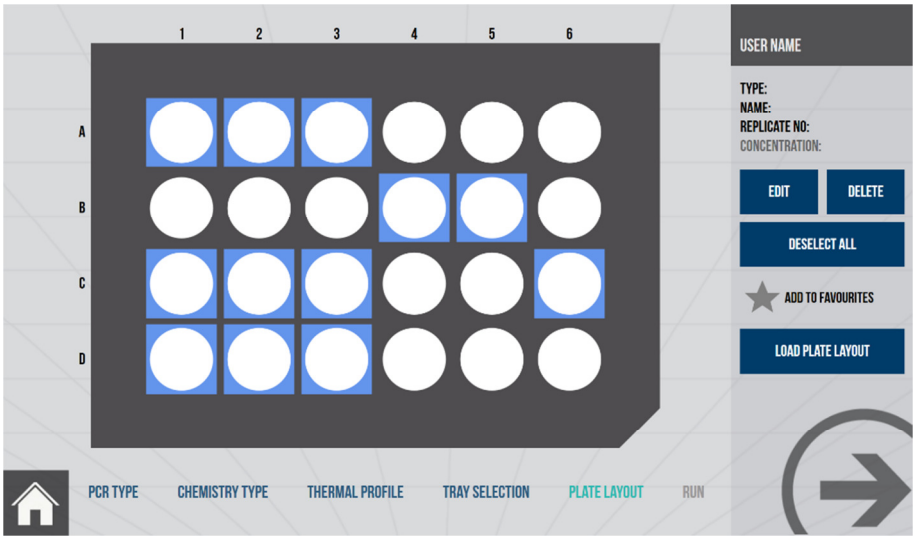
Figure 7



- Figure 7 shows the chosen **xxplate** with its wells and the grid they are on.

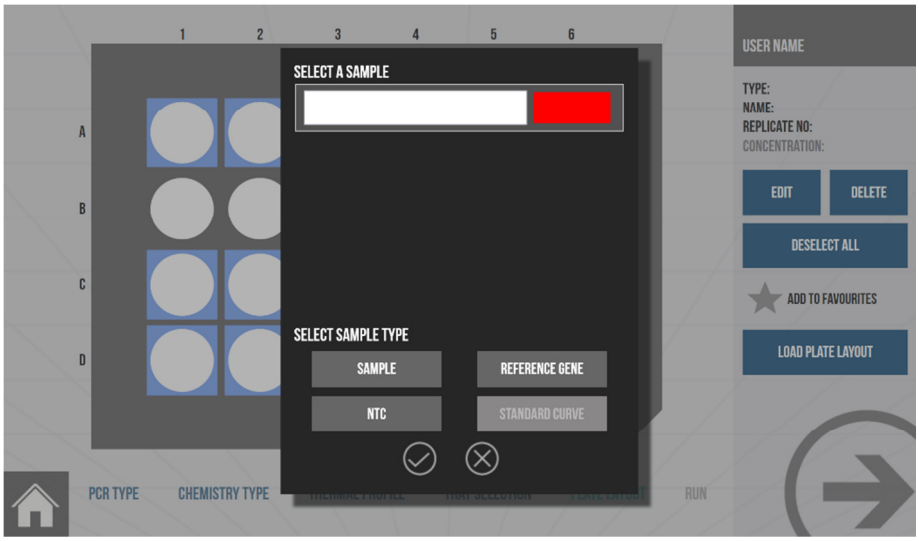
- These wells can be labelled with information to help the analysis of the results. To select a group of wells to edit touch them individually or draw your finger over them. Touching them again will de-select them, or touch **DESELECT ALL** to clear the complete selection.

Figure 7a



- With the required wells highlighted touch **EDIT** and a screen will pop-up, see Figure 7b.

Figure 7b



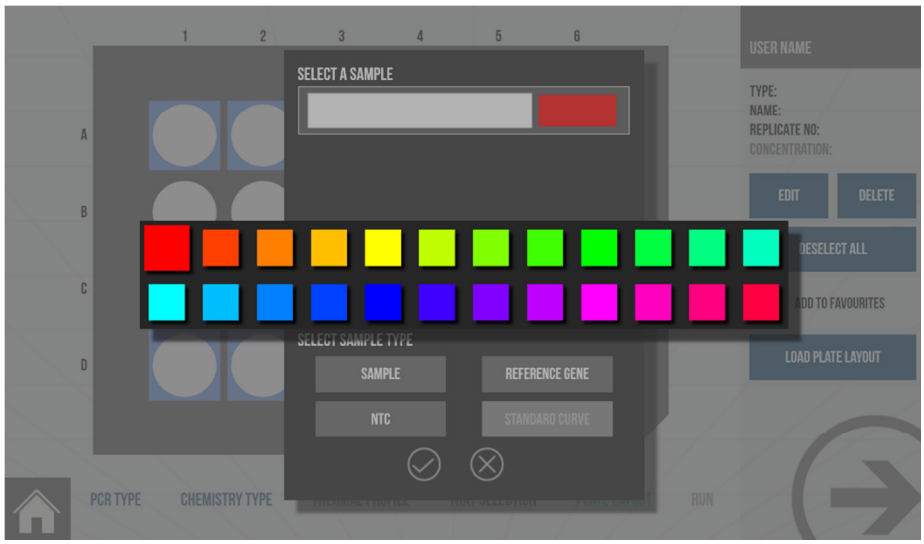
- In the screen that pops up the type of sample that is to be put in the selected wells can be chosen.

  - **SAMPLE** refers to the Sample to be tested.
  - **NTC** to a No Template Control sample.

- **REFERENCE GENE** a sample of known response for comparison.
- **STANDARD CURVE** where that process is being completed

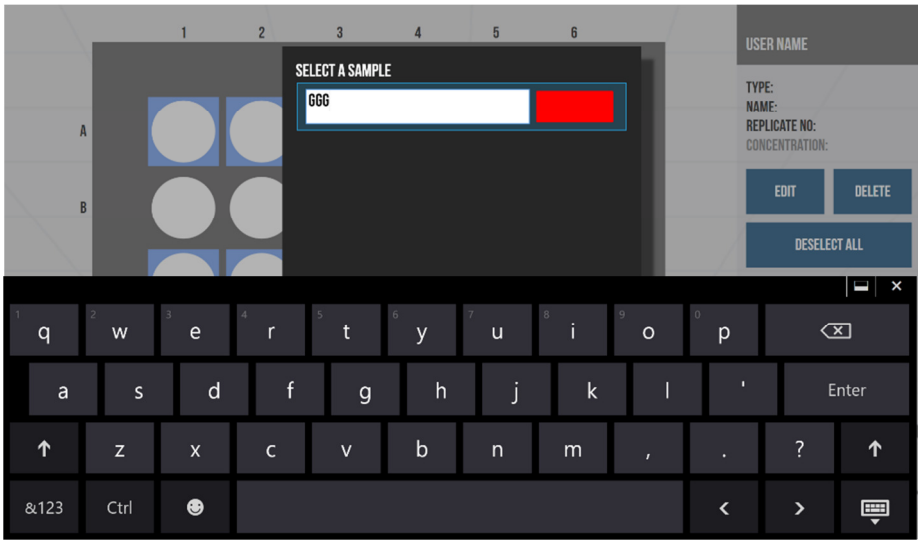
- The display colours can also be chosen for the various charts, **xxpress** suggests a colour, red as shown in the example in Figure 7b. To change the suggested colour touch the coloured rectangle and further pop-up screen will appear. Touching the desired colour select it. See Figure 7c.

Figure 7c



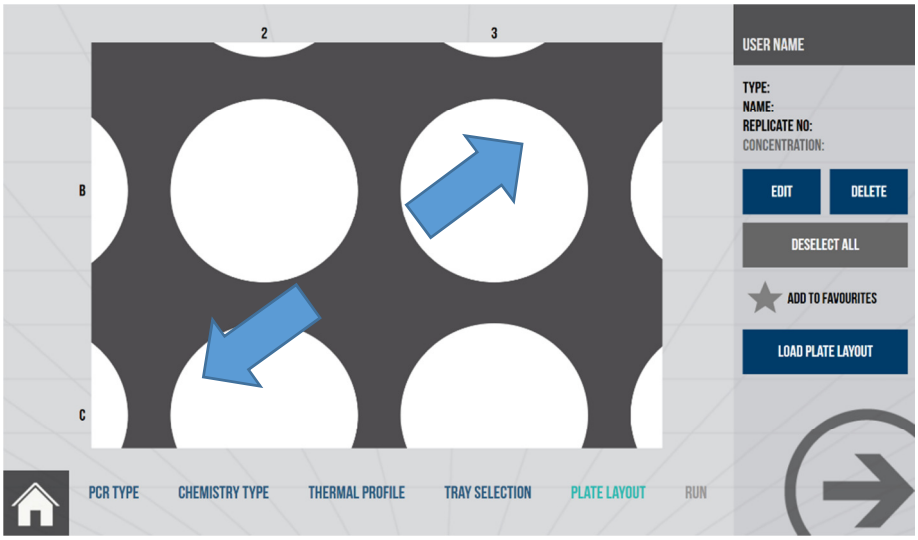
- The samples can also be individually named. Touching the white tile will bring up a touchscreen keyboard so each well or group of wells can be named. See Figure 7d.

Figure 7d



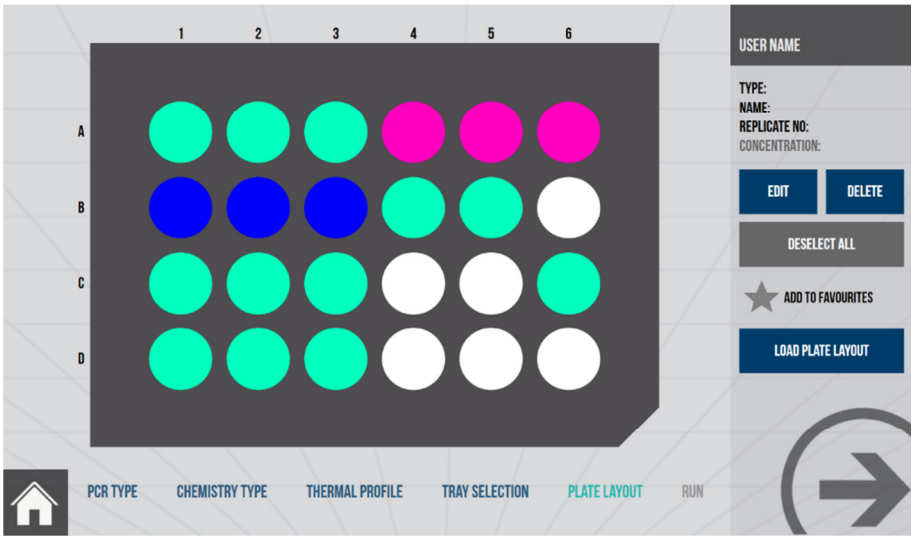
- Touch the ⊘ tick will accept the information and then the process can be repeated as necessary to label the rest of the plate.
- You can clear the well selection or even reset the plate completely using the tiles on the right.

Figure 7e



- To make selection of the wells easier on the 54 well and the 96 well plates then two fingered gestures can be used to zoom into the plate area and pan around it. Move fingers in the direction of the blue arrows in Figure 7e to zoom in, pinch together to zoom out and drag a finger across the screen to pan. These movements also work on the chart screens.
- The cell references on the edge of the window ensure that it is always clear which wells are being viewed.

Figure 7f



- Once all the information is entered as shown in Figure 7f, touch again the forward arrow at the bottom right of the screen to move to the review screen.

Figure 8

- Figure 8 shows the confirmation screen that gives the user the opportunity to review their experiment prior to running it. If anything needs editing then touching the blue navigation bar on the bottom will take the user back to the earlier screens so they can be edited or checked as required.

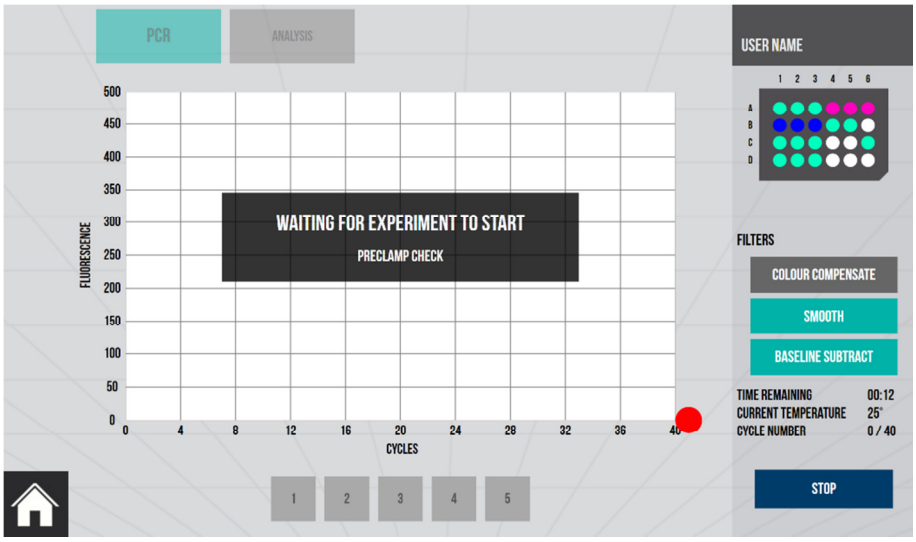
- Once the user is happy that the experiment is correctly defined then they can add the prepared test plate (see Section 7.2.4) with the test samples in. To do this touch the Front Door Release Button (See table 2) to open the units loading door.

- Place the prepared **xxplate** onto the slides ensuring that it correctly located so the slides engage into all three holes on either side of the **xxplate**.

- When correctly located close the door by pushing on the front of it until it latches shut.

- Touch the forward arrow on the bottom right of the screen to start the experiment.

Figure 9



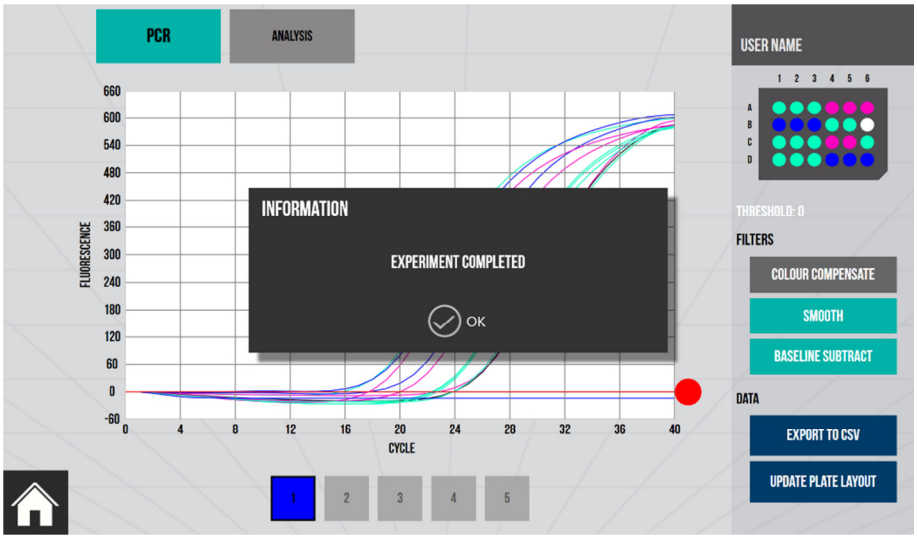
- Once the experiment is initiated **xxpress** performs a number of checks on the plate and initialises it systems. There will then be a short whirring sound as it clamps the plate into the unit before it starts the heat cycling.

- Once the measurement cycles are running the results will appear on the chart, the chart can be zoomed by gestures as described earlier. The chart data can also be adjusted selecting the filters on the right, touch the tiles to toggle these filters on and off.

    - **BASELINE SUBTRACT** uses the early readings to set the initial level of the trace at zero to make it easier to compare multiple traces.
    - **SMOOTH** creates a best fit curve to the data which helps in comparing the results.
    - **COLOUR COMPENSATION** is used for multiplex assays and reduces the effects of cross-talk from adjacent channels. It is not required for a single channel experiment. (See notes on Colour Compensation)

- Once all the cycles are complete **xxpress** will display a measure confirming that the experiment is complete, see Figure 9a. Touch the tick to accept this, the results are saved automatically and can now be analysed or export (see Section 7.2.5).

Figure 9a



7.2.3 Designing a New Melt-Curve Experiment

- Creating a Melt-Curve Experiment is very similar to creating the PCR Experiment. Select **MELT** from the PCR menu.

Figure 10

- Touch the arrow at the bottom right corner to advance to the Chemistry screen.

Figure 11

- The Chemistry screen is simpler as just the signalling type needs to be defined to allow **xxpress** to set the sensitivity of the camera.
- Advance to the Thermal Profile screen using the arrow as before.

Figure 12

- In the Thermal Profile screen the cycle will show the range of the melt and the user can adjust that and the number of measurements taken per degree.

Figure 12a

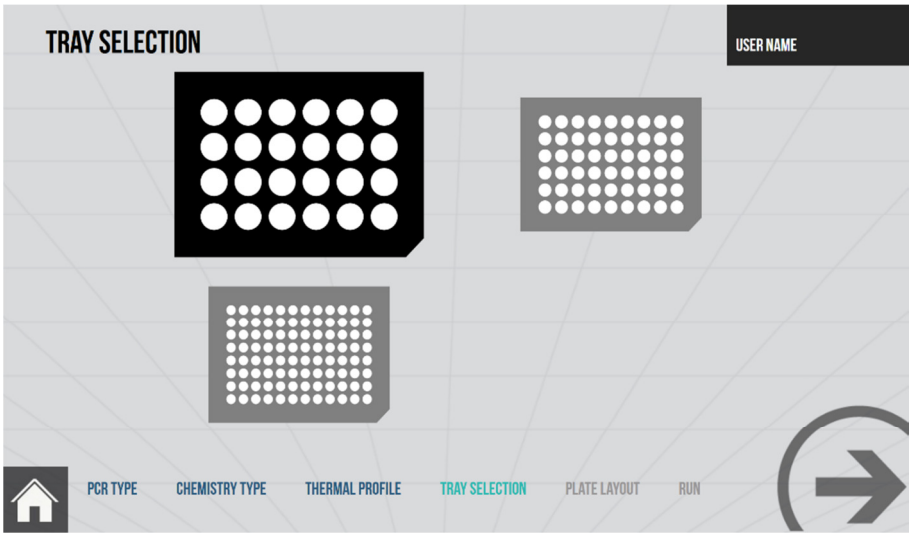
- The example in Figure 12 above shows a Melt that will start at 40°C after a dwell of 5 seconds at 40°C. It will then rise to 95°C taking 1 measurement per degree.

- The more measurements per degree greater the resolution on the melt temperatures and the longer the experiment will take.

- Advance to the Tray Selection screen using the arrow as before.

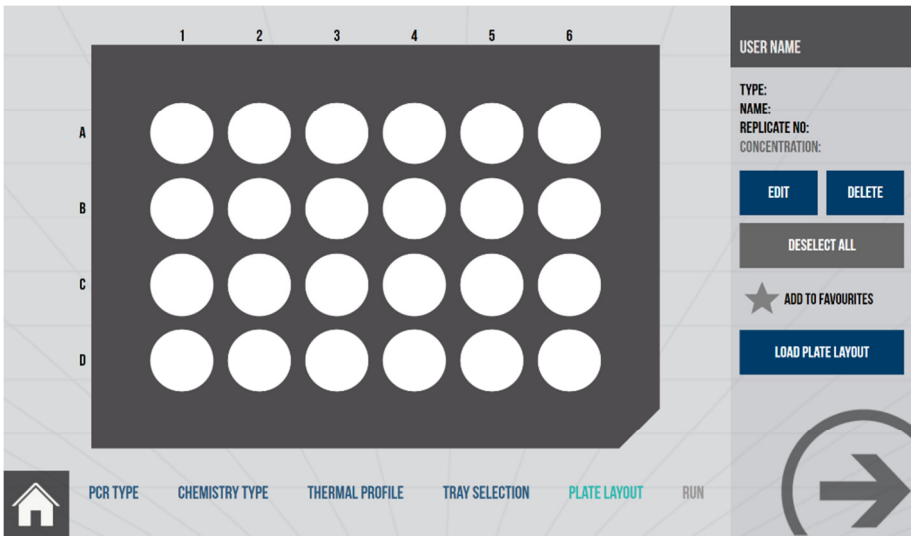
- Select the type of **xxplate** to be used, see Figure 13

Figure 13



- Advance to the Plate Layout screen using the arrow as before

Figure 14



- The plate layout can be created as shown earlier or it can be recalled from the memory. Touch the tile **LOAD PLATE LAYOUT** to select a previously created plate layout.

- Touch the desired layout and then accept the selection by touching the ⊘ tick.

Figure 14a

- Advance to the Confirm and Run screen using the arrow as before.

Figure 14b

- Figure 14b shows the confirmation screen that gives the user the opportunity to review their experiment prior to running it. If anything needs editing then touching the blue navigation bar on the bottom will take the user back to the earlier screens so they can be edited or checked as required.

- Once the user is happy that the experiment is correctly defined then they can add the prepared test plate (see Section 7.2.4) with the test samples in. To do this touch the Front Door Release Button (See table 2) to open the units loading door.

- Place the prepared **xxplate** onto the slides ensuring that it correctly located so the slides engage into all three holes on either side of the **xxplate**.

- When correctly located close the door by pushing on the front of it until it latches shut.

- Touch the forward arrow on the bottom right of the screen to start the experiment.

- There are many other types of experiments that can be created on the **xxpress** unit, however they all follow the same format and at each stage all the parameters are available to edit.

7.2.4 Running the Experiment

- Before running an experiment the sample **xxplate** needs to be prepared. All **xxplates** required to have a heat sealed film applied to them to seal the contents and prevent evaporation during the experiment. Details of how to seal the **xxplates** can be found in the **xxsealer** manual.

- **NEVER PUT A XXPLATE IN THE XXPRESS SYSTEM WITHOUT IT BEING HEAT SEALED. Only heat seal the xxplates with the recommended heat sealing film**.

- **NEVER PUT A LABEL ON THE BOTTOM OF THE XXPLATE. Keep the bottom "black" surface of the xxplate clean and never obstruct it by sticking a label on it as the unit measures the temperature of the samples using the radiation emitted from this surface.**

- To place the prepared and sealed **xxplate** into the **xxpress** system touch the Front Door Release Button (See table 2) to open the units loading door.

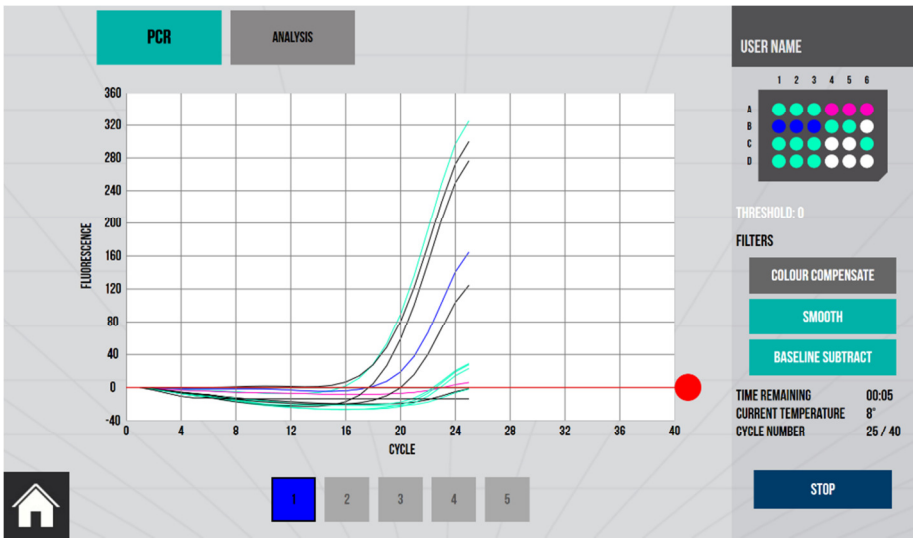
Figure 15

- Place the **xxplate** onto the slides ensuring that it correctly located so that the slides engage into all three holes on either side of the **xxplate**, see Figure 15.

- When correctly located close the door by pushing on the front of it until it latches shut.
- Once the experiment has been started by touching the forward arrow on the **RUN** screen then the **xxpress** system will run a number of checks on the plate. These are listed in an information window that pops up in the middle of the display. These include the recognition of the plate to make sure it is the right type and positioned correctly in the unit. The recognition of the plate also enables accurate fluorescence measurement.

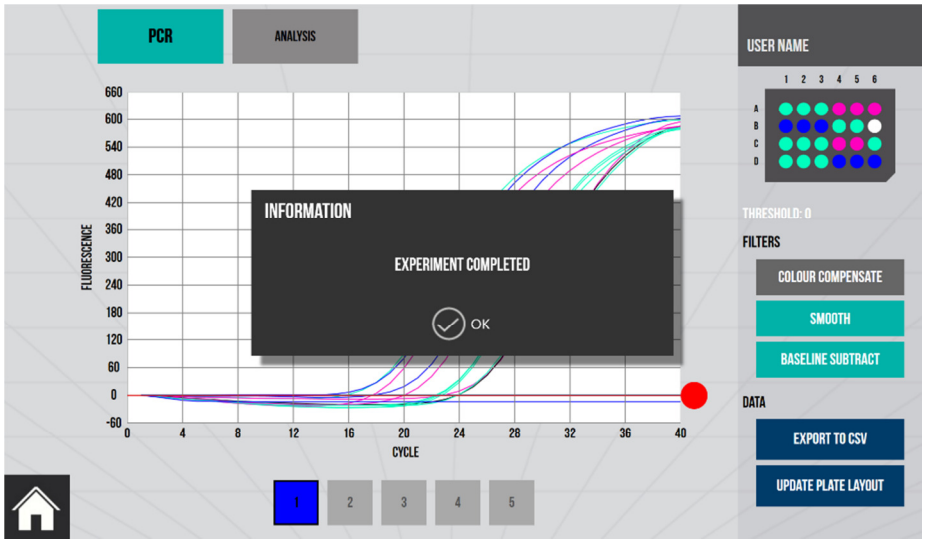
- The unit also clamps the plate in situ so that it can control the heating and cooling precisely. The clamping of the plate can be recognised by the whirring of the motors that drive the clamps. Once all the checks are done the experiment will start and a results screen will be presented. Figure 16 shows the early stages of a run, the display graph shows the level of fluorescence against the cycle count.

Figure 16



- During the operation it is normal for the unit to issue a short hum from the cooling compressors every cycle as they are used to cool the plate
- Once the experiment is complete the clamps will release and an information window will pop up to confirm this.

Figure 16a



7.2.5 Experiment Results and Analysis

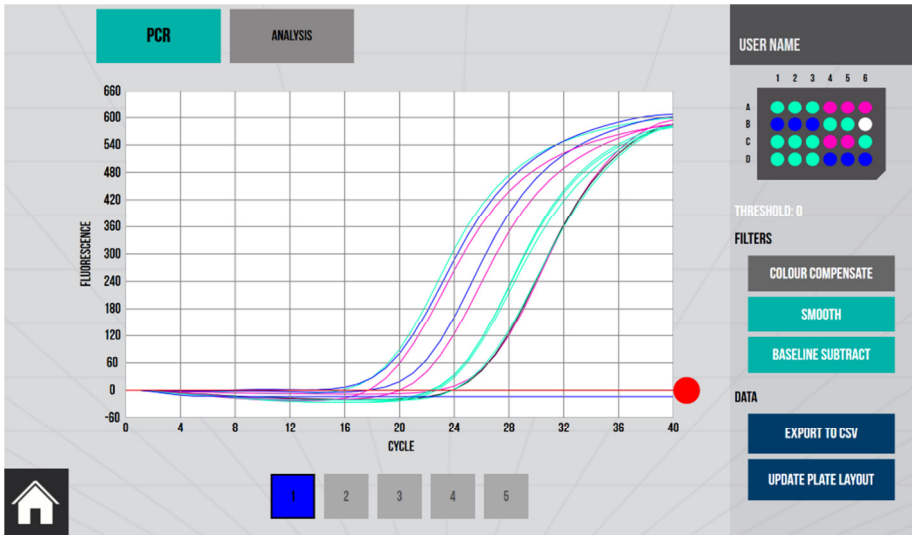
- At the end of an experiment the results are displayed as shown in Figure 17. Depending on the type of experiment different parameters are shown. For a PCR run the Ct is calculated whereas for a MELT it will be Tm.

- The results graph has a number of options for displaying the results. The curves can be smoothed or just show the raw data. Similarly the data can be shown with the background fluorescence removed (**BASELINE SUBTRACT**) or not. Touch the tiles on the right to toggle these filters on and off.

- The **PCR** or **MELT** and **ANALYSIS** tab tiles on the top left of the screen change the view from the graph to a results template.

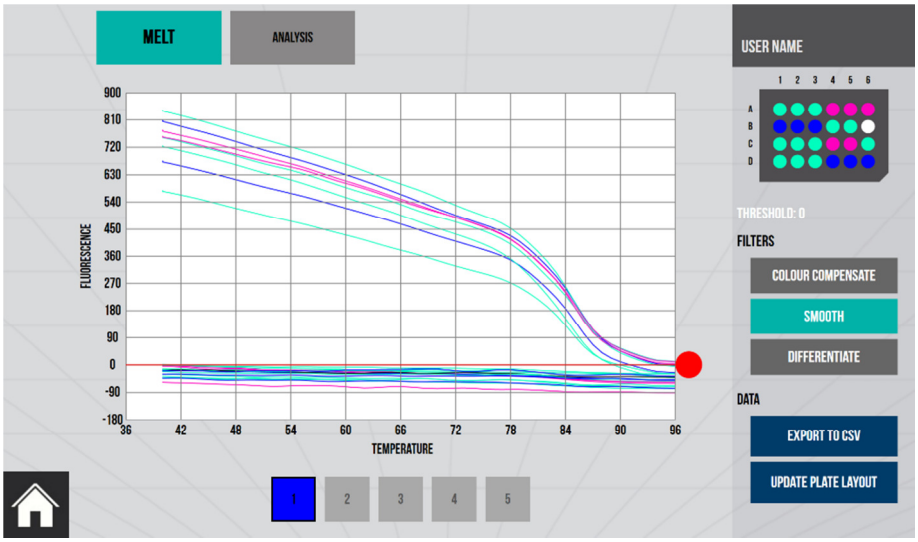
- There is a manual adjustment that can be used to adjust the Ct threshold value by eye. Touch the red circle and slide it up and down to adjust the threshold, the value is shown in the menu bar on the right of the screen.

Figure 17



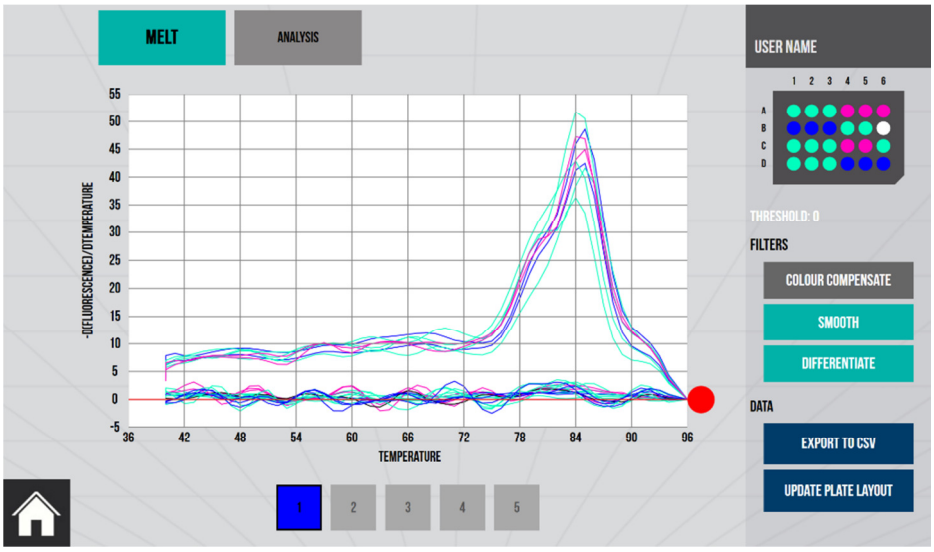
- When looking at a Melt there is the option of looking at the differential of the curve which helps identify the Tm more easily. Figure 17a shows an example of a Melt in it standard form.

Figure 17a



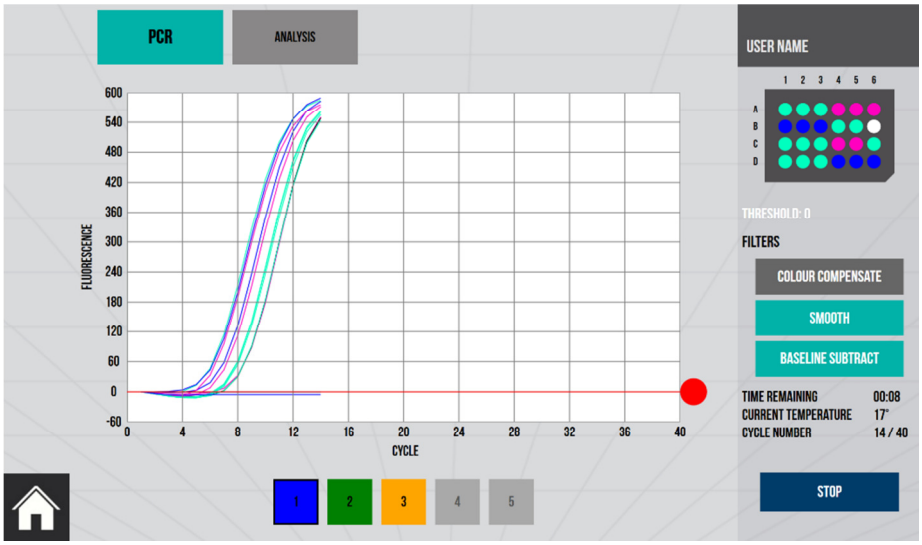
- Touching the **DIFFERENTIATE** tile on the right will give a display like the one shown in Figure 17b.

Figure 17b



- Results can be export in a CSV format so they can be analysed in other ways as required. Select the blue **EXPORT TO CSV** tile to do this. Note, if the smoothing filter or background filter is active when the data is exported the values will include this filtering.

Figure 17c



- For Multiplex experiments where data is gathered on more than one fluorescence channel then this data can be viewed using the coloured channel tiles at the bottom of the screen, see Figure 17c.
- Where there may be cross talk between adjacent fluorescence channels touching the **COLOUR COMPENSATE** filter tile activate the filter and will enhance the results.

8 Maintenance and Servicing

Although the **xxpress** unit does not require any scheduled maintenance or servicing, the operator should regularly clean and inspect the unit for any detects, as described in Section 8.2 below.

DANGER

WARNING

Please observe and comply with all of the **Unit Maintenance and Serviceability** precautions listed in Section 8.

Never removed the unit casework. There are no user or operator serviceable parts inside the unit.

Always switch off and unplug the unit before performing any cleaning or disinfecting tasks.

For technical and service related enquiries, please contact your distributor or BJS Bio at the address given on Page 2 of this manual.

8.1 Replacing the Unit Fuse

The unit fuse should only be replaced by a suitably qualified technician.

DANGER

The unit fuse will only blow as a result of an internal unit fault or if the voltage selector switch has been incorrectly set (see Section 5). This fuse should only be changed after the unit has been thoroughly inspected, and must be replaced with the exact type specified in Section 4.

Thoroughly inspect the unit for any signs of damage, loose components or liquid spillage or ingress. If in doubt, please contact BJS Bio on the number given on Page 2 of this manual.

DANGER

The fuse holder is removed by disconnecting the mains cord and then using a small flat bladed screwdriver to carefully pull open the fuse holder, see Figure 18 and remove the old fuse.

After replacing the fuse with the corrected rated one for the operating voltage being used (Section 4), push the fuse holder firmly back into the inlet module.

The unit must be electrically safety tested for excess leakage current before being repowered from the mains supply.

Figure 18

1. Remove the AC plug from the power inlet module
2. Use a small flat bladed screwdriver to carefully pull out the fuse holder
3. Fit the correct fuse in the far position only
4. Push the holder back into the inlet mode

8.2 Routine Cleaning and Inspection

The unit casework should be cleaned and inspected at regulator internals, and whenever contamination or spillage occurs, as follows:

1. Switch off the unit and disconnect the power before performing any inspection checks or cleaning.
2. Before cleaning, always inspect the unit casework, heater plate and moving parts for any signs of wear, damage, cracks or other defects.
3. Clean the casework using a damp cloth soaked with a disinfectant solution (such as Virkon), whilst wearing suitable PPE.
4. Remove any debris or fluff from around or between the moving parts of the door mechanism and sliding plate carrier.
5. Clean the display and buttons, taking care to avoid over wetting.
6. Check that the ventilation holes underneath and on the rear of the unit are clear of dust and fluff build-up. Replace the air filter as necessary

DANGER

After cleaning, ensure that the unit is thoroughly dry, especially around the mains power inlet, before reconnecting the power cord and switching the unit on.

8.3 Decontamination Procedure

The unit and accessories should be decontaminated using the following procedure before being stored or transported.

Decontamination Procedure

Thoroughly clean all outside surfaces of the product (including any accessories, power cords, manuals, packaging, etc) with a damp cloth soaked with suitable disinfectant solution (such as Virkon).

8.4 Transportation and Storage

The **xxpress** unit and its accessories should be thoroughly decontaminated using the procedure detailed in Section 8.3 before being placed in its original packaging for transportation or storage.

WARNING

Refer to Section 4 for the acceptable range of Storage and Transportation environmental conditions.

Always ensure that the unit and accessories are completely dry and free of any condensation before being packed.

Certificate of Decontamination

We respect the health and safety of our clients and employees, and request that any products or accessories being returned are decontaminated in accordance with the procedure below.

1. Decontamination Procedure

Thoroughly clean all outside surfaces of the product (including any accessories, power cords, manuals, packaging, etc) with a damp cloth soaked with suitable disinfectant solution (such as Virkon).

Allow to dry fully before packing.

2. Decontamination Declaration

Company Name: _____

Address: _____

Product Code: XP-1002-01-1

Serial Number: _____

Reason For Return: _____

Where Product Used: _____

Please tick the appropriate option(s) below:

☐ I certify that I have decontaminated the product as per the above procedure.

Decontaminant Used: _____

☐ I certify that the product has not been exposed to any chemical or biological materials.

Title: _____ Name: _____

Signature: _____ Date: _____

Telephone: _____ Email: _____

9 Warranty and Returns

BJS Biotechnologies Ltd. warrants the **xxpress** product, when purchased new and installed and operated in accordance with the instructions of this manual, to be free from defects in materials and workmanship, and will repair or replace, at their discretion, any unit or accessory which exhibits such defects.

In no event will BJS Biotechnologies be liable for any indirect, incidental or consequential damages resulting from any defect or warranty claim.

NOTE

Unspecified use or unauthorised modification of any part of the **xxpress** unit or its accessories or the use or attachment of any adaptor or peripheral not supplied, specified or sanctioned by BJS Biotechnologies will invalidate this warranty.

This warranty is provided to the original purchaser of the product for one year from the date of purchase.

Under the terms of this warranty, the product must be returned in its original packaging, transportation prepaid by the sender, with a copy of the Proof of Purchase and a detailed description of the problem.

WARNING

The product must be decontaminated using the procedure detailed in Section 8.3 and a Certificate of Decontamination supplied with any return. If the product is considered too hazardous to be shipped, please contact BJS Biotechnologies on the number given on Page 2 of this manual for further instructions.

Please contact your distributor (or BJS Biotechnologies on the number given on Page 2 of this manual) to assess the defect and arrange the return the product if necessary.

10 Product Disposal

At end-of-life, this product must be disposed of in accordance with your local authority regulations for the disposal of potentially hazardous waste and electronic equipment.

The unit and its accessories should be decontaminated using the procedure detailed in Section 8.3 before disposal or shipping.

Do not dispose of this product into unsorted municipal waste or public landfill.

Please contact your distributor (or BJS Biotechnologies at the address on Page 2 of this manual) for details of how to correctly dispose of this product.