

SENSOQUEST

Biomedical Electronics



History SensoQuest

- Biotron GmbH was founded in 1985 by Jörg Schrader, now CEO of SensoQuest
- The main business was:
Production of thermocyclers for Biometra
- 1993 Whatman bought Biometra
- 1997 Whatman-Biometra bought Biotron
- 2001 – 05 Development of Labcycler
- 2005: Foundation of **SensoQuest GmbH**



Conception of the Labcycler

- Long life
- High quality
- Modern and solid design
- Easy handling
- Touchscreen
- High speed
- Low energy consumption
- Low noise in the laboratory
- Universal block-changing

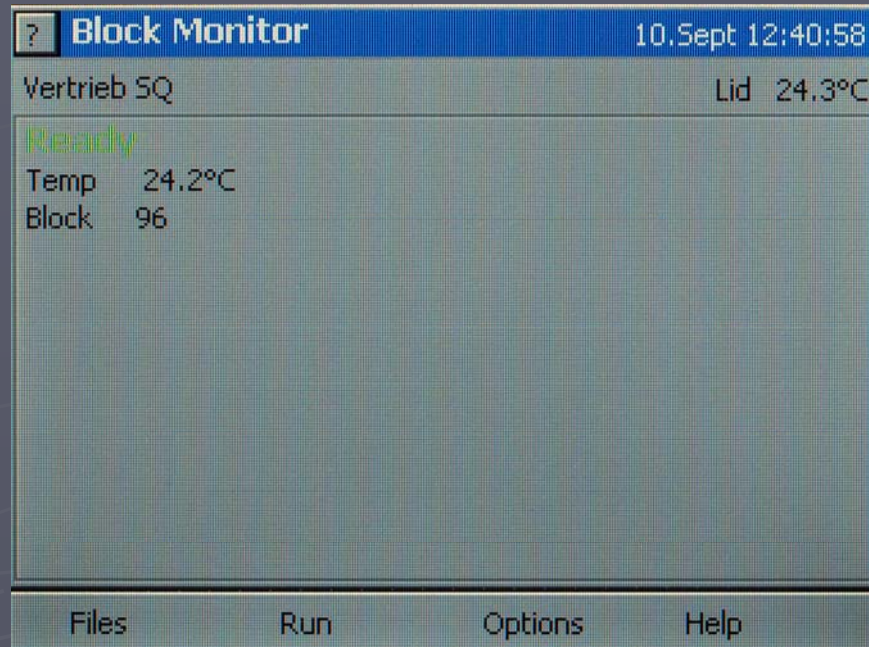
High Quality, Long Life, Modern & Solid Design

- Materials: Gold, Silver, Copper & Aluminium
- Aluminium front plate, gold coated silver blocks, copper lids
- 6 separately controlled peltier elements of the newest generation
- Blocks with self calibration temperature measuring
- Therefore a tube thermistor is not necessary for calibrating
- Life Time: More then 600,000 cycles are tested
- 20 years life time in a standard laboratory

Display & Keyboard

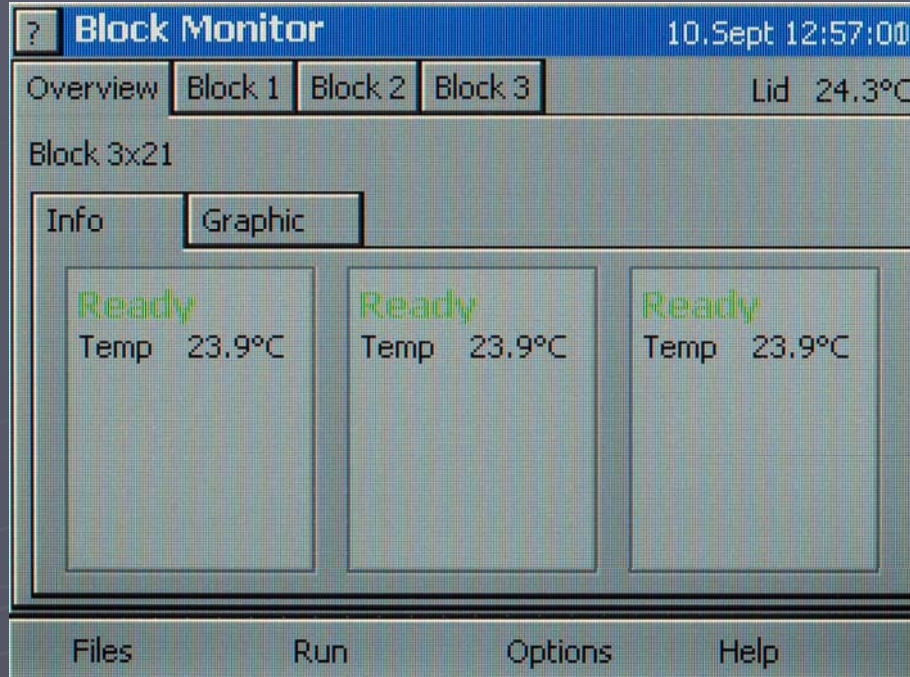
- A modern Touchscreen
- TFT ¼ VGA illuminated colour
- 76,800 pixel, 5.7" diagonal
- Finger tapping or Touch pen tapping
- Languages English and German
- Alphanumeric function keys
- Easy to use software with selfexplaining icons
- Context-sensitive help function
- Graphic monitoring of PCR process

Display & Keyboard



Start window Thermoblock 96

Display & Keyboard



Start window Triple Block 3 x 21 [0.2 ml tubes]

Automatic Lid

- Heated lid
- Fully programmable with the touch screen
- Controlled by an electric motor
- Power 200 Watt
- Fast: Heating rate 1°C/s
- Lid can be deactivated
- Preheating can be deactivated
- Pressure 30 to 120 Newton (N)
- E.g.: 30-60 N for single tubes, 60 to 90 N for stripes, 90 to 120 N for microtiterplates
- Hotstart-procedure possible
- Pause: Manual and programmable

Automatic Lid



Unbolt handling key

Lid

Thermoblocks

- Thermoblock 48, 96, and 384
Electroformed gold plated silver
Thermal conductivity 429 W/mK
Heating rate 4.2 ° C/s, cooling rate 3.6 ° C/s
- Control accuracy ± 0.01 ° C
- 6 separately controlled peltier elements of the newest generation
- Temperature – 5 ° C to 99 ° C
- Blocks with self calibration temperature measuring
-
- Uniformity ± 0.25 ° C at 55 ° C, ± 0.4 ° C at 95 ° C
- Ramp rate 0.001 °C/s to 5.0 °C/s
- De(In)crements: Temperature ± 9.99 ° C
Time ± 99.99 seconds

Thermoblock 48



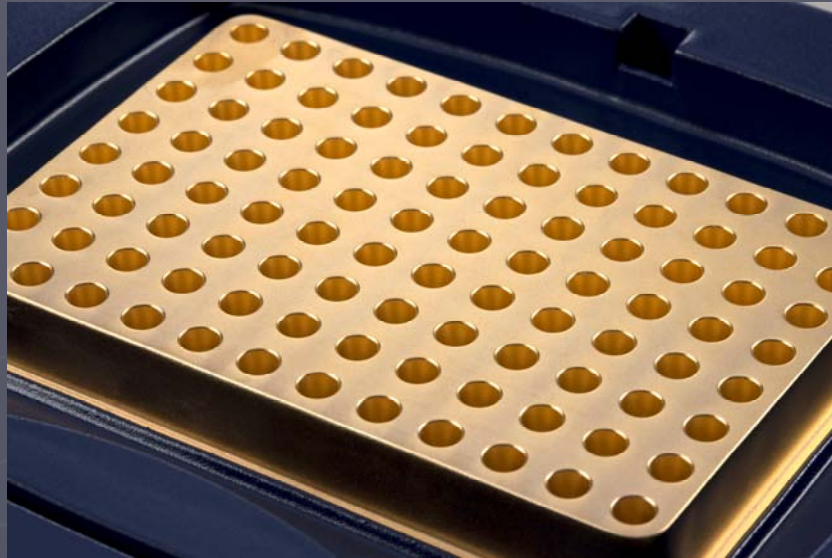
48 Wells, 8 zone gradient, 0.5 ml tubes

Thermoblock 96



96 Wells, 12 zone gradient, 0.2 ml tubes or microtiterplates

Thermoblock 96



Detail picture of the electroformed gold plated silver

Thermoblock 384



384 Wells, 24 zone gradient, microtiterplates
The unique 384 well silver block

Triple Block 3 x 21

- Material: Anodised aluminium
- Thermal conductivity 209 W/mK
- Heating rate 2.5 ° C/s, cooling rate 2.2 ° C/s
- 3 independent PCR runs
- 3 x 21 wells for 0.2 ml tubes
- Minimum volume 10 µl
- Protection against condensation by 3 passive lids
- Seperate and parallel monitoring of all blocks

Triple Block 3 x 21



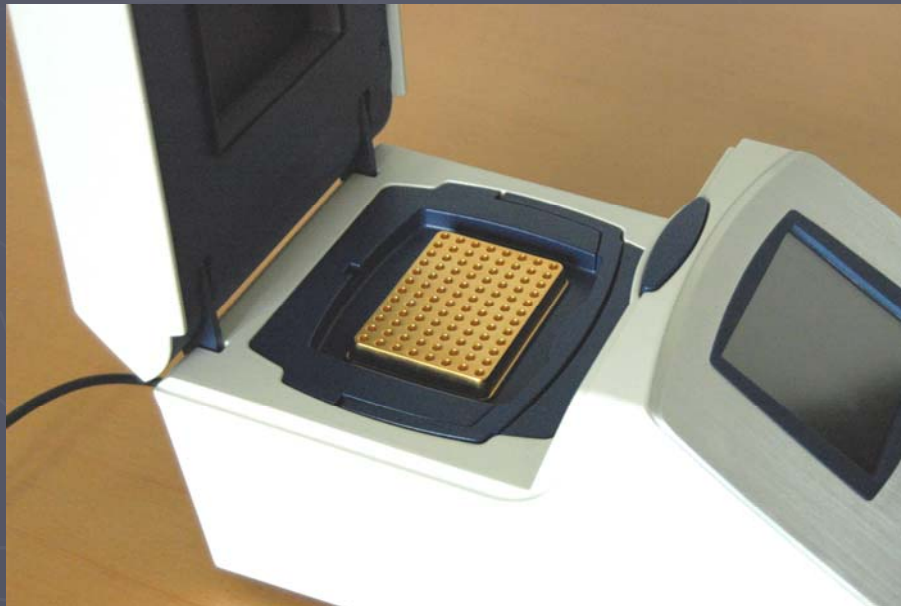
Without passive lids

Triple Block 3 x 21



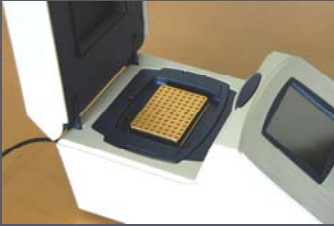
With one passive lid

Quick Block Changing System



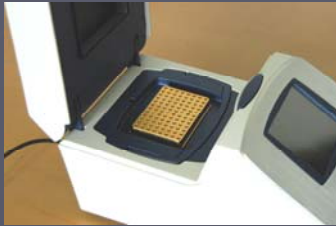
Picture 1

Quick Block Changing System



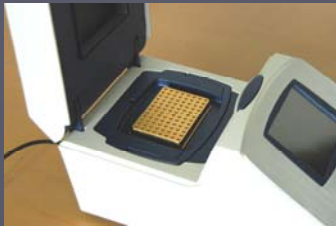
Picture 2

Quick Block Changing System



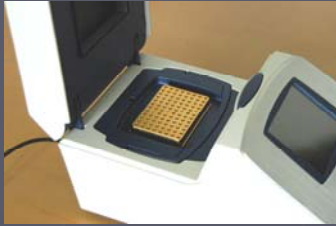
Picture 3

Quick Block Changing System



Picture 4

Quick Block Changing System

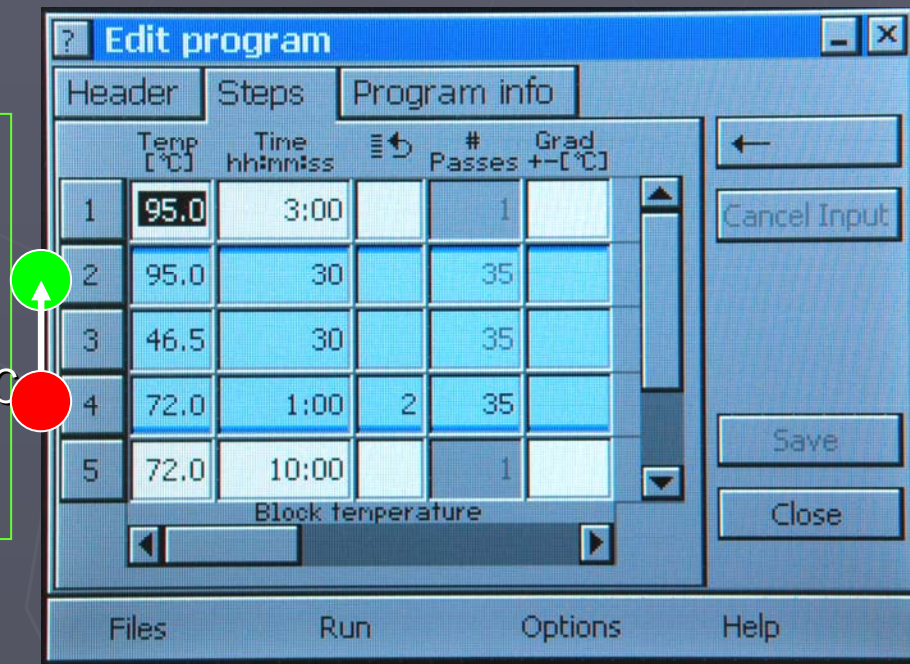


Picture 5

Auto Re-Start Function

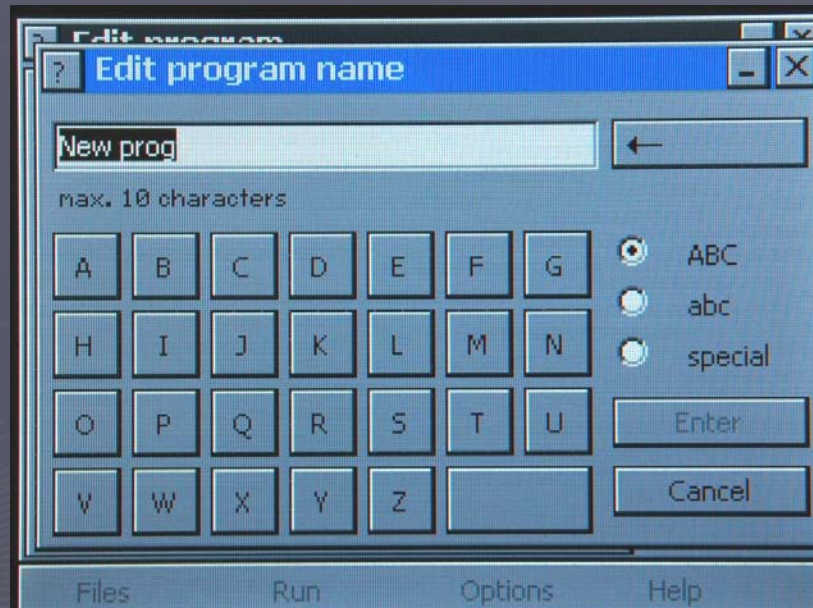
- Line Voltage 85 V to 265 without switching, 50 to 60 Hz

Black Out during elongation cycle step 72° C, automatic Re-Start at the last denaturation step 95° C to inhibit unspecific annealing



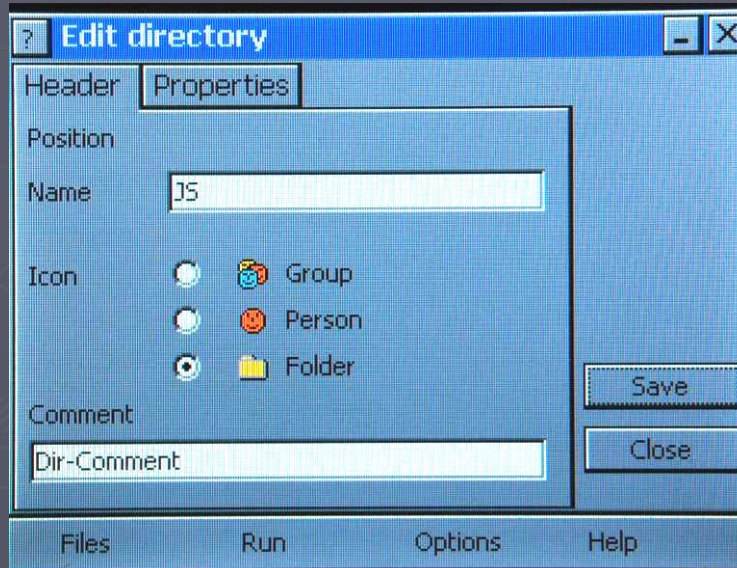
- Restart at the last denaturing cycle inhibit unspecific products

User interface



- Alphanumeric and function keys in the touchscreen
- Special characters at special
- Figures at special and numeric silicone keys

Programm Administration



- More than 680 programmes
- Classification in folder, person, and group, up to 4 levels

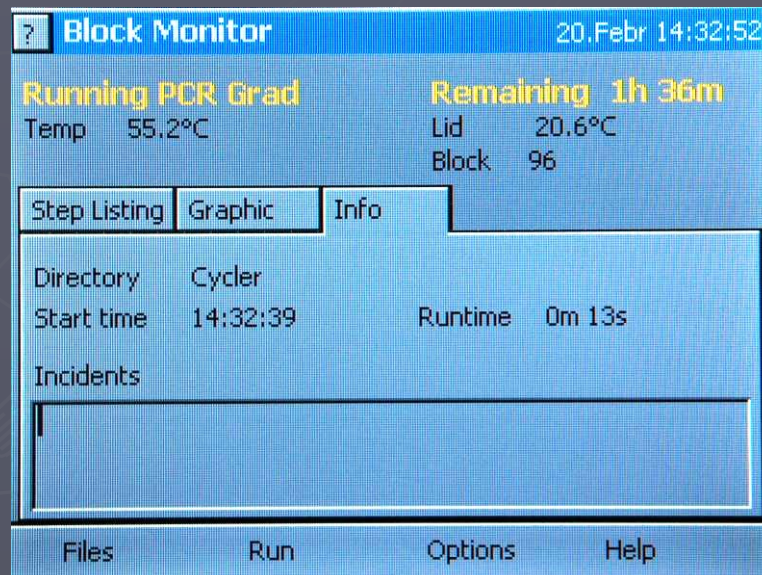
Programm Administration

- Copy function via copy and paste
- **Intersystem copy function** between two devices also via copy and paste



- Interfaces: 2*RS232 for software-updates
- Software updates are free and always compatible with old devices

Programme INFO

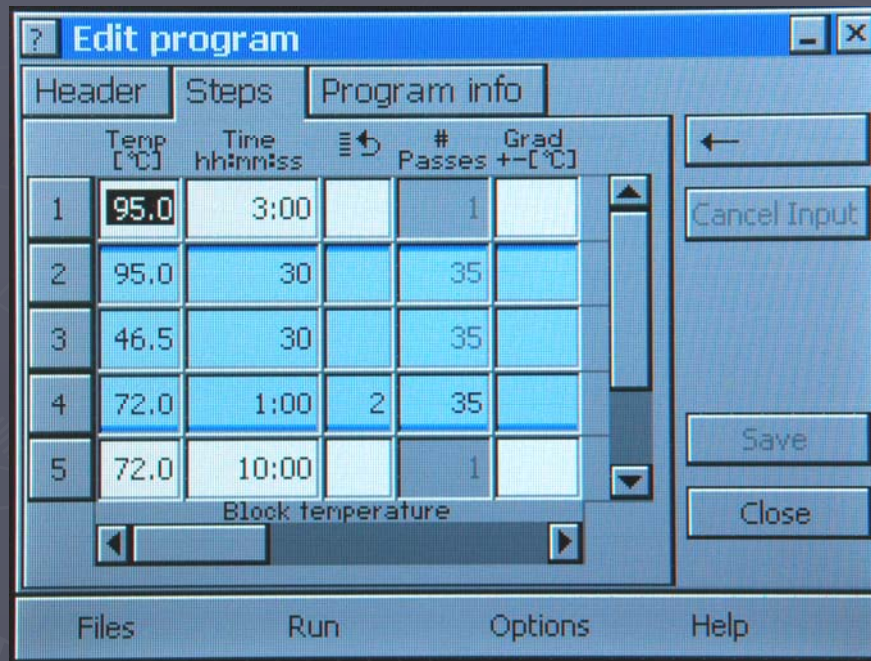


- Runtime
- Display of the remaining runtime of the active process (PCR)

Standard PCR

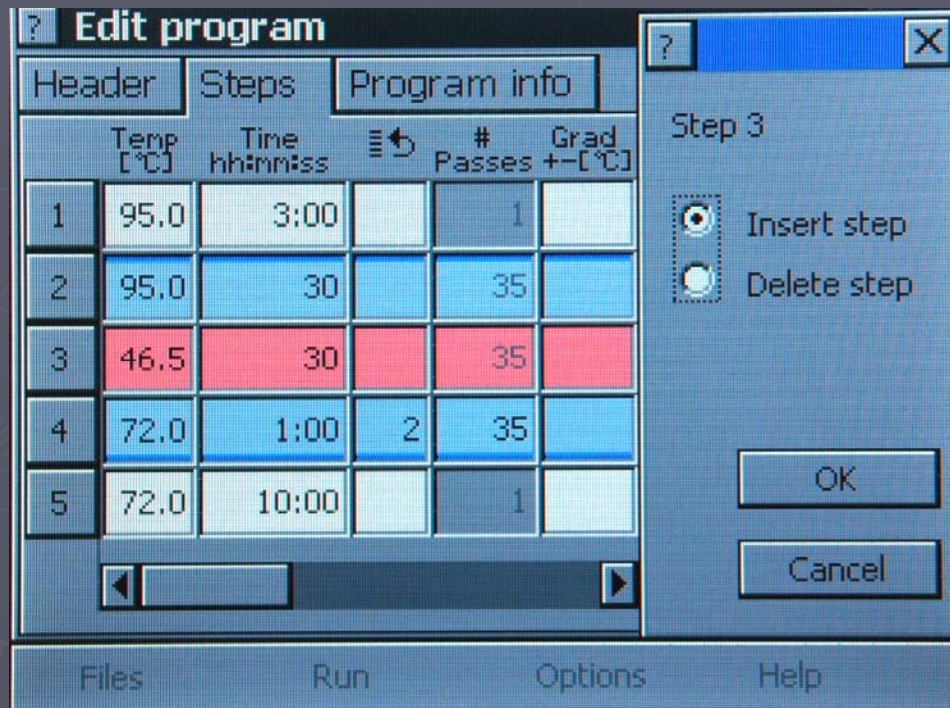
1. Initial Denaturing Step
 - 1-5 min, 95-98° C
2. Denaturing Step
 - 0.5-2 min, 94-95° C
3. Primer Annealing Step
 - 0.5-2 min, 5° C lower than melting temperature (e.g. 58° C)
4. Extension Step
 - 1 min for each 1000 bp using Taq-polymerase, 70-75° C
5. Number of Cycles
 - 25-35 (max. 40)
6. Final Extension Step
 - 5-15 min, 72° C
7. Storage after PCR
 - Endless (∞), 4-8° C

PCR Programm at the Screen



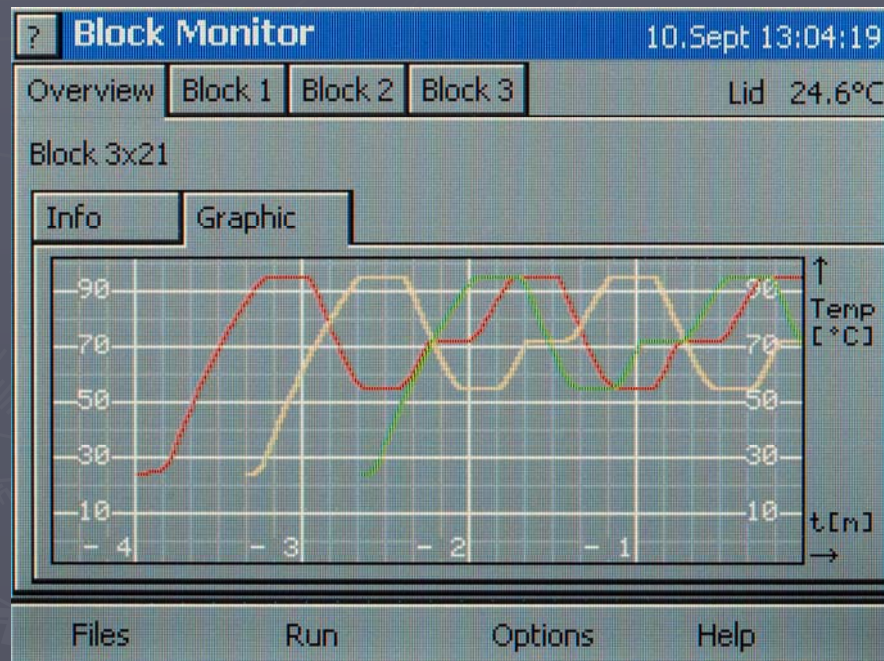
- TFT-Picture: Standard Programme
- The cycle is marked in blue

Insert a Step



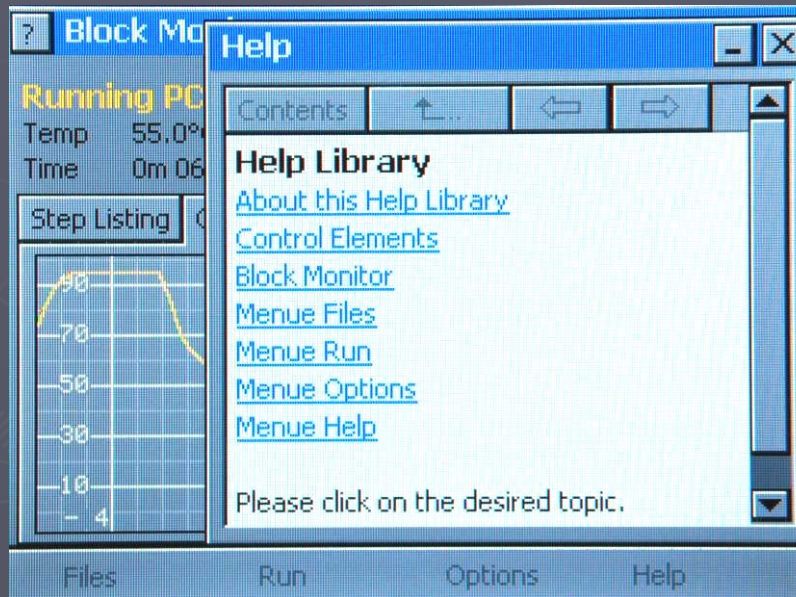
- The new step is marked in red
- Tapping on the numbers here 1-5

Online Observation



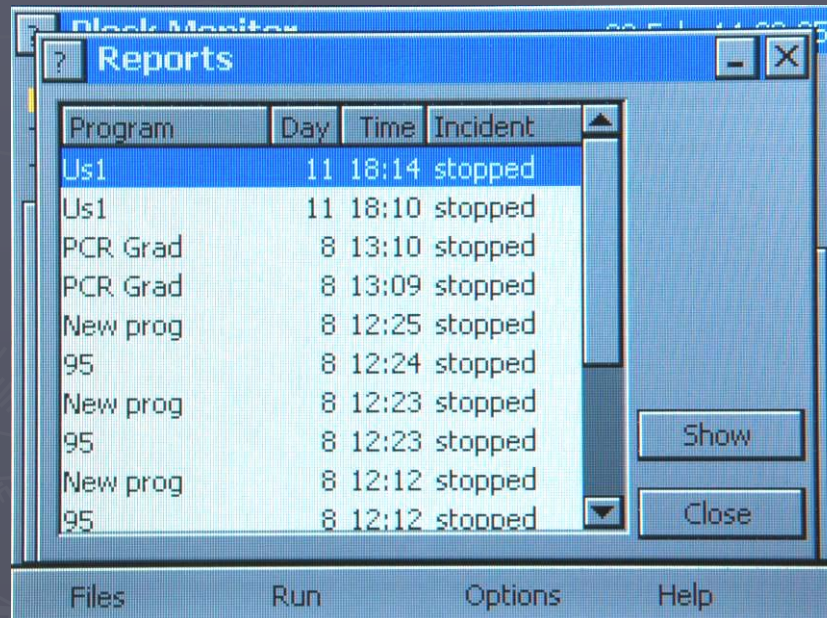
- Graphical online monitoring of 3 different PCR in the Triple Block
- Red is the block left, yellow the middle block, and green the right one

Help Function



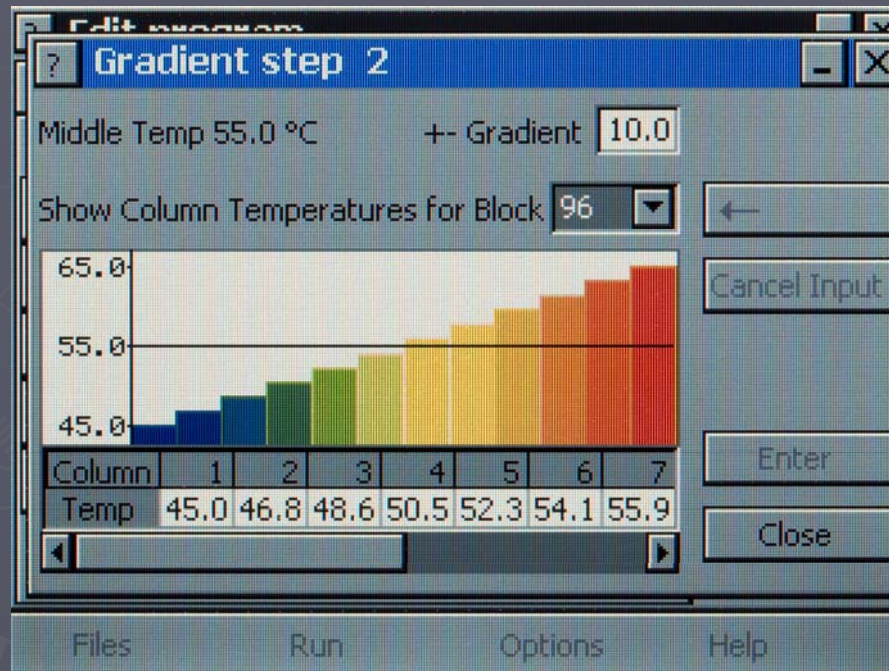
- Also during the process
- Help library
- The same information that is written in the manual

Reports



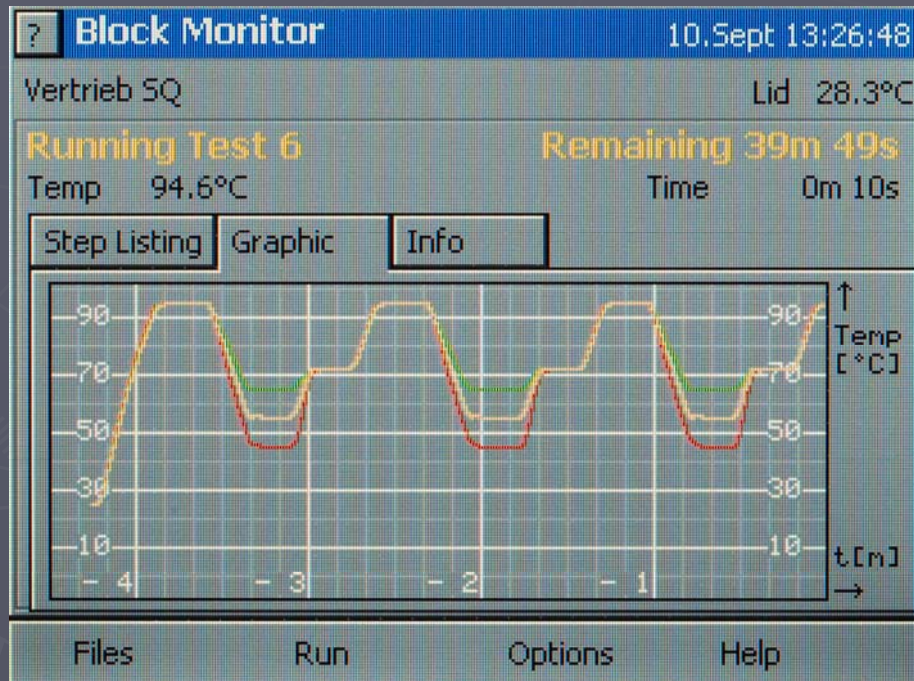
- The last 16 programme runs can be displayed any time !

Gradient Function



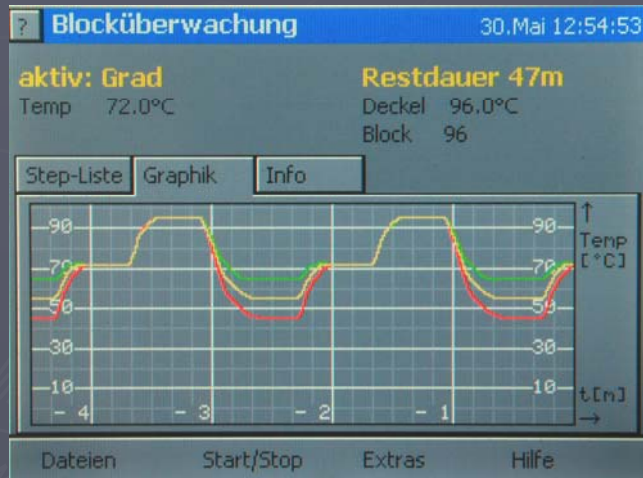
- 40 ° C, ± 20 °C between the blocks from left to right
- Thermoblock 48: 8 zones, -96: 12 zones, 384: 24 zones

Gradient Function

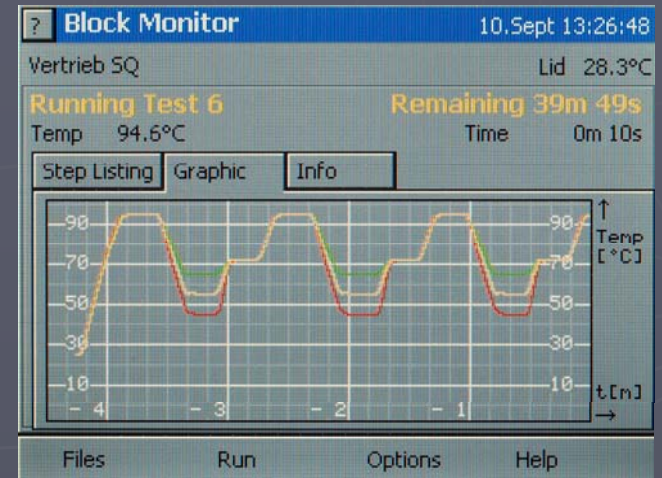


- 40 ° C, ± 20 °C between the blocks from left to right
- Thermoblock 48: 8 zones, -96: 12 zones, 384: 24 zones
- Green: Maximum temperatur, yellow: middle value, red: lowest value

Fast Control



- With deactivated fast control
- The ramping is smoother
- The PCR process is 15 % slower
- Interesting for PCR processes with slower ramping, e.g. multiplex PCR



- With activated fast control
- Standard adjustment

Thermal Conductivity

$$k = \frac{Q}{t} \times \frac{L}{A \times \Delta T}$$

- The flow of thermal energy through a substance from a higher-to a lower-temperature region.

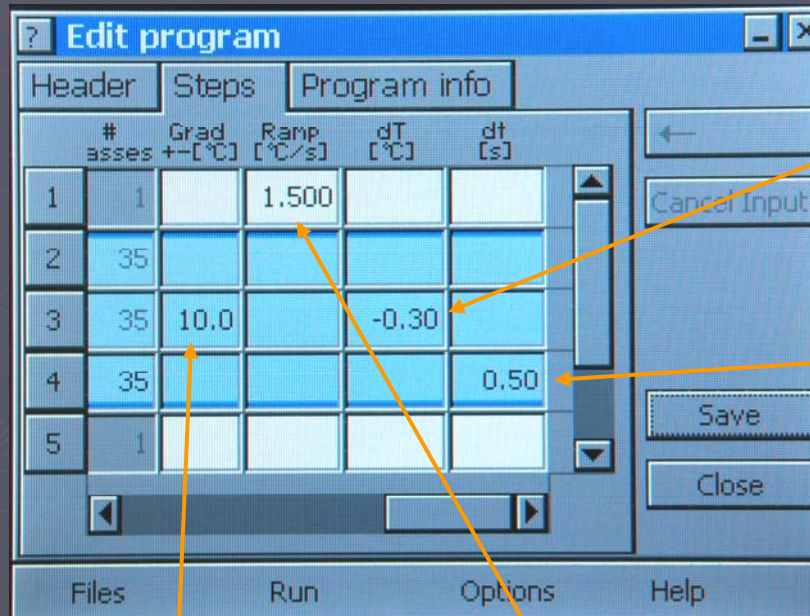
OR: Thermal conductivity = heat flow rate \times distance / (area \times temperature difference)



Important for Heating & Cooling Rate

Material	Thermal Conductivity
Diamond	2000 (W/mK)
Silver <i>SensoQuest Blocks</i>	429
Gold	318
Aluminium <i>Most Competitors Blocks</i>	205
Iron	80
Titanium	21
Plastics e.g. Tubes	1
Water e.g. PCR-Reaction	0.6

Edit Program



The 'Edit program' dialog box contains a table with the following data:

	# asses	Grad \pm [°C]	Ramp [°C/s]	dT [°C]	dt [s]
1	1		1.500		
2	35				
3	35	10.0		-0.30	
4	35				0.50
5	1				

Buttons: Cancel Input, Save, Close. Bottom menu: Files, Run, Options, Help.

Temperature
in(de)crements: -0.30°C
[$\pm 9.99^{\circ}\text{C}$]

Time
in(de)crements: 0.50 s
[$\pm 99.99\text{ s}$]

Ramping: 1.5°C/s [$0.001 - 5.0^{\circ}\text{C/s}$]

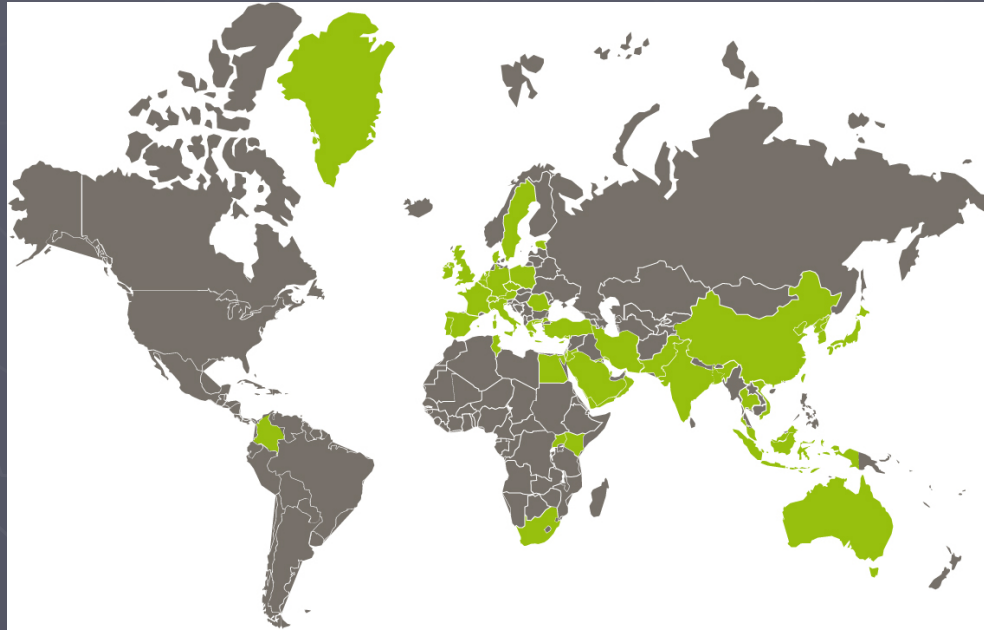
Gradient: 10°C [$\pm 20^{\circ}\text{C}$]

Temperature & Time In(de)crements

- Temperature Increments: -9.99°C to $+9.99^{\circ}\text{C}$ (dT [$^{\circ}\text{C}$]/Cycle)
- Time Increments: -99.99 sec to $+99.99$ sec (dt [s]/Cycle)
- For troubleshooting: E.g, nonspecific bands or poor amplification yield
 - 1) Annealing temperature is too low: raise the temperature in increments of 2°C /(No. of cycles)
 - 2) Denaturing conditions are too low: optimize the temperature in increments of 0.2°C
 - 3) Extension time too short: raise in increments of 1 min

SENSOQUEST

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- World wide distributor network: Focus Europe and Asia

www.sensoquest.com