

9. The apparatus of claim 1, wherein the processor is programmable to operate the at least one heat source.

10. The apparatus of claim 9, wherein the at least one heat source is a contact heat source selected from a resistive heater, a radiator, a fluidic heat exchanger and a Peltier device.

11. The apparatus of claim 10, wherein the contact heat source is configured at the receiving bay to be thermally coupled to a distinct location in a microfluidic cartridge received in the receiving bay, whereby the distinct location is selectively heated.

12. The apparatus of claim 11, wherein the distinct location has a surface area of between about 1 mm² and about 225 mm².

13. The apparatus of claim 11, wherein the distinct location has a surface area of between about 1 mm² and about 100 mm².

14. The apparatus of claim 13, further comprising at least one additional contact heat source, wherein the contact heat sources are each configured at the receiving bay to be independently thermally coupled to a different distinct location in a microfluidic cartridge received in the receiving bay, whereby the distinct locations are independently heated.

15. The apparatus of claim 12, wherein the contact heat source is configured to be in direct physical contact with a distinct location of a microfluidic cartridge received in the receiving bay.

16. The apparatus of claim 12, further comprising a compliant layer at the contact heat source configured to thermally couple the contact heat source with at least a portion of a microfluidic cartridge received in the receiving bay.

17. The apparatus of claim 16, wherein the compliant layer at the contact heat source has a thickness of between about 0.05 and about 2 millimeters and a Shore hardness of between about 25 and about 100.

18. The apparatus of claim 11, wherein at least one said heat source is a radiative heat source configured to direct heat to a distinct location of a microfluidic cartridge received in the receiving bay.

19. The apparatus of claim 1, further comprising a lid at the receiving bay, the lid being operable to at least partially exclude ambient light from the receiving bay.

20. The apparatus of claim 19, wherein the lid is a sliding lid.

21. The apparatus of claim 19, wherein the lid comprises the optical detector.

22. The apparatus of claim 19, wherein a major face of the lid at the optical bay varies from planarity by less than about 100 micrometers.

23. The apparatus of claim 19, wherein the lid is configured to be removable from the apparatus.

24. The apparatus of claim 19, wherein the lid comprises a latching member.

25. The apparatus of claim 1, further comprising at least one input device coupled to the processor, the input device being selected from the group consisting of a keyboard, a touch-sensitive surface, a microphone, a hard disk drive, an optical disk drive, a serial connection, a parallel connection, a wireless network connection, a wired network connection and a mouse.

26. The apparatus of claim 1, further comprising at least one sample identifier coupled to the processor, the sample identifier being selected from an optical character reader, a bar code reader and a radio frequency tag reader.

27. The apparatus of claim 26, wherein the sample identifier is a handheld bar code reader.

28. The apparatus of claim 1, further comprising at least one output coupled to the processor, the output being selected from a display, a printer, a speaker, a serial connection, a parallel connection, a wireless network connection and a wired network connection.

29. The apparatus of claim 1, further comprising a heating stage configured to be removable from the apparatus wherein at least one said heat source is located in the heating stage.

30. A method of carrying out PCR on a plurality of polynucleotide-containing samples, the method comprising:

introducing the plurality of samples in to a microfluidic cartridge, wherein the cartridge has a plurality of PCR reaction chambers configured to permit thermal cycling of the plurality of samples independently of one another; moving the plurality of samples into the respective plurality of PCR reaction chambers; and amplifying polynucleotides contained with the plurality of samples, by application of successive heating and cooling cycles to the PCR reaction chambers.

* * * * *