C L A I M S

1. A storage device comprising:

a control apparatus configured to write data to or read data from a storage medium that includes a plurality of non-volatile memory chips; and

a stocker configured to store a plurality of the storage media that are detached from the control apparatus, wherein

the control apparatus includes a first temperature control system configured to:

raise temperature of the storage medium to a first temperature or higher; and

cool the storage medium, which has been maintained to the first temperature or higher, to lower than the first temperature before the storage medium is conveyed to the stocker, and

the stocker includes a second temperature control system configured to cool the storage medium to a second temperature or lower, the second temperature being lower than the first temperature.

2. The storage device of claim 1, wherein the control apparatus further includes:

a stage configured to hold the storage medium;

a probe card including a plurality of probes on a first surface, the first surface facing the storage medium when the storage medium is held by the stage; and

a drive unit configured to:

move at least one of the stage or the probe card to bring a plurality of pad electrodes provided on the storage medium into contact with the plurality of probes, the plurality of pad electrodes being provided on a surface of the storage medium that faces the probe card when the storage medium is held by the stage; or

separate the plurality of pad electrodes and the

plurality of probes that are in contact with each other, wherein

the drive unit is configured to bring the plurality of pad electrodes of the storage medium into contact with the plurality of probes after the first temperature control system raises the temperature of the storage medium to the first temperature or higher on the stage.

3. The storage device of claim 2, wherein

the first temperature control system includes a plurality of temperature control systems formed in the stage, each of the plurality of temperature control systems being configured to perform temperature control for each of a plurality of areas of the storage medium held by the stage.

4. The storage device of claim 3, wherein

the first temperature control system is configured to maintain temperature of each of the plurality of areas of the storage medium within a first range using the plurality of temperature control systems.

5. The storage device of claim 4, wherein

the plurality of areas are areas corresponding to respective positions of the plurality of non-volatile memory chips in the storage medium.

6. The storage device of claim 2, wherein

the first temperature control system includes a temperature control system configured to control temperature of the first surface of the probe card.

7. The storage device of claim 2, wherein

the probe card further includes a plurality of semiconductor components disposed on a second surface opposing to the first surface; and

the first temperature control system includes a temperature control system configured to cool the plurality of semiconductor components on the second surface.

8. The storage device of claim 7, wherein

the probe card further includes heat insulating material between the first surface and the second surface.

9. The storage device of claim 7, wherein

the plurality of semiconductor components includes at least one of (A) at least one controller configured to control the non-volatile memory chips, (B) an interface switch configured to selectively operate a plurality of the controllers, (C) a relay, and (D) a capacitor.

10. The storage device of claim 7, wherein

at least one of the plurality of semiconductor components is configured to monitor at least one of temperature measured by a thermometer provided in the stage and temperature measured by a thermometer provided in the probe card.

11. The storage device of claim 1, wherein

the second temperature control system includes a cooling system configured to use cooling water, cooling air or liquid nitrogen as a refrigerant.

12. The storage device of claim 1, wherein

the second temperature control system includes an electronic cooling system configured to use a Peltier element provided in a first portion configured to hold the storage medium, or in a second portion connected to the first portion.

13. The storage device of claim 2, wherein

the control apparatus further includes a refresh system configured to seal around the storage medium with a noble gas or

an inert gas, and to raise the temperature of the storage medium on the stage using the first temperature control system.

14. The storage device of claim 13, wherein

the noble gas or the inert gas is one of nitrogen, argon, helium, krypton, or xenon.

15. The storage device of claim 2, wherein

the control apparatus is further configured to, when replacing the storage medium in contact with the plurality of probes from a first storage medium to a second storage medium stored in the stocker, cool the first storage medium maintained to the first temperature or higher, to lower than the first temperature on the stage using the first temperature control system.

16. The storage device of claim 2, wherein

the control apparatus is further configured to, when replacing the storage medium in contact with the plurality of probes from a third storage medium to a fourth storage medium stored in the stocker, raise temperature of the fourth storage medium cooled to the second temperature or lower, to the first temperature or higher on the stage using the first temperature control system, and bring the plurality of pad electrodes of the fourth storage medium into contact with the plurality of probes using the drive unit.

17. The storage device of claim 1, further comprising a conveyance system configured to convey the storage medium from the control apparatus to the stocker or convey the storage medium from the stocker to the control apparatus, wherein

the first temperature is room temperature, and

the conveyance system includes a third temperature control system configured to adjust air in the conveyance system for a purpose of preventing condensation during conveyance of the

storage medium cooled to the second temperature or lower from the stocker to the control apparatus.

18. A control method of a storage device, the storage device including a control apparatus and a stocker, said method comprising:

raising temperature of a storage medium that includes a plurality of non-volatile memory chips to a first temperature or higher, in the control apparatus that is configured to write data to or read data from the storage medium loaded on a stage;

cooling the storage medium, which has been maintained to the first temperature or higher, to lower than the first temperature, in the control apparatus before the storage medium is conveyed to the stocker;

cooling a plurality of the storage media to a second temperature or lower, while the stocker stores the plurality of the storage media detached from the control apparatus, the second temperature being lower than the first temperature; and

when replacing the storage medium connected to a probe card of the control apparatus from a first storage medium to a second storage medium stored in the stocker,

cooling the first storage medium maintained to the first temperature or higher, to lower than the first temperature in the control apparatus;

raising temperature of the second storage medium cooled to the second temperature or lower, to the first temperature or higher in the control apparatus; and

loading the second storage medium on the stage.

19. The storage device of claim 1, wherein
the storage medium is a semiconductor wafer.

20. The control method of claim 18, wherein
the storage medium is a semiconductor wafer.