CLAIMS

1. An impedance calibration circuit, comprising a parameter module, an initial value generation module, and a calibration module; wherein

the parameter module is configured to perform an environment detection processing and output an environment parameter signal;

the initial value generation module is configured to receive the environment parameter signal, and output an initial calibration value based on the environment parameter signal when a calibration instruction signal is received; and

the calibration module is configured to receive the initial calibration value, and perform impedance calibration processing based on the initial calibration value when the calibration instruction signal is received;

wherein the environment parameter signal comprises at least a temperature parameter signal, the parameter module comprises a temperature sensor and a decoding module; wherein

the temperature sensor is configured to perform temperature detection on the environment where the impedance calibration circuit is located, and output a temperature signal; and

the decoding module is configured to receive the temperature signal, perform decoding processing on the temperature signal, and output the temperature parameter signal;

wherein the temperature parameter signal is used to adjust the initial calibration value.

2. The impedance calibration circuit of claim 1, wherein the initial calibration value comprises a first initial calibration value and a second initial calibration value;

wherein the calibration module is specifically configured to: determine the first initial calibration value as an initial value of a first impedance calibration code, and determine the second initial calibration value as an initial value of a second impedance calibration code; and

adjust the first impedance calibration code to realize a calibration of pull-up impedance; and adjust the second impedance calibration code after the pull-up impedance calibration is completed, to realize a calibration of pull-down impedance.

3. The impedance calibration circuit of claim 2, wherein the calibration module comprises a first counting module, a first comparator, and a resistor module, the resistor module comprising a first pull-up resistor unit connected with a standard resistor; wherein

the resistor module is configured to receive the first impedance calibration code, control a resistance value of the first pull-up resistor unit based on the first impedance calibration code, and output a first voltage signal;

the first comparator is configured to receive the first voltage signal and a first reference signal, compare the first voltage signal with the first reference signal, and output a first indication signal; and

the first counting module is configured to receive the first indication signal and a first counting clock signal, and perform addition processing on the first impedance calibration code every time a pulse of the first counting clock signal is detected when the first indication signal is in a first level state; and perform subtraction processing on the first impedance calibration code every time a pulse of the first counting clock signal is detected when the first indication signal is in a second level state, to achieve calibration processing of the pull-up impedance.

4. The impedance calibration circuit of claim 3, wherein the calibration module further comprises a second counting module and a second comparator, the resistor module further comprises a second pull-up resistor unit and a pull-down resistor unit, a resistance value of the second pull-up resistor unit is controlled by the first impedance calibration code, and the second pull-up resistor unit is connected with the pull-down resistor unit; wherein

the resistor module is further configured to control a resistance value of the pull-down resistor unit based on the second impedance calibration code after the pull-up impedance calibration is completed, and output a second voltage signal; wherein after the pull-up

impedance calibration is completed, a resistance value of the second pull-up resistor unit is calibrated to a standard resistance value by the first impedance calibration code;

the second comparator is configured to receive the second voltage signal and a second reference signal, compare the second voltage signal with the second reference signal, and output a second indication signal; and

the second counting module is configured to receive the second indication signal and a second counting clock signal, and perform addition processing on the second impedance calibration code every time a pulse of the second counting clock signal is detected when the second indication signal is in a third level state; and perform subtraction processing on the second impedance calibration code every time a pulse of the second counting clock signal is detected when the second indication signal is in a fourth level state, to achieve calibration processing of the pull-down impedance.

5. The impedance calibration circuit of claim 4, wherein a control terminal of the first pull-up resistor unit receives the first impedance calibration code, a first terminal of the first pull-up resistor unit is connected with a power signal, a second terminal of the first pull-up resistor unit is connected with a first terminal of the standard resistor, and a second terminal of the standard resistor is connected with a ground signal; and

a control terminal of the second pull-up resistor unit receives the first impedance calibration code, a first terminal of the second pull-up resistor unit is connected with the power signal, a second terminal of the second pull-up resistor unit is connected with a first terminal of the pull-down resistor unit, and a second terminal of the pull-down resistor unit is connected with the ground signal.

6. The impedance calibration circuit of claim 4, wherein the calibration module further comprises an oscillation module and a control module, the first counting module is integrated with a first detection module, and the second counting module is integrated with a second detection module; wherein

the oscillation module is configured to receive the calibration instruction signal, and

output a clock signal based on the calibration instruction signal;

the control module is configured to receive the clock signal, and output the first counting clock signal to the first counting module based on the clock signal;

the first detection module is configured to record a change of the first indication signal; and output a first stop signal to the control module responsive to that the change of the first indication signal meets a first preset condition;

the control module is further configured to stop output of the first counting clock signal in a case where the first stop signal is received, and output the second counting clock signal to the second counting module based on the clock signal;

the second detection module is configured to record a change of the second indication signal; and output a second stop signal to the control module responsive to that the change of the first indication signal meets a second preset condition; and

the control module is further configured to stop output of the second counting clock signal in a case where the second stop signal is received.

7. The impedance calibration circuit of claim 6, wherein

the control module is further configured to output an internal stop signal to the oscillation module in a case where the second stop signal is received; and

the oscillation module is further configured to receive the internal stop signal, and stop output of the clock signal based on the internal stop signal.

8. The impedance calibration circuit of claim 6, wherein

the first preset condition refers to that the first indication signal continues to be changed from a second value to a first value after having been changed from the first value to the second value during three consecutive adjustment processes of the first impedance calibration code; and

the second preset condition refers to that the second indication signal continues to be changed from the second value to the first value after having been changed from the first value to the second value during three consecutive adjustment processes of the second impedance calibration code.

9. The impedance calibration circuit of any one of claims 4-8, wherein

the first counting module is further configured to receive a latch signal, and latch the first impedance calibration code based on the latch signal; and

the second counting module is further configured to receive the latch signal, and latch the second impedance calibration code based on the latch signal.

10. An impedance calibration method, applied to an impedance calibration circuit, comprising:

determining an environment parameter signal through environment detection processing;

determining an initial calibration value based on the environment parameter signal; and

performing impedance calibration processing based on the initial calibration value when a calibration instruction signal is received;

wherein the environment parameter signal comprises at least a temperature parameter signal, and determining the environment parameter signal through environment detection processing comprises:

performing temperature detection on the environment where the impedance calibration circuit is located to obtain a temperature signal; and

performing decoding processing on the temperature signal to obtain the temperature parameter signal;

wherein the temperature parameter signal is used to adjust the initial calibration value.

11. The impedance calibration method of claim 10, wherein the initial calibration value comprises a first initial calibration value and a second initial calibration value, and performing impedance calibration processing based on the initial calibration value comprises:

determining the first initial calibration value as an initial value of a first impedance calibration code, and determining the second initial calibration value as an initial value of a second impedance calibration code;

adjusting the first impedance calibration code to realize a calibration of pull-up impedance; and

adjusting the second impedance calibration code after the pull-up impedance calibration is completed, to realize a calibration of pull-down impedance.

12. The impedance calibration method of claim 11, wherein the impedance calibration circuit comprises a first pull-up resistor unit connected with a standard resistor, and adjusting the first impedance calibration code to realize the calibration of the pull-up impedance comprises:

adjusting a resistance value of the first pull-up resistor unit based on the first impedance calibration code to determine a first voltage signal;

comparing the first voltage signal with a first reference signal to output a first indication signal;

performing addition processing on the first impedance calibration code every time a pulse of the first counting clock signal is detected when the first indication signal is in a first level state; and performing subtraction processing on the first impedance calibration code every time a pulse of the first counting clock signal is detected when the first indication signal is in a second level state; and

stopping output of the first counting clock signal in a case where a change of the first indication signal meets a first preset condition, and ending calibration process of the pull-up

impedance.

13. The impedance calibration method of claim 11, wherein the impedance calibration circuit further comprises a second pull-up resistor unit and a pull-down resistor unit, wherein the resistance value of the second pull-up resistor unit is controlled by the first impedance calibration code, and the second pull-up resistor unit is connected with the pull-down resistor unit; and adjusting the second impedance calibration code to realize the calibration of the pull-down impedance comprises:

adjusting a resistance value of the pull-down resistor unit based on the second impedance calibration code to output a second voltage signal, wherein, after the pull-up impedance calibration is completed, a resistance value of the second pull-up resistor unit is calibrated to a standard resistance value by the first impedance calibration code;

comparing the second voltage signal with a second reference signal to output a second indication signal;

performing addition processing on the second impedance calibration code every time a pulse of the second counting clock signal is detected when the second indication signal is in a third level state; and performing subtraction processing on the second impedance calibration code every time a pulse of the second counting clock signal is detected when the second indication signal is in a fourth level state; and

stopping output of the second counting clock signal in a case where a change of the second indication signal meets a second preset condition, and ending calibration process of the pull-down impedance.

14. The impedance calibration method of claim 11, further comprising:

latching the first impedance calibration code and the second impedance calibration code when a latch signal is received.

15. A semiconductor memory, comprising the impedance calibration circuit of any one of claims 1-9.