

SUBSCRIBER IDENTITY MODULE, INTELLIGENT TERMINAL, AND METHOD FOR USING SUBSCRIBER IDENTITY MODULE

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] The present application enters the national stage under the Patent Cooperation Treaty (PCT) from International Application No. PCT/CN2022/124584, filed on October 11, 2022, which and claims priority of Chinese Patent Application No. 202210383011.7, entitled "SUBSCRIBER IDENTITY MODULE, INTELLIGENT TERMINAL, AND METHOD FOR USING SUBSCRIBER IDENTITY MODULE", filed on April 12, 2022, which are incorporated herein by reference to their entire disclosures.

FIELD OF TECHNOLOGY

[0002] The present disclosure relates to a field of communication technologies, in particular to a subscriber identity module, an intelligent terminal, and a method for using the subscriber identity module.

BACKGROUND

[0003] A conventional subscriber identity module (SIM or SIM card) is an integrated circuit (IC) card that identifies the identity of a mobile subscriber in a mobile

communication system, and is used for secure storage of operator data, authentication of the subscriber identity, and encryption of customer information. Subscriber identity modules are widely used in intelligent terminals such as mobile phones and smart watches.

[0004] In the prior art, due to constraints of power consumption, costs, and the like, the subscriber identity module generally has low processing performance, few external interfaces, and low rate of communication with a processing module on the intelligent terminal, thereby limiting its capability in supporting security applications such as identity authentication and financial transaction. Meanwhile, the processing module on the intelligent terminal has strong processing performance and can support rich applications, but the processing module has a multitude of logical and physical channels, which makes it operate in a complex running environment and renders it vulnerable to security attacks.

[0005] Therefore, it is desirable to provide a new subscriber identity module, an intelligent terminal, and a method for using the subscriber identity module, which can solve the above problems.

SUMMARY OF THE DISCLOSURE

[0006] In view of the above problems, an objective of the present disclosure is to provide a subscriber identity module, an intelligent terminal, and a method for using the

subscriber identity module, particularly a method for extending the application support capability of the subscriber identity module, so as to extend an application support capability of the subscriber identity module, and improve the performance and security of running an application.

[0007] According to one aspect of the present disclosure, a subscriber identity module is provided, and includes: a first communication interface, configured to support multiplexing of a 7816 interface with an SPI+ (serial peripheral interface plus) interface, wherein a communication rate of the SPI+ interface is higher than a communication rate of the 7816 interface; and a first running unit, which is connected to the first communication interface for data transmission, and configured to run a first subprogram to implement at least one of functions including secure boot, encryption, decryption, and authentication.

[0008] Optionally, the first communication interface is connected to a second communication interface of an intelligent terminal for data transmission.

[0009] According to another aspect of the present disclosure, an intelligent terminal is provided, and includes: a second communication interface, configured to support multiplexing of a 7816 interface with an SPI+ interface, wherein a communication rate of the SPI+ interface is higher than a communication rate of the 7816 interface; and a second running unit, which is connected to the second communication interface for data

transmission, and configured to run a second subprogram to perform non-sensitive data processing and/or human-computer interaction.

[0010] Optionally, the second communication interface is connected to a first communication interface of a subscriber identity module for data transmission.

[0011] Optionally, the first communication interface and/or the second communication interface includes: a data port configured to input and/or output data; a clock port configured to transmit a clock signal, wherein a rising edge or a falling edge of the clock signal serves as a synchronization signal for the data; and a reset port configured to transmit a reset signal, which has a valid state at high voltage level or low voltage level, wherein when the processing module sends the reset signal in the valid state to the subscriber identity module, the subscriber identity module performs cold reset; and when the subscriber identity module sends the reset signal in the valid state to the processing module, the processing module performs hot reset on the second subprogram.

[0012] Optionally, the subscriber identity module or the processing module is capable of serving as a master terminal to initiate communication.

[0013] According to another aspect of the present disclosure, a method for using a subscriber identity module is provided, and includes: running a first subprogram on the subscriber identity module to implement secure boot, encryption, decryption, and/or authentication; through a communication interface that supports multiplexing of a 7816

interface with an SPI+ interface, establishing a communication connection between the subscriber identity module and a processing module; and running a second subprogram on the processing module of an intelligent terminal.

[0014] Optionally, the method for using a subscriber identity module further includes: initiating, by the subscriber identity module or the processing module, an inquiry to the processing module or the subscriber identity module through a 7816 interface protocol to determine whether the SPI+ interface is supported or not; and in a case where the SPI+ interface is supported by the processing module or the subscriber identity module, performing communication between the processing module and the subscriber identity module by using an SPI+ interface protocol; or in a case where the SPI+ interface is not supported by the processing module or the subscriber identity module, performing communication between the processing module and the subscriber identity module by using the 7816 interface protocol.

[0015] Optionally, the method for using a subscriber identity module further includes: when the subscriber identity module sends a first reset signal to the processing module, performing, by the processing module, hot reset on an application after the first reset signal is acquired by the processing module; or when the processing module sends a second reset signal to the subscriber identity module, performing, by the subscriber

identity module, cold reset after the second reset signal is acquired by the subscriber identity module.

[0016] Optionally, the communication connection between the subscriber identity module and the processing module is established to perform data interaction; and the method for using a subscriber identity module further includes: sending, by the subscriber identity module, a clock signal to the processing module; or sending, by the processing module, a clock signal to the subscriber identity module, wherein a rising edge or a falling edge of the clock signal serves as a synchronization signal for the data interaction.

[0017] In the subscriber identity module, the intelligent terminal, and the method for using the subscriber identity module according to the embodiments of the present disclosure, the first subprogram is run on the subscriber identity module to implement secure boot, encryption, decryption, and/or authentication, thereby improving the security of running an application.

[0018] Further, the second subprogram is run on the processing module to execute an application, thereby extending the application support capability of the subscriber identity module.

[0019] Furthermore, the communication interface between the subscriber identity module and the processing module is the 7816 interface, which can be multiplexed with

the SPI+ interface, resulting in good transmission compatibility, high efficiency, and a wide application range.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020] The above and other objectives, features and advantages of the present disclosure will become more apparent from the description of the embodiments of the present disclosure below with reference to the accompanying drawings, in which:

[0021] FIG. 1 shows a schematic structural diagram of a subscriber identity module according to an embodiment of the present disclosure;

[0022] FIG. 2 shows a schematic structural diagram of an intelligent terminal according to an embodiment of the present disclosure;

[0023] FIG. 3 shows a schematic device diagram of an intelligent terminal according to an embodiment of the present disclosure;

[0024] FIG. 4 shows a timing diagram according to an embodiment of the present disclosure;

[0025] FIG. 5 shows a schematic diagram of function allocation of an application according to an embodiment of the present disclosure; and

[0026] FIG. 6 shows a flowchart of a method for using a subscriber identity module according to an embodiment of the present disclosure.

DETAILED DESCRIPTION OF EMBODIMENTS OF THE DISCLOSURE

[0027] Various embodiments of the present disclosure will be described in more detail below with reference to the accompanying drawings. In the accompanying drawings, the same elements are denoted with the same or similar reference signs. For the sake of clarity, various parts in the drawings are not drawn to scale. In addition, some well-known parts may not be shown in the drawings.

[0028] Specific implementations of the present disclosure are further described in detail below in conjunction with the accompanying drawings and embodiments. The following describes many specific details of the present disclosure, such as structures, materials, dimensions, treatment processes, and technologies for components, so as to understand the present disclosure more clearly. However, as those skilled in the art can understand, the present disclosure may be implemented without following these specific details.

[0029] It should be understood that during description of the structure of a component, when one layer or area is referred to as being located "on" or "above" another layer or area, it can refer to that one layer or area is directly located on another layer or area, or other layers or areas are further included between one layer or area and another layer or area. Moreover, if the component is turned over, the one layer or area will be located "under" or "below" another layer or area.

[0030] FIG. 1 shows a schematic structural diagram of a subscriber identity module according to an embodiment of the present disclosure. As shown in FIG. 1, the subscriber identity module 100 according to the embodiment of the present disclosure includes a first running unit 110 and a first communication interface 120.

[0031] Specifically, the first running unit 110 is connected to the first communication interface 120 to transmit data, and the first running unit 110 runs a first subprogram to implement at least one of the following functions: secure boot, encryption, decryption, and authentication. Optionally, the first running unit 110 runs an applet to implement security functions, such as secure boot, encryption, decryption and authentication, of a corresponding application. Optionally, input and/or output data and other data mentioned herein may be information in various forms, such as a signal or a command.

[0032] In an optional embodiment of the present disclosure, the first communication interface 120 is configured to input and/or output data. The first communication interface 120 is a 7816 interface which can be multiplexed with an SPI+ interface, which is a specific serial peripheral interface. Optionally, the first running unit 110 is configured to receive an input data through the first communication interface 120, run a first subprogram to implement at least one of the following functions: secure boot, encryption, decryption, and authentication, and output an output data, which is generated by the first subprogram, through the first communication interface 120.

[0033] FIG. 2 shows a schematic structural diagram of an intelligent terminal according to an embodiment of the present disclosure. As shown in FIG. 2, the intelligent terminal according to the embodiment of the present disclosure is, for example, a mobile phone, a computer, or any other device (hereinafter, the intelligent terminal being a mobile phone is taken as an example), including a subscriber identity module 100 and a processing module 200. The subscriber identity module 100 includes a first running unit 110 and a first communication interface 120. The processing module 200 includes a second running unit 210 and a second communication interface 220.

[0034] Specifically, the first running unit 110 is connected to the first communication interface 120 to input and/or output data, and the first running unit 110 runs a first subprogram to implement at least one of the following functions: secure boot, encryption, decryption, and authentication.

[0035] The second running unit 210 is connected to the second communication interface 220 to transmit data, and runs a second subprogram. For example, the second running unit runs the second subprogram to execute an application. Optionally, the second running unit 210 runs (executes) an application (APP) and is responsible for performing non-sensitive information processing, human-computer interaction, and other functions. The second communication interface 220 is a 7816 interface which is multiplexed with an SPI+ interface.

[0036] In the above embodiment of the present disclosure, a new intelligent terminal is proposed, which can extend the application support capability of the subscriber identity module (SIM or SIM card). The intelligent terminal combines the subscriber identity module and the Applet which is run on the subscriber identity module with the processing module and the APP which is run on the processing module to ensure the performance and security of application running. Specifically, the intelligent terminal includes the subscriber identity module, the Applet which is run on the subscriber identity, the processing module and an APP which is run on the processing module. The subscriber identity module and the Applet which is run thereon are responsible for security functions such as secure boot, encryption, decryption, and authentication, and the processing module and the APP which is run thereon are responsible for performing non-sensitive information processing and human-computer interaction function. The processing module and the APP which is run thereon extend the processing capability of the subscriber identity module.

[0037] FIG. 3 shows a schematic device diagram of an intelligent terminal according to an embodiment of the present disclosure. As shown in FIG. 3, the intelligent terminal according to the embodiment of the present disclosure includes a processing module 200 and a subscriber identity module 100.

[0038] Specifically, a second running unit 210 in the processing module 200 includes a baseband processor and/or an application processor, such as a mobile phone baseband/application processor. An application (APP) is run on the baseband/application processor of the intelligent terminal for processing non-sensitive data in the application, performing human-computer interaction and other functions.

[0039] An applet is run on a first running unit 110 in the subscriber identity module 100 to implement functions such as secure boot, encryption, decryption, and authentication of the application.

[0040] A second communication interface 220 of the processing module 200 is connected to a first communication interface 120 of the subscriber identity module 100 for data transmission.

[0041] As shown in FIG. 3, the first communication interface 120 includes a data port (IO), a clock port (CLK), and a reset port (RST). The second communication interface 220 includes a data port (IO), a clock port (CLK), and a reset port (RST). The data port (IO) is configured to input and/or output data. The clock port (CLK) is configured to transmit a clock signal. The reset port (RST) is configured to transmit a reset signal.

[0042] In a specific embodiment of the present disclosure, the mobile phone baseband/application processor is connected to the subscriber identity module through three physical ports (an input/output port, a clock port, and a reset port), and supports

multiplexing of a 7816 interface with a high-speed interface, namely an SPI+ interface, where an IO port of the 7816 interface is multiplexed as a bidirectional data port SPI_SDA of the SPI+ interface; a clock port CLK of the 7816 interface is multiplexed as a clock port SPI_CLK of the SPI+ interface; and a reset port RST of the 7816 interface is multiplexed as a reset port SPI_RST of the SPI+ interface. It is to be noted that the communication interface between the processing module and the subscriber identity module is a 7816 interface or an SPI+ interface, and when the 7816 interface is multiplexed with the SPI+ interface, a protocol supports negotiation between the 7816 interface and the SPI+ interface. Optionally, a communication rate supported by the SPI+ interface is higher than a communication rate of the 7816 interface, and the 7816 interface is compatible with existing subscriber identity modules. Certainly, the form of ports is not limited to this. The technical solution of the present disclosure can be implemented by transforming a three-wire interface into a four-wire interface or an interface with more wires, the ports of the SPI+ interface can be slightly transformed, for example, the ports of the SPI+ interface may be transformed to include an input port SPI_Datain, an output port SPI_Dataout, and a clock port SPI_CLK, or include an input port SPI_Datain, an output port SPI_Dataout, a clock port SPI_CLK, and a reset port SPI_RST, wherein a port is added and mapped to an undefined port of the 7816 interface).

[0043] The ports of the SPI+ interface can be defined as follows:

[0044] SPI_SDA: a simplex bidirectional signal port, and a data channel between the mobile phone baseband/application processor and the subscriber identity module;

[0045] SPI_CLK: a clock port for transmitting a clock signal, which has a rising edge or a falling edge serving as a synchronization signal for data; and

[0046] SPI_RST: a reset port for transmitting a reset signal which has a valid state at high voltage level or low voltage level. When the mobile phone baseband/application processor sends the reset signal in the valid state to the subscriber identity module, the subscriber identity module performs cold reset. When the subscriber identity module sends the reset signal in the valid state to the mobile phone baseband/application processor, the mobile phone baseband/application processor only performs hot reset on an APP that supports function extension.

[0047] Referring to the timing diagram as shown in FIG. 4, new data is sent at a first clock edge of the SPI+ interface, and data acquisition is performed by a receiving terminal at a second clock edge of the SPI+ interface. The first clock edge may be a rising edge or a falling edge, and the second clock edge may be a falling edge or a rising edge. Optionally, the mobile phone baseband/application processor or the subscriber identity module can serve as a master terminal to initiate communication.

[0048] According to the above embodiments of the present disclosure, the first subprogram is run on the subscriber identity module, the second subprogram is run on the

intelligent terminal, the communication interface between the subscriber identity module and the intelligent terminal is the 7816 interface or the SPI+ interface, and the 7816 interface is multiplexed with the SPI+ interface, the protocol supports the negotiation between the 7816 interface and the SPI+ interface, where the communication rate of the SPI+ interface is higher than the communication rate of the 7816 interface, and the 7816 interface is compatible with existing subscriber identity modules; and the subscriber identity module and the first subprogram run thereon are responsible for security functions such as secure boot, encryption, decryption, and authentication, and the intelligent terminal and the second subprogram run thereon are responsible for performing non-sensitive information processing and human-computer interaction function, and extending the processing capability of the subscriber identity module.

[0049] Further, by combining respective characteristics of the mobile phone baseband/application processor and the subscriber identity module, software/hardware interfaces and workflows of the mobile phone baseband/application processor and the subscriber identity module are defined, which extends the application support capability of the subscriber identity module, and improves the performance and security of application running.

[0050] FIG. 5 shows a schematic diagram of function allocation of an application according to an embodiment of the present disclosure. As shown in FIG. 5, the Applet on

the subscriber identity module is responsible for security-related functions such as secure boot, encryption, decryption, and authentication, and the mobile phone baseband/application processor is responsible for performing non-sensitive data processing and human-computer interaction function. The mobile phone baseband/application processor or the subscriber identity module can serve as a master terminal to initiate communication.

[0051] In a specific embodiment, when an application is run on the intelligent terminal, the application is first securely booted on the subscriber identity module. Then, processing non-sensitive information in the application, performing human-computer interaction and other functions are implemented on the baseband/application processor of the mobile phone. For security related functions such as encryption and authentication, the subscriber identity module performs corresponding encryption and authentication. The subscriber identity module performs data interaction with the mobile phone baseband/application processor through the communication interface. Certainly, the present disclosure is not limited to this. The functions executed by the subscriber identity module can be set according to specific requirements. The functions executed by the mobile phone baseband/application processor can be set according to specific requirements. Function coordination and execution process between the subscriber

identity module and the mobile phone baseband/application processor can also be designed according to specific requirements.

[0052] FIG. 6 shows a flowchart of a method for using a subscriber identity module according to an embodiment of the present disclosure. As shown in FIG. 6, the method for using a subscriber identity module according to the embodiment of the present disclosure includes the following steps:

[0053] In step S101, a first subprogram is run on the subscriber identity module to implement secure boot, encryption, decryption, and/or authentication.

[0054] The first subprogram is run on the subscriber identity module to implement secure boot, encryption, decryption, and/or authentication. Optionally, a first running unit on the subscriber identity module receives at least one of a boot signal, an encryption signal, a decryption signal, and an authentication signal through a first communication interface, runs a first subprogram to implement corresponding secure boot, encryption, decryption, and authentication based on the received signal, and outputs an output data, which is generated by the first subprogram, through the first communication interface.

[0055] In step S102, a communication connection between the subscriber identity module and a processing module is established through a communication interface that supports multiplexing of a 7816 interface with an SPI+ interface.

[0056] The communication connection between the subscriber identity module and the processing module is established through the communication interface that supports multiplexing of the 7816 interface with the SPI+ interface, so that data interaction between the subscriber identity module and the processing module can be performed. Optionally, a second running unit in the processing module can transmit data through a second communication interface, and the first running unit in the subscriber identity module can transmit data through the first communication interface.

[0057] In step S103, a second subprogram is run on the processing module.

[0058] The second subprogram is run on the processing module, for example, the second subprogram is run to perform non-sensitive information processing in an application, human-computer interaction and other functions. Optionally, the processing module can receive the output data provided by the subscriber identity module, and run the second subprogram based on the received output data.

[0059] In an optional embodiment of the present disclosure, the method for using a subscriber identity module further includes the following steps:

[0060] initiating, by the processing module, an inquiry to the subscriber identity module through a 7816 interface protocol to determine whether the SPI+ interface is supported or not; and

[0061] in a case where the SPI+ interface is supported by the subscriber identity module, performing communication between the processing module and the subscriber identity module by using an SPI+ interface protocol; or

[0062] in a case where the SPI+ interface is not supported by the subscriber identity module, performing communication between the processing module and the subscriber identity module by using the 7816 interface protocol.

[0063] Specifically, in order to extend the compatibility with an original subscriber identity module, a negotiation protocol between a 7816 communication interface and the SPI+ interface is used for communication interface negotiation. After the subscriber identity module is powered on and booted securely and completely, the mobile phone baseband/application processor can serve as a master terminal to initiate protocol negotiation, that is, the mobile phone baseband/application processor can negotiate a communication protocol with the subscriber identity module. A specific negotiation method includes: first, initiating, by the mobile phone baseband/application (AP) processor, an inquiry to the subscriber identity module through the 7816 interface protocol to determine whether the SPI+ interface is supported or not; if the SPI+ interface is supported by the subscriber identity module, sending a reply of support, and starting to perform communication between the mobile phone baseband/application processor and the subscriber identity module by using the SPI+ interface protocol from a next

instruction; or if the SPI+ interface is not supported by the subscriber identity module, starting to perform communication by using the 7816 interface protocol from a next instruction of the mobile phone. Optionally, after being powered on and booted securely and completely, the subscriber identity module can serve as a master terminal to initiate protocol negotiation, that is, the subscriber identity module can negotiate a communication protocol with the mobile phone baseband/application processor. Specifically, a negotiation method may include: first, initiating, by the subscriber identity module, an inquiry to the mobile phone baseband/application processor through the 7816 interface protocol to determine whether the SPI+ interface is supported or not; if the SPI+ interface is supported by the mobile phone baseband/application processor, sending a reply of support, and starting to perform communication between the subscriber identity module and the mobile phone baseband/application processor by using the SPI+ interface protocol from a next instruction; or if the SPI+ interface is not supported by the mobile phone baseband/application processor, starting to perform communication by using the 7816 interface protocol from a next instruction.

[0064] Optionally, the method for using a subscriber identity module further includes:

[0065] when the subscriber identity module sends a first reset signal to the processing module, performing, by the processing module, hot reset on an application after the first reset signal is acquired by the processing module; or

[0066] when the processing module sends a second reset signal to the subscriber identity module, performing, by the subscriber identity module, cold reset after the second reset signal is acquired by the subscriber identity module.

[0067] In an optional embodiment of the present disclosure, the communication connection between the subscriber identity module and the processing module is established to perform data interaction. The method for using a subscriber identity module further includes: sending, by the subscriber identity module, a clock signal to the processing module; or sending, by the processing module, a clock signal to the subscriber identity module, where a rising edge or a falling edge of the clock signal serves as a synchronization signal for the data interaction. The subscriber identity module or the processing module is capable of serving as a master terminal to initiate communication. When the subscriber identity module serves as the master terminal, the subscriber identity module is configured to send a clock signal to the processing module. When the processing module serves as the master terminal, the processing module is configured to send a clock signal to the subscriber identity module.

[0068] It should be noted that, relational terms herein such as first and second are only used to distinguish one entity or operation from another, and do not necessarily require or imply that any such actual relationship or order exists between these entities or operations. Moreover, the terms "comprise" and "include" or any other variation thereof are intended

to cover a non-exclusive inclusion, so that a process, method, material, or device including a series of elements not only includes those elements, but also includes other elements not expressly listed or inherent to such process, method, material, or device. Without further limitations, an element defined by the phrase "includes one..." does not exclude the presence of additional identical elements in the process, method, material, or device including the element.

[0069] According to the embodiments of the present disclosure, as described above, these embodiments do not elaborate on all details and do not limit the disclosure to only the specific embodiments described. Obviously, many modifications and changes can be made based on the above description. This specification selects and specifically describes these embodiments in order to better explain the principles and practical applications of the present disclosure, so that those skilled in the art can make good use of the present disclosure and make modifications on the basis of the present disclosure. The present disclosure is limited only by the claims and their full scope and equivalents.

CLAIMS

WHAT IS CLAIMED IS:

1. A subscriber identity module, comprising:

a first communication interface, configured to support multiplexing of a 7816 interface with an SPI+ interface, wherein a communication rate of the SPI+ interface is higher than a communication rate of the 7816 interface; and

a first running unit, which is connected to the first communication interface for data transmission, and configured to run a first subprogram to implement at least one of functions including secure boot, encryption, decryption, and authentication.

2. The subscriber identity module according to claim 1, wherein the first communication interface is connected to a second communication interface of an intelligent terminal for data transmission.

3. An intelligent terminal, comprising a processing module, wherein the processing module comprises:

a second communication interface, configured to support multiplexing of a 7816 interface with an SPI+ interface, wherein a communication rate of the SPI+ interface is higher than a communication rate of the 7816 interface; and

a second running unit, which is connected to the second communication interface for data transmission, and configured to run a second subprogram to perform non-sensitive

data processing and/or human-computer interaction.

4. The intelligent terminal according to claim 3, wherein

the second communication interface is connected to a first communication interface of a subscriber identity module for data transmission.

5. The intelligent terminal according to claim 4, wherein the first communication interface and/or the second communication interface comprises:

a data port, configured to input and/or output data;

a clock port, configured to transmit a clock signal, wherein a rising edge or a falling edge of the clock signal serves as a synchronization signal for the data; and

a reset port, configured to transmit a reset signal, which has a valid state at high voltage level or low voltage level,

wherein when the processing module sends the reset signal in the valid state to the subscriber identity module, the subscriber identity module performs cold reset; and when the subscriber identity module sends the reset signal in the valid state to the processing module, the processing module performs hot reset on the second subprogram.

6. The intelligent terminal according to claim 4, wherein the subscriber identity module or the processing module is capable of serving as a master terminal to initiate communication.

7. A method for using a subscriber identity module, wherein the method comprises:

running a first subprogram on the subscriber identity module to implement secure boot, encryption, decryption, and/or authentication;

through a communication interface that supports multiplexing of a 7816 interface with an SPI+ interface, establishing a communication connection between the subscriber identity module and a processing module; and

running a second subprogram on the processing module of an intelligent terminal.

8. The method according to claim 7, further comprising:

initiating, by the subscriber identity module or the processing module, an inquiry to the processing module or the subscriber identity module through a 7816 interface protocol, to determine whether the SPI+ interface is supported or not; and

in a case where the SPI+ interface is supported by the processing module or the subscriber identity module, performing communication between the processing module and the subscriber identity module by using an SPI+ interface protocol; or

in a case where the SPI+ interface is not supported by the processing module or the subscriber identity module, performing communication between the processing module and the subscriber identity module by using the 7816 interface protocol.

9. The method according to claim 7, further comprising:

when the subscriber identity module sends a first reset signal to the processing module, performing, by the processing module, hot reset on an application after the first

reset signal is acquired by the processing module; or

when the processing module sends a second reset signal to the subscriber identity module, performing, by the subscriber identity module, cold reset after the second reset signal is acquired by the subscriber identity module.

10. The method according to claim 7, wherein the communication connection between the subscriber identity module and the processing module is established to perform data interaction; and

the method for using a subscriber identity module further comprises:

sending, by the subscriber identity module, a clock signal to the processing module;

or

sending, by the processing module, a clock signal to the subscriber identity module,

wherein a rising edge or a falling edge of the clock signal serves as a synchronization signal for the data interaction.