

CLAIMS

[Claim 1]

A communication device, comprising:

transmission and reception circuitry configured to communicate with an external
5 communication device, including transmitting and receiving data via a data signal
line and transmitting a clock via a clock signal line; and
control circuitry configured to

detect at least one of an acknowledgement signal or an absence of an
acknowledgement signal transmitted from the external communication device in
10 response to a signal from the transmission and reception circuitry; and

in a case where the control circuitry detects the absence of an
acknowledgement signal, cause the transmission and reception circuitry to prevent
a conflict with read data and a termination command by transmitting a clock for a
predetermined number of bits following the absence of the acknowledgement
15 signal,

wherein the predetermined number of bits corresponds to a sum of a conflict
prevention clock period and a first bit of a preamble following the conflict
prevention clock period.

[Claim 2]

20 The communication device according to claim 1, wherein the predetermined
number of bits is 19.

[Claim 3]

The communication device according to claim 1, wherein the detection of the
absence of the acknowledgement signal by the control circuitry is a result of a one-
25 bit error in a second bit of a preamble transmitted from the external communication
device.

[Claim 4]

The communication device according to claim 1, wherein the control circuitry includes a state machine configured to ignore the received data for the conflict prevention clock period having a duration corresponding to at least the
5 predetermined number of bits following the absence of an acknowledgement signal.

[Claim 5]

The communication device according to claim 1, wherein the transmission and reception circuitry is configured to maintain the data signal line at an H level
10 during a period in which the transmission circuitry is preventing the conflict.

[Claim 6]

The communication device according to claim 1, wherein the transmission and reception circuitry transmits a number of clock cycles when the absence of an acknowledgement signal is detected, the number of clock cycles being the same as
15 the predetermined number of bits following the absence of an acknowledgement signal.

[Claim 7]

The communication device according to claim 1, wherein the transmission and reception circuitry transmits a clock for a duration corresponding to at least the
20 predetermined number of bits of the data transmitted from the external device in response to a transmission of a read command and prevents confliction the data for at least a period for transmitting the number of clock cycles.

[Claim 8]

The communication device according to claim 7, wherein the transmission and
25 reception circuitry transmits the command signal at a timing of a second bit of a preamble of the signal when the data is transmitted from the external

communication device.

[Claim 9]

The communication device according to claim 1, wherein the transmission and reception circuitry transmits a command instructing to terminate a particular communication mode following the conflict prevention clock period, wherein the
5 conflict prevention clock period has a duration corresponding to at least the predetermined number of bits following the absence of an acknowledgement signal.

10 [Claim 10]

The communication device according to claim 1, wherein the transmission and reception circuitry transmits a command instructing to restart communication in a particular communication mode following the conflict prevention clock period, wherein the conflict prevention clock period has a duration corresponding to at
15 least the predetermined number of bits following the absence of an acknowledgement signal.

[Claim 11]

The communication device according to claim 1, wherein
the control circuitry is configured to detect an error by comparing a first bit
20 sequence following a preamble of the data received by the transmission and reception circuitry to a second bit sequence corresponding to a data type designated by the preamble, and
in a case where the control circuitry detects the error, the control circuitry causes the transmission and reception circuitry to transmit a command after transmitting a
25 clock for a duration corresponding to at least a second predetermined number of bits after the preamble.

[Claim 12]

The communication device according to claim 1, wherein the control circuitry detects an error by performing parity check on the data received by the transmission and reception circuitry wherein a first parity bit contained in the data
5 is an even-numbered parity and a second bit contained in the data is an odd-numbered parity.

[Claim 13]

The communication device according to claim 1, wherein the transmission and reception circuitry drives a second bit of a preamble transmitted or received
10 following the read data.

[Claim 14]

The communication device according to claim 1, wherein the transmission and reception circuitry is configured to communicate in an SDR mode and an HDR mode, data communication being performed at a first transfer rate in the SDR
15 mode, the data communication being performed at a second transfer rate higher than the first transfer rate in the HDR mode.

[Claim 15]

The communication device according to claim 14, wherein the control circuitry is configured to detect an error in a preamble immediately after transmitting a read
20 command in the HDR mode and immediately before the read data.

[Claim 16]

The communication device according to claim 14, wherein the HDR mode includes a plurality of additional modes in which the transmission and reception circuitry is capable of communicating, the plurality of additional modes including: a double
25 data rate mode, a ternary symbol pure-bus mode, and a ternary symbol legacy-inclusive-bus mode.

[Claim 17]

The communication device according to claim 14, wherein the communication device is further configured to switch the mode of the external communication device via a mode change signal.

5 [Claim 18]

The communication device according to claim 1, wherein the data signal line sequentially transmits serial data bit by bit, and the clock signal line transmits a serial clock having a predetermined frequency.

10 [Claim 19]

A communication system, comprising:

a first communication device having a control initiative in a bus including a data signal line and a clock signal line; and

a second communication device configured to perform communication in accordance with the control initiative of the first communication device, wherein the first communication device includes

first transmission and reception circuitry configured to communicate with the second communication device, including transmitting and receiving data via the data signal line and transmitting the clock via a clock signal line; and

20 control circuitry configured to

detect at least one of an acknowledgement signal or an absence of an acknowledgement signal transmitted from the second communication device in response to a signal from the first transmission and reception circuitry; and

in a case where the control circuitry detects the absence of an acknowledgement signal, cause the transmission and reception circuitry to prevent a conflict with read data and a termination command by transmitting a clock for a

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predetermined number of bits following the absence of the acknowledgement signal,

wherein the predetermined number of bits corresponds to a sum of a conflict prevention clock period and a first bit of a preamble following the conflict

5 prevention clock period, and

the second communication device includes second transmission and reception circuitry configured to communicate with the first communication device, including transmitting and receiving data via the data signal line and receiving the clock via the clock signal line.

10 [Claim 20]

The communication system according to claim 19, wherein the predetermined number of bits is 19.

[Claim 21]

The communication system according to claim 19, further comprising:

15 at least one third communication device configured to communicate in accordance with the control initiative of the first communication device, wherein one of the second communication device and at least one third communication device does not transmit the acknowledgement signal,

the others of the second communication device and at least one third communication device transmits the acknowledgement signal, and

20 the control circuitry is configured to detect that the one of the second communication device and at least one third communication device did not transmit the acknowledgement signal.

[Claim 22]

25 A communication method for a communication device, the method comprising: communicating with an external communication device, including transmitting and

receiving data via a data signal line and transmitting a clock via a clock signal line;
detecting at least one of an acknowledgement signal or an absence of an
acknowledgement signal transmitted from the external device in response to a
signal from the transmission and reception circuitry; and

5 in a case where the control circuitry detects the absence of an acknowledgement
signal, preventing a conflict with read data and a termination command by
transmitting a clock for a predetermined number of bits following the absence of
the acknowledgement signal,

10 wherein the predetermined number of bits corresponds to a sum of a conflict
prevention clock period and a first bit of a preamble following the conflict
prevention clock period.

[Claim 23]

The communication method according to claim 22, wherein the predetermined
number of bits is 19.

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