hybrid modulation needs to be performed on the data packet. For processes of an NRZ modulation scheme and a PAM4 modulation scheme, refer to the descriptions in the foregoing embodiment. Details are not described herein again.

[00114] Step 802: The second switching unit splits the data packet into first data and second data, and sends the first data to an NRZ modulator.

[00115] A data packet splitting method is described in the foregoing embodiment. Details are not described in this embodiment again.

[00116] Step 803: The second switching unit sends the second data to a PAM4 modulator.

[00117] Step 804: The NRZ modulator modulates the first data to generate a modulated first data packet.

[00118] The modulated data packet carries the foregoing packet header structure, and includes a modulation type identifier, an NRZ length parameter, and a payload. The NRZ length parameter indicates a size of the first data.

[00119] Step 805: The PAM4 modulator modulates the second data to generate a modulated second data packet, and sends the second data packet to an error correction encoder.

[00120] Step 806: The error correction encoder performs error correction encoding on the second data packet, to add check data and generate a third data packet, and sends the third data packet to a first switching unit.

[00121] Step 807: The first switching unit combines the first data packet and the third data packet, and sends a combined data packet to a PAM4 sender.

[00122] Step 808: The PAM4 sender sends the combined data packet to a PAM4 receiver through a channel.

[00123] Step 809: The PAM4 receiver sends the data packet received from the channel to an analysis unit and a fourth switching unit.

[00124] Step 810: The analysis unit analyzes a packet header of the data packet, obtains a modulation type and an NRZ length parameter of the data packet, and notifies a third switching unit and the fourth switching unit of the modulation type and the NRZ length parameter.

[00125] Step 811: The fourth switching unit splits the received data packet into the first data packet and the third data packet based on the modulation type and the NRZ length parameter of the data packet, sends the first data packet to an NRZ demodulator, and sends the third data packet to an error correction decoder.

CLAIMS

1. A baseband data transmission system, comprising a first switching unit, a first sending path, a second sending path, and a sender, wherein the first sending path and the second sending path are disposed in parallel, and the first sending path and the second sending path have different performance indicators;

the first sending path is configured to modulate a to-be-transmitted data packet, and sending a modulated output to the first switching unit;

the second sending path is configured to modulate the to-be-transmitted data packet, and sending a modulated output to the first switching unit; and

the first switching unit is configured to connect to the first sending path and the second sending path, and select the output of the first sending path or the second sending path based on a type of the to-be-transmitted data packet.

2. The data transmission system according to claim 1, wherein

the first sending path and the second sending path are specifically configured to modulate the to-be-transmitted data packet, and output modulated data and modulation types.

3. The data transmission system according to claim 2, wherein the system further comprises a receiver, an analysis unit, a first receiving path, a second receiving path, and a third switching unit, wherein the first receiving path and the second receiving path are disposed in parallel;

the analysis unit is configured to receive an output from the receiver, extract the modulation type of the modulated data, and send the modulation type to the third switching unit;

the first receiving path and the second receiving path are configured to demodulate the modulated data; and

the third switching unit is configured to connect to the first receiving path and the second receiving path, and select an output of the first receiving path or the second receiving path based on the modulation type.

4. The data transmission system according to claim 1, wherein the performance indicator comprises at least one of the following: a delay, a bit error rate, a bandwidth, and power consumption.

5. The data transmission system according to any one of claims 1 to 4, wherein the system

further comprises:

a second switching unit, configured to receive the to-be-transmitted data packet, and select a sending path based on the type of the to-be-transmitted data packet.

6. The data transmission system according to claim 5, wherein

when the to-be-transmitted data packet is a short packet having a low-delay requirement, the first switching unit sends the to-be-transmitted data packet to the first sending path;

when the to-be-transmitted data packet is a long packet having a low-delay requirement, the first switching unit divides the data packet into first data and second data, sends the first data to the first sending path, and sends the second data to the second sending path; or

when the to-be-transmitted data packet is a data packet having a high-bandwidth requirement, and has no delay requirement, the first switching unit sends the to-be-transmitted data packet to the second sending path.

7. The data transmission system according to claim 6, wherein

a length m of the first data satisfies:

$m<n+2BR*T$, wherein

T is a codec delay, BR is a bitrate of a first modulator, and n is a quantity of bits of check data of an error correction encoder.

8. The data transmission system according to claim 3, wherein the system further comprises:

a fourth switching unit, configured to receive the output of the receiver, and select a receiving path based on the modulation type.

9. The data transmission system according to any one of claims 1 to 8, wherein the first sending path comprises the first modulator, and the second sending path comprises a second modulator.

10. The data transmission system according to claim 9, wherein

a bit error rate of the first modulator is less than a bit error rate of the second modulator, a delay of the first sending path is less than a delay of the second sending path, and a bandwidth of the second modulator is greater than a bandwidth of the first modulator.

11. The data transmission system according to claim 9 or 10, wherein

a voltage difference between adjacent levels output by the first modulator is greater than a voltage difference between adjacent levels output by the second modulator.

12. The data transmission system according to any one of claims 9 to 11, wherein

a level output by the first modulator is a subset of a level output by the second modulator.

13. The data transmission system according to any one of claims 9 to 12, wherein

the first modulator is a non-return-to-zero NRZ modulator, the second modulator is a 4 pulse amplitude modulation PAM4 modulator, the sender is a PAM4 sender, and the receiver is a PAM4 receiver.

14. The data transmission system according to claim 13, wherein

a first demodulator on the first receiving path is an NRZ demodulator, and a second demodulator on the second receiving path is a PAM4 demodulator, wherein

the NRZ demodulator is configured to receive a data packet from the receiver, and output, with a granularity of two bits, a high-order bit in every two bits as a demodulation output result.

15. A baseband data transmission method, applied to a baseband data transmission system, wherein the system comprises a first switching unit, a first sending path, a second sending path, and a sender, the first sending path and the second sending path are disposed in parallel, and the first sending path and the second sending path have different performance indicators; and

the method comprises:

modulating, by the first sending path, a to-be-transmitted data packet, and sending a modulated output to the first switching unit;

modulating, by the second sending path, the to-be-transmitted data packet, and sending a modulated output to the first switching unit; and

connecting, by the first switching unit, to the first sending path and the second sending path, and selecting the output of the first sending path or the second sending path based on a type of the to-be-transmitted data packet.

16. The method according to claim 15, wherein the method further comprises:

modulating, by the first sending path and the second sending path, the to-be-transmitted data packet, and outputting modulated data and modulation types.

17. The method according to claim 16, wherein the system further comprises a receiver, an analysis unit, a first receiving path, a second receiving path, and a third switching unit, wherein the first receiving path and the second receiving path are disposed in parallel; and

the method further comprises:

receiving, by the analysis unit, an output from the receiver, extracting the modulation type of the modulated data, and sending the modulation type to the third switching unit;

demodulating, by the first receiving path and the second receiving path, the modulated data; and

connecting, by the third switching unit, to the first receiving path and the second receiving path, and selecting an output of the first receiving path or the second receiving path based on the modulation type.

18. The method according to any one of claims 15 to 17, wherein the system further comprises a second switching unit, and the method further comprises:

receiving, by the second switching unit, the to-be-transmitted data packet, and selecting a sending path based on the type of the to-be-transmitted data packet.

19. The method according to claim 18, wherein

when the to-be-transmitted data packet is a short packet having a low-delay requirement, the first switching unit sends the to-be-transmitted data packet to the first sending path;

when the to-be-transmitted data packet is a long packet having a low-delay requirement, the first switching unit divides the to-be-transmitted data packet into first data and second data, sends the first data to the first sending path, and sends the second data to the second sending path; or

when the to-be-transmitted data packet is a data packet having a high-bandwidth requirement, and has no delay requirement, the first switching unit sends the to-be-transmitted data packet to the second sending path.

20. The method according to claim 17, wherein the system further comprises a fourth switching unit, and the method further comprises:

receiving, by the fourth switching unit, the output of the receiver, and selecting a receiving path based on the modulation type.