CLAIMS

What is claimed is:

1. An optical receiving assembly, comprising: an optical receiving port, an adjustable optical path deflection assembly, a semiconductor optical amplifier, an optical detector, and a controller, wherein an optical signal received by the optical receiving port is incident onto the semiconductor optical amplifier through the adjustable optical path deflection assembly, the semiconductor optical amplifier amplifies and couples the incident optical signal to the optical detector, and the optical detector converts the received optical signal into an electrical signal and outputs the electrical signal;

wherein the controller controls the adjustable optical path deflection assembly according to an electrical signal strength output by the optical detector, so as to adjust a coupling efficiency of the optical signal coupled from the optical receiving port to the semiconductor optical amplifier and maintain the electrical signal output by the optical detector within a preset range;

wherein the controller sets an operating voltage and an operating temperature of the semiconductor optical amplifier, and maintains the operating voltage and the operating temperature respectively at a voltage preset value and a temperature preset value, and the voltage preset value and the temperature preset value are an optimal operating point of the semiconductor optical amplifier when a specific optical power is incident onto the semiconductor optical amplifier; and

wherein the adjustable optical path deflection assembly adjusts the

coupling efficiency of the optical signal coupled from the optical receiving port to the semiconductor optical amplifier by adjusting a deflection angle of the optical signal.

2. The optical receiving assembly according to claim 1, wherein the adjustable optical path deflection assembly is a transmissive type deflection assembly.

3. The optical receiving assembly according to claim 2, wherein the adjustable optical path deflection assembly is a MEMS refractor , or

the adjustable optical path deflection assembly includes a refraction prism with an adjustable refractive index, or

the adjustable optical path deflection assembly includes a refraction prism and an angle adjustment mechanism, and the controller controls the angle adjustment mechanism to adjust an angle of the refraction prism.

4. The optical receiving assembly according to claim 1, wherein the adjustable optical path deflection assembly is a reflective type deflection assembly.

5. The optical receiving assembly according to claim 4, wherein the adjustable optical path deflection assembly is a MEMS reflection mirror, or

the adjustable optical path deflection assembly includes a reflection mirror and an angle adjustment mechanism, and the controller controls the angle adjustment mechanism to adjust a deflection angle of the reflection mirror.

6. The optical receiving assembly according to claim 4, further comprising: an optical path deflection unit, wherein the optical path deflection unit is located in a light path between the optical receiving port and the adjustable optical path deflection assembly, or is located in a light path between the adjustable optical path deflection assembly and the semiconductor optical amplifier;

wherein the optical path deflection unit is configured to deflect the optical signal received by the optical receiving port to the adjustable optical path deflection assembly, or to deflect an optical signal reflected by the adjustable optical path deflection assembly to the semiconductor optical amplifier.

7. The optical receiving assembly according to claim 6, wherein the optical path deflection unit is a reflection mirror or a refraction prism.

8. The optical receiving assembly according to claim 4, further comprising: two optical path deflection units, wherein the two optical path deflection units are respectively located in the light path in front of and behind the adjustable optical path deflection assembly;

wherein the two optical path deflection units are respectively configured to deflect the optical signal received by the optical receiving port to the adjustable optical path deflection assembly, and to deflect an optical signal reflected by the adjustable optical path deflection assembly to the semiconductor optical amplifier.

9. The optical receiving assembly according to claim 8, wherein the two optical path deflection units are two separate reflection mirrors or two refraction prisms respectively, or the two optical path deflection units are two reflection mirrors respectively arranged on a triangular prism.

10. The optical receiving assembly according to claim 1, further comprising: a collimating lens group, a first coupling lens, a second coupling lens, and a trans-impedance amplifier,

wherein the collimating lens group is located in a light path between the optical receiving port and the adjustable optical path deflection assembly; wherein the first coupling lens is located in a light path between the adjustable optical path deflection assembly and the semiconductor optical amplifier, and is configured to couple the optical signal into the semiconductor optical amplifier;

wherein the second coupling lens is located in a light path in front of the optical detector, and is configured to couple the optical signal amplified by the semiconductor optical amplifier into the optical detector;

wherein the trans-impedance amplifier is electrically connected to the optical detector, and is configured to amplify the electrical signal output by the optical detector.

11. The optical receiving assembly according to claim 10, wherein a combination of one, two, or more of an optical isolator, an optical filter, a wave division multiplexer, and an optical path deflector are further

provided between the semiconductor optical amplifier and the second coupling lens, and/or

an optical isolator is further provided between the semiconductor optical amplifier and the adjustable optical path deflection assembly.

12. The optical receiving assembly according to claim 1, wherein the semiconductor optical amplifier includes a semiconductor optical amplifier chip and a TEC (thermoelectric cooler), the semiconductor optical amplifier chip is arranged on the TEC through a substrate, and the controller controls the TEC to stabilize an operating temperature of the semiconductor optical amplifier chip.

13. The optical receiving assembly according to any one of claim 1 to claim 12, further comprising: a sealed box,

wherein an airtight cavity is formed inside the sealed box, the optical receiving port is arranged at one end of the sealed box, and an electrical interface is provided at another end or one side of the sealed box; wherein the electrical interface is electrically connected to an external circuit board, and the controller is arranged on the external circuit board; wherein the adjustable optical path deflection assembly, the semiconductor optical amplifier, and the optical detector are arranged in the airtight cavity.

14. An optical module, comprising: a packaging housing and a circuit board arranged in the packaging housing, wherein the optical module further comprises the optical receiving assembly as claimed in any one of claim 1

to claim 13, and the optical receiving assembly is arranged in the packaging housing and electrically connected to the circuit board.

15. A control method of an optical receiving assembly, wherein the optical receiving assembly includes an adjustable optical path deflection assembly, a semiconductor optical amplifier, and an optical detector, wherein the adjustable optical path deflection assembly is optically coupled to an input of the semiconductor optical amplifier, and an output of the semiconductor optical amplifier is optically coupled to the optical detector, the method comprising steps of:

setting an operating voltage and an operating temperature of the semiconductor optical amplifier, and maintaining the operating voltage and the operating temperature respectively at a voltage preset value and a temperature preset value, wherein the voltage preset value and the temperature preset value are an optimal operating point of the semiconductor optical amplifier when a specific optical power is incident onto the semiconductor optical amplifier;

monitoring an electrical signal strength output by the optical detector, and determining whether or not the electrical signal strength is within a preset range; and

when the electrical signal strength is within the preset range, maintaining a state of the adjustable optical path deflection assembly to be unchanged, and, when the electrical signal strength is not within the preset range, controlling the adjustable optical path deflection assembly to adjust a deflection angle of an optical signal incident onto the semiconductor

optical amplifier according to a change of the electrical signal strength, so as to adjust a coupling efficiency of the optical signal coupled into the semiconductor optical amplifier to make the electrical signal strength output by the optical detector maintaining within the preset range,

wherein the specific optical power is less than or equal to an optical power corresponding to a sensitivity point required by the optical receiving assembly, and the specific optical power is greater than or equal to an optical power corresponding to an optimal sensitivity point of the optical receiving assembly,

wherein the optical power corresponding to the sensitivity point required by the optical receiving assembly is greater than or equal to the optical power corresponding to the optimal sensitivity point of the optical receiving assembly, and

wherein the sensitivity point is a minimal optical power value required to satisfy a predetermined bit error rate for a communication system, and the optimal sensitivity point is a minimal optical power value required by the optical receiving assembly to achieve the predetermined bit error rate.

16. The control method according to claim 15, wherein, in the step of monitoring the electrical signal strength output by the optical detector, the electrical signal strength is monitored by detecting a received signal strength indication (RSSI) of a trans-impedance amplifier that is electrically connected to the optical detector.

17. The control method according to claim 15, wherein the preset range is the

electrical signal strength that is monitored when the specific optical power is incident onto the semiconductor optical amplifier.