Summary

[0005] Note that, in an electrical connection socket of the above-mentioned type, the signal pin is typically held in the communication hole of the metal housing by an insulating holding member. However, the holding member typically has a larger relative permittivity than that of air.

[0006] As such, in a signal path of a coaxial structure formed by the signal pin and the inner peripheral surface of the communication hole, the characteristic impedance may be varied between the region held by the holding member and other regions. As a result, when a signal is transmitted between the electrical component and the circuit board, signal deterioration may result due to a reflection phenomenon in the signal path.

[0007] In view of the above problems, an object of the present disclosure is to provide an electrical connection socket that can ensure impedance matching in the signal path formed by signal pins and can suppress the signal deterioration during signal transmission.

[0008] According to an aspect, there is an electrical connection socket for relaying transmission and reception of an electrical signal between a first electrical component and a second electrical component, the electrical connection socket comprising:

a metal housing including a communication hole for communicating between an upper surface of the metal housing and a lower surface of the metal housing, the metal housing being disposed such that the first electrical component is disposed at the lower surface, and that the second electrical component is disposed at the upper surface;

a signal pin configured to be inserted into the communication hole such that a coaxial line is formed with an inner wall surface of the communication hole, the signal pin being configured such that one end of the signal pin is electrically connected to a terminal of the first electrical component, and that another end of the signal pin is electrically connected to a terminal of the second electrical component;

a first holding member configured to hold the signal pin in the communication hole such that an outer peripheral surface of the signal pin is spaced from the inner wall surface of the communication hole, the first holding member having an annular shape and being press-fitted and fixed to the communication hole in an upper region in the communication hole; and

a second holding member configured to hold the signal pin in the communication hole such that an outer peripheral surface of the signal pin is spaced from the inner wall surface of the communication hole, the second holding member having an annular shape and being press-fitted and fixed to the outer peripheral surface of the signal pin and engaged in a lower region in the communication hole,

wherein a characteristic impedance of a signal path formed by the signal pin is lower than a predetermined characteristic impedance serving as a reference in a first region and a second region,

the first region being a region where the signal pin is held by the first holding member,

the second region being a region where the signal pin is held by the second holding member,

the characteristic impedance matches the predetermined characteristic impedance in a third region between the first region and the second region of the signal path, and

the characteristic impedance is higher than the predetermined characteristic impedance in a fourth region adjacent to the upper side of the first region of the signal path and in a fifth region adjacent to the lower side of the second region of the signal path,

wherein the fourth region is set to a region where the signal pin protrudes upward from the communication hole, and

wherein the fifth region is set to a region where the signal pin forms the coaxial line with the inner wall surface of the communication hole, and a distance between the outer peripheral surface of the signal pin and the inner wall surface of the communication hole in the fifth region is greater than a distance between the outer peripheral surface of the signal pin and the inner wall surface of the communication hole in the third region. A present disclosure is an electrical connection socket for relaying transmission and reception of an electrical signal between a first electrical component and a second electrical component, the electrical connection socket including a metal housing including a

communication hole for communicating between an upper surface of the metal housing and a lower surface of the metal housing, the metal housing being disposed such that the first electrical component is disposed at the lower surface, and that the second electrical component is disposed at the upper surface; a signal pin configured to be inserted into the communication hole such that a coaxial line is formed with an inner wall surface of the communication hole, the signal pin being configured such that one end of the signal pin is electrically connected to

## Claims

1. An electrical connection socket for relaying transmission and reception of an electrical signal between a first electrical component and a second electrical component, the electrical connection socket comprising:

a metal housing including a communication hole for communicating between an upper surface of the metal housing and a lower surface of the metal housing, the metal housing being disposed such that the first electrical component is disposed at the lower surface, and that the second electrical component is disposed at the upper surface;

a signal pin configured to be inserted into the communication hole such that a coaxial line is formed with an inner wall surface of the communication hole, the signal pin being configured such that one end of the signal pin is electrically connected to a terminal of the first electrical component, and that another end of the signal pin is electrically connected to a terminal of the second electrical component;

a first holding member configured to hold the signal pin in the communication hole such that an outer peripheral surface of the signal pin is spaced from the inner wall surface of the communication hole, the first holding member having an annular

shape and being press-fitted and fixed to the communication hole in an upper region in the communication hole; and

a second holding member configured to hold the signal pin in the communication hole such that an outer peripheral surface of the signal pin is spaced from the inner wall surface of the communication hole, the second holding member having an annular shape and being press-fitted and fixed to the outer peripheral surface of the signal pin and engaged in a lower region in the communication hole,

wherein a characteristic impedance of a signal path formed by the signal pin is lower than a predetermined characteristic impedance serving as a reference in a first region and a second region,

the first region being a region where the signal pin is held by the first holding member,

the second region being a region where the signal pin is held by the second holding member,

the characteristic impedance matches the predetermined characteristic impedance in a third region between the first region and the second region of the signal path, and

the characteristic impedance is higher than the predetermined characteristic impedance in a fourth region adjacent to the upper side of the first region of the signal path and in a fifth region adjacent to the lower side of the second region of the signal path,

wherein the fourth region is set to a region where the signal pin protrudes upward from the communication hole, and

wherein the fifth region is set to a region where the signal pin forms the coaxial line with the inner wall surface of the communication hole, and a distance between the outer peripheral surface of the signal pin and the inner wall surface of the communication hole in the fifth region is greater than a distance between the outer peripheral surface of the signal pin and the inner wall surface of the communication hole in the third region.

2. The electrical connection socket according to claim 1, wherein the signal pin includes:

a pin barrel fixed by the holding member in the communication hole; and

a first plunger and a second plunger coupled to the pin barrel at an upper end portion and a lower end portion of the pin barrel, respectively, such that the first plunger and the second plunger are slidable in a vertical direction.

3. The electrical connection socket according to claim 2,

wherein the pin barrel is fixed so as to be sandwiched from an upper side and a lower side through the first holding member and the second holding member in the communication hole.

4. The electrical connection socket according to claim 1,

wherein the first electrical component is a circuit board; and

wherein the second electrical component is an IC package.