IMPEDANCE CONTROLLED ELECTRICAL CONTACT

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This claims priority to U.S. Patent Application Serial No. 62/816,865 filed March 11, 2019, the disclosure of which is hereby incorporated by reference as if set forth in its entirety herein.

BACKGROUND

[0002] Electrical connectors include an electrically conductive electrical contact that is configured to be placed in electrical communication with first and second electrical components so as to allow data transfer between the first and second electrical components. A radio frequency (RF) electrical contact has a mounting end that is typically mounted to a coaxial cable, and a mating end that typically mates to a printed circuit board, thereby placing the coaxial cable and the printed circuit board in electrical communication with each other. The RF electrical contact can form a separable interface with the printed circuit board.

[0003] Certain types of RF contacts include an outer electrical conductor, an inner electrical conductor, and an electrically insulative spacer disposed between the inner and outer electrical conductors. The inner electrical conductor is configured to mate with the printed circuit board, and further configured to be mounted to the electrical signal conductor of the coaxial cable. The outer electrical conductor is configured to mount to an outer electrical shield or ground of the coaxial cable. In some RF contacts, the inner conductor is movable and spring biased. Accordingly, as the mating end of the inner conductor is placed against the printed circuit board, the spring becomes compressed, thereby applying a biasing force to the inner conductor against the printed circuit board.

[0004] However, movement of the inner electrical conductor of conventional RF contacts can cause impedance to vary along the length of the electrical contact. It is therefore desired to provide an electrical RF contact having a movable inner conductor while achieving a substantially constant impedance profile along its length.

SUMMARY OF THE INVENTION

[0004a] According to a first aspect of the present invention, there is provided an electrical contact comprising:

a stationary electrical contact member; and

a movable electrical contact member that is movable with respect to the stationary electrical contact member from an initial position to a mated position, wherein the movable electrical contact member is biased toward the initial position, and the movable electrical contact member ~~has an outer surface~~ that is in contact with the stationary electrical contact member both

in the initial position and the mated position, ~~and at all positions between the initial position and the mated position,~~

wherein the electrical contact is configured to conduct RF signals within 10 percent of a target impedance both when the movable electrical contact member is in the initial position and when the movable electrical contact member is in the mated position.

[0004b] According to a second aspect of the present invention, there is provided an electrical contact comprising:

a stationary electrical contact member; and

a movable electrical contact member that is movable with respect to the stationary electrical contact member from an initial position to a mated position,

wherein the movable electrical contact member contacts a contact location of the stationary electrical contact member as the movable electrical contact member moves from the initial position to the mated position, and the contact location of the stationary electrical contact member is stationary as the movable electrical contact member moves from the initial position to the mated position, and

wherein the electrical contact is configured to transmit RF signals through approximately 67 GHz.

[0004c] According to a third aspect of the present invention, there is provided an electrical contact comprising:

a stationary electrical contact member; and

a movable electrical contact member that is movable with respect to the stationary electrical contact member in a rearward direction from an initial position to a mated position, wherein the movable electrical contact member is in contact with the stationary electrical contact member both in the initial position and the mated position, and at all positions between the initial position and the mated position,

wherein the movable electrical contact member tapers as it extends in a forward direction to a front end that defines a signal mating end of the electrical contact, and the forward direction is opposite the rearward direction, and

wherein the electrical contact is configured to transmit RF signals through approximately 67 GHz.

[0004d] According to a fourth aspect of the present invention, there is provided an electrical contact comprising:

an electrically conductive outer housing having a front end; and

an inner electrical contact including:

a stationary inner electrical contact member that defines first and second cantilevered arms that terminate at a distal end of the stationary inner electrical contact member; and

a movable inner electrical contact member that projects from the front end of the electrically conductive outer housing, wherein the movable inner electrical contact member is movable with respect to the stationary electrical contact member in a rearward direction from an initial position to a mated position, wherein the movable electrical contact member is in contact with the first and second cantilevered arms both in the initial position and the mated position, and at all positions between the initial position and the mated position,

wherein the electrically conductive outer housing defines a first zone having a first inner cross-sectional dimension, and a second zone having a second inner cross-sectional dimension that is greater than the first inner cross-sectional dimension, wherein the first zone is disposed forward of the second zone, and the first zone defines the front end of the electrically conductive outer housing, and

wherein the distal end of the stationary inner electrical contact member is disposed in the second ~~transition~~ zone of the electrically conductive outer housing.

[0004e] According to a fifth aspect of the present invention, there is provided an electrical contact comprising:

a stationary electrical contact member; ~~and~~

a movable electrical contact member that defines a signal mating end and is movable with respect to the stationary electrical contact member from an initial position to a mated position, wherein the movable electrical contact member is in contact with the stationary electrical contact member both in the initial position and the mated position; and

an electrically conductive outer housing that defines a ground mating end,

wherein the electrical contact is configured to conduct RF signals within 10 percent of a target impedance both when the movable electrical contact member is in the initial position and when the movable electrical contact member is in the mated position, and

wherein the signal mating end and the ground mating end are configured to be brought against a substrate so as to place the electrical contact in electrical communication with the substrate.

BRIEF DESCRIPTION OF THE DRAWINGS

[0005] Fig. 1 is a perspective view of an array of RF electrical contacts supported by an array housing;

[0006] Fig. 2A is a perspective view of an RF electrical contact of the RF electrical contacts of Fig. 1 shown in an initial configuration prior to being mated with a printed circuit board;

[0007] Fig. 2B is a perspective view of the RF electrical contact illustrated in Fig. 2A, but shown in a mated configuration when mated with a printed circuit board;

[0021]

[0022]

DETAILED DESCRIPTION

[0023] Referring to Figs. 1-2D, an array 10 of electrical contacts 20 can include a plurality of electrical contacts 20 and an array housing 12 that supports the electrical contacts 20. In particular, the array housing 12 can support the electrical contacts 20 such that the electrical contacts 20 are aligned with each other along one or more columns and one or more rows that are substantially perpendicular to the one or more columns. That is, respective central axes 31 (see Fig. 3A) of the electrical contacts 20 can be aligned with each other along one or more columns and one or more rows. The array housing 12 defines a front end 13 and a rear end 15 opposite the front end 13 along a longitudinal direction that is perpendicular to each of the columns and rows. The front end 13 is spaced from the rear end 15 in a forward direction. Conversely, the rear end 15 is spaced from the front end 13 in a rearward direction opposite the forward direction.

[0024] Each of the electrical contacts 20 can include a signal contact member that defines a first or signal mating end 23, and a ground contact member 14 that defines a second or ground mating end 25. In particular, each of the electrical contacts can include an outer housing 22 that defines the ground contact member 14. The outer housing 22 includes an outer housing body 27, and the signal mating end 23~~ground mating end 25~~ projects out from outer housing body 27. The signal mating end 23 and the ground mating end 25 can each project out from the front end 13 in the forward direction. In particular, the array housing 12 defines an aperture 16 that extends through the front end 13. The signal mating end 23 and the ground mating end 25 extend through the aperture 16 in the forward direction. Further, the front end 13 defines an internal surface 17 that defines the aperture 16.

member 30 between the substrate 48 and the RF signal conductor 72 of the electrical cable 71. In one example, the RF signal conductor 72 can couple to the stationary inner contact member 30 in any suitable manner as desired. For instance, the RF signal conductor 72 can extend into the inner channel 51 of the stationary inner contact member 30 in the forward direction. Thus, the RF signal conductor 72 is placed in electrical communication with the stationary inner contact member 30 with respect to electrical conduction. The RF signal conductor 72 can be soldered or otherwise secured to the stationary inner contact member 30.

[0057] The electrical shield 76 can be coupled to the outer housing 22, thereby placing the electrical shield 76 in electrical communication with the outer housing 22 with respect to electrical conduction. In this regard, the outer housing 22 can be configured as an outer electrical contact. The outer housing 22 can be mated with an electrical ground contact pad of the substrate 48. In particular, the ground mating end 25 is configured to be brought against the electrical ground contact pad ~~when the inner contact~~. The ~~ground~~ signal mating end ~~25~~ 23 projects out from the front end of the outer housing 22. In particular, the ~~ground~~ signal mating end ~~25~~ 23 can project out from the front end of the outer housing 22 in the forward direction.

[0058] Referring also to Fig. 1, the ground mating end 25 at least partially surrounds the signal mating end 23. In particular, the ground mating end 25 at least partially surrounds the signal mating end 23 in a plane that is oriented perpendicular to the central axis 31. For instance, the ground mating end 25 can entirely surround the signal mating end 23. That is, the ground mating end 25 can extend continuously and uninterrupted about an entirety of the signal mating end 23 in the plane that is oriented perpendicular to the central axis 31. For example, the ground mating end 25 can be circular in the plane. It should be appreciated, however, that the ground mating end 25 can define any suitable alternative shape in the plane as desired.

[0059] Alternatively, referring now to Fig. 7, the ground mating end 25 can partially surround the signal mating end 23. In particular, the ground mating end 25 can partially surround the signal mating end 23 in a plane that is oriented perpendicular to the central axis 31. Thus, the ground mating end 25 can surround a portion of the signal mating end 23. In one example, the ground contact member 14 can define at least one recess 19 that extends radially through the ground mating end 25 in the plane. Thus, the ground mating end 25 can be discontinuous as it extends about the signal mating end 23 in the plane. In one example, the ground mating end 25 can define at least two segments 25a and 25b in the plane. The

ground mating end 25 can define respective recesses 19 that are disposed between the segments 25a and 25b in the plane. The recesses 19 between the first and second segments

What is Claimed:

1. An electrical contact comprising:

a stationary electrical contact member; and

a movable electrical contact member that is movable with respect to the stationary electrical contact member from an initial position to a mated position, wherein the movable electrical contact member is biased toward the initial position, and the movable electrical contact member ~~has an outer surface that~~ is in contact with the stationary electrical contact member both in the initial position and the mated position, ~~and at all positions between the initial position and the mated position,~~

wherein the electrical contact is configured to conduct RF signals within 10 percent of a target impedance both when the movable electrical contact member is in the initial position and when the movable electrical contact member is in the mated position.

2. The electrical contact as recited in claim 1, wherein the target impedance is 50 Ω.

3. The electrical contact as recited in any one of the preceding claims, wherein the electrical contact is configured to conduct RF signals~~single-ended impedance is~~ within 3 Ω of the target impedance.

4. The electrical contact as recited in any one of the preceding claims, wherein the electrical contact is configured to conduct RF signals~~single-ended impedance is~~ within 1 Ω of the target impedance.

5. The electrical contact as recited in any one of the preceding claims, wherein the movable electrical contact member contacts a contact location of the stationary electrical contact member as the movable electrical contact member moves from the initial position to the mated position, and the contact location of the stationary electrical contact member is stationary as the movable electrical contact member moves from the initial position to the mated position.

6. The electrical contact as recited in claim 5, further comprises an electrically conductive outer housing that is electrically isolated from each of the movable and stationary electrical contact members.

7. The electrical contact as recited in claim 6, wherein the electrically conductive housing defines a first zone having a first inner cross-sectional dimension, and a second zone having a second inner cross-sectional dimension that is greater than the first inner cross-sectional dimension.

8. The electrical contact as recited in claim 7, wherein the second zone is aligned with a distal free end of the stationary electrical contact member.

9. The electrical contact as recited in any one of claims 6 to 8, wherein the contact defines a gap that extends from the movable inner contact member to the outer housing, and the gap is at least approximately 5 mils.

10. The electrical contact as recited in any one of claims 7 to 9, further comprising an electrically insulative spacer that extends from the stationary electrical contact member to the outer housing.

11. The electrical contact as recited in any one of the preceding claims, wherein the outer surface of the movable inner contact member is tapered from a first region to a front end that is configured to mate with an electrical contact pad of a substrate.

12. The electrical contact as recited in claim 11, wherein the outer surface of the movable inner member tapers from a first cross-sectional dimension to a second cross-sectional dimension that ranges from 50 percent to 90 percent of the first cross-sectional dimension.

13. The electrical contact as recited in claim 12, wherein the second cross-sectional dimension is approximately five-sixths of the first cross-sectional dimension.

~~14. The electrical contact as recited in any one of the preceding claims, wherein the movable electrical contact member is biased toward the initial position.~~

~~15~~14. The electrical contact as recited in any one of the preceding claims, wherein the stationary electrical contact member comprises at least one arm that defines a distal end of the stationary electrical contact member, and the movable electrical contact member is in contact with the distal end both in the initial position and the mated position, and at all positions between the initial position and the mated position.

~~16~~15. The electrical contact as recited in claim ~~15~~14, wherein the at least one arm of the stationary electrical contact member comprises first and second cantilevered arms.

~~17~~16. The electrical contact as recited in claim ~~16~~15, wherein each of the first and second cantilevered arms are resilient and deflected outward, and apply an inward spring force against the movable electrical contact member.

~~18~~17. The electrical contact as recited in any one of the preceding claims, wherein the electrical contact is an RF electrical contact.

~~19~~18. The electrical contact as recited in any one of the preceding claims, wherein the electrical contact transmits RF signals through approximately 67 GHz.

~~20~~19. The electrical contact as recited in any one of the preceding claims, wherein the electrical contact transmits RF signals through approximately 72 GHz.

~~21~~20. The electrical contact as recited in any one of the preceding claims, wherein the electrical contact transmits RF signals through approximately 108 GHz.

~~22~~21. The electrical contact as recited in any one of the preceding claims, wherein the movable electrical contact defines a first mating end, the electrical contact is elongate along a central axis, and the electrical contact further comprises a ground contact member that defines a second mating end that at least partially surrounds the first mating end in a plane that is oriented substantially perpendicular to the central axis.

~~23~~22. The electrical contact as recited in claim ~~22~~21, wherein the second mating end extends about an entirety of the first mating end in the plane.

~~24~~23. An array of electrical contacts, comprising:

an array housing; and

the electrical contact as recited in claim 23 supported by the array housing, wherein the array housing includes an internal surface that defines a recess that surrounds an entirety of the ground mating end.

~~25~~24. The array of electrical contacts as recited in claim ~~24~~23, wherein the array housing is electrically conductive.

~~26~~25. The electrical contact as recited in claim ~~22~~21, wherein the second mating end extends about a portion less than an entirety of the first mating end in the plane.

~~27~~26. An array of electrical contacts, comprising:

an array housing; and

the electrical contact as recited in claim ~~25~~ 24 supported by the array housing, wherein the array housing includes an internal surface that defines a recess that partially surrounds the ground mating end,

wherein the internal surface further defines a channel that extends from the recess toward an outer perimeter of the array housing.

~~28~~27. The array of electrical contacts as recited in claim ~~27~~26, wherein the channel extends from the recess to the outer perimeter of the array housing.

~~29~~28. The array of electrical contacts as recited in any one of claims ~~27~~ 26 to ~~28~~27, wherein the array housing is electrically conductive.

~~30~~29. A cellular transmission tower comprising the electrical contact as recited in any one of claims 1 to ~~23~~ 22 and ~~26~~25.

~~31~~30. A chip testing system comprising the electrical contact as recited in any one of claims 1 to ~~23~~ 22 and ~~26~~25.

~~32~~31. An electrical contact comprising:

a stationary electrical contact member; and

a movable electrical contact member that is movable with respect to the stationary electrical contact member from an initial position to a mated position,

wherein the movable electrical contact member contacts a contact location of the stationary electrical contact member as the movable electrical contact member moves from the initial position to the mated position, and the contact location of the stationary electrical contact member is stationary as the movable electrical contact member moves from the initial position to the mated position, and

wherein the electrical contact is configured to transmit RF signals through approximately 67 GHz.

~~33~~32. The electrical contact as recited in claim ~~32~~31, wherein the stationary electrical contact member comprises a base portion and first and second cantilevered arms that extend out from the base portion to a distal end, and the distal end defines the stationary contact location of the stationary electrical contact member.

~~34~~33. The electrical contact as recited in claim ~~33~~32, wherein each of the first and second cantilevered arms are resilient, and the movable electrical contact member deflects the cantilevered arms outward, such that the cantilevered arms apply an inward spring force against the movable electrical contact member.

~~35~~34. The electrical contact as recited in any one of claims ~~33~~ 32 to ~~34~~33, wherein each of the first and second cantilevered arms is tapered inwardly toward the movable electrical contact member as it extends away from the base portion.

~~36~~35. The electrical contact as recited in any one of claims ~~32~~ 31 to ~~35~~34, wherein the stationary~~outer~~ electrical contact member is spaced from the ~~inner~~ moveable electrical contact member at all locations except for the stationary contact location when the ~~inner~~ movable electrical contact member has moved from the initial position toward the mating position.

~~37~~36. The electrical contact as recited in claim ~~36~~35, wherein the ~~outer~~ stationary electrical contact member is spaced from the ~~inner~~ movable electrical contact member at all locations except for the stationary contact location when the ~~inner~~ movable electrical contact member is in the mating position.

~~38~~37. The electrical contact as recited in any one of claims ~~33~~ 32 to ~~37~~36, further comprises an electrically conductive outer housing that is electrically isolated from each of the movable and stationary electrical contact members, wherein the electrically conductive housing defines a first zone having a first inner cross-sectional dimension, and a second zone having a second inner cross-sectional dimension that is greater than the first inner cross-sectional dimension.

~~39~~38. The electrical contact as recited in claim ~~38~~37, wherein the second zone is aligned with the distal end of the stationary electrical contact member.

~~40~~39. The electrical contact as recited in any one of claims ~~38~~ 37 to ~~39~~38, further comprising an electrically insulative spacer that extends from the stationary electrical contact member to the outer housing.

~~41~~40. The electrical contact as recited in claim ~~40~~39, wherein the stationary electrical contact member receives the movable electrical contact member.

~~42~~41. The electrical contact as recited in any one of claims ~~32~~ 31 to ~~41~~40, wherein the movable electrical contact member is biased toward the initial position.

~~43~~42. The electrical contact as recited in any one of claims ~~32~~ 31 to ~~42~~41, wherein the electrical contact is an RF electrical contact.

~~44. The electrical contact as recited in any one of claims 32 to 43, wherein the electrical contact is configured to transmit RF signals through approximately 67 GHz.~~

~~45~~43. The electrical contact as recited in any one of claims ~~32~~ 31 to ~~44~~42, wherein the electrical contact is configured to transmit RF signals through approximately 72 GHz.

~~46~~44. The electrical contact as recited in any one of claims ~~32~~ 31 to ~~45~~43, wherein the electrical contact is configured to transmit RF signals through approximately 108 GHz.

~~47~~45. An electrical contact comprising:

a stationary electrical contact member; and

a movable electrical contact member that is movable with respect to the stationary electrical contact member in a rearward direction from an initial position to a mated position, wherein the movable electrical contact member is in contact with the stationary electrical contact member both in the initial position and the mated position, and at all positions between the initial position and the mated position,

wherein the movable electrical contact member tapers as it extends in a forward direction to a front end that defines a signal mating end of the electrical contact, and the forward direction is opposite the rearward direction, and

wherein the electrical contact is configured to transmit RF signals through approximately 67 GHz.

~~48~~46. The electrical contact as recited in claim ~~47~~45, wherein the movable electrical contact member contacts a contact location of the stationary electrical contact member as the movable electrical contact member moves from the initial position to the mated position, and the contact location of the stationary electrical contact member is stationary as the movable electrical contact member moves from the initial position to the mated position.

~~49~~47. The electrical contact as recited in claim ~~48~~46, further comprises an electrically conductive outer housing that is electrically isolated from each of the movable and stationary electrical contact members, wherein the electrically conductive housing defines a first zone having a first inner cross-sectional dimension, and a second zone having a second inner cross-sectional dimension that is greater than the first inner cross-sectional dimension.

~~50~~48. The electrical contact as recited in claim ~~49~~47, wherein the second zone is aligned with a distal free end of the stationary electrical contact member.

~~51~~49. The electrical contact as recited in any one of claims ~~49~~ 47 to ~~50~~48, further comprising an electrically insulative spacer that extends from the stationary electrical contact member to the outer housing.

~~52~~50. The electrical contact as recited in any one of claims ~~47~~ 45 to ~~51~~49, wherein the movable electrical contact member is biased toward the initial position.

~~53~~51. The electrical contact as recited in any one of claims ~~47~~ 45 to ~~52~~50, wherein the stationary electrical contact member comprises first and second cantilevered arms that define a distal end of the stationary electrical contact member, and the movable electrical contact member is in contact with the distal end both in the initial position and the mated position, and at all positions between the initial position and the mated position.

~~54~~52. The electrical contact as recited in claim ~~53~~51, wherein each of the first and second cantilevered arms are resilient and deflected outward, and apply an inward spring force against the movable electrical contact member.

~~55~~53. The electrical contact as recited in any one of claims ~~47~~ 45 to ~~54~~52, wherein the electrical contact is configured to transmit RF signals through approximately 72 GHz.

~~56~~54. The electrical contact as recited in any one of claims ~~47~~ 45 to ~~55~~53, wherein the electrical contact is configured to transmit RF signals through approximately 108 GHz.

~~57~~55. An electrical contact comprising:

an electrically conductive outer housing having a front end; and

an inner electrical contact including:

a stationary inner electrical contact member that defines first and second cantilevered arms that terminate at a distal end of the stationary inner electrical contact member; and

a movable inner electrical contact member that projects from the front end of the electrically conductive outer housing, wherein the movable inner electrical contact member is movable with respect to the stationary electrical contact member in a rearward direction from an initial position to a mated position, wherein the movable electrical

contact member is in contact with the first and second cantilevered arms both in the initial position and the mated position, and at all positions between the initial position and the mated position,

wherein the electrically conductive outer housing defines a first zone having a first inner cross-sectional dimension, and a second zone having a second inner cross-sectional dimension that is greater than the first inner cross-sectional dimension, wherein the first zone is disposed forward of the second zone, and the first zone defines the front end of the electrically conductive outer housing, and

wherein the distal end of the stationary inner electrical contact member is disposed in the second ~~transition~~ zone of the electrically conductive outer housing.

~~58~~56. The electrical contact as recited in claim ~~57~~55, wherein each of the first and second cantilevered arms are resilient, and the movable electrical contact member deflects the cantilevered arms outward, such that the first and second cantilevered arms apply an inward spring force against the movable electrical contact member.

~~59~~57. The electrical contact as recited in any one of claims ~~57~~ 55 to ~~58~~56, wherein each of the first and second cantilevered arms is tapered inwardly toward the movable electrical contact member as it extends away from the base portion.

~~60~~58. The electrical contact as recited in any one of claims ~~57~~ 55 to ~~59~~57, wherein the electrically conductive outer ~~electrical contact member~~housing is spaced from the inner electrical contact ~~member~~ at all locations except for the distal end of the stationary inner contact member when the inner electrical contact member has moved from the initial position toward the mating position.

~~61~~59. The electrical contact as recited in claim ~~60~~58, wherein the electrically conductive outer ~~electrical contact member~~housing is spaced from the inner electrical contact ~~member~~ at all locations except for the distal end when the inner electrical contact member is in the mating position.

~~62~~60. The electrical contact as recited in any one of claims ~~57~~ 55 to ~~61~~59, wherein the electrically conductive outer housing is electrically isolated from each of the movable and stationary inner electrical contact members.

~~63~~61. The electrical contact as recited in any one of claims ~~57~~ 55 to ~~62~~60, further comprising an electrically insulative spacer that extends from the stationary inner electrical contact member to the outer housing.

~~64~~62. The electrical contact as recited in any one of claims ~~57~~ 55 to ~~63~~61, wherein the movable inner electrical contact member is biased toward the initial position.

~~65~~63. The electrical contact as recited in any one of claims ~~57~~ 55 to ~~64~~62, wherein the electrical contact is an RF electrical contact.

~~66~~64. An electrical contact comprising:

a stationary electrical contact member; ~~and~~

a movable electrical contact member that defines a signal mating end and is movable with respect to the stationary electrical contact member from an initial position to a mated position, wherein the movable electrical contact member is in contact with the stationary electrical contact member both in the initial position and the mated position; and

an electrically conductive outer housing that defines a ground mating end,

wherein the electrical contact is configured to conduct RF signals within 10 percent of a target impedance both when the movable electrical contact member is in the initial position and when the movable electrical contact member is in the mated position, and

wherein the signal mating end and the ground mating end are configured to be brought against a substrate so as to place the electrical contact in electrical communication with the substrate.

~~67~~65. The electrical contact as recited in claim ~~66~~64, wherein the target impedance is 50 Ω.

~~68~~66. The electrical contact as recited in any one of claims ~~66~~ 64 to ~~67~~65, wherein the electrical contact is configured to conduct RF signals~~single-ended impedance~~ is within 3 Ω of the target impedance.

~~69~~67. The electrical contact as recited in any one of claims ~~66~~ 64 to ~~68~~66, wherein the electrical contact is configured to conduct RF signals~~single-ended impedance~~ is within 1 Ω of the target impedance.

~~70~~68. The electrical contact as recited in any one of claims ~~66~~ 64 to ~~69~~67, wherein the movable electrical contact member contacts a contact location of the stationary electrical contact member as the movable electrical contact member moves from the initial position to the mated position, and the contact location of the stationary electrical contact member is stationary as the movable electrical contact member moves from the initial position to the mated position.

~~71~~69. The electrical contact as recited in claim ~~70~~68, further comprises an electrically conductive outer housing that is electrically isolated from each of the movable and stationary electrical contact members.

~~72~~70. The electrical contact as recited in claim ~~71~~69, wherein the electrically conductive housing defines a first zone having a first inner cross-sectional dimension, and a second zone having a second inner cross-sectional dimension that is greater than the first inner cross-sectional dimension.

~~73~~71. The electrical contact as recited in claim ~~72~~70, wherein the second zone is aligned with a distal free end of the stationary electrical contact member.

~~74~~72. The electrical contact as recited in any one of claims ~~71~~ 69 to ~~73~~71, wherein the contact defines a gap that extends from the movable inner contact member to the outer housing, and the gap is at least approximately 5 mils.

~~75~~73. The electrical contact as recited in any one of claims ~~72~~ 70 to ~~74~~72, further comprising an electrically insulative spacer that extends from the stationary electrical contact member to the outer housing.

~~76~~74. The electrical contact as recited in any one of claims ~~66~~ 64 to ~~75~~73, wherein the outer surface of the movable inner contact member is tapered from a first region to a front end that is configured to mate with an electrical contact pad of a substrate.

~~77~~75. The electrical contact as recited in claim ~~76~~74, wherein the outer surface of the movable inner member tapers from a first cross-sectional dimension to a second cross-sectional dimension that ranges from 50 percent to 90 percent of the first cross-sectional dimension.

~~78~~76. The electrical contact as recited in claim ~~77~~75, wherein the second cross-sectional dimension is approximately five-sixths of the first cross-sectional dimension.

~~79~~77. The electrical contact as recited in any one of claims ~~66~~ 64 to ~~78~~76, wherein the movable electrical contact member is biased toward the initial position.

~~80~~78. The electrical contact as recited in any one of claims ~~66~~ 64 to ~~79~~77, wherein the stationary electrical contact member comprises at least one arm that defines a distal end of the stationary electrical contact member, and the movable electrical contact member is in contact with the distal end both in the initial position and the mated position, and at all positions between the initial position and the mated position.

~~81~~79. The electrical contact as recited in claim ~~80~~78, wherein the at least one arm of the stationary electrical contact member comprises first and second cantilevered arms.

~~82~~80. The electrical contact as recited in claim ~~81~~79, wherein each of the first and second cantilevered arms are resilient and deflected outward, and apply an inward spring force against the movable electrical contact member.

~~83~~81. The electrical contact as recited in any one of claims ~~66~~ 64 to ~~82~~80, wherein the electrical contact is an RF electrical contact.

~~84~~82. The electrical contact as recited in any one of claims ~~66~~ 64 to ~~82~~80, wherein the electrical contact transmits RF signals through approximately 67 GHz.

~~85~~83. The electrical contact as recited in any one of claims ~~66~~ 64 to ~~82~~80, wherein the electrical contact transmits RF signals through approximately 72 GHz.

~~86~~84. The electrical contact as recited in any one of claims ~~66~~ 64 to ~~85~~83, wherein the electrical contact transmits RF signals through approximately 108 GHz.

~~87~~85. The electrical contact as recited in any one of claims ~~66~~ 64 to ~~86~~84, wherein the movable electrical contact defines a first mating end, the electrical contact is elongate along a central axis, and the electrical contact further comprises a ground contact member that defines a second mating end that at least partially surrounds the first mating end in a plane that is oriented substantially perpendicular to the central axis.

~~88~~86. The electrical contact as recited in claim ~~87~~85, wherein the second mating end extends about an entirety of the first mating end in the plane.