Claims

1. A connection system for transmitting signal cables through tiered stages, wherein at least one stage comprises:

a first signal cable having a center conductor terminated by a first constant impedance receptacle connector or first constant impedance plug connector;

a first connector housing for securing said first signal cable;

a header housing mounted to a first plate, said header housing having a first header housing constant impedance receptacle connector or a first header housing constant impedance plug connector mounted on a first side, and a second header housing constant impedance receptacle connector or a second header housing constant impedance plug connector mounted on a second side opposite said first side, wherein said first header housing connector on said first side is complementary to said first constant impedance receptacle connector or said first constant impedance plug connector of said first signal cable, such that said first connector housing attaches to said header housing on said first side in a constant impedance cable connection; and

a second connector housing a second signal cable, wherein said second signal cable has a center conductor terminated by a second constant impedance receptacle connector or second constant impedance plug connector, wherein said second connector housing second signal cable connector is a complementary connector to said second header housing constant impedance receptacle connector or second header housing constant impedance plug connector on said second side, such that said second connector housing attaches to said header housing on said second side in a constant impedance cable connection.

2. The connection system of claim 1 including a seal located between said header housing connectors on said first and second sides for sealing said center conductor passing therethrough.

3. The connection system of claim 1 wherein said header housing includes a removable attenuator or filter component connected at one end to said header housing constant impedance plug connector and at an opposing end to said header housing constant impedance receptacle connector, for signal attenuation and/or electrical signal filtering of said first and second signal cables.

4. The connection system of claim 1 wherein said first plate is a heat sink or a ground potential or both for constant impedance connectors, attenuators, and/or filters.

5. The connection system of claim 1 wherein said first plate is a refrigeration plate.

6. The connection system of claim 1 wherein said first constant impedance receptacle connector or said first constant impedance plug connector of said first cable includes an attenuator or filter component embedded therein for signal attenuation and/or electrical signal filtering of said first and second signal cables.

7. The connection system of claim 1 wherein said second constant impedance receptacle connector or said second constant impedance plug connector of said second cable includes an attenuator or filter component embedded therein for signal attenuation and/or electrical signal filtering of said first and second signal cables.

8. The connection system of claim 1 wherein additional connection system stages are connected to said at least one stage.

9. A connection system for transmitting signal cables through tiered stages comprising:

a plurality of first signal cables, wherein at least one of said plurality of first signal cables includes a center conductor terminated by a first constant impedance receptacle connector or first constant impedance plug connector;

a first connector housing for securing each of said first signal cables;

a header housing mounted to a first plate, said header housing having said first constant impedance receptacle connector or said first constant impedance plug connector mounted on a first side, and said constant impedance plug connector or said first constant impedance receptacle connector mounted on a second side opposite said first side, wherein said header housing connectors on said first side are complementary connectors to said first constant impedance receptacle connector or said first constant impedance plug connector of said first constant impedance receptacle connector or said first constant impedance plug connector of said at least one of said plurality of first signal cables, such that said first connector housing attaches to said header housing on said first side in a constant impedance cable connection; and

a second connector housing having a plurality of second signal cables, wherein at least one of said plurality of second signal cables has a center conductor terminated by a second constant impedance receptacle connector or second constant impedance plug connector, wherein said second connector housing second signal cable connector is complementary connector to said second constant impedance receptacle connector or said second constant impedance plug connector of said header housing connector on said second side, such that said second connector housing attaches to said header housing on said second side in a constant impedance cable connection.

10. The connection system of claim 9 including:

a lower housing stage having an upper portion and a lower portion, said lower housing stage mounted to a second plate, said lower housing stage upper portion comprising a plurality of modified constant impedance connectors for mating with said plurality of second signal cables extending from said header housing on said second side.

11. The connection system of claim 10, wherein said modified constant impedance connectors each includes an attenuator or filter component embedded therein for signal attenuation or electrical signal filtering, said lower housing stage lower portion including constant impedance connector receptacles or constant impedance plugs terminating with a plurality of third signal cables.

12. The connection system of claim 10 wherein said second plate is a heat sink or a ground potential or both for said modified constant impedance connectors.

13. The connection system of claim 10 wherein said second plate is a refrigeration plate.

14. The connection system of claim 10 wherein said lower housing stage upper portion and lower housing stage lower portion each include extended ribs for attachment to a clamp mounted to said second plate.

15. The connection system of claim 11 wherein said modified constant impedance connector attenuators or filters are press-fit into said lower housing stage upper portion or said lower housing stage lower portion.

16. The connection system of claim 9 including:

a plug housing block or a receptacle housing block for terminating said plurality of second signal cables, wherein said plug housing block includes a constant impedance plug connector for each of said plurality of second signal cables, or a constant impedance receptacle connector for each of said plurality of second signal cables, or some combination thereof;

an adaptor housing having a plurality of apertures for mounting attenuator housings, filter housings, or both, each of said attenuator housings and/or filter housings associated with a signal cable of said plurality of second signal cables, and having a complementary constant impedance connector on a first side of said adaptor housing for connecting with said reciprocal constant impedance connector of plug housing block; and

a receptacle housing block for connecting to said adaptor housing on a second side, said receptacle housing block including a constant impedance plug connector in electrical communication with said plurality of second signal cables, or a constant impedance receptacle connector in electrical communication with said plurality of second signal cables, or some combination thereof, and having a plurality of third signal cables extending therefrom;

wherein said receptacle housing block connected to said adaptor housing on said adaptor housing second side, such that complementary constant impedance connectors of receptacle housing block connect to complementary constant impedance connectors of said adaptor housing second side.

17. The connection system of claim 16 wherein said attenuator housing, said filter housing, or both, each include a resilient component for electrical communication, thermal communication, electromagnetic interference protection, or any combination thereof, to an inner wall of each respective aperture of said adaptor housing.

18. The connection system of claim 11 including at least one additional plate for mounting a second lower housing stage, said second lower housing stage comprising a second set of a plurality of modified constant impedance connectors in electrical communication with said plurality of third signal cables, said second set of modified constant impedance connectors each having a second attenuator or second filter component embedded therein for signal attenuation or electrical signal filtering.

19. The connection system of claim 16 including:

an additional plate;

a second plug housing block or a receptacle housing block mounted to said at least one additional plate, in electrical communication with said third signal cables, wherein said plug housing block includes a constant impedance plug connector for each of said plurality of third signal cables, or a constant impedance receptacle connector for each of said plurality of third signal cables, or some combination thereof;

a second adaptor housing having a plurality of apertures for mounting second attenuator housings, second filter housings, or both, each of said second attenuator housings and/or second filter housings associated with a signal cable of said plurality of third signal cables, and having a complementary constant impedance connector on a first side of said second adaptor housing for connecting with said reciprocal constant impedance connector of second plug housing block; and

a second receptacle housing block for connecting to said second adaptor housing on a second side, said second receptacle housing block including a constant impedance plug connector in electrical communication with said plurality of third signal cables, or a constant impedance receptacle connector in electrical communication with said plurality of third signal cables, or some combination thereof, and having a plurality of fourth signal cables extending therefrom;

wherein said second receptacle housing block is connected to said second adaptor housing on said second adaptor housing second side, such that complementary constant impedance connectors of said second receptacle housing block connect to complementary constant impedance connectors of said second adaptor housing second side.

20. The connection system of claim 11 wherein said attenuator provides up to 40dB attenuation.

21. The connection system of claim 18 wherein said second attenuator provides less than 40dB attenuation.

22. The connection system of claim 9 wherein said constant impedance connectors comprise non-magnetic material.

23. The connection system of claim 9 wherein said constant impedance receptacle connector includes a stabilizing bobbin around the center conductor to facilitate matched impedance.

24. The connection system of claim 18 wherein said first and second attenuators or filters are in a casing, said casing being secured within an internal cavity of said modified constant impedance connector housing.

25. The connection system of claim 11 wherein said plurality of second signal cables or said plurality of third signal cables, or both, comprise superconducting cabling material.

26. A method of connecting electrical cables in a tiered staged connection system, comprising forming a first stage connection by:

connecting a first signal cable having a center conductor terminated by a first constant impedance receptacle connector or a first constant impedance plug connector to a first connector housing;

mounting a first header housing constant impedance receptacle connector or a first header housing constant impedance plug connector mounted on a first side of a header housing;

mounting a second header housing constant impedance receptacle connector or a second header housing constant impedance plug connector mounted on a second side of said

header housing opposite said first side, wherein said first header housing connector on said first side is complementary to said first constant impedance receptacle connector or said first constant impedance plug connector of said first signal cable, such that said first connector housing attaches to said header housing on said first side in a constant impedance cable connection;

mounting said header housing to a first plate,

connecting a second signal cable to a second connector housing, wherein said second signal cable has a center conductor terminated by a second constant impedance receptacle connector or second constant impedance plug connector, wherein said second connector housing second signal cable connector is a complementary connector to said second header housing constant impedance receptacle connector or said second header housing constant impedance plug connector on said second side, such that said second connector housing attaches to said header housing on said second side in a constant impedance cable connection; and

mounting said second connector housing to said header housing.

27. The method of claim 26 including inserting a seal located between said header housing connectors on said first and second sides for sealing said center conductor passing therethrough.

28. The method of claim 26 including connecting a removable attenuator or filter component at one end to said header housing constant impedance plug connector and at an opposing end to said header housing constant impedance receptacle connector, for signal attenuation and/or electrical signal filtering of said first and second signal cables.

29. The method of claim 26 including embedding an attenuation or filtering component or both within an adaptor removably insertable within an adaptor housing.

30. The method of claim 29 including connecting said adaptor housing at one end to said header housing constant impedance plug connector and at an opposing end to said header housing constant impedance receptacle connector.

31. The method of claim 26 including electrically connecting a second stage connection to said first stage connection.

32. The method of claim 31 wherein said second stage connection includes a second stage upper connector housing, a second stage header housing mounted to a plate, and a second stage lower connector housing, wherein complementary constant impedance plugs and receptacles are mounted to said second stage upper connector housing, said second stage header housing, and said second stage lower connector housing, to form constant impedance electrical connections for signal cables passing therethrough.