communicatively coupled to the plurality of cabin services to provide control of the plurality of cabin services. The control module includes at least one communication port; and a plurality of relays coupled to the communication port, wherein the communication port corresponds to the plurality of cabin services, and wherein each relay of the plurality of relays provide discrete control of an associated cabin service of the plurality of cabin services.

In another embodiment, the disclosed control module unit of a cabin service system comprising a pair of power rails and a plurality of cabin services may include a plurality of communication ports, and a plurality of relays coupled to at least one communication port of the plurality of communication ports, wherein each communication port of the plurality of communication ports corresponds to at least one cabin service of a plurality of cabin services, and wherein each relay of the plurality of relays provides discrete control of an associated cabin service of the plurality of cabin services.

In another embodiment, also disclosed is a method for installing a cabin service system in a vehicle, the method may include the steps of: (1) coupling a pair of power rails to a support structure of the vehicle, (2) coupling a control module unit to the pair of power rails, the pair of power rails providing electrical power to and mechanical attachment of the control module unit, and (3) ~~communicatively~~ coupling the control module unit to a plurality of cabin services. The control module unit includes a plurality of communication ports; and a plurality of relays coupled to at least one communication port of the plurality of communication ports, wherein each communication port of the plurality of communication ports corresponds to at least one cabin service of the plurality of cabin services, and wherein each relay of the plurality of relays provides discrete control of an associated cabin service of the plurality of cabin services.

Other embodiments of the disclosed cabin service system and control module unit will become apparent from the following detailed description, the accompanying drawings and the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a block diagram of one embodiment of the disclosed cabin service system;

Fig. 2 is a schematic illustration of one implementation of the disclosed cabin service system;

Fig. 3 is a perspective view of a portion of one embodiment of the control module unit of the disclosed cabin service system;

Fig. 4 is a schematic illustration of the operation of the power rails of the disclosed cabin service system with circuits connected thereto;

Fig. 5 is a schematic illustration of one embodiment of the simplified overhead electronics unit of the disclosed cabin service system;

CLAIMS:

1. A cabin service system comprising:

a control module unit;

a pair of power rails, said power rails being configured to provide mechanical attachment and electrical power to said control module unit; and

a plurality of cabin services,

wherein said control module is communicatively coupled to said plurality of cabin services to provide control of said plurality of cabin services.

2. The cabin service system of Claim 1 wherein said control module comprises:

at least one communication port; and

a plurality of relays coupled to said communication port,

wherein said communication port corresponds to said plurality of cabin services and

wherein each relay of said plurality of relays provide discrete control of an associated cabin service of said plurality of cabin services.

3. The cabin service system of Claim 1 wherein said control module comprises:

a plurality of communication ports; and

a plurality of relays coupled to at least one communication port of said plurality of communication ports,

wherein each communication port of said plurality of communication ports corresponds to at least one cabin service of said plurality of cabin services, and

wherein each relay of said plurality of relays provides discrete control of an associated cabin service of said plurality of cabin services.

4. The cabin service system of Claim 3 wherein at least one communication port of said plurality of communication ports is coupled to an associated cabin service of said plurality of cabin services to transmit data to said associated cabin service.

5. The cabin service system of Claim 3 or 4 wherein said plurality of communication ports is selected from a group consisting of an infrared port, an Ethernet port, a controller area network port, and an RS-485 port.

6. The cabin service system of any one of Claims 1 to 5 wherein said control module unit comprises:

at least one electrical spring contact detachably connected to at least one power rail of said pair of power rails to provide electrical power said control module unit; and

at least one non-conductive spring clip detachably connected to said at least one power rail to provide mechanical attachment of said control module unit to said at least one power rail.

7. The cabin service system of any one of Claims 1 to 6 comprising at least one control panel communicatively coupled to said control module unit, wherein said control panel transmits control signals to said control module unit to control said plurality of cabin services.

8. The cabin service system of any one of Claims 1 to 7 comprising:

a power source; and

a simplified overhead electronics unit coupled to the power source via a non-essential power bus and an essential power bus,

wherein said simplified overhead electronics unit provides a power output to said pair of power rails.

9. The cabin service system of Claim 8 wherein said simplified overhead electronics unit comprises:

a first converter to convert power on said non-essential power bus from 115V AC to 12V DC;

a second converter to convert power on said essential power bus from 28V DC to 12V DC; and

a relay to switch said power output from said non-essential power bus to said essential power bus when said essential power bus is energized.

10. The cabin service system of Claim 8 or 9 comprising:

a first electrical circuit coupled to said pair of power rails and said simplified overhead electronics unit to provide power for operation of essential functions while electrically connected to said pair of power rails; and

a second electrical circuit coupled to said pair of power rails and said simplified overhead electronics unit to provide power for operation of non-essential functions while electrically connected to said pair of power rails.

11. A control module unit of a cabin service system comprising a pair of power rails and a plurality of cabin services, said control module unit comprising:

a plurality of communication ports; and

a plurality of relays coupled to at least one communication port of said plurality of communication ports,

wherein each communication port of said plurality of communication ports corresponds to at least one cabin service of said plurality of cabin services, and

wherein each relay of said plurality of relays provides discrete control of an associated cabin service of said plurality of cabin services.

12. The control module unit of Claim 11 wherein at least one communication port of said plurality of communication ports is coupled to an associated cabin service of said plurality of cabin services to transmit data to said associated cabin service.

13. The control module unit of Claim 11 or 12 wherein said plurality of communication ports is selected from a group consisting of an infrared port, an Ethernet port, a controller area network port, and an RS-485 port.

14. The control module unit of any one of Claims 11 to 13 comprising:

at least one electrical spring contact detachably connected to at least one power rail of said pair of power rails to provide electrical power said control module unit; and

at least one non-conductive spring clip detachably connected to said at least one power rail to provide mechanical attachment of said control module unit to said at least one power rail.

15. The control module unit of any one of Claims 11 to 14 wherein said pair of power rails is coupled to a simplified overhead electronics unit, wherein said simplified overhead electronics unit is coupled to a power source via a non-essential power bus and an essential power bus, and wherein said simplified overhead electronics unit provides a power output to said pair of power rails.

16. The control module unit of Claim 15 comprising:

a first electrical circuit coupled to said pair of power rails and said simplified overhead electronics unit to provide power for operation of essential functions while electrically connected to said pair of power rails; and

a second electrical circuit coupled to said pair of power rails and said simplified overhead electronics unit to provide power for operation of non-essential functions while electrically connected to said pair of power rails,

wherein said first electrical circuit and said second electrical circuit operate alternately based upon a polarity of said power output to said pair of power rails.

17. A method for installing a cabin service system in a vehicle, said method comprising:

coupling a pair of power rails to a support structure of said vehicle;

coupling a control module unit to said pair of power rails, said pair of power rails providing electrical power to and mechanical attachment of said control module unit; and

coupling said control module unit to a plurality of cabin services.

18. The method of Claim 17 wherein said control module comprises:

a plurality of communication ports; and

a plurality of relays coupled to at least one communication port of said plurality of communication ports,

wherein each communication port of said plurality of communication ports corresponds to at least one cabin service of said plurality of cabin services, and

wherein each relay of said plurality of relays provides discrete control of an associated cabin service of said plurality of cabin services.

19. The method of Claim 18 wherein said plurality of communication ports is selected from a group consisting of an infrared port, an Ethernet port, a controller area network port, and an RS-485 port.

20. The method of any one of claims 17 to 19, comprising:

coupling said pair of power rails to a simplified overhead electronics unit;

coupling said simplified overhead electronics unit to a power source via a non-essential power bus and an essential power bus, such that said simplified overhead electronics provides a power output to said pair of power rails;

coupling a first electrical circuit coupled to said pair of power rails and said simplified overhead electronics unit to provide power for operation of essential functions while electrically connected to said pair of power rails; and

coupling a second electrical circuit to said pair of power rails and said simplified overhead electronics unit to provide power for operation of non-essential functions while electrically connected to said power rails,

wherein said first electrical circuit and said second electrical circuit operate alternately based upon a polarity of said power output to said pair of power rails.

Claims

1. A cabin service system comprising:

a control module unit;

a pair of power rails, said power rails being configured to provide mechanical attachment and electrical power to said control module unit; and

a plurality of cabin services,

wherein said control module is communicatively coupled to said plurality of cabin services to provide control of said plurality of cabin services, wherein said control module comprises:

at least one communication port; and

a plurality of relays coupled to said communication port,

wherein said communication port corresponds to said plurality of cabin services, and

wherein each relay of said plurality of relays provide discrete control of an associated cabin service of said plurality of cabin services.

2. The cabin service system of Claim 1 wherein said control module comprises:

a plurality of communication ports; and

a plurality of relays coupled to at least one communication port of said plurality of communication ports,

wherein each communication port of said plurality of communication ports corresponds to at least one cabin service of said plurality of cabin services, and

wherein each relay of said plurality of relays provides discrete control of an associated cabin service of said plurality of cabin services.

3. The cabin service system of Claim 2 wherein at least one communication port of said plurality of communication ports is coupled to an associated cabin service of said plurality of cabin services to transmit data to said associated cabin service.

4. The cabin service system of Claim 2 or Claim 3 wherein said plurality of communication ports is selected from a group consisting of an infrared port, an Ethernet port, a controller area network port, and an RS-485 port.

5. The cabin service system of any one of the preceding claims wherein said control module unit comprises:

at least one electrical spring contact detachably connected to at least one power rail of said pair of power rails to provide electrical power said control module unit; and

at least one non-conductive spring clip detachably connected to said at least one power rail to provide mechanical attachment of said control module unit to said at least one power rail.

6. The cabin service system of any one of the preceding claims comprising at least one control panel communicatively coupled to said control module unit, wherein said control panel transmits control signals to said control module unit to control said plurality of cabin services.

7. The cabin service system of any one of the preceding claims comprising:

a power source; and

a simplified overhead electronics unit coupled to the power source via a non-essential power bus and an essential power bus,

wherein said simplified overhead electronics unit provides a power output to said pair of power rails.

8. The cabin service system of Claim 7 wherein said simplified overhead electronics unit comprises:

a first converter to convert power on said non-essential power bus from 115V AC to 12V DC;

a second converter to convert power on said essential power bus from 28V DC to 12V DC; and

a relay to switch said power output from said non-essential power bus to said essential power bus when said essential power bus is energized.

9. The cabin service system of Claim 7 or Claim 8 comprising:

a first electrical circuit coupled to said pair of power rails and said simplified overhead electronics unit to provide power for operation of essential functions while electrically connected to said pair of power rails; and

a second electrical circuit coupled to said pair of power rails and said simplified overhead electronics unit to provide power for operation of non-essential functions while electrically connected to said pair of power rails.

10. A control module unit of a cabin service system comprising a pair of power rails and a plurality of cabin services, said control module unit comprising:

a plurality of communication ports; and

a plurality of relays coupled to at least one communication port of said plurality of communication ports,

wherein each communication port of said plurality of communication ports corresponds to at least one cabin service of said plurality of cabin services, and

wherein each relay of said plurality of relays provides discrete control of an associated cabin service of said plurality of cabin services.

11. The control module unit of Claim 10 wherein at least one communication port of said plurality of communication ports is coupled to an associated cabin service of said plurality of cabin services to transmit data to said associated cabin service.

12. The control module unit of Claim 10 or Claim 11 wherein said plurality of communication ports is selected from a group consisting of an infrared port, an Ethernet port, a controller area network port, and an RS-485 port.

13. The control module unit of any one of Claims 10 to 12 comprising:

at least one electrical spring contact detachably connected to at least one power rail of said pair of power rails to provide electrical power said control module unit; and

at least one non-conductive spring clip detachably connected to said at least one power rail to provide mechanical attachment of said control module unit to said at least one power rail.

14. The control module unit of any one of Claims 10 to 13 wherein said pair of power rails is coupled to a simplified overhead electronics unit, wherein said simplified overhead electronics unit is coupled to a power source via a non-essential power bus and an essential power bus, and

wherein said simplified overhead electronics unit provides a power output to said pair of power rails.

15. The control module unit of Claim 14 comprising:

a first electrical circuit coupled to said pair of power rails and said simplified overhead electronics unit to provide power for operation of essential functions while electrically connected to said pair of power rails; and

a second electrical circuit coupled to said pair of power rails and said simplified overhead electronics unit to provide power for operation of non-essential functions while electrically connected to said pair of power rails,

wherein said first electrical circuit and said second electrical circuit operate alternately based upon a polarity of said power output to said pair of power rails.

16. A method for installing a cabin service system in a vehicle, said method comprising:

coupling a pair of power rails to a support structure of said vehicle;

coupling a control module unit to said pair of power rails, said pair of power rails providing electrical power to and mechanical attachment of said control module unit; and

coupling said control module unit to a plurality of cabin services, wherein said control module comprises:

a plurality of communication ports;

and a plurality of relays coupled to at least one communication port of said plurality of communication ports,

wherein each communication port of said plurality of communication ports corresponds to at least one cabin service of said plurality of cabin services, and

wherein each relay of said plurality of relays provides discrete control of an associated cabin service of said plurality of cabin services.

17. The method of Claim 16 wherein said plurality of communication ports is selected from a group consisting of an infrared port, an Ethernet port, a controller area network port, and an RS-485 port.

18. The method of Claims 15 to 17, comprising:

coupling said pair of power rails to a simplified overhead electronics unit;

coupling said simplified overhead electronics unit to a power source via a non-essential power bus and an essential power bus, such that said simplified overhead electronics provides a power output to said pair of power rails;

coupling a first electrical circuit coupled to said pair of power rails and said simplified overhead electronics unit to provide power for operation of essential functions while electrically connected to said pair of power rails; and

coupling a second electrical circuit to said pair of power rails and said simplified overhead electronics unit to provide power for operation of non-essential functions while electrically connected to said power rails,

wherein said first electrical circuit and said second electrical circuit operate alternately based upon a polarity of said power output to said pair of power rails.