CLAIMS

1. A medical tubing set comprising:

a fluid conduit adapted to convey a medical fluid;

an optical element coupled to the fluid conduit and configured to provide illumination; and

a power source configured to power the optical element.

2. The medical tubing set of claim 1, wherein the optical element comprises a fiber optic coating and a light-generating element.

3. The medical tubing set of claim 1, wherein the optical element comprises a light-emitting diode and the power source is a voltage to power the light-emitting diode.

4. The medical tubing set of claim 1, wherein the optical element comprises an electroluminescent wire and the power source is an alternating current to power the electroluminescent wire.

5. The medical tubing set of claim 1, wherein the optical element is located in the fluid conduit.

6. The medical tubing set of claim 1, wherein the medical tubing set further comprises dual lumen tubing and the fluid conduit and optical element are located in discrete conduits.

7. The medical tubing set of claim 6, wherein the dual lumen tubing further comprises a nested lumen set having an outer lumen and an inner lumen.

8. The medical tubing set of claim 1, wherein the optical element displays colored light.

9. The medical tubing set of claim 1, further comprising:

at least one sensor configured to sense at least one characteristic related to the medical tubing system.

10. The medical tubing set of claim 9, wherein the at least one sensor comprises a pressure sensor, an occlusion sensor, a temperature sensor, a fluid flow sensor, a liquid density sensor, an

air bubble sensor, a salinity sensor, a pH sensor, a dissolved oxygen sensor, a conductivity sensor, or an electrolyte sensor.

11. The medical tubing set of claim 10, further comprising:

an integrated circuit configured to transmit a signal to a device interface.

12. The medical tubing set of claim 9, further comprising:

a microcontroller configured to receive a signal from the at least one sensor.

13. The medical tubing set of claim 12, further comprising an interface adapted to program the microcontroller.

14. The medical tubing set of claim 13, wherein the interface adapted to program the microcontroller is configured to program a standardized profile.

15. The medical tubing set of claim 12, wherein the microcontroller is further configured to manage at least one operating mode related to the medical tubing system.

16. The medical tubing set of claim 12, wherein the medical tubing set is operably coupled to a medical device and the interface is operable via the medical device.

17. The medical tubing set of claim 16, wherein the microcontroller is housed in the medical device.

18. A method of operating a medical tubing set, the method comprising:

installing the medical tubing set in a medical device at a first end and in a patient at a second end;

setting at least one operating parameter of the medical tubing set;

sensing at least one characteristic of the medical tubing set;

comparing the at least one sensed characteristic against the at least one operating parameter; and

illuminating the medical tubing set based on at least the comparison of the at least one sensed characteristic and the at least one operating parameter.

19. The method of claim 18, wherein setting at least one operating parameter further comprises setting an illumination color.

20. The method of claim 18, wherein setting at least one operating parameter further comprises setting a pressure upper limit and a pressure lower limit.

21. The method of claim 18, wherein illuminating the tubing set further comprises intermittently illuminating the tubing set to create a flashing effect when the at least one sensed characteristic is outside of an operating range of the at least one characteristic set by the at least one operating parameter.

22. The method of claim 18, wherein illuminating the tubing set further comprises continuously illuminating the tubing set.

23. The method of claim 18, wherein setting at least one operating parameter is done automatically upon installation of the medical tubing set in the medical device.

24. The method of claim 18, wherein illuminating the tubing set further comprises applying a concentrated beam of light to a conduit having walls coated in a fiber optic coating.

25. The method of claim 18, wherein illuminating the tubing set further comprises applying a voltage to a light-emitting diode.

26. The method of claim 18, wherein illuminating the tubing set further comprises applying an alternating current to an electroluminescent wire.

27. A method of operating a medical tubing set, the medical tubing set comprising a fluid conduit adapted to convey a medical fluid, an optical element coupled to the fluid conduit and configured to provide illumination, and a power source configured to power the optical element, the method comprising:

installing the medical tubing set in a medical device at a first end and in a patient at a second end;

providing a source of power with the power source;

applying the source of power to the optical element; and

illuminating the fluid conduit with the optical element.

28. A system for medical tubing detection and management, comprising:

an infusion manifold housing having at least one fluid channel therethrough;

at least one fluid input port in said infusion manifold housing, said at least one fluid input port being configured to (i) connect fluidically to illuminated medical tubing and (ii) be in fluidic communication with said at least one fluid channel through said infusion manifold housing;

a fluid output port in said infusion manifold housing, said fluid output port being configured to be in fluidic communication with said at least one fluid channel through said infusion manifold housing; and

at least one photosensor in said infusion manifold housing,

wherein (i) said at least one photosensor is configured to receive light from the illuminated medical tubing that is connected to said at least one fluid input port and (ii) said fluid output port is configured to connect fluidically to fluid output tubing.

29. The system for medical tubing detection and management of claim 28, wherein said at least one photosensor generates an output signal in response to light received from the illuminated medical tubing.

30. The system for medical tubing detection and management of claim 29, further comprising at least one infusion pump that is fluidically connected to the illuminated medical tubing, the at least one infusion pump being configured to generate a light output that is conducted from the illuminated medical tubing to said at least one photosensor in said infusion manifold housing, wherein the light output from the at least one infusion pump is indicative of at least one characteristic of the at least one pump.

31. The system for medical tubing detection and management of claim 30, wherein the at least one characteristic of the at least one infusion pump includes an identification of a drug being delivered to a patient.

32. A system for medical tubing detection and management, comprising:

an infusion manifold housing having at least one fluid channel therethrough;

at least one fluid input port in said infusion manifold housing, said at least one fluid input port being configured to (i) connect fluidically to illuminated medical tubing and (ii) be in fluidic communication with said at least one fluid channel through said infusion manifold housing;

a fluid output port in said infusion manifold housing, said fluid output port being configured to be in fluidic communication with said at least one fluid channel through said infusion manifold housing;

at least one light pipe in said infusion manifold housing, said at least one light pipe having a first end and a second end, with said first end thereof being optically connected to said at least one fluid input port;

at least one lens in said infusion manifold housing, said at least one lens being (i) optically connected to said second end of said at least one light pipe and (ii) configured to transmit light from said at least one light pipe outwardly from said infusion manifold housing; and

at least one photosensor located externally from said infusion manifold housing,

wherein (i) said at least one photosensor is configured to receive light from said at least one lens and (ii) said fluid output port is configured to connect fluidically to fluid output tubing.

33. The system for medical tubing detection and management of claim 32, wherein said at least one photosensor generates an output signal in response to light received from the illuminated medical tubing.

34. The system for medical tubing detection and management of claim 33, further comprising at least one infusion pump that is fluidically connected to the illuminated medical tubing, the at least one infusion pump being configured to generate a light output that is conducted from the illuminated medical tubing to said at least one photosensor located externally from said infusion manifold housing, wherein the light output from the at least one infusion pump is indicative of at least one characteristic of the at least one pump.

35. The system for medical tubing detection and management of claim 34, wherein the at least one characteristic of the at least one infusion pump includes an identification of a drug being delivered to a patient.

36. The system for medical tubing detection and management of claim 30, characterised in that said system is configured to identify each of a plurality of infusion pumps that are connected, by said illuminated medical tubing, respectively, to each of said at least one fluid input port in said infusion manifold housing.

37. The system for medical tubing detection and management of claim 34, characterized in that said system is configured to identify each of a plurality of infusion pumps that are connected, by said illuminated medical tubing, respectively, to each of said at least one fluid input port in said infusion manifold housing.

38. A method of medical tubing detection and management, comprising steps of:

providing a system for medical tubing detection and management, including (i) an infusion manifold housing having at least one fluid channel therethrough, (ii) at least one fluid input port in said infusion manifold housing, said at least one fluid input port being configured to (a) connect fluidically to illuminated medical tubing and (b) be in fluidic communication with said at least one fluid channel through said infusion manifold housing, (iii) a fluid output port in said infusion manifold housing, said fluid output port being configured to be in fluidic communication with said at least one fluid channel through said infusion manifold housing, and (iv) at least one photosensor in said infusion manifold housing, wherein (I) said at least one photosensor is configured to receive light from the illuminated medical tubing that is connected to said at least one fluid input port and generate an output signal in response thereto, and (II) said fluid output port is configured to connect fluidically to fluid output tubing; and

fluidically connecting at least one infusion pump to the illuminated medical tubing, the at least one infusion pump being configured to generate a light output that is conducted from the illuminated medical tubing to said at least one photosensor in said infusion manifold housing, wherein (i) the light output from the at least one infusion pump is indicative of at least one characteristic of the at least one pump and (ii) the at least one characteristic of the at least one infusion pump includes an identification of a drug being delivered to a patient from said fluid output tubing.

39. A method of medical tubing detection and management, comprising steps of:

providing a system for medical tubing detection and management, including (i) an infusion manifold housing having at least one fluid channel therethrough, (ii) at least one fluid input port in said infusion manifold housing, said at least one fluid input port being configured to (a) connect fluidically to illuminated medical tubing and (b) be in fluidic communication with said at least one fluid channel through said infusion manifold housing, (iii) a fluid output port in said infusion manifold housing, said fluid output port being configured to be in fluidic communication with said at least one fluid channel through said infusion manifold housing, (iv) at least one light pipe in said infusion manifold housing, said at least one light pipe having a first end and a second end, with said first end thereof being optically connected to said at least one fluid input port, (v) at least one lens in said infusion manifold housing, said at least one lens being (a) optically connected to said second end of said at least one light pipe and (b) configured to transmit light from said at least one light pipe outwardly from said infusion manifold housing, and (vi) at least one photosensor located externally from said infusion manifold housing, wherein (I) said at least one photosensor is configured to receive light from said at least one lens and generate an output signal in response thereto, and (II) said fluid output port is configured to connect fluidically to fluid output tubing; and

fluidically connecting at least one infusion pump to the illuminated medical tubing, the at least one infusion pump being configured to generate a light output that is conducted from the illuminated medical tubing to said at least one photosensor located externally from said infusion manifold housing, wherein (i) the light output from the at least one infusion pump is indicative of at least one characteristic of the at least one pump and (ii) the at least one characteristic of the at least one infusion pump includes an identification of a drug being delivered to a patient from said fluid output tubing.

CLAIMS

1. A medical tubing set comprising:

a fluid conduit adapted to convey a medical fluid;

an optical element coupled to the fluid conduit and configured to provide illumination;

a power source configured to power the optical element; and

a dual lumen tubing, wherein the fluid conduit and optical elements are located in discrete conduits.

2. The medical tubing set of claim 1, wherein the dual lumen tubing further comprises a nested lumen set having an outer lumen and an inner lumen.

3. The medical tubing set of claim 1, further comprising:

at least one sensor configured to sense at least one characteristic related to the medical tubing system, wherein the at least one sensor comprises a pressure sensor, an occlusion sensor, a temperature sensor, a fluid flow sensor, a liquid density sensor, an air bubble sensor, a salinity sensor, a pH sensor, a dissolved oxygen sensor, a conductivity sensor or an electrolyte sensor; and

an integrated circuit configured to transmit a signal to device interface.

4. The medical tubing set of claim 1, further comprising:

at least one sensor configured to sense at least one characteristic related to the medical tuning system;

a microcontroller configured to receive a signal from the at least one sensor; and

an interface adapted to program the microcontroller.

5. The medical tubing set of claim 4, wherein the interface adapted to program the microcontroller is configured to program a standardized profile.

6. The medical tubing set of claim 4, wherein the microcontroller is further configured to manage at least one operating mode related to the medical tubing system.

7. The medical tubing set of claim 4, wherein the medical tubing set is operably coupled to a medical device and the interface is operable via the medical device.

8. The medical tubing set of claim 7, wherein the microcontroller is housed in the medical device.

9. A system for medical tubing detection and management, comprising:

an infusion manifold housing having at least one fluid channel therethrough;

at least one fluid input port in said infusion manifold housing, said at least one fluid input port being configured to (i) connect fluidically to illuminated medical tubing and (ii) be in fluidic communication with said at least one fluid channel through said infusion manifold housing;

a fluid output port in said infusion manifold housing, said fluid output port being

configured to be in fluidic communication with said at least one fluid channel through said infusion manifold housing; and

at least one photosensor in said infusion manifold housing,

wherein (i) said at least one photosensor is configured to receive light from the illuminated medical tubing that is connected to said at least one fluid input port and (ii) said fluid output port is configured to connect fluidically to fluid output tubing.

10. The system for medical tubing detection and management of claim 9, wherein said at least one photosensor generates an output signal in response to light received from the illuminated medical tubing.

11. The system for medical tubing detection and management of claim 10, further comprising at least one infusion pump that is fluidically connected to the illuminated medical tubing, the at least one infusion pump being configured to generate a light output that is conducted from the illuminated medical tubing to said at least one photosensor in said infusion manifold housing, wherein the light output from the at least one infusion pump is indicative of at least one characteristic of the at least one pump.

12. The system for medical tubing detection and management of claim 11, wherein the at least one characteristic of the at least one infusion pump includes an identification of a drug being delivered to a patient.

13. A system for medical tubing detection and management, comprising:

an infusion manifold housing having at least one fluid channel therethrough; at least one fluid input port in said infusion manifold housing, said at least one fluid input port being configured to (i) connect fluidically to illuminated medical tubing and (ii) be in fluidic communication with said at least one fluid channel through said infusion manifold housing;

a fluid output port in said infusion manifold housing, said fluid output port being

configured to be in fluidic communication with said at least one fluid channel through said infusion manifold housing;

at least one light pipe in said infusion manifold housing, said at least one light pipe

having a first end and a second end, with said first end thereof being optically connected to said at least one fluid input port;

at least one lens in said infusion manifold housing, said at least one lens being (i)

optically connected to said second end of said at least one light pipe and (ii) configured to transmit light from said at least one light pipe outwardly from said infusion manifold housing; and

at least one photosensor located externally from said infusion manifold housing, wherein (i) said at least one photosensor is configured to receive light from said at least one lens and (ii) said fluid output port is configured to connect fluidically to fluid output tubing.

14. The system for medical tubing detection and management of claim 13, wherein said at least one photosensor generates an output signal in response to light received from the illuminated medical tubing.

15. The system for medical tubing detection and management of claim 14, further comprising at least one infusion pump that is fluidically connected to the illuminated medical tubing, the at least one infusion pump being configured to generate a light output that is conducted from the illuminated medical tubing to said at least one photosensor located externally from said infusion manifold housing, wherein the light output from the at least one infusion pump is indicative of at least one characteristic of the at least one pump.

16. The system for medical tubing detection and management of claim 15, wherein the at least one characteristic of the at least one infusion pump includes an identification of a drug being delivered to a patient.

17. The system for medical tubing detection and management of claim 11, characterised in that said system is configured to identify each of a plurality of infusion pumps that are connected, by said illuminated medical tubing, respectively, to each of said at least one fluid input port in said infusion manifold housing.

18. The system for medical tubing detection and management of claim 15, characterized in that said system is configured to identify each of a plurality of infusion pumps that are connected, by said illuminated medical tubing, respectively, to each of said at least one fluid input port in said infusion manifold housing.

19. A method of medical tubing detection and management, comprising steps of:

providing a system for medical tubing detection and management, including (i) an

infusion manifold housing having at least one fluid channel therethrough, (ii) at least one fluid input port in said infusion manifold housing, said at least one fluid input port being configured to (a) connect fluidically to illuminated medical tubing and (b) be in fluidic communication with said at least one fluid channel through said infusion manifold housing, (iii) a fluid output port in said infusion manifold housing, said fluid output port being configured to be in fluidic communication with said at least one fluid channel through said infusion manifold housing, and (iv) at least one photosensor in said infusion manifold housing, wherein (I) said at least one photosensor is configured to receive light from the illuminated medical tubing that is connected to said at least one fluid input port and generate an output signal in response thereto, and (II) said fluid output port is configured to connect fluidically to fluid output tubing; and

fluidically connecting at least one infusion pump to the illuminated medical tubing, the at least one infusion pump being configured to generate a light output that is conducted from the illuminated medical tubing to said at least one photosensor in said infusion manifold housing, wherein (i) the light output from the at least one infusion pump is indicative of at least one characteristic of the at least one pump and (ii) the at least one characteristic of the at least one infusion pump includes an identification of a drug being delivered to a patient from said fluid output tubing.

20. A method of medical tubing detection and management, comprising steps of:

providing a system for medical tubing detection and management, including (i) an infusion manifold housing having at least one fluid channel therethrough, (ii) at least one fluid input port in said infusion manifold housing, said at least one fluid input port being configured to (a) connect fluidically to illuminated medical tubing and (b) be in fluidic communication with said at least one fluid channel through said infusion manifold housing, (iii) a fluid output port in said infusion manifold housing, said fluid output port being configured to be in fluidic communication with said at least one fluid channel

through said infusion manifold housing, (iv) at least one light pipe in said infusion manifold housing, said at least one light pipe having a first end and a second end, with said first end thereof being optically connected to said at least one fluid input port, (v) at least one lens in said infusion manifold housing, said at least one lens being (a) optically connected to said second end of said at least one light pipe and (b) configured to transmit light from said at least one light pipe outwardly from said infusion manifold housing, and (vi) at least one photosensor located externally from said infusion manifold housing, wherein (I) said at least one photosensor is configured to receive light from said at least one lens and generate an output signal in response thereto, and (II) said fluid output port is configured to connect fluidically to fluid output tubing; and

fluidically connecting at least one infusion pump to the illuminated medical tubing, the at least one infusion pump being configured to generate a light output that is conducted from the illuminated medical tubing to said at least one photosensor located externally from said infusion manifold housing, wherein (i) the light output from the at least one infusion pump is indicative of at least one characteristic of the at least one pump and (ii) the at least one characteristic of the at least one infusion pump includes an identification of a drug being delivered to a patient from said fluid output tubing.