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(54) **BUTTON ADAPTER FOR DISPOSABLE URETEROSCOPE**

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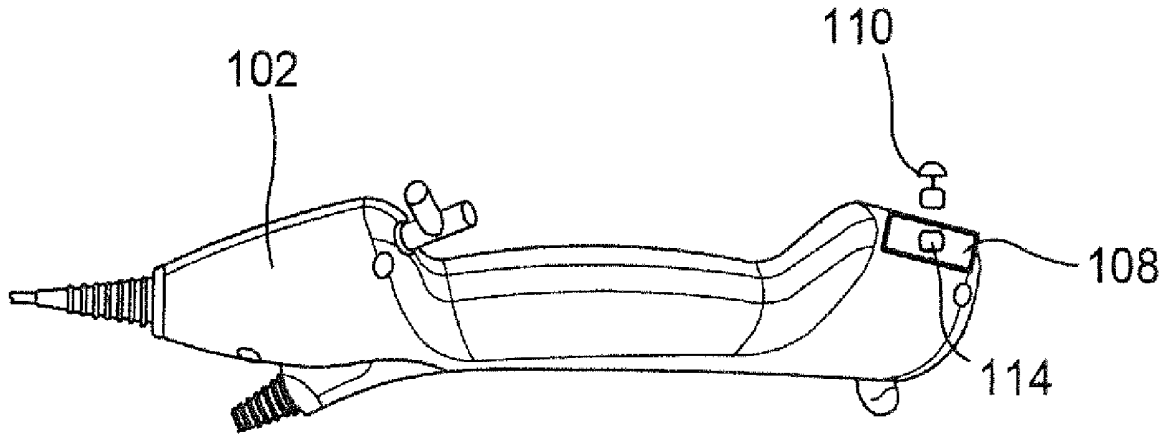
CPC ***A61B 1/307*** (2013.01); *A61B 1/00066* (2013.01); *A61B 1/0014* (2013.01); ***A61B 1/00121*** (2013.01)

(57) **ABSTRACT**

An adapter for a disposable medical scope device includes a body configured to be removably attached to a scope device. The adapter includes at least one button including an actuator configured to activate at least one circuit within a scope device to which it is attached. The body is configured to be electrically coupled to a control unit such that, when the circuit is activated by the button, a signal is sent from the adapter to the control unit to control the control unit's handling of output from the scope device.



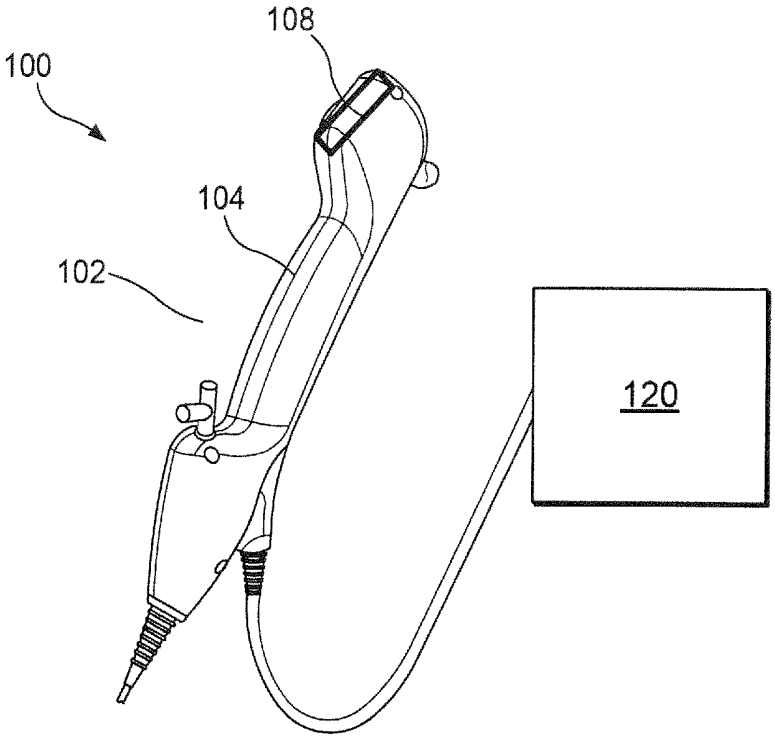


FIG. 1

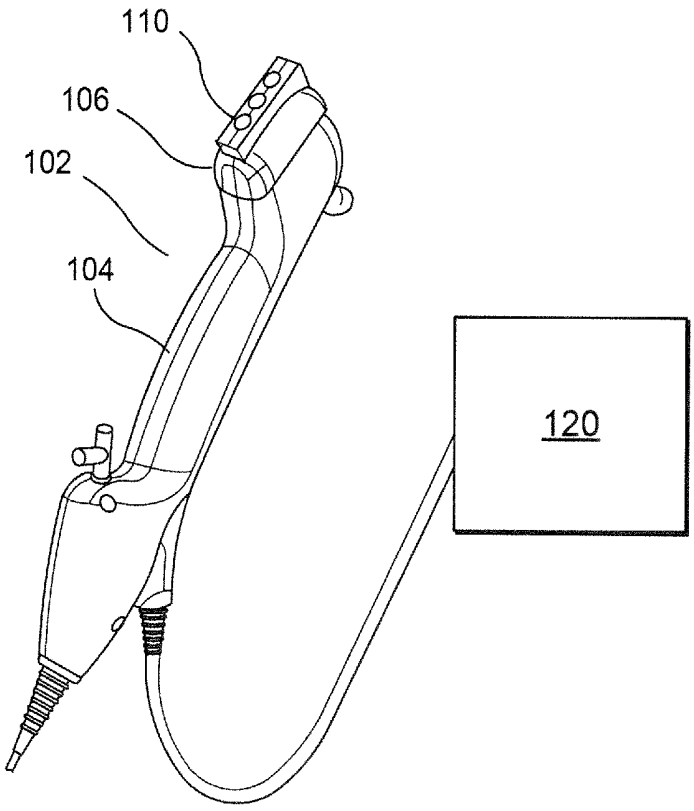


FIG. 2

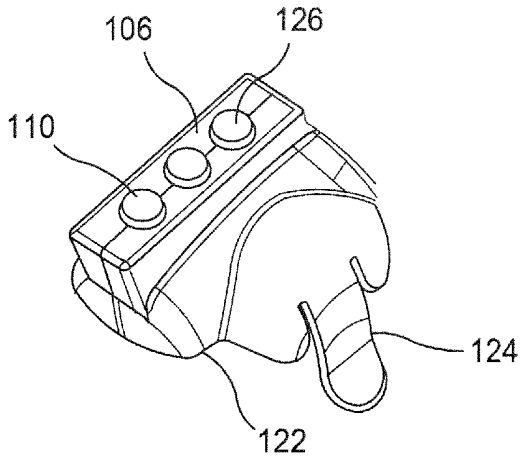


FIG. 3

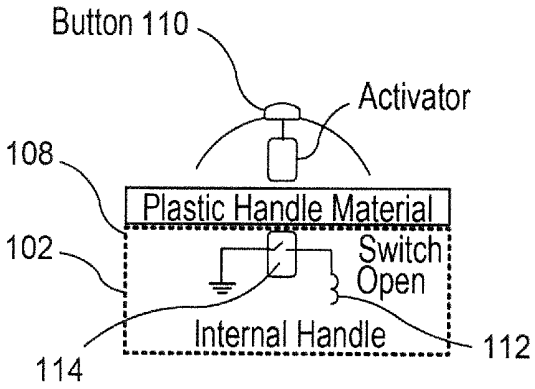


FIG. 4

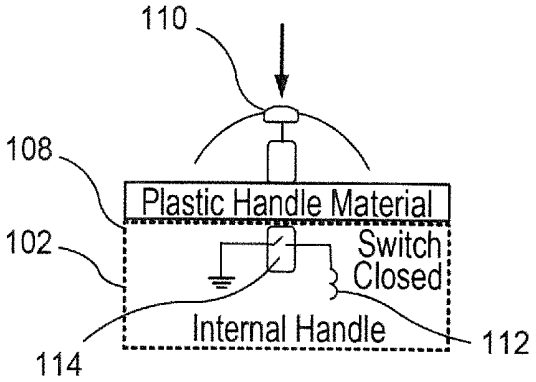


FIG. 5

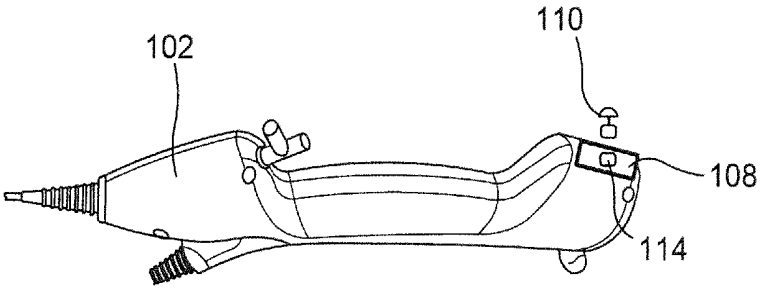


FIG. 6

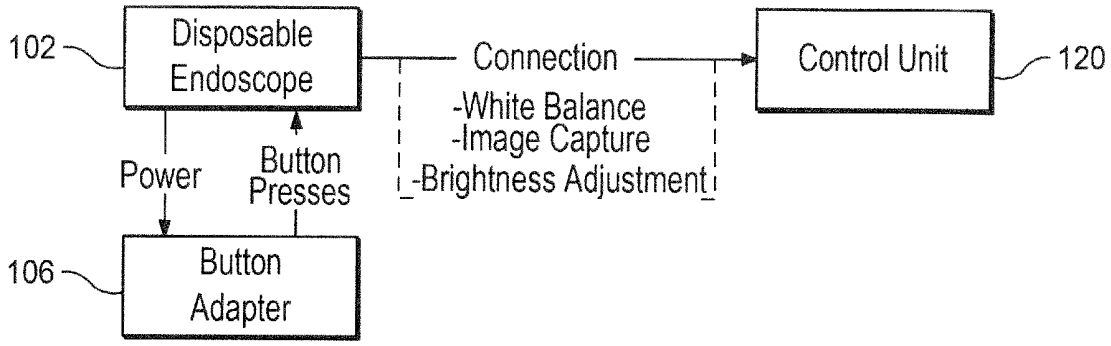


FIG. 7

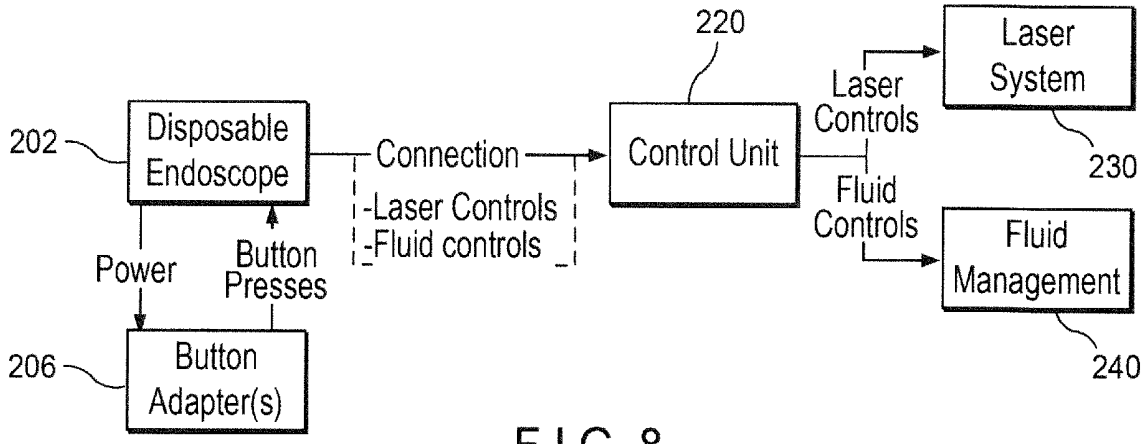


FIG. 8

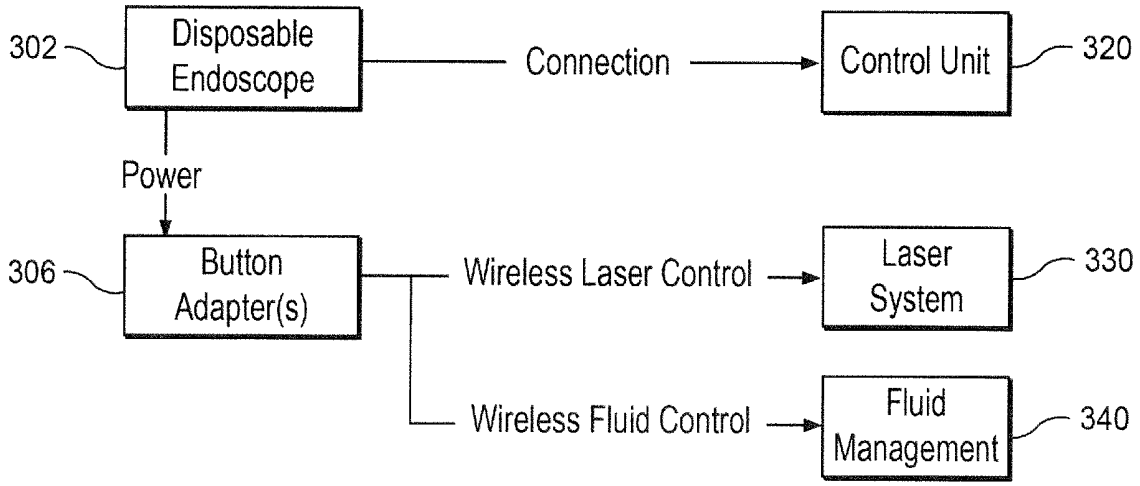


FIG. 9

BUTTON ADAPTER FOR DISPOSABLE URETEROSCOPE

PRIORITY CLAIM

[0001] The present disclosure claims priority to U.S. Provisional Patent Application Ser. No. 62/768,271 filed Nov. 16, 2018; the disclosure of which is incorporated herewith by reference.

FIELD

[0002] Aspects of the present disclosure generally relate to medical devices and methods. Particular aspects relate generally to endoscopic devices and methods.

BACKGROUND

[0003] Programmable buttons on endoscopes have been used to control features, such as image capture, white balance, illumination control, etc. These buttons have been incorporated into the device, usually somewhere on the handle, and control these endoscope features with direct communication to a control unit connected to the endoscope.

[0004] For disposable endoscopes, it is beneficial to minimize features to reduce component cost. Buttons added to the disposable endoscopes can control similar features but need to be programmed to interface with the control unit. Additional features cannot be added without updating the control unit or adding interface communication to other equipment, such as laser control, video recording or fluid management. Thus, there is a need for an adapter that may be optionally connected to a disposable endoscope and contains buttons that can control various features without updates or connections to the control unit.

SUMMARY

[0005] The present disclosure relates to an adapter for a disposable medical scope device comprising a body configured to be removably attached to a scope device, the adapter including at least one button including an actuator configured to activate at least one circuit within a scope device to which it is attached, the body configured to be electrically coupled to a control unit such that, when the circuit is activated by the button, a signal is sent from the adapter to the control unit to control the control unit's handling of output from the scope device.

[0006] In an embodiment, a circuit switch of the at least one circuit is indirectly actuated by the button, preventing a fluid pathway into the scope device.

[0007] In an embodiment, the button is one of a magnet or conductive material.

[0008] In an embodiment, the adapter includes mating features configured to couple the adapter to the scope device.

[0009] In an embodiment, the mating features are clips.

[0010] In an embodiment, the at least one button is configured to interface with an electrical contact pad on the scope device.

[0011] In an embodiment, the control unit includes an image display, the adapter being configured to control display features of the image display when the adapter is coupled to the scope device.

[0012] In an embodiment, the display features include white balance, image capture and brightness.

[0013] The present disclosure also relates to an adapter for a disposable medical scope device comprising a body configured to be removably attached to a scope device, the adapter including at least one button including an actuator configured to activate at least one circuit within a scope device to which it is attached, the body configured to be electrically coupled to at least one external system such that, when the circuit is activated by the button, a signal is sent from the adapter to the external system to control the external system's output to the scope device.

[0014] In an embodiment, the body is configured to be electrically coupled to first and second external systems.

[0015] In an embodiment, the body is configured to be wirelessly electrically coupled to the first and second external systems.

[0016] In an embodiment, the body is configured to be directly electrically coupled to the first and second external systems via a control unit such that the adapter controls the first and second external systems via signals sent through the control unit.

[0017] In an embodiment, the buttons of the adapter are programmed with a first sequence code corresponding to the first external system and a second sequence code corresponding to the second external system, each of the first and second sequence codes sending a signal to the control unit to adjust settings of the corresponding external system when the adapter is coupled to the scope device.

[0018] In an embodiment, the first external system is a laser system and the second external system is a fluid management system.

[0019] In an embodiment, a circuit switch of the at least one circuit is indirectly actuated by the button, preventing a fluid pathway into the scope device.

[0020] The present disclosure also relates to a method of controlling a scope system from a scope device comprising positioning an adaptor over a scope device, the scope device being electrically connected to a control unit, the adaptor comprising: a body configured to be removably attached to a scope device, the adapter including at least one button including an actuator configured to activate at least one circuit within a scope device to which it is attached, the body configured to be electrically coupled to at least one external system such that, when the circuit is activated by the button, a signal is sent from the adapter to the external system to control the external system's output to the scope device, and actuating the button to control features of the control unit and the external system from the scope device.

[0021] In an embodiment, a circuit switch of the at least one circuit is indirectly actuated by the button, preventing a fluid pathway into the scope device.

[0022] In an embodiment, the button is one of a magnet or conductive material.

[0023] In an embodiment, the adapter includes mating features configured to couple the adapter to the scope device.

[0024] In an embodiment, the at least one button is configured to interface with an electrical contact pad on the scope device.

BRIEF DESCRIPTION

[0025] FIG. **1** shows a perspective view of a scope device according to an exemplary embodiment of the present disclosure;

[0026] FIG. **2** shows a perspective view of a scope device system according to an exemplary embodiment of the present disclosure;

[0027] FIG. **3** shows a perspective view of an adapter of the scope device system of FIG. **2**;

[0028] FIG. **4** shows an internal view of the electrical components of the scope device and adapter of the scope device system of FIG. **2** according to an exemplary embodiment of the present disclosure;

[0029] FIG. **5** shows another internal view of the electrical components of the scope device and adapter of the scope device system of FIG. **2**;

[0030] FIG. **6** shows a perspective view of the scope device of FIG. **1**;

[0031] FIG. **7** shows a schematic diagram of the interfaces between the components of the scope device system of FIG. **1** according to a first exemplary embodiment of the present disclosure;

[0032] FIG. **8** shows a schematic diagram of the interfaces between the components of the scope device system of FIG. **1** according to a second exemplary embodiment of the present disclosure; and

[0033] FIG. **9** shows a schematic diagram of the interfaces between the components of the scope device system of FIG. **1** according to a third exemplary embodiment of the present disclosure.

DETAILED DESCRIPTION

[0034] The present disclosure may be further understood with reference to the following description and appended drawings, wherein like elements are referred to with the same reference numerals. The present disclosure relates, for example, to devices, systems and methods for the removal of debris within a lumen (e.g., within a living body). Exemplary embodiments describe a system including an adapter optionally connected to a disposable endoscope or ureteroscope devices, such as the LithoVue™, which contains buttons that can control various features of the scope device without updates or connections to the control unit. In some embodiments, the adapter may be electrically interfaced with the scope device to control the various features. In other embodiments, the adapter may wirelessly control the various features from the scope device. It should be noted that the terms "proximal" and "distal", as used herein, are intended to refer to a direction toward (proximal) and away from (distal) a user of the device (e.g., physician).

[0035] As shown in FIGS. **1-6**, a scope system **100** according to an exemplary embodiment of the present disclosure comprises, in an exemplary embodiment, a disposable scope device **102** including a handle **104** which, during use, remains outside a living body, an adapter **106** and a control unit **120**. As shown in FIG. **1**, the scope device **102** may comprise any scope configured for use in minimally invasive procedures, such as a ureteroscope, for example, under the brand name LithoVue™ or Next Generation LithoVue™. The scope device **102** is connected via, for example, a plug, to a control unit **120**, such as a computer, with an image display. The control unit **120** provides power to the scope device **120** and allows the adapter **106** to control various functions of the scope system **100**. The control unit **120** is also operatively connected to any external equipment or systems such as, for example, a laser system, a fluid management system and/or image/video capture devices. Thus, the control unit **120** is capable of controlling various functions of the connected systems and devices. In order for the adapter **106** to control various features of the scope system **100**, the scope device **102** includes an electrical contact pad **108** positioned thereon that is configured to interface with electrical components of the adapter **106**. The contact pad **108** provides power from the control unit **120** to the adapter **106**. The contact pad **108** also uses simple electronics to provide an electrical connection between the scope device **102** and a plurality of buttons **110** on the adapter **106**. For example, as shown in FIGS. **4-5**, the handle **104** may be internally hardwired with at least one circuit **112** with a switch **114** that may be activated (i.e., opened or closed) when a button **110** on the adapter **106** is pressed. The circuit **112**, when closed, is hardwired, in this embodiment, to send a signal through the scope device **102** to the control unit **120**. It is noted that although FIGS. **4-5** show a single circuit **112** and button **110**, any number of circuits may be connected to the contact pad **108** to allow for adaptability of the adapter **106** depending on the procedure and number of systems connected to the control unit **120**. In an exemplary embodiment, the circuit switch **114** is indirectly controlled by the button **110** (i.e., through used of a magnet, conductive material, etc.), preventing a fluid pathway into the scope device **102**. That is, the contact pad **108** is waterproof with all electrical components being protected from external fluids via, for example, a layer of plastic handle material.

[0036] The adapter **106** is configured to be removably attached to a portion of the handle **104** of the scope device **102**. As shown in FIG. **2** the adapter **106**, in this embodiment, is attachable to a proximal end of the scope device **102**. However, it will be understood by those skilled in the art that the adapter **106** may be attachable to any portion of the scope device **102**, depending on the preferences of the physician performing the procedure. The adapter **106** is, in this embodiment, a molded component formed of, for example, plastic. The adapter **106** may be molded so that a first surface **122** thereof (i.e., a surface that interfaces with an outer surface of the scope device **102**) form fits against a specific contour of the outer surface of the handle **104**, providing a low-profile addition to the scope handle **104**. Mating features **124** (i.e., clips) extend from lateral sides of the adapter **106** and may clip into receiving portions (not shown) of the handle **104** to provide a more secure fit between the adapter **106** and the handle **104**. It will be understood by those skilled in the art that although clips are shown in the present embodiment, any mating features may be used to couple the adapter **106** to the handle **104** such as, for example snap-fits or magnetic connectors. A plurality of buttons **110** are incorporated in the adaptor **106** and are configured to interface with the electrical contact pad **108** on the scope device **102**. It will be understood that although FIGS. **2-3** depicts three buttons **110**, any number of buttons **110** may be incorporated into the adapter **106**, depending on the requirements of the procedure and/or physician. Each button **110** consists of an actuator such as, for example, a magnet used in a reed switch or a conductive material used in a capacitive switch, which causes the circuit **112** in the handle **104** to open or close, sending a button press signal through the scope device **102** to the control unit **120**. Specifically, as each button **110** is pressed, a surface **126** of the button **110** closest to the handle **104** abuts the plastic material of the handle **104** covering the contact pad **108**. This proximity of the pressed button **110** to the circuit **112** is enough to actuate the circuit switch **114**. The button **110**, in this embodiment, does not directly interact with the circuit **112**, as noted above, to prevent a fluid pathway into the scope device **102** and allowing the adapter **106** to be an

optional component. Thus, because the adapter **106** is an optional component that can interface with the handle **104** as desired, the adapter **106** can expand the use and addition of external features to the scope system **100** without needing to incorporate a control design into the scope device **102**. Furthermore, the adapter **106** allows expansion of feature usage of disposable ureteroscopes while minimizing cost and offering customers a wider range of features with other equipment such as laser systems, fluid management systems and image/video capture systems.

[0037] FIG. **7** depicts an exemplary embodiment of the electrical connections and control features between the scope device **102**, the adapter **106** and the control unit **120** of an exemplary scope system **100**. In this embodiment, the adapter **106** is capable of controlling an image display of the control unit **120** through its connection with the scope device **120** when positioned on the handle **104**. In an exemplary embodiment, each button may control a different aspect of the image display. For example, a first button may control the white balance of the image display while a second button controls image capture and a third button controls the brightness of the image display. It will be understood, however, that the buttons **110** may be programmed to control any features of the display and are not limited to the above-identified features. Furthermore, the adapter **106** may include any number of buttons **110** depending on the procedure or the preferences of the user.

[0038] Looking to FIG. **7**, the control unit **120** is the source of power to the scope device, which provides power to the adapter **106** when the two components interface at the contact pad **108**. The adapter **106** may be pre-programmed to then control the display features through its connection to the scope device **100** and the connection of the scope device **100** to the control unit **120**.

[0039] FIG. **8** depicts another exemplary embodiment of the electrical connections and control features between the scope device **202**, the adapter **206**, the control unit **220**, and two external systems—a laser system **230** and a fluid management system **240**. Each of the laser system **230** and the fluid management system **240** is electrically connected to the control unit **220** via, for example, a direct line such as a plug. In this embodiment, the adapter **206** is capable of controlling the laser system **230** and the fluid management system **240** when positioned on the handle **204**. In an exemplary embodiment, specific signal codes may be pre-assigned to the laser system **230** and the fluid management system **240**, via the control system **220**, which allow the adapter **206** to control these features beyond the control unit **220**. For example, if the laser system **230** is connected to the control unit **220**, a certain code sequence may be entered using the buttons **210** on the adapter **206**. This sequence is sent through the control unit **220** to the laser system **230** to adjust laser settings or use. If the fluid management system **240** is connected to the control unit **220**, a different code sequence may be entered using the buttons **210**, sending a signal through the control unit to the fluid management system **240** to adjust the fluid management system settings. In another exemplary embodiment, rather than using sequence codes, two separate adapters **206** may be used, a first adapter **206** for the laser system **230** and a second adapter **206** for the fluid management system **240**. Because the adapters **206** are removable, when the user wants to control, for example, the laser system **230**, the first adapter **206** is simply coupled to the handle **204**. If, during the procedure, the user wants to switch to controlling the fluid management system **240**, the user need only remove the first adapter **206** from the handle **204** and couple the second adapter **206**, which is programmed to the fluid management system **240**, to the handle **204**.

[0040] Looking to FIG. **8**, the control unit **220** is the source of power to the scope device **202**, which provides power to the adapter **206** when the two components interface. Following the arrows from the adapter **206**, once the adapter **206** is connected to the scope device **202**, button presses activate the circuit in the disposable endoscope which, through the connection to the control unit **220**, controls the laser system **230** and/or the fluid management system **240**.

[0041] FIG. **9** depicts a scope system **300** according to another exemplary embodiment of the present disclosure. The system **300**, in this embodiment, also includes a scope device **302**, an adapter **306**, a control unit **320**, and two external systems—a laser system **330** and a fluid management system **340**. However, in this embodiment, the laser system **230** and the fluid management system **340** are wirelessly controlled by the adapter **306**. In this embodiment, the control unit **320** is the source of power to the scope device **302**, which provides power to the adapter **306** when the two components interface. Specifically, the scope device **302** is electrically connected to the control unit **320** via, for example, a direct line such as a plug. The laser system **330** and the fluid management system **340**, however, are separate components that are not directly electrically connected to the control unit **320**. Thus, these systems may receive power from other sources (i.e., an electrical outlet), Once connected to the scope device **300**, the adapter **306** is able to send control signals to the laser system **330** and the fluid management system **340** with, for example, short wave radio frequencies. As with the scope device **200**, specific signal codes may be pre-assigned to the laser system **330** and the fluid management system **340** which allow the adapter **306** to control these features. In another exemplary embodiment, rather than using sequence codes, two separate adapters **306** may be used, a first adapter **306** for the laser system **330** and a second adapter **306** for the fluid management system **340**. Because the adapters **306** are removable, when the user wants to control, for example, the laser system **330**, the first adapter **306** is simply coupled to the handle **304**. If, during the procedure, the user wants to switch to controlling the fluid management system **340**, the user need only remove the first adapter **306** from the handle **304** and couple the second adapter **306**, which is programmed to the fluid management system **340**, to the handle **304**. Thus, this embodiment allows for compatibility with future features and systems that are not on the market when the endoscope is designed.

[0042] It will be appreciated by those skilled in the art that changes may be made to the embodiments described above without departing from the inventive concept thereof. It should further be appreciated that structural features and methods associated with one of the embodiments can be incorporated into other embodiments. It is understood, therefore, that this invention is not limited to the particular embodiment disclosed, but rather modifications are also covered within the scope of the present invention as defined by the appended claims.

1-15. (canceled)

16. An adapter for a disposable medical scope device, comprising:

a body configured to be removably attached to a scope device, the adapter including at least one button including an actuator configured to activate at least one circuit within a scope device to which it is attached, the body configured to be electrically coupled to a control unit such that, when the circuit is activated by the button, a signal is sent from the adapter to the control unit to control the control unit's handling of output from the scope device.

17. The system of claim **16**, wherein the circuit switch is indirectly actuated by the button, preventing a fluid pathway into the scope device.

18. The system of claim **16**, wherein the button is one of a magnet or conductive material.

19. The system of claim **16**, wherein the adapter includes mating features configured to couple the adapter to the scope device.

20. The system of claim **19**, wherein the mating features are clips.

21. The system of claim **16**, wherein the scope device is a disposable scope device.

22. The system of claim **16**, wherein the control unit includes an image display, the adapter being configured to control display features of the image display when the adapter is coupled to the scope device.

23. The system of claim **22**, wherein the display features include white balance, image capture and brightness.

24. An adapter for a disposable medical scope device, comprising:

a body configured to be removably attached to a scope device, the adapter including at least one button including an actuator configured to activate at least one circuit within a scope device to which it is attached, the body configured to be electrically coupled to at least one external system such that, when the circuit is activated by the button, a signal is sent from the adapter to the external system to control the external system's output to the scope device.

25. The adapter of claim **24**, wherein the body is configured to be electrically coupled to first and second external systems.

26. The adapter of claim **25**, wherein the body is configured to be wirelessly electrically coupled to the first and second external systems.

27. The adapter of claim **25**, wherein the body is configured to be directly electrically coupled to the first and second external systems via a control unit such that the adapter controls the first and second external systems via signals sent through the control unit.

28. The adapter of claim **25**, wherein the buttons of the adapter are programmed with a first sequence code corresponding to the first external system and a second sequence code corresponding to the second external system, each of the first and second sequence codes sending a signal to the control unit to adjust settings of the corresponding external system when the adapter is coupled to the scope device.

29. The adapter of claim **25**, wherein the first external system is a laser system and the second external system is a fluid management system.

30. The adapter of claim **24**, wherein a circuit switch of the at least one circuit is indirectly actuated by the button, preventing a fluid pathway into the scope device.

31. A method for controlling a scope system from a scope device, comprising:

positioning an adaptor over a scope device, the scope device being electrically connected to a control unit, the adaptor comprising:

a body configured to be removably attached to a scope device, the adapter including at least one button including an actuator configured to activate at least one circuit within a scope device to which it is attached, the body configured to be electrically coupled to at least one external system such that, when the circuit is activated by the button, a signal is sent from the adapter to the external system to control the external system's output to the scope device; and

actuating the button to control features of the control unit and the external system from the scope device.

32. The device of claim **31**, wherein a circuit switch of the at least one circuit is indirectly actuated by the button, preventing a fluid pathway into the scope device.

33. The device of claim **31**, wherein the button is one of a magnet or conductive material.

34. The device of claim **31**, wherein the adapter includes mating features configured to couple the adapter to the scope device.

35. The device of claim **31**, wherein the at least one button is configured to interface with an electrical contact pad on the scope device.

* * * * *

专利名称(译)	一次性输尿管镜按钮适配器		
公开(公告)号	US20200154992A1	公开(公告)日	2020-05-21
申请号	US16/553401	申请日	2019-08-28
[标]申请(专利权)人(译)	波士顿科学西美德公司		
申请(专利权)人(译)	BOSTON SCIENTIFIC SCIMED，INC.		
当前申请(专利权)人(译)	BOSTON SCIENTIFIC SCIMED，INC.		
[标]发明人	RAUNIYAR NIRAJ PRASAD BROMANDER ROY		
发明人	ZAPPIA, JR., THOMAS MICHAEL RAUNIYAR, NIRAJ PRASAD BROMANDER, ROY		
IPC分类号	A61B1/307 A61B1/00		
CPC分类号	A61B1/00066 A61B1/307 A61B1/0014 A61B1/00121 A61B1/00039 A61B1/00103 A61B1/00142 G05G1/02 H01H9/04		
优先权	62/768271 2018-11-16 US		
外部链接	Espacenet USPTO		

摘要(译)

用于一次性医疗内窥镜设备的适配器包括被配置为可移除地附接到内窥镜设备的主体。 适配器包括至少一个按钮，该按钮包括致动器，该致动器被配置为激活与其连接的观察仪器内的至少一个电路。 主体被配置为电耦合至控制单元，使得当通过按钮激活电路时，信号从适配器被发送至控制单元，以控制控制单元对观察装置的输出的处理。