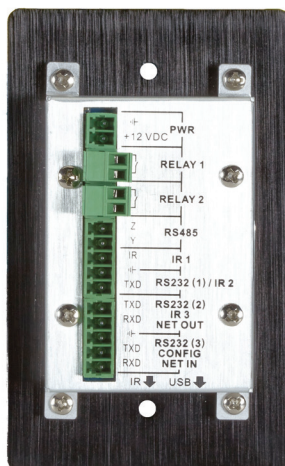# BLACK BOX®

Wallplate Control Panel - 8-Button, RS-232

User Manual

Program buttons to send RS-232 and RS-485 commands to control projectors, screens, and other third-party devices.

Black Box and the Double Diamond logo are registered trademarks of BB Technologies, Inc.

Any other trademarks mentioned in this manual are acknowledged to be the property of the trademark owners.

FEDERAL COMMUNICATIONS COMMISSION AND
INDUSTRY CANADA RADIO FREQUENCY INTERFERENCE STATEMENTS

This equipment generates, uses, and can radiate radio-frequency energy, and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio communication. It has been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart B of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when the equipment is operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own expense will be required to take whatever measures may be necessary to correct the interference.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This digital apparatus does not exceed the Class A limits for radio noise emission from digital apparatus set out in the Radio Interference Regulation of Industry Canada.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le Règlement sur le brouillage radioélectrique publié par Industrie Canada.

Normas Oficiales Mexicanas (NOM)
Electrical Safety Statement
INSTRUCCIONES DE SEGURIDAD

1. Todas las instrucciones de seguridad y operación deberán ser leídas antes de que el aparato eléctrico sea operado.

2. Las instrucciones de seguridad y operación deberán ser guardadas para referencia futura.

3. Todas las advertencias en el aparato eléctrico y en sus instrucciones de operación deben ser respetadas.

4. Todas las instrucciones de operación y uso deben ser seguidas.

4. Todas las instrucciones de operación y uso deben ser seguidas.

5. El aparato eléctrico no deberá ser usado cerca del agua—por ejemplo, cerca de la tina de baño, lavabo, sótano mojado o cerca de una alberca, etc..

6. El aparato eléctrico debe ser usado únicamente con carritos o pedestales que sean recomendados por el fabricante.

7. El aparato eléctrico debe ser montado a la pared o al techo sólo como sea recomendado por el fabricante.

8. Servicio—El usuario no debe intentar dar servicio al equipo eléctrico más allá lo descrito en las instrucciones de operación. Todo otro servicio deberá ser referido a personal de servicio calificado.

9. El aparato eléctrico debe ser situado de tal manera que su posición no interfiera su uso. La colocación del aparato eléctrico sobre una cama, sofá, alfombra o superficie similar puede bloquea la ventilación, no se debe colocar en libreros o gabinetes que impidan el flujo de aire por los orificios de ventilación.

10. El equipo eléctrico deber ser situado fuera del alcance de fuentes de calor como radiadores, registros de calor, estufas u otros aparatos (incluyendo amplificadores) que producen calor.

11. El aparato eléctrico deberá ser connectado a una fuente de poder sólo del tipo descrito en el instructivo de operación, o como se indique en el aparato.

12. Precaución debe ser tomada de tal manera que la tierra fisica y la polarización del equipo no sea eliminada.

13. Los cables de la fuente de poder deben ser guiados de tal manera que no sean pisados ni pellizcados por objetos colocados sobre o contra ellos, poniendo particular atención a los contactos y receptáculos donde salen del aparato.

14. El equipo eléctrico debe ser limpiado únicamente de acuerdo a las recomendaciones del fabricante.

15. En caso de existir, una antena externa deberá ser localizada lejos de las lineas de energia.

16. El cable de corriente deberá ser desconectado del cuando el equipo no sea usado por un largo periodo de tiempo.

17. Cuidado debe ser tomado de tal manera que objectos liquidos no sean derramados sobre la cubierta u orificios de ventilación.

18. Servicio por personal calificado deberá ser provisto cuando:

 A: El cable de poder o el contacto ha sido dañado; u

 B: Objectos han caído o líquido ha sido derramado dentro del aparato; o

 C: El aparato ha sido expuesto a la lluvia; o

 D: El aparato parece no operar normalmente o muestra un cambio en su desempeño; o

 E: El aparato ha sido tirado o su cubierta ha sido dañada.

Safety Precautions

For reliable operation of the equipment and personnel safety, follow the guidelines below for installation, use, and maintenance of the device.

1. The system must be grounded properly. Do not use two-blade plugs and ensure the alternating power supply ranges from 100 to 240 VAC and 50 to 60 Hz.

2. Do not put the control panel in an environment that is not within the its temperature tolerance.

3. Because the switch's power generates heat when running, be sure the working environment is properly ventilated to avoid damage caused by equipment overheating.

4. Turn off the general power switch in humid weather or when the control panel will be left unused for long time.

5. Before operating, be sure that the alternating current wire is pulled out of the power supply.

6. NEVER open the casing of the equipment, DO NOT repair it on your own. This might be harmful to persons or the equipment.

7. DO NOT splash any liquids on or around the equipment.

Table of Contents

1. Specifications

Interfaces	
Programming Port	USB or RS-232
Output Ports	(3) RS-232, (1) RS-485, (3) Infrared, (2) Relay
Serial Control Port	RS-232
Baud Rate and Protocol	9600 baud, 8 data bits, 1 stop bit, no parity
Frequency Response	20 Hz - 20 kHz
Environmental	
Temperature Tolerance	-4 to +158° F (-20 to +70° C)
Humidity	10 to 90%
Power	
Power Supply	100 VAC–240 VAC, 50/60 Hz
Consumption	1 W
Physical	
Dimensions	1.1"H x 2.8"W x 4.5"D (2.8 x 7 x 11.4 cm)
Weight	0.33 lb (0.15 kg)

2. Overview

2.1 Introduction

together. The Wallplate Control Panel has (3) built-in programmable RS-232 connectors, (1) RS-485 connector, (3) Infrared (IR) connectors, (2) Relay connectors, and (1) mini USB connector.

NOTE: RS-232 port 1 and IR port 2 share the same port and cannot be used at the same time. RS-232 port 2 and IR port 3 share the same port and cannot be used at the same time. The Programmable Control Panel can fully control the compatible switches, as well as third-party devices such as projectors, screens, etc. Use the device for presentations in showrooms, classrooms, and boardrooms.

2.2 Features

• Every button can be programmed to send bi-directional RS-232 and RS-485 commands simultaneously to control third-party devices.

• Every button can be programmed to send the infrared code and control the relay to simultaneously control the third-party devices.

• Every button has the built in infrared code, RS-232 code learning function, and baud-rate setting.

• ID looping function. Up to 10 Wallplate Control Panels can be looped and controlled together via ID.

• Program via a USB or RS-232 port to work with PC software (Black Box Control).

• Has crystal and backlit buttons with user-friendly customizable changeable labels.

• You can control the brightness of the backlight.

• Dimensions: 1.1"H x 2.8"W x 4.5"D (2.8 x 7 x 11.4 cm).

2.3 What's Included

Your package should include the following items. If anything is missing or damaged,
Your package should contain the following items. If anything is missing or damaged,
contact Black Box Technical Support
at 724-746-5500 or info@blackbox.com.

• (1) Wallplate Control Panel - 8-Button, RS-232

• (3) pluggable terminal blocks

• (1) mini USB converter cable

• (2) IR emitters

• (8) button caps

• (1) button label

• (1) transparent paper table

• (1) 12-VDC power adapter

To download this user manual from our Web site:

1. Go to www.blackbox.com

2. Enter the part number (AVS-CTRL8) in the search box:

3. Click on the "Resources" tab on the product page, and select the document you
    wish to download.

If you have any trouble accessing the Black Box site to download the manual, you can
contact our Technical Support at 724-746-5500 or info@blackbox.com.

2.4 Hardware Description

Figures 2-1 through 2-3 show the front, side, and back panels of the AVS-CTRL8.
Tables 2-1 ans 2-2 describes its components.
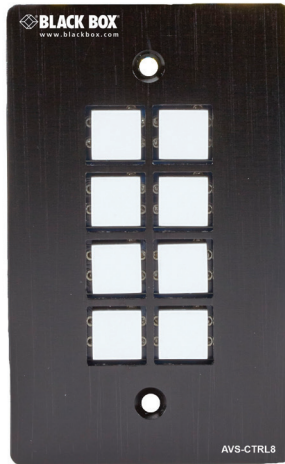
2.4.1 Front Panel

Figure 2-1. Front panel of the AVS-CTRL8.

The front panel contains (8) crystal and luminescent programmable buttons. Every button can be programmed with the Black Box Control software.
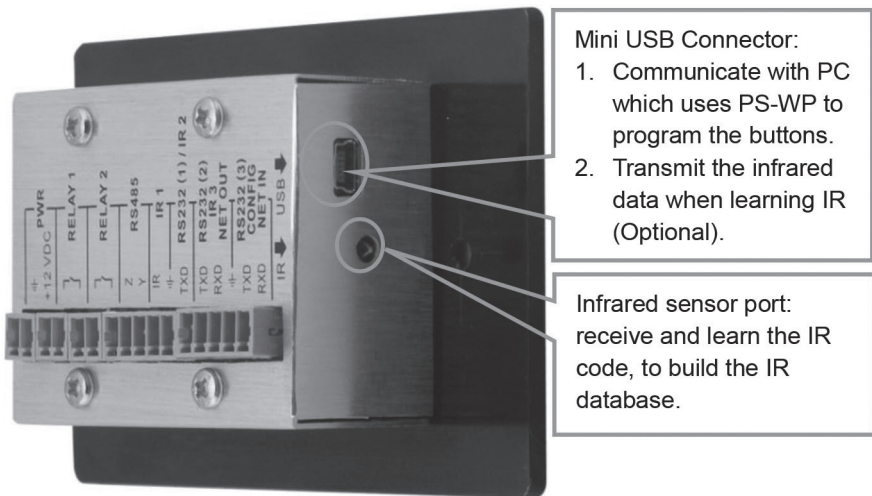
2.4.2 Side Panel

Mini USB Connector:
1. Communicate with PC which uses PS-WP to program the buttons.
2. Transmit the infrared data when learning IR (Optional).

Infrared sensor port: receive and learn the IR code, to build the IR database.

Figure 2-2. Connectors on the side panel of the AVS-CTRL8.

Table 2-1. SIde panel components.

Number in Figure 2-2	Component	Description
1	Mini USB connector	This connector has two functions: 1. Communicate with the PC that uses Black Box Control to program the buttons. 2. Transmit the infrared data when learning IR (optional).
2	Infrared sensor port	Receive and learn the IR code to build the IR database.

NOTE: When using the USB port to program the AVS-CTRL-8 buttons, the available COM port number should not be more than 10.

2.4.3 Back Panel
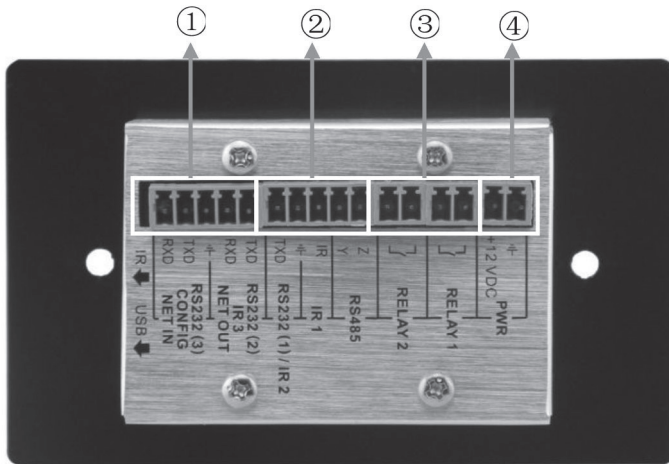
Figure 2-3. Back panel.

The AVS-CTRL8 has various ports on the rear panel, including a Looping port, RS-232 port, RS-485 port, IR port, Relay port, and Power port as described in the table on the next page.

Table 2-2. Back panel components.

Number in Figure 2-3	Component	Description
1	RS-232 port 2/ IR port 3	Use this port to control other devices or for looping output. RS-232 port 2 and IR port 3 share the same port; their use depends on the setting of Black Box Control software. The other part of the port is RS-232 port 3. It can be used to control other devices or for looping output, or connect with a PC. These two ports share the same grounding.
2	RS-232 port 1/ IR port 2, IR port 1, and RS-485 port	a. RS-232 (1)/IR2: share the same port, its detailed use depends on the Black Box Control setting. When used as RS-232, the port transmits data but does not receive data. b. IR1: To control other devices, program this port via Black Box Control software. c. RS-485: You can program the RS-485 port with commands to control the device with the RS-485 port. The command for RS-485 is the same as RS-232 port 1.
3	Low-Voltage relay ports	Set the relay on/off via Black Box Control software.
4	Power connector	12-VDC. Be sure that the "+" and "-" are never mixed or connected incorrectly.

2.5 Typical Application

The Wallplate Control Panel can activate different ports at one time. Every button can send RS-232 and RS-485 commands, IR codes, and control the relay at the same time.
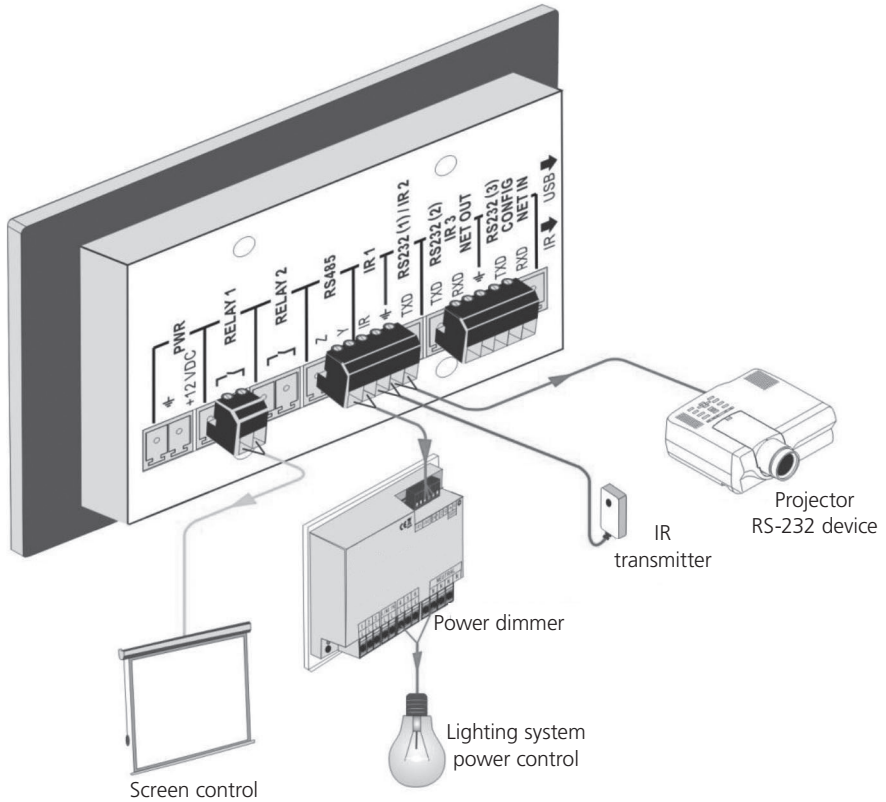

Figure 2-3. System Diagram.

3. Programming and Looping

Tshe Wallplate Control Panel can be connected to the computer for programming, to set the functions of every button. You can connect it via USB or RS-232, and it works with the Black Box Control software.
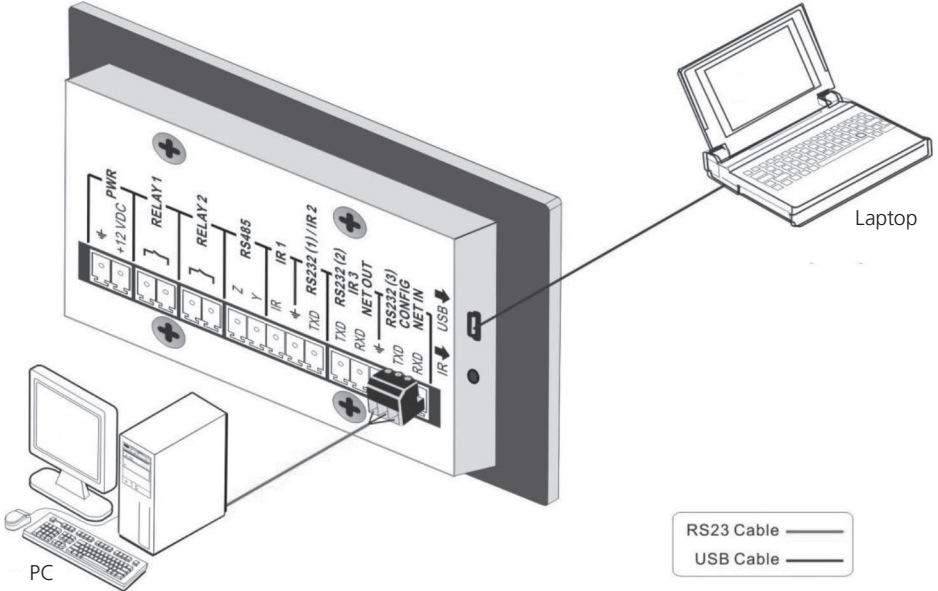

Figure 3-1. Programming Connection

Several AVS-CTRL8 units can also be looped to create a system that controls more devices. It is looped using the RS-232 setting.
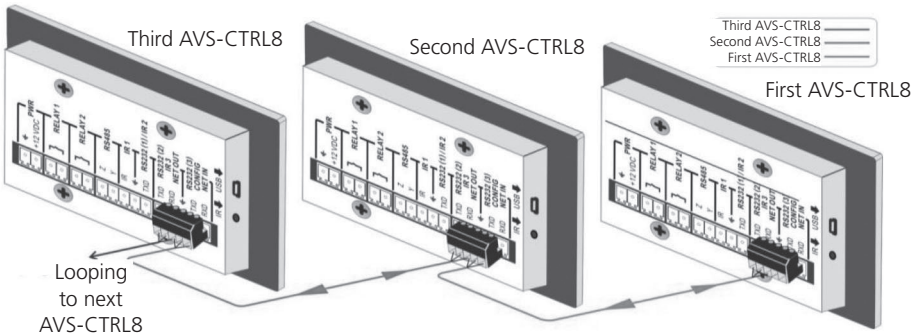
Figure 3-2. Several Looping Wallplates Control Panels connected.

After you connect the Wallplate Control Panel as above, set the ID of each Wallplate Control Panel via Black Box Control software. The ID number ranges from 01 to 99, and it also contains the class of the Wallplate Control Panel in the loop. Set different Wallplate Control Panel units to different IDs. Once you make these connections, you can set the control modes via Black Box Control software. For connection details, see the picture on the next page.
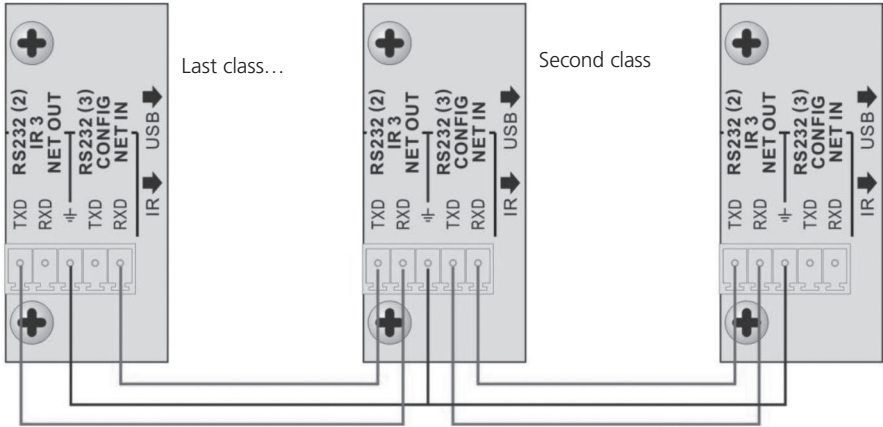

Figure 3-3. Detailed looping connections.

NOTE: Up to 99 Wallplate Control Panels can be looped within one system, but for normal interaction, we recommend looping a maximum of 10 Wallplate Control Panels in one system.

4. System Operation

4.1 USB Driver Installation

You can download the Black Box Control software from www.blackbox.com.

The Black Box Control software can run directly without installation. When you connect the Wallplate Control Panel with a PC via USB, you might need to install the USB driver.

4.2 Software Programming

Use the Black Box Control software to easily set every button on the AVS-CTRL8.

After connecting the Wallplate Control Panel with PC via USB or RS-232, you can open the Black Box Control software to program the buttons. The main window of Black Box Control software has five parts: main menu, panel (button) setting, event setting, action list, and event list. In this manual, we will show the uses of all functions. The main window of Black Box Control software is shown below.
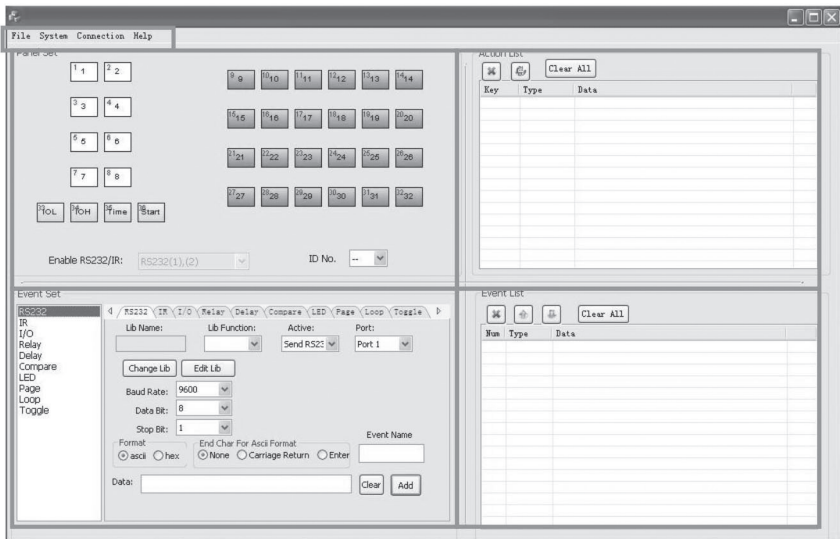
Figure 4-1. Main window.

We will introduce the configurations one-by-one.

4.2.1 Main Menu

The main menu includes file management, system model, connection type, and help.

1. File management: Open/Save/Save as a configuration. After programming, you can save the configuration to a file, so that you can use the same configuration next time.
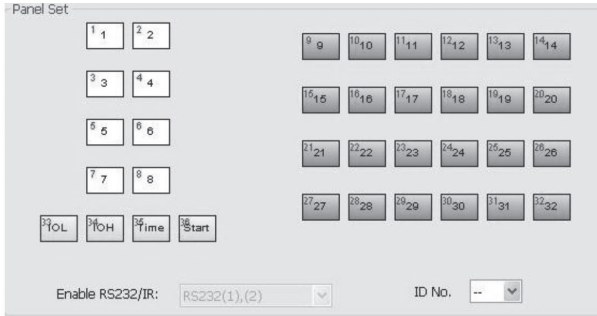
2. System model: The diagram below shows the main menu.

Figure 4-2. Main menu.

NOTE: When selecting the Wallplate Control Panel model, the "Output Port Selection" dialog box will appear. You can select different RS and IR types, depending on the uses of the two shared ports.
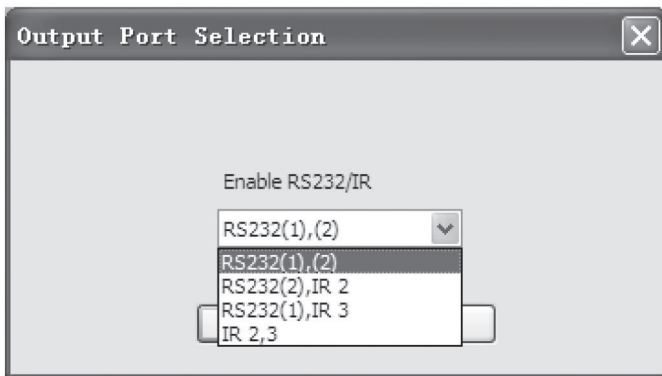
Figure 4-3. Output Port Selection dialog box.

The output port set in Black Box Control software corresponds to the port used in Wallplate Control Panel. There are four output types, as shown below ("√" means the port is available):.

Table 4-1. Output port of AVS-CTRL8.

Output port of AVS-CTRL8	IR1	RS-232 (1)	IR2	RS-232 (2)	IR3	RS-232 (3)	RS-485
Output mode of Black Box Control software							
RS-232(1)(2)	√	√		√		√	√
RS-232(2), IR2	√		√	√		√	
RS-232(1), IR3	√	√			√	√	√
IR2, 3	√		√		√	√	

3. Connection type: follow the instructions in the picture below:

1. COM port, connected via serial port.

2. USB, connected via mini USB port.

3. Disconnect (disconnect the connection).

4. Upload: Upload the programmed data to the AVS-CTRL8. The old data will be cleared.

5. Clear: Clear the data in the AVS-CTRL8.
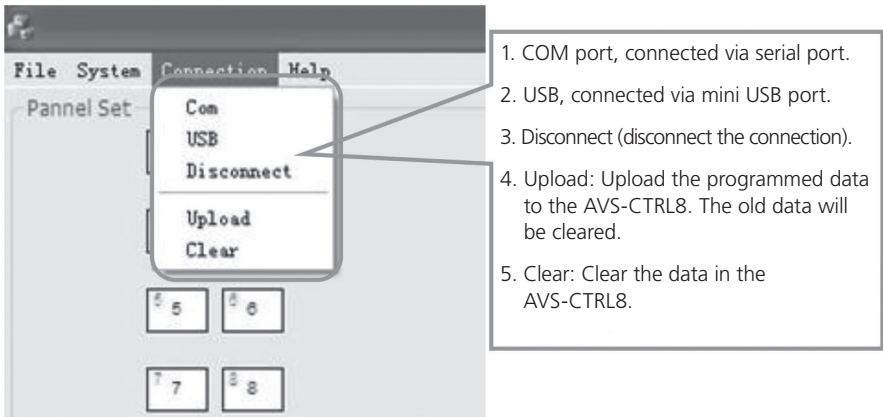
Figure 4-4. Connection window.

The functions of the Wallplate Control Panel buttons will be available only after the programmed data is uploaded successfully.

4. Help: Show the Black Box Control software's information.

4.2.2 Panel/Key Setting

There are three different colors of keys on the Black Box Control software panel. Add a key action to action list, then add events to this action; enabling this action will execute the events. The example below introduces the uses of different buttons:
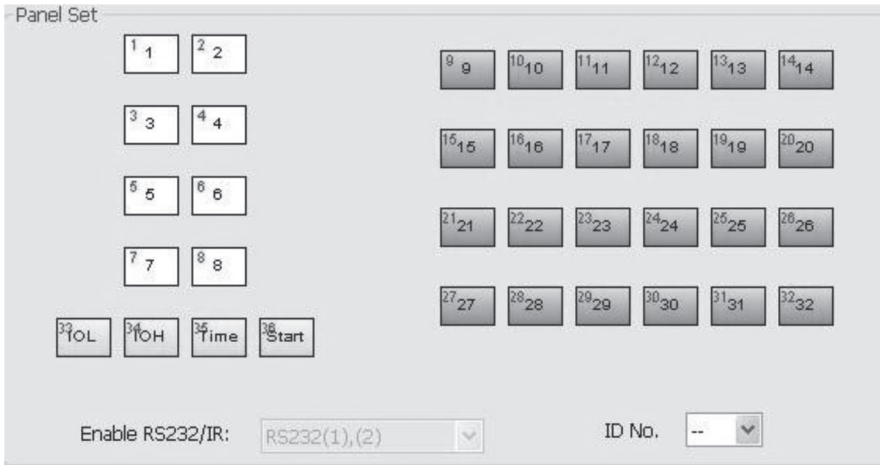

Figure 4-5. Panel Set screen.

1. White keys: keys 1–8, correspond to the buttons on Wallplate Control Panel. Click the key, and the dialog below will appear:

Key Action Type:

1. Pressing the button selects Execute events.

2. Releasing the button executes the action.

3. For built-in actions that need to be switched by other buttons, press to execute.

4. Toggle between built-in actions.
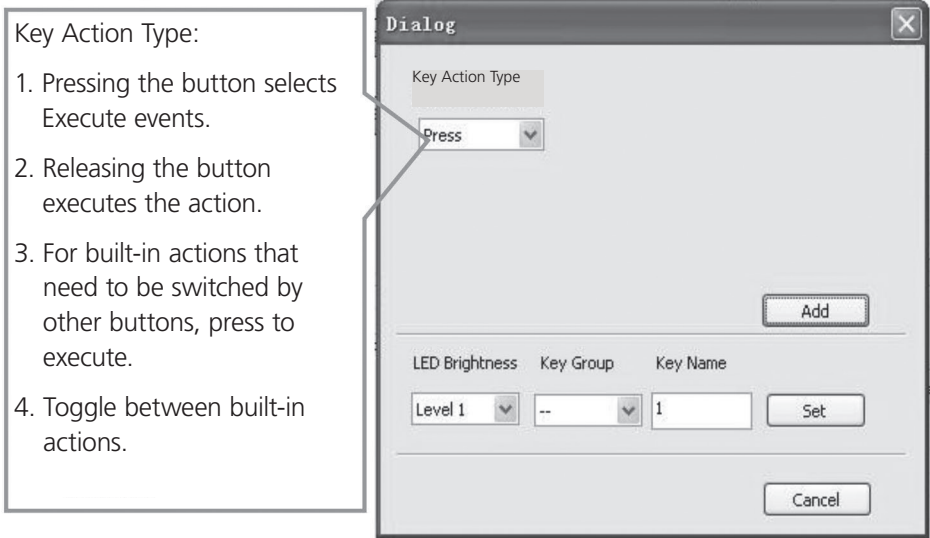
Figure 4-6. Wallplate Control Panel buttons dialog box.

When you select "Toggle," the setting interface is as shown next:

Figure 4-7. Setting interface.

The toggle class is the action loop class and depends on the numbers of looped actions. When the class is 2, there are two actions that you can toggle.

2. Blue Keys: Keys 9–32, all virtual keys, are used in the loop function. When you use the loop function, you must set the ID, which can range from 1 to 99. Press "Add" to add the button to the action list.

3. Yellow Keys: Keys 33–36, all are virtual keys. Key 33 and 34 are for I/O control, which is not supported with Wallplate Control Panel. Key 36 is a start action; if you add events to this action, when the Wallplate Control Panel power is on, it will execute the events in this action. Key 35 is a delay button, and you can set three time slots.
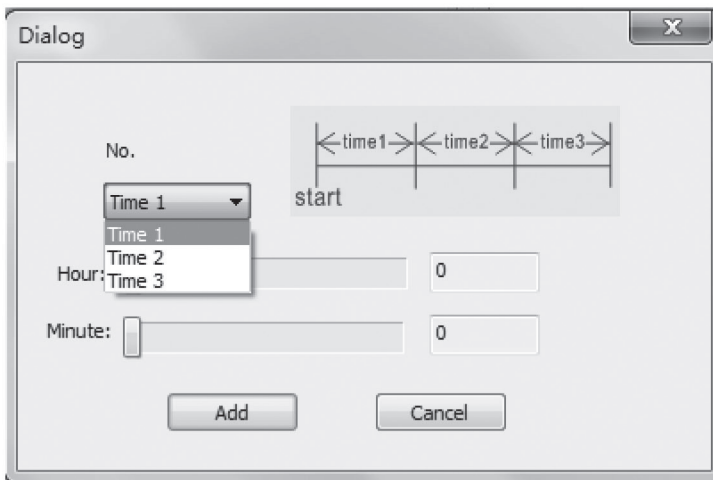
Figure 4-8. Dialog box.

This is the time that elapses after the Wallplate Control Panel starts. When set to time1, Wallplate Control Panel will execute the events in time1. Next, set time2 and time3.

Example: Set time1 to 5 minutes, and time2 to 3 minutes, add event1 to time1 and event2 to time2. When the unit starts, it will execute event1 after 5 minutes, and then execute event2 after 8 minutes.

4.2.3 Action List

Action list shows all the set actions. An available action must be added to the list. The action list is shown in the picture below:
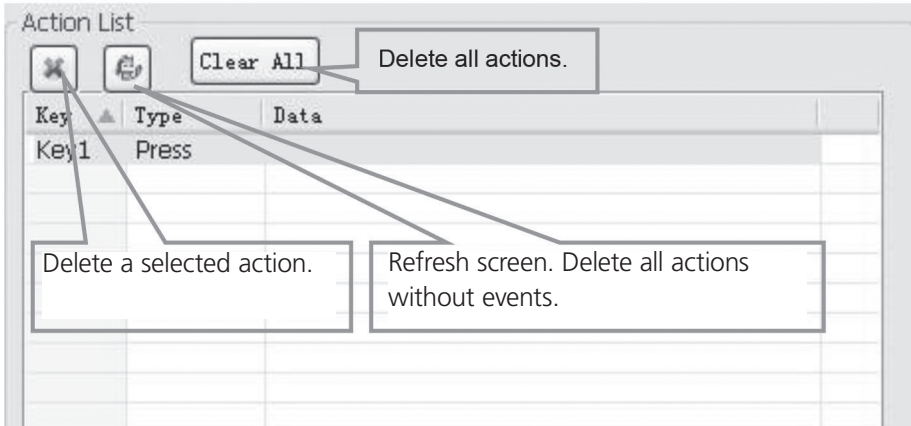

Figure 4-9. Action List screen.

4.2.4 Event Setting

Event settings include RS-232, IR, I/O, Relay, Delay, Compare, LED, Page, Loop, and Toggle. Before you set events, you must add an action. The following introduction will show you how to set each event:

• RS-232 Setting

Use this item to set the Wallplate Control Panel's serial ports parameters. Click "RS-232," and the following screen will appear.
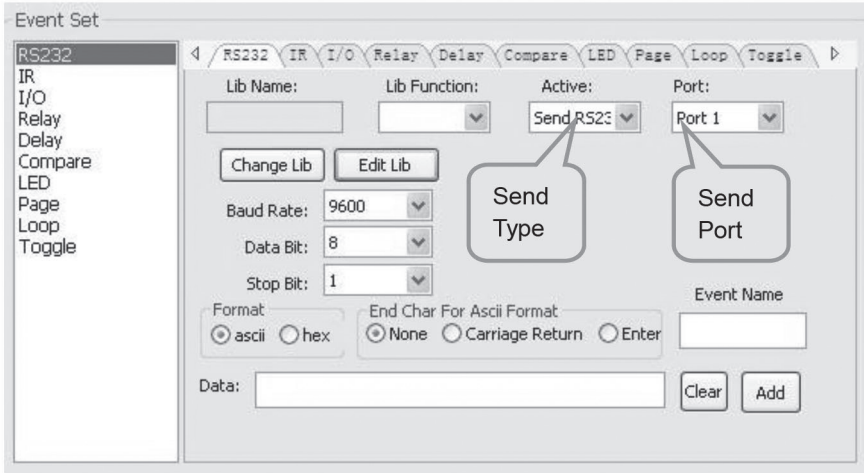
Figure 4-10. Event setting screen.

1. You can directly enter RS-232 data or select it from the from library. Click "Change Lib" to select a library file and open it. Click "Edit Lib" to create or edit a library file as below:
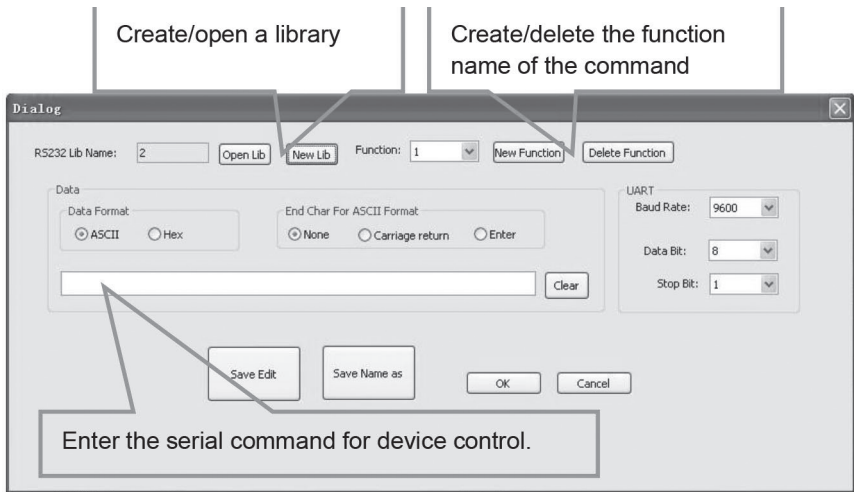

Figure 4-11. Library screen.

NOTE: When you finish editing, remember to save the setting and then press "OK."

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2. There are two send types: send once and send more times. When you select "more times," you can set the send times and the delay between times.
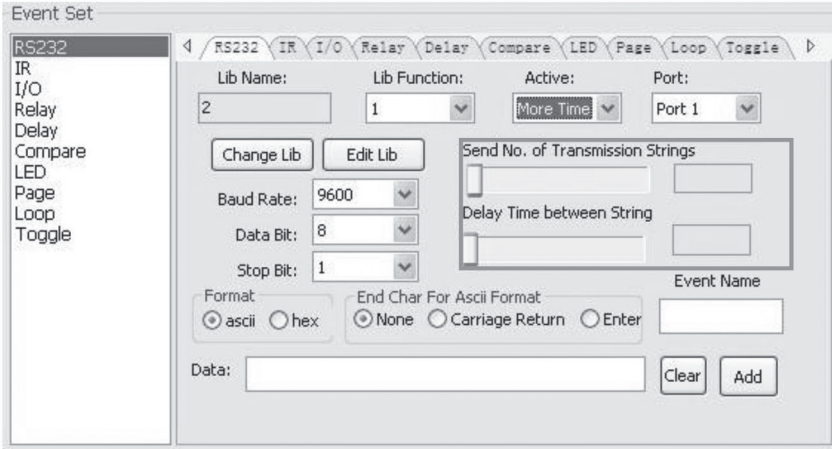
Figure 4-12. Send screen.

3. The send port must be selected the same as the model setting; otherwise, the event cannot be added.

4. Users can set the event name. This is an optional function.

• IR Setting

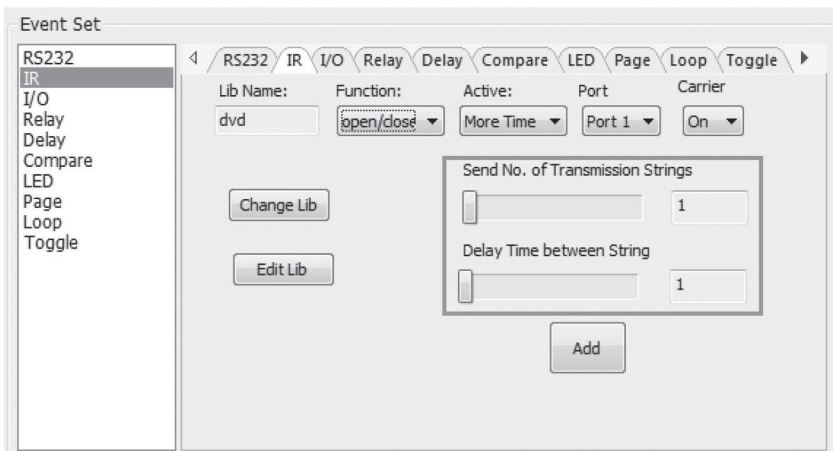Use this item to set the Wallplate Control Panel's IR ports' parameters. Click "IR," and the screen below will appear.

Figure 4-13. IR set screen.

1. Select the IR data from the library. Click "Change Lib" to select a library file and open it. Click "Edit Lib" to create or edit a library file.
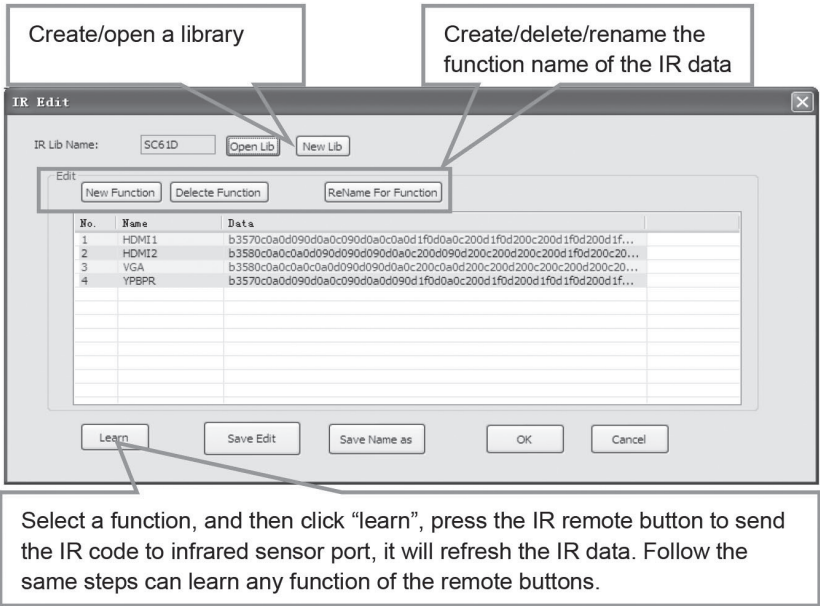

Figure 4-14. Edit Library screen.

NOTE: When you finish editing, save the editing and press "OK."

2. There are two send types: send once and send more times. When you select "more times," the send times and the delay between times can be set.
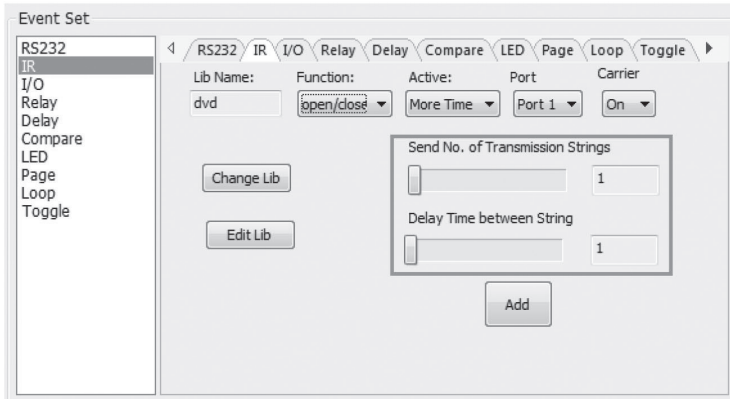

Figure 4-15. Event Set screen.

3. You must select the send port to be the same as model setting, otherwise, the event cannot be added.

4. Set the IR carrier on/off, to turn on/turn off IR sending.

I/O Setting

There is no I/O port on the Wallplate Control Panel, so its setting is not included in this manual.
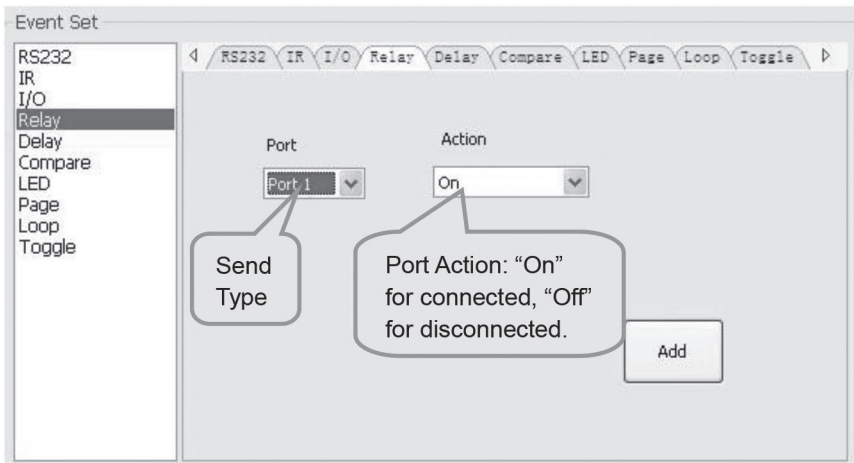
• Relay Setting

This item sets ports relay.

Figure 4-16. Repay Settings screen.

• Delay setting

This item sets a delay time between two events; so when one event is finished, it will delay for the set time, then start another event.
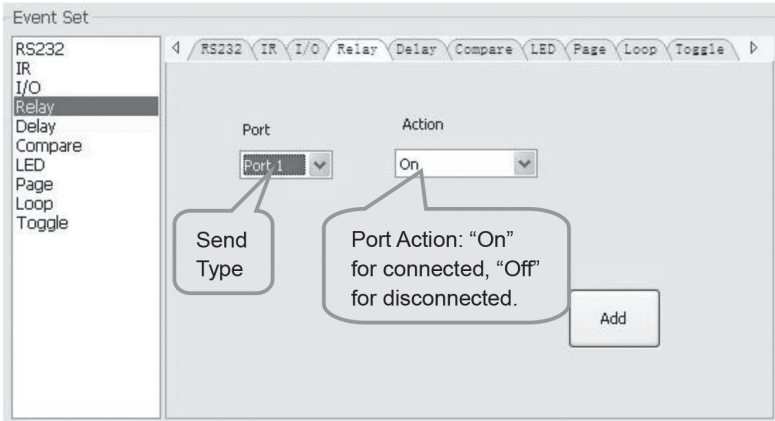

Figure 4-17. Delay setting screen.

• Compare Setting

Use this item to compare RS-232 commands feedback. When the Wallplate Control Panel sends an RS-232 command to the controlled device, the device will send feedback. If you add the correct feedback in the data, the Wallplate Control Panel will compare it with the feedback received from the controlled device to verify whether or not the command is working.
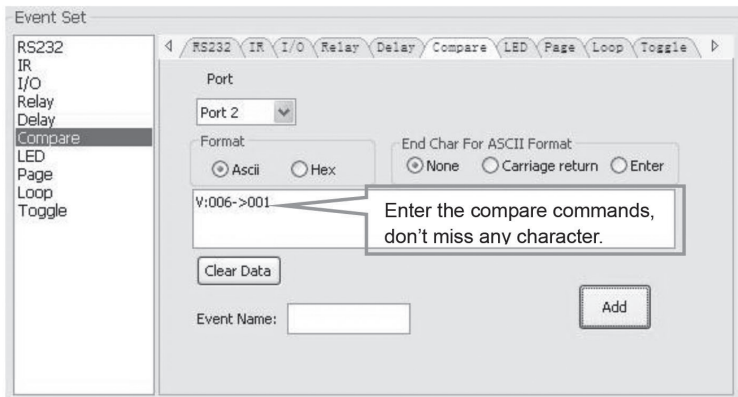

Figure 4-18. Compare Setting screen.

1. The send port must be selected the same as the model setting; otherwise, the event cannot be added. Port 1 cannot be used to compare, because there no receive pin on this port.

2. You can set the event name, which is optional.

3. When you set the priority of events in one event list from top to bottom, you can compare three or more events. When you send a serial command, you can compare it to other events. If the compare is incorrect, the event behind compare will not be executed.

• LED setting

This item is used to set the Wallplate Control Panel's button LEDs to turn on/off.
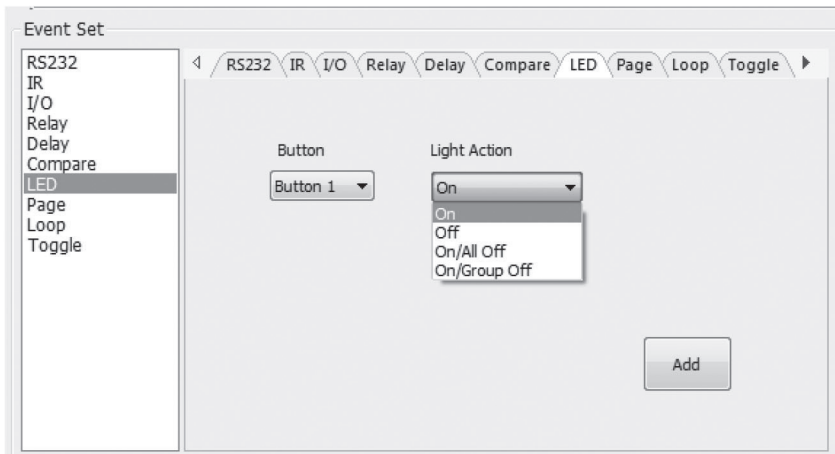

Figure 4-19. Event Set screen.

• Page setting

You can set the white buttons to "page" that includes four actions. To change different actions, you will need the other white buttons to activate the page action number. See the following example.

1. Take button1 for example: click key1 and select the action type "page," then add the four actions to the action list. Add the "press" action to add keys 5-8 to the list.
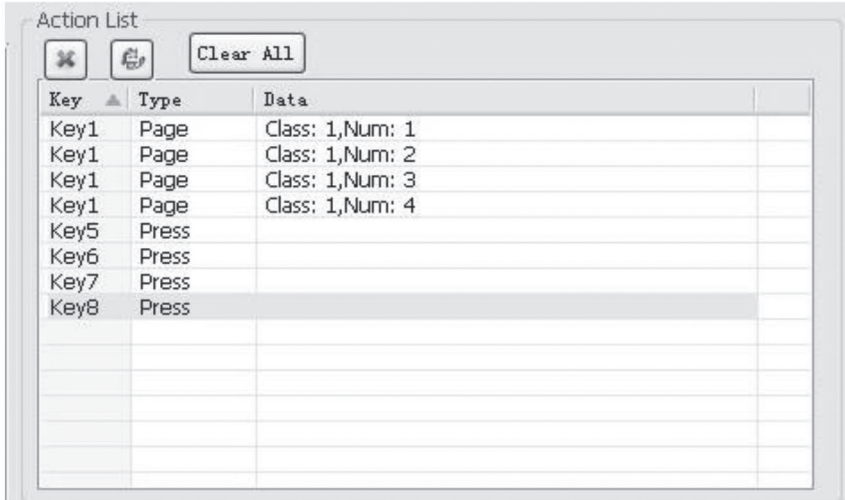
Figure 4-20. Action List screen.

2. When setting events, you can add four different events to the four page actions of key1, and the four other keys will be added to each page event.
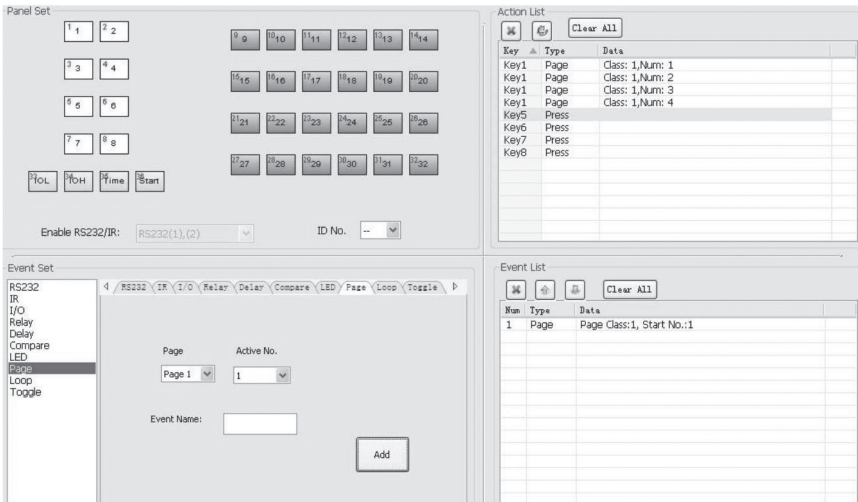

Figure 4-21. Adding page events.

Then set the "page" event to four "press" actions to activate the four page number: key5-num1, key6-num2, key7-num3, and key8-num4.

a. When you press button5 and then button1, button1 will execute the event of num1, if you press button1 more times, it will execute num1 more times;

b. When you press button6 and then button1, button1 will execute the event of num2, if you press button1 more times, it will execute num2 more times;

c. When you press button7 and then button1, button1 will execute the event of num3, if you press button1 more times, it will execute num3 more times;

d. When you press button8 and then button1, button1 will execute the event of num4, if you press button1 more times, it will execute num4 more times.

• Loop Setting

Use this item to loop Wallplate Control Panel. When using the loop function, you must set the ID of each Wallplate Control Panel.

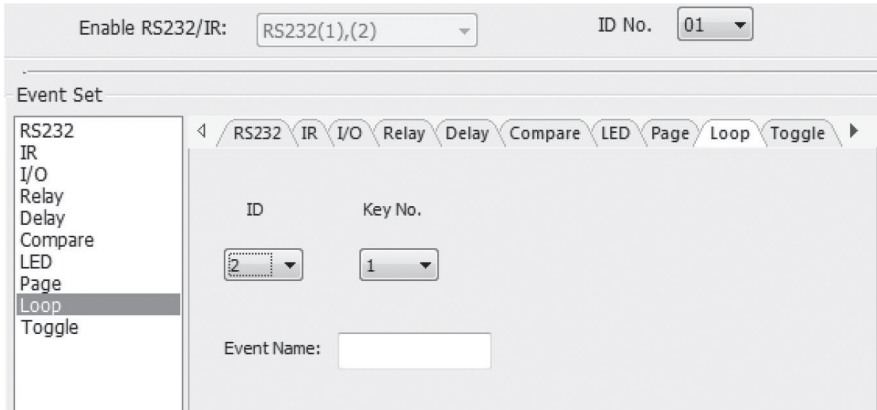Figure 4-22. Loop setting screen.

• Toggle Setting

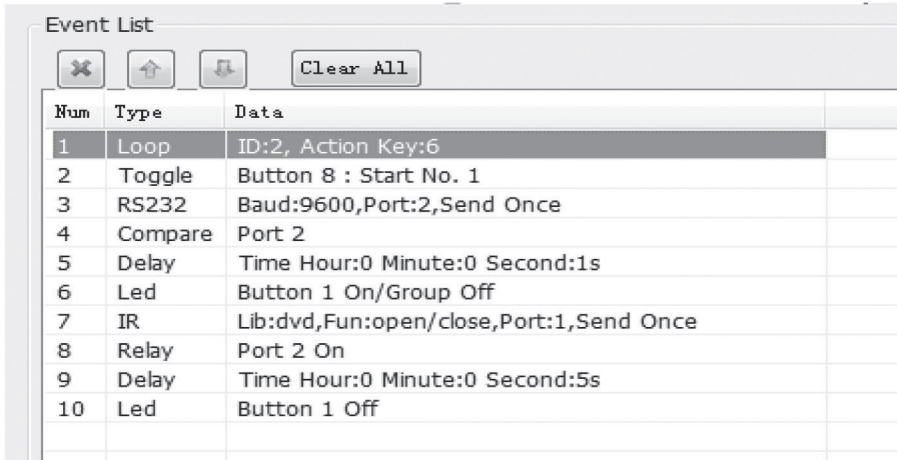Figure 4-23. Toggle setting screen.

Setting toggle is similar to the page setting. Toggle performs differently; its actions include loop running. Toggle will perform as described next.

a. When you press button5 and then button1, button1 will execute the num1 event; press button1 more times and it will execute num2, then num3->num4->num1 and so on.

b. When you press button6 and then button1, button1 will execute the num2 event; press button1 more times and it will execute num3, then num4->num1->num2 and so on.

c. When you press button7 and then button1, button1 will execute the num3 event; press button1 more times and it will execute num4, then num1->num2->num3 and so on.

d. When you press button8 and then button1, button1 will execute the event of num4; press button1 more times and it will
execute num1, then num2->num3->num4 and so on.

4.2.5 Event List

The event list shows all events of the selected action, and for each action of Wallplate Control Panel, the most events that can be added is ten. The executing priority is from 1 to 10. If an event executes incorrectly, all the events behind it will not be executed.

Num	Type	Data
1	Loop	ID:2, Action Key:6
2	Toggle	Button 8 : Start No. 1
3	RS232	Baud:9600,Port:2,Send Once
4	Compare	Port 2
5	Delay	Time Hour:0 Minute:0 Second:1s
6	Led	Button 1 On/Group Off
7	IR	Lib:dvd,Fun:open/close,Port:1,Send Once
8	Relay	Port 2 On
9	Delay	Time Hour:0 Minute:0 Second:5s
10	Led	Button 1 Off

Figure 4-24. Event List screen.

4.3 Front Panel Operation

The front panel has crystal and luminescent programmable buttons: You can program every button using the Black Box Control software. Connect the PC via USB or RS-232. You can change every label inside the button. Choose the label you need and change it as described below.

NOTE: A transparent paper table is included in the box with your product.

5. Troubleshooting and Maintenance

1. If the device cannot work, check and make sure the power cord is connected. Be sure the power connector is not mixed or connected improperly. Then restart, and if device still does not work, the Wallplate Control Panel might be broken. Contact Black Box Technical Support at 724-746-5500 or info@blackbox.com for instructions for sending the unit back for repair.

2. When USB cannot open or is without a response, make sure the USB driver is installed correctly, and then reconnect the USB cable.

3. When uploading the software and USB cannot be found, restart the software or Wallplate Control Panel.

4. When the LED of a button is not lit, check if there is a compare configured for this button. If yes, delete the compare and try again. If the device still does not work, the LED may be broken. Contact Black Box Technical Support for instructions for sending the unit back for repair.

5. When serial commands are sent without executing a function, check the baud rate and the serial connection and make sure they are correct.

6. If the loop function will not work, reboot the Wallplate Control Panel.

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Black Box provides an extensive range of networking and infrastructure products. You'll find everything from cabinets and racks and power and surge protection
products to media converters and Ethernet switches all supported by free, live 24/7
Tech support available in 60 seconds or less.

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