

COBALT[®]



CP-42L • CP-44
CP-78 • CP-84L
Control Panels
Product Manual

WAVE-CONTROL-PANEL-OM_v1.0

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PESA™ is a trade name of PESA.

Manual Identification

Manual Name WAVE-CONTROL-SERIES-OM_v1.0 Release Date August 11, 2025

Firmware Version: 1.10.3 (or greater)

Table 1: Record of Release, Manual Versions, and Changes

Document Version	Date	Description
V1.0	August 11, 2025	Initial Release, content applicable to Firmware Version 1.10.3 or greater

Specifications subject to change. E&OE.

Contact

Thank you for choosing this Cobalt Digital, Inc. product. The Cobalt Digital Inc. line includes video decoders and encoders, audio embedders and de-embedders, distribution amplifiers, format converters, remote control systems, and much more. Should you have questions pertaining to the installation or operation of your Cobalt device, please contact us at support@cobaltdigital.com. Feel free to contact us about product operation, pricing, your nearest dealer, or upcoming trade shows at info@cobaltdigital.com. Visit our website at www.cobaltdigital.com for more information.

Manual Overview

This manual provides installation and operating instructions for the COBALT® WAVE SERIES Control Panels.

For more information, visit www.cobaltdigital.com. Click on Support>Reference Documents.

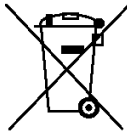
Explore guides to network control of devices, firmware updates, and other topics.

Warnings, Cautions, and Notes

Certain items in this manual are highlighted by special messages.
Here is some important information about product use and disposal.



Electronic device or assembly is susceptible to damage from an ESD (electrostatic discharge) event.
Handle only using appropriate ESD prevention practices.
If an ESD wrist strap is not available, handle device only by edges and avoid contact with any connectors or components.



Symbol (WEEE 2002/96/EC)
For product disposal, ensure the following:
Do not dispose of this product as unsorted municipal waste.
Collect this product separately.
Use collection and return systems available to you.

Warnings

Warning messages indicate a possible hazard which, if not avoided, could result in personal injury or death.

!WARNING! NO USER SERVICEABLE PARTS INSIDE.
REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

Cautions

Caution messages indicate a problem or incorrect practice which, if not avoided, could result in improper operation or damage to the product.

CAUTION! This device is intended for environmentally controlled use only in appropriate video terminal equipment operating environments.
CAUTION! Inadequate cooling can reduce equipment reliability.
CAUTION! Install devices in a rack with adequate space for air circulation, especially devices with no fans for cooling.

Notes

Notes provide supplemental information to the accompanying text. Notes typically precede the text to which they apply.



Important notes regarding product use are shown.
Failure to observe may result in unexpected or incorrect operation.

Product Overview

The WAVE Control Series has compact control panels in (CP-42L or CP-44) 1RU (3.5 inch) or (CP-78 or CP-84L) 2RU (7 inch) frames. These control panels provide a high density solution that offers unprecedented flexibility, ease of use, and integration.

Each control panel provides a single 10/100/1000 Ethernet port for IP-based controls.

Each unit also has two 25-pin D-SUB connectors, supporting 2 to 20 (with licensing) general purpose input or output channels.

An integrated web server supports browser control and system setups which can be saved and recalled quickly.

This system is designed to support multiple WAVE routers, with various options in each control panel.

Control Panel Router Compatibility

The Cobalt Digital WAVE control panels support control of select Cobalt Digital WAVE Routers. Communication between control panels and routers is done via the Cobalt Router Protocol (CRP), so compatibility is limited to routers that support CRP. Currently (July 2025), supported control panel models are:

Cobalt Digital WAVE RTR-32x32 Router

Cobalt Digital WAVE RTR-64x64 Router

Features

The WAVE Control Series Control Panel includes the following features:

Compatible with Cobalt Digital Inc. WAVE Routers

With a license, each control panel may be powered by Power over Ethernet (PoE) at 40 watts maximum

With a license, GPIO may be extended from two to 20 channels

Two power supplies may be connected to the control panel, providing redundant power supply

Control panel button labels can be edited for easier recognition

Vivid color button illumination provides information about button state and active routers and routes

The LCD screen (CP-44 and CP-78) shows status for the control panel and a selected route

Default for Destination Take (three-button) or Destination Orient (two-button) route control is available

Buttons can be labeled in language fonts supported by computer display

Lua script creation and editing enables local control of LCD screen and LCD button messages

An online key cap template supports local creation of button labels for the CP-44 or CP-78 control panels

Quiet fan-less design

Functional Description

This section shows information about the form, fit, and function of the device.

Technical Specifications

Table 1: Product Specifications

Item	Characteristic
Product	WAVE CONTROL SERIES Control Panels
Dimensions	19 inches wide rack mount, CP-78 or CP-84L 3.5 inches tall (2RU) or CP-42L or CP-44 1.75 inches tall (1RU) CP-42L or CP-84L 1.75 inches deep into rack, CP-78 1.4 inches deep into rack, and CP-44 1.35 inches deep into rack
Weight	CP-84L 3.35 lb, CP-78 2.5 lb, CP-44 2.15 lb, and CP42L 2.72 lb
Power Requirements	12 V DC 100 W maximum
Power Supply	Recommended: 110-240 V AC 50/60 Hz, +12 V DC 10 A, with an M12 5-pole connector
Network Connect	RJ45 port for 10/100/1000 Mbps Ethernet
Serial Ports	(1) 25-pin D-SUB connector GPI (general purpose input) and (1) 25-pin D-SUB connector GPO (general purpose output)

Here are views of the panels as shown in the control panel web interface.

Figure 1: CP-84L Panel



Figure 2: CP-78 Panel



Figure 3: CP-44 Panel



Figure 4: CP-42L Panel



Front Panel Components

The front panel of each control panel has different controls for switching among connected routers, routes, and salvos:

CP-84L has 84 LCD buttons that can be programmed for various functions and labels.

CP-78 has a small LCD screen and 74 LED-illuminated buttons with paper labels under a clear cap.

CP-44 has a small LCD screen and 44 LED-illuminated buttons with paper labels under a clear cap.

CP-42L has 42 LCD buttons that can be programmed for various functions and labels.

BLUE LEDs: On the CP-44 and CP-78 front panels, LEDs illuminate when the panel is connected to power.

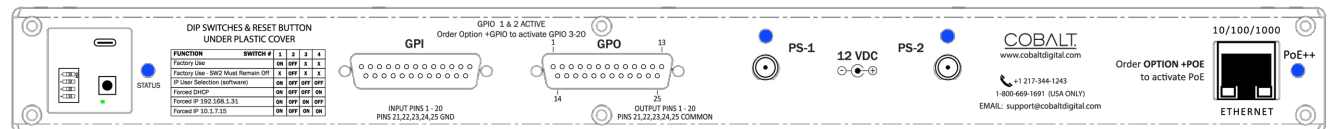
LCD SCREEN: On the CP-44 and CP-78 control panels the LCD screen shows system and route connection status.

BUTTONS: Depending on the features of the control panel, buttons can be labeled to describe a button's purpose. Route, salvo, destination, source, lock, and shift buttons allow control of connected routers.

Table 2: Front and Rear Panel LED State Description

Label	States	Description
Front (CP-44 and CP-78 only) and Rear Status	Blue (ON) OFF	Operating Unit is not powered
Rear: PS-1	Blue (ON) OFF	Power supply unit is Powered Power supply unit is Not Powered
Rear: PS-2	Blue (ON) OFF	Power supply unit is Powered Power supply unit is Not Powered

Figure 5: Rear Panel Typical Components



Rear Panel Components

ETHERNET PORT: An RJ-45 Ethernet 10/100/1000 LAN port is located on the lower center of the control panel. The RJ45 Ethernet connector allows connection of the control panel to a 10/100/1000 Ethernet LAN using Cat 5 or

greater cable to access the control panel's built-in web server through an Internet browser. Multiple configurations are available, including standalone control, a local LAN, or a WAN control setup. This Ethernet connection also allows control over the network using the WAVE CONTROL SERIES user interface or other control protocols. The port has standard LEDs to show link and activity.

Table 3: Ethernet Port LEDs

Position and Color	State	Description
Right LED, Amber	OFF	No Link Established
	ON	Link Established
Left LED, Green	OFF	No Network Activity
	ON	Blinking LED shows network activity

POWER SUPPLY: Two redundant power supply connectors are located on the lower left corner of the control panel rear panel. A power supply must be connected to operate this control panel. External power supplies that accept 110-240VAC 50/60Hz power inputs and supply +12VDC to the WAVE control panel can be connected.

For redundant operation, a second power supply may be purchased separately.

POWER LED: An LED above each power supply connector indicates power supply status.

STATUS LED: On the rear panel, a blue LED illuminates to show the panel is powered on. On the CP-44 and CP-78 control panels a blue LED on the front panel shows the same colors and flashing pattern (if any) during operation as the rear panel Status LED.

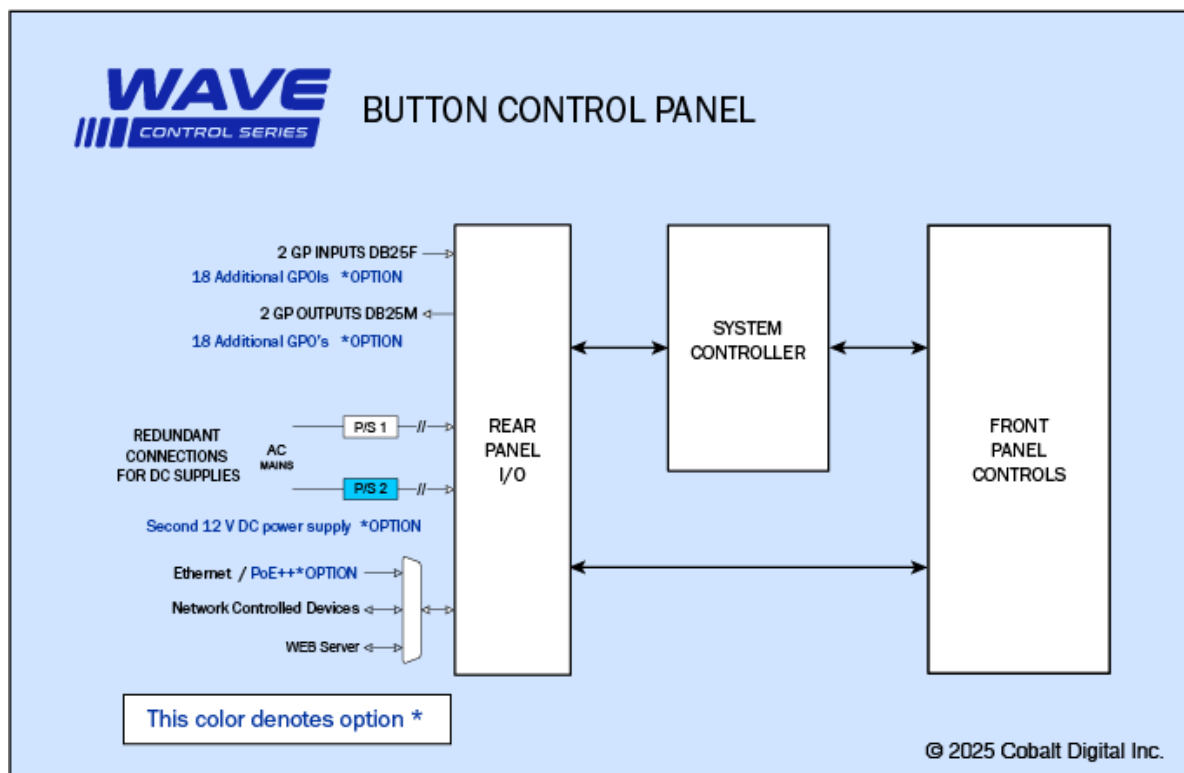
SERIAL PORTS: A GPI 25-pin D-SUB female port and a GPO 25-pin D-SUB male port are available for serial communication. Each unit has two 25-pin D-SUB connectors, supporting 2 to 20 (18 available by licensing) general purpose input or output channels.

BLACK PLASTIC CAP: A black plastic cap protects DIP switches and a reboot button.

DIP SWITCHES: Behind a black plastic cap, DIP (Dual Inline Package) switches enable forced IP Address assignment. A label may be applied on the rear panel of the control panel describing switch positions to force a particular IP address for the control panel. Specifications are subject to change.

REBOOT BUTTON: Behind a black plastic cap, next to the DIP switches, a small button enables reboot of the control panel after DIP switch positions are changed. Pressing this button reboots the control panel the same as reboot of the control panel using the web interface.

Figure 6: Block Diagram



System Requirements

The WAVE CONTROL SERIES Control Panel interface requires a Microsoft Windows® computer, a current browser, and a network connection to a compatible WAVE Router:

Cobalt Digital WAVE RTR-32x32 Router

Cobalt Digital WAVE RTR-64x64 Router

User Control Interfaces

There are several options for control of the control panel. The control interfaces are cross-compatible and can operate together.

Where applicable, a controller setting change made using a particular user interface is reflected on any other connected interface.

WAVE control panel Web Interface

Cobalt Control Panel (CCPP API)

Lua API

WAVE Router Web Interface (Routes and Salvos are set up in the router, and may be triggered from a WAVE Control Panel)

Several additional options are available for control of a WAVE control panel:

COBALT WAVE Control Series CP-84L 2U Remote Control Panel

COBALT WAVE Control Series CP-78 2U Remote Control Panel

COBALT WAVE Control Series CP-42L1U Remote Control Panel
COBALT WAVE Control Series CP-441U Remote Control Panel

Visit www.cobaltdigital.com for current COBALT® WAVE system options.

WAVE CONTROL SERIES Web Interface

This embedded web interface is accessible through the IP address of each WAVE CONTROL SERIES control panel. Virtual control of each control panel is enabled, and support is provided for the CCPP API and Lua API.

Cobalt Control Panel Protocol (CCPP) API access

The WAVE control panel platform provides remote control and monitoring facilities through the Cobalt Control Panel Protocol (CCCP) application programming interface (API), accessible via both HTTP and WebSocket.

The Cobalt Control Panel Protocol enables automation and programmatic control of the control panels by other devices.

Button attributes can be monitored and modified, Lua scripts can be manipulated, auxiliary devices can be added and removed, GPIO lines can be monitored and toggled, user accounts can be managed, system commands can be executed, and various status parameters can be queried and monitored.

Complete documentation for CCPP is available at: [http://\[control_panel's_address_or_hostname\]/ccpp/](http://[control_panel's_address_or_hostname]/ccpp/)

Lua API, Lua Scripting Environment

It's important that we introduce the scripting environment fairly early on, since this is a central feature that makes our products unique.

The behavior of the buttons and display(s) on the front of the control panel is controlled by a user-defined script written in the Lua programming language. This allows button mappings, key labels, and display text to be completely customized by the user. Custom logic may also be implemented inside Lua scripts.

Each control panel ships with one or more “built-in” Lua scripts which provide all essential control panel control functionality. Separate scripts are available for Destination-Oriented (DO) and Destination-Source-Take (DST) operation paradigms. The differences between these paradigms are explained in the “Operation paradigms” section of this document. All control panels include a built-in Destination-Oriented script. The CP-78 and CP-84L also include a Destination-Source-Take script.

Complete documentation for LUA API is available at: [http://\[control_panel's_address_or_hostname\]/lua/](http://[control_panel's_address_or_hostname]/lua/)

Routes and Salvos Are Set Only in a Router, Not a Control Panel



Routes and salvos are set up in the WAVE Router, and may be triggered from a WAVE CONTROL SERIES control panel.

Installation and Setup

Installing a Control Panel in a Rack

Figure 1: Rear Panel Typical Components

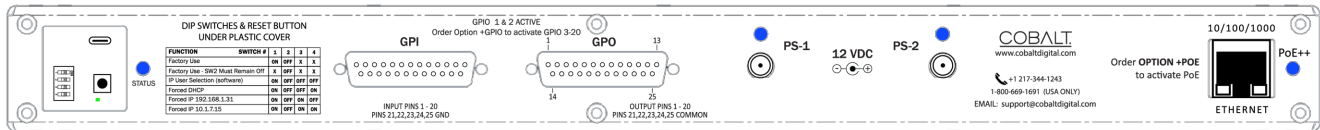
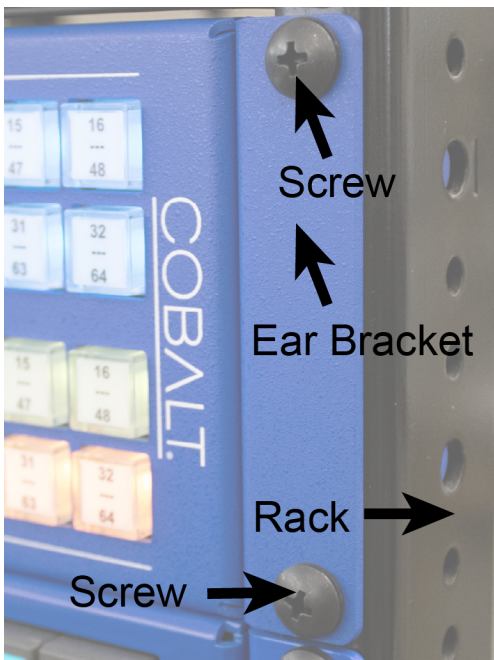


Figure 2: Front Panel Installation on a Rack



1. Contact support@cobaltdigital.com if parts are missing. Remove the control panel from packaging.
2. On the control panel's rear panel (Figure 1), connect an Ethernet power source (PoE, Power over Ethernet) supplying 12 V DC to the RJ-45 connector. or connect one or two 12 V DC 60 watt power supplies (Part Number PS-4) to the connectors marked PS-1 and PS-2
3. First install the right and left screws in the lower holes in the ear bracket (Figure 2) to hold the control panel on the rack. This makes placement and alignment easier for upper screws put through the ear bracket holes into the rack.

Set the Control Panel's Network Address Using the DIP switches

!WARNING!

NO USER SERVICEABLE PARTS INSIDE.
REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

Figure 3: Sample Label Near the DIP Switches

**DIP SWITCHES & RESET BUTTON
UNDER PLASTIC COVER**

STATUS

FUNCTION	SWITCH #	1	2	3	4
Factory Use		ON	OFF	X	X
Factory Use - SW2 Must Remain Off		X	OFF	X	X
IP User Selection (software)		ON	OFF	OFF	OFF
Forced DHCP		ON	OFF	OFF	ON
Forced IP 192.168.1.31		ON	OFF	ON	OFF
Forced IP 10.1.7.15		ON	OFF	ON	ON

1. If you do not want to make the control panel reboot using the web interface, disconnect power from the control panel, making reboot automatic when power is connected.
2. The DIP switches are under a black plastic cover near the DIP switches instruction label. Remove and retain the cover.
3. Use the Forced IP address to make first connection to the control panel. After initial setup, move DIP switches positions for network address values needed for your local network.
4. If the panel is still connected to power, press the small black button near the DIP switches to reboot the control panel. The panel may also be rebooted using the web interface through the Admin Tab and Reboot in the page header. A warning message may show if the DIP switch positions do not agree with the IP Address option set in the control panel interface software.
5. Install the black plastic cover on the port in the rear panel.

Setting Up the Device

1. Connect a Cat 5 or better Ethernet cable to the Ethernet port. The network address for the control panel is set by DIP switches positions inside a plastic cover on the rear of the control panel. The IP address may also be set using web interface software.
2. The Ethernet connector is Power over Ethernet (PoE) capable when a license enables use. Contact support@cobaltdigital.com for a PoE license.
3. Connect at least one power supply to operate this control panel. Connect 12 V DC power supply cable(s) to PSU-1, PSU-2, or both connectors. Connect external 100 watt power supplies that accept 110-240 V AC 50/60 Hz power inputs and supply +12 V DC 10 A to the WAVE control panel. Connect the power supply to main power with a plug suitable for your local power requirements.
4. Connect to the GPI (general purpose input, pins 1-20 input and pins 21-25 common) and GPO (general purpose output, pins 1-20 output and pins 21-25 common) 25-pin D-Sub ports as desired for serial port control of the control panel. A license applied to the control panel makes 20 channels available through the GPI and GPO ports.
5. Open a web browser on a computer connected to the same network as the control panel. Based on the setting of the DIP switches in the control panel, connect to the Forced IP address shown on the control panel label. The label may vary among control panels and specifications are subject to change.
6. On the opening screen, enter the Username "Admin" and the Password "password", then click on the Sign in button. If security is an issue, change the Username and Password at your earliest convenience.

7. On the first screen of the WAVE Control Series Interface, a panel shows. Click on the Admin Tab at the lower left corner of the screen.
8. Click on Network at the top of the screen to open a dialog to set the IP address for the control panel.
9. In the IP Settings window select either Static or DHCP, depending on your local network needs.
10. For the Static option, enter the information needed to connect the router to your local network. For the DHCP option, automatic communication will establish a connection.

If the DIP switches configuration is set to any of the "forced" IP address modes, a warning message is shown. To avoid the warning message and apply the network settings, set the DIP switches to the IP User Selectable (software) mode and reboot the control panel. Upon reboot, the control panel will use the network settings set in software.

Default Settings

When delivered from the factory some settings are ready for immediate connection and operation.

Destination Take or Destination Orient Route Control

On the CP-78 and CP-84L control panels, either Destination Take (three-button) or Destination Orient (two-button) route control may be selected as the default for the system. Upon delivery, either Built-in control approach may be selected using the control panel web interface.

On the CP-42L and CP-44 control panels Destination Orient (two-button) route control is the default for the system.

Button Labels

English language is used for button and LCD screen messages, but creating and applying a Lua script can show other languages on the CP-42L and CP-84L panel buttons.

On CP-44 and CP-78 control panels, a clear plastic cap covers the button. Visit the Cobalt Digital website to download a Key Cap Template Acrobat file.

Edit the Acrobat file to create and print other labels for the buttons.

1. A metal tool can mar or damage the clear plastic cap.
2. Carefully remove and retain the clear plastic cap from a button.
3. Remove the existing label and put a new label inside the cover.
4. Install the cover on the button.

Operating Instructions

Control and Display Descriptions

This section describes the user interface controls, indicators, and displays for using the WAVE CONTROL SERIES control panel. Router functions can be accessed and controlled using any of the user interfaces described here. User interfaces vary in presenting controls, displays, and indicators. Function menus among these interfaces are similar for control of a WAVE router.



NOTE: The control panel reports its values directly to the connected interface.
The value displayed at any time is the actual value as set in the control panel.

Cobalt® Remote Control Panel User Interfaces

These remote control panels contain two General Purpose Inputs (GPI) and two General Purpose Outputs (GPO). Eighteen additional ports can be added using the + GPI option. Both contain a PoE++ compatible Ethernet port. PoE++ functionality is available using the + PoE option. Dual DC power inputs provide for redundant operation.

COBALT WAVE Control Panel CP-84L features 84 LCD buttons.

COBALT WAVE Control Panel CP-78 features 78 buttons. A small LCD panel displays status.

COBALT WAVE Control Panel CP-44 features 44 buttons. A small LCD panel displays status.

COBALT WAVE Control Panel CP-42L features 42 LCD buttons.

Visit www.cobaltdigital.com for more information.

WAVE Control Panel Operation

The WAVE Control Panel interface includes buttons (and a small LCD screen on the CP-44 and CP-78 units). An internal web-based interface allows virtual control through a network connected computer.

A current web browser on a network connected computer may be used to access the interface. Open a web browser and enter the IP address previously configured for the control panel.

On the front and rear panels of WAVE control panels CP-44 and CP-78 an LED shows blue light while the panel is powered on.

Under a black plastic cap on the rear of the control panels there are two useful controls.

DIP Switches: Four DIP switches force IP addresses for the control panel. Refer to the label near the DIP Switches for correct positions. After changing DIP switch positions, either set Status alert messages to Ignore or reset the control panel IP setting in Admin > Network dialog to match the DIP switches settings.

Reboot Button: A small push button near the DIP switches allows hard reboot of the control panel. Reboot is always recommended after DIP switches settings are changed.

Here are views of the panels as shown in the control panel web interface.

Figure 1: CP-84L Panel



Figure 2: CP-78 Panel



Figure 3: CP-44 Panel



Figure 4: CP-42L Panel



WAVE Control Panel Integrated Web Server Interface

The WAVE Control Panel interface is an internal web-based interface to control and view route settings.

A current web browser on a network connected computer may be used to access the interface.

Open a web browser and enter the IP address previously configured for the control panel.

Figure 5: Tabs in the COBALT® WAVE Control Panel Web Interface

Click on the WAVE CONTROL SERIES logo to hide text by the icon, increasing the horizontal width of the activity window. When only icons show, click on the device name (CP-44, etc.) to show text by the icons, reducing the horizontal width of the activity window on the screen.

Tabs are text and icons. When clicked on, a blue box shows the Tab has been selected. The Tabs labeled Panel, Devices, GPIO, Lua API, CCPP API, Status, Admin, and Logout open dialogs that control various functions.




NOTE: In several tabs, click on a text box to show or hide the dialog window.

Panel Tab

When the Panel tab is selected, an interactive display of a control panel enables remote operation of connected devices and a Lua script editor is visible.



In header section of the Lua script window, select the  toggle panel icon to hide or show the control panel at the top of the screen.


Lua Scripts

Beneath the interactive control panel is a text editor to support writing and editing of Lua scripts.

Lua scripts enable change in messages on panel buttons in the web interface (and on the unit when the buttons are LCD capable, such as on the CP-42L and the CP-84L control panel).

Lua scripts also enable change in messages on the small LCD panel in the web interface (and on the unit when the unit has a front panel LCD screen, such as on the CP-44 and the CP-78 control panel).


Beneath a tab labeled Built-in, there are Lua scripts created by Cobalt Digital to set the factory default appearance of the control panel buttons and LCD screen.

Roll over the  icon with a mouse cursor to see more information about the Lua script.

Built-in (default) scripts cannot be deleted.







On the CP-78 and CP-84L control panels, two default route control options are available.

Beneath a tab labeled User, Lua scripts may be created, saved, and applied to manage the LCD screen or LCD button appearance on the control panel.

Roll over the  icon with a mouse cursor to see more information about the Lua script.

The User scripts can be deleted by clicking on the  icon.

In the header for the window showing a Lua script, by the name of the visible Lua script, there are icons that support script management.

-  Select the diskette icon to save a Lua script for a panel configuration change. Click on Yes to apply the change described in the Lua script.
-  Select the eye icon to run the Lua script on the panel.
-  Select the icon to reset changes. This reverses the changes applied to the panel configuration.
-  Select the zoom-in icon to enlarge text in the Lua script. A horizontal scroll bar on the bottom of the screen may be needed to read each line of text when magnified. There are 15 steps of view between enlarging and reducing text on the screen.
-  Select the zoom-out icon to reduce the size of text in the Lua script.
-  Select the toggle panel icon to hide or show the control panel at the top of the screen.

A drop-down dialog shows the control panel type (such as CP-44) with an option for Custom application.

An elevator bar on the right side of the screen allows scrolling through a selected Lua script.

Operation Paradigms

Under the Destination-Source-Take (DST) paradigm, a route is made by first pressing the desired destination button, pressing the desired source button, and then pressing a dedicated “Take” button. The source will be routed to the destination as soon as the Take button is pressed. This provides more secure operation, reducing the possibility for inadvertent route changes or misselection of sources.

On the CP-78, the DST script's Take button replaces the DO script's Salvo Shift button.

When a source is selected but not yet routed, the source is said to be staged. A staged source is indicated by magenta illumination of the corresponding source button. When a source is staged, the Take button flashes between bright teal blue and dim teal blue, indicating that Take can be pressed to create the route. In addition, the staged source number and name are shown on a line at the bottom of the middle region of the display. A staged source can be cancelled by pressing either the active source button or active destination button.

Multiple source buttons can be pressed before the Take button is pressed; only the most recently selected source will be routed to the destination when Take is pressed.

When a route is made under DST, pressing the Take button again (without selecting a source) will immediately revert the destination to route to its previous source. Whenever another destination is selected, this “memory” of the previous source is lost.

Under the Destination-Oriented (DO) paradigm, a route is made by first pressing the desired destination button, and then pressing the desired source button. The source will be routed to the destination as soon as the source button is pressed. This provides faster operation than DST and conserves the use of a button which would otherwise be needed for “Take”, but does not have the route-reverting functionality.

When a route is made under DO, the button corresponding to the selected source will momentarily flash magenta.

Control Panel Button Default Color Assignments

Salvo Triggers are GREEN

Dim Green: A salvo is mapped to the button and may be triggered

Bright Green: A salvo is being triggered (because operator pushed the button)

Router Selection is MAGENTA

Dim Magenta: router is configured, but is not currently selected

Bright Magenta: router is configured and currently selected

Lock Destination or Panel is WHITE

Off: The selected destination is not locked

Flashing between Bright White and Dim White: The selected destination is locked

Dim White: The panel lock inactive

Flashing between Bright White and Medium White: The panel lock is active

Source and Destination Shift buttons are BLUE. Use of the Shift button enables selection of alternative options for the button.

Dark Blue: Not shifted

Light Blue: Shifted

Sources are CYAN (light blue)

Dim Cyan: The source that is not routed to the selected destination

Bright Cyan: The source that is routed to the selected destination

Unlocked Destinations or Selected Destinations are YELLOW

Dim Yellow: The destination is unlocked or not selected

Bright Yellow: The destination is selected

Locked and Non-Selected Destinations are ORANGE

Figure 6: CP-44 and CP-78 Control Panel LCD Screens

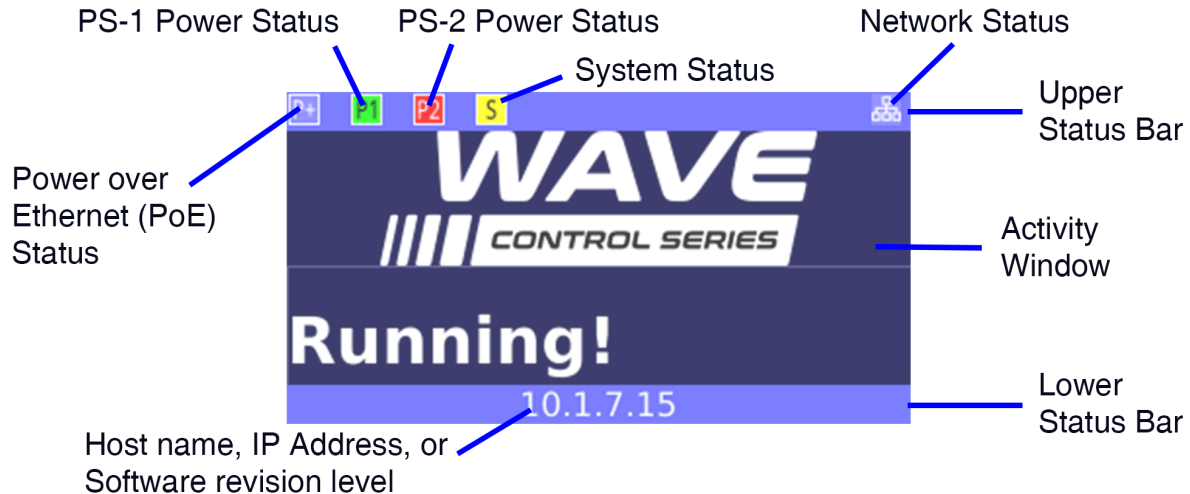
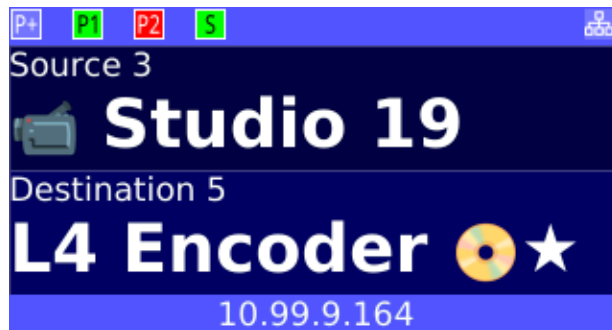


Figure 7: CP-44 and CP-78 LCD Screen Display

Description of LCD Screen Display and Icons

Left side upper status bar icons on the screen provide information about control panel connections.

The  icon indicates Power over Ethernet (PoE) status.

In the PoE status icon, a green color indicates that PoE support is licensed and a supported PoE-carrying link is present; a medium blue color indicates that PoE support is licensed but a supported PoE-carrying link is not present; a light blue color indicates that PoE support is not licensed.

The  icon indicates power supply 1 status. The  icon indicates power supply 2 status.

In the power supply status icons, a green color indicates that the corresponding power supply is attached and operational; a red color indicates that the corresponding power supply either has failed or is not attached.

This  icon indicates system status.

In the system status icon, a green color indicates normal status; a medium blue color indicates an active informational notification; a yellow color indicates an active warning; a red color indicates an active fault. In the case of multiple active notifications, the color shown will correspond to the highest severity of all active notifications. Faults are considered to have the highest severity, followed by warnings, followed by informational notifications. See the "Status" sidebar in the web management application for details about the current system status.

A right side upper status bar  icon shows status for the control panel network connection.

On the right side of the top status bar, the network status icon shows.

When the network link is active, the icon has no marks.

When the network link is inactive, a red X marks the network icon, such as .

The bottom status bar cycles between showing the control panel's network host name, the control panel's current IP address, and the running firmware version.

The central activity windows shows active source and destination information, including names assigned in the connected router web interface. Some information about source state such as "Source staged" when using the Destination Take option.

A screen saver shows on the LCD screen when the control panel is idle.

When control panel buttons are not touched for 30 minutes, a screen saver activates, and an animation shows on the display in instead of system messages. Button LEDs also dim to a lower brightness level.

Press an inconsequential control panel button, such as the Panel Lock button, to wake the panel. Buttons are still active, even while the screen saver is active. Most buttons still perform their usual functions even when the screen saver shows. Pressing an inconsequential key wakes the unit up without modifying routes or changing which route is shown on the display.

Panel Lock

Press and hold down the Panel Lock button for about two seconds. Panel lock disables all other buttons on the control panel.

When the panel is locked, the Panel Lock button flashes between bright white and medium white. On the LCD screen of the CP-44 and the CP-78 control panels, a message "Panel Locked" shows.

Unlock the panel by pressing and holding the Panel Lock button for about two seconds.

When the panel is unlocked, the Panel Lock button shows dim white.

Router Selection

Only routers that have been connected to the control panel through the web interface Devices tab can be controlled using the control panel buttons.

On the CP-42L and the CP-44 control panels only four routers may be controlled using the four buttons.

On the CP-78 and CP-84L control panels eight routers may be controlled using the four buttons. Press the Router Shift button to toggle between router one through four and routers five through eight.

Selecting a Route

A route is a connection between a source (input) and a destination (output). Routes can be made, but not saved using the panel buttons.

Only the WAVE router web interface supports saving routes in a salvo. A salvo is a group of routes which may be stored and later applied (triggered).

Steps for Route Selection Dependent on Operation Paradigms (Described Above)

Depending on the Lua script selected in the interface, DST (three-button Destination Take) or DO (two-button Destination Orient):

DST route selection (this option is available through a Built-in Lua script for the CP-74 and CP-84L panels):

1. Press a Destination button
2. Press a Source button
3. Press the Take button to set a route. On CP-78 control panels, before the Take button is pressed the LCD screen shows "Source staged".
4. Pressing the Take button again changes the source between the previously selected source and the new source in a route.

DO route selection (this is the default on the CP-42L and the CP-44 panels, while this option is available by selection of a Built-in Lua script on the CP-74 and the CP-84L panels):

1. Press a Destination button
2. Press a Source button to set a route.

Locking a Route

Each destination may be locked by pressing the Destination Lock button. This lock prevents inadvertent rerouting of the destination to a different source. A locked destination's route will not be affected by manual

route changes or salvo change. A destination button shows an orange color light when the destination is locked. To unlock the destination, press the destination button then press the Lock button. A destination button shows a yellow color light when the destination is unlocked.

Changing Source, Destination, and Route Titles

Refer to instructions in the WAVE router manual for more information about naming sources, destinations, and route titles.

Applying or Triggering a Salvo on a Control Panel

Apply (trigger) a salvo on the control panel by pressing a Salvo button. On the control panel, the routes set up in the salvo will show on the buttons on the control panel. When a salvo is triggered, each route in the salvo is made, connecting a destination and a source.

Triggering a salvo overwrites previously active routes in the control panel, with the exception of any locked destinations.

Changing sources and destinations of routes on the control panel does not affect the salvo saved in the WAVE router interface.

On the CP-42L and the CP-44 control panels, only four salvos may be triggered using the four buttons.

On the CP-78 and CP-84L control panels, eight salvos may be controlled using the four buttons. Press the Salvo Shift button to toggle between salvos one through four and salvos five through eight. The LCD buttons on CP-42L and CP-84L control panels change to show salvo numbers available for triggering.

Devices Tab

When the Devices tab is selected, devices controlled from the control panel can be set.

Device Selection: At present, only Wave Series Router is available as a selection.

Device Address: A prompt says "Enter a valid IP address or hostname (wave looks like: ws://(ip address)/wsapp/)". Enter applicable information in the dialog.

Create Device button enables connection to the device entered Device Address in the dialog above Create Device. A prompt shows if no address has been entered "Address/URL cannot be blank!"

Delete Device button deletes a device if it is highlighted in the table below the button.

A device list shows in a table with unit identification (UID), a WAVE logo, and the IP Address for the unit. Elevator arrows allow selection to change among connected devices.

Text under the table shows the number of entries in the table.

GPIO Tab

When selected, a table displays the available general purpose input and output (GPI and GPO) connections available through the two 25-pin connectors on the rear panel of the control panel.

When a license has not been applied only two GPO options and two GPI options show.

When a license has been applied, 20 GPO options and 20 GPI options show on the screen.

Under the heading GPO Name and State there is GP0-1 and following names up to GPO-20 and drop-down selector for OPEN or CLOSED.

Under the heading GPI Name and State there is GP0-1 and names up to GPO-20 (where licensed) and a statement for the State, OPEN.

The GPIO allows simple state messages to pass into and out of the control panel to enable external control or remote control of other simple devices. Lua scripts may be created to cause activity through the GPIO connections.

Lua API Tab

When the Lua API (application programming interface) tab is selected, a text file describes the Cobalt Lua Command Reference.

Lua scripts enable change in messages on panel buttons in the web interface (and on the unit when the buttons are LCD capable, such as on the CP-42L and the CP-84L control panel).

Lua scripts also enable change in messages on the small LCD panel in the web interface (and on the unit when the unit has a front panel LCD screen, such as on the CP-44 and the CP-78 control panel).

An elevator bar on the right side of the screen allows scrolling through the instructions.

Click on blue hypertext to go directly to descriptive text.

Please note that the basic lua libraries are not complete.

The Lua API at Rev 2.3.2 supports only the WAVE Series Router, with possible future extensions for other device types.

CCPP API Tab

When the CCPP (Cobalt Control Panel Protocol) API (application programming interface) tab is selected, a text file describes the Cobalt Control Panel Protocol (CCPP). The Cobalt Control Panel Protocol (CCPP) is a JSON based protocol that communicates through various protocol payloads, specifically HTTP restful interface and WebSockets. An elevator bar on the right side of the screen allows scrolling through the instructions. Click on hypertext to go directly to the descriptive text. Please note that the basic lua libraries are not complete.

The CCPP API at Rev 1.3.0 supports only the WAVE Series Router. This protocol will also adopt other functions specific to the control panel. Thus, the router function commands are separated into system specific and router specific commands.

Status Tab

When the Status tab is selected, a banner shows in the upper right corner of the screen. Temperature readings for the system sections (Local, PoE, and Power Zones) show, above any alert messages active in the control panel, such as "WARNING - System is in forced DHCP mode. Please check dip-switches."

Admin Tab

This tab provides options to manage access, operation, and files.

About

A list of product information shows below the About header.

Product

Company

Product Version

CPA Version

Hardware Version

API Version

Serial Number

Users

Under the Users header, user and password control is enabled.

1. When a name is selected in the Username list, click on the Change Password button.
2. A dialog opens to enter both the current password and a new password.
3. Click on the Submit button to authorize the new password for a user to access the control panel software interface.

Network

Under the Network header, IP settings show and may be changed. Mode, Address, Net Mask, Gateway and Name Servers show and new information may be entered.

1. Under the IP Settings title, the dialog may be changed between Dynamic Host Configuration Protocol (DHCP) and Static Address setting. DHCP may be preferred for automating network connection on a large network.
2. If Static is selected, drop-down dialogs allow entry of new IP settings for the control panel.
Address (decimal numbers and dots to the IPv4 standard, such as 10.99.20.40)
Net mask (decimal numbers and dots to the IPv4 standard, such as 255.255.255.0)
Gateway (decimal numbers and dots to the IPv4 standard, such as 10.99.20.1)
Name Servers - If more than one server, separate each with a comma (no spaces) (decimals and dots to the IPv4 standard, such as 10.99.20.1)
3. If network settings are changed, click on the Save IP Settings button to authorize the network settings for the control panel.

A warning sign shows "Save IP settings to configure DHCP after first boot".

An alert message about DHCP or other IP settings conflicting with control panel DIP switches settings may be disabled using the Status drop-down dialog.

Status

Under the Status header, alert message options show.

Entries per page can be changed among 10, 25, 50, and 100.

Message options can be searched using a search dialog.

Click on a check box in the Ignore column to keep messages from showing when the described condition occurs. The messages and alert conditions can be extended using the Lua API.

Here is a list of eight default alert messages that may show on the control panel web interface:

INFO - Settings have been modified. Autosave will occur shortly

WARNING - System is in forced DHCP mode. Please check dip-switches

WARNING - System is in forced IP 1 (192.168.1.31) address mode. Please check dip-switches

WARNING - System is in forced IP 2 (10.1.7.15) address mode. Please check dip-switches

WARNING - Software upgrade in progress. Please refrain from using the system.

WARNING - Temperature is over 75C for 'Local Zone'

WARNING - Temperature is over 75C for 'PoE Zone'

WARNING - Temperature is over 75C for 'Power Zone'

A message at the bottom of the message table describes the total number of alert messages set for the system. Click on advance and return arrows in a dialog to see multiple pages of alert messages.

For recommended responses to the default alerts refer to the Troubleshooting section of this manual.

System

Under the System header, file upload is available to apply firmware updates or licenses. Upload files such as firmware updates or purchased licenses to the device.

1. Click on the Choose File button to select a file.
2. In the dialog, identify the file to upload and Click on the Open button.
3. Click on the Upload button to save the file to the device.
4. Reboot the router after upload of a file.

SSH

CAUTION! Enabling SSH may degrade router security.
Enable SSH only when instructed by Cobalt Digital Inc. Customer Service.
SSH will reset to Disabled at each reboot of the control panel.

SSH Enable. By default, SSH is disabled and only used for support. If support instructs you to enable SSH, then enable it here. SSH is a protocol that enables transfer of encrypted files across an unsecure network connection.

1. Click on a radio button by Enable SSH or Disable SSH.

By default this option is not enabled. It is only used for support of the device.

Brightness

Under the Brightness header, two sliders allow LCD display screen (CP-44 and CP-78) and button brightness to be changed for the connected control panel. Use a mouse cursor to move the slider or highlight it and use keyboard arrow keys to move the slider left or right.

1. Each slider adjusts brightness in 10% increments between 0 and 100%. The button under the slider line shows the brightness number percentage.
2. When a slider is moved to its lowest position (below 10%), the button under the slider shows OFF.

Screen Saver

Under the Screen Saver header, two dialog windows enable control of a screen saver feature on the small LCD display screen (on CP-44 and CP-78 control panels) or dimming of the button LEDs. Default timeout for dimming buttons or the LCD display screen is 30 minutes (1800 seconds).

1. The Select Screen Saver dialog is a drop-down that allows selection between Dim Screen and Logo Fall. Adjust the amount of screen dimming with a slider under the Brightness header. Logo Fall shows an animated WAVE logo falling and bouncing across the screen.
2. Screen save timeout (seconds) limits the idle time before the screen saver activates. The range is 30 to 3600 seconds.
3. There are two options for adjusting the timeout value. Elevator buttons allow adjustment of the timeout value, up and down.

If needed, highlight the text in the dialog using a mouse cursor and type numbers into the dialog then press the Enter computer keyboard button.

4. If a number less than 30 is entered, a warning window shows "Please enter a value between 30 and 3600 seconds."

Logs

Under the Logs header, options show for system log management and immediate download of a system log.

A slider may be moved to enable remote Syslog logging, which is saving a system to a location outside the control panel.

An Address dialog requires entry of decimal numbers and dots to the IPv4 standard, such as 10.99.20.40. A port number is also required for output. System logs contain a timestamped record of a control panel's events and messages. These logs may be used to review issues that may occur. Logs are contained in a gzip (.gz) file.

Click on the OK button to apply the information entered for the Address and Port.

If needed, click on the Reset button to clear the dialog and enter information for another Address and Port.

Click on the Download Logs button to save a file to your remote location. Save the GZ file to your computer so you may share it with Cobalt Digital Customer Support.

Reboot

Under the Reboot header, a button shows for reboot of the control panel.

Clicking of this button will shut down and restart the control panel. This option reboots only the control panel, not connected devices.

This button may be used, with the same results as pressing the button near the DIP switches on the back of the control panel. router, which may be used if DIP switches positions are changed on the control panel to change network settings.

Reset

Under the Reset header, a Reset button allows the control panel to be restored to factory settings. Configuration of routes, sources, destinations, and salvos will be reset to defaults.

Some settings are retained such as control panel connection and the control panel IP address.

1. In the dialog window, click on the Factory Reset button.

If a configuration file has been saved, it may be loaded to restore information after the router is reset to factory default.

Logout Tab

Click on this tab to exit the interface, returning to the login screen.

Troubleshooting

The WAVE control panel requires no periodic maintenance in normal operation in a dust free, controlled-temperature environment. Otherwise, remove debris and dust accumulation to allow cooling air to circulate around the control panel and nearby equipment.

If an alert message shows on the control panel web interface, it may be disabled using the software interface Admin Tab and Status header.

Table 1: Status Message and Solution

Status Message	Severity	Solution
Settings have been modified. Autosave will occur shortly.	INFO	Let Autosave occur. Status LEDs show blue until Autosave is complete. The color changes to green when Autosave is complete after approximately 10 seconds.
System is in forced DHCP mode.	WARNING	Change the DIP switches positions to IP User Selectable (software) mode to match the mode selected in the software interface. Reboot the router.
System is in forced IP (192.168.1.30) address mode.	WARNING	
System is in forced IP (10.1.7.14) address mode.	WARNING	
Software upgrade in progress. Please do not use the system until upgrade and reboot is complete.	WARNING	Let system upgrade and reboot before using the system.
Temperature is over 75C for 'Local Zone'	WARNING	Remove power from the control panel and improve ventilation for the control panel and surrounding equipment.
Temperature is over 75C for 'PoE Zone'	WARNING	
Temperature is over 75C for 'Power Zone'	WARNING	

If other issues occur, without messages showing like those that are controlled by the Status Tab and Status Settings drop-down menu, here are some suggested remedies.

Table 2: Signal Path Issues

Problem	Cause	Solution
LOS shows for a route in the Router Table	Loss of signal	Verify signal at source to the router.
Input signal status is not showing as expected in the Router Table	Connection Fault	Make source is connected to the correct Input BNC connector on the router
Output signal is not delivered as expected	Connection Fault	Make sure the output cable is connected to the correct Output BNC connector on the router
There is interference in input and output signals	Connection Fault	Make sure cables and connectors are clean and unmarred. Replace damaged cables. Disconnect and reconnect cables to the router.

If these or other issues arise in the installation, setup, or operation of this device, make note of issues and operating conditions and send an email to support@cobaltdigital.com, call 217-344-1243, or call Toll Free in the USA 800-669-1691.

Cobalt Control Panel Protocol, API Access

The WAVE control panel platform provides remote control and monitoring facilities through the Cobalt Control Panel Protocol (CCCP) application programming interface (API), accessible via both HTTP and WebSocket.

The Cobalt Control Panel Protocol enables automation and programmatic control by other devices.

Routing and salvo parameters can be queried and set, system commands can be executed, and various status parameters can be queried and monitored.

Complete documentation for CCP is available at: [http://\[control_panel's_address_or_hostname\]/ccpp/](http://[control_panel's_address_or_hostname]/ccpp/)

Cobalt Control Panel Lua API Access

The WAVE control panel platform provides remote control and monitoring facilities through the Cobalt Control Panel Lua API application programming interface (API), accessible via both HTTP and WebSocket.

The Cobalt Control Panel Lua API enables automation and programmatic control by other devices.

Routing and salvo parameters can be queried and set, system commands can be executed, and various status parameters can be queried and monitored.

Complete documentation for Lua API is available at: [http://\[control_panel's_address_or_hostname\]/lua/](http://[control_panel's_address_or_hostname]/lua/)

Available Parts

WAVE CONTROL SERIES CP-42L

The Cobalt WAVE CP-42L Remote Control Panel features 42 back-lit LCD dot matrix display buttons.

All buttons are illuminated by Red, Green and Blue LEDs providing a wide choice in background colors.

The frame is 1U - 1.75 inches tall and is only 3.4 inches deep with removable rack mount “ears” for desktop use or other custom installations.

WAVE CONTROL SERIES CP-44

The Cobalt WAVE CP-44 Remote Control Panel features 44 back-lit buttons. All buttons are illuminated by Red, Green and Blue LEDs providing a wide array of background colors to choose from. Factory presets provide a solid starting point from which to customize each button color. The front panel color LCD display keeps you informed of the panel status. The frame is 1U / 1.75 inches tall and is only 3.4 inches deep with removable rack mount “ears” for desktop use or other custom installations.

WAVE CONTROL SERIES CP-78

The Cobalt WAVE CP-78 Remote Control Panel features 78 back-lit buttons. All buttons are illuminated by Red, Green and Blue LEDs providing a wide array of background colors to choose from. Factory presets provide a solid starting point from which to customize each button color. The front panel color LCD display keeps you informed of the panel status. The frame is 2U / 3.5 inches tall and is only 3.4 inches deep with removable rack mount “ears” for desktop use or other custom installations.

WAVE CONTROL SERIES CP-84L

The Cobalt WAVE CP-84L Remote Control Panel features 84 back-lit LCD dot matrix display buttons. All buttons are illuminated by Red, Green and Blue LEDs providing a wide array of choices in background colors. The frame is 2U - 3.5 inch tall and is only 3.4 inches deep with removable rack mount “ears” for desktop use or other custom installations.

POWER SUPPLY PS-4

The power supply for the WAVE control panels has a power cord suitable for the installation region. Two power supplies may be connected for redundant power supply.

WAVE RTR-64x64 ROUTER

The COBALT WAVE RTR-64x64 12G SDI/ASI/MADI ROUTER is a mid size 64x64 Crosspoint solution contained within a compact 4U (7 inch) tall frame. This router provides a high density solution that offers unprecedented flexibility, ease of use, and integration. The frame is a thin 3.75 inch deep chassis. A single 10/100/1000 Ethernet port for IP based controls such as General Remote protocol SW-P-08 and PESA PNET.

WAVE RTR-32x32 ROUTER

The COBALT WAVE RTR-32x32 12G SDI/ASI/MADI ROUTER is a 32x32 Crosspoint solution contained within a compact 4U (7 inch) tall frame that is a thin 3.75 inch deep chassis. A single 10/100/1000 Ethernet port for IP based controls such as General Remote protocol SW-P-08 and PESA PNET.

PS-WAVE-120-L

The power supply for the WAVE Routers has a power cord suitable for the installation region. Two power supplies may be connected for redundant power supply.



WAVE-CONTROL-PANEL-OM_v1.0

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