

WAVE RTR-64x64 Router

Product Manual

WAVE-64-RTR-OM_v1.2

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PESA™ is a trade name of PESA.

Manual Identification

Manual Name WAVE-64-RTR-OM_v1.2 Release Date May 29, 2025

Firmware Version: 1.9.0 (or greater) COBALT® WAVE RTR-64x64 Web Interface Version: 1.8.3 (or greater)

Copyright Table 1 Record of Release, description of manual version and changes

Document Version	Date	Description
V1.0	November 10, 2023	Initial Release, content applicable to Firmware Version 1.010 or greater
V1.1	November 29, 2023	Minor typographical corrections, content applicable to Firmware Version 1.010 or greater
V1.2	May 29, 2025	WAVE router feature extensions (including Configuration File Download, Set Location, and Beacon for router location) in Firmware Version 1.9.0 and Web Interface Version 1.8.3, field installation of optional fan removed from manual

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.

Cobalt Digital, Inc. Limited Warranty

This product is warranted to be free from defects in material and workmanship for a period of five (5) years from the date of shipment to the original purchaser, except that 4000, 5000, 6000, 8000 series power supplies, and Dolby® modules (where applicable) are warranted to be free from defects in material and workmanship for a period of one (1) year. Spotcheck units and LMNTS units will be warranted for a period of 3 years from date of shipment to the original purchaser.

Cobalt Digital Inc.'s ("Cobalt") sole obligation under this warranty shall be limited to, at its option, (i) the repair or (ii) replacement of the product, and the determination of whether a defect is covered under this limited warranty shall be made at the sole discretion of Cobalt.

This limited warranty applies only to the original end-purchaser of the product, and is not assignable or transferrable therefrom. This warranty is limited to defects in material and workmanship, and shall not apply to acts of God, accidents, or negligence on behalf of the purchaser, and shall be voided upon the misuse, abuse, alteration, or modification of the product. Only Cobalt authorized factory representatives are authorized to make repairs to the product, and any unauthorized attempt to repair this product shall immediately void the warranty. Please contact Cobalt Technical Support for more information.

To facilitate the resolution of warranty related issues, Cobalt recommends registering the product by completing and returning a product registration form. In the event of a warrantable defect, the purchaser shall notify Cobalt with a description of the problem, and Cobalt shall provide the purchaser with a Return Material Authorization ("RMA"). For return, defective products should be double boxed, and sufficiently protected, in the original packaging, or equivalent, and shipped to the Cobalt Factory ServiceCenter, postage prepaid and insured for the purchase price. The purchaser should include the RMA number, description of the problem encountered, date purchased, name of dealer purchased from, and serial number with the shipment.

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Cobalt Digital, Inc. 2015/Rev.1.9 Specifications subject to change. E&OE.

Manual Overview

This manual provides installation and operating instructions for the COBALT® WAVE RTR-64x64 router.

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.
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 RTR-64x64 router is a midsize 64x64 Crosspoint solution contained within a compact 4U (7 inch) tall frame. The frame is a thin 3.75 inch-deep chassis. The router provides a high density solution that offers unprecedented flexibility, ease of use & integration.

The router provides a single 10/100/1000 Ethernet port for IP-based controls such as General Remote protocol SW-P-08 and PESA PNET.

The unit also has RS-422 and RS-232 9-pin serial communication ports. The two serial ports (RS-232 and RS-422) are reserved for future use and are not operable in Software Revision (Platform) 1.9.0, Software Revision (Neo) 1.8.3, or previous revisions.

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

This compact design is specifically optimized for 12G SDI operation but handles lower SDI rates with ease.

Features

The WAVE RTR-64x64 router includes the following features:

- High-density 4RU 12G SDI router with full size 75 ohm BNC connectors
- 64x64 Crosspoint with support for signals up to 12G
- Supported signals include ASI, MADI, or SDI 12G, 6G, 3G, HD, and SD
- External analog reference for SMPTE RP 168 switch point timing
- Direct interface compatibility with SW-P-08 and PESA PNET remote control protocols
- Two power supplies may be connected to the router, providing redundant power supply
- Quiet fan-less design
- An optional fan may be factory installed if the router must operate in environments above 50 °C
- Compatible with Cobalt Digital, Inc. WAVE control panels

Functional Description

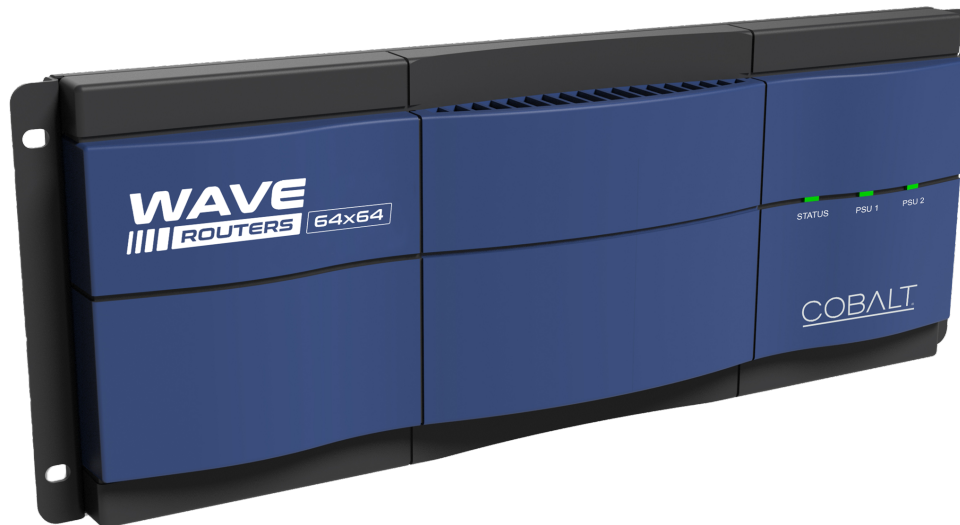
This section shows information about the form, fit, and function of the device.

Technical Specifications

Functional Description Table 1 Product Specifications

Item	Characteristic
Product	WAVE RTR-64x64
Dimensions	19 inches wide rack mount, 7 inches tall (4RU), 3.75 inches deep including front bezel and rear connectors.
Weight	11 lbs. (dependent on installation of the optional fan)
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	RJ-45 port for 10/100/1000 Mbps Ethernet
Source Inputs	(64) 12G full size BNC
Destination Outputs	(64) 12G full size BNC
Serial Ports	(1) RS-422 (right of the RJ-45 port) and (1) RS-232 (left of the RJ-45 port) DE-9F connectors reserved for future use
External Reference Loop	(2) full size BNC

Functional Description Figure 1 Front Panel View with LED Indicators



Front Panel Components

The front panel of the device has three LED indicators on the right that are marked Status, PSU 1, and PSU 2. The front and rear panel LEDs show the same colors and flashing during operation.

Functional Description Table 2 Front and Rear Panel LED State Description

Label	States	Description
Front: Status or Rear: Status ID	Green Blue Red Flashing Red and Blue	Operating Status change is being saved Error: Make sure of router network connection Beacon state for finding a router in a rack is enabled
Front: PSU 1 or Rear: PS-1	Blue (ON) OFF	Power supply unit is Powered Power supply unit is Not Powered
Front: PSU 2 or Rear: PS-2	Blue (ON) OFF	Power supply unit is Powered Power supply unit is Not Powered

FRONT BEZEL: The front bezel may be removed to change DIP switches settings or to clean the optional fan.

DIP SWITCHES: The DIP (Dual In-line Package) switches allow manual control of some features, such as setting the device's network address. See Installation and Setup text for setting the DIP switches.

OPTIONAL FAN: The optional fan may be installed at the factory by Cobalt Digital, Inc. Dust may collect in the device, blocking air circulation. While power is disconnected from the router, remove the front bezel. Remove debris and dust from the fan and ventilation ports.

Functional Description Figure 2 Rear Panel View

Rear Panel Components

FULL SIZE BNC CONNECTORS: The WAVE RTR-64x64 router rear panel consists of full size BNC SDI 12G video inputs 1-64 (top four rows) and BNC SDI 12G video outputs 1-64 (bottom four rows).

EXT REF LOOP: Two BNC connectors are dedicated to an External Reference Loop. These two Ext. Ref. Loop inputs are connected together, so either one may be used as an input or an output. See the SMPTE RP 168 standard for compatible input.

ETHERNET PORT: An RJ-45 Ethernet 10/100/1000 LAN port is located on the lower center of the router. The RJ-45 Ethernet connector allows you to connect the router to a 10/100/1000 Ethernet LAN using CAT 5 or greater cable to access the router'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 Routers user interface or other control protocols. The port has standard LEDs to show link and activity.

Functional Description Table 3 Ethernet Port LEDs

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

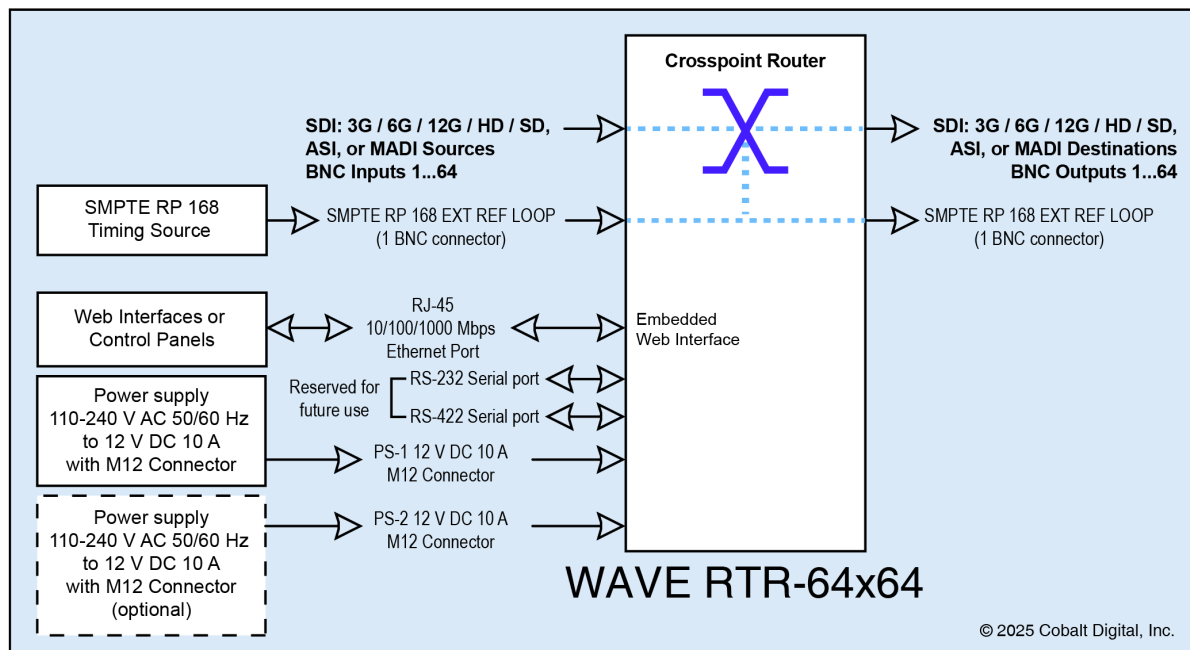
POWER SUPPLY: Two redundant power supply connectors are located on the lower left corner of the router rear panel. A power supply must be connected to operate this router. External power supplies that accept 110-240VAC 50/60Hz power inputs and supply +12VDC to the WAVE 64x64 router can be connected. For redundant operation, a second power supply may be purchased separately.

An optional fan is available for continuous operation in environments above 50° C. If the optional fan is installed at the factory, two power supplies must be connected and operating.

LEDs: Three LEDs above the power supply connectors indicate router and the power supply status. The front and rear panel LEDs show the same colors and flashing during operation.

INACTIVE SERIAL PORTS: The two serial ports (RS-232 and RS-422) are reserved for future use and are not operable in Software Revision (Platform) 1.9.0, Software Revision (Neo (web interface)) 1.8.3, or previous revisions. One RS-232 9-pin Serial female D connector is located to the left of the Ethernet port. One RS-422 Serial 9-pin female D connector is located to the right of the Ethernet port.

Functional Description Figure 3 Block Diagram



User Control Interfaces

There are several options for control of the WAVE RTR-64x64 Router. 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 Router Web Interface

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

- 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.

System Requirements

The WAVE Router interface requires a Microsoft Windows® computer, a current browser, and a network connection to the WAVE RTR-64x64 router.

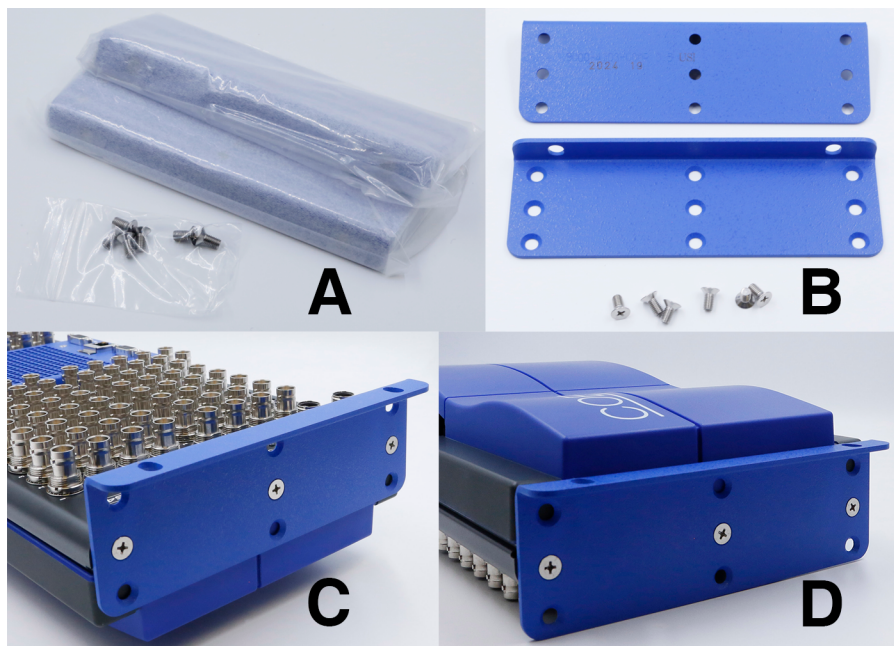
Refer to DashBoard® or other software for current system requirements.

Installation and Setup

Installing a Router in a Rack

!WARNING! Use only the screws included with the router's rack mounting brackets. Longer screws may intrude on the circuit board inside the router case. Damage to the circuit board cannot be repaired, voiding the warranty for the router.

Installation and Setup Figure 1 Ear Bracket Installation on a Router




1. Contact support@cobaltdigital.com if parts are missing. Remove ear brackets and screws from packaging (Installation and Setup Figure 1 Item A) to mount the router on a rack. Make sure six screws (Screw, Flat head, 90 deg, Phillips, M5 × 0.8 mm, 10 mm Length, Stainless Steel, RoHS Compliant) are kept with the Cobalt ear brackets (Figure 1 Item B).
2. On each ear bracket there are three rows of three countersunk screw holes (Figure 1 Item B).
 - The router may be mounted on a rack with the rear panel and connectors facing out for easy access to cable connectors (Figure 1 Item C).
 - The router may be mounted on a rack with the front panel facing out for easy access to the DIP switches inside the blue front bezel panel (Figure 1 Item D). The bezel panel may be removed and replaced as needed.
3. Install an ear bracket so the flat side of the ear bracket mates with the side of the router, with the countersunk side of the screw hole facing away from the router (Figure 1 Items C and D).
4. First install the right and left screws in the lower holes in the ear bracket to hold the router on the rack. This makes placement and alignment easier for upper screws put through the ear bracket holes into the rack.

Set the Router's Network Address Using the DIP switches

!WARNING!

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

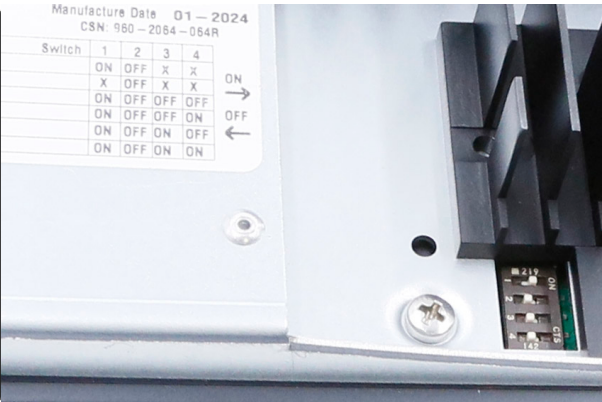
Installation and Setup Figure 2 Sample Label Near the DIP Switches and Location Photo

MANUFACTURE: COBALT DIGITAL, INC.
MODEL NUMBER: WAVE RTR - 64x64
SERIAL NO.

546012R
MAC: 00:23:02:08:54:DC

2506 Galen Drive
Champaign, IL 61821
1 - 217 - 344 - 1243
cobaltdigital.com
support@cobaltdigital.com

MADE IN USA
Manufacture Date 01 - 2024
CSN: 960 - 2064 - 064R

Function	Switch	1	2	3	4
Factory Use		ON	OFF	X	X
Factory Use - SW2 Must Remain Off		X	OFF	X	X
IP User Selectable (software)		ON	OFF	OFF	OFF
Forced DHCP		ON	OFF	OFF	ON
Forced IP 192.168.1.30		ON	OFF	ON	OFF
Forced IP 10.1.7.14		ON	OFF	ON	ON



1. If you do not want to make the router to reboot using the web interface, disconnect power from the router, making reboot automatic when power is connected.
2. The blue front panel bezel is held on the router frame by four ball studs that mate with sockets on the router face. Remove the bezel by pulling it straight out from the router.
3. The DIP switches and a label are on the left side of the front of the router, near a heat sink (Installation and Setup Figure 2).
4. Use the Forced IP address to make first connection to the router. After initial setup, move DIP switches positions for network address values needed for your local network.

Installation and Setup Figure 3 Four Ball Studs on the Bezel



5. Make sure bezel light guides are aligned with the LEDs on the router with product lettering right side up on the front of the bezel to align the four ball studs (Installation and Setup Figure 3) with router sockets.
6. Press the bezel onto the router frame.
7. If previously disconnected, connect power to the router.



NOTE: After initial setup, always reboot the router after changing router DIP switches positions.

Setting Up the Device



NOTE: The External Reference Loop is optional. If an external timing source is connected to the labeled EXT REF LOOP BNC connectors, the router will perform seamless switching as specified in SMPTE RP 168 whenever cross-point routing changes are made. If no external timing source is connected, switching will be performed immediately on command, without seamless transition.

1. Connect a cable from a compatible analog timing source (such as the COBALT® 9960-TG2-REF1 Test Signal Generator) to one of the EXT REF LOOP BNC connectors on the rear panel of the WAVE Router. General practice is input on the left and loop out on the right, although looping reference connectors can receive reference input on either connector of the looping pair. If the open BNC connector is not connected to another device, terminate the connector with a 75 Ohm dummy load. If no timing source is connected to the router, there is no need to terminate either EXT REF LOOP connectors.
2. Connect Input and Output cables to labeled BNC connectors.
3. Connect a CAT 5 or better Ethernet cable to the Ethernet port. The network address for the router is set by DIP switches positions inside the bezel on the front of the router. The IP address may also be set using web interface software or a control panel.
4. Connect at one power supply to operate this router. If the optional router fan is installed at the factory, two power supplies must be connected to the router. Connect 12 V DC power supply cable(s) to PSU-1, PSU-2, or both M12 5-pole power connectors. Connect external 100 W power supplies that accept 110-240 V AC 50/60 Hz power inputs and supply +12 V DC 10 A to the WAVE router. Connect the power supply to main power with a plug suitable for your local power requirements.
5. There is no need to connect to the RS-232 or RS-422 ports on the rear panel of the device. These are reserved for future use.
6. Open a web browser on a computer connected to the same network as the router. Based on the setting of the DIP switches in the router, connect to the Forced IP address shown on the router label. The label may vary among routers and specifications are subject to change.
7. On the first screen of the WAVE Router Interface, a router table shows.
8. Click on the Settings Tab at the top of the screen.
9. Click on IP Settings to open a dialog to set the IP address for the router.
10. In the IP Assignment window select either Static or DHCP, depending on your local network needs.
11. 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 router. Upon reboot, the router will use the network settings set in software.

Operating Instructions

Control and Display Descriptions

This section describes the user interface controls, indicators, and displays for using the WAVE RTR-64x64 router. 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 the WAVE RTR-64x64 Router.



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

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 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.

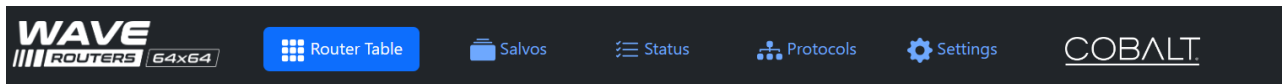
COBALT WAVE Control Panel CP-42L features 42 buttons.

Visit www.cobaltdigital.com for more information.

WAVE Router Integrated Web Server Interface

The WAVE Router interface is an internal web-based interface to control and view router 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 router.

Operating Instructions Figure 1 Tabs in the COBALT® WAVE Web Interface



Clicking on the WAVE logo or the COBALT logo opens a window to the Cobalt Digital Website.

Tabs are text and icons. When clicked on, a blue box shows the Tab has been selected. The Tabs labeled Router Table, Salvos, Status, Protocols, and Settings open dialogs that control router functions.



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

Router Table Tab

The router's sources (inputs) and destinations (outputs) are arranged in a table, with each source occupying a row and each destination occupying a column. A connection, or route, between a source and a destination is indicated by color in the intersecting cell, which also contains a short textual description of the type of signal on that route.

Routing a source to a destination causes the source to be connected to the destination through the Crosspoint. Such a route can be made by clicking the intersecting cell between the source and the destination. Each destination must have a source routed to it. A single source can be sent to multiple destinations, but a destination can take only one source.

The Reference Input cell is at the top left. This indicates the SMPTE RP 168 reference input status. If no compatible timing source is connected, the text No Reference shows in this cell.

Input modes are in the leftmost column. Input modes allow choice between AUTO (video) and MADI (Multichannel Audio Digital Interface) for each source. Set the input mode to automatically detect video modes or force the input to detect MADI.

The Input Status column shows the type of signal detected on each input, such as MADI, HD, 3G, or 12G. If no valid signal is detected on an input, the corresponding Input Status cell shows LOS (loss of signal).

Changing Source, Destination, and Route Titles

Each source and destination have an associated title, which may be customized for easier recognition. By default, sources are named SOURCE-1 through SOURCE-64. By default, destinations are named DEST-1 through DEST-64.

To the right of the Input Status column, the Source Name column shows the title of each source. Click on a title to edit it. While editing, a "short title" may also be entered, which is used in contexts where space is limited, such as router control panel buttons. When editing is complete, click the x to leave the editing interface and apply the changes.

Additional columns to the right represent each destination. Click on a title to edit it. As with the sources, a short title may also be entered. When editing is complete, click the x to leave the editing interface and apply the changes.

Locking a Route

Each destination may be locked, preventing inadvertent rerouting of the destination to a different source. A locked destination's route will not be affected by manual route changes or Salvos. Above the title of each destination a lock icon indicates whether the destination is locked or unlocked. Clicking the icon toggles the lock. When a destination is locked the active source cell becomes gray.

Text for a route's input source type will also show in the corresponding Destination column. If no valid signal is detected on the route, the cell becomes red (or gray when the destination is locked) and shows the text LOS. When the cursor hovers over a cell in the Router Table, a message describing the potential route is shown, so that it can be verified before clicking to make the route.

Salvos Tab

A salvo is a group of routes which may be stored and later applied (triggered). Each salvo may contain multiple routes. When a salvo is triggered, each route in the salvo is made, connecting a source and a destination. Salvo routes are reflected in the Router Table. Sources and destinations not included in a salvo are not affected in the Router Table.

The Salvos Tab provides options for creating, editing, triggering, and removing salvos. The stored salvos are shown in a table. Up to 10 salvos can be stored.


Click on the New Salvo button at the top of the page to create a new empty salvo. A row representing the new salvo is added to the bottom of the table. Each salvo has an associated name, which may be customized for easier recognition. Salvos may also have a short title, which is used in contexts where space is limited, such as router control panel buttons. Enter a description of the salvo in the salvo's Name field. If desired, enter a short description in the salvo's Short Name field.

Modifying Routes in a Salvo

Click on the new salvo's Add Route button. A route is added to the salvo, represented by a Source input drop-down menu and a Destination output drop-down menu, connected by an arrow. Select a Source and a Destination.

Click on the Add Route button to create another route. A source may be routed to multiple destinations, but only one source may be routed to a destination. When a salvo is triggered, its routes will be applied sequentially from top to bottom; if a route lower in the list involves the same destination as a route higher in the list, the lower route will take precedence.


Click on the x next to a route to delete that route from its parent salvo.

Click on the expand/collapse button  to the right of a salvo's Add Route button to show or hide the salvo's route list.

Salvos can also be created from the active set of routes. To do this, click the downward arrow on the New Salvo button, and then click New from Router Table. A new salvo is created containing all 64 routes that are currently connected.

Triggering a Salvo

Click on the Trigger button next to a salvo's name to apply the routes contained in that salvo. The new routes will be reflected in the Router Table. Triggering a salvo overwrites previously active routes in the Router Table, with the exception of any locked destinations.

Deleted salvos cannot be restored. Delete a salvo by clicking on the trash can symbol  on the same line as the salvo name.

Status Tab

The status tab provides control of status alerts. By default, status alerts show when an event occurs.

Click on the Current Status box to display current system status, such as a notice about impending Autosave after a setting is changed.

Click on the Status Settings box to change when system alerts show. Click on an Ignore check box to turn off alerts about system status. Alerts from the system are subject to change.



NOTE: Reference Input (Ext Ref Loop) Error or Alarm Condition shows a service affecting error (a RED LED). This WARNING may be disabled in the Status Tab, if no reference will be connected to the EXT REF LOOP BNC connectors. NOTE: The External Reference Loop is optional. If an external timing source is connected to the labeled EXT REF LOOP BNC connectors, the router will perform seamless switching as specified in SMPTE RP 168 whenever crosspoint routing changes are made. If no external timing source is connected, switching will be performed immediately on command, without seamless transition.

Operating Instructions Table 1 Compatible SMPTE RP 168 Video Signals

Reference Format	Video Format	Video Rate	Reference Format	Video Format	Video Rate
525i59	525i59	SD	1080i50 / 1080psf25	1080p25 / 2160p25	HD / 6G
525i59	1080i59	HD	1080i50 / 1080psf25	1080p50 / 2160p50	3G / 12G
525i59	1080p29 / 2160p29	>HD / 6G	1080i59 / 1080psf29	525i59	SD
525i59	1080p29 / 2160p29	3G / 12G	1080i59 / 1080psf29	1080i59	HD
625i50	625i50	SD	1080i59 / 1080psf29	1080p29 / 2160p29	HD / 6G
625i50	1080i50	HD	1080i59 / 1080psf29	1080p59 / 2160p59	3G / 12G
625i50	1080p25 / 2160p25	HD / 6G	1080i60 / 1080psf30	1080i60	HD
625i50	1080p50 / 2160p50	3G / 12G	1080i60 / 1080psf30	1080p30 / 2160p30	HD / 6G
720p50	625i50	SD	1080i60 / 1080psf30	1080p60 / 2160p60	3G / 12G
720p50	1080i50	HD	1080psf23.98	1080psf23.98	HD / 6G
720p50	1080p25 / 2160p25	HD / 6G	1080psf23.98	1080psf23.98	3G / 12G
720p50	1080p50 / 2160p50	3G / 12G	1080psf24	1080psf24	HD
720p59	525i59	SD	1080psf24	1080p24 / 2160p24	HD / 6G
720p59	1080i59	HD	1080psf25	625i50	SD
720p59	1080p29 / 2160p29	HD / 6G	1080psf25	1080psf25	HD
720p59	1080p59 / 2160p59	3G / 12G	1080psf25	1080p25 / 2160p25	HD / 6G
720p60	1080i60	HD	1080p23.98	1080p23.98 / 2160p23.98	HD / 6G
720p60	1080p30 / 2160p30	HD / 6G	1080p24	1080p24 / 2160p24	HD / 6G
720p60	1080p60 / 2160p60	3G / 12G	1080p25	625i50	SD
1080i50 / 1080psf25	625i50	SD	1080p25	1080p25 / 2160p25	HD / 6G
1080i50 / 1080psf25	1080i50	HD			

Protocols Tab

The Protocols Tab provides options to define PESA® or SW-P-08 settings.

PESA Settings

Use the PESA Settings section to create, modify, and delete panels.

To create a new panel:

1. Click on the Pesa Settings cell to to see all columns.
2. Click on the OK button to apply the entered data.
3. The entered data will show on the Pesa Settings panel list.
4. Click on the New Panel button.
5. In the dialog window, select Panel Type from the pull-down menu.

Enter the IP ID, IP Address, Subnet Mask, and Gateway Address in the corresponding fields. Use IPv4 addresses (typically written in decimal numbers-dot notation, consisting of four decimal numbers separated by periods, such as 192.168.0.1).

SW-P-08 Settings

Use the SW-P-08 Settings to specify the TCP/IP port.

1. To specify the port, expand the SW-P-08 Settings field.
2. Type the desired port number in the field, usually 2000.
3. Click on the Apply button.

Settings Tab

The Settings tab shows About (which is system information), IP Settings, and Administration.

About

System information is shown here.

Product Name

Company Name

Software Revision (Platform)

Software Revision (Neo (the interface))

Hardware Revision

Serial Number (for the device)

Temperatures in equipment Zones shown in Degrees C, including the CPU, and four Crosspoint zones in the Router

LED Status

This shows color circles for the system Status ID and power supplies (PSU 1 and PSU 2). When the LEDs are not in the Beacon state, the Status ID (rear) and Status (front) LEDs display the color corresponding to the highest-severity active status such as: Blue for Info (informational; lowest severity), Yellow for Warning (medium severity), or Red for Fault (highest severity). These colors also show on the Front and Rear Panel LEDs.

Switch Status

This section enables finding a connected router.

Beacon

Enable the Beacon state to make the router front Status and rear Status ID LEDs flash between red and blue to make the router easier to find on a rack with multiple routers in operation. Move the slider toward the Text Enable physical unit location. This makes the Status LEDs on the front and rear panels of the router flash between red and white. The router LEDs will stop flashing after 10 minutes.

Location

This text may be changed in the Settings Tab Administration drop-down dialog under Set Location Information. Enter a text description describing the physical location of the router, such as rack identification numbers.

IP Settings

This section provides you the option to assigning an IP address for the router as either Static or automated by DHCP.



NOTE: Fault messages may show, if enabled, about DIP switches positions not agreeing with software Network IP address settings. Reset the DIP switches positions and reboot the router, or disable the network setting FAULT messages in the interface Settings Tab under Status Settings.

Static IP Address

1. Under IP Assignment, select Static from the pull-down menu.
2. Under Static IP Address, enter appropriate information for your network in the labeled fields:
Address (decimal numbers and dots to the IPv4 standard, such as 10.99.20.40)
Subnet mask (decimal numbers and dots to the IPv4 standard, such as 255.255.255.0)
Gateway Address (decimal numbers and dots to the IPv4 standard, such as 10.99.20.1)
Name Server - 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. Click on the Set IP Setting button. The system will save and apply these settings, overwriting settings driven by DIP switches positions on the WAVE Router.

DHCP Assignment

Dynamic Host Configuration Protocol (DHCP) may be preferred over Static Address setting. DHCP can avoid manual IP Address setting, which is helpful for maintaining a large network.

1. Under IP Assignment select DHCP from the pull-down menu.
2. Under Current IP Address, enter appropriate information for your network in the labeled fields:
Address (decimal numbers and dots to the IPv4 standard, such as 10.99.20.40)
Subnet mask (decimal numbers and dots to the IPv4 standard, such as 255.255.255.0)
Gateway Address (decimal numbers and dots to the IPv4 standard, such as 10.99.20.1)
3. Click on the Set IP Setting button. The system will save and apply these settings, overwriting settings driven by DIP switches positions on the WAVE Router.

Administration

This tab provides options to upload files, enable SSH (Secure Shell) protocol, reboot the router, download activity logs, enable remote server logging, and restore the device to factory default.

File Upload

Upload files such as configuration files, 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 OK button.
3. Click on the Upload button to save the file to the device.
4. Reboot the router after upload of a file.

Support

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 router.

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. By default this option is not enabled. It is only used for support of the device.
2. Move the slider in the dialog window to enable SSH.

Reboot

This option reboots the router, which may be used if DIP switches positions are changed on the router to change network settings.

1. Click on the Reboot Now button to reboot the router.

Download Logs

This downloads a system log to your local computer. System logs contain a timestamped record of a router's events and messages. These logs may be used to review issues that may occur. Logs are contained in a gzip (.gz) file.

1. In the Download Logs dialog, click on the Download Logs button.
2. Save the GZ file to your computer so you may share it with Cobalt Digital Customer Support.

Download Configuration

This downloads a router's configuration file to your local computer. Configuration files contain a record of the parameters set in the router's software. Configuration files have a .distro extension, and may be saved outside the router to backup and restore complex setups. To restore a saved configuration, upload a configuration file using File Upload.

1. In the Download Configuration dialog, click on the Download Configuration button.
2. Save the file as a system backup for your convenience.

Remote Syslog Server

Enable and disable remote system log collection. This automates sending system log files to an independent repository. When enabled, logs are sent to the specified remote server.

1. In the dialog window, move the slider toward the text Enable remote Syslog Logging
2. In the labeled dialog field, enter the remote server's IP address (decimal numbers and dots to the IPv4 standard, such as 10.99.20.40)
3. In the labeled dialog field, enter the Port number.
4. Click on the OK button.

Factory Default

Reset the router to factory settings. Configuration of routes, sources, destinations, and salvos will be reset to defaults.

Some settings are retained such as control panel connection using the PESA and SW-P-08 settings, the router IP address, the remote system log server, and router location text.

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. .

Set Location Information

Update router location information here.

1. Enter a free-form character string to describe the location of the router.
2. Click on the Save button. This information shows in the Settings Tab>About>Location section.

Troubleshooting

The WAVE RTR-64x64 router 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 through the router.



NOTE: When the LEDs are not in the Beacon state, the Status ID (rear) and Status (front) LEDs display the color corresponding to the highest-severity active status: Blue for Info (informational; lowest severity), Yellow for Warning (medium severity), or Red for Fault (highest severity). These LED colors also show in the web interface Status Tab Current Status drop-down.

If a message shows, it may be disabled using the software interface Status Tab and Status Settings drop-down menu.

Troubleshooting 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 30 seconds.
Crosspoint is reporting high temperatures (90C+)	WARNING	Make sure the router has effective ventilation. The fan (if installed) may be blocked or disconnected from power.
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.
Incompatible reference or no reference detected	FAULT	Disable the FAULT message in the Status Settings dialog if no reference source is to be connected.
Error communicating with Crosspoint	FAULT	An internal communications error occurred. Reboot the router. If error recurs, download the system log and share it with Cobalt Customer Service.
Error communicating with EQ (input n) ($n=1...64$)	FAULT	Check the Router table for an LOS (lost signal) message. There may be an EQ (equalizer) hardware fault. Reboot the router. If the error recurs, download the system log and share it with Cobalt Customer Service. .
Error communicating with CD (output n) ($n=1...64$)	FAULT	Check the Router table for an LOS (lost signal) message. There may be a CD (cable driver) hardware fault. Reboot the router. If the error recurs, download the system log and share it with Cobalt Customer Service.
Error communicating with IO expander	FAULT	An internal communications error occurred. Make sure router has not overheated. Reboot the router. If the error recurs, download the system log and share it with Cobalt Customer Service. .

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.

Troubleshooting Table 2 Signal Path Issues

Problem	Cause	Solution
LOS shows for a route in the Router Table	Loss of signal	Verify signal at source.
Input signal status is not showing as expected in the Router Table	Connection Fault	Make source is connected to the correct Input BNC connector
Output signal is not delivered as expected	Connection Fault	Make sure the output cable is connected to the correct Output BNC connector
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:

- Generate a system log file with the router's web interface to capture system data
- Send an email to support@cobaltdigital.com, call 217-344-1243, or call Toll Free in the USA 800-669-1691.

Cobalt Router Protocol, API Access

The WAVE router platform provides remote control and monitoring facilities through the Cobalt Router Protocol (CRP) application programming interface (API), accessible via both HTTP and WebSocket.

The Cobalt Router 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 CRP is available at: [http://\[router's_address_or_hostname\]/crp/](http://[router's_address_or_hostname]/crp/)

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WAVE-64-RTR-OM_v1.2

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