

CARBONITE

Carbonite Black Configuration Guide

v15.0

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Patents

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Carbonite

Designed for Live!

Carbonite Black improves on the highly popular Carbonite series by bringing up to 3 MEs, 4 MiniME™ outputs, more I/O, dedicated AES audio outputs, and full DashBoard integration with a touchscreen display. All this in the same compact 2RU frame form factor and intuitive control panel you have come to expect.

Designed for Automation!

The Carbonite family of switchers support the highly advanced OverDrive® Caprica automated production control system. Caprica takes advantage of the years of device integration that Ross® has developed in the large switcher product lines and puts it into an independent server. The Caprica server takes the place of the production switcher for controlling over 200 additional production elements (such as robotics, graphics, audio mixers, servers, etc.), timing the show and creating production macros.

Designed for Linear!

The Carbonite family of switchers continues to build on Ross® Video's reputation for setting the standard for multi-definition linear editing suites. The traditional layout and familiar controls of other Ross® switchers provide the power and ease of use you have come to expect. Carbonite cleanly connects to virtually any editor using the industry standard GVG100/110 protocols.

Designed for You!

With Ross® Video products installed in well over 125 countries world-wide, our sales, demonstration, and training people get a lot of ongoing feedback from customers. This feedback is carefully tracked and considered in the design and feature-set development of our products. Key members of the design teams are part of an ongoing program in which they provide product demonstrations, assist with product installation, and train operators. As a result, the complete line of Ross Video products continues to offer our legendary combination of power and ease of use.

Join our Growing Customer Base!

Deciding to purchase a Carbonite switcher will put you in good company, with many thousands of Ross switchers installed worldwide. Carbonite continues to build on a family of multi-definition switchers that have been delivering the goods every day in live sports, stadium scoreboards, and drama productions, mobile productions, as well as local and network newscasts.

Experience Great Support!

Ross® has designed and manufactured production switchers for over 45 years, with significant year over year growth for the past 29 years. We believe that an important factor of our success is our focus on providing a superior customer experience. We continually benchmark our warranty and technical support to ensure that they are the best in the industry.

We hope that you join the many thousands of satisfied video professionals around the world that are proud owners of Ross® production switchers. Please do not hesitate to contact us with any questions or comments you have related to this Configuration Guide at Tel: +1-613-652-4886, Fax: +1-613-652-4425 or email us at solutions@rossvideo.com.

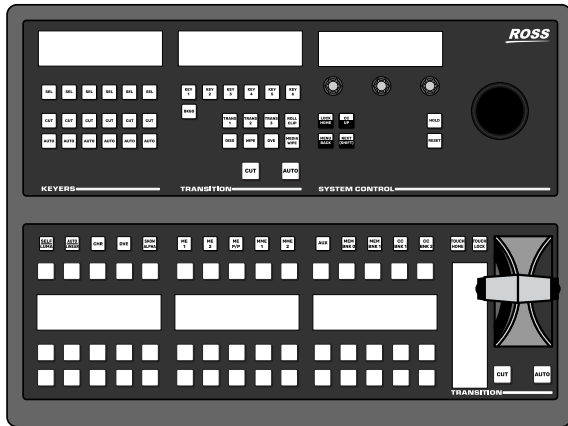
Feature Enhancements

A number of features have been added, or updated, to this version of software. This section provides a brief introduction to these features, and how to use them.

v15.0.3 Features

TouchDrive 1C Panel Support

Support for the TD1C control panel has been added.

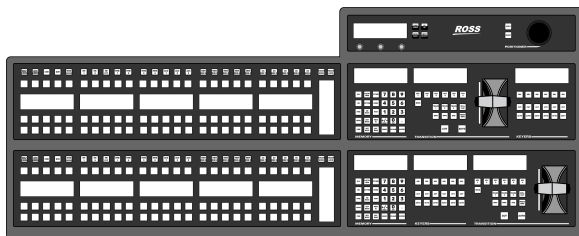


v15.0 Features

TouchDrive Control Panel

Carbonite Black now supports the new TouchDrive line of control panels. Running a Linux® operating system and giving you a familiar DashBoard interface with touchscreen mnemonics and panel displays, the new TouchDrive control panel represents the next level in user experience.

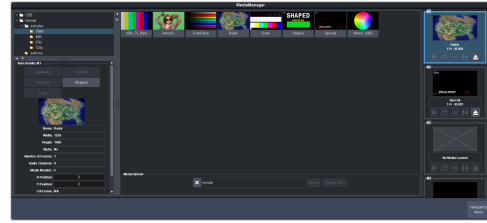
Visit <http://help.rossvideo.com/switcher-panels> for information on setting up and using the new TouchDrive control panel.



New MediaManager

The MediaManager interface has been integrated into DashBoard and given a new look.

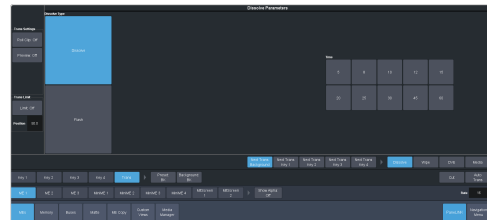
All the same functionality, with the exception of playlists, plus the ability to upload media from your host DashBoard computer.



Tip: If you still need the playlist functionality, the legacy MediaManager can still be accessed by navigating a web browser to the IP address of the frame.

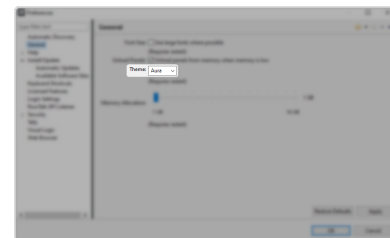
New DashBoard Menus

The DashBoard interface has been extensively updated. Both the Configuration and Live Assist tabs have been updated to allow for a more intuitive layout and access to more switcher settings from DashBoard.



Aura DashBoard Theme

Carbonite Black now supports the Aura DashBoard theme.



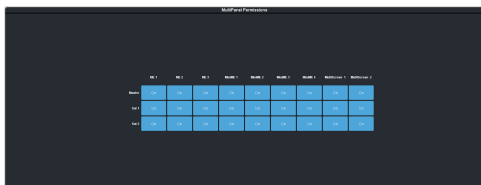
SoftPanel Has Moved

The SoftPanel interface is now separate from the master panel, but shares the same permissions. Create a new DashBoard device with the IP address of the frame and connect on port 5257.

MultiPanel in DashBoard

MultiPanel can now be configured from DashBoard. Each frame supports up to 3 independent control connections (Master, Satellite 1, and Satellite 2) as well as

SoftPanel/Satellite 3. Each connection, with the exception of SoftPanel, can be from a control panel, DashBoard, or a combination of the two. All devices on the same control connection mirror each other.



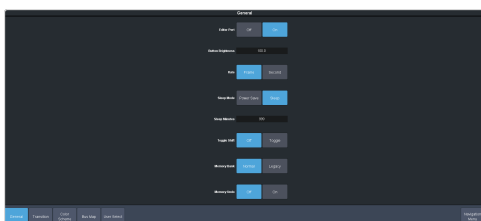
Note: SoftPanel shares the permissions of the Master Panel.

The independent control connections are selected by the port you connect to on the frame. Multiple panels and DashBoard connections can connect on the same port, but they will all share the same permissions and mirror each other for control.

- **Master Panel** — 5253
- **Satellite 1** — 5255
- **Satellite 2** — 5256
- **SoftPanel/Satellite 3** — 5257

Personality Menu

More of the personality settings for the control panel and frame have moved into DashBoard. Bus maps, user button assignments, and color schemes can all be applied independently to the master and satellite panels.



User Select Buttons Expanded

You can now set the user select buttons from DashBoard. These buttons have been expanded to include all buttons on that row and include functionality like key type, show alpha, and memory and custom control selection.



User select button assignment are part of switcher personality for the control panel.

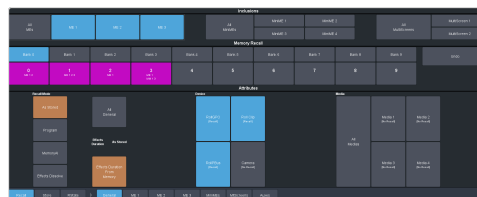
Import/Export Switcher Sets

You can now export switcher sets from the switcher using DashBoard. These sets are stored on the computer running the DashBoard control system and can then be imported to another switcher.



Improved Memory Interface

The memory interface in DashBoard has been improved to make it more intuitive in showing what the inclusions are for a memory and what attributes will be recalled.



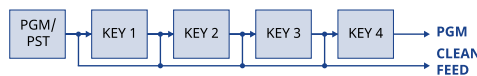
Features

Thank you for your interest in the Ross® Carbonite Series Multi-Definition Live Production Switcher. The Carbonite series builds on the Ross® reputation for designing switchers that fit the needs of any production environment.

Clean Feed Output

Clean feed is typically used for bilingual and live-to-tape productions. It provides a second Program output that is derived from a different location than the standard program output. A frequent application is the recording of shows for later airing without call-in phone numbers inserted.

The clean feed output can come from before or between the keys.



Custom Controls

This feature brings the power of macros to the switcher operator. Button presses, menu selections, event commands, or even the switcher state can be recorded to a custom control with pauses or holds between the events. A simple button press can play these events back again. Step through complex show openings as easily as pressing Custom Control buttons 1, 2, then 3.

Device Control

The switcher can control a number of external devices, such as video servers and robotic cameras. For a complete list of supported devices, and information on how to set up and control these devices, visit the Ross Video website

(rossvideo.com/production-switchers/carbonite/interface-list).

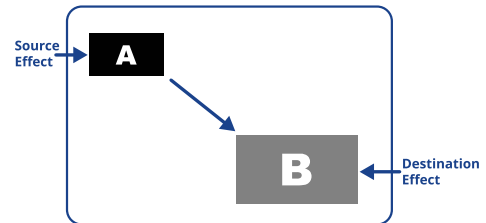
DVE (Fly Key)

The advanced 2D DVE comes standard with each switcher, and can be used for performing over the shoulder, or picture in picture shots. This allows all key types to be zoomed, cropped, and repositioned horizontally and vertically to create the look you want, or you can use one of

the useful pre-built 2D effects to perform 2D background transitions.

Effects Dissolve

The Effects Dissolve feature allows you to interpolate from one memory to another using a memory recall. The switcher will interpolate from the starting memory to the destination memory, creating a smooth, two key frame effect.



Only elements such as clip level and pattern position can be interpolated in the effects dissolve. Other elements, such as crosspoint selection, pattern, and next transition data are recalled first, and then the switcher will slew to the recalled memory.

An effects dissolve can be performed on as many elements and MEs as required, based on the memory that is being recalled.

General Purpose Interface (GPI)

The switcher is equipped with 34 GPI I/Os that can be assigned as either an input or output independently.

The GPI inputs allow the switcher to interface with peripheral equipment such as editors. Each GPI input can be used to perform simple editing and switcher functions such as fade to black or an auto transition.

LiveEDL

Edit Decision Lists (EDL) are files used by non-linear editing (NLE) suites to aid in post-production. Your switcher can capture EDL data in a file that you load into your NLE suite.

For information on using the LiveEDL feature, visit the Ross Video Website (rossvideo.com).

Matte/Wash Generator

A matte generator and complex wash generator per ME, capable of multi-color washes comes standard. Any one of the color generators can be assigned to MATTE, or wipe pattern edges.

An additional simple color generator is available for an Aux Bus.

ME Effect System

The ME (Multi-level Effect) systems are standard. The number of MEs depends on the chosen switcher model.

Each ME provides 4 keyers supporting pattern mask, box mask, self-key, and linear key.

Media-Store

Up to 4 independent channels of still/animations are available switcher-wide, allowing for thousands of full screen stills and logos that can be cached and used on the switcher.

Media-Store provides 8 GB of cache. The number of images cached increases considerably when smaller, non-full screen images like logos are loaded from USB.

MediaManager

The MediaManager allows you to easily manage stills and animations on the switcher in a graphics interface.

MediaWipe

A MediaWipe allows you to use an animation from the Media-Store to play over a background or key transition. When the transition starts, the switcher plays the selected animation over top of the background and keys that are being transitioned. A cut, dissolve, wipe, or DVE wipe is then performed layered under the animation to bring up the next shot when the animation ends.

MemoryAI Recall Mode

We take the guessing out of memory recalls by ensuring that a memory recall will not affect what is currently on-air. MemoryAI uses the content of the memory to configure the Next Transition area and Preview bus for the background and keyers so that the next transition takes the same sources on-air that were on-air in the memory.

For example, store a memory that has a key on-air with CAM1 and CAM2 selected on the background. When this memory is recalled normally, it pops the same key on-air with CAM1 and CAM2 on the background. When the

memory is recalled with MemoryAI turned on, CAM1 is selected on the preset bus, and CAM2 is selected on a key that is not on-air. The transition area is then set up for a background transition to bring CAM2 onto the background, take any on-air keys off, and take a key on-air with CAM1.

Memory System

Storage for 100 complete switcher snapshots per ME, MiniME™, MultiScreenMultiScreen, and chrome keys comes standard with all switchers. All of these memories can be stored to a USB media drive, providing custom tailored memories for every operator and every show.

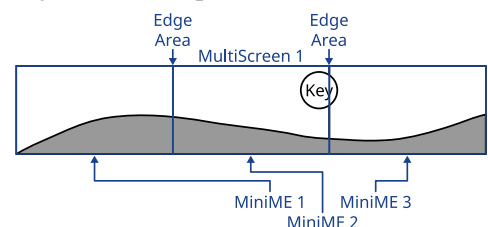
MiniME™

The MiniME™ is an additional ME that is provided with the switcher to perform basic dissolves and cuts. Each MiniME™ has 2 keyers, background, and preset buses. Unlike a full ME, the MiniME™ only supports dissolves and cuts, restricts key 1 to DVE keys only, and has no preview output. Key 2 on a MiniME™ is the same as an ME keyer. The MiniME™ shares all the same sources as the ME.

MultiScreen

The MultiScreen is made up of a number of MultiScreenMultiScreen generators. Each MultiScreenMultiScreen breaks the scene up into separate outputs (MiniME™ outputs) that can be sent to independent projectors or displays to make a unified picture.

Each screen in the MultiScreenMultiScreen output uses a MiniME™ to create the background and keys of the output.



MultiViewer

Each MultiViewer allows you to view up to 16 video sources, in 45 different layouts, from a single output BNC. Any video source on the switcher, including ME Program, Preview, and Media-Store channels, can be routed to any box

on the MultiViewer. All boxes on the MultiViewer output include mnemonic source names and red and green tallies.

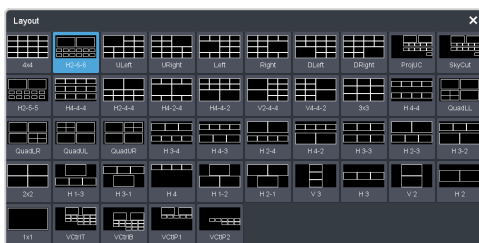


Figure 1: HD Layouts

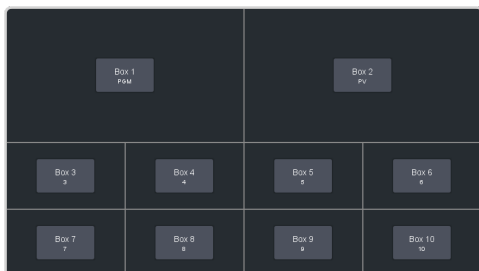


Figure 2: MultiViewer Grid

The Carbonite Black comes standard with 2 broadcast-quality integrated MultiViewer generators and the Carbonite Black+ comes standard with 5. The MultiViewer outputs on the Carbonite Black+ are only available on dedicated output BNCs. Each of these MultiViewer outputs has a specific range of input and output BNCs that can be assigned to boxes on the MultiViewer.

Note: If the switcher is operating in a standard-definition or 3G video format, the MultiViewer automatically outputs high-definition, but each MultiViewer is only available on specific output BNCs.

OverDrive® Caprica Support

Carbonite can be controlled from OverDrive® using the Caprica interface. This interface allows OverDrive® to perform memory recalls, transitions, and run custom controls on the switcher. For information on setting up Caprica to interface with the switcher, refer to the documentation that came with your Caprica server.

The switcher must be in a 2.5 ME mode or have 3 MEs installed to be controlled by Caprica.

Pattern and Matte/Wash Generators

A single pattern generator dedicated to wipes comes standard, and is equipped with 10 classic

wipes. Most wipes can be rotated, bordered, multiplied, aspectized, and repositioned.

Tally Outputs

The switcher has 34 assignable tally relays located in the rack frame. Each tally can be assigned to any number of combinations of input and output or bus.

UltraChrome

The UltraChrome chroma keys uses advanced video processing technology to provide exceptional blue spill reduction and clean edges, even with difficult source material. Glass, smoke, translucent materials, and natural shadows are handled superbly.

There are 2 floating Chroma Keys that are available across all MEs.

XPression Live CG

Seamlessly combine the creative power of the Ross® XPression Designer software with the ease of use of your Ross® switcher. Create stunning still graphics using XPression Designer, and transfer them directly to a media-store channel on the switcher using the RossLinq interface. Up to two (2) channels with dedicated alpha can be controlled from the XPression Software Client. This feature supports still images only.

Each switcher comes with a single license of XPression. Additional licenses can be ordered.

Product Comparison

Use the following table to compare the different switchers in the product line.

TouchDrive Control Panels

	TD1C	TD1	TD2	TD2S	TD3S
Control Panel					
Panel Source Buttons per Row	15	15	15	25	25
Number of User Assignable Buttons per Row	15	15	25	25	25
Number of Control Panel Rows	1	1	2	2	3
DashBoard Interface	Yes				
Touchscreen Monitor	Optional				
Integrated Touchscreen Panel Displays	Yes				
Button Colors	Full HSL				
Mnemonic Colors	20 (background and text)				
Source Mnemonic Icons	Yes				
Legendary Ross Fader Handle with Lifetime Guarantee	Yes				
Positioner	Z Axis				
In Row Memory Keypad	No	No	No	Yes	Yes
Engineering and Networking					
Redundant Power	Yes (optional)				
Ethernet Connectivity	1 × GigE				
USB	4 × USB 2.0, 1 × USB 3.0				

Carbonite Black Frames

	Carbonite Black	Carbonite Black+	Carbonite Black+ 12G
Frame			
Separate Rack Frame	Yes		
Rack Frame Height	2 RU		
Redundant Power	Yes (optional)		
Video Input/Output			
Multi-Definition HD/SD	1080i 50/59.94, 720p 50/59.94, 1080pSF 23.98/25/29.97, 1080p 29.97		
Standard Definition Processing	525, 625		
SDI Inputs (Max)	36		
HDMI Inputs (Max)	0		
Analog Inputs (Max)	0		
SDI Outputs (Max)	22	25	
Clean Feed System	Yes		
FSFCs (Max/Min)	6/0	36/36	
Input Reference Format	Internal / Black Burst / Tri-Level		
Independent Reference Inputs	1		
Independent Reference Outputs	2		
MultiViewer Generators	2	5	
Effects Capabilities			
Keys per ME	4		
2D DVE Channels per ME (Max/Min)	8/4		
Proc Amps and Color Correctors	No	Yes	
Memory AI	Yes		

	Carbonite Black	Carbonite Black+	Carbonite Black+ 12G
UltraChrome Chroma Keys per ME	2		
Storage and Networking			
USB Media Drive	Yes (user supplied USB 2.0)		
Media-Store Channels	4		
Media-Store CACHE	8 GB		
Audio Only Playout for Media-Store	Yes		
Ethernet Connectivity	2 GigE		
Linux® OS	Yes		
Animated Logo Players with Audio (requires video and alpha playout)	Yes		
Peripheral Interfacing			
Device Control	Yes		
OverDrive® Caprica Compatible	Yes		
Roll Clip Control	AMP/RossTalk/GPI Output		
External Link Ports	1		
Serial Ports	1 (RJ45)		
Ethernet Serial Port Expanders	Control® DeviceMaster® RTS Series		
Automation and Editor Protocols	RossTalk/GVG100		
GPI I/Os	34		
Tallies	34		
USB Ports	1 (Frame)		

Software Configurations

	Carbonite Black	UltraChromeHR	Mosaic
Video Input/Output			
Multi-Definition HD/SD	1080i 50/59.94, 720p 50/59.94, 1080pSF 23.98/25/29.97, 1080p 29.97		
Standard Definition Processing	525, 625		n/a
ME	Yes	No	No
Keyers	Yes	No	No
MiniME™	Yes (4)	Yes (4)	Yes (10 ¹ Tiles)
MiniME™ Key	Yes (2)	Yes (3)	Yes (4)
MultiScreen	Yes (2)	No (0)	Yes (5 ¹ Canvases)
MultiViewer	Yes (2/5 ³)	Yes (2)	Yes (4)
2D DVE Channels per ME (Min/Max)	4/8	0/0	18
Media-Store	Yes (4)	Yes (8)	Yes (36 ²)
Aux Buses	20	20	10
Chroma Keys	Yes (2)	Yes (4 ¹)	No
Custom Controls	Yes	No	Yes
Input FSFC (max)	Yes (6)	No	Yes (36)
Output FC (max)	Yes	No	Yes
Tallies	Yes (34)	No (0)	Yes (34)
Panel Support	Carbonite Black and TouchDrive	Carbonite Black only	Carbonite Black only

Notes:

¹ Requires an addition software option for the maximum number.

² Each input BNC can be configured as a Media-Store.

³ Carbonite Black/Carbonite Black+

Standard System

Whether you have a demanding production environment, or a more modest one, selecting the Carbonite Multi-Definition Live Production Switcher that is right for you should not be a complicated task.

TouchDrive Control Panel

Select the control panel that meets the needs of your production environment.

Option	Description
TD1C-PANEL	A compact rack-mountable panel with 15 source buttons, 15 user select buttons (plus 3 in the transition area), independent keyer and transitions areas, updated 3-knob menu interface, and an advanced z-axis positioner.
TD1-PANEL	The same features as the TD1C panel but in a standard panel row design.
TD2-PANEL	The same features as the TD1 panel, but with 2 panel rows.
TD2S-PANEL	The same features as the TD2 panel, but with 25 source buttons, 25 user select buttons (plus 3 in the transition area), and an Acuity® style memory area with keypad and rate buttons.
TD3S-PANEL	The same features as the TD2S panel, but with 3 panel rows.

Note: The TouchDrive control panels do not come with a power supplies. You must pick either a standard brick power supply (CUF-PSU), or a rack power option (CUF-RACKPWR) to provide power for the control panel.

TouchScreen Display (TD-DISPLAY)

A 15.6-inch touchscreen monitor that connects directly to the TouchDrive control panel for power, DashBoard interface, and touch-control.

Note: A separate VESA®-100 (VESA® MIS-D, 100, C) mounting arm is required for the display.

Power Supplies

The redundant power supply options provides protection against AC power failure. It allows two external power supplies to receive power from independent power sources. Complete failure of one source, or power supply, will not affect standard operations. If the main AC power

fails, power is drawn from the remaining source. The transition from one power source to the other is totally transparent and has no effect on operations; a critical feature should one power source fail during an on-air broadcast.

Tip: You can order a second CUF-PSU option to provide redundant power for the control panel.

Option	Description
CUF-PSU	Adds a brick power supply for the control panel.
CUF-RACKPWR	Adds the Ultripower rack power supply for the control panel.

Carbonite Black Frame

The Carbonite Black frame comes with 2 MEs as standard and can be upgraded to 3 MEs if required.

Option	Description
CBF-236	Carbonite Black frame with 2 MEs, 36 inputs, and 22 outputs.
CBF-236PLUS	Carbonite Black+ frame with 2 MEs, 36 inputs, and 25 outputs.
CBF-236PLUS-12G	Carbonite Black+ 12G frame with 2 MEs, 36 inputs, and 25 outputs.

UltraChromeHR



Important: This option is not available with the TouchDrive control panel at this time.

Note: This option includes the Carbonite Black (CBF-236) frame.

This option configures the Carbonite Black frame as an UltraChromeHR chroma key processor with 2 chroma key channels, expandable to 4. Each chroma key channel has a background mixer, CG mask key combiners, 2 downstream and 1 upstream color correctors, and an input frame buffer. In addition, the UltraChromeHR chroma key processor has two MultiViewer outputs, up to 8 channels of Media-Store, a matte generator, 4 MiniME™ engines with 3 keys (self or auto select only) each, 100 memories, and 20 aux buses. Each MiniME™ performs independent key and background transitions of either a dissolve or a cut.

When combined with the ACID® cameras, you can take advantage of the additional UltraChromeHR 0:4:4 full bandwidth color

output of the camera to create a high quality chroma key with exceptional edge fidelity. The UltraChromeHR chroma key processor still outputs standard HD-SDI 4:2:2 video signals when operating with the ACID® camera.

Option	Description
CBF-ULTRACHRHR	UltraChromeHR with 2 chroma key channels.
CBF-ULTRACHRHR-CK3	Adds a third chroma key channel to the UltraChromeHR.
CBF-ULTRACHRHR-CK4	Adds a fourth chroma key channel to the UltraChromeHR.

Mosaic



Important: This option is not available with the TouchDrive control panel at this time.

Note: This option includes the Carbonite Black+ (CBF-236PLUS) frame.

This option configures the Carbonite Black+ frame as a Mosaic dynamic compositing tool that can output a canvas size of over 20 million pixel. There are 5 canvases that share 10 tile outputs, with 4 keys per tile, 36 input FSFCs, 11 output format converters, proc amps and color correctors.

You can load the Mosaic software onto a Carbonite Black+ frame to get a basic 4 tile engine.

Option	Description
CBF-MOSAIC-SYSTEM	Mosaic 10 tile engine.
CBF-MOSAIC-UPG	Upgrade an existing Carbonite Black+ to Mosaic 10 tile engine.

System Options

Options are typically ordered when the switcher is purchased. However, you can order options if your needs change in the future. Most of our options can be easily installed in the field. You can take comfort in knowing that you can purchase options in the future and that installation at your site will be a smooth process.

XPression Live CG (XDS0-0001-CPS)

Each switcher comes standard with a single license of XPression that provides up to two (2) channels with dedicated alpha that can be controlled from the XPression Software Client. This feature supports still images only.

The XPression Designer requires a computer with a Windows® 7 (32/64 bit) operating system and an NVIDIA® graphics card.

2 to 3 ME Upgrade (CBF-ADD-ME3)

This option increases the number of MEs in your Carbonite Black switcher from 2 to 3.

ACID® UltraChromeHR Camera

ACID® cameras have been designed for maximum HD performance in any studio production environment. They offer best-in-class resolution, sensitivity and signal to noise ratio, plus unique UltraChromeHR outputs for chroma key applications.

Option	Description
AC-H200-UCHR	ACID® AC-H200-UCHR camera.
AC-Z50-UCHR	ACID® AC-Z50-UCHR camera.

DashBoard Display (CBPS-DashMenu)

The DashBoard Display combines a DashBoard computer with a touchscreen into a single unit that can be installed onto a standard VESA-100 mount. The DashBoard Display connects to the switcher over ethernet to provide the advanced menu system interface to the setup and operation of your Carbonite or Carbonite Black switcher.

The DashBoard Display eliminates the need to connect another computer to your switcher network just to run DashBoard.

SMC-9901 Serial to MIDI Converter (SMC-9901)

The SMC-9901 Serial to MIDI Converter is used to allow control of an Audio Mixer from a Ross Video switcher.

The SMC-9901 provides a single DB-9 connector for 38,400 baud serial RS-422 communication, one 5-pin DIN connector for MIDI in, and two 5-pin DIN connectors for MIDI out. Power, Serial Tx and Rx, MIDI In and MIDI Out Status LEDs next to the ports show activity status.

The SMC-9901 connect to the switcher via the serial port on the frame, or an external port expander such as the Control® DeviceMaster®.

SHC-9642 SDI to HDMI Converter (SHC-9642)

The SHC-9642 SDI to HDMI Converter is a high-quality signal conversion solution within the family of GearLite compact, self-contained modular products. The SHC-9642 is the ideal solution for converting any SDI input signal (up to 3Gb/s) into an HDMI Type-A output format. User-selectable audio decoding is available with unbalanced, stereo analog audio outputs. Up to 16 channels of embedded audio are selectable, in stereo pairs, for de-embedding and decoding.

Tip: The SHC-9642 SDI to HDMI Converter is a great way to convert a 3Gb/s MultiViewer output to HDMI™ for external monitoring.

Carbonite Onsite Operational Training (CARBONITE-OTR-1DAY)

Although Ross Video switchers are designed to be as easy as possible to install and operate, training is highly recommended to ensure that the process of taking your Ross Video switcher to air is a smooth one.

Training is provided on the customer's equipment at their site. Expenses are extra, and billed at the completion of the visit. Ross Video cannot guarantee the availability of a local Trainer, as such, travel costs to all locations will be invoiced at cost. Two (2) days, or more, of training is recommended for multiple MLE systems. Four (4) weeks advanced scheduling

notice is required. Additional days of training can be added with the **CARBONITE-OTR-1DAY** option. Please quote one additional option for each additional day of training required.

Customers cancellation or rescheduling of on-site services without seven (7) calendar days advanced notice will incur full invoice.

Carbonite Online Operational Training (CARBONITE-ONL-1DAY)

Sometimes you don't need the hands-on attention that having a trainer come to your facility provides. In these situations Ross Video provides comprehensive, web-based, online training.

Two (2) days, or more, of training is recommended for multiple ME systems. Four (4) weeks advanced scheduling notice is required. Additional days of training can be added with the **CARBONITE-ONL-1DAY** option. Please quote one additional option for each additional day of training required.

Customers cancellation or rescheduling of on-site services without seven (7) calendar days advanced notice will incur full invoice.

Onsite Technical Training

On-site technical training introduces the user to some of the technical aspects of switcher operation and maintenance. This includes, but is not limited to; Basic operation, Switcher installation and configurations, Peripheral interfaces, Video signal flow, System timing requirements, Circuit block diagrams, Circuit board overviews, Jumpers and indicators, Troubleshooting tips, Software upgrading, and Routine maintenance.

Training is provided on the customer's equipment at their site. Expenses are extra, and billed at the completion of the visit. Ross Video cannot guarantee the availability of a local Trainer, as such, travel costs to all locations will be invoiced at cost. Two (2) days, or more, of training is recommended for multiple ME systems. Four (4) weeks advanced scheduling notice is required. Additional days of training can be added with the same option code. Please quote one additional option for each additional day of training required.

Option	Description
CARBONITE-OTT-1DAY	Carbonite Onsite Technical Training (1-Day).
CBF-ULTRACHRHR-OTT-1DAY	UltraChromeHR Onsite Technical Training (1-Day).
CBF-MOSAIC-OTT-1DAY	Mosaic Onsite Technical Training (1-Day).

Onsite Commissioning

On-site Commissioning is a great way to ensure that your switcher is properly installed into your facility and tuned to maximum performance.

Once the customer has installed and cabled the equipment, a Ross Commissioning expert will come on site to get the switcher configured, verify that all peripheral interfaces are operating properly, provide a basic technical orientation, and help you get on the air.

Training is provided on the customer's equipment at their site. Expenses are extra, and billed at the completion of the visit. Ross Video cannot guarantee the availability of a local Trainer, as such, travel costs to all locations will be invoiced at cost. Two (2) days, or more, of training is recommended for multiple ME systems. Four (4) weeks advanced scheduling notice is required. Additional days of training can be added with the same option code. Please quote one additional option for each additional day of training required.

Customers cancellation or rescheduling of on-site services without seven (7) calendar days advanced notice will incur full invoice.

Please note that commissioning does not replace operator or technical training. Contact your Ross representative to discuss which types of assistance are best suited to your needs.

Option	Description
CARBONITE-COM-1DAY	Carbonite Onsite Commissioning (1-Day).
CBF-ULTRACHRHR-COM-1DAY	UltraChromeHR Onsite Commissioning (1-Day).
CBF-MOSAIC-COM-1DAY	Mosaic Onsite Commissioning (1-Day).

Extended Warranty

This extends the standard one-year warranty on your control panel or frame by one year. Additional years can be purchased if required.

Option	Description
Panels	
TD1C-PANEL-HW	Adds an additional year of warranty to the TD1C control panel.
TD1-PANEL-HW	Adds an additional year of warranty to the TD1 control panel.
TD2-PANEL-HW	Adds an additional year of warranty to the TD2 control panel.
TD2S-PANEL-HW	Adds an additional year of warranty to the TD2S control panel.
TD3S-PANEL-HW	Adds an additional year of warranty to the TD3S control panel.
TD-DISPLAY-HW	Adds an additional year of warranty to the touchscreen display.
Frames	
CBF-236-ROSSCARE	Adds an additional year of warranty to the CBF-236 frame.
CBF-236PLUS-ROSSCARE	Adds an additional year of warranty to the CBF-236PLUS frame.
CBF-236PLUS-12G-ROSSCARE	Adds an additional year of warranty to the CBF-236PLUS-12G frame.
CBF-336-ROSSCARE	Adds an additional year of warranty to the CBF-236 frame with the CBF-ADD-ME3 option installed.
CBF-336PLUS-ROSSCARE	Adds an additional year of warranty to the CBF-236PLUS frame with the CBF-ADD-ME3 option installed.

Specifications

The information in this section is subject to change without notice.

Carbonite Black Resources

The number of resources specific to your switcher depends on the options installed.

Resource	Carbonite Black	Carbonite Black+	Carbonite Black+ 12G
2D DVE Channels per ME (Max/Min) ¹	8/4		
Aux Buses	20		
Chroma Keys per ME	2 (floating)		
Custom Controls	256 (8 Banks × 32 CCs)		
Max Events per CC	998		
FSFCs (Max/Min) ¹	6/0	36/36	
GPI I/Os	34		
Keyers per ME	4		
Matte Generators per ME	2		
Media-Store Channels	4		
Media-Store CACHE	8 GB		
Memories per ME	100		
MEs (max)	3		
MiniME™ Engines	4		
MultiScreen Generators	2 ²		
MultiViewer Boxes	16		
MultiViewer Layouts	39		
MultiViewer Outputs	2	5	
Pattern Generators per ME	2		
Tallies	34		
SDI Video Inputs	36		
SDI Video Outputs	22	25	
Frame IP	192.168.0.123		
Panel/CarboNET IP	192.168.0.129		

Notes:

¹ The number of DVE channels and FSFCs that are available depends on the switcher mode you are in. This table assumes that all options are installed.

² Each MultiScreen consumes MiniME™ engines to generate the output. The number of MultiScreen outputs that are available depends on the number of MiniME™ engines that are available.

UltraChromeHR Resources

The number of resources specific to your switcher depends on the options installed.

Resource	UltraChromeHR
2D DVE Channels per ME	0
Aux Buses	20
Chroma Keys (Max)	4 ¹
Custom Controls	0
FSFCs (Max/Min)	0/0
GPI I/Os	34
Keyers per ME	0
Keyers per MiniME™	3
Matte Generators	1
Media-Store Channels	8 ¹
Media-Store CACHE	8 GB
Memories	100
MEs (max)	0
MiniME™ Engines	4
MultiScreen Generators	0
MultiViewer Boxes	16
MultiViewer Layouts	32
MultiViewer Heads	2
Pattern Generators per ME	0
Tallies	0
SDI Video Inputs	36
HDMI Video Inputs	0
SDI Video Outputs	22
HDMI Video Outputs	0
Frame IP	192.168.0.123

Notes

¹ UltraChromeHR comes with 2 channels of chroma key as standard, expandable to 4.

² There are 2 Media-Store channels per chroma key channel.

Mosaic Resources

The number of resources specific to your switcher depends on the options installed.

Resource	Mosaic
2D DVE Channels per ME	18
Aux Buses	10
Chroma Keys (Max)	0
Custom Controls	256
Input FSFCs	36
Output Format Converters	11
GPI I/Os	34
Keyers per ME	0
Keyers per MiniME™	4
Matte Generators	1
Media-Store Channels	36 ¹
Media-Store CACHE	512 MB ²
Memories	100
MEs (max)	0
MiniME™ Engines	10
MultiScreen Generators	5
MultiViewer Boxes	10
MultiViewer Layouts	28
MultiViewer Heads	4
Pattern Generators per ME	0
Tallies	34
SDI Video Inputs	36
HDMI Video Inputs	0
SDI Video Outputs	25
HDMI Video Outputs	0
Frame IP	192.168.0.123

Notes:

¹ Each input BNC can be configured as Media-Store channel.

² Cache is divided up per group of 6 inputs.

Environmental Characteristics

All Switchers	
Ambient Temperature Range	Operating: 0 - 40°C (32 - 104°F) Storage: -20 - 85°C (-4 - 185°F)

All Switchers	
Frame Cooling	Active, Front-to-Back airflow

Video Input Specifications

Input Specification	Carbonite Black
Equalization (using Belden 1694 cable)	>50m @ 3Gb/s
	>100m @ 1.5 Gb/s
	>300m @ 270 Mb/s (5°-40°C)
Impedance	75 ohms, terminating
Video Inputs, SDI	SMPTE 259M/292M/424M serial digital (non-looping)
High Speed HDMI Cable (Max 10m)	n/a
Reference Inputs (non-terminating, looping)	Standard Definition — analog black
	High Definition — tri-level sync

Video Output Specifications

Output Specification	Value
Return Loss	<-23dB @ 1.5GHz
	<-18dB @ 3GHz
Rise and Fall Time	800ps ±10% (SD)
	240ps ±10% (HD)
Signal Level	800mV ±10%
DC Offset	0 Volts
Overshoot	<10%
Video Outputs, SDI HD Mode	10-bit SMPTE-292M/424M serial digital

Audio Specifications

Specification	Carbonite Black
Audio Depth	24-bit AES3 in HD (20-bit in SD)
Channels	1 Stereo Pair (2 channels)
Output	AES (×2 ports)
File Format	Multi-channel Waveform Audio File (.wav)
Impedance	110 Ohms, differential
Minimum/Maximum output voltage swing	1.5/6V peak-to-peak

Specification	Carbonite Black
Rise and Fall Times	20ns, typical
Sample Rate	48kHz
Synchronization	Locked to Video

Jitter

Specification	Value
HD - Tri-Level Sync	Alignment (> 100KHz) < 0.2UI
	Timing (<10Hz) < 1.0UI
HD - Composite Reference	Performance not guaranteed with composite reference
SD - Tri-Level Sync	Alignment (> 1KHz) < 0.2UI
	Timing (<10Hz) < 0.2UI
SD - Composite Reference	Alignment (> 1KHz) < 0.2UI
	Timing (<10Hz) < 0.5UI

System Timing

- All video inputs zero time relative to reference input, auto timing will correct for inputs out of time by up to +/- 0.25 line.
- System delay is less than 1 line.

Power Consumption — Panel

	TD1	TD2	TD2S	TD3S
Power	73W 4.87A 15V	85W 5.67A 15V	107W 7.13A 15V	165W 11A 15V
Input Voltage	100 - 120V~, 220 - 240V~, 47-63Hz			

Power Consumption — Frame

	Carbonite Black	Carbonite Black+	Carbonite Black+ 12G
Power	120W 2.5A 48V	180W 3.75A 48V	206W 4.3A 48V
Input Voltage	100 - 120V~, 220 - 240V~, 47-63Hz, 1.6A		

Option Summary

Use the available options listed in the following tables for each control panel or frame.

Frame Options

	Carbonite Black	Carbonite Black+	Carbonite Black+ 12G
Frames			
2 ME, 36 Inputs	CBF-236	CBF-236PLUS	CBF-236PLUS-12G
UltraChromeHR			
2 Channel UltraChromeHR	CBF-ULTRACHRHR		
UltraChromeHR Channel 3 Addition	CBF-ULTRACHRHR-CK3		
UltraChromeHR Channel 4 Addition	CBF-ULTRACHRHR-CK4		
Mosaic			
10 Tile Mosaic		CBF-MOSAIC-SYSTEM	
Mosaic 10 Tiles Upgrade		CBF-MOSAIC-UPG	
Frame Options			
2-3 ME Frame Upgrade	CBF-ADD-ME3		
Redundant Power, Frame	PSU-48V5.9A-4PIN		
Extended Warranty, 2 ME Frame	CBF-236-ROSSCARE	CBF-236PLUS-ROSSCARE	CBF-236PLUS-12G-ROSSCARE
Extended Warranty, 3 ME Carbonite Black Frame	CBF-336-ROSSCARE	CBF-336PLUS-ROSSCARE	CBF-336PLUS-12G-ROSSCARE
Switcher Options			
DashBoard Display	CBPS-DashMenu		
SHC-9642 SDI to HDMI Converter	SHC-9642		
SideShot	CPS-SideShot		
SMC-9901 Serial to MIDI Converter	SMC-9901		
XPression Live CG	XDS0-0001-CPS		

Training Options

	Code
Carbonite Online Operational Training	CARBONITE-ONL-1DAY
Carbonite Onsite Commissioning	CARBONITE-COM-1DAY
UltraChromeHR Onsite Commissioning	CBF-ULTRACHRHR-COM-1DAY
Mosaic Onsite Commissioning	CBF-MOSAIC-COM-1DAY
Carbonite Onsite Operational Training	CARBONITE-OTR-1DAY

Code	
Carbonite Onsite Technical Training	CARBONITE-OTT-1DAY
UltraChromeHR Onsite Technical Training	CBF-ULTRACHRHR-OTT-1DAY
Mosaic Onsite Technical Training	CBF-MOSAIC-OTT-1DAY

TouchDrive Control Panel Options

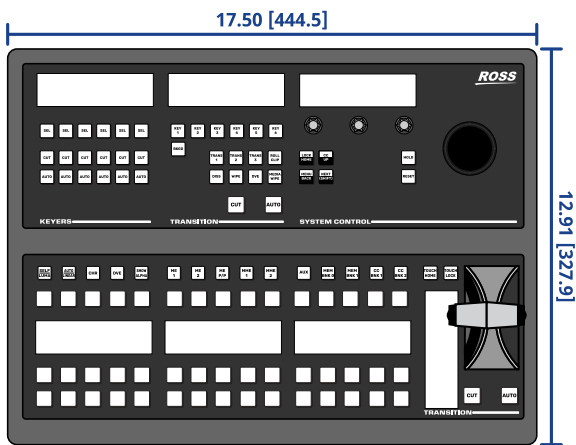
	TD1C	TD1	TD2	TD2S	TD3S
Control Panels					
Panel	TD1C-PANEL	TD1-PANEL	TD2-PANEL	TD2S-PANEL	TD3S-PANEL
Brick Power Supply	CUF-PSU				
Ultripower Rack Power Supply	CUF-RACKPWR				
Extended Warranty, Panel	TD1C-PANEL-HW	TD1-PANEL-HW	TD2-PANEL-HW	TD2S-PANEL-HW	TD3S-PANEL-HW
TouchScreen Display					
Display	TD-DISPLAY				
Extended Warranty, Display	TD-DISPLAY-HW				

Panel Dimensions

These dimensions are provided as a guide only. Contact Ross Video Technical Support for scale CAD drawings of the control panels and frames.

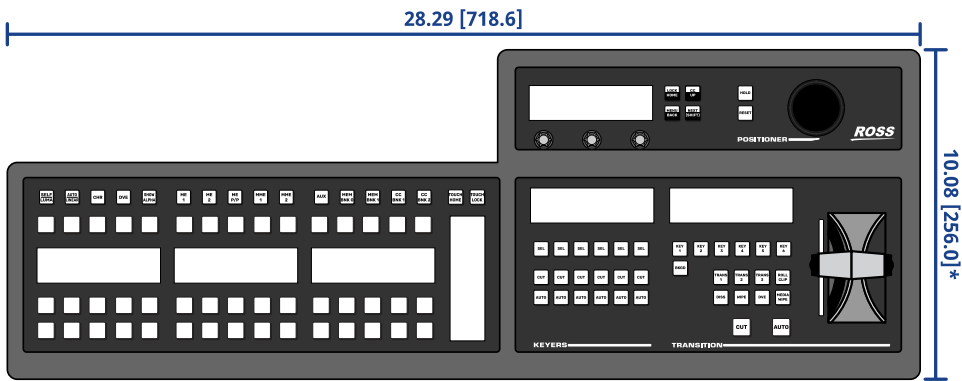
Dimensions are in inches with metric dimensions shown in brackets [mm].

TD1C



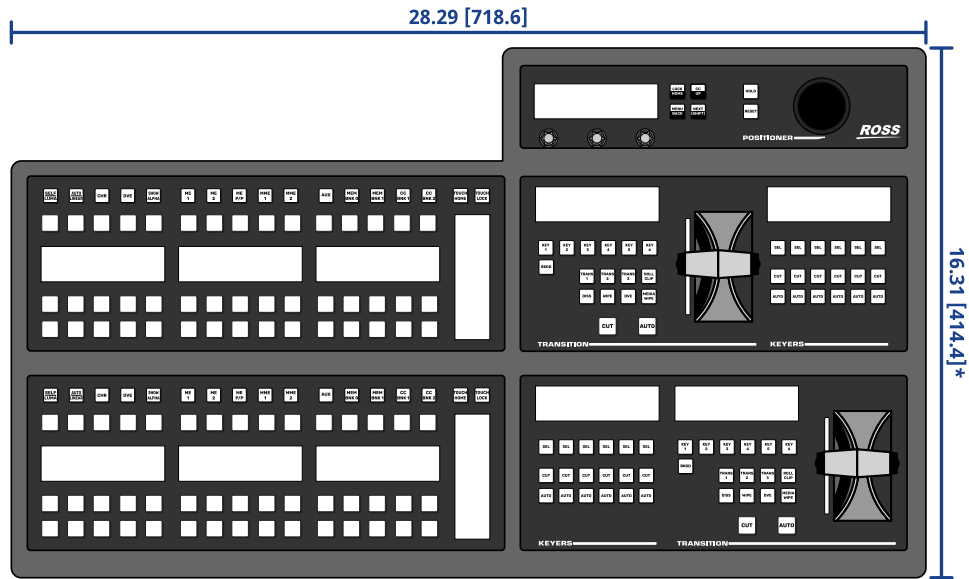
TD1

Note: * Because the TouchDrive control panel is curved, the depth measurement is only approximate.



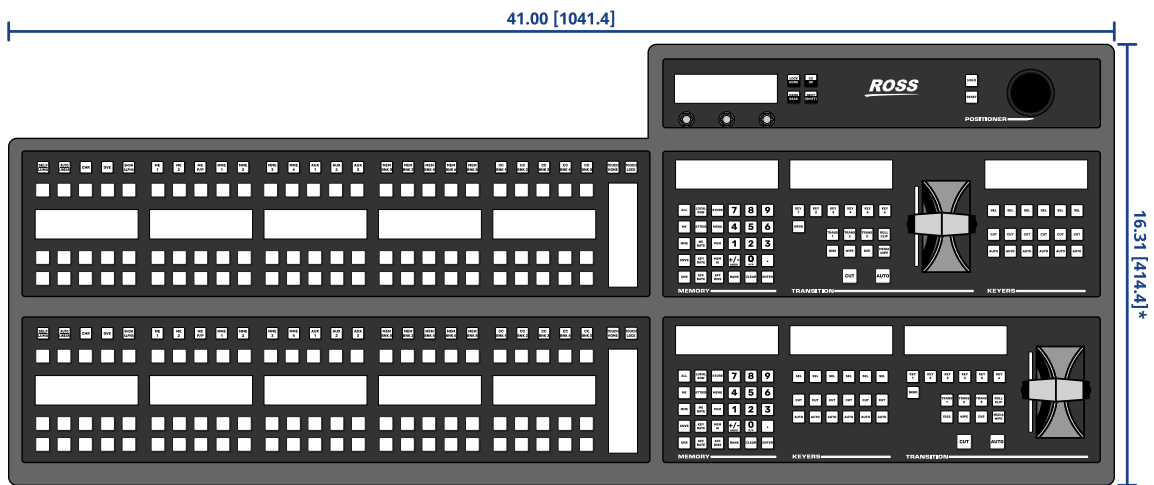
TD2

Note: * Because the TouchDrive control panel is curved, the depth measurement is only approximate.



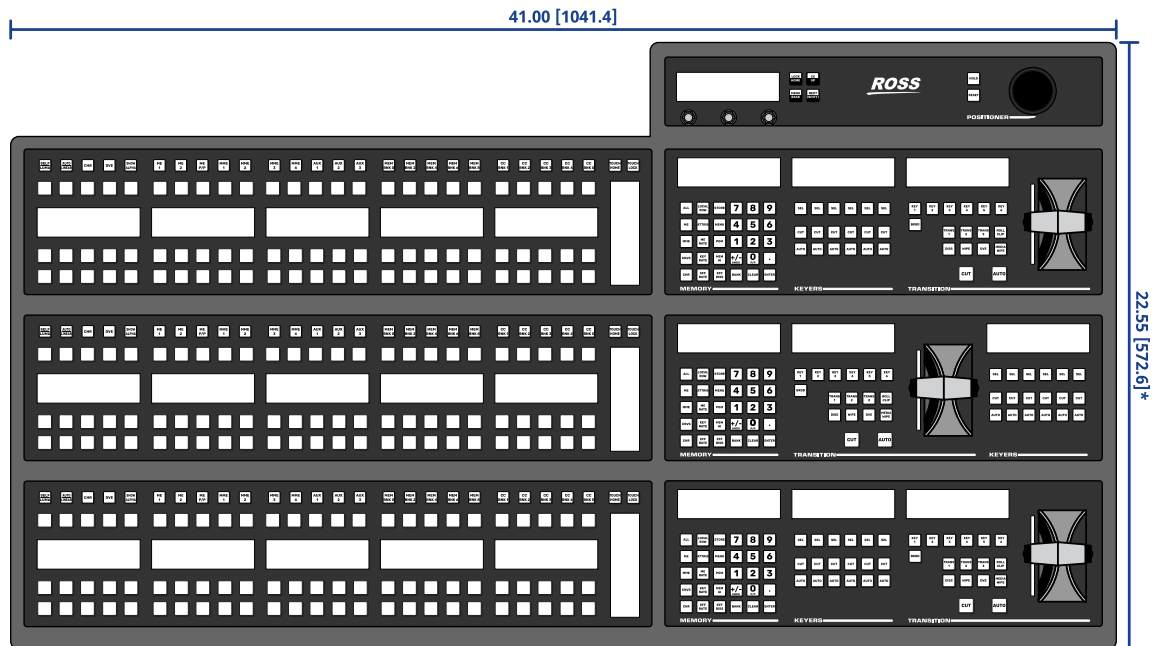
TD2S

Note: * Because the TouchDrive control panel is curved, the depth measurement is only approximate.



TD3S

Note: * Because the TouchDrive control panel is curved, the depth measurement is only approximate.



Frame Dimensions

Dimensions are in inches with metric dimensions shown in brackets [mm].

Carbonite Black Frames

(Carbonite Black, Carbonite Black+, and Carbonite Black+ 12G)

