CARBONITE

Ultrix Carbonite
Configuration Guide

v9.1

ROSS

www.rossvideo.com

Document Information

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Patents

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Contents

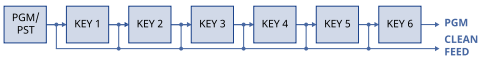
Features

Thank you for your interest in the Ross® Carbonite Family of Production Switchers. The Ultrix Carbonite builds on the Ross® reputation for designing switchers that fit the needs of any production environment.

Clean Feed Output

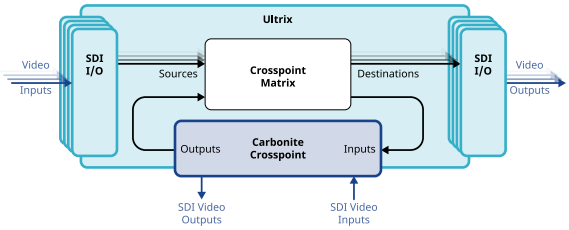
Clean feed is typically used for bilingual and live-to-tape productions. It provides a second Program output that is derived from a different location than the standard program output. A frequent application is the recording of shows for later airing without call-in phone numbers inserted.

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



Video I/O

Video signals come into the router through the SDI IO blades and are assigned from the router crosspoint as destinations that are available to the switcher as inputs. All inputs to the router are routable to each ME in the switcher. Video outputs from the switcher are assigned to the router as sources that can be routed to destinations. The switcher also has an addition 4 input and 4 output HD-BNCs that can be used to pass video directly to and from the switcher.



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.

Sequencer

The switcher has 5 Sequencers that allow you to create a playlist or rundown of custom events, much like custom controls. Each Sequencers can be run independently or linked to other Sequencers so that they all advance together. The Sequencer uses sequences to store the rundown of events. These sequence files can be loaded into one or multiple Sequencers.

> ***Tip:*** *You can link multiple Sequencers together so that as you advance though one, the other Sequencers will advance.*

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*).

Device setup can be done through DashBoard.

DVE (Fly Key)

The advanced DVE engine comes standard with each switcher and can be used for performing over the shoulder, or picture in picture, shots with 3D borders and lighting effects.

2D DVE Keys

All key types can 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.

3D Borders

Flat or bevelled borders with independent inner and outer shaping and Y-axis perspective, or skew, can be applied to any DVE key.

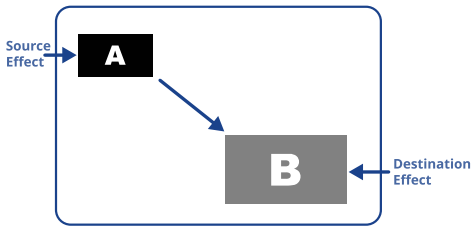
Lighting/Drop Shadow

A single directional light with optional drop shadow can be applied to the key and border. The bevel lighting of the border and shadow changes as the position of the light is moved.

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 24 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 independent keyers supporting pattern mask, box mask, self-key, linear key.

Media-Store

Each channel of Media-Store provides a combined video with alpha for playout of stills and animations that 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, with audio, from the Media-Store to play over a background or key transition. When the transition starts, the switcher plays the selected animation and audio 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. The audio is played out one of the AES ports.

Clip Player

The clip player offers a single playout channel for clips in the ITU-T H.264 (MPEG-4 AVC) codec in specific HD formats that can be assigned as a source on any bus in the switcher. Basic transport controls can be performed manually from the **Clip Player** page, using custom controls, or through AMP commands.

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™, and Canvas 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.

Each memory has an independent set of Store and Recall Attributes that can be used to specify what elements are stored or recalled with a memory, as well as adding effects to memory recalls. This allows you to store a set of attributes with a memory and then recall it as stored, or override the attributes stored in the memory and apply different ones when the memory is recalled. A memory attribute does not need to be stored in the memory to be recalled.

MiniME™

The MiniME™ is an additional ME that is provided with the switcher to perform basic dissolves and cuts. Each MiniME™ has keyer, background, and preset buses. Unlike a full ME, the MiniME™ only supports dissolves and cuts. The MiniME™ shares all the same sources as the ME.

UltraScene (HD Only)

UltraScene provides a simplified interface for creating a show with multiple key layers and basic transitions. UltraScene consists of 4 scenes that share 8 layers in 4 layer pairs. Layers can only be added in pairs, so a scene can have 2, 4, 6, or 8 layers. Each layer is set up like a keyer with a video source, alpha, and key type. Each layer can also be turned on or off to cut the video source on or off-air. A background source is also available over which the layers are keyed, or the scene can be taken as a source on bus.

High Dynamic Range (HDR) and Wide Color Gamut (WCG) Conversion

The RGB color correctors are used to convert between different SDR and HDR ranges and between color gamuts (WCG).

> ***Note:*** *You must have available color correctors to be able perform the HDR/WCG conversion.*

HDR and WCG conversion can be applied on the fly to input video signals.

To configure the dynamic range and color gamut conversion of input sources you must apply a color corrector to the input. This will convert the input source to the format that the switcher is operating in.

Supported Color Gamuts:

- **BT.709** — color gamut recommended for HD video signals.
- **BT.2020** — wide color gamut recommended for UHDTV1 video signals.

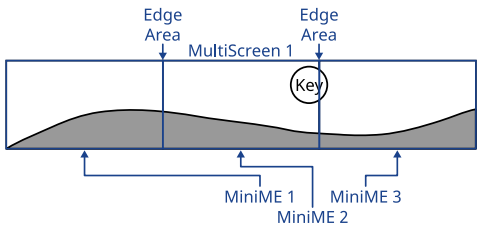
Supported Dynamic Ranges

- **SDR** — Standard Dynamic Range.
- **HLG** — Hybrid Log Gamma.
- **PQ** — Perceptual Quantizer.
- **S-Log3** — Sony® S-Log3.

Mosaic/MultiScreen

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

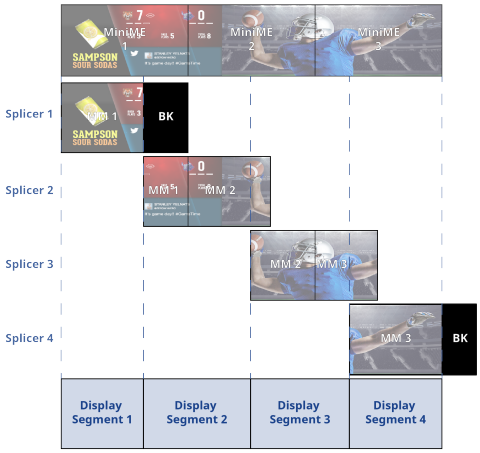
Each screen in the Canvas output uses a MiniME™ to create the background and keys of the output.



MultiScreen can be further expanded with the Mosaic software and option codes to include more tiles, for larger canvases, and quad Splicers.

Splicer (Mosaic Only)

Splicers allow you to use DVEs to position up to four sources (2×2) on a single output. This can be used to position and stitch together the canvas outputs (MiniME™/Tiles) for the downstream LED processors.



MultiViewer

Each MultiViewer allows you to view up to 16 video sources (32 with Shift), in 51 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.

The MultiViewer Shift features allows you to access a shifted set of sources for the MultiViewer by pressing the **SHIFT** button on a control panel or in ViewControl. The MultiViewer Shift functionality can only be assigned to a single panel at a time.

Each MultiViewer head supports an integrated clock that can display time of day, or a countdown timer. The position, size, and color of the clock can be adjusted.

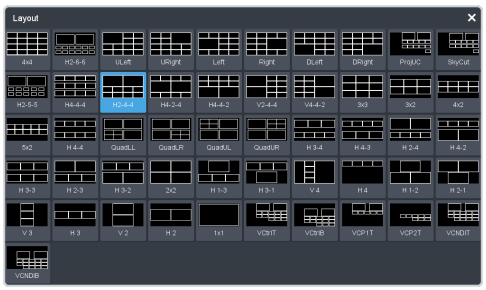


Figure 1: HD Layouts

Figure 2: MultiViewer Grid

ViewControl

The ViewControl touchscreen interface through DashBoard allows you to select sources on switcher buses, perform transitions, and run custom controls to recall memories or control external devices. The MultiViewer Shift function allows you to assign sources to a shifted set of MultiViewer boxes, expanding the number of sources available on ViewControl from 16 to 32.

> ***Tip:*** *It is recommended that the large Preview and Program boxes not be assigned shifted sources as they will follow the bus selecting.*

ViewControl takes the MultiViewer output of the switcher and overlays the DashBoard interface over it. Bringing the MultiViewer output into DashBoard is accomplished either by using multiple SDI/HDMI™ converters or a single SDI to NDI® converter.

OverDrive® Caprica Support

Ultrix 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.

It is recommended to have 2 MEs installed to be controlled by Caprica, but operation is possible with a single ME and using MiniME™s.

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.

Note: *The wash generator is not available in UHDTV1.*

Tally Outputs

The switcher has 24 assignable tally transistors located in the rack frame. Each tally can be assigned to any number of combinations of input and output or bus.

UltraChrome

The UltraChrome 2 chroma keyer uses independent chroma key engines to produce the video and alpha components of the key. These internal video streams can be composited in a keyer, or fed out two separate video streams to an external device, such as a video server.

Ross Platform Manager Licensing

RPM licenses are issued by the Ross Activation Server under a Customer Product Key. The Product Key is then added to a Ross Platform Manager that multiple switchers can access to request software licenses. Each switcher must request and release licenses from/to the Ross Platform Manager.

RPM licenses can easily be requested or released from a switcher to a pool of licenses on the Ross Platform Manager. This allows you to move licenses between different studios depending on production needs by releasing licenses from one switcher and requesting them by another.

Note: *A network connection to the Ross Platform Manager is required to request or release RPM licenses.*

Note: *Ross Keys licenses are not impacted by RPM licenses. All licenses are cumulative and can be combined on the same switcher.*

Tip: *A new switcher set register has been added to store RPM license requests.*

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 an media-store channel on the switcher using the RossLinq interface. Up to four (4) 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.

Note: *A separate Windows® PC with an NVIDIA® graphics card is required to use this option. PC no provided.*

Product Comparison

Use the following table to compare the different switcher configurations.

Note: *Refer to the Ultrix™ marketing material for information on the configurations and features of the Ultrix™ router.*

TouchDrive Control Panels

	TD1C	TD1	TD2	TD2S	TD3S	TD3	TD4	TDx3	TDx4
Control Panel									
Panel Source Buttons per Row	15	15	15	25	25	35	35	35	35
Number of User Assignable Buttons per Row	15	15	15	25	25	35	35	35	35
Number of Control Panel Rows	1	1	2	2	3	3	4	3	4
Dual Delegation Row	No							Yes	
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					Z Axis plus Flex Buttons			
Flex Control Module	No					1	2	1	2
On Panel Mini Menu	1 Touch Display with 3 Knobs					2 Touch Displays with 6 Knobs			
In Row Memory Keypad	No			Yes					
Engineering and Networking									
Redundant Power	Yes (optional)								
Ethernet Connectivity	1 × 2.5GigE								
USB	4 × USB 2.0, 1 × USB 3.0								

Ultrix Carbonite

	Ultrix Carbonite
Video Input/Output	
UHDTV1 Video Formats	UHDTV1 23.98/24/25/29.97/30/50/59.94/60
HD Video Formats	1080p 23.98/24/25/29.97/30/50/59.94/60 1080pSF 23.98/24/25/29.97/30 1080i 50/59.94 720p 50/59.94
HD-BNC Inputs	4
Routable Video Inputs	18
Total Video Inputs	22 (18 + 4)
HD-BNC Outputs	4
Routable Video Outputs	18
Total Video Outputs	22 (18 + 4)
Clean Feed System	Yes
Reference Inputs	n/a (Ultrix™)
Reference Outputs	n/a (Ultrix™)
Storage and Networking	
USB Media Drive	Yes (user supplied USB 2.0)
Media-Store CACHE	8 GB
Audio Only Playout for Media-Store	Yes
Ethernet Connectivity	1 × GigE
Linux® OS	Yes
Peripheral Interfacing	
Device Control	Yes
OverDrive®Caprica Compatible	Yes
Roll Clip Control	AMP/RossTalk/GPI Output
Serial Ports	1 (RJ45)
Ethernet Serial Port Expanders	Comtrol® DeviceMaster® RTS Series
Automation and Editor Protocols	RossTalk/GVG100/OGP
GPI I/Os	24
Tallies	24
USB Ports	1 (SDPE)

Hardware Options

Hardware 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.

Control Panels

Control Panels

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

Option	Description
TouchDrive Panels	
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.
TD3-PANEL	The same features as the TD3S panel, but with 35 source buttons and 35 user select buttons per row, a single Flex Control module, an advanced Positioner module, a stacked 3-knob menu with two displays, and a second Row Control display at the left end of the each row.
TD4-PANEL	The same features as the TD3 panel, but with 4 panel rows, and an additional Flex Control module.
TDx3-PANEL	The same features as the TD3 panel, but the single keyer row is replaced with a Dual Delegation keyer row providing two rows of buttons.
TDx4-PANEL	The same features as the TDx3 panel, but with 4 panel rows.

Note: *The TouchDrive control panels do not come with 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

A 15.6-inch 1920×1080 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.*

Tip: *The Touchscreen Display gets power directly from the control panel and uses the panel redundant power.*

Option	Description
TD-TOUCHSCREEN	The 15.6-inch touchscreen monitor.

Note: *Third party touchscreens are not supported. If you want to use a different display with the TouchDrive control panel, it must be a standard display used in conjunction with a mouse and keyboard.*

Power Supplies

Note: *The TouchDrive control panel does not come with a power supply. 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.*

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 TouchDrive control panel.

Option	Description
CUF-RACKPWR	Adds the Ultripower rack power supply for the TouchDrive control panel.
PSU-12V16A-2PIN	Adds a redundant power supply for the CB9 control panel.

Table 1: Number of Required Power Supplies

Panel	Primary Power	Full Redundant Power
TD1	1	2 (1+1)
TD1C	1	2 (1+1)
TD2	1	2 (1+1)
TD2S	1	2 (1+1)
TD3S	1	2 (1+1)
TD3	2	4 (2+2)
TD4	2	4 (2+2)
TDx3	2	4 (2+2)
TDx4	2	4 (2+2)

Extended Warranty

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

Option	Description
TouchDrive	
TD1C-PANEL-HM	Adds an additional year of warranty to the TD1C control panel.
TD1-PANEL-HM	Adds an additional year of warranty to the TD1 control panel.
TD2-PANEL-HM	Adds an additional year of warranty to the TD2 control panel.
TD2S-PANEL-HM	Adds an additional year of warranty to the TD2S control panel.
TD3S-PANEL-HM	Adds an additional year of warranty to the TD3S control panel.
TD3-PANEL-HM	Adds an additional year of warranty to the TD3 control panel.
TD4-PANEL-HM	Adds an additional year of warranty to the TD4 control panel.
TDx3-PANEL-HM	Adds an additional year of warranty to the TDx3 control panel.
TDx4-PANEL-HM	Adds an additional year of warranty to the TDx4 control panel.
TD-TOUCHSCREEN-HM	Adds an additional year of warranty to the touchscreen display.

Frame

Ultrix™ Hardware

The Ultrix™ chassis contains both the router and switcher hardware. The size of the Ultrix™ router defines the maximum number of MEs the switcher has.

Option	Description
ULTRIX-FR2	An Ultrix FR2 frame with support for up to 2 SWR-SDPE blades (switchers). The system comes with no blades installed.
ULTRIX-FR5	An Ultrix FR5 frame with support for up to 4 SWR-SDPE blades (switchers). The system comes with no blades installed.
ULTRIX-FR12	An Ultrix FR12 frame with support for up to 8 SWR-SDPE blades (switchers). The system comes with no blades installed.
ULTRICOOL	An external cooling system for the ULTRIX-FR5 frames.
ULTRICOOL-PS	Redundant power supply for the ULTRICOOL.
ULTRIPOWER	The external power supply for Ultrix™.
ULTRIPOWER-PS	An additional power supply for the Ultripower.

Ultrix Carbonite Hardware

The SDPE blade provides the hardware for the switcher software options. Software licences are required to properly operate the switcher on the hardware.

Tip: *You can purchase additional SDPE blades as spares for critical hardware replacements.*

Option	Description
SWR-SDPE	The SDPE blade that is installed into the Ultrix™ frame and supports the switcher software. The number of SDPE blades that can be installed depends on the size of the router. • Ultrix FR2 can support up to 2 SWR-SDPE blades. • Ultrix FR5 can support up to 4 SWR-SDPE blades. • Ultrix FR12 can support up to 8 SWR-SDPE blades.

Extended Warranty

This extends the standard one-year warranty on your hardware by one year. Additional years can be purchased if required.

Option	Description
SWR-SDPE-HM	Adds an additional year of warranty to the SDPE blade.

Optional Hardware

Ultritouch

The 2 or 4 RU rack mountable Ultritouch adaptable system control panel allows you to control some aspects of switcher operation using a DashBoard interface.

The DashBoard interface on Ultritouch provides status, buses, and custom control tabs. You must connect to the switcher from Ultritouch to be able to control the switcher functions.

Option	Description
ULTRITOUCH-2-HR	2RU Ultritouch High Resolution adaptable system control panel.
ULTRITOUCH-4	4RU Ultritouch adaptable system control panel.
ULTRITOUCH-PS	Ultritouch redundant power supply.

Remote Panels

This option provides external control for selecting sources on an Aux bus from a remote panel. There are a number of options for the remote control panels, depending on your requirements.

Option	Description
RCP-ME	Adds the 40 source button ethernet enabled RCP-ME remote control panel with integrated backlit display.
RCP-QE18	Adds the 18 mnemonic source button ethernet enabled RCP-QE18 remote control panel.
RCP-QE36	Adds the 36 mnemonic source button ethernet enabled RCP-QE36 remote control panel.

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® 10 or 11 operating system and an NVIDIA® graphics card.

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.*

HD-BNC to BNC Adapters

Ultrix Carbonite uses HD-BNC for video inputs and outputs on both the SDPE blade and the Ultrix™ I/O blades. If your cable infrastructure is already routed with standard BNCs, HD-BNC to BNC adapters can be used to convert the inputs and outputs. Each option provides 8 HD-BNC to BNC cable adapters.

Option	Description
CUF-HDBNC-BNC	8 HD-BNC to BNC cable adapters.

Software Options

Software Options can be installed at any time to expand the functionality or resources of your switcher. Software options can be obtained either permanently using Ross Keys or temporarily using Ross Platform Manager (RPM).

- **Ross Keys Licenses** — a one-time key is permanently applied to your switcher to unlock the purchased software options. These options cannot be externally managed and are only available to the switcher they were purchased for.
- **RPM Licenses** — a pool of multi-use licenses are accessed from Ross Platform Manager using a Customer Product Key. Any switcher of the same make and model with the Customer Product Key can connect to the RPM server and request software license from the pool or release licenses back to the pool.

Mosaic Upgrade

This option configures the Ultrix Carbonite frame as a Mosaic dynamic compositing tool that can output a canvas size of over 20 million pixels. 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 Ultrix Carbonite frame to get a basic 4 tile engine.

Important: *You must have the UHDTV1 license installed for the switcher (CUFR-ADD-UHD) and for the Ultrix™ router to process UHDTV1 video signals.*

Option	HD	UHDTV1
CUFR-ADD -MOSAIC	10 × MiniME™ Engines	6 × MiniME™ Engines
	5 × Canvas Generators	2 × Canvas Generators
	10 × Splicer Generators	6 × Splicer Generators
	18 × Media-Store Channels (Video)	4 × Media-Store Channels (Video)

Ultrix™ Hardware

The Ultrix™ chassis contains both the router and switcher hardware. The size of the Ultrix™ router defines the maximum number of MEs the switcher has.

Option	Description
ULTRIX-FR2	An Ultrix FR2 frame with support for up to 2 SWR-SDPE blades (switchers). The system comes with no blades installed.
ULTRIX-FR5	An Ultrix FR5 frame with support for up to 4 SWR-SDPE blades (switchers). The system comes with no blades installed.
ULTRIX-FR12	An Ultrix FR12 frame with support for up to 8 SWR-SDPE blades (switchers). The system comes with no blades installed.
ULTRICOOL	An external cooling system for the ULTRIX-FR5 frames.
ULTRICOOL-PS	Redundant power supply for the ULTRICOOL.
ULTRIPOWER	The external power supply for Ultrix™.
ULTRIPOWER-PS	An additional power supply for the Ultripower.

Ultrix Carbonite Hardware

The SDPE blade provides the hardware for the switcher software options. Software licences are required to properly operate the switcher on the hardware.

Tip: *You can purchase additional SDPE blades as spares for critical hardware replacements.*

Option	Description
SWR-SDPE	The SDPE blade that is installed into the Ultrix™ frame and supports the switcher software. The number of SDPE blades that can be installed depends on the size of the router. • Ultrix FR2 can support up to 2 SWR-SDPE blades. • Ultrix FR5 can support up to 4 SWR-SDPE blades. • Ultrix FR12 can support up to 8 SWR-SDPE blades.

MEs

Important: *Each ME in the system must be licensed. By default, the SWR-SDPE blade does not come with any ME licenses installed.*

Note: *The ME options are added through DashBoard using license keys and can be increased at any time.*

The number of MEs that a license provides depends on the video mode the switcher is operating in.

Note: *The CUFR-ADD-UHD licence must be installed to access the UHD switcher mode.*

Software Licenses	Resources / Switcher Modes		
	HD 2 ME 4 MM	HD 3 ME	UHD
Base	0 × ME	0 × ME	0 × ME
CUFR-ADD-ME1	1 × ME	n/a	1 × ME
	6 × Keys		6 × Keys
	4 × MiniME™		2 × MiniME™
CUFR-ADD-ME2	2 × ME	3 × ME	2 × ME
	6 × Keys	6 × Keys	6 × Keys
	4 × MiniME™	0 × MiniME™	2 × MiniME™

Ultrix™ Software Options

The switcher needs some Ultrix™ software options in order to operate properly.

Option	Description
ULTRIMIX	Add support for audio routing. Ultrix Carbonite uses the audio routing for Media-Store audio.
ULTRISPEED	Add support for 12G video in the Ultrix FR2. Ultrix Carbonite uses 12G video for UHDTV1.
ULTRISPEED-FR5	Add support for 12G video in the Ultrix FR5. Ultrix Carbonite uses 12G video for UHDTV1.
ULTRISPEED-FR12	Add support for 12G video in the Ultrix FR12. Ultrix Carbonite uses 12G video for UHDTV1.
ULTRISCAPE	Added support for the Ultrix™ Multi-Viewer. Ultrix Carbonite uses UltriScape to replace the MultiViewer.

UHDTV1 Upgrade

A UHDTV1 license adds support for the UHDTV1 video formats for all MEs.

Note: *The UHDTV1 option is added through DashBoard using license keys and can be installed at any time.*

Software License	Resources / Switcher Modes
CUFR-ADD-UHD	Add the software license for UHDTV1 video formats.

Video Processing Licensing

Licenses for FSFC, and Proc Amps and Color Correctors can be added to switcher. The number of resources available depends on whether the switch is operating in HD or UHDTV1.

- **CUFR-ADD-FSFC** — Adds the license for FSFCs.
- **CUFR-ADD-PACC** — Adds the license for Proc Amps and Color Correctors.

Note: *Both licenses are added through DashBoard using license keys and can be increased at any time.*

Frame Sync and Format Converters

Software License	Resources / Switcher Modes	
	HD	UHDTV1
Base	0 × FSFC	0 × FSFC
CUFR-ADD-FSFC	22 × FSFC	4 × FSFC

Proc Amps and Color Correctors

Software License	Resources / Switcher Modes	
	HD	UHDTV1
Base	0 × PACC	0 × PACC
CUFR-ADD-PACC	22 × PACC	4 × PACC

Training and Commissioning Options

Carbonite Onsite Operational Training

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 ME 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.

Option	Description
CARBONITE-OTR-1DAY	Add 1 Day of on-site operational training.

Carbonite Online Operational Training

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.

Option	Description
CARBONITE-ONL-1DAY	Add 1 Day of online operational training.

Carbonite 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	Add 1 Day of on-site technical training.

Carbonite 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	Add 1 Day of on-site commissioning.

Specifications

Switcher resources, video specifications, power rating, and port pinouts.

Resources

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

Resource	HD 2 ME 4 MM	HD 3 ME	UHD
MEs (Max)[2]	2	3	2
MiniME™ Engines	4	0	2
Keyers per ME	6 + Trans		
Canvas Generators	2[1]		1[1]
Video Processor MultiViewer	2		1
MultiViewer Boxes	16		
MultiViewer Layouts	44		
Input FSFC (Min/Max)[2]	0/22		0/4
Frame Delay (Max Frames)	13		7
Proc Amp/Color Correctors (Min/Max)[2]	0/22		0/4
2D DVE Channels Switcher Wide	12		6
Aux Buses	28		
Chroma Keys (floating)	4		2
Custom Controls	256 (8 Banks × 32 CCs)		
Max Events per CC	998		
GPI I/Os	24		
Media-Store Channels (Video + Alpha)	4		4
Media-Store CACHE	8 GB		
Memories per ME	100		
Pattern Generators per ME	2		1
Matte Generators per ME	2		1
Matte Generators	3 (1 per ME + Global)		1 (1 per ME + Global)
UltraScene Scenes (Max)	4		0
Sequencers (Max)	5		
Tallies	24		
Total Video Inputs	22 (18 + 4)		
Total Video Outputs	22 (18 + 4)		
Frame IP (default)	192.168.0.123		
Panel/CarboNET IP (default)	192.168.0.129		

Notes:

[1] Each Canvas consumes MiniME™ engines to generate the output. The number of Canvas outputs that are available depends on the number of MiniME™ engines that are available.

[2] Software options are required to be installed to activate the maximum number of resources.

Video Input Specifications

Important: *These specifications apply only to the HD-BNC on the SDPE blade.*

Input Specification	Value
UHDTV1 Video Formats	UHDTV1 23.98/24/25/29.97/30/50/59.94/60
HD Video Formats	1080p 23.98/24/25/29.97/30/50/59.94/60 1080pSF 23.98/24/25/29.97/30 1080i 50/59.94 720p 50/59.94
Dynamic Range Support (HD and UHDTV1 only)	Standard Dynamic Range (SDR) Hybrid Log Gamma (HLG) Perceptual Quantizer (PQ) Sony® S-Log3.
Color Gamut Support (HD and UHDTV1 only)	BT.709 BT.2020
Equalization (using Belden 1694 cable)	>35m @ 12Gb/s (5°-40°C)
	>50m @ 3Gb/s (5°-40°C)
	>100m @ 1.5Gb/s (5°-40°C)
Impedance	75 ohm, terminating
Video Inputs, SDI	SMPTE 292M/424M/ST-2082 (non-looping)
Reference Input	Supplied by Ultrix™

Video Output Specifications

Important: *These specifications apply only to the HD-BNC on the SDPE blade.*

Output Specification	Value
UHDTV1 Video Formats	UHDTV1 23.98/24/25/29.97/30/50/59.94/60
HD Video Formats	1080p 23.98/24/25/29.97/30/50/59.94/60 1080pSF 23.98/24/25/29.97/30 1080i 50/59.94 720p 50/59.94
Return Loss	<-7.8dB @ 12GHz
	<-10dB @ 3GHz
	<-15dB @ 1.5GHz
Rise and Fall Time	26ps ±10% (UHD)
	240ps ±10% (HD)
Signal Level	800mV ±10%
DC Offset	0 Volts
Overshoot	<10%

Output Specification	Value
Video Outputs, SDI HD Mode	10-bit SMPTE-292M/424M serial digital
Video Outputs, SDI UHDTV1 Mode	SMPTE ST 2082-1:2015 (Amendment 1:2016)

Audio Specifications

Specification	Value
Audio Depth	24-bit AES3 in HD (20-bit in SD)
Channels	1 Stereo Pair (2 channels)
Output	AES
File Format	Multi-channel Waveform Audio File (.wav)
Impedance	110 Ohms, differential
Minimum/Maximum output voltage swing	1.5/6V peak-to-peak
Rise and Fall Times	20ns, typical
Sample Rate	48kHz
Synchronization	Locked to Video

Jitter

Important: *These specifications apply only to the HD-BNC on the SDPE blade.*

Specification	Value
UHD - Tri-Level Sync	Alignment (> 100KHz) < 0.21UI
	Timing (<10Hz) < 1.84UI
UHD - Composite Reference	Performance not guaranteed with composite reference
HD - Tri-Level Sync	Alignment (> 100KHz) < 0.2UI
	Timing (<10Hz) < 1.0UI
HD - Composite Reference	Performance not guaranteed with composite reference

System Timing

Important: *These specifications apply only to the HD-BNC on the SDPE blade.*

- 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.

Option Codes

Refer to the individual sections for more detailed information on each option.

TouchDrive Control Panel Options

	TD1C	TD1	TD2	TD2S	TD3S	TD3	TD4	TDx3	TDx4
Control Panels									
Panel	TD1C-PANEL	TD1-PANEL	TD2-PANEL	TD2S-PANEL	TD3S-PANEL	TD3-PANEL	TD4-PANEL	TDx3-PANEL	TDx4-PANEL
Brick Power Supply (Power + Redundant)	CUF-PSU (1+1)					CUF-PSU (2+2)			
Ultripower Rack Power Supply	CUF-RACKPWR								
Extended Warranty, Panel	TD1C-PANEL -HM	TD1-PANEL -HM	TD2-PANEL -HM	TD2S-PANEL -HM	TD3S-PANEL -HM	TD3-PANEL -HM	TD4-PANEL -HM	TDx3-PANEL -HM	TDx4-PANEL -HM
TouchScreen Display									
Display	TD-TOUCHSCREEN								
Extended Warranty, Display	TD-TOUCHSCREEN-HM								

Frame Options

Table 2: Frame Options

	Ultrix FR2	Ultrix FR5	Ultrix FR12
Router (speak with your Ultrix™ sales representative for options)			
Ultrix™ Frame	ULTRIX-FR2	ULTRIX-FR5	ULTRIX-FR12
Ultrix HDX-IO	ULTRIX-HDX-IO		
Ultrix IP-IO	ULTRIX-IP-IO		
Ultrix IPX-IO	ULTRIX-IPX-IO		
Ultrix MODX-IO	ULTRIX-MODX-IO		
Ultripower Chassis with 1 PSU	ULTRIPOWER		
Ultripower Additional PSU	ULTRIPOWER-PS		
Ultricool	ULTRICOOL		
Ultricool Redundant PSU	ULTRICOOL-PS		
UltriScape	ULTRISCAPE		
UltriSpeed	ULTRISPEED	ULTRISPEED-FR5	ULTRISPEED-FR12
UltriMix	ULTRIMIX		
Switcher Hardware			
SDPE Blade	SWR-SDPE		
Switcher Software Licenses			
ME 1 License	CUFR-ADD-ME1		
ME 2 License	CUFR-ADD-ME2		
UHDTV1 License	CUFR-ADD-UHD		
FSFC License	CUFR-ADD-FSFC		
PA/CC License	CUFR-ADD-PACC		

	Ultrix FR2	Ultrix FR5	Ultrix FR12
Options			
PTZ-12G	PTZ-12G-BLACK		
PTZ-NDI	PTZ-NDI-BLACK		
2RU Ultritouch	ULTRITOUCH-2-HR		
4RU Ultritouch	ULTRITOUCH-4		
Ultritouch Redundant Power	ULTRITOUCH-PS		
Extended Warranty			
Extended Warranty, SDPE	SWR-SDPE-HM		

Training Options

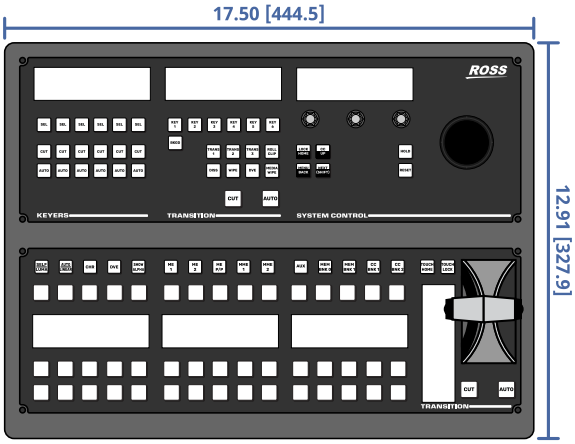
	Code
Carbonite Online Operational Training	CARBONITE-ONL-1DAY
Carbonite Onsite Commissioning	CARBONITE-COM-1DAY
Carbonite Onsite Operational Training	CARBONITE-OTR-1DAY
Carbonite Onsite Technical Training	CARBONITE-OTT-1DAY

Panel Dimensions

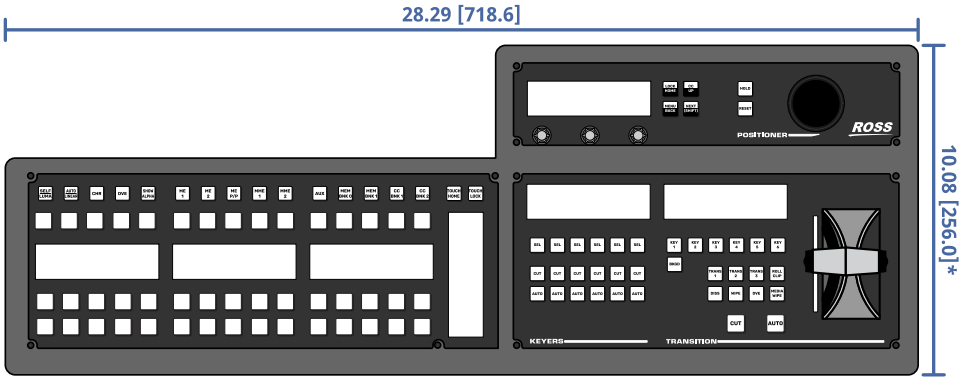
Important: *These dimensions are provided as a guide only. Scale DXF/CAD drawings of the control panels are available from the Ross Video website.*

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

TD1C

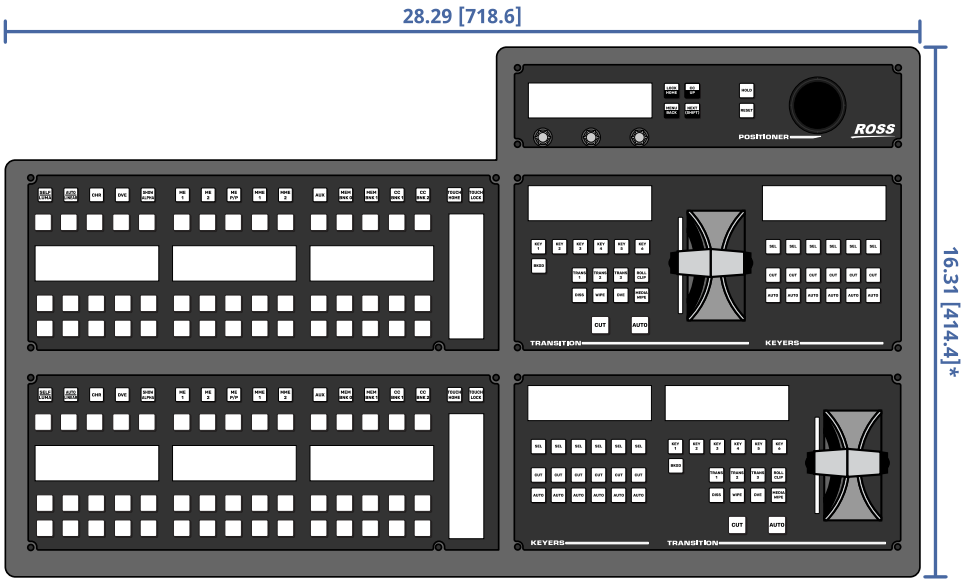


TD1



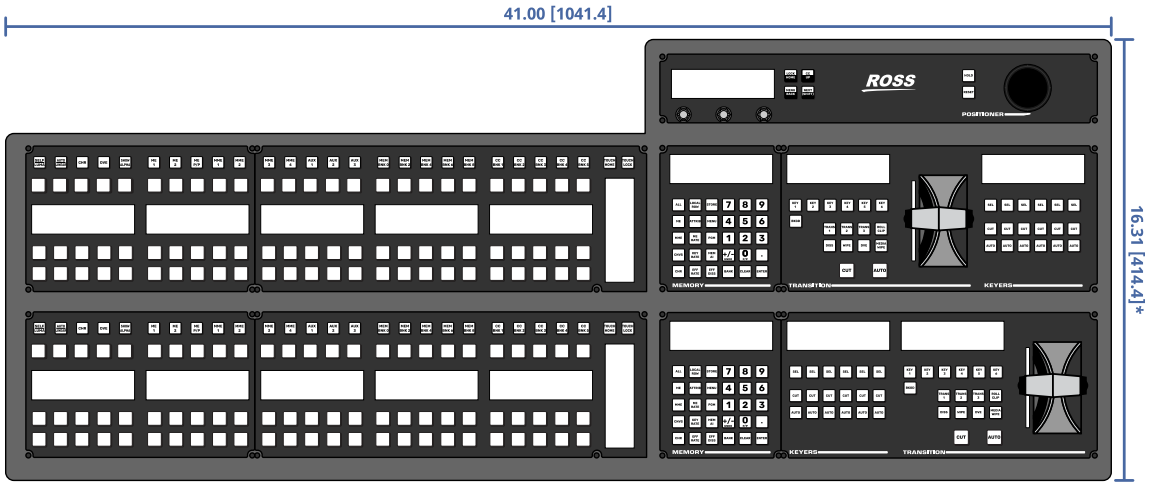
Note: ******* *Because the TouchDrive control panel is curved, the depth measurement is only approximate.*

TD2



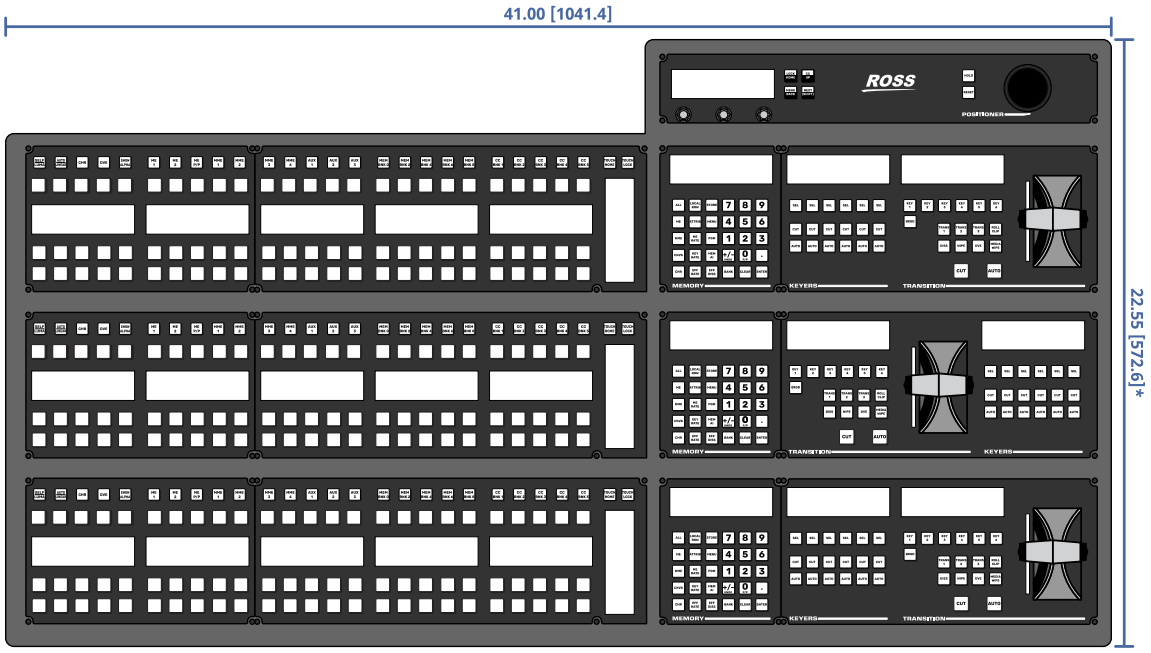
Note: ******* *Because the TouchDrive control panel is curved, the depth measurement is only approximate.*

TD2S



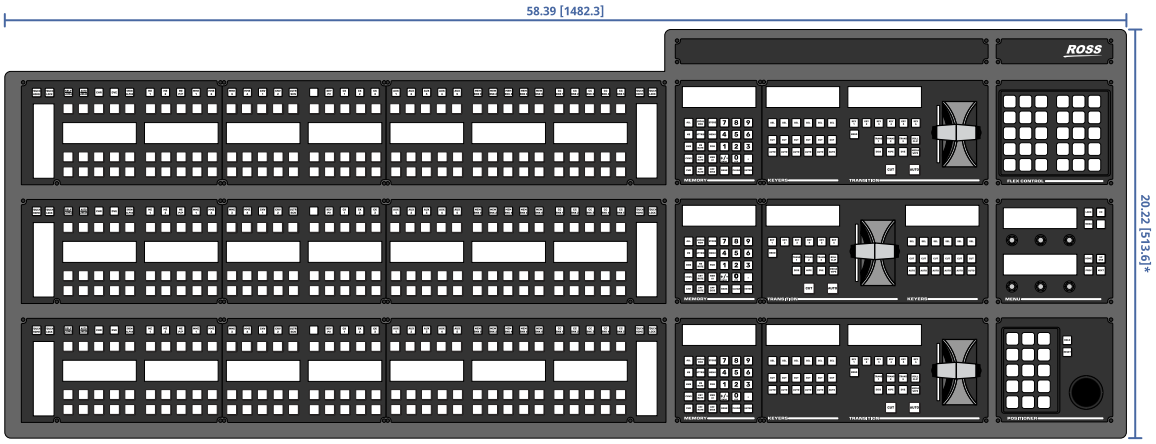
Note: ******* *Because the TouchDrive control panel is curved, the depth measurement is only approximate.*

TD3S



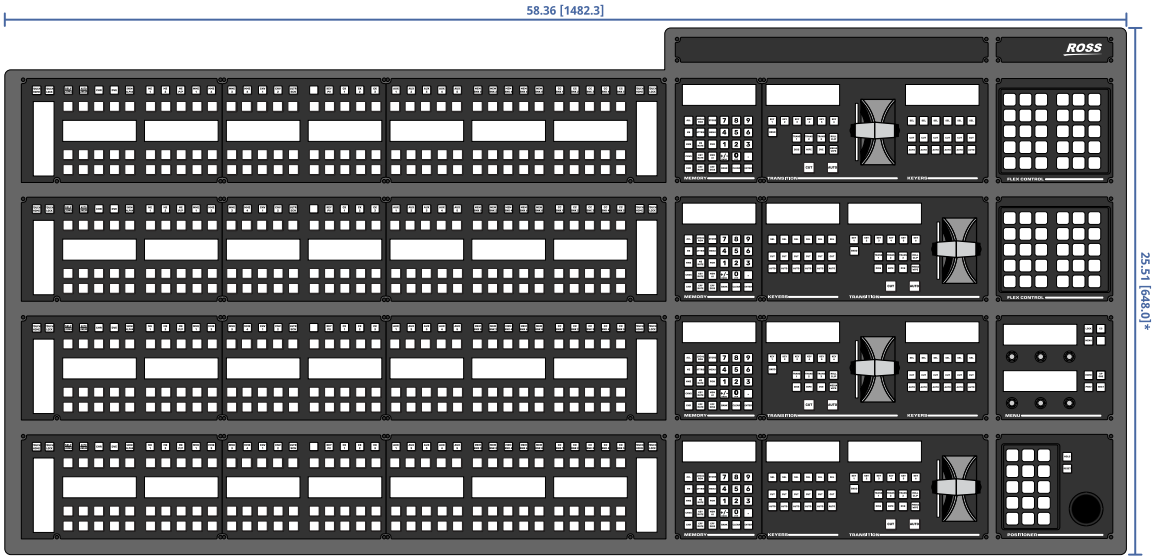
Note: ******* *Because the TouchDrive control panel is curved, the depth measurement is only approximate.*

TD3/TDx3



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

TD4/TDx4



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

TouchDrive Desk Cutouts

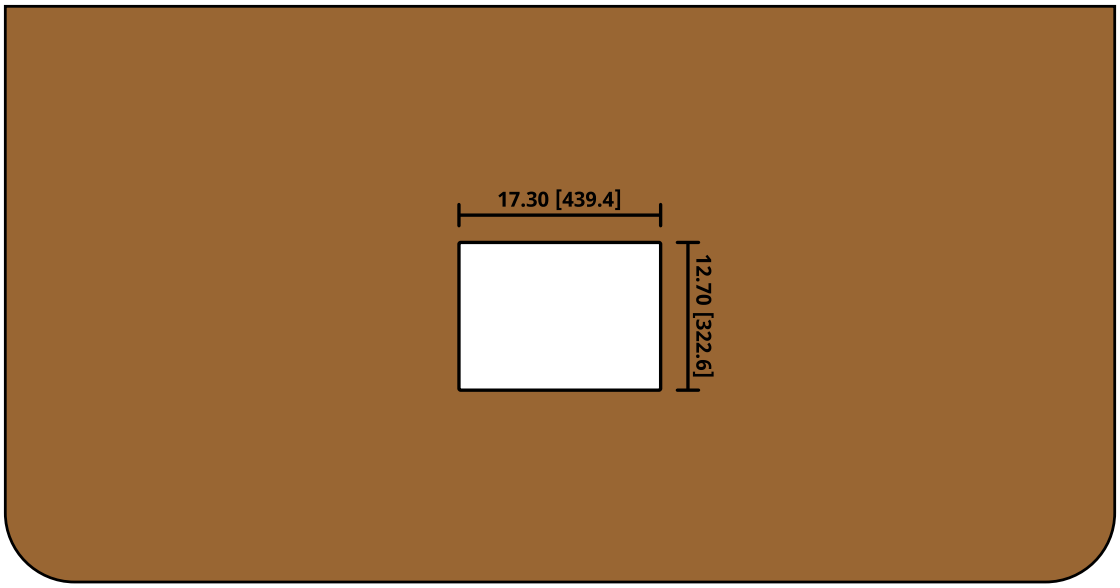
Important: *These dimensions are provided as a guide only. Scale DXF/CAD drawings of the control panels are available from the Ross Video website that should be used as a template for a desk cutout.*

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

Note: *The Desk Mounting option is required to properly secure the panel to a desk.*

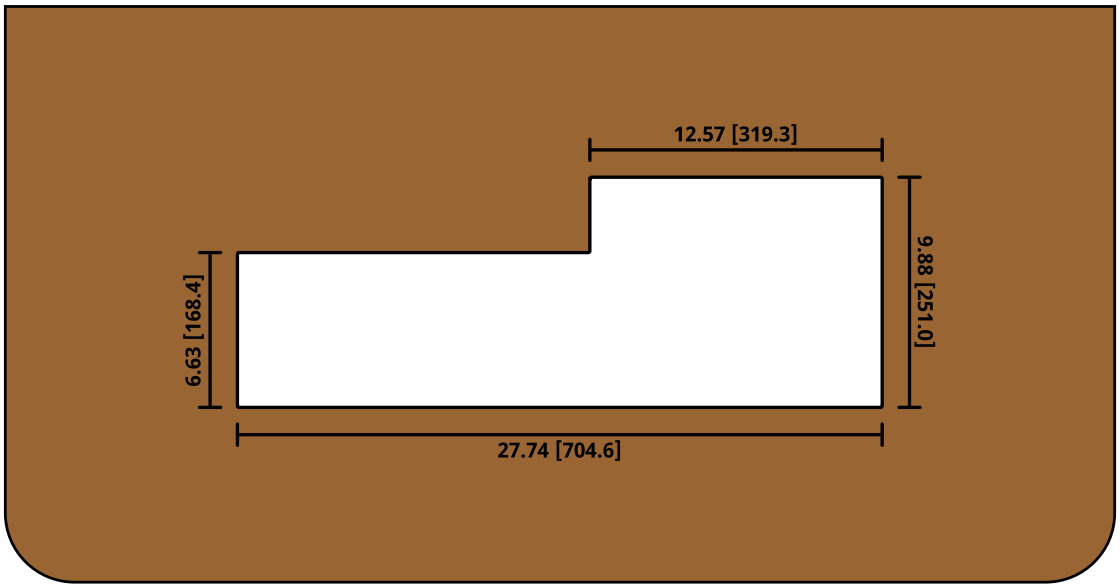
Note: *Remove the on-desk legs from the bottom of the control panel to mount it in a desk.*

TD1C



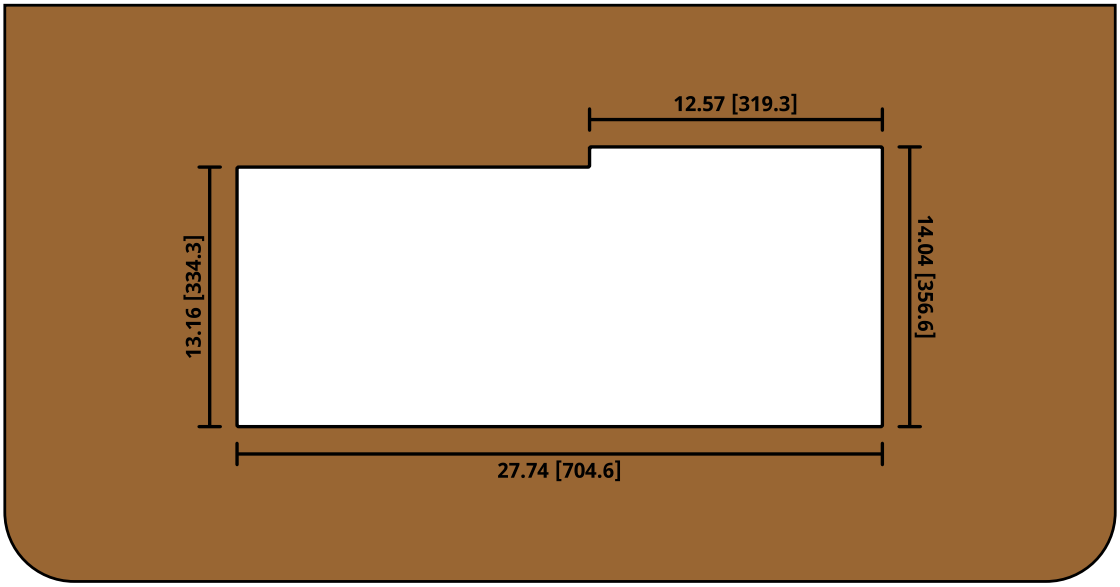
Note: *Remove the on-desk legs from the bottom of the control panel to mount it in a desk.*

TD1



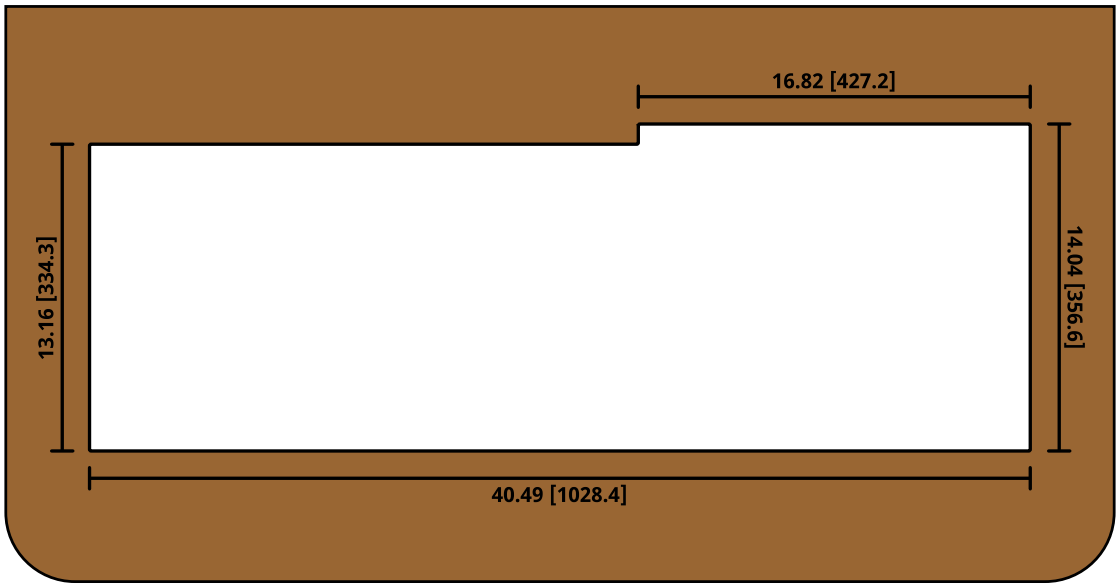
Note: *Remove the on-desk legs from the bottom of the control panel to mount it in a desk.*

TD2



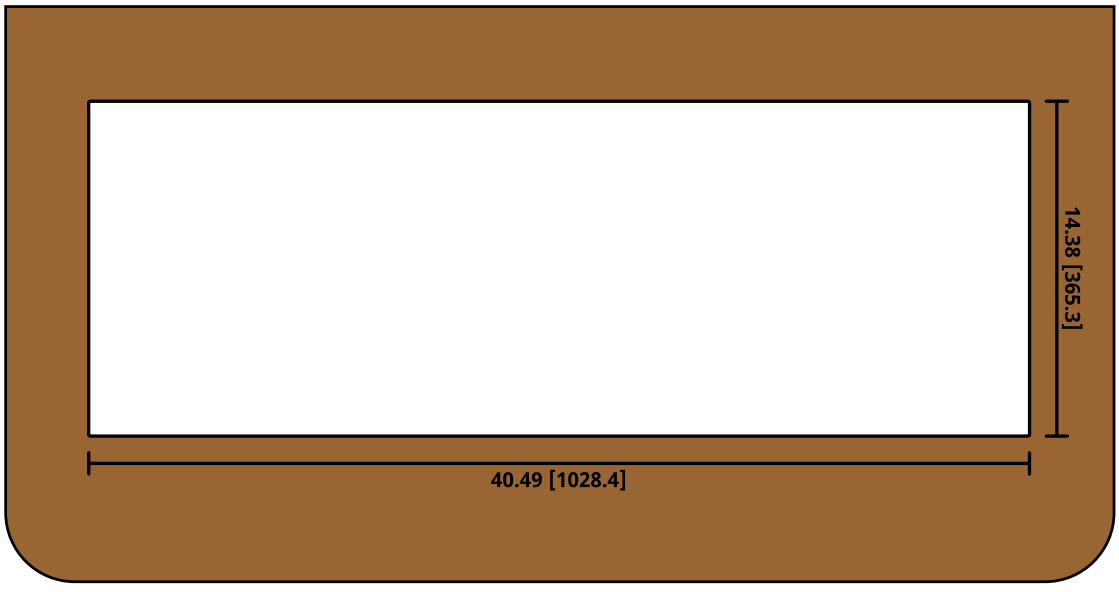
Note: *Remove the on-desk legs from the bottom of the control panel to mount it in a desk.*

TD2S



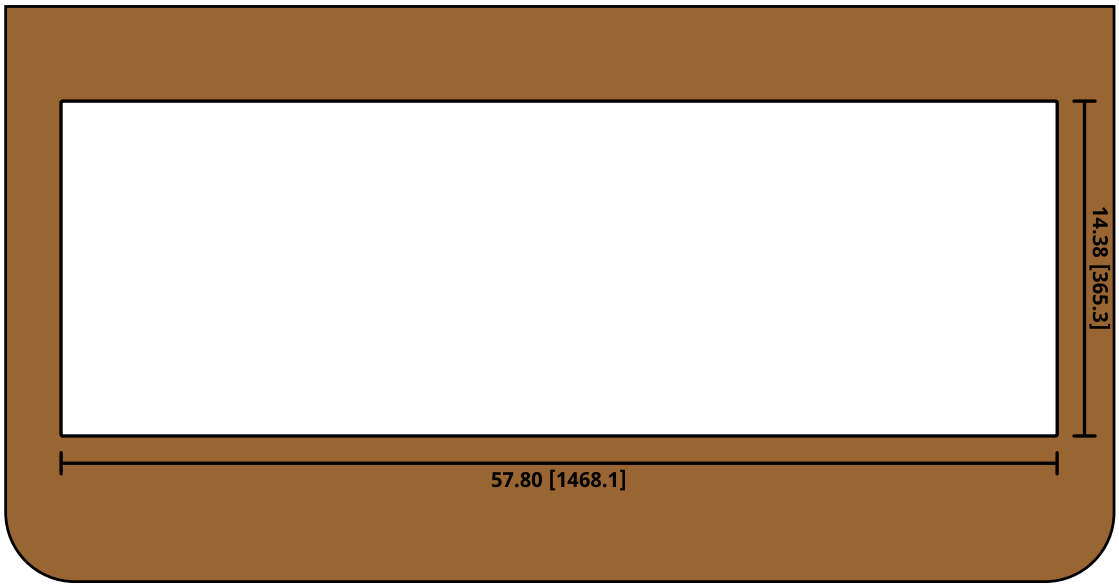
Note: *Remove the on-desk legs from the bottom of the control panel to mount it in a desk.*

TD3S



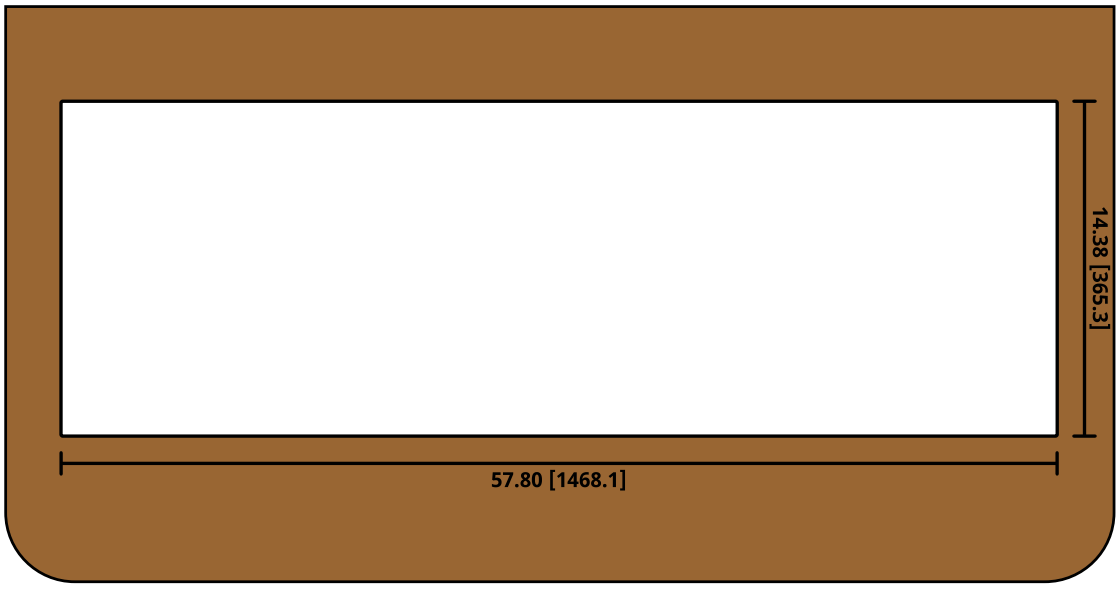
Note: *Remove the on-desk legs from the bottom of the control panel to mount it in a desk.*

TD3/TDx3



Note: *Remove the on-desk legs from the bottom of the control panel to mount it in a desk.*

TD4/TDx4



Note: *Remove the on-desk legs from the bottom of the control panel to mount it in a desk.*